Prevalence of Risk Factors of Non-communicable Diseases among Adolescents of a Rural Area in Darjeeling District of West Bengal

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Abstract

Introduction: Adolescence is the transitional period between childhood and adulthood when new health behaviors are laid down, which may track in to adulthood and have lifelong impact. Global trends show that these NCD-related behaviors are gradually rising among young people, and that they establish patterns of behavior that persist throughout life and are often hard to alter.

Objective: To find out the prevalence and socio demographic predictors of risk factors of non communicable diseases among adolescents of a rural area

Methods: A community based cross sectional study was conducted among 365 adolescents residing in a rural area of Siliguri subdivision. They were interviewed and measurements were taken using standard procedure.

Results: The prevalence of behavioural factors for NCDs like tobacco use, alcohol use, unhealthy diet, physically inactivity was 18.4%, 4.7%, 87.1% and 23.0% respectively; metabolic risk factors like overweight, hypertension, and abdominal obesity 28.5%, 17.5%, 1.4% respectively. After adjustment, the odds of behavioural and metabolic risk factors were found highest among the males, participants whose mothers were not working and those who belonged to Hindu families and lower socioeconomic class.

Conclusion: The proportion of risk factors of non communicable diseases among the rural adolescents was quite high. Given the associated health problems and costs, non communicable diseases have become an issue of serious concern.

Introduction

Modern lifestyle has radically revolutionized the way we live and has led to the emergence and spread of lifestyle disease, also known as chronic non communicable diseases. Consequently, non-communicable diseases (NCDs) have become a key contributor to the morbidity mortality and disability in both developed countries and developing countries. Presently, NCDs cause more deaths than all other causes of mortality combined. Deaths due to NCDs are likely to escalate from 38 million in 2012 to 52 million by 2030. In the economic perspective, treatment of NCDs is exorbitantly high and lengthy which reduces millions of people into poverty annually, stifling development.

The picture is worse in India, where NCDs contribute to 60 % of all deaths which translates to around 5.87 million deaths. Besides this, India shares more than two-third of the total deaths due to NCDs in the South-East Asia Region of WHO. Underlying these non communicable diseases, there are a few common and preventable risk factors. The risk factors are mainly behavioral (tobacco use, physical inactivity, unhealthy diet, and the harmful use of alcohol) that result in key metabolic/metabolic changes (raised blood pressure, overweight/obesity, raised blood glucose and raised cholesterol).

Adolescence, midway between childhood and adulthood, is perhaps the last best chance to build positive healthy behaviors and limit unhealthy behaviors, including tobacco and alcohol use, poor eating habits, and not as much of exercise. This is the time when new health behaviors are laid down, which may track in to adulthood and have lifelong impact. Global trends show that these NCD-related behaviors are gradually rising among young people, and that they establish patterns of behavior that continue throughout life and are often hard to amend. Consequently, it becomes important to monitor these risk factors in this age group with the aim to encourage the development of healthy adult life style and thereby reduce the risk of morbidity and mortality from NCDs.

As per Census 2011, overall 20.4% of the West Bengal population belongs to adolescents. However, there is dearth of published studies depicting NCD risk factor profile among the adolescents. In this perspective the present study was intended to generate information regarding the magnitude of risk factors of NCDs among the adolescents of rural area of Siliguri Subdivision of Darjeeling District, which will finally help authorities to plan community-based programs/interventions targeting the risk factors, which in turn can lead to a fall in the occurrence of NCDs.

Objectives

1. To find out the prevalence of risk factors of non communicable diseases among the rural adolescents was quite high. Given the associated health problems and costs, non communicable diseases have become an issue of serious concern.

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factors of non-communicable diseases among adolescents of a rural area.

2. To determine the socio-demographic predictors affecting the prevalence of risk factors of non-communicable diseases.

Methodology

A community-based cross-sectional study was done among adolescents of Siliguri subdivision of Darjeeling district from April to August 2016. The study population comprised of all adolescents (aged 10-19 years) residing in the study area for at least 1 year. However, adolescents with documented mental illness and other debilitating illness were excluded.

A sample size of 384 was calculated using single population proportion formula by taking the proportion (p) of adolescents using tobacco in any form as 13.1%. Supposing 95% confidence level, 5% absolute precision, design effect of 2 and non-response rate of 10% the final sample size was calculated as 385, which was rounded off to 390 for an equal sub-sample of 13 from each of 30 clusters (tea gardens/villages).

Firstly, 30 clusters were selected from a list of villages/tea gardens using the probability proportional to size method. In each cluster, with a random start from the center, consecutive households were visited to select 13 willing adolescents. If there were more than one adolescent in a single house, only one adolescent was selected from each household randomly.

Outcome variable

Presence of behavioural or metabolic risk factors was considered as the outcome variables.

Explanatory variables

Explanatory variables were age, gender, religion, mother’s occupation and socio-economic status of the family.

Ethical committee approval

Prior to conduction of study, ethical clearance was obtained from the Institutional Ethics Committee of North Bengal Medical College, Siliguri, West Bengal, India. Informed consent and assent were obtained from the guardians and the participating adolescents respectively and they were also reassured that full confidentiality would be maintained within the limits of medical ethics.

Data collection

The data were gathered from the study population at their households by using a predesigned, pretested, semi-structured proforma which included details of socio-demographic characteristics (age, gender, religion, caste, occupational status, educational status, parent’s education and occupation and socioeconomic status) and information of different risk factors of non-communicable diseases (smoking, alcohol, unhealthy diet and physical inactivity). Customization of the questionnaire was done by initial translation, back-translation, and re-translation, followed by pre-testing of the questionnaire among a convenience sample of 30 adolescents attending the General OPD of North Bengal Medical College and Hospital.

Anthropometric characteristics and blood pressure measurements were done by the investigators during daytime at the household setting of the participant. In case of female participant, a female attendant was present during examination.

Measurements of risk factors

1. Tobacco use: Participants were grouped into current smokers of cigarettes or bidis (yes/no) or use of smokeless tobacco (yes/no) in the 7 days prior to the interview and frequency of such was noted. Smoking or use of smokeless tobacco more than once in last 7 days was considered as risk factor.

2. Alcohol consumption: Participants were questioned about alcohol use (yes/no) and classified as users or non-users, where users had consumed one or more standard alcoholic drinks in the last 30 days.

3. Inadequate fruit and vegetable consumption: Average daily number portions of fruits/vegetables consumed by the study participants over the last 7 days were calculated. Daily fruit and vegetable consumption of less than 5 portions was considered to be inadequate, per the WHO recommendations of NCD behavioral risk factor indicators.

4. Physical inactivity: The participants were enquired about the time spent in moderate physical activities during a typical week. Adolescents who reported doing less than 30 minutes of work for at least 3 days per week were considered as having the risk factor.

Metabolic risk factors for NCD were defined as follows:

1. Overweight: World Health
Results

Among the 390 adolescents recruited for the study, complete data could be collected from 365 participants. The mean±SD age of the participants was 14.3 ± 2.8 years. Majority of the study population were early adolescents (43.8%), males (61.4%) and belonged to families practising Hinduism (96.2%) and belonging to a lower socioeconomic stratum (64.1%).

The proportion of behavioural factors for NCDs like tobacco use, alcohol use, unhealthy diet, physically inactivity was 18.4%, 4.7%, 87.1% and 23.0% respectively; metabolic risk factors like overweight, hypertension, and abdominal obesity 28.5%, 17.5%, 1.4% respectively (Table 1).

Similarly, higher odds of metabolic risk factors were found in males, participants whose mothers were not working and those who belonged to Hindu families and lower socioeconomic class. However, the odds were higher in the early adolescent age group (10-13 years) than their older counterparts.

In the same way, after adjusting for the predictors, the model elucidated between 7.9% (Cox and Snell R-square) and 10.7% (Nagelkerke Rsquare) of variance of metabolic risk factors in the study subjects, and rightly classified 49.7% of cases. The input of the independent variables was not significant. [Hosmer and Lemeshow Test Chi square value was 4.263 and significance was 0.833.]

Discussion

In the present times, risk factors of non communicable diseases have become a major public health challenge worldwide, the effect of which is grave in terms of premature morbidity, mortality, and economic loss. There is a developing body of evidence which suggests that most of these diseases have their roots in the behaviours acquired during adolescence. So it becomes imperative to study the prevalence of risk factors among adolescents.

The present study infers that the risk factors was quite prevalent among the rural adolescents. The figures were quite high compared to a study

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### Table 1: Prevalence of risk factors of non-communicable diseases among the study population n=365

<table>
<thead>
<tr>
<th>Behavioural risk factors</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco use</td>
<td>67</td>
<td>18.4</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>17</td>
<td>4.7</td>
</tr>
<tr>
<td>Unhealthy diet</td>
<td>318</td>
<td>87.1</td>
</tr>
<tr>
<td>Physically inactive</td>
<td>84</td>
<td>23.0</td>
</tr>
<tr>
<td>Metabolic risk factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over weight</td>
<td>104</td>
<td>28.5</td>
</tr>
<tr>
<td>Abdominal obesity</td>
<td>5</td>
<td>1.4</td>
</tr>
<tr>
<td>Hypertension</td>
<td>64</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Organisation (WHO) guidelines for BMI for adolescents were used to classify the study participants.

2. Abdominal obesity: As per the WHO definition, waist circumference of >102 cm in men and >88 cm in women was defined as having abdominal obesity.

3. Hypertension: Normal BP was defined as an average systolic BP (SBP) and/or diastolic BP (DBP) <90th percentile for age, sex and height. Prehypertension was recognized if the mean SBP and/or DBP was ≥90th and <95th percentile for age, sex and height, or if the average SBP was >120 mmHg or DBP was >80 mmHg for adolescents. Hypertension (stages 1 and 2) was defined as average SBP and/or DBP ≥95th percentile, while average SBP and/or DBP >99th percentile plus 5 mmHg indicated stage 2 disease.

### Table 2: Predictors of risk factors of non-communicable diseases among the study population n=365

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Behavioural risk factors</th>
<th>Metabolic risk factors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
<td>AOR (95% CI)</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early adolescent (10-13 years)</td>
<td>143 (89.4)</td>
<td>17 (10.6)</td>
<td>1 (Referent)</td>
</tr>
<tr>
<td>Mid adolescent (14-16 years)</td>
<td>95 (88.8)</td>
<td>12 (11.2)</td>
<td>0.97 (0.44 - 2.18)</td>
</tr>
<tr>
<td>Late adolescent (17-19 years)</td>
<td>95 (96.9)</td>
<td>3 (3.1)</td>
<td>4.48 (1.24 - 16.11)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>126 (89.4)</td>
<td>15 (10.6)</td>
<td>1 (Referent)</td>
</tr>
<tr>
<td>Male</td>
<td>207 (92.4)</td>
<td>17 (7.6)</td>
<td>1.56 (0.72 - 3.35)</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>13 (92.9)</td>
<td>1 (7.1)</td>
<td>1 (Referent)</td>
</tr>
<tr>
<td>Hindu</td>
<td>320 (91.2)</td>
<td>31 (8.8)</td>
<td>1.29 (0.15 - 10.83)</td>
</tr>
<tr>
<td>Mother’s occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stays at home</td>
<td>228 (91.9)</td>
<td>20 (8.1)</td>
<td>1 (Referent)</td>
</tr>
<tr>
<td>Working</td>
<td>105 (89.7)</td>
<td>12 (10.3)</td>
<td>0.80 (0.37 - 1.74)</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower SES</td>
<td>218 (93.2)</td>
<td>16 (6.8)</td>
<td>1 (Referent)</td>
</tr>
<tr>
<td>Higher SES</td>
<td>115 (87.8)</td>
<td>16 (12.2)</td>
<td>0.39 (0.18 - 0.85)</td>
</tr>
<tr>
<td>Total</td>
<td>333 (91.2)</td>
<td>32 (8.8)</td>
<td></td>
</tr>
</tbody>
</table>

Statistical analysis

The data collected were compiled, entered and analysed by IBM SPSS version 20. The proportion of risk factors was expressed in number and percentages. To find out the predictors, binary logistic regression analysis was used. The dependent variable in the analysis was behavioural risk factors and metabolic risk factors, which were converted to dichotomous variables, where having one or more risk factors was considered as 1 and not having any was considered as 0. The predictor variables used for the analysis were age group, gender, religion, mother’s occupational status and socio-economic status. Multicollinearity among the independent variables was identified by the Variance Inflation Factor (VIF) test (<2).

In the same way, after adjusting for the predictors, the model elucidated between 3.5% (Cox and Snell R-square) and 7.8% (Nagelkerke Rsquare) of variance of behavioural risk factors in the study subjects, and correctly classified 100% of cases. The influence of the independent variables was not significant. [Hosmer and Lemeshow Test Chi square value was 2.89 and significance was 0.941.]
among high school going adolescents in Mangalore. This may be due to difference in dietary and social habits in Eastern and Southern India.

Initiation of tobacco most commonly happens during adolescence, who are the key targets of the tobacco industry when recruiting new smokers. According to Global Youth Tobacco Survey (GYTS), 14.6% of students currently use any form of tobacco; 4.4% currently smoke cigarettes; 12.5% currently use some other form of tobacco. This may be attributed to psychosocial reasons like peer pressures, curiosity, yearning for excitement and experimentation or as a stress buster.

Use of alcohol by adolescents has become a major issue nowadays. Recent evidence suggests that brain development continues well into adolescence and that alcohol consumption can affect such development. Similar to the present study, as well. Similar picture was observed in studies done in urban Delhi also reported higher odds of lifestyle risk factors among males, which was quite similar to the present study.

Religion

Religion may have a significant role in the shaping of behaviours among adolescents. In Muslims, use of alcohol beverages is mostly prohibited. On the other hand, the dietary practices among Hindus and Muslims are quite dissimilar which may be reason for the findings of the present study. A study by Gupta et al found that the risk factors for coronary heart disease were more prevalent among the Hindu study participants than their Muslim counterparts.

Maternal occupation

The role of a mother is paramount to developing healthy habits in adolescents. Presently, the redefining of the role of women from housewives to working mothers has significant implications for child development. It has often been argued that adolescent having working mothers are under lessened supervision which may tend to increase the risk of negative peer influences leading to involvement in numerous unhealthy behaviours. However, the present study reveals a completely different picture. This may be due to the small proportion of adolescents with working mothers in the current study.

Socioeconomic status

Once thought of as diseases of the affluent society, in the present era NCDs have been found to have close links with poverty, and the rapid rise in NCDs is predicted to hinder poverty alleviation programs in low-income countries. Evidence suggests that often the lowest income households have the highest proportions of NCD risk factors. Similar picture was observed in the present study. The reason for this may be detrimental behaviours linked to NCDs such as smoking and alcohol abuse are often a coping strategy for the stresses and challenges poor people face in their daily lives. Moreover, the preventive services which can be accessed by higher income groups may not be afforded by people of lower income groups.

Conclusion

The result of the present study gives an idea that the risk factors for NCD are widely prevalent among rural adolescents. The proportion of risk factors of non-communicable diseases among the adolescents, together with the associated health problems and costs, is a cause of vital concern among health care professionals and parents. The study recommends that an all-inclusive school based education scheme and a family based approach to be initiated to prevent such unhealthy practices.

Limitations of the study

The behavioural risk factors were self-reported and thus there may be a chance of social desirability bias. Besides, the inherent limitation of cross-sectional study cannot be ruled out as there were no longitudinal inferences.

Future scope of the study

A longitudinal study can be done to know the extent and progress of risk factors of non-communicable diseases from childhood to adolescence, so that timely interventions can be taken.

What this study adds

With the advent of newer means of entertainment and dietary practices, rural adolescents have begun to embrace these harmful behaviours, like their urban peers, which are taking a massive toll on their health and future
Acknowledgements

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References


