ORIGINAL ARTICLE

POSITIVE AND NEGATIVE PSYCHOLOGICAL CORRELATES, GENDER SPECIFIC AND TRADITIONAL FACTORS FOR FIRST ONSET ANGINA IN A SAMPLE OF PAKISTANI WOMEN

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Background: Coronary Heart Disease (CHD) occurs to a greater extent in developed than developing countries like Pakistan. Our understanding of risk factors leading to this disease in women, are largely derived from studies carried out on samples obtained from developed countries. Since prevalence of CHD in Pakistan is growing, it seems pertinent to infer risk and protective factors prevalent within the Pakistani women. This case control study investigated the role of psychological, traditional and gender specific risk and protective factors for Angina in a sample of Pakistani women aged between 35–65 years. **Methods**: Female patients admitted with first episode of Angina fulfilling the study inclusion/exclusion criteria were recruited within the first three days of stay in the hospital. One control per case matched on age was recruited. Translated versions of standardized tools: Life Orientation Test (LOT), The Hope Scale, Subjective Happiness Scale and Depression, Anxiety and Stress Scale (DASS) were used to measure the psychological variables. Information on medical conditions like diabetes, hypertension, family history of IHD, presence and absence of menopause and use of oral contraceptive pills was obtained from the participants. Body Mass Index for cases and controls was calculated separately with the help of height and weight recorded for the participants. **Results**: Multivariate logistic regression analyses revealed that depression, anxiety and stress are risk factors, were as optimism and hope are protective predictors of Angina. 64% and 85 % of variance in Angina were attributed to psychological factors. Menopause, diabetes and hypertension are significantly associated with the risk of Angina, explaining 37% and 49% of variance in Angina. The study provides evidence for implementation of gender specific risk assessment and preventive strategies for Angina. The study gives directions for large scale prospective, epidemiological, longitudinal as well as interventional studies, to be tailored for indigenous population and secondly development and standardization of measures to appraise psychological factors of Angina prevalent within the Pakistani population

Keywords: Angina, Multivariate logistic regression analyses, primary and secondary prevention

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INTRODUCTION

Though the global disease morbidity as well mortality statistics due to Coronary Heart Disease are alarming but since the mid 1960s massive decline in cardiovascular diseases and death rates in western countries has been observed. However, a similar decline in low and middle income countries like Pakistan is absent. Two main reasons can be ascribed to this fact. First, coronary care has been enormously enhanced in developed countries and second, lifestyle risk factors identified by extensive research are addressed through preventive and interventional strategies. Preventive approaches can facilitate in reducing the medical as well as economic cost of disease burden at individual as well as national level.

However incidence and prevalence of cardiovascular disease is escalating in low income countries like Pakistan. An increase in incidence of CHD in women has been observed. 53.2% of all deaths in women are attributable to CVD.[1] Women have a risk of one in three of dying from CHD.[2]

CHD represents itself 10 years later in women as compared to men, though after menopause the occurance trend remains alike across gender. Psychological profiles of women differ from men so risk factors of diseases are likely to differ.[3,4] Women health is given less importance in underdeveloped and developing countries, and heart disease as a serious ailment itself has been under recognized within women population.[5,6]

Empirical evidence appears to confirm significant association of CHD with negative factors, namely stress**,** depression and anxiety[10] in women. Moreover some positive factors like optimism, hope and happiness have found to play a protective role in onset of CHD.[7–11]

Menopause has found to be independent risk factors for women.[12] Oral contraceptive pills have found to induce changes in both carbohydrate and lipoprotein risk factors that consequently increase the risk of CHD in women.[13]

Diabetes and Hypertension are significant risk factors for CHD in women.[14–16] Studies conducted in Pakistan are limited mostly to bio-behavioural risk factors for CHD.[17] To carry out research for identification of psychological, gender specific and traditional risk factors; within the female indigenous population is need of the hour.

In the light of current literature following hypotheses are proposed:

Hypothesis-II: Negative psychological factors (Stress, Depression and Anxiety) are likely to be risk factors for Angina in women.

Hypothesis-II: Positive psychological factors (Optimism, Hope and happiness) are likely to be protective factors for Angina in women.

Hypothesis-III: Gender specific factors (absence of menopause and use of oral contraceptive pills) are likely to be risk factors for Angina in women.

Hypothesis-IV: Traditional factors (presence of family history of IHD, medical conditions like diabetes and hypertension) are likely to be risk factors for Angina in women.

MATERIAL AND METHODS

Case Control Research Design was employed in the present study. Participants of the study were females aged 35 to 65 years recruited from four major hospitals of Punjab, having a functional coronary care unit or an equivalent cardiology ward. Patients with first chest pain confirmed as Angina by the cardiologists (pain not due to non-cardiac reasons), pain confirmed as Angina through exercise, electrocardiography, cardiologist summary and symptom score, were recruited in the study.

Patients experiencing cardiogenic shock, diagnosed with a significant chronic medical illness including: liver disease, hyperthyroidism or hypothyroidism, renal disease, malignant disease, with past history of any psychiatric diagnosis or currently using antipsychotic medications (antidepressant or anti-anxiety medication) will not be included in the study. Pregnant females and those with history of treatment for heart disease such as percutaneous transluminal coronary angioplasty (PICA) or coronary artery bypass graft (CABG) surgery, or with chest pain due to non-cardiac reasons, were also excluded. Patients who were unable to provide informed consent or were not able to read and write Urdu language were also excluded from the study.

Community-based controls recruited in the study were attendants, visitors or relatives of the cardiac patient, unrelated (not first-degree blood relatives) having no previous diagnosis of heart disease or history of exertional chest pain. Exclusion criteria followed for community controls was the same as that set up for the cases.

To investigate the risk and protective association of the aforesaid factors with Angina and to find whether these factors differ between cases and the controls, we solicited a sample of 50 patients with confirmed diagnosis of Angina and 50 age matched controls, which were free of Angina before and at the time of testing. The sample was recruited from hospitals situated in the city of Lahore, that were either cardiology hospitals or hospitals running a cardiology unit or an equivalent coronary care unit catering for patients diagnosed with CHD. Purposive sampling was employed to gather the study sample.

Optimism was measured by the Life Orientation Test. The LOT consists of 8 coded items, plus 2 fillers. Items are framed in an optimistic manner, half in a pessimistic manner, and respondents indicate their extent of agreement or disagreement with each item on a five point scale (A= I agree a lot , B= I agree a little, C= I neither agree nor disagree, D= I disagree a little, E= I disagree a lot). Items 2, 5, 6, and 8 are fillers. Responses to "scored" items are to be coded so that high values imply optimism. Cronbach alpha for the current sample was found to be .90.

The Hope scale was used to measure the positive construct of hope. It consists of 12 items. It is an eight point likert scale ranging from (1. =Definitely False. 2. =Mostly False, 3. =Somewhat False, 4. =Slightly False, 5. =Slightly True, 6. =Somewhat True, 7. =Mostly True to 8. =Definitely True). The agency subscale score is derived by summing items 2, 9, 10, and 12; the pathway subscale score is derived by adding items 1, 4, 6, and 8. The total Hope Scale score is derived by summing the four agency and the four pathway items. Cronbach alpha for the current sample was found to be .88.

Subjective Happiness Scale (SHS) was used to measure subjective happiness. The SHS is a 4-item scale that intends to measure global subjective happiness. Response categories are recorded on a seven point likert scale, ranging from 1 (least) to 7 (most). The fourth item on the SHS is coded in the reverse direction (7, most to 1, least). Cronbach alpha for the current sample was found to be .73.

To gather information on psychological risk factors Depression, Anxiety and Stress Scale (DASS), short version 21 items with four response categories (0 =Did not apply to me at all, 1=Applied to me to some degree, or some of the time, 2 =Applied to me to a considerable degree, or a good part of time, 3 =Applied to me very much, or most of the time) was used. DASS-21 had very good Cronbach's alpha values of 0.75, 0.74 and 0.79, for depression, anxiety and stress subscales. For construct validity, it has good factor loading values

for 17 out of 21 items (.31 to .75). Cronbach alpha for the current sample was found to be .83.

Information on self reported medical conditions like diabetes, hypertension, presence and absence of menopause and use of oral contraceptive pills was gathered from study participants. Body Mass Index: Height, was measured in centimeters, (by using a non-stretchable standard tape with a metal buckle at one end over the light clothing), weight was assessed in kilograms. Cutoffs for BMI were calculated separately based on the control data.

Institutional consent from appropriate hospital authorities was sought before conducting the current investigation. Participants who volunteer to participate in the study were asked to sign a written consent form. Information regarding reported family history of IHD and physical health factors (diabetes and hypertension), demographic characteristics (age, gender, marital status, education, occupation, income, rural/ urban living and family structure), and physical measurements (waist and hip circumference), were gathered with the help of a self constructed questionnaire. Non-stretchable standard tape was used to measure waist and hip circumference, over the light clothing. Waist measurement was taken at the narrowest point amid the costal margin and iliac crest. Hip circumferences were measured at the point of the widest diameter around the region of the buttocks. LOT-R, Hope Scale, Subjective Happiness and DASS (21 item) were translated into indigenous language (forward and backward translation procedure was employed) and there psychometric properties were predetermined for the current study sample, before use in the study.

RESULTS

A Binary logistic regression analysis was performed to ascertain psychological factors associated with Angina by using forward conditional method, with Angina as the outcome variable and psychological variables (Depression, anxiety, stress, hope, optimisim and happiness) as predictor variables.A total of 100 cases were analyzed and the full model significantly predicted presence of IHD (Omnibus Chi-square=102.69, df=5,p<.001). The model accounted for between 64% and 85 % of variance in Angina. Overall 93% of the predictions were accurate. Among the positive psychological factors; optimism and hope were found to be significant positive psychological predictors of Angina and depression, anxiety and stress were found to be significant negative psychological predictors of Angina.

A Binary logistic regression analysis was performed to ascertain factors associated with Angina by using forward conditional method, with Angina as the outcome variable and psychological variables (traditional and gender-specific factors) as predictor variables. A total of 100 cases and controls were analyzed and the full model significantly predicted presence of IHD (Omnibus Chi-square =46.79, df =3, p< .001). The model accounted for between 37% and 49% of variance in Angina. Overall 77% of the predictions were accurate. Presence of menopause, diabetes and hypertension were found to be significant predictors of Angina.

Table-1: Descriptive statistics are presented as frequencies or mean values and standard deviations (SD)

	Disease Status	
	Women Cases	**Women Controls**
	f (%)	f (%)
Marital Status		
Married	48 (96)	45 (90)
Unmarried	1 (2)	3 (6)
Widowed	1 (2)	2 (4)
Education		
10 or less years	49 (98)	19 (38)
Up till 12 years	1 (2)	16 (32)
Up till 14 years	-	15 (30)
Occupation		
Housewife's	36 (72)	32 (64)
Working	11 (22)	15 (30)
Not currently working	2 (4)	3 (6)
Retired	1 (2)	-
Income		
Less than 5000 Rs	20 (40)	9 (18)
Between 5000 and 10000	19 (38)	21 (42)
Between 10000 and 20000	11 (22)	20 (40)
Living		
Rural	8 (16)	12 (24)
Urban	42 (84)	38 (76)
Diabetes	15 (30)	44 (88)
Present	35 (70)	6 (12)
Hypertension	23 (46)	35 (70)
Present	27 (54)	15 (30)

Table-2: Positive and negative psychological factors independently associated with angina in cases and controls

	B	**Exp (B)**
Variable	(SE)	OR (95% CI)
Step 1	5.76***	
Constant	(1.07)	
	-0.29***	
Optimism	(0.05)	0.74 (0.67-0.82)
Step 2	16.54***	
	-0.32***	
Optimism	(.076)	0.72 (0.62-0.83)
	-0.22***	
Hope	(0.05)	0.79 (0.71-0.88)
Step 3	12.06**	
Constant	(3.66)	
	-0.31***	
Optimism	(0.08)	0.73 (0.62-0.90)
	-0.21***	
Hope	(0.06)	0.80 (0.71-0.90)
Negative Psychological Factors	0.09**	
Depression, anxiety and stress	(0.03)	1.09 (1.02-1.17)

OR=odds ratio; CI=confidence interval. Overall data adjusted for age. **p<.01, ***p<.001.

Table-3: Traditional and gender-specific factors independently associated with angina in cases and controls

	B	Exp (B)
Variable	(SE)	OR (95% CI)
Step 1	-1.07***	
Constant	(0.29)	
Diabetes		
Absent		1
Present	2.84***	17.11(6.01-48.68)
	(0.53)	
Step 1	-1.56***	
Constant	(0.40)	
Hypertension		
Absent		1
Present	1.11*	3.06(1.10-8.52)
	(0.52)	
Diabetes		
Absent		1
Present	2.87***	17.99(6.06-53.40)
	(0.55)	
Final model	-2.17***	
Constant	(0.54)	
Menopause		
Absent		1
Present	1.11***	3.04(1.03-8.99)
	(0.55)	
Hypertension		
Absent		1
Present	1.08*	
	(0.53)	2.96(1.037-8.44)
Diabetes		
Absent		1
Present	3.11***	22.41(6.93-72.52)
	(0.59)	

OR=odds ratio; CI=confidence interval. Overall data adjusted for age. **p<.05, ***p<.001.

DISCUSSION

The present study investigated positive and negative psychological factors along with traditional and gender specific factors associated with Angina in a sample of Pakistani women. Results revealed that stress, depression and anxiety are risk factors of Angina. International empirical research appears to confirm a significant association of MI and Angina with negative factors, namely stress, depression, and anxiety.[7, 11,18,19]

Our findings confirmed the role of protective factors like hope and optimism in first onset of Angina. Similar evidence exists that confirms the protective role of optimism, hope and social support for cardiac as well as many other illnesses.[9,20]

Empirical research demonstrates that optimistic thinking acts as a protective factor for health. Similar protective effects of optimistic explanatory style for CHD have been documented earlier.[11] Clearly optimism serves as a significant predictor for good health, and pessimism or hopelessness tends to be associated with the risk of heart diseases.[21]

Optimistic explanatory style has been found to protect against risk of IHD whereas pessimistic style has been found to be linked with hopelessness and risk of heart disease.[11, 21]

Results of our study are much in line with already available empirical evidence at hand. So it can be safely concluded that optimistic explanatory style is a potential protective factor against risk of CHD whereas pessimism and hopelessness are associated with risk of heart disease.[21,22]

Happiness did not turn out to be a significant protective factor of Angina within the national sample of women. This is contrary to the available evidence. Happiness is associated with a positive factor that is locus of control.[23]Women in our culture tend to have less control over their environments which usually is associated with delay in accessing health care facilities for medical concerns.[24] Prospective longitudinal studies need to be conducted to further confirm the result of our case control study.

Among gender specific factors presence of menopause turned out to be a risk factor of Angina in women. Internationally ample evidence supports the evidence at hand, menopause in women has found to be associated with the risk of heart disease. Gender differences have been observed in prevalence rates of IHD in men and women. In women, CHD tends to develop at a later age as compared to men[25] in pre-menopausal women the risk of Angina is less compared to that of men. A significant increase is observed at the onset of heart disease after menopause [25,12]

However use of contraceptive pills was not found to be significantly associated with the risk of Angina. Although oral contraceptive pills have found to induce changes in both carbohydrate and lipoprotein risk factors that consequently increase the risk of coronary heart disease.[13] Use of oral contraceptive pills are very less in Pakistani women and women who use it rarely take these pills on a regular basis so irregular use of contraceptive pills can be reason why it didn't turn out to be a significant risk factor of Angina. There is a need to investigate the association between use of oral contraceptives and onset of Angina within a sample of Pakistani women with the help of a prospective longitudinal design.[16,26]

Among traditional risk factors diabetes and hypertension turned out to be significantly associated with the risk of Angina in women. Diabetes turned out to be a significant risk factor for Angina in this study. The results are in line with the empirical evidence provided by several case control, cross-

sectional as well as prospective studies conducted worldwide.[14,16]

Hypertension turned out to be a significant risk factor of Angina in Pakistani women. Consistent findings exist worldwide and from Pakistan, where more women are found to be hypertensive than men.[17, 27]

Hypertension has been identified as a significant risk factor for IHD in Pakistani population.[15,16] The Interheart Study confirmed that 36% of the PAR of AMI exists for hypertension in women compared to 19% in men.

BMI $\geq$25 kg/m^2 was not found to be associated with the risk of Angina in women. This finding is not in line with much of the available evidence at hand. Our results are inconsistent with earlier findings evidence regarding association of BMI as a risk factor for Angina in women is scarce and needs further exploration.[28,29]

The current study like any other research has its limitations. First, a case control study can barely prove causation, and there exists a chance of potential confounding in a case control study if there is a degree of difference in ascertaining of risk factors between cases and controls. However, an attempt was made to reduce this factor by employing uniformity in the method of data collection for all the study participants irrespective of their case control status. The study is retrospective and information on risk factors was collected retrospectively, while cases were in hospital after the onset of a first Angina. In this case reverse causation and recall bias are well established epidemiological difficulties. Self-reported information was gathered to inquire about menopause status, presence of diabetes, hypertension; therefore some bias in reporting may well be possible. Ideally efforts at uncovering the factors of Angina in Pakistani women population could have been undertaken in a well designed multi-center prospective cohort design, however issues of time, and cost, made this impractical.

In spite of its limitations, case control design is ideal for a preliminary investigation of factors of Angina: conclusions drawn from this study can be used to justify a more longitudinal design.

Results will help guide towards gender specific assessment of Angina and provided directions for developing guidelines for primary and secondary prevention and cardiac interventions in Pakistan.

CONCLUSION

This study has provided intriguing and original evidence of factors of Angina, corroborating with many studies carried out in America, Europe and South Asia. Timely preventive as well as psychological interventional strategies, especially designed for women will help reduce the economic burden of disease in Pakistan. This study can be considered a pioneer one in designing gender specific public health planning, to counter the escalating disease burden in our country. The study provides new vision for emphasis on psycho-education, counseling and awareness campaigns about potential risk factors of Angina in women, to public at large. Considering the fact that multiple psychological, gender specific and traditional factors are associated to the onset of Angina in Pakistani population, it is important that a multi-disciplinary team comprising of cardiologist, psychologists, physicians, psychiatrists, counselors, dieticians, and social workers should join their efforts in an integrated manner for implementation of preventive and interventional strategies. In a country like Pakistan where there are limited economic resources and health budget is extremely low, the first line of action will definitely be to focus on primary intervention as it is more cost-effective and best fitted for the native needs of a developing country like Pakistan.

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AUTHOR'S CONTRIBUTION

RR designed and conducted the study, literature review, half of data collection, maniuscript writing. AA rest half of data collection, data analysis and proof reading.

REFERENCES

1. American Heart Association. Statistical Fact Sheets; 2007.
2. Angell M. Caring for women's health - What is the problem? N Engl J Med 1993;329(4):271–2.
3. Hallstrom T, Samuelsson S, Balldin J, Walinder J, Bengtsson C, Nystrom E, *et al*. Abnormal dexamethasone suppression test in normal females. Br J Psychiatry 1983;142:489–97.
4. Orth-Gomer K, Horsten M, Wamala SP, Mittleman MA, Kirkeeide R, Svane B, et al. Social relations and extent and severity of coronary artery disease: The Stockholm Female Coronary Risk Study. Eur Heart J 1988;19(11):1648–56.
5. Henig RM. Are Women's Hearts Different-NYTimes.com [Internet]. [cited 2013 Dec 17]. Available from: http://www.nytimes.com/1993/10/03/magazine/are-women-s-hearts-different.html?pagewanted=all&_r=0
6. Judelson D. Gender differences in evaluation and management of coronary disease. Cardiovasc Dis Chest Pain 1994;10:3–8.
7. Hemingway H, Marmot M. Evidence based cardiology: Psychosocial factors in the aetiology and prognosis of coronary heart disease. Systematic review of prospective cohort stuides. BMJ 1999;318(7196):1460–7.
8. Strike PC, Steptoe A. Psychosocial factors in the development of coronary artery disease. Prog Cardiovasc Dis 2004;46(4):337–47.
9. Wang HX, Mittleman MA, Orth-Gomer K. Influence of social support on progression of coronary artery disease in women. Soc Sci Med 2005;60(3):599–607.

10. Smith TW, Ruiz JM. Psychosocial influences on the development and course of coronary heart disease: Current status and implications for research and practice. J Consult Clin Psychol 2002;70(3):548–68.
11. Kubzansky LD, Sparrow D, Vokonas P, Kawachi I. Is the glass half empty or half full? A prospective study of optimism and coronary heart disease in the normative aging study. Psychosom Med 2001;63(6):910–6.
12. Grace SL, Fry R, Cheung A, Stewart DE. Cardiovascular Disease. BMC Womens Health 2004:4(Suppl 1):S15.
13. Crook D, Godsland IF, Wynn V. Oral contraceptives and coronary heart disease: modulation of glucose tolerance and lasma lipid risk factors by progestins. Am J Obset Gynecol 1988;158(6 Pt 2):1612–20.
14. Hamideh S, Behzad M, Ebrahim G, Hassan E, Mojtaba S. Diet, hypercholesterolemia and diabetes in ischemic heart disease. Pak J Med Sci 2007;23(4):596–601.
15. LinkBack PNT, Karim T. waist-hip ratio and its relationship with coronary heart disease in hospital, swat. Pak J Med Sci 2007;23(4):585–8.
16. Nishtar S. The riskcorn study: A study of the risk factors for coronary artery disease in a Pakistani population., Islamabad:Heartfile,Pakistan;2006.
17. Jafary MH, Samad A, Ishaq M, Jawaid SA, Ahmad M, Vohra EA. Profile of acute myocardial infarction (AMI) in Pakistan. Pak J Med Sci 2007;23(4):485–9.
18. Havranek EP, Masoudi FA, Westfall KA, Wolfe P, Ordin DL, Krumholz HM. Spectrum of heart failure in older patients: Results from the National heart Failure project. Am Heart J 2002;143(3):412–7.
19. Kubzansky LD, Kawachi I. Going to the heart of the matter: Do negative emotions cause coronary heart disease? J Psychosom Res 2000;48(4-5):323–37.
20. Yusuf S, Hawken S, Ôunpuu S, Dans T, Avezum A, Lanas F, *et al.* Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet 2004;364(9438):937–52.
21. Everson SA, Kauhanen J, Kaplan GA, Goldberg DE, Julkunen J, Toumilehto J, *et al.* Hostility and increased risk of mortality and acute myocardial infarction: The mediating role of behavioural risk factors. Am J Epidemiol 1997;146(2):142–52.
22. Dykema J, Bergbower K, Peterson C. Pessimistic explanatory style, stress, and illness. J Soc Clin Psychol 1995;14(4):357–77.
23. Langer EJ, Abelson RP. The psychology of control. Beverly Hills: Sage Publications; 1983;p.311.
24. O'Carroll RE, Smith KB, Grubb NR, Fox KAA, Masterton G. Psychological factors associated with delay in attending hospital following a myocardial infarction. J Psychom Res 2001;51(4):611–4.
25. Lerner JJ, Kannel WB. Patterns of coronary heart disease morbidity and mortality in the sexes: A 26-year follow-up of the Framingham population. Am Heart J 1986;111(2):383–90.
26. Din S, Rabbi F, Qadir F, Khattak M. Statistical analysis of risk factors for cardiovascular disease in Malakand division. Pak J Stat Oper Res 2007;3(2):117–24.
27. Patel KC, Bhopal R. Diabetes epidemic in the South Asian Diaspora: Action before desperation. J R Soc Med 2007;100(3):115–6.
28. Woodward M, Oliphant J, Lowe G, Tunstall-Pedoe H. Contribution of contemporaneous risk factors to social inequality in coronary heart disease and all causes mortality. Prev Med 2003;36(5):561–8.
29. Adebamowo CA, Ogundiran TO, Adenipekun AA, Oyesegun RA, Campbell OB, Akang EE, *et al*. Waist-hip ratio and breast cancer risk in urbanized Nigerian women. Breast Cancer Res 2003;5(2):R18–24.

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