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Untersuchung des Risikos für Herz-Kreislauf-Erkrankungen bei Mitarbeitern der Bank der Oberschicht in Gulbarga

Vinod R. K., Pastapur
Viswabharathi Medical College, Kurnool

ABSTRACT

In der Situation: Angestellte der Officer-Grade-Bank in Gulbarga wurden untersucht, da sie einen hohen Arbeitsstress ausgesetzt sind. Ziel: (1) Die Wahrscheinlichkeit von Herz-Kreislauf-Erkrankungen bei der Studie zu bewerten. To propose a comparable population-based strategy for heart disease screening for other groups. Settings and Design: 59 officers from 242 banks in Gulbarga city (nationalized and private), were willing to participate in the study. First, this population was screened by a self-assessment survey with ten questions about past history, family history, and lifestyle habits. Für die Analyse wurde ein Scoring-System verwendet. Material and Methods: The preliminary section of this cross-sectional study was carried out disease (representing 83% of the examined population) and thus qualified for the second round of evaluation. Out of the only 31 officers who underwent the second round of assessment, 15 (48.4%) were found to be at higher risk and were therefore sent to the third round. Of the 15 officers, only five underwent the third round of evaluation. All of them were found to be extremely at risk for CVDs and were appropriately referred to a tertiary health care centre. Ergebnisse: Die Studie zeigt die Verwendung eines Risikobewertungsmodells zur Vorhersage des Risikos für Herz-Kreislauf-Erkrankungen bei Personen mit hohem Risiko. Similar models could be used to assess other population groups' risks.

Key words: Blood investigations, cardiovascular disease, professional stress, risk assessment

INTRODUCTION

disease (which constituted 83% of the examined population) and was therefore qualified for the second round of evaluation. Of the only 31 officers who underwent the second round of assessment, 15 (48.4%) were found to be at higher risk and were sent to the third round. Of the 15 officers, only five passed the third round of assessment. All of them were found to be highly at risk for CVDs and were appropriately referred to a tertiary health care centre. Ergebnisse: Die Studie zeigt, wie ein Risikobewertungsmodell Menschen mit hohem Risiko für Herz-Kreislauf-Erkrankungen vorhersagen kann. Similar models could be used to evaluate the risks of other population groups.

In India, about 40.4% of deaths (37.8 million) were attributable to noncommunicable diseases in 1990, and it is projected that this will increase to 67% (76.3 million) by the year 2020.[1]

CHD prevalence in urban populations increased from 3.5% in 1960s to 9.5% in 1990s. In rural areas, itincreased from 2% in 1970s to 4% in 1990s.[2] Coronary risk factors are more common among urban Indians andare confirmed by case-control studies. In our Country, it has been found that CHD affects the population a decade earlier than the west.

An ideal way to reduce the incidence of cardiovasculardiseases is through population based preventive measures along with a high risk treatment approach. The need of the hour is to design a study for population based screening of risk factors for CVD. This will help in framing appropriate preventive measures.

Aims

To implement a suggested model for cardiovascular riskassessment, among a high risk population.

Objectives

(1) To assess the risk of cardiovascular disease amongbank employees,
(2) To screen and refer previously undiagnosedcardiovascular ill-health among the said populace,

(3) To propose a similar population based heart diseasescreening strategy for other groups.

Literature review

There are few well planned large scale epidemiological studies available in India, and most of the data are derived from hospital based studies, which are not epidemiologically appropriate to draw inferences that can be applicable to a community at large. The rapid growth of Indian economy has contributed to a number of social problems, as the traditional agrarian society tries to adapt to urbanization and a changing economic order.[3]

A study by Mohanan[5] *et al.* showed a CHD prevalence of 7.4%. This study was conducted on 128 adults during October to December 2005, in Mangalore, Karnataka. Hypertension as already known was found to be a risk factor for CHD in this study also. The various other risk factors such as gender, family history, diet pattern, lifestyle, alcoholism, and diabetes were found to be

associated with an increased mean blood pressure, whichin turn is a risk factor for CHD.

A meta-analysis of various small population based studies from different parts of India shows that the prevalence of CHD has increased from 7.05% (1961) to 9.67% in 1995 in urban Indian population, and from 2.03% (1974) to 3.7% in 1995 in rural population.[6]

A series of 6597 consecutive diabetic subjects were studied to assess the prevalence of CHD by Mohan V.*et al.* in the CUPS study, which revealed on ECG that 11% of subjects (age standardized, 9.0%) had CAD. On further expansion of this study to the urban Chennai residents, it was found that the prevalence of CHD among diabetics was 2--3-fold higher as compared to the nondiabetics (21.4% vs. 9.1%). Prevalence of CHD increased with an increase in total cholesterol (P < 0.001), Low density Lipoprotein LDL cholesterol (P < 0.001), Triglycerides (P=0.002) and Total cholesterol/High density lipoproteinTC/HDL ratio (P = 0.0132). Multiple logistic regression analysis identified age (P < 0.001) and LDL cholesterol (P = 0.051) as the risk factors for CHD.[7]

MATERIALS AND METHODS

Total screening of the population for CAD is not feasible due to economic and logistic reasons. However, a screening of population at higher risk for developing CVD is still possible, as suggested by Hazra [6] *et al.* A similar effort is also being used in the ''Greenville Hospital system'' in South Carolina (United States of America).

Our study population comprises of bank officers in Gulbarga city. A few banks were selected (Nationalized and Private), and only the officer grade employees of these banks were included in the study. This study group was considered as they work under professional stress, which predisposes them for developing heart diseases. This observational study provides point prevalence risk, following assessment of the at-risk population. The defined population (bank employees), were included in this cross-sectional study, considering the work-related stress associated with the nature of their profession.

The initial part of this cross-sectional study was conducted during April 2006, with multiple assessment levels of the study being completed in the ensuing months.

This population was initially screened through a self- assessment scale. Those who score ≥ 3 by self assessmentwere then considered for first preliminary and then detailed assessment, which were carried out at a hospital in Gulbarga.

All the officers in the study were males, as the numbersof female officer-grade bank employees in Gulbarga citywere minimal. Of the few female officers, none wished to participate in the study. All the officers in the study were in the 40--60 year age group, as in the banking sector in India: employees reach the Officer grade after40 years of age and superannuate by 60 years of age.

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The officers during the course of the study were subjected to a standard 12 lead electrocardiography (ECG). The ECG findings were consulted with the Physician at a referral hospital. Ischemia/infarction was diagnosed as per Minnesota coding guidelines[8]. Estimation of blood glucose was done by the laboratory enzymatic method. Fasting blood sugar level ≥110 mg/dl (venous blood) was taken as impaired glucose tolerance or a potential case of diabetes mellitus. Blood pressure was measured using a mercury BP apparatus. High blood pressure (HBP) was defined as blood pressure of ≥140/90 mm Hg, measured on two different occasions. A person with history of treatment for HBP was classified as a hypertensive. Persons who smoked 10 cigarettes or more or chewed tobacco at least twice a day were classified smokers/tobacco users. Body mass index (BMI), that is the ratio of weight in kilogram to the square of the height in meters, was used as an indicator of overweight[9]/obesity. A BMI
>25 kg/m^2 was considered as overweight[9] and >30kg/m^2 was considered as obese.

BMI has been used by WHO as the standard for recording obesity statistics since the early 1980s. As it depends only on weight and height, its assumptions about the distribution between lean body mass and adipose tissue are not always exact. It does not take into account many factors such as frame size and muscularity, water weight and varying proportions of fat, bone and cartilage.[10]

The same group was assessed at three different levels, with only the subjects qualifying at each round proceeding to the next level. Among all of 242 bank employees in Gulbarga city, only 59 were willing to be part of the study. Hence Prevalence risk will not be calculated with 242 as the denominator. As Paired proportion test could only be computed with respect to 242, it will not be applied here.

As data regarding past experience and current disease status were collected at the same point of time, it accounted for a Univariate analysis. Thus, statistical tests could not be applied to the data. Hypothesis testing with regard to cause- effect relationship was not done, as the study group was assessed at one point of time. Inclusion of control group would have provided statistically significant results. But given the relative limitations of the systems in which the study was conducted, it was a difficult task to implement analytical and/or experimental study designs. [Tables 1 and 2].

Those subjects found positive in detailed assessment were referred to a tertiary health care centre [Table 3].

RESULTS

Out of the total 242 bank employees in Gulbarga

Table 1: Enumeration of banks in Gulbarga city

Nationalized banks	Branches	No. of officers	Nationalized banks	Branches	No. of officers
GDCC	2	6	Canara	3	38
KSFC	1	13	Indian	1	5
Punjab National	1	3	Corporation	1	7
State Bank of Mysore	1	5	Central Bank of India	1	2
Syndicate	3	20	Indian Overseas	1	4
UCO	1	2	Karnataka	1	4
Krishna Grameena	5	40	State Bank of Hyderabad	8	65
Bank of Maharashtra	1	4	State Bank of India	5	37
Andhra	1	8	Private		
Bank of Baroda	1	4	UTI	1	6
Bank of India	1	4	Vysya	1	10
Vijaya	1	4	TN Mercantile	1	2
Union	1	2	Catholic Syrian	1	2
KSIC	1	2	8 Cooperative[a]	--	--

[a]*Co-operative banks were not considered due to lack of time, GDCC - Gadchiroli district central cooperative bank limited, KSFC - Karnataka state financial corporation, UCO - United commercial bank, KSIC - Karnataka silk industries corporation limited, UTI - Unit trust of India*

city, 59 employees were examined in the study. Hence, prevalence risk will not be computed with 242 bank employees as the denominator. Among these, 49 were found to be at risk for cardiovascular diseases(comprising ~83% of the assessed population) and thus qualified to the second round of assessment. Only 31 officers underwent the second round of assessment, out of whom 15 (48.4%) were found at risk and thus were subjected to the third round. About 5 officers (out of the 15) underwent the third round of risk assessment and were all referred to a tertiary health care centre [Table 4 and Figure 1].

DISCUSSION

Out of the 242 officer grade bank employees across all branches in a total of 26 banks in Gulbarga city, only59 Officers were willing to be a part of the study. We subjected this group (~25% of the total officer grade bank employee populace) to the self-assessment scale.About 49 officers (~83% of the study population) scored >3 on the self-assessment scale. Out of these 49, only 31 had the time and enthusiasm to proceed to the preliminary assessment level of our Study. Out of these 31, 15 (~25%) were found at risk and were requested to undergo the detailed assessment. Only five officers underwent the last level of assessment, and were diagnosed to have some cardiac pathology. They were referred to a tertiary health care centre in Gulbarga city.

Table 2: Parameters of self assessment scale

Factors	Scale
Family history of CAD/DM/HTN/Stroke	2
Known Diabetic	2
Known CAD	2
Known hypertension	2
Smoking/chewing tobacco	2
Sedentary life style	1
Obesity	2
Over weight	1
History of polycystic ovarian disease (PCOD)	2
History of exertional chest pain	2

Parameters for primary assessment

Parameter	Sl. no.	Investigations
Physical examination	8	Blood sugar fasting
Weight	9	Serum cholesterol
Height	10	ECG
BMI (body mass index)		
Waist hip circumference		
Blood pressure		
Heart rate		

As a result of this study, 83% of the study populationwere found to be at-risk for cardiovascular diseases. We were able to alert them regarding the same, and had advised them regarding lifestyle measures such that the progression and early onset of disease was prevented. Fifteen subjects whose risk-assessment after the second round, were found to be morbid/co-morbid with illnesses were counseled regarding appropriate diagnosis, compliance to treatment and periodic check-ups. The five officers who underwent the final level of assessment, were never aware of the quantum of cardiac pathologywithin themselves. Through this study, we were ableto refer the five officers: utmost at risk to a Tertiary care facility. The Physician who co-authored the study, opined that the five subjects had ECG variations and bio-chemical profiles conforming with an on-going, relatively serious cardiac pathology. Through our study, we were able to identify the same at an early stage and refer them to higher centres: wherein they could undergo interventional health care. As a result ofwhich, we gained lead time by putting off/postponing events of severe morbidity and/or end organ damage to an extended future date.

Parameters for detailed assessment

- Total lipid profile,
- Inflammatory cardiac markers, e.g.: CRP,
- Homocystine, Lipoprotein – a,

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- TMT/ECHO,
- Glucose tolerance test.

This proposed population-based screening test for adults, helps us to initially identify those at

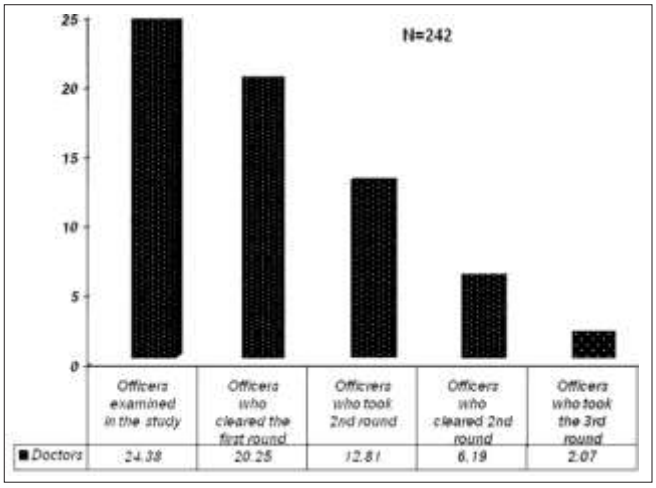

Figure 1: Bar diagram depicting officers (*n* = 242) who participated in each of the three rounds and those who were found at risk after the initial two rounds

Table 3: Enumeration of bank officers examined during the initial self-assessment round

Nationalized banks	Officers examined initially	Officers at risk after 1st round	Officers at risk after 2nd round	Officers who took 3rd round	Officers referred
GDCC	-	-	-	-	-
KSFC	6	4	2	0	0
Punjab National	3	0	0	0	0
State Bank of Mysore	3	2	0	0	0
Syndicate	-	-	-	-	-
UCO	2	2	0	0	0
Krishna Grameena	12	11	6	1	1
Bank of Maharashtra	1	1	0	0	0
Andhra	-	-	-	-	-
Bank of Baroda	2	1	1	0	0
Bank of India	2	2	1	1	1
Vijaya	1	1	0	0	0
Union	2	1	0	0	0
KSIC	-	-	-	-	-
Canara	-	-	-	-	-
Indian	5	5	1	0	0
Corporation	-	-	-	-	-
Central Bank of India	-	-	-	-	-
Indian Overseas	3	3	0	0	0
Karnataka	4	4	1	1	1
State Bank of Hyderabad	-	-	-	-	-
State Bank of India	11	11	2	1	1
Private					
UTI	-	-	-	-	-
Vysya	2	1	1	1	1
TN Mercantile	2	1	0	0	0
Catholic Syrian	1	1	0	0	0
8 Cooperative	-	-	-	-	-

Table 4: Total beneficiaries

	Number	(%)
Total number of bank employees	242	-
Officers examined in the study	59	
Officers found at risk after the first round	49	83.05
Officers who took the 2nd round	31	
Officers found at risk after the 2nd round	15	25.4
Officers who took the 3rd round	5	

cardiovascular risk by administering the self-assessment scale. Then we can stratify the at risk group by carrying out the preliminary assessment. Further we can specify the group at highest risk, by subjecting them to the detailed assessment strategy. By this way, we can identify, stratify and specify individuals at risk for CVD, from the capital population.

The proposed model could be used on the general population, wherein they could be motivated through a multimedia approach for self-assessment, through radio/ television/newspaper advertisements. Preliminary and then detailed assessments could be carried out at a chain

of hospitals within the existing medical care frame work (District Hospitals, Medical Colleges and other Tertiary Hospitals).

CONCLUSION

Die höhere incidence von chronic non-communicable diseases such as cardiovascular diseases, cancer and diabetes has caused India to face an increasing disease burden. Die dringende Notwendigkeit besteht darin, Maßnahmen zu integrieren, die auf der populationsbasierten Population basieren, um die Risikofaktoren für Herzerkrankungen zu ändern, sowie kostengünstige Lösungen für die Behandlung von Patienten mit erhöhtem Risiko für Herzerkrankungen. Die vorgeschlagene Methode ist praktikabel und könnte für die Bewertung des kardiovaskulären Risikos in anderen populationsgruppen verwendet werden..

As this disease affects our population a decade earlier than the west, disease prevention is the most cost-effective strategy for improving the health of our population.[3] Eine nationale Gesundheitspolitik muss in diesem Zusammenhang erstellt werden.Epidemiologic transition[11] describes the paradigm

shift in communicable diseases, as a predominant concern in developing countries, towards chronic non-communicable diseases. With respect to the evolution of cardiovascular diseases in such countries, the increased numbers could be because of changing lifestyle measures including dietary practices, towards which the native population is genetically unaccustomed to.

The study was designed with an intent to initially identify the at-risk group among a populace with work related stress (bank employees), subsequently stratify the ones with higher risk among them, and further refer the subjects with utmost risk to a higher healthcare centre.

In unserer Untersuchung wurden sekundäre Vorsichtsmaßnahmen wie frühzeitige Diagnose und Behandlung angewendet. Dies führte dazu, dass Patienten, die früher an einem tertiären medizinischen Einrichtungsbesuch teilnehmen würden, wenn sie anfangen würden zu zeigen, dass sie an einer progressiveren Erkrankung litten und letztendlich zu Organschäden führten, frühzeitig identifiziert wurden und angemessene Maßnahmen zur Beseitigung von Schäden ergriffen wurden..

Although most chronic disease (CVD in the present scenario) pathological processes cannot be reversed, through our study we were gained lead time by detecting, referring and thus postponing/preventing end organ damage.

Limitations of the study

1. Stratification for different grades of officers (I--VII) was not carried out in our study. Different grades experience different amounts of professional stress, as responsibilities vary among them.
2. Age wise stratification and subsequent cardiac risk assessment with increasing age was not carried out.
3. Personal life stress could confound the association between professional stress and heart disease risk. In our study, we could not assess them separately.
4. Blood cardiac markers Homocysteine and Lipoprotein-a, could not be tested in Gulbarga due to the unavailability of enzyme kits in the laboratory.
5. Study design: Rather than the cross-sectional study design, a case-control design could have yielded statistically significant results.

Challenges unforeseen

1. All the officers (242) could not be included due to lack of cooperation from their respective bank managers.
2. Cooperative banks could also not be included due to lack of resources (time, money).
3. Higher authorities not permitting/lack of time among the officers, were few hindrances for including all the officers in the study.
4. Some officers rejected to be a part of the study, as they carried health insurance and did not need our health check-up services.

Future direction

All the subjects who scored ≥3 on the self-assessment scale should be further screened after 2 years to determine the frequency of new cardiac events – development of myocardial infarction or stroke, and whether new risk factors have arisen, and to statistically determine the cost benefit ratio of the proposed strategy.

Ethical committee approval

The study was approved by our Institutional review committee and that the subjects had given informed consent.

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