PREVALENCE OF DEPRESSION, ANXIETY AND STRESS AMONG OBESE PATIENTS WITH CHRONIC MEDICAL ILLNESS IN KLINIK RAWATAN KELUARGA, HOSPITAL USM AND ITS ASSOCIATED FACTORS

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DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MEDICINE

(FAMILY MEDICINE)

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ABBREVIATION

AIDS- acquired immunodeficiency syndrome

BMI- body mass index

CI-confident interval

CPG- clinical practice guidelines

CRF-case report form

DASS-21- Depression , Anxiety, Stress Scale 21

DM- diabetes mellitus

HPA-hypothalamic-pituitary-adrenocortical axis

HUSM-Hospital University Sains Malaysia

HIV- human deficiency virus infection

IQR-inter quartile range

KRK-Klinik Rawatan Keluarga

OR-odd ratio

NAFLD- non-alcoholic fatty liver disease

NHMS- National Health and Morbidity Survey

MHI-monthly household income

ROC-receiver operating characteristic

SAM- sympathetic-adrenal-medullary

SD-standard deviation

SPSS-statistical package for social science

USM-Universiti Sains Malaysia

UPM- Universiti Putra Malaysia

WHO-World Health Organization

ABSTRACT

Title : Prevalence Of Depression, Anxiety And Stress Among Obese Patients With Chronic Medical Illness In Klinik Rawatan Keluarga , Hospital Universiti Sains Malaysia (HUSM) And Its Associated Factors

Introduction: Obesity and depression are two prevalent disorders that are costly to both individuals and society especially in patients with chronic medical illness. Depression usually co-exists with anxiety and stress. The aim of this study is to determine the prevalence and the factors associated with depression, anxiety and stress in obese patients with chronic medical illness attending Klinik Rawatan Keluarga.

Methods: The study was cross sectional in design and was carried out in HUSM. A total of 274 eligible consenting respondents participated in the study. The Depression, Anxiety and Stress Scale (DASS21) questionnaire was used for measurement of depression, anxiety and stress among the respondents. Data was analysed using the SPSS version 21 software using both descriptive and inferential statistics (single and multiple logistic regression).

Results: The prevalence of depression, anxiety and stress among obese patients with chronic medical illness were 13.9%, 23.4%, and 10.9% respectively. Using multiple logistic regression, age (p=0.003, OR: 0.96, 95%CI: 0.91,0.98), occupation (not working)(p=0.013 , OR:3.65 ,95% CI:1.32,10.09,) and current smoker (p=0.022, OR:3.18, 95% CI:1.18,8.55) were associated with depression. For anxiety, the associated factors were no formal education (p=0.011, OR:5.70, 95%CI: 1.49, 21.89,), BMI (p=0.029, OR:1.07, 95% CI:1.01,1.13) and family history of mental illness (p= 0.018, OR:5.10 ,95% CI: 1.33, 19.56). Stress was strongly associated with female gender (OR 5.06, 95% CI 1.70-15.13) and current smoking status (OR 6.49, 95% CI 2.03-20.70).

Conclusion: Prevalence of depression, anxiety and stress symptoms in obese patients with chronic medical illness were 13.9%, 23.4% and 10.9% respectively. The significant associated factors were age, not working, BMI, current smoker, no education, family history of mental illness and gender. Screening of obese patients with chronic illness for depression, anxiety and stress at primary care setting is recommended hence early intervention can be offered.

ABSTRAK

Tajuk: Prevalens Kemurungan, Anzieti Dan Stress Di Kalangan Pesakit Obese Dengan Penyakit Perubatan Kronik Di Klinik Rawatan Keluarga, Hospital Universiti Sains Malaysia Serta Faktor Berkaitan.

Pengenalan: Obesiti dan kemurungan adalah penyakit biasanya ada bersama anzieti dan stress. Obesiti dan kemurungan akan meningkatkan kos perubatan dan ekonomi. Kajian ini adalah untuk menentukan prevalens dan faktor-faktor berkaitan kemurungan, anxiety dan stress bagi pesakit obese dengan penyakit kronik yang datang ke Klinik Rawatan Keluarga, Hospital Universiti Sains Malaysia .

Metodologi: Kajian ini adalah kajian keratan rentas (cross sectional) yang dijalankan di Klinik Rawatan Keluarga, Hospital Universiti Sains Malaysia. Sebanyak 274 peserta kajian yang layak menyertai kajian ini. Set soalan dari DASS-21 digunakan dalam kajian untuk menguji kemurungan, anzieti dan stress. Data dianalisa menggunakan SPSS versi 21.

Keputusan kajian: Prevalens kemurungan, anzieti dan stress masing-masing adalah 13.9%, 23.4% dan 10.9%. Dengan menggunakan `multiple logistic regression`, didapati umur, pekerjaan dan merokok adalah faktor berkaitan dengan kemurungan manakala untuk anziety, ia berkait dengan tidak berpendidikan, BMI dan sejarah keluarga penyakit mental. Stress pula berkait rapat dengan perempuan dan merokok.

Kesimpulan: Prevalens kemurungan, anzieti dan stress adalah 13.9%, 23.4% dan 10.9% masing-masing di kalangan pesakit obese dengan penyakit kronik dengan. Saringan kemurungan, anzieti dan stress adalah disarankan untuk dilakukan di kalangan pesakit kronik dengan obesity.

CHAPTER ONE

INTRODUCTION AND LITERATURE REVIEWS

1.1 Overview

Obesity and depression are two prevalent disorders that are costly both medically and economically to individuals and society (1). Obesity is known to have significant association with other major illnesses. One of the meta-analytic review concluded that there is a consistent relationship between obesity and depression(1). Depression is prevalent in patients with chronic medical illness and at the same time will amplify the physical symptoms. Later on, depression will cause more impairment in their daily function and will decrease the adherence to the prescribed regimens(1). Depression itself usually occurs together with anxiety and stress. Many studies showed link between depression and obesity (2-5), as well as biochemical changes in our body secondary to stress that will lead to increase in body weight (6, 7). Prospective data from Alameda County Study found that obesity had increased risk for depression(8).

Obesity on the other hand is prevalent in patients with chronic illness. In one study assessing depression in type 2 diabetes mellitus, almost half(48.9%) of the patients had BMI of more than 30kg/m^2 and 12% of the patient actually suffered from major depression(9). One in 7 people will suffer psychological impairment from depression, however many will not be diagnosed despite of multiple visits to health facilities(10). The higher co-incidence of depression with other medical illness warrants it to be recognized by all health professionals thus early treatment can be initiated(10). In general population, the average age for the onset of depression varies between 24-35 years. There is currently a rising trend in incidence of depression in younger age group(10).

1.2 Problem Statement

Obesity is on the rise in most parts of the world, Malaysia included. From the latest National Health and Morbidity Survey 2011, almost one third of Malaysians are obese (11). It is becoming a threat to public health locally and globally as it has a significant association with other major illnesses. It is associated with 5 out of 10 leading causes of morbidity and death like diabetes mellitus, heart problem, cancer, chronic back pain, cerebrovascular accident and hypertension (12).

There are many groups studying the relationship between depression and obesity. As depression, anxiety and stress will eventually affect the prognosis of patients with chronic illnesses, it is important to screen and identify this group hence any action could be done earlier.

The study was designed and carried out among obese patients with underlying chronic illness in Klinik Rawatan Keluarga (KRK) in Hospital Universiti Sains Malaysia. The objectives are to look for prevalence of depression, anxiety and stress and factors associated with them. This study could serve as a baseline data and provide further insight into planning and developing strategies for health education purposes.

1.3 Literature review

Obesity and depression are two prevalent disorders that are costly both medically and economically to individuals and to the society as well (1, 13). Anxiety also is very prevalent and always co-morbid with depression (14, 15). In 2005, the life prevalence for any anxiety disorder in Unites States was almost 30% and further increased to 40% in 2012 (15, 16). It is associated with high economic cost in which half of the cost are indirectly due to loss of productivity and the rest are from medications(15). Stress is the body`s way of responding to

any demand or threat when the body is unable to cope with it. Stress will progress into depression if it is not well detected and managed (17).

1.3.1 Depression

Depression is a broad term, ranges from mild sadness to melancholia, the deepest form of depression. It is characterized by loss of interest, sadness, low spirits, inability to feel joy, changes in appetite, sleep problem and fatigue, low self-esteem, poor concentration and at its worst; suicidal ideas. More than 800,000 people died each year because of suicide(18). Half of the patients with first episode of depression will experience prodromal period with significant depressive symptoms. These symptoms can be present before the patient is diagnosed for weeks to years together with anxiety symptoms and other mild depressive symptoms. Family history of depression always plays a role since it has a strong indicator for the development of depression and with long recovery time(19).

Depression in major depressive disorder can be chronic and relapsing(20). Many depressed patients remain chronically ill with various levels of symptoms. Depression, if not handled or treated properly will become chronic, recurrent and would later on causing impairment in patient`s life. There are many prognostic indicators that influence the recovery rate and relapse probability in depressed individuals such as severe depressive episode, episode of depression more than 6 months, presence of co-morbid illness, psychotic features, early age of onset, alcohol or drug abuse, history of prior psychiatric illness, poor social support, poor family functioning, low family income and low level of functioning for 5 years prior to illness(10). About two-third of patients with depression has criteria for other psychiatric disorders like anxiety disorder, substance abuse, alcohol abuse and personality disorder(21).

Depression is closely related to other medical illnesses. Many medical conditions has been associated with high risk of developing depression, like diabetes, HIV, chronic pain,

Parkinson`s disease, cardiovascular disease, cerebrovascular and multiple sclerosis(1). Depressive patient with other physical disorder like myocardial infarction is associated with higher morbidity and mortality and its successful diagnosis and treatment have shown to improve medical condition(21) Results from meta-analysis showed that depression is an independent risk factor and can increase up to 30% the risk of getting coronary heart disease and myocardial infarction (22) compared to those who do not have depression. Depressive symptoms will predict functional decline over 5 years in adults with stable coronary heart disease (23). The functional status of patient with coronary heart disease would be much improved along with the improvement of the depressive symptoms(24).

In view of economic impact, depression is very costly, both direct and indirectly. Direct cost comes from the treatment and physician consultation time and indirect cost comes from poor productivity as a result of depression leading to increased in morbidity and mortality(14). However less than half of affected patients received treatment throughout the world(18). WHO recognized a few reasons for ineffective care including a lack of resources, lack of trained medical staff, and stigma that is linked with mental disorders. Another barrier to successful care is incorrect assessment. Some patients who were having depression were not correctly diagnosed and some were over treated(18).

Prevalence of depression in general population

Depression is very common and it was estimated that the lifetime risk for experiencing depression is about 15%(10). It is estimated about 350 million people were affected by depression(18) . A review article was done by Firdaus and Tian in 2011 regarding the prevalence of depression in Malaysia. They noted that prevalence of depression in Malaysia varied from 3.9% to 46% based on 3 major categories of patients. The categories were

clinical group of patients, general community patients and primary care patients(25). The authors however were cautious regarding the different interpretations when describing depression in those studies. Some of the studies were using symptoms while others used lifetime depression or current depression. On the other hand, different scales were used and the populations were also different(25). In a primary care setting, the prevalence of depression is 5-10% and may rank second by the year 2020 as the cause for disability worldwide(21).

1.3.2 Anxiety

Anxiety is a normal response towards challenging or threatening situation and the most common psychological reaction to stress and frustration in daily life. Anxiety feelings will prompt physical response when someone feels threatened. The symptoms of anxiety are palpitations, sweating, trembling, feelings of fear and panic and if the symptoms become continuous, severe and persistent, it can cause impairment in daily activity, social and occupational functioning(21). These symptoms are commonly found in primary care. Patients with anxiety disorder are always co-morbid with depressive symptoms or other anxiety problem like agoraphobia, hypochondriacal ideas and obsession. They usually have social difficulties that finally would affect the quality of life(26). Anxiety disorders may also exert similar adverse effects as depression. Researchers found that anxiety disorder generally preceded depressive disorders up to eleven years(27) and therefore it is not surprising to see that both diseases were occurred together. Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-V) classifies anxiety disorders into several categories, which are panic disorder, specific phobias, social phobia, agoraphobia, generalized anxiety disorder, separation anxiety and specific mutism(28).

Prevalence of anxiety in general population

A lifetime prevalence for anxiety disorder among adult American is almost 29%(27) with the age of onset at 11 years old(27). In Malaysia there are a few studies done on prevalence of anxiety with anxiety prevalence ranging from 7.8% to 12.9% (29-31). One study assessing prevalence of anxiety among women in primary care setting noted prevalence of anxiety was 7.8% with the main predictors were women being humiliated by husbands and afraid of their husbands (30). The higher prevalence of anxiety was seen from a study done at rural community in East Coast Malaysia with the prevalence of 12.9%(29). In this study, woman gender and education level more than PMR were associated with more anxiety symptoms. Another study was done in one of the states considered as urban which is in Selangor. In this study, the prevalence of anxiety was 8.2% and the identified predictors were cancer, serious problem at work, unhappy relationship with family, domestic violence and high perceived stress(31).

1.3.3 Stress

Stress is defined as a state of tension that occurs when there were so many needs in the environment. It is also a process of adaptation in response to a physical or psychological challenge. It is a condition in which the level of adrenergic arousal is high. Stress can be chronic or acute, resulting in a range of unpleasant psychological, physical and behavioral problems. There are so many factors that make people vulnerable to stress, for example less eating, poor sleeping pattern, lack of exercise, physical illness and social isolation(32). People with stressful life events were closely linked to develop depression vice versa (33).

Prevalence of stress in general population

An online survey was done in America to look for stress in 2011. In this survey there was a major concern regarding stress in several groups of people; the caregivers and those with chronic illnesses. Caregivers in the survey were those who are taking care of the aging or chronically ill family members. Chronically ill adults were those with at least one of the following conditions which was depression, type 2 diabetes, obesity and heart disease(34). The result showed that the stress was critical in those who were 50 years and more, caregivers and those with obesity and/or depression. When assessing obese adult with stress, they reported poor habit resulting from stress; with 51% admitted that they have eaten too much or unhealthy meals in relation to stress. In addition, 33% or one-third mentioned about taking foods to manage stress(34).

There were several studies done in Malaysia to look for prevalence of stress. One of the studies looking for stress among pre-clinical medical students in Universiti Putra Malaysia (UPM) noted a prevalence of 16.9%(35). Among diabetes mellitus patients, the prevalence in one study was 12.5%(36).

Stress is known to have linked with all leading physical causes of deaths such as heart disease, cancer and stroke(37). Early recognition and early management is important to every health personnel because in one study, it was noted that in primary health care setting only 3% of the visits included stress management counseling by the primary care specialist(38). Psychological stress is known to be associated with many diseases including cardiovascular illness, human deficiency virus infection and acquired immunodeficiency syndrome /(HIV/ AIDS as well as depression(37). There are two endocrine pathways that are very important as a response to a psychological stress which is hypothalamic-pituitary-adrenocortical axis (HPA) and the sympathetic-adrenal-medullary (SAM) systems (37). It is closely related with

the cortisol hormone, the primary effector of HPA activation that later on will regulate the physiological process such as anti-inflammatory responses, gluconeogenesis and metabolism of fats, protein and carbohydrates(37).

1.3.4 Obesity

Obesity is an abnormal fat deposition which is excessive in the body. Generally men with more than 25% body fat and women with more than 35% body fat are considered obese(39). Obesity is multifactorial and is associated with many chronic illnesses. Obesity is often defined in terms of body mass index (BMI). BMI is defined as a person`s weight in kg divided by the square of his height by meters ($kg/m^2$). World Health Organization (WHO)`s definition for obese is when the BMI is greater or equal to $30kg/m^2$, however, Malaysia uses a different scale to define obesity. According to Malaysia's Clinical Practice Guidelines on management of Obesity 2004, obese is defined as BMI more or equal to $27.5kg/m^2$. The WHO professional consultations reported that the universal body mass index (BMI) criterion that were developed by WHO was not appropriate for Asian populations because the different associations between BMI, percentage of body fat and health risk from European populations(39). The risk of obesity related diseases among Asian were increased from a lower BMI of $23kg/m^2$ (40). It is shown that Asian people start to have diabetes at younger age and at relatively lower BMI compared to the Westerners (41, 42).

Prevalence of obesity in general population

The prevalence of obesity is currently increasing throughout the world, so does in Malaysia. From 2008, WHO reported that it was estimated that more than 1.4 billion adults more than 20 years of age were overweight. Out of these overweight adults, over 200 million men and 300 million women all over the world were obese. The prevalence of obesity among adults aged 20 years or older in USA based on the National Health and Nutrition Examination

Survey 2011-2012 was 34.9%(43). In Malaysia, the prevalence of obesity is in increasing trend. During National and Morbidity Survey (NHMS) IV in 2011, the prevalence of obese adult more than 18 years of age was 27.2% or 4.4 million(11) with BMI of more or equal to 27.5kg/m^2(39). Latest NHMS 2015 showed that the prevalence of obesity was further increased to 30.6 %(44). During NHMS III in 2006, the prevalence of obesity in adults was 14.0% (45), however the cut off point for BMI for obese during the survey was >30.0 kg/m2. Even with the different BMI used to define obesity from these two surveys, it showed the increment of obesity in Malaysia. A study done in 1962 noted that obesity was more in women with lower economic status compared to men(46).

Obesity and its relation with medical illness

Obesity has a very strong association with other major illnesses. It is associated with many non-communicable diseases like diabetes mellitus, cardiovascular disease; mainly heart disease and stroke, musculoskeletal like osteoarthritis and some cancers(39, 47). The risk is increased with the increased BMI(48, 49). Other than that, obesity is highly associated with dyslipidaemia, metabolic syndrome and sleep apnea(47). Other illnesses that are associated with obesity are cardiac failure, left ventricular hypertrophy, hypertension, hyperuricaemia and gout(39). Obesity is the main predictor for fatty liver and fatty liver is known as one of the causes for non-alcoholic fatty liver disease (NAFLD)(50).

Obese class III patient with BMI of 40-59kg/m^2 was known to be associated with increased rate of mortality and major reduction in life expectancy if compared to normal weight (51). Most of the excess deaths were due to cancer, diabetes and heart disease.

Associated factors for obesity

Obesity is associated with many factors. One local study in Selangor was done to look for prevalence of obesity and its associated factors among adult women. From this study, they found that the obesity in women was strongly associated with increasing age, Indian ethnicity, not attending school, no formal education, being married and also those who suffered miscarriage in the past 6 months. In this study, the prevalence of depression in obese women was 10% but was not statistically significant (52).

1.3.5 Depression, anxiety and stress in obese

Earlier , a clinical review found that obesity and mental disorder was closely linked as they shared similar pathophysiological pathway(53). Mental disorder especially mood disorder and obesity are multisystem syndrome and is known for its dysregulation in the metabolic, endocrine and inflammatory system(53). People with common mental disorder such as depression and anxiety are particularly at risk of gaining weight, hence become obese(54). Another meta analysis concluded that there was a consistent relation between obesity and depression(1). Another found that obese patients with chronic conditions are more likely to be predominantly exposed to suffer psychological distress(55). There are many articles linking depression, anxiety and/or stress with obesity. One of it is a study done in 12,992 participants in New Zealand(56). In this study, they were looking for any association between mental disorders with obesity. They found that obesity was significantly associated with major depression disorder (OR:1.27), anxiety disorder (OR:1.46) and post-traumatic stress disorder with OR of 2.64.

A review done looking for any association between anxiety and obese by Lykoras et al (57) in 2011. They concluded from the review that, there was association between anxiety and

obesity, however it may not be straightforward and need further studies to explain the association.

Another study in was done to look for association between obesity and stress(58). This study involved 112,716 Canadians aged 18years and more. From this study, they found that lifetime stress was associated with an increased risk of obesity especially in women (OR 1.44). Obesity and metabolic syndrome also have close relationship with stress. Stress is influencing obesity by both psychological and physiological mechanisms(3). Individual who eat in response to stress was shown to have an increased preference for high fat and/or sweet food, in which may lead to increased in body weight(59).

Psychological stress is known as one of the risk factors for cardiovascular disease. One study assessing a cohort of chronic patients in Mexico found that chronic stress was an independent risk factor for obesity in men and carotid atherosclerosis in women (7). This finding was in line with the previous study which stated that ischaemic(60) stroke was independently associated with self-perceived stress(60).

The link between type 2 diabetes mellitus, obesity and depression was discovered in both men and women from one study done in Sweden(61). This study found that obese men with type 2 diabetes mellitus were more emotionally unstable compared to men with diabetes but have normal weight. In addition, stress and mental disorder are also associated with eating disorder which later on will influence future change in weight (54).

One study mentioned about the close relationship between obesity with major depression, suicidal ideation and suicidal attempts(2). In this study, the probability of having major depression in obese patient was 37%. With an increase of 10 unit BMI in female participants of the study, the risk for past year suicidal ideas or attempts increased by 22%(2).

1.4 Justification of study

Overall prevalence figures of depression amongst patients in primary care, clinical settings, and in the general community in Malaysia were ranging from 6.7% to 14.4% as stated in one review done by Mukhtar et al(25) regarding the studies on prevalence in Malaysia. Yet, there was no study done regarding epidemiological estimations on the prevalence of depression, anxiety and stress among obese patients.

Mukthtar et al (25)reported that the assessment of prevalence of depression among clinical setting so far were among headache patients(62) ,breast cancer patients(63), postnatal women and post –stroke patients (25). For general population groups, the groups that had been studied on the prevalence were elderly group and women. The high prevalence rate of depression in Malaysia indicates that a serious attention should be given to depressive symptoms, since their severity possibly will contribute to a decline in the quality of productivity and an increased morbidity and mortality of the individual. It will also affect the society and the nation eventually (25). Because the significant mortality and morbidity linked to mood disorder and obesity, one clinical review suggested that all clinicians should screen all obese patient for any depressive symptoms(53). The screening is more significant and important in those who are high in risk; as in obese type 2 diabetes mellitus patients and those with abnormal inflammatory signal such as patients with cardiovascular disease.

Meanwhile, there were lacks of study assessing prevalence of anxiety and stress in our country. Anxiety and stress if not detected early will in due course become worsened without treatment and usually is co-morbidly present with other psychiatric illness such as depression and anxiety(21). Besides, mood disorders have been associated with poor treatment outcome and diminished compliance for other health related conditions.

Obesity, on the other hand, has becoming one of the major threatening conditions. As the prevalence of obesity is currently increasing, an estimation of the prevalence of depression in obese patients could be the baseline plan for further management of this group especially in primary care. Therefore, the relationship of depression with obesity and the prevalent of this relationship may be an appropriate concern in public health and clinical efforts to tackle the problem. It is very important for any medical provider to recognize and identify depression, anxiety and stress especially in obese patients with chronic medical illnesses and to anticipate future problem thus a thorough treatment can be given(64).

1.5 Conceptual framework

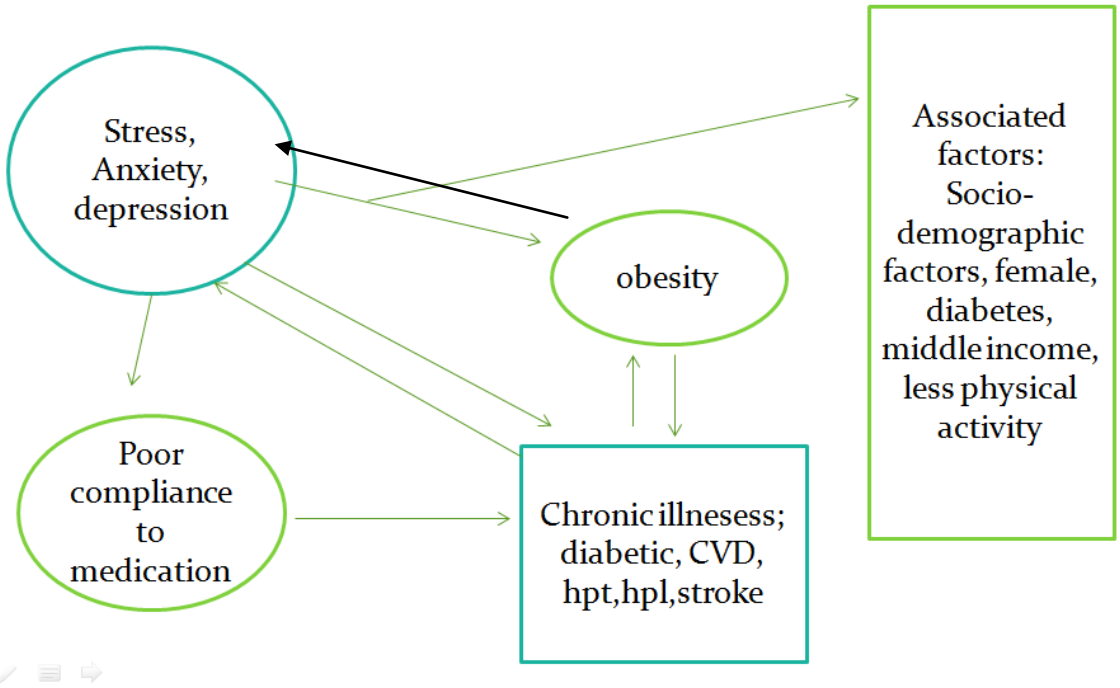

Figure 1: conceptual framework

CHAPTER TWO

OBJECTIVES AND RESEARCH HYPOTHESIS

2.1 General objective

To study the prevalence and associated factors of depression, anxiety and stress among obese patients with chronic illnesses attending Klinik Rawatan Keluarga , Hospital USM.

2.2 Specific objectives

1. To determine the prevalence of depression, anxiety and stress among obese patients with chronic medical illness attending Klinik Rawatan Keluarga in Hospital USM.

2. To determine the associated factors of depression, anxiety and stress in obese patients with chronic medical illnesses attending Klinik Rawatan Keluarga in Hospital USM.

2.3 Hypothesis

1. Depression, anxiety and stress are high in obese patients with chronic medical illness attending Klinik Rawatan Keluarga in Hospital USM.

2. Sociodemographic backgrounds, smoking, physical inactivity and history of family with mental illness are significantly associated with depression, anxiety and stress in obese patients with chronic medical illness.

2.4 Definition of operational terms

1. **Obesity** is defined as people with BMI of 27.5 kg/m^2 (39).
2. **Depression** is defined as when the result from DASS-21 score is more than 9(65).
3. **Anxiety** is defined as when the result from DASS-21 score is more than 7 (65).
4. **Stress** is defined as when the result from DASS-21 score is more than 14 (65).
5. **Chronic medical illness** means patients with any of these diseases: hypertension, hyperlipidaemia, stroke, diabetes mellitus and cardiovascular disease (66, 67). Patient would give self report on the disease that later on would be confirmed with the information from the medical report that she or he had been diagnosed with the illness.
6. **Smoking activity**- smoking defines as someone who was actively smoking at least one day in the last 30 days. Non- smoker means those who never smokes and former smoker is someone who successfully quit smoking at least 6 months(68)
7. **Physical inactivity** means no reported activity; or any physical activity or activities done less than 20 minutes or less than three times per week(69, 70) with no participation in walking, moderate-intensity or vigorous-intensity activity during the previous week. Moderate intensity activities are activities such as brisk walking, cycling, swimming, home repair, and yard work with an accumulated duration of at least 30 minutes or more a day at least 5 days a week (70, 71). Vigorous activities cause large increase in heart rate and breathing done at least 20 minutes at least 3 days a week.(70). Example of vigorous activities are sports or heavy home labour(71).
8. **Family history of mental illness** means someone with first degree relative with mental illness diagnosed by health personnel. Mental illness means any mental, behavioral, or emotional disorder (excluding substance use disorders or developmental disorder) which is diagnosable currently or within the past year and

with sufficient duration to meet diagnostic criteria specified within the 4th edition of Diagnostic and Statistic Manual of Mental Disorder (DSM-IV) (72).

9. **Income** is the monthly household income (MHI), and it was calculated as the total monthly income of the respondent and other members in the household. Income was not initially categorized but was later on grouped into two categories which were less than RM 830 and more than RM 830. Below poverty means MHI of less than RM 830 and non-poverty means MHI of more than RM 830. The classification was based on the poverty line incomes of RM830 in Peninsular Malaysia in 2012 as reported in Labour and Work Statistic 2015 by Ministry of Human Resource (73).
10. **Tertiary education** means any formal education after secondary school(74) and non tertiary means any formal education other than tertiary education.
11. **Pensioner** means anybody who retired and received pension(75).

CHAPTER THREE

METHODOLOGY

3.1 Study design

A cross sectional study conducted from February 2015 to December 2015.

3.2 Study location

The study was conducted at Klinik Rawatan Keluarga (KRK) in Hospital USM. Hospital USM is considered as a tertiary hospital where it also received referrals from health clinics. KRK is an outpatient clinic that provides primary care services for population in Kelantan. The services provided included screening, prevention programmes, management of chronic and acute diseases and expanded scope such as mens` health clinic, women`s health clinic and quit smoking. Apart from that it provides a continuation care for those who were discharged from ward and from other specialist clinic in Hospital USM or other hospitals.

3.3 Study population and sample

3.3.1 Reference population

All obese patients with chronic medical illness in Kota Bharu, Kelantan.

3.3.2 Source population

All obese patients with chronic medical illness attending KRK, Hospital USM.

3.3.3 Study population

All obese patients with chronic medical illnesses attending KRK, Hospital USM from February 2015 to December 2015 that fulfilled the inclusion and exclusion criteria.

Inclusion criteria

1. All the outpatients with chronic medical illness: hypertension, diabetes mellitus, stroke, ischemic heart disease or hyperlipidaemia that have BMI ≥ 27.5kg/m2
2. Ages 18 years and above at the time of sampling
3. Understand Malay and able to read

Exclusion criteria

1. Currently pregnant
2. Less than 6 weeks postpartum
3. Subject who is illiterate
4. Patient with known psychiatric illness in the past (verified by medical record).

3.3.4 Sampling method

A systematic random sampling in the ratio of 1:2 based on attendance list at KRK, Hospital USM was applied. Patients were screened by the help of staff nurses at the registration counter. My assistant and I would review every folder and would look at the weight and height as written in the folder. Every obese patient with BMI of 27.5 was screened for inclusion and exclusion criteria. Every second suitable patient was then approached for written consent and was explained regarding the purpose of study. Every consented patient

then would be brought to another room for another anthropometric measurement, socio-demographic interview and to fill in DASS-21 questionnaire.

3.3.5 Sample size calculations

Objective 1 was to determine the prevalence of depression among obese patients with chronic medical illnesses attending KRK in Hospital USM. The sample size was calculated by using a single proportion formula:

$$n = \left\{\frac{Z\alpha}{\Delta}\right\}^2 P\,(1-P)$$

n= minimum required sample

The parameters were as follows:-

z = 1.96,

Δ = 0.05 (precision – this can be adjusted if the sample size calculated is too big and not feasible to be carried out)

p = percentage of prevalence of depression among obesity in a study was 15.5%(76)

$n = (1.96/0.05)^2 \times p(1-p)$,

n = 202

The minimal sample size was 202 and after considering 20% drop out, the calculated sample size was 242

n = 202 + 20% drop out

n = 242

Objective 1 was to determine the prevalence of anxiety among obese patients with chronic medical illness attending KRK in Hospital USM. The sample size was calculated by using single proportion calculation

$$n = \left\{\frac{Z\alpha}{\Delta}\right\}^2 P\,(1-P)$$

P = prevalence of anxiety among obese type 2 diabetic patients in Sweden was 16.1% (61)

n=sample size is 207 + 20% drop rate

n= 248

Objective 1 was to determine the prevalence of stress among obese patient with chronic medical illness attending KRK in Hospital USM. The sample size was calculated by using single proportion formula.

$$n = \left\{\frac{Z\alpha}{\Delta}\right\}^2 P\,(1-P)$$

n = minimum required sample

$z\alpha$ = value of normal standard distribution was 1.96

Δ = detectable difference was 0.05

P= prevalence of stress among obese patients in Canada was 19.1% (58)

The minimum sample size is 238 and after considering 20% non response rate, the sample size calculated is 284

Objective 2 : To determine the associated factors for depression, anxiety and stress among obese patients with chronic medical illness attending KRK in HUSM.

Sample size was calculated by comparing two proportions for categorical variables and by comparing two means for numerical variables using power and sample size calculation software.

α= level of significant = 0.05

Power of the study = 80%

P_0 = obese female among general population (not depressed)=14.7% (77)

P_1 = obese female with depression=25.9% (5)

M = The ratio of good and poor outcome = 1

Sample size = 210 + 20 % drop rate= 252

Other sample size calculation-Appendix V

Hence, the largest sample size calculated was from objective 1 (n = 284) which was used as the study sample size.

3.4. Research Tool

The data collection was done by using:

1. Case Report Form (CRF)
2. Anthropometric measurements

3.4.1 Case report form (CRF)

The CRF has two parts:

i. Part I: consist of socio-demographic, marital, race, education level, employment, monthly income, health status (Appendix IIa).

ii. Part II: self administered of the Malay version of depression, anxiety and stress scale (DASS); DASS-21. The validated Malay or Bahasa Malaysia version will be used for this study (78) (Appendix IIb)

Depression, anxiety and stress scale (DASS) - DASS-21:

The Depression, Anxiety and Stress Test (DASS) is a questionnaire designed to measure the three related negative emotional states of depression, anxiety and stress. The test uses a three scale rating system to measure the severity of a range of symptoms related to depression, anxiety and stress. In effect the test is a Depression Test, Anxiety Test, and Stress Test all in a single test. The original version of DASS is 42 item. The full DASS-42 gives more reliable scores and more information regarding specific symptoms, however DASS-21 has more advantage in term of time spend as taking only half of the time to administer. DASS-21 is a modified and shorter version of DASS-42(79). It only takes 5-10 minutes to finish the questionnaires. DASS-21 is chosen because it has ability to screen all three symptoms; depression, anxiety and stress in a short duration of time in one occasion.

There are several published studies showing that the DASS-21 has the same factor structures and gives similar results to the full DASS-42(80). DASS is not a diagnostic questionnaire but rather as a severity measurement (78), therefore if the participant is suggestive to have

depression, anxiety or stress, further action should be done to confirm the diagnosis and to refer if necessary. DASS has been translated to many languages including Malay version(81) by Ramli et al in 2007.

The cut-off values used by DASS-21 (79) to measure the severity of depression, anxiety and stress vary from one subscale to another. The `Depression` subscale assesses hopelessness, devaluation of life, lost-of interest, anhedonia and self –deprecation. The `Anxiety` subscale includes autonomic stimulation (sweating, palpitations, trembling, and dry mouth) plus feelings of apprehension and panic whereas the `Stress` subscale includes inability to relax, intolerance, irritability and frustration. It has 21 questions in which for depression the questions are from number 3,5,10,13,16,17 and 21. For anxiety, the questions are number 2,4,7,9,15,19,20 and for stress the questions are from number 1, 6,8,11,12,14, 18.

Internal consistency reliability coefficient for DASS-21 depression, anxiety, stress subscale and full scale were found to be high with Cronbach`s alpha of 0.88 for depression, 0.82 for anxiety and 0.90 for stress and 0.93 for total score(80). For Validated Malay version, the Cronbach`s alpha were 0.84, 0.74.,0.79 for depression, anxiety and stress respectively(81).

Participants were asked to rate their experience on each symptom over the past week based on 4-point severity scale. The scale was ranging from 0 (does not apply to me) up to 3 (applies to me most or all the time). Scores for each scale would be summed up later on and further categorized to normal, mild, moderate, severe, extremely severe based on DASS manual(65).

When using the DASS-21, the obtained scale scores would be multiplied by 2 (65), so that results can be compared to the DASS normative data and to other published DASS data. From DASS-21, we can classify the severity of each symptom based on the scores (Table 1), however in this study, respondents who scored more than normal value would be classified accordingly and were not further classified based on severity.

Table 1: DASS-21 table classification (scores after multiplied by 2)-

	Depression	Anxiety	Stress
Normal	0 – 9	0 - 7	0 – 14
Mild	10 – 13	8 – 9	15 – 18
Moderate	14 – 20	10 – 14	19 – 25
Severe	21 – 27	15 – 19	26 – 33
Extremely Severe	28+	20+	34 +

3.4.2 Anthropometric measurement:

Height and weight of the participants will be measured twice by using calibrated Seca scale, with participants wearing light-weight clothing without shoes after they consented to participate (to confirm). Height to the nearest centimeter was measured by stable stadiometer (Seca).BMI is calculated as weight in kg divided by the square of height in meter (kg/m^2). BMI was classified according to Malaysia guidelines on Management of Obesity 2004(39).

3.5 Data collection procedures

Questionnaires preparation started before getting approval from Human Research Ethics committee of USM. Data collection was started in February 2015 after getting the approval in January 2015 till December 2015. Socio-demographic and other information were collected with the helped of one trained interviewer via face-to-face interview. Depression, anxiety and

stress symptoms were measured using a self-administered short version of the Depression, Anxiety and Stress Scale (DASS); DASS-21.

All eligible participants were identified and selected during their visit to KRK for various medical reasons. A systematic random sampling in the ratio of 1:2 based on attendance list was applied. Every obese patient with BMI of 27.5 that fulfilled the inclusion and exclusion criteria was approached to participate.

The selected obese patients were explained regarding the study and reassured about the confidentiality of all the information given. Those who agreed to participate were required to sign a consent form and a set of self-administered questionnaire will be given. The weight and height would be measured one more time to confirm the BMI. The participants then answered the case report form (CRF) in a private room in the clinic. Each of the completed CRF was tagged with code number which was only known to the researcher as part of confidentiality measures and kept in an envelope.

3.6 Data entry and statistical analysis:

Data were entered and analyzed using Statistical Package for Social Sciences (SPSS for Windows version 22.0) based on fully-answered questionnaires. Each question was analyzed individually.