Research Article

Health Behavior of Iranian students in India-impact from migration

Morteza Abdullatif Khafaie[1*], Behzad Khafaie[2], Shokrollah Salmanzadeh[3] and Anjali Radkar[4]

[1]*Social Determinants of Health Research Center & Public Health Department, Faculty of Health, Ahwaz Jundishapur University of Medical Sciences, Ahwaz, Iran*
[2]*Department of Statistics, Omidieh Branch, Islamic Azad University, Omidieh, Iran*
[3]*Faculty of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahwaz, Iran*
[4]*Gokhale Institute of Politics and Economics, Pune, India*
*Email: m.khafaie@live.com

ABSTRACT

Environment and behaviors change due to international movement may influences health of migrants. data about health status in the young Iranian who migrates to India for the reason of study is limited. We aimed to determine prevalence of risk factors for cardiovascular health among Iranian students migrate to India. Information on exercise, dietary habit, and smoking was collected (=283) and then subject underwent through body measurements. Health behavior of student identified and compared to the time before migration. We have also investigated the possible change in their lifestyle by length of migration. We found >50% of students were overweight and obese. Migration from Iran to India has changed the lifestyles of students in an unfavorable way. These includes an increased in prevalence of current smokers (+4%), absence of exercise (+6%), low intakes of whole grain bread (+19%) and low fruit and vegetable intakes (+22%). migration from Iran to India for the reason of study had unfavorable effect on health.

Key words: health behavior, migration, Iranian student, cardiovascular

INTRODUCTION

According to the world health organization (WHO) report, cardio-vascular diseases (CVD) is responsible for a third of global deaths and developing country is the most affected (82%)(1). Even though CVD is approaching epidemic extent in developing countries but there is less data from vulnerable group such migrant student to develop interventional programs.

Epidemiological studies on migrant have investigated the impact of migration on health outcomes and have indicated a significant impact of genetic, environmental, as well as lifestyle factors on mortality(2, 3). Nevertheless, it appears likely that the migrants have a higher risk of CVD than the country of origin(4). Excess risk perhaps is due to changes in lifestyle, altered psycho-social situation, physical activity patterns and changes in dietary habit, presided by generally migrant status and particularly diversity of nation's lifestyle(5-7). Previous migrant studies provide strong evidence for the influence of environmental and lifestyle factors in etiology of CVD(8).

A common limitation in migrant studies is that migrants are not representative of the population of their country of origin(9). Consequently, country-specific risk factor patterns may therefore not be pertinent to the migrants. Iranian students represent a large and growing segment of migrant to India, and there are no data on their health status. There are many foreign students, mainly Iranian, residing in Pune who are prone to experience changes in their dietary habits, psycho-social situation or physical activity patterns. Therefore we identified prevalence of lifestyle risk factors in migrants and compared to the time before migration (in Iran) and also investigated possible change in their lifestyle by length of living in India.

MATERIALS AND METHODS

Study population and design: Iranian students were stratified based on their place of study, using registry records of Pune University, then a representative sample of 243 were randomly selected (considering prevalence of smoking in population of origin=22.3%(10), with 95% CI and precision of 0.05(11).Students appointed for a 30 minutes interview between Jun 2008 and February 2009(response rate 67.3%). A standard questionnaire were used to obtain information on socio-demographic, and behavioral risk factors in three domain. *Exercise (*at least 30 minutes a day during most days of the week and scored as no=1 and yes=0(12)), smoking (currently smoking on daily bases or occasional; scored as no=0 yes=1) and dietary habit (excess fat intake, excess sugar intake and low fiber intake). Excess fat intake obtained by 4 questions- having red meat >3 times a week (each serving equal to 85 gram)(13), having fried foods >3 times a week, use of whole milk or milk products rather than low fat milk or milk products, and using butter and margarine >1 a day(14-19). Presence of each condition assigned 1 and average of these 4 point assumed as excess fat score. Same scoring protocol is assigned for excess sugar and low fiber intake. Excess sugar intake obtained by 2 questions, two or more daily serving of sweets or sugar containing soft drinks (more than 24 ounces). Low fiber intake-not having high fiber cereal most days of week, daily having <2 pieces of whole grain bread or muffins daily, or daily <5 servings of fruit or vegetables daily (400- 500 grams)(20, 21). Internal consistency of questionnaire was assessed via the calculation of Cronbach's alpha(22). The Cronbach's Alphas were ≥0.78 (overall), indicating our instrument is reliable measure of lifestyle factors. Subject were asked to provide history of their behavior and weight before migration to India and then subjects underwent through body measurements (i.e. height and weight) as per standard protocols. The study approved by the ethic group of Pune University and all students gave verbal consent before participation. An overview on study population and information attained are depicted in table 1.

Statistical analysis: Descriptive characteristics of study population and prevalence of exercise, smoking, dietary risk (calculated as ($\sum$[excess fat score]+[excess sugar score]+[low fiber score])/3), over weight and obesity were stratified by migration duration (1yr< and >1yr). To investigate the probably anthropometric and behavioral change after migration to India we used Chi-square (goodness-of-fit) and to investigate the difference among the study subject as per their migration duration (≤ 1 year vs. > 1 year), Fisher's exact tests were used. Total risks score *(TR$_s$)* calculated as arithmetic mean of all factors (exercise, smoking, and dietary risk) and dichotomized at 75th percentile (values 0.50). Logistic regression was used to investigate possible association between duration of migration (to India) and increased total risk score (>0.50). Regression model were adjusted for gender, age, marital status, and educational status (indicator of undergraduate, postgraduate and research as reference). We present odd ratio (OR) of TR$_s$ more than 0.50 for additional 12 months living in India. The significance threshold was *P*=0.05 in all analyses. All statistical analyses were performed using STATA version 11.1 software (STATA Corporation, college station, TX).

RESULTS

Characteristics of study population are presented in table 2. Of 284 (49% male) participants, more than 50% were migrated to India before a year. Students were ≥18 years and the majority were undergraduate (47%), and post-graduate (40%). Seventy five percent of students were recruited from Departments of Pune University, Symbiosis and Fergusson College. The characteristics of the students by migration status are presented in table 2. Mean ages of participants were 29, ranging from 18 to 57 years, and 73% were not married. About half of students were undergraduate and of middle income class.

Mean BMI of students who were living in India more than 12 months (group II) were 23.31 kg/m^2. Of 114 individual who underwent height and weight measurements, 53% and 7% were overweight (BMI>23) and obese (BMI>27.5), respectively. Age was significantly associated with overweight and obesity (BMI>23 kg/m^2) even after adjustment for gender (OR=1.06, 95% CI, 1.00- 1.12). Twenty nine percent of students reported that they gain weight after their arrival in India. Length of time living in India was positively correlated with levels of BMI but not statically significant. Prevalence of lifestyle risk factors for cardiovascular health among Iranian students before and after

migration is presented in figure 1. Sixty three percent of migrants were not engaged in regular physical activity (exercise), versus 57% before migration (*P*=0.041). This differences were significantly more in group I (before 58% vs. after 68%, P=0.00) than group II (before 57% vs. after 59%, P=0.138). None of explanatory variables were related to frequency of exercise. Prevalence of smoking was 19% and 23% before and after migration respectively (P=0.070). Prevalence of smoking in males was 2.5 times higher than prevalence of smoking in female (34% vs. 13% respectively, P<0.001). Moreover, Prevalence of smoking was higher in group II (26%) than group I (20%) but were not statistically significant.

Sixty nine percent of students ate red meat 3 or more times a week before migration while about 53% after migration to India (P<0.001). Student also reported lower serving of sweets, and butter compare to the time before migration (P<0.05). We found low intakes' rate of whole grain bread was significantly increased after migration (41% before vs. 60% after, P<0.001). The prevalence of lack of daily consumption of fruit and vegetable was 53% and 75% before and after migration respectively (P<0.001). There were no significant difference in frequency of low intake of high fiber cereals, excess intakes of fried food, sugar containing soft drink usage, and whole milk product preferences.

Table 1: An overview on study population and information attained

	Study group 1.1	Study group 1.2
Data source	Student of Pune ≤1 year	Student of Pune >1 year
Out come	Dietary habit[b] exercise, and smoking[c]	Dietary habit, exercise, smoking, and body mass index (BMI)
Explanatory variable	Age[f], gender, marital status[g], education status[h] , household number & income,	
Data collection	Interview	Interview and body measurement
Sample size	124	159

[b] *Dietary habit: involved excess fat/sugar intake, low fiber, fruit, & vegetable intake;* [c] *Smoking: current smoker (daily, occasional) and non-smoker (ex-smoker and never smoked);* [g] *Marital status not married include not married and those who were widowed or divorced versus married (cohabiting)*

Table 2: Characteristics of Iranian students migrated to Pune, India, recruited between *J*un 2008 and February 2009

	Total N=284	India ≤1 year n= 126	India> 1 years N=158
Male-N (%)	140 (49)	56 (45)	84 (53)
Age-mean (SD)	28.56 (7.53)	28.29 (7.62)	28.76 (7.48)
†BMI (kg/m^2)- mean (SD)	23.31 (3.07)	23.31 (3.07)	NA
Overweight (>23 kg/m^2)-%	61 (53)	61 (53)	NA
Obese (>23 kg/m^2)-%	8 (7)	8 (7)	NA
Not married- N (%)	207 (73)	106 (85)	101 (64)
Education- N (%)			
Undergraduate	141 (50)	77 (62)	57 (36)
Postgraduate	113 (40)	37 (30)	76 (48)
Research	37 (13)	11 (9)	26 (16)
Household income- N (%)			
Low	8 (3)	4 (5)	4 (4)
Middle low	107 (38)	51 (68)	56 (56)
Middle high	44 (15)	13 (17)	31 (31)
High	16 (6)	7 (9)	9 (9)
Household number- mean (SD)	4.15 (1.66)	4.38 (1.72)	3.96 (1.58)

†Only 114 subjects provided Body Mass Index (BMI) measurement

Combined risk factor analysis (explained in methodology) showed, TR$_s$ were significantly higher in India than TR$_s$ of student before migration (0.39±0.15 before vs. 0.42±0.16 after, P<0.00). Also we found duration of migration associated with increases risk of being TR$_s$ more than 0.5 (OR of a month additional stay in India= 1.02 [95% CI, 1.00 to 1.04]). For instance, odd of TR$_s$ more than 0.5 are 1.29 times greater for a student who lived 12 months longer in India. We found undergraduate student (OR=1.03, 1.00 to 1.06), and women (OR=1.03, 1.01 to 1.07) affected more than students from higher education and men respectively. However these differences were not significant (figure 2).
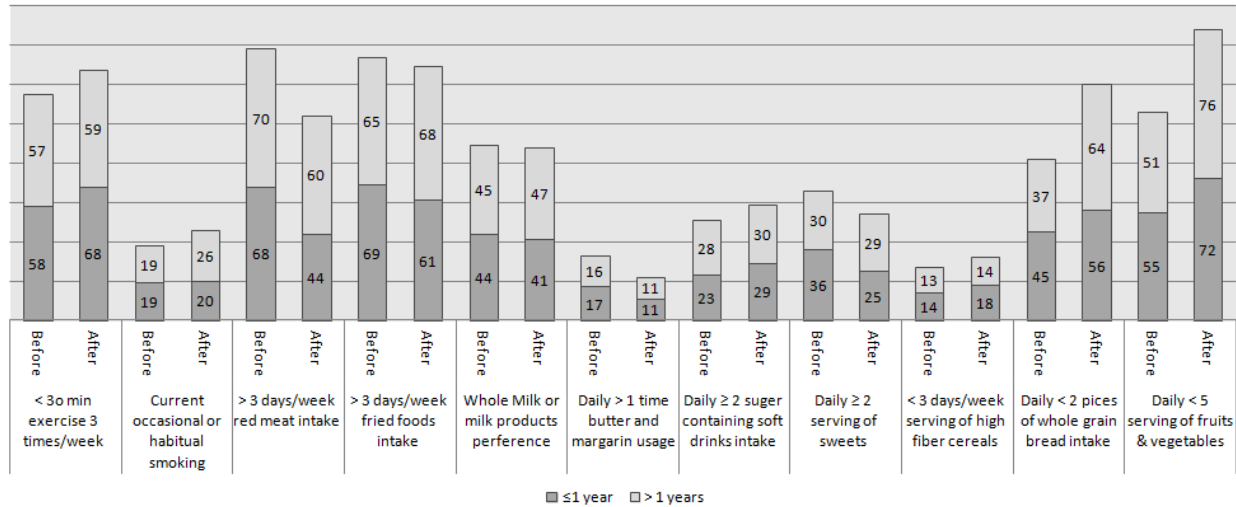
Figure 1-Prevalence of lifestyle risk factors for cardiovascular health among Iranian students before and after migration
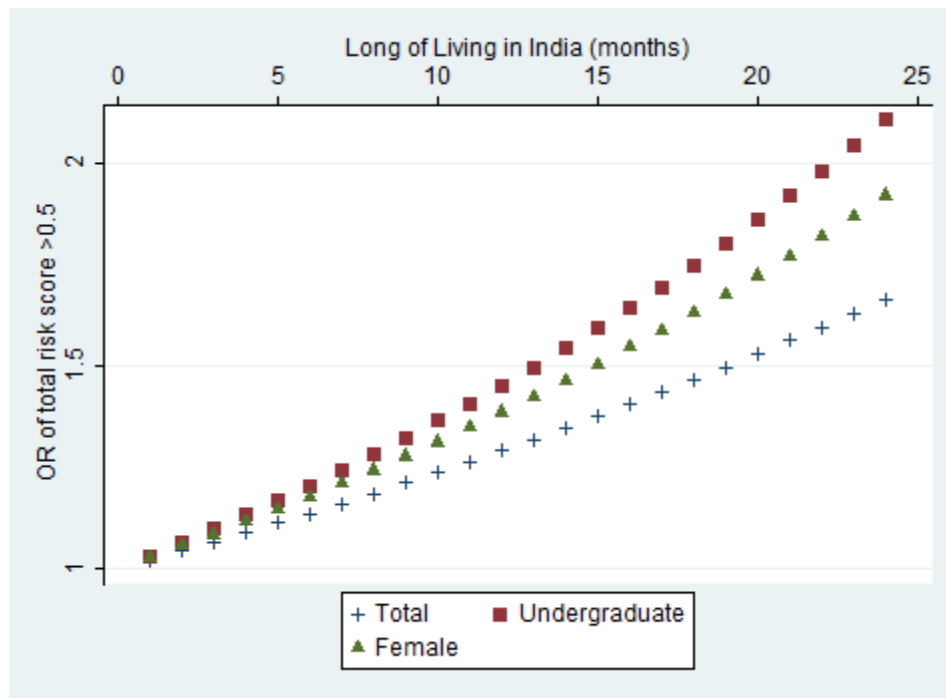

Figure 2- Combined risk factor analysis. Odd ratio of TRs for additional time of living in India

DISCUSSION

We investigated prevalence of risk factor for cardiovascular health in Iranian student in India and effect of migration on their lifestyle. We found more than half of students were overweight and obese. Migration from Iran to India has changed the lifestyles of students in an unfavorable way for CV health. These include a significantly higher prevalence of current smokers, absence of exercise, and low fiber intake. Living for longer duration in India also significantly increased odd of high TR_s (>0.5) and these changes were more in female and less educated students. The INTERHEART study(23, 24) evaluated potentially modifiable risk factors associated with myocardial infarction in 52 countries and suggested nine risk factors (namely, smoking, raised Apo lipoprotein B / Apo lipoprotein A1 ratio, hypertension, diabetes, obesity, psychosocial factors, daily consumption of fruits and vegetables, alcohol consumption, and physical inactivity) accounts for most important risk of myocardial infarction. However, small segment of INTERHEART population were young adult. Also previous studies reported increased risk of non-

communicable disease in migrant compare to population of origins(25). Tehran Lipid and Glucose Study (TLGS), illustrate 40%, and 23.1% of the adult population over 20 years in Tehran were overweight ($25<BMI<29.9$ kg/m^2) and obese ($BMI\geq30$ kg/m^2) respectively (10). In this study prevalence of overweight in both sexes were more or less same, 42.6% of male and 38.1% of female, however obesity by two fold more were predominant among female, 14.4% of male and 29.5% of female. The TLGS also stated high prevalence of overweight and obesity among adolescents, 13.3% and 12.6% of girl and 4.1% and 6.7% among boys respectively.

Systematic reviews and meta-analyses of observational studies have evidenced reduced CV risk in physically active subjects(26). Physical inactivity alone is responsible to more than 2 million annual deaths worldwide(27). Results of our study is compatibles with 2005 reports of national profile of non-communicable disease risk factors in the Islamic Republic of Iran which indicate about 67.5% of adult are physically inactive (http://www.ncdinfobase.ir/english/docs.asp). The prevalence of smoking has declined radically in many Western populations, but it is increasing quickly in young adult of developing countries including Iran (28-30). Prevalence of smoking in our study were similar to TLGS (10) which reported 22.3% of adult (26% of the men and 3.6% of the women) were smoker. However we found higher prevalence than first survey of the non-communicable disease risk factor surveillance system in Iran (6.7% to -13.4%)(31).

Various epidemiological studies undertaken in Western countries have confirmed that high intake of fruit and vegetables reduce risk of CVD(20). Poor intake of fruits and vegetables is measured as important risk factor for CVD. Greater than five servings (at least 400 grams a day, excluding potatoes) daily intake of fruits and vegetables is observe as an important nutritional intervention for prevention of chronic diseases(32). Some prospective studies illustrate that vegetarians have about 25% lower risk of heart disease than non-vegetarians(33). Based on data on fruit and vegetable consumption in twenty-one countries (mainly developing nations), fruit and vegetable intake, showed that only 3 countries met the minimum WHO recommendation. The per capita net consumption of fruits and vegetables in urban areas of Iran has been showed amount of 169 g and 239 g per day, respectively(34).

Study investigates the current status of Iranian students migrant to India and compares their previous status, when residing in their respective countries. Strength of the study lies in the fact that the comparison is done against the same population. However recall bias was the main concern in the study. These data supports the increasing rates of CV risks in Iran, especially young adult (35). Since non-communicable diseases contribute to common risk factors, comprehensive intervention programs which targeting vulnerable population is needed to prevent further phenomenon's of metabolic disorders and cardiovascular event. One approach could be targeting overall behaviors of university students which account for more than 2.5 million populations in Iran. Moreover, large numbers of student are abroad and experiencing a conflict psycho-social situation, dietary habits, or physical activity patterns. We concludes migration from Iran to India for the reason of study had unfavorable effect particularly on CVD risk factors.

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