PUBLIC HEALTH RESEARCH

Anxiety and Depressive Symptoms among Ischaemic Heart Disease Patients in a Malaysian Tertiary University Hospital

Suzaily Wahab[1], Shamsul Azhar Shah[2], Soo Tze Hui[1], Siti Juliana Hussin[1], Mohd Fekri Ahmat Nazri[1], Izzatul Izzanis Abd Hamid[1], Rosdinom Razali[1], Tuti Iryani Daud[1], Syahnaz Mohd Hashim[3], Umi Kalthum Md Noh[4] and Abdul Hamid Abdul Rahman[1]

[1]Department of Psychiatry, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.
[2]Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.
[3]Department of Family Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.
[4]Department of Ophthalmology Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.

**For reprint and all correspondence: Dr Suzaily Wahab, Associate Professor & Psychiatrist, Department of Psychiatry, Universiti Kebangsaan Malaysia Medical Centre, 56000 Cheras, Kuala Lumpur, Malaysia.*
Email: suzailywhb@yahoo.com

ABSTRACT

Received 20 August 2014
Accepted 6 January 2015

Introduction Anxiety and depression were known to bring detrimental outcome in patients with ischemic heart disease (IHD). Notwithstanding their high prevalence and catastrophic impact, anxiety and depression were unrecognized and untreated. The aim of this study was to determine the prevalence of anxiety and depression among IHD patients and the association of this condition with clinical and selected demographic factors.

Methods This was a cross-sectional study on 100 IHD patients admitted to medical ward in UKMMC. Patients diagnosed to have IHD were randomly assessed using Hospital Anxiety and Depression Scale (HADS) and Perceived Social Support (PSS) Questionnaire. Socio-demographic data were obtained by direct interview. Fifteen percent of IHD patients in this sample were noted to have anxiety, fourteen percent noted to have depression while thirty two percent was noted to have both anxiety and depression. Patients' age group and the duration of illness were found to have significant association with anxiety. Socio-demographic data were obtained by direct interview.

Results Fifteen percent of IHD patients in this sample were noted to have anxiety, fourteen percent noted to have depression while thirty two percent was noted to have both anxiety and depression. Patients' age group and the duration of illness were found to have significant association with anxiety. The other clinical and selected demographic factors such as gender, race, marital status, education level, occupation, co-existing medical illness and social support were not found to be significantly associated with anxiety or depression among the IHD patients.

Conclusions In conclusion, proper assessment of anxiety and depression in IHD patients, with special attention to patients' age and duration of illness should be carried out routinely to help avert detrimental consequences.

Keywords Anxiety - depression - ischaemic heart disease - acute coronary syndrome - heart disease.

INTRODUCTION

Cardiovascular disease is the leading cause of death in the world, representing 30% of all global deaths (WHO Report 2011)[1]. In Malaysia, heart diseases were the third leading cause of death in 2008, comprising a total of 6.6% patients who died in government hospital (Department of Statistics Malaysia)[2]. This continues to happen in lieu of improvement in health services and facilities provided. The rising trend of heart diseases in Malaysia has reached a critical point where immediate intervention has to be implemented.

It is known that patients with coronary heart disease are at risk of developing anxiety and depression which tend to be under recognized, yet having undeniable impact to quality of life[3, 4]. It has also become increasingly clear that anxiety and depression play an important role in the development of cardiac disease as well as its ominous prognosis[5-7].

The association between anxiety and depression with ischaemic heart disease has been shown by previous studies [8, 9]. Among the proposed biological model linking depression with cardiac disease includes changes in autonomic nervous system[10] inflammatory cytokines[11] serotonin transport promoter region gene (5-HTTLPR) polymorphism[12] and hormone regulatory factors[13]. As for some specific anxiety disorders, the role of inflammatory cytokines[14] and platelet activity has also been documented[15].

The strong intertwining relationship between anxiety, depression and cardiac disease and the ability of these emotional issues to affect the overall outcome of the cardiac illness warrants further intensive research in this area. Even though studies have been done globally addressing these two emotional distresses, one cannot argue that findings may also differ due to several cultural factors. The differences not only include how symptoms were expressed, their interpretation and, the social response towards the symptoms[16] but also the biological response towards the emotion[17]. The difference of symptoms observed across countries and ethnic groups warrants for further studies in specific populations.

The aim of this current study was to investigate the prevalence of anxiety and depression among ischemic heart disease (IHD) patients in a tertiary university hospital in Kuala Lumpur and its association with clinical and selected demographic factors.

MATERIALS AND METHODOLOGY

This research project had been approved by Research and Ethical Committee, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre. This cross-sectional study was carried out among patients with IHD who were admitted to the medical wards in UKMMC. The samples were selected using universal sampling method. Both male and female patients between 30 to 70 years old, diagnosed with IHD, with ability to understand English or Bahasa Malaysia and had given written consent were included in the study.

Instruments

Three sets of questionnaires were used in this study, which included a set of socio-demographic questionnaires for the patients and their caregivers, the validated Malay version of Hospital Anxiety and Depression Scale (HADS) and translated Malay version of Perceived Social Support (PSS) for Family and Friends questionnaire. The HADS questionnaire[18] consisted of 14 items in which 7 items assessed anxiety and another 7 items assessed depression. A total score of 8 and above was considered as having positive symptom for depression or anxiety. The Perceived Social Support (PSS) from Friends (PSS-Fr) and Family (PSS-Fa) scales questionnaire[19] which consisted of 40 items were used to assess the degree of support provided by family and friends of the subjects. Higher scores indicate more support received, as perceived by the subjects.

The data was analysed using SPSS, version 19. There were 9 independent variables (age, race, gender, marital status, education level, occupation, co-existing medical illness, duration of illness and social support) and 2 dependent variables (anxiety and depression).

RESULTS

Among the 100 patients, 66% were females and 34% were males. The majority of patients were in the age group of 61 to 70, and were Malays (60%), while 33% were Chinese and 7% Indian. Almost three quarter (74%) were married and the majority had educational level up to secondary school. Most of them (59%) had been diagnosed with IHD for at least 6 months.

Among the 100 patients included in the study, 15% and 14% were screened positive for anxiety and depression respectively, while 32% were screened positive for both anxiety and depression (Table 2). Males were noted to have more positive symptoms of anxiety 51.5% (34) and depression 43.9% (29) compared to females. Among the ethnic groups, Malays were noted to have more anxiety and depressive symptoms.

Table 1 Demographic data among respondents

	Factors	N = 100
Gender	Female	66
	Male	34
Age	31 - 40	8
	41 - 50	14
	51 - 60	34
	61 - 70	44
Race	Malay	60
	Chinese	33
	Indian	7
Marital Status	Single	10
	Married	74
	Divorced	11
	Widowed	5
Educational level	None	7
	Primary	29
	Secondary	52
	Tertiary	12
Occupation	Self employed	23
	Government	19
	Private	17
	Housewife	6
	Pension	18
	Unemployed	17
Co-existing medical illness	Present	84
	Absent	16
Duration of illness	Less than 6 months	59
	More than 6 months	41

Table 2 Prevalence of anxiety and depression (%)

	Frequency	Percentage (%)
Normal	39	39.0
Anxiety only	15	15.0
Depression only	14	14.0
Anxiety and depression	32	32.0

The median age of patients with anxiety was 55. The number of respondents who were screened positive for anxiety with duration of illness less than 6 months was 25 (61.0%) while those with duration of illness more than 6 months was 22 (37.3%). Significant differences were observed among patients with anxiety in terms of age groups (p=0.04) and duration of illness (p=0.05) (Table 3).

Table 3 Frequency of anxiety and depression and its association with patient's socio-demographic factors

	Anxiety			**Depression**		
	Frequency (%)			**Frequency (%)**		
	Positive	**Negative**	**P value**	**Positive**	**Negative**	**P value**
Sex						
Male	34(51.5)	32(43.5)	0.208	29(43.9)	37(56.1)	
Female	13(38.2)	21(61.8)		17(50.0)	17(50.0)	0.565
Age group (years)						
31-40	5(62.5)	3(37.5)		4(28.5)	10(71.5)	
41-50	9(64.3)	5(35.7)		6(54.5)	5(45.5)	
51-60	13(38.2)	21(61.8)	**0.04**	14(40.0)	21(60.0)	0.365
61-70	20(45.5)	24(54.5)		20(52.6)	18(47.4)	

Race						
Malay	30(50.0)	30(50.0)		28(46.7)	32(53.3)	
Chinese	15(45.5)	18(54.5)	0.596	15(45.5)	18(54.5)	0.688
Indian	2(28.6)	5(71.4)		3(42.9)	4(57.1)	
Education level						
None	2(28.6)	5(71.4)		4(57.1)	7(42.9)	
Primary	12(41.4)	17(58.6)	0.22	14(48.3)	15(52.7)	0.059
Secondary	24(46.2)	28(53.8)		19(36.5)	33(63.5)	
Tertiary	9(75.0)	3(25.0)		9(75.0)	3(25.0)	
Marital status						
Single	6(60.0)	4(40.0)		5(50.0)	5(50.0)	
Married	34(45.9)	40(54.1)	0.481	34(45.9)	40(54.1)	0.951
Divorced	6(54.5)	5(45.5)		5(45.5)	6(54.5)	
Widowed	1(20.0)	4(80.0)		2(40.0)	3(60.0)	
Employment status						
Self-employed	9(39.1)	14(60.9)		9(39.1)	14(60.9)	
Government	9(47.4)	10(52.6)		9(47.4)	10(52.6)	
Private sector	10(58.8)	7(41.2)	0.128	10(58.8)	7(41.2)	0.492
Housewife	2(33.3)	4(66.7)		2(33.3)	4(66.7)	
Pensioner	11(61.1)	7(38.9)		11(61.1)	17(38.9)	
Unemployed	5(29.4)	12(70.6)		5(29.4)	12(70.6)	
Co-existing medical illness						
Present	38(45.2)	46(54.8)	0.419	39(46.4)	45(53.6)	0.844
Absent	9(56.3)	7(43.8)		7(43.8)	9(56.3)	
Duration of IHD						
Less than 6 months	25(61.0)	16(39)	**0.02**	17(41.5)	24(58.5)	0.448
More than 6 months	22(37.3)	7(62.7)		29(49.2)	30(50.8)	

No significant differences were observed between other variables (gender, marital status, educational level, occupation, presence of co-existing medical illness and perceived social support) with anxiety or depression.

Table 4 Relationship between social support score towards anxiety and depression

	Outcome	Mean ± SD	P value
Anxiety	Positive	28.47 ± 8.968	0.541
	Negative	27.38 ± 8.771	
Depression	Positive	26.13 ± 10.496	0.066
	Negative	29.39 ± 6.880	

DISCUSSION

The high prevalence of anxiety and depression among heart disease patients had been shown in a number of previous research[20, 21]. In our study, a similar percentage of depression (14%) and anxiety (15%) was noted.

Presence of anxiety and depression were significantly associated with demographic factors such as gender[22-24] and educational status[24]. Females and patients with low educational levels were noted to have higher levels of anxiety and depressive symptoms. A protective effect towards anxiety and depression was also seen in those with higher educational level[25]. Surprisingly in our study, depression and anxiety seemed to occur more in males and in patients who attained their formal education till secondary school level.

Other factor such as employment status also contributes significantly to the prevalence of depression. Patients who were unable to work and unemployed have higher prevalence of depression[5]. Widowed patients have higher risk for developing anxiety and depression than patients who were married, divorced and never married[23]. Other factors such as ethnic groups, employment and marital status did not show significant associations with either anxiety or depression in the study population.

Conflicting findings were found with regards to the association of anxiety with age and the duration of illness. Research by Luttik et al.

2011 found that disease related factors (for example, duration of illness) were not found to be associated with anxiety or depression. On the other hand, a study by Dogar et al. 2008 showed that patients who suffered the illness longer had higher level of anxiety and depression. The effect of age on anxiety and depression was previously investigated and findings showed that patients in the age group of 50 to 60 years had the peak occurrence of anxiety and depression[26].

In the current study, both age and duration of illness have significant association with the occurrence of anxiety. Patients in the age range of 50s, which was the middle age group, were noted to suffer from anxiety compared to other age groups. One of the possible explanations is at the age of 50s, people in Malaysia will experience a transition phase from being employed to having a retirement (at around 56-58 years). During this period, they may have lots of concerns and worries about their life especially on the financial impact of their illness to their family members. This phase of anticipating transition to the retirement days along with their unhealthy status could be a predisposing factor to the emergence of anxiety symptoms in this study population.

In this research, a significant association was found between presence of anxiety and the duration of illness (IHD) less than 6 months. A previous study[27], has also shown that significant reductions of anxiety symptoms were noted when measured at different times (during baseline and follow up). The study concluded that time could play a role in symptom reduction. The improvement in anxiety symptoms over time can also be explained by our understanding of the grieving phases as described by Kubler Ross[28]. In grief, after the initial phase of shock and anger, depression and anxiety may ensue in the first few months of illness, before finally reaching the phase of acceptance when the symptoms will reduce or remit. However, it is important to note that in grief, the duration for each phase may vary among individuals.

The positive association between social support and incidence of coronary heart disease has previously been documented[28], possibly by buffering the effects of various stressors[29]. The magnitude of social support was also found to be inversely proportionate with the occurrence of anxiety and depression in coronary heart disease patients[30], and low social support has been shown to predict the level of depression in the patients[31, 32]. However, our result showed no association between social support and the occurrence of anxiety or depression in the IHD patents. One possible explanation for this finding could be due to the presence cognitive distortion in patients who had anxiety[33] or depression[34, 35] which may have contributed to the false perception of having poor support.

In this study the presence of co-existing medical illness was only significantly associated with anxiety but not with depression, similar to findings by Luttik, 2011. In most circumstances, ischemic heart disease (IHD) occurs as a complication of hypertension, diabetes mellitus and dyslipidemia. It is however important to note that this study did not look into the specific details of the existing medical illnesses, such as the duration or chronicity of the existing medical illnesses. The presence of a more chronic course of illnesses might have led to lesser emotional turmoil in the patients compared to presence of newly diagnosed medical illnesses which undeniably may pose greater stress to the patients.

Limitations of study

Some of the limitations found in this study include, the small sample size and the cross sectional method of study which makes determining cause or effect relationship unlikely. Sample selection in which just one tertiary centre also posed difficulty in generalizing research findings. Lifestyle factors such as smoking, alcohol drinking and obesity were also not taken into account. In addition, patients' understanding regarding their illness and the severity of the illness itself could also have contributed to the development of anxiety and depression.

CONCLUSION AND RECOMMENDATION

In summary, we note that age factor and duration of illness have significant associations with emotional distress in patients with ischaemic heart disease. The presence of any emotional distress, especially depression or anxiety, undoubtedly contributes to further poorer prognosis in heart disease patients. It is therefore of utmost importance to screen all patients with heart disease for these symptoms in order to improve clinical outcomes. As the middle age group has been shown to be more vulnerable to emotional distress, further strategies to help prevent and overcome these symptoms in this population are deemed necessary. Bearing in mind that cultural difference may have certain contribution to the manifestations of anxiety or depression, focus need to be set in the different ethnic groups to detect this emotional pathology. Personality factor should also be looked into as it may contribute to anxiety and depression in the patients. Further prospective research which may enable one to better observe and predict the course of both anxiety and depression in IHD patients need to be-carried out in order to improve the overall outcome of these patients.

ACKNOWLEDGEMENTS

We would like to thank all the respondents who took part in this study and everyone involved who had made this study a success. Our appreciation also goes to UKMMC for the grant given to conduct this research. Lastly, we would like to express our gratitude to Prof. Dr. Rusymah Idrus who was the main coordinator for the Special Study Module, Faculty of Medicine, Universiti Kebangsaan Malaysia and Prof. Dr Srijit Das for his guidance in writing this manuscript.

Conflict of interest

The authors have no conflicts of interests to declare.

REFERENCES

1. Global status report on noncommunicable disaeses 2010 Geneva. World Health Organization. 2011.
2. Statistics on Causes of Death Malaysia Department Of Statistics, Malaysia. 2008.
3. Dekker RL, Lennie TA, Albert NM, Rayens MK, Chung ML, Wu JR, et al. Depressive symptom trajectory predicts 1-year health-related quality of life in patients with heart failure. Journal of cardiac failure. 2011;17(9):755-63.
4. Müller-Tasch T, Peters-Klimm F, Schellberg D, Holzapfel N, Barth A, Jünger J, et al. Depression is a major determinant of quality of life in patients with chronic systolic heart failure in general practice. Journal of cardiac failure. 2007;13(10):818-24.
5. Fan AZ, Strine TW, Jiles R, Mokdad AH. Depression and anxiety associated with cardiovascular disease among persons aged 45 years and older in 38 states of the United States, 2006. Preventive medicine. 2008;46(5):445-50.
6. Nicholson A, Kuper H, Hemingway H. Depression as an aetiologic and prognostic factor in coronary heart disease: a metaanalysis of 6362 events among 146 538 participants in 54 observational studies. European Heart Journal 2006;27:2763-74.
7. Axon RN, Zhao Y, Egede LE. Association of depressive symptoms with all-cause and ischemic heart disease mortality in adults with self-reported hypertension. American Journal of Hypertension. 2010;23(1):30-7.
8. Kubzansky LD, Cole SR, Kawachi I, Vokonas P, Sparrow D. Shared and unique contributions of anger, anxiety, and depression to coronary heart disease: a prospective study in the normative aging study. Annals of Behavioral Medicine,. 2006; 31(1):21-9.
9. Lichtman JH, Bigger JT, Blumenthal JA, Frasure-Smith N, Kaufmann PG, Lespérance F, et al. Depression and coronary heart disease recommendations for screening, referral, and treatment: a science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research: endorsed by the American Psychiatric Association. Circulation. 2008;118(17):1768-75.
10. De Jonge P, Mangano D, M.A W. Differential association of cognitive and somatic symptoms with heart rate variability in patients with stable coronary heart disease findings from the Heart and Soul study. Psychosom Med. 2007;69:735-9.
11. Brouwers C, Mommersteeg P, Nyklíček I, Pelle AJ, Westerhuis BL, Szabó BM, et al. Positive affect dimensions and their association with inflammatory biomarkers in patients with chronic heart failure. Biological psychology. 2013; 92(2):220-6.
12. Parissis JT, Fountoulaki K, Filippatos G, Adamopoulos S, Paraskevaidis I, Kremastinos D. Depression in coronary artery disease: novel pathophysiologic mechanisms and therapeutic implications. International journal of cardiology. 2007; 116(2):153-60.
13. Otte C, Neylan TC, Pipkin SS, Browner WS, Whooley MA. Depressive symptoms and 24-hour urinary norepinephrine excretion levels in patients with coronary disease: findings from the Heart and Soul Study. American Journal of Psychiatry. 2005;162(11):2139-45.
14. Von Känel R, Begré S, Abbas CC, Saner H, Gander ML, Schmid JP. Inflammatory biomarkers in patients with posttraumatic stress disorder caused by myocardial infarction and the role of depressive symptoms. Neuroimmunomodulation. 2009;17(1):39-46.
15. Iny LJ, Pecknold J, Suranyi-Cadotte BE, Bernier B, Luthe L, Nair NP, et al. Studies of a neurochemical link between depression, anxiety, and stress from [3H] imipramine and [3H] paroxetine binding on human platelets. Biological psychiatry. 1994;36(5):281-91.
16. Kirmayer LJ. Cultural variations in the clinical presentation of depression and anxiety: implications for diagnosis and treatment. Journal of Clinical Psychiatry. 2001;62:22-30.

17. Lin KM. Biological differences in depression and anxiety across races and ethnic groups. The Journal of clinical psychiatry. 2000;62:13-9.
18. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatrica Scandinavica. 1983; 67 (6):361-70.
19. Procidano ME, Heller K. Measures of perceived social support from friends and from family: Three validation studies. American journal of community psychology. 1983;11(1):1-24.
20. Rudisch B, Nemeroff CB. Epidemiology of comorbid coronary artery disease and depression. Biological psychiatry. 2003;54(3):227-40.
21. Van Melle JP, De Jonge P, Spijkerman TA, Tijssen JG, Ormel J, Van Veldhuisen DJ, et al. Prognostic association of depression following myocardial infarction with mortality and cardiovascular events: a meta-analysis. Psychosomatic Medicine. 2004;66(6):814-22.
22. Bjerkeset O, Nordahl HM, Mykletun A, Holmen J, Dahl AA. Anxiety and depression following myocardial infarction: gender differences in a 5-year prospective study. Journal of psychosomatic research. 2005;58(2):153-61.
23. Dogar IA, Khawaja IS, Azeem MW, Awan H, Ayub A, Iqbal J, et al. Prevalence and risk factors for depression and anxiety in hospitalized cardiac patients in Pakistan. Psychiatry (Edgmont). 2008;5(2):38.
24. Luttik MLA, Jaarsma T, Sanderman R, Fleer J. The advisory brought to practice Routine screening on depression (and anxiety) in coronary heart disease; consequences and implications. European Journal of Cardiovascular Nursing. 2011;10(4):228-33.
25. Bjelland I, Krokstad S, Mykletun A, Dahl AA. The HUNT study:Does a higher educational level protect against anxiety and depression?. Social Science and Medicine. 2008;66:1334-45.
26. Hinz A, Kittel J, Karoff M, Schwarz R. Age and sex dependencies of anxiety and depression in cardiologic patients compared with the general population. GMS Psycho-Social-Medicine. 2004.
27. Arora D, Anand M, Katyal VK, Anand V. Anxiety and Well-being among Acute Coronary Syndrome Patients: Overtime. J Indian Acad Appl Psych. 2010;36(1):79-88.
28. Kuper H, Marmot M, Hemingway H. Systematic review of prospective cohort studies of psychosocial factors in the aetiology and prognosis of coronary heart disease. Coronary heart disease epidemiology. 2005:363-413.
29. Alloway R, Bebbington P. The buffer theory of social support: A review of the literature. Psychological medicine. 1987;17(1):91-108.
30. Goldston K, Baillie AJ. Depression and coronary heart disease: a review of the epidemiological evidence, explanatory mechanisms and management approaches. Clinical psychology review.28(2):288-306.
31. Holahan CJ, Moos RH, Holahan CK, Brennan PL. Social support, coping, and depressive symptoms in a late-middle-aged sample of patients reporting cardiac illness. Health Psychology. 1995;14:152–63.
32. Frasure-Smith N, Lespérance F, Gravel G, Masson A, Juneau M, Talajic M, et al. Social support, depression, and mortality during the first year after myocardial infarction. Circulation. 2000;101(16):1919-24.
33. Muran EM, Motta RW. Cognitive distortions and irrational beliefs in post-traumatic stress, anxiety, and depressive disorders. Journal of Clinical Psychology.49(2):166-76.
34. Beck AT. Thinking and depression: I. Idiosyncratic content and cognitive distortions. Archives of General Psychiatry. 1963;9(4):324-33.
35. Beck AT, Emery G, Greenberg RL. Anxiety disorders and phobias: A cognitive perspective: Basic Books; 2005.