EPIDEMIOLOGY BASED PLANNING OF AN INFORMATION, EDUCATION AND COMMUNICATION STRATEGY FOR CORONARY RISK PREVENTION

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ABSTRACT

A population based cross-sectional analytical study was undertaken on a randomly selected sample of 2400 army personnel at Delhi to assess the prevalence of well-established coronary risk factors (tobacco use, systemic arterial hypertension, overweight, dietary risk, and lack of regular physical exercise) and their association with certain determinant variables, viz, age, social status, education, and occupation. Data analysis through mathematical models indicated that age more than 35 years, Junior Commissioned Officer rank, and education more than 10th standard were independent and significant predictors of the presence of at least 2 coronary risk factors. These variables were used for identifying high risk target audience. The study indicated that a much higher proportion of target audience desired that the Regimental Medical Officers should provide them with health education regarding coronary risk factor prevention and that the mode of communication should be "small group discussions" of 4 to 5 persons. The linear trend analysis showed a highly significant result in respect of both these variables ($p < 0.01$). Based on these findings, an information, education and communication strategy was planned and pilot-tested in the field and recommendations were submitted.

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KEY WORDS : Health education; Ischaemic heart disease; Prevalence; Risk factors.

Introduction

Ischaemic heart disease (IHD) is a condition whose importance needs no emphasis. It represents the most formidable dilemma that the medical world is faced in modern times. The magnitude of the problem in terms of sheer numbers is mammoth. In addition, the amount of mortality, morbidity, residual disability and human suffering that it results in is beyond description [1,2]. The disease assumes special importance in context of Indian army, where it is one of the leading causes of death, disability, hospital stay and invalidment [3].

Epidemiologic research over the past many years has conclusively proven the role of risk factors like tobacco use, being overweight, physical inactivity, systemic arterial hypertension, and excessive dietary consumption of saturated fat and cholesterol in the causation of IHD [1,2,4-7]. However, it is a surprising fact that despite the organizational commitment to prevent IHD and the availability of highly developed preventive and

curative services, the condition continues to cause considerable loss of highly trained manpower and unquantifiable human suffering [3]. For this reason, the task which the entire medical fraternity is faced with is to devise, through valid and precise methodology, a suitable educational strategy with a view to ensure favourable behavioural change in our clientele.

It was against the above backdrop that the present study was carried out with the objectives of determining the prevalence of the above-mentioned, well-established coronary risk factors, and to study their association with putative predictor variables, with a view to identify the 'high-risk target audience', and to assess the felt need of such target audience as regards their desired source of knowledge and method of education.

Material and Methods

The study was a population based, cross-sectional analysis in the setting of a large cantonment (Delhi). Minimum sample size at the conventional

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alpha and beta error levels of 0.05 (two-tailed) and 0.20 respectively was approximately 2400 and was selected by systematic random sampling from the sampling frame [8-10].

The outcome variables of interest were the important coronary risk factors mentioned above. The cut-off criteria for these risk factors were as per guidelines of various expert bodies [1,5,11-13]. The putative predictor variables to be examined were age (less than or more than 35 years), formal education (less than or more than 10th standard), occupation in the Army (Arms/Services) and social status (officers, junior commissioned officers, other ranks).

Instruments used in the study included a sphygmomanometer, weighing scales and the questionnaire, which included a pretested, 24-hour dietary recall schedule [14]. All the instruments and techniques were standardized and validated during a pilot study on 100 subjects so as to ensure high content, criterion and construct validity [15]. Dummy variables were introduced at optimum points in the schedule. Correlation of repeated measures was assessed by correlation coefficient and ANOVA for continuous variables and kappa coefficient for categorical ones. There were no refusals encountered.

Results

Prevalence of coronary risk factors:- It was observed that regular tobacco use was the commonest risk factor, with a prevalence touching almost half the population (Table 1). Fourteen to 15 per cent of the personnel exhibited dietary risk or lack of regular physical exercise, while overweight and hypertension had a lower prevalence (4%-5%). Almost 8 per cent of the personnel showed multiple risk factors the commonest combination being tobacco use and dietary risk.

Predictors of tobacco use:- Multiple logistic regression analysis, to simultaneously control for the confounding effect of various predictor variables (age, social class, education, occupation) in their relationship with tobacco use indicated that increasing age, being from Arms, having a higher education and being a junior commissioned officer (JCO) were all independent and significant risk factors for being a tobacco user (Table 2). The odds ratio was found to be clearly high for JCOs,

TABLE 1

Prevalence of risk factors

Regular Tobacco Use	45.9%
Dietary Risk	14.7%
Lack Of Regular Exercise	14.3%
Overweight	5.3%
Systemic Arterial Hypertension	4.4%
Multiple Risk Factors	8.1%
Commonest Combination : Tobacco Use and Dietary Risk	

TABLE 2

Multiple logistic regression analysis of tobacco use

Exposure Variable	Beta Coefficient	Odds Ratio (95% C.I.)	p value
Age	0.037	1.04 (1.02 - 1.05)	< 0.001
Arms	0.567	1.8 (1.5 - 2.1)	< 0.001
Education	0.921	2.5 (1.95 - 3.24)	< 0.001
Officers	-0.24	0.78 (0.46 - 1.34)	> 0.05
JCOs	0.84	2.3 (1.6 - 3.4)	< 0.001

i.e., 2.3 and for Arms, i.e., 1.8.

Predictors of systemic arterial hypertension:- It was observed that increasing age has a highly significant association, the odds of being a hypertensive increasing by about 14 per cent when age was more than 35 years (Table 3). There was also a 'just significant' association with higher education. While the effect of age is biologically plausible, as regards the observed association with higher education, it is quite possible that another, still unknown, intervening variable may be responsible. However, even if this is so, education can still be used as a surrogate marker to identify those that are at a higher risk of being hypertensive and tobacco users.

Predictors of overweight :- There was only one variable, i.e., social status, which showed a significant association with overweight (Table 4). A linear trend analysis of this coronary risk factor according to army rank structure (social class) showed a highly significant rising trend, with the odds of being overweight being 3 times for offi-

TABLE 3
Multiple logistic regression analysis of hypertension

Exposure Variable	Beta Coefficient	Odds Ratio (95% C.I.)	p Value
Age	0.13	1.14 (1.10 - 1.17)	< 0.001
Arms	-0.21	0.8 (0.5 - 1.2)	> 0.05
Education	0.51	1.67 (1.05 - 2.60)	< 0.05
Officers	-11.5	0.0	> 0.90
JCOs	0.30	1.4 (0.8 - 2.5)	> 0.20

TABLE 4
Trend analysis : Body mass index and rank

Rank	B.M.I.		Total	Stratum
	> 25 No. (%)	≤ 25 No. (%)		
Other Ranks	91 (4.2)	2095 (95.8)	2186	1.00
Offrs	9 (12.7)	62 (87.3)	71	3.30
JCOs	28 (19.6)	115 (8.4)	143	5.60

Linear trend Chi Square = 70.9; $p < 0.001$

cers and more than 5 times for JCOs, in comparison with 'other ranks', which was used as the baseline category.

Predictors of dietary risk and lack of regular physical exercise :- The salient features of the mathematical model, as presented in Table 5, indicate that lack of regular physical exercise showed a highly significant association with increasing age and JCOs rank. The probability that an individual aged more than 35 years would be exercising regularly is only 89 per cent as compared to younger ones. Similarly, the probability of a JCO undertaking regular physical exercise is less than half as compared to other ranks. Dietary risk did not show any adverse relation with any of the predictor variables. In fact, the officers rank showed a significant protective effect, with the odds of officers consuming 'risky' diet, as per criteria defined, being only one-thirds.

Identification of the 'target audience' :- From the above findings, those predictor variables which carried a significant risk of being associated with at least 2 of the 5 coronary risk factors were worked out (Table 6). It was found that age more

TABLE 5
Logistic regression : Physical exercise and dietary risk

Outcome Variables	Significant Associations		
	Exposure Variable	Odds Ratio (95% C.I.)	p value
Regular	Age > 35 yrs	0.89 (0.87 - 0.91)	< 0.001
Physical Exercise	JCOs	0.47 (0.3 - 0.7)	< 0.001
Dietary Risk	Officers	0.33 (0.18 - 0.61)	< 0.001

TABLE - 6
The 'target audience'

Predictor variables carrying risk of at least two coronary risk factors

Age > 35 (Tobacco, hypertension, physical inactivity)
EDN > 10 (Tobacco, hypertension)
JCOs (Tobacco, overweight, physical, inactivity)
" Age > 35; Education > 10; JCOs"
(Total 872 Out of 2400 (36.3%))

than 35 years, JCOs rank, and educational level more than 10th standard were strong and significant predictors of the prevalence of at least 2 of the 5 coronary risk factors. Thus, the 'high-risk target audience', for directing the information, education and communication efforts was identified as all those personnel who are aged more than 35 years, JCOs in rank or educated more than 10th standard. This target audience formed a little more than one-thirds (36.3%) of the total sample.

Felt need of target audience as regards source of education:- The linear trend analysis of the comparison between target and non-target audience on the basis of various sources of education is presented in Table 7. It was observed that a very large majority of both, the target audience (91.1%) as well as the non-target audience (66.1%) were desirous of obtaining their education regarding coronary risk prevention from the Regimental Medical Officers (RMOs). Linear trend analysis showed a highly significant result indicating the strong desire of the target audience in favour of RMOs for this purpose.

It was observed that a large majority (58.8%) of the target audience was in favour of "small group discussions" of 4 to 5 persons as the desired

TABLE - 7

Trend analysis of the felt need of target audience : Source of education

Desired Source	Audience				Total	Stratum odds ratio
	Target No.	Target (%)	Non-target No.	Non-target (%)		
Unit Offrs	37	(4.2)	319	(20.9)	356	1.00
Other Sources	41	(4.7)	199	(13.0)	240	1.78
R.M.O.s	794	(91.1)	1010	(66.1)	1804	6.78
Total	872	(100)	1528	(100)	2400	

Linear trend Chi square = 179; $p < 0.001$

method of education, while much lesser proportions favoured lectures (17.8%) and 'other methods' as exhibitions, video films, newsletters etc. (23.7%) (Table 8). On the other hand, the trend was significantly reversed ($p < 0.001$) for 'non-target audience', who largely desired lectures (56.4%) and 'other methods' as the desired method.

TABLE - 8

Trend analysis of the felt need of target audience : Method of education

Desired Method	Audience				Total	Stratum odds ratio
	Target No.	Target (%)	Non target No.	Non target (%)		
Lectures	155	(17.8)	861	(56.4)	1016	1.00
Other methods	204	(23.4)	485	(31.7)	759	2.30
Small-group discussions	513	(58.8)	182	(11.9)	625	15.6
Total	827	(100)	1528	(100)	2400	

Linear Trend Chi square = 582.4; $P < 0.0001$ *Pre-testing of suggested educational strategy :-*

In the light of above findings, a pretesting was done on a pilot sample of 100 subjects, identified as belonging to the target audience, on the basis of criteria mentioned earlier. Discussions with small groups of 4 to 5 subjects were organized, during which prevention of coronary risk factors was discussed by a RMO, followed by a two-way discussion. The mean time taken for such small group discussions was found to be 14 minutes with a SD of 0.7 minutes.

Discussion

The prevalence of various coronary risk factors obtained in this study compares well with an earlier study done on Air Force personnel [16]. The high prevalence of tobacco use (45.9%) among army personnel noticed in this study is a cause for concern. An interesting phenomena observed was the association of higher education with tobacco use. It seems to indicate that merely having a better education is no guarantee that individuals will not indulge in unhealthy life styles; favourable changes in attitudes and practices may not necessarily follow provision of knowledge!

The present strategy of coronary risk prevention in the Army uses the conventional approach of "mass education" of all personnel, using such traditional methods as lectures, exhibitions, visit to health museums, and so on. The findings of the present study give an indication that there is, possibly, a need to change this present strategy by adopting the following steps : (i) Identifying a high-risk target audience comprising of all officers, all JCOs and all other ranks who are more than 35 years old or educated more than 10th standard. (ii) Forming small groups of 4 to 5 persons out of the above defined target audience. (iii) Organizing personal discussions between the RMOs and these small groups, as regards coronary risk prevention, in a "two-way" educational process.

Pretesting of the above recommendations indicated that one such small group of 4 to 5 persons can be covered by the RMO in 14 to 15 minutes. In an ordinary army unit, with about 900 to 1000 personnel and one RMO, about 300 to 360 men (36.2%) are likely to be identified as the target audience. Thus, about 80 small groups of the target audience would be formed in an ordinary army unit, each needing approximately 15 minutes for two-way discussions with the RMO.

It is suggested that the occasions of six-monthly and annual medical examinations, duly spread over the entire year, can be fruitfully utilized by the RMOs to organize personal discussions regarding coronary risk prevention, with such target audience organized into small groups of 4 to 5 persons.

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