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Research Article

To Assess If Any 10 Years Cardiovascular Mortality Risk In Patients with Psychiatric Disorders By Using Framingham Risk Score

Dr. Vivek Pratap Singh[1], Dr. Archana Javadekar[2*], Dr. Ekram Goyal[3]
[1]Assistant Professor, Department of Psychiatry, Netaji Subhash Medical College & Hospital, Patna, Bihar, India.
[2*]Professor, Department of Psychiatry, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.
[3]Assistant Professor, Department of Psychiatry, B.R. Ambedkar State Institute of Medical Sciences, Punjab, India.
Corresponding Author: Dr. Archana Javadekar, Professor, Department of Psychiatry, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune, Maharashtra, India.
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ABSTRACT
Aim: The aim of the present study was to assess if any 10 years cardiovascular mortality risk in patients with psychiatric disorders by using Framingham risk score.
Methods: The cross-sectional study was conducted at Dr. D. Y. Patil Medical College, Hospital and Research centre, Pimpri, Pune from July 2015 to September 2017 and 126 patients were included in the study.
Results: The majority of patients 78(61.9%) were in the age group of less than 40 years and there were 48(38.1%) cases who were aged more than 40 years. Majority of cases were females 67(53.2%) and 59(46.8%) cases were males. The association between Framingham risk score with metabolic syndrome showed that patients with metabolic syndrome had a mean value of
10.32 with standard deviation of 5.97 on both sides and in patient who were not having metabolic syndrome mean Framingham risk score was 2.61 with standard deviation of 5.89. A significant difference of Framingham risk score according to metabolic syndrome was found as p value was found to be<.0001. The association between coronary artery heart disease risk with metabolic syndrome showed that in patients who were diagnosed with metabolic syndrome in them 0-5 % risk was seen in 34(72.34%) cases and >5% risk was seen in 13(27,66%) patients. In patients not having metabolic syndrome in 0-5% risk was seen in 73(92.41%) cases and >5 % risk was seen in 6(7.59%) patients.
Conclusion: The study suggests that patients suffering from psychiatric disorders are at higher risk of developing metabolic syndrome. The Framingham risk score and 10 years coronary heart disease risk was also found to be higher in these patients. Asian population is already at higher risk to develop metabolic syndrome, routine screening of patients suffering from psychiatric disorder and those who are receiving psychotropics for metabolic disturbances becomes essential.

Keywords: Cardiovascular Mortality Risk, Psychiatric Disorders, Framingham Risk Score.

INTRODUCTION

Cardiovascular disease is the leading cause of overall mortality, accounting for 24 % of deaths worldwide, while psychiatric diseases, led by major depressive disorder, are considered the eleventh most burdensome disease globally, with an increasing effect on overall mortality.[1,2] Criteria for the definition of severe mental illness (SMI) differ, with some authors applying a narrow definition based on psychosis3 and others also including a set of nosological entities of different types and clinical symptoms but with several common diagnostic criteria: severity, persistence over time (2 years or more), and a tendency toward clinical deterioration and difficulties in social and occupational function.[4,5]

The increased risk of CVD among patients with SMI is attributed to unhealthy lifestyle factors such as poor diet, inadequate physical activity, cigarette smoking, alcohol consumption, and sedentary behaviors.[6,7] Additionally, biological mechanisms, including autonomic nervous system (ANS) dysfunction, hypothalamic-pituitary-adrenal (HPA) axis dysregulation, inflammation, lipid pattern abnormalities, oxidative stress, increased platelet reactivity, and obesogenic effects of psychotropic medication, have been proposed.[8-11] Early identification of individuals at elevated risk of CVD is necessary so that lifestyle modification or pharmacological interventions can be

initiated to alleviate the risk of disease.[12] Current recommendations on the prevention of CVD in clinical practice emphasize the need to base interventions on an assessment of the individual's total burden of risk rather than on the level of any particular risk factor.[13,14] This is because most people who develop CVD have several risk factors which interact to produce their total risk. CVD prevention guidelines recommend the use of CVD risk scores to guide treatment decisions for primary prevention in people who do not yet have clinical manifestations of CVD.[15,16] Several prediction risk equations for CVD are available including the Framingham risk score[17], ASCVD (Atherosclerotic Cardiovascular Disease) risk score[18], QRISK[19] and others but have not been validated for use in low resource settings. Because of this, CVD risk assessment is not routinely done among patients with SMI in low resource settings, yet these patients are at risk of premature morbidity and mortality from CVD.

The aim of the present study was to assess if any 10 years cardiovascular mortality risk in patients with psychiatric disorders by using framingham risk score.

MATERIALS AND METHODS

The cross sectional study was conducted at Dr. D. Y. Patil Medical College, Hospital and Research centre, Pimpri, Pune from July 2015 to September 2017 and 126 patients were included in the study.

Inclusion criteria

- Patients presenting with psychiatric disorders at a tertiary care centre for the first time
- Patients taking some psychotropic medications
- Adults >20yrs Old Exclusion criteria
- Patients who refused to give consent
- Pregnant women with psychiatric illness
- All those who have delivered a child in past 1 year ETHICS

IEC (Institute ethics committee) clearance was obtained before starting the study. Written and informed consent was obtained, from all patients.

METHODOLOGY

Informed consent was taken from all the patients who were the part of this study. At any point any patient who was found to be incompetent on the basis of severity of any illness to provide informed consent the caregiver who were staying with the patient were approached for the same. After explaining the purpose and design of the study all the patients who were diagnosed with psychiatric disorders according to ICD-10 by two senior psychiatrists of tertiary health care system were recruited.

Patient's age, demographic features; family history, level of education, duration of disease, use of alcohol and or nicotine, use of concomitant medications or psychotropic drug history, history of diagnosis and treatment of diabetes, dyslipidaemia, hypertension or any other medical conditions was also evaluated and mentioned. Calibrated Scales was used to measure body weight and height in kilograms and centimeters respectively. Waist circumference was measured at a point taken midway between inferior costal margin and superior iliac crest at the end of normal expiration while standing. Blood pressure in supine position was noted by using standard mercury manometer and at least two readings at five minutes intervals were taken. If blood pressure was >140/90 mm of Hg then a third reading after 30 minutes was recorded and the lowest of these readings was taken. Fasting blood sugar, triglyceride, high density lipoprotein values were also estimated by taking fasting venous samples under aseptic measures. Metabolic Syndrome was diagnosed in the enlisted study group from the data obtained after obtaining all the biochemical values and comparing the values with the base values which were mentioned in the International Diabetes Federation Criteria and then 10 years cardiovascular risk was assessed in the same patient by using the Framingham risk scoring. The data obtained according to the study requirement was analyzed using the proper statistical methods.

Tools

International Diabetes Federation Criteria (Idf)

Metabolic syndrome was first defined by International Diabetes Federation in 2006 and of all the criterion which were used this was the only criteria which was epidemiologically and clinically relevant. This was well adapted as these provided a differential profile for Asian populations.

These definitions gave priority to abdominal obesity (Abdominal circumference of ≥ 90cms and ≥ 80cms for men and women of Asian origin respectively and 102cms and 88cms for Non- Asians male and females respectively. The

other criteria used was Triglyceride levels of > 150 mg/dl, a systolic blood pressure ≥130 mm of Hg or a diastolic blood pressure ≥85 mm of Hg, A fasting plasma glucose level of ≥100 mg/dl, high density lipoproteins of <40 mg/dl and 50 mg/dl for men and women respectively. The IDF criteria needs central obesity plus any other two or more out of five criteria.[18]

Framingham Cardiovascular Risk Score (Frs)

The Framingham Risk Score is a sex specific algorithm that was used to estimate the 10 years cardiovascular risk of an individual. The score was estimated on the basis of age, sex, total cholesterol, high density lipoprotein (HDL) cholesterol, diabetes mellitus, smoking habits and systolic arterial pressure. The Framingham Risk Score first originated based on the data that was obtained from Framingham Heart Study to estimate the 10 years risk of developing coronary heart disease. In addition to coronary heart disease prediction 10 years cardiovascular disease risk, periphery artery disease, heart failure, cerebrovascular events were subsequently added in 2008 Framingham Risk Score.[19]

Statistical Analysis

The scales were scored as per the test manual. Data was collected, compiled and tabulated.The statistical analysis was done using parametric test and the final interpretation was based on Z test (standard normal variate) with 95% level of significance. Results were statistically analyzed using the software:- Statistical package for the social science (SPSS) Version 21. Parametric data was analyzed by paired and unpaired T test. Frequency data was analyzed by chi square test.

RESULTS

Table 1: Baseline Characteristics

Age (Yrs)	**No of cases**	Percentage
21 – 30	40	31.7
31 – 40	38	30.2
41 – 50	32	25.4
>50	16	12.7
Sex		
Male	59	46.8
Female	67	53.2
Education		
Illiterate	56	44.4
Primary	36	28.6
Secondary	8	6.3
Higher secondary	14	11.1
Graduate	12	9.5
Marital status		
Married	79	62.7
Unmarried	41	32.5
Separated	2	1.6
Divorced	4	3.2
Residence		
Rural	68	54
Urban	58	46
Occupation		
Unskilled	71	56.3
Skilled	23	18.3

Housewife	17	13.5
Student	4	3.2
Unemployed	11	8.7

The majority of patients 78(61.9%) were in the age group of less than 40 years and there were 48(38.1%) cases who were aged more than 40 years. Majority of cases were females 67(53.2%) and 59(46.8%) cases were males. 56(44.4%) cases were illiterates, 36 patients (28.6%) were educated upto primary level,14(11.1%) were from higher secondary level,12(9.5%) were graduates and 8(6.3%) were educated upto secondary level. 79(62.7%) cases were married ,41 cases(32.5%) were unmarried,4(3.2%) were divorced and 2(1.6%) cases were separated. 68(54%) patients were belonging to rural areas and 58(46%) cases were from urban India.

71(56.3%) cases were unskilled, 23(18.3%) were skilled, 17(13.5%) were housewife, 11(8.7%) cases were unemployed and 4(3.2%) cases were students.

Table 2: Comparison of Framingham Risk Score According to Metabolic Syndrome in Study Group

Parameter	**Metabolic syndrome**				**Z Value**	P Value
	Present (n=47)		**Absent (n=79)**			
	Mean	SD	Mean	SD		
FRS score	10.32	5.97	2.61	5.89	5.98	<0.0001

The association between Framingham risk score with metabolic syndrome showed that patients with metabolic syndrome had a mean value of 10.32 with standard deviation of 5.97 on both sides and in patient who were not having metabolic syndrome mean Framingham risk score was 2.61 with standard deviation of 5.89. A significant difference of Framingham risk score according to metabolic syndrome was found as p value was found to be<.0001.

Table 3: Association between Coronary Heart Disease and Metabolic Syndrome in Study Group

CHD risk (%)	**Metabolic syndrome**		Total (%)
	Present (%)	Absent (%)	
0 – 5 (Low)	34 (72.34)	73 (92.41)	107 (84.92)
>5(High)	13 (27.66)	6 (7.59)	19 (15.08)
Total	47 (100)	79 (100)	126 (100)

The association between coronary artery heart disease risk with metabolic syndrome showed that in patients who were diagnosed with metabolic syndrome in them 0-5 % risk was seen in 34(72.34%) cases and >5% risk was seen in 13(27,66%) patients. In patients not having metabolic syndrome in 0-5% risk was seen in 73(92.41%) cases and >5 % risk was seen in 6(7.59%) patients. A significant association between coronary artery heart disease risk and metabolic syndrome was found as p value was <.01.

DISCUSSION

Cardiovascular disease (CVD), which includes ischaemic heart disease and stroke, is a leading cause of morbidity and mortality worldwide.[20] CVD is more prevalent among patients with severe mental illness (SMI) compared to the general population resulting in reduced life expectancy and increased morbidity and mortality in this population.[21-24] As previously reported, patients with SMI have a 78% higher risk for developing CVD and a 53% higher risk for harboring factors related to CVD.[25]

The majority of patients 78(61.9%) were in the age group of less than 40 years and there were 48(38.1%) cases who were aged more than 40 years. This finding was consistent with a study done by Lakhan et al[26] which showed that age is an important predictor of mental illness in the population irrespective of the residential settings. Majority of cases were females 67(53.2%) and 59(46.8%) cases were males. This was in accordance to a study done by Malhotra et al[27] where they found that gender differences occurs in mental disorder but women predominates. 56(44.4%) cases were illiterates, 36 patients (28.6%) were educated upto primary level,14(11.1%) were from higher secondary level,12(9.5%) were graduates and 8(6.3%) were educated upto secondary level. This was consistent with a study done by Gomes et al[28] where maximum number of individual suffering from mental disorders had completed their studies only till their secondary education and another possible explanation would be that poor education can decrease people skills and could lead to faulty coping mechanism making them prone to mental health illnesses.[29]

The association between Framingham risk score with metabolic syndrome showed that patients with metabolic syndrome had a mean value of 10.32 with standard deviation of 5.97 on both sides and in patient who were not having metabolic syndrome mean Framingham risk score was 2.61 with standard deviation of 5.89. A significant difference of Framingham risk score according to metabolic syndrome was found as p value was found to be<.0001. The differences in the CVD risk could be attributable to the different risk prediction scores used in these other studies which mainly used the Framingham risk score (FRS) which uses a wider age range, 20- 70 years, compared to the Globorisk which uses a narrower age range of 40-74 years. The FRS includes people below 40 years whose risk for CVD is generally lower and therefore could explain the low risk in these studies. The risk of CVD in our study was however lower than in the UK (10.4%)[30] and Toronto (8.9%)[31] probably because of the differences in socioeconomic status across these countries.

The association between coronary artery heart disease risk with metabolic syndrome showed that in patients who were diagnosed with metabolic syndrome in them 0-5 % risk was seen in 34(72.34%) cases and >5% risk was seen in 13(27,66%) patients. In patients not having metabolic syndrome in 0-5% risk was seen in 73(92.41%) cases and >5 % risk was seen in 6(7.59%) patients. A significant association between coronary artery heart disease risk and metabolic syndrome was found as p value was <.01. This was in accordance to various studies done where ten year risk of having coronary artery heart disease was found to be significantly higher in patients diagnosed with metabolic syndrome.[32,33]

CONCLUSION

The study suggests that patients suffering from psychiatric disorders are at higher risk of developing metabolic syndrome. The Framingham risk score and 10 years coronary heart disease risk was also found to be higher in these patients. Asian population is already at higher risk to develop metabolic syndrome, routine screening of patients suffering from psychiatric disorder and those who are receiving psychotropics for metabolic disturbances becomes essential. we can give simple lifestyle advices like exercises and balanced diet which can reduce the morbidity and mortality rates in patients suffering from mental disorders leading to improvement in their quality of life.

REFERENCES

1. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012; 380(9859):2095–128. doi: 10.1016/S0140-6736(12)61728-0.
2. Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. Disability- adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012; 380(9859):2197–223.
3. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Fifth. Arlington: American Psychiatic Publishing; 2013.
4. Ruggeri M, Leese M, Thornicroft G, Bisoffi G, Tansella M. Definition and prevalence of severe and persistent mental illness. Br J Psychiatry. 2000; 177:149–55.
5. Guideline development group of the Clinical Practice Guideline on

Psychosocial Interventions in Severe Mental Illness. Clinical practice guideline on psychosocial interventions in severe mental illness. Madrid: Ministry of Health and Social Policy; 2009.

6. Stubbs B., Williams J., Gaughran F., Craig T. How sedentary are people with psychosis? A systematic review and meta-analysis. Schizophrenia research. 2016; 171(1-3):103–109. doi: 10.1016/j.schres.2016.01.034.
7. De Hert M., Schreurs V., Vancampfort D., Van Winkel R. Metabolic syndrome in people with schizophrenia: a review. World Psychiatry. 2009;8(1):15–22.
8. Goldstein B. I., Carnethon M. R., Matthews K. A., et al. Major depressive disorder and bipolar disorder predispose youth to accelerated atherosclerosis and early cardiovascular disease: a scientific statement from the American Heart Association. Circulation. 2015; 132(10):965–986.
9. Stapelberg N. J., Hamilton-Craig I., Neumann D. L., Shum D. H., McConnell H. Mind and heart: heart rate variability in major depressive disorder and coronary heart disease- a review and recommendations. Australian & New Zealand Journal of Psychiatry. 2012; 46(10):946–957.
10. Adibfar A., Saleem M., Lanctot K., Herrmann N. Potential biomarkers for depression associated with coronary artery disease: a critical review. Current molecular medicine. 2016; 16(2):137–164.
11. Subramaniam M., Lam M., Guo M. E., et al. Body mass index, obesity, and psychopathology in patients with schizophrenia. Journal of Clinical Psychopharmacology. 2014; 34(1):40–46.
12. Stephens J. W., Ambler G., Vallance P., Betteridge D. J., Humphries S. E., Hurel S. J. Cardiovascular risk and diabetes. Are the methods of risk prediction satisfactory? European Journal of Cardiovascular Prevention & Rehabilitation. 2004; 11(6):521–528.
13. Pearson T. A., Blair S. N., Daniels S. R., et al. AHA guidelines for primary prevention of cardiovascular disease and stroke: 2002 update. Circulation. 2002; 106(3):388–391.
14. Jackson R. Guidelines on preventing cardiovascular disease in clinical practice. BMJ. 2000; 320(7236):659–661.
15. Anderson T. J., Grégoire J., Hegele R. A., et al. 2012 update of the Canadian Cardiovascular Society guidelines for the diagnosis and treatment of dyslipidemia for the prevention of cardiovascular disease in the adult. Canadian Journal of Cardiology. 2013; 29(2):151–167.
16. Duerden M., O'Flynn N., Qureshi N. Cardiovascular risk assessment and lipid modification: NICE guideline. The British Journal of General Practice. 2015; 65(636):378–380.
17. Lloyd-Jones D. M., Wilson P. W. F., Larson M. G., et al. Framingham risk score and prediction of lifetime risk for coronary heart disease. The American journal of cardiology. 2004; 94(1):20–24.
18. Preiss D., Kristensen S. L. The new pooled cohort equations risk calculator. Canadian Journal of Cardiology. 2015; 31(5):613–619.
19. Hippisley-Cox J., Coupland C., Robson J., Brindle P. Derivation, validation, and evaluation of a new QRISK model to estimate lifetime risk of cardiovascular disease: cohort study using QResearch database. BMJ. 2010; 341(dec09 1):p. c6624.
20. Eckel R. H., Jakicic J. M., Ard J. D., et al. 2013 AHA/ACC Guideline on Lifestyle Management to Reduce Cardiovascular Risk: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Journal of the American College of Cardiology. 2014;63(25):2960–2984.
21. Brown S., Barraclough B. Causes of the excess mortality of schizophrenia. The British journal of psychiatry. 2000;177(3):212–217.
22. Miller B. J., Paschall C. B., Svendsen D. P. Mortality and medical comorbidity among patients with serious mental illness. Psychiatric Services. 2006;57(10):1482–1487.
23. Naghavi M., Wang H., Lozano R., et al. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2015;385(9963):117–171.
24. Murray C. J. L., Vos T., Lozano R., et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the

Global Burden of Disease Study 2010. The lancet. 2012;380(9859):2197–2223.

25. Correll C. U., Solmi M., Veronese N., et al. Prevalence, incidence and mortality from cardiovascular disease in patients with pooled and specific severe mental illness: a large- scale meta-analysis of 3,211,768 patients and 113,383,368 controls. World Psychiatry. 2017;16(2):163–180.
26. Lakhan R, Ekúndayò O. National sample survey organization survey report: An estimation of prevalence of mental illness and its association with age in India. Journal of Neurosciences in Rural Practice. 2015;6(1):51.
27. Malhotra S, Shah R. Women and mental health in India: An overview. Indian Journal of Psychiatry. 2015;57(6):205.
28. Gomes V, Miguel T, Miasso A. Common Mental Disorders: socio-demographic and pharmacotherapy profile. Revista Latino-Americana de Enfermagem. 2013;21(6):1203- 1211.
29. Manners A, Schnabel L, HernandezJudy E. Silberg,Eaves.The Relationship between Education and Mental Health: New Evidence from a Discordant Twin Study. LSoc Forces. 2016; 95 (1): 107-131.
30. McCreadie R. G. Diet, smoking and cardiovascular risk in people with schizophrenia: descriptive study. The British Journal of Psychiatry. 2003;183(6):534–539.
31. Cohn T., Prud'homme D., Streiner D., Kameh H., Remington G. Characterizing coronary heart disease risk in chronic schizophrenia: high prevalence of the metabolic syndrome. The Canadian Journal of Psychiatry. 2004;49(11):753–760.
32. Said M, Sulaiman Aet al.Metabolic syndrome and cardiovascular risk among patients with schizophrenia receiving antipsychotics in Malaysia. Singapore Med J.2012; 53(12) : 801
33. Wysokiński A, Kazmierski J, Kłoszewska I. Comparison of metabolic parametersand Framingham cardiovascular risk scores before and after in-hospital treatment with antipsychotics.Archives of Psychiatry and Psychotherapy. 2014;16(1):21-29.