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OCCURRENCE OF TYPE 2 DIABETES MELLITUS IN THE PARENTS OF JHARKHAND STATE'S TRIBAL MEDICAL STUDENTS STUDYING AT RAJENDRA INSTITUTE OF MEDICAL SCIENCES (RIMS), RANCHI: A COMPARISON WITH THEIR NON TRIBAL PEERS

Diabetology

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ABSTRACT

Background: Rapidly increasing toll of Diabetes Mellitus (DM) cases has become a great challenge for healthcare affecting almost all socioeconomic groups and according to the projections made in few studies, our country is standing on the verge of becoming world capital of DM by the year 2030. Studies have also shown that there is only a marginal difference in prevalence of diabetes among different states in India and the cases are increasing at a steady rate in all the states including in Jharkhand. Jharkhand is a land of 32 different types of indigenous scheduled tribe communities. The prevalence of DM in these marginalized and vulnerable groups of people has not been studied yet. As the ethnic and socio cultural practices are significantly different in every tribal community and they are mostly endogamous, it would be particularly important to study the traits and trends of DM in these groups. The data can be quite helpful in understanding the genetic bases of the disease pathogenesis. **Methods:** We conceptualized this study aiming on to observe the occurrence of type 2 DM in the parents of tribal medical students in comparison with that in the parents of their non tribal peers studying at Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand. We recruited 262 students for our study and a structured questionnaire was supplied to them. **Results:** Out of 50 tribal students included in our study, 14 (28.00%) gave us the history of diabetes in either one or both of their parents whereas 53 (25.00%) out of 212 students from non tribal peer group responded with same answers (p value = 0.7190; no significant difference). **Discussion:** Two important findings that we observed in our study are quite higher occurrence of type 2 DM both among the tribal and non tribal groups than the prevalence of the disease in general population and almost equal occurrence of type 2 DM in the subjects of both these groups. These findings can be attributed to the urban residency, affluent socioeconomic status and sedentary lifestyle of our subjects, as all these risk factors for type 2 DM were significantly prevalent in both groups. Slightly more occurrence of cases in tribal group in comparison to non tribal peers can be due to the concept of "thrifty genotype" for the pathogenesis of type 2 DM, which is more applicable to the tribal subjects. **Conclusion:** We concluded from our study that urbanization, affluent socioeconomic condition and sedentary lifestyle are very important risk factors for the pathogenesis of type 2 DM due to which there was clustering of cases in our study groups. Furthermore, transition of tribal communities from rural to urban settings is making them prone for developing type 2 DM. therefore the disease spectrum of type 2 DM in these communities should be extensively studied. These data can be extremely important in formulating strategies for preventive and curative steps targeting the vulnerable tribal communities.

KEYWORDS

Type 2 Diabetes Mellitus, Scheduled Tribe (ST) Communities.

Introduction

India is very rapidly moving ahead on the road of becoming world capital for Diabetes Mellitus (DM) and this disease is gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with it.[1,2] Wild et al in their study have predicted that the prevalence of diabetes will become double globally from 171 million in 2000 to 366 million in 2030 with a maximum increase in India.[3]

A detailed report published in the Lancet Global health journal clearly emphasized that the burden of diabetes is increasing rapidly in India. This report presents a comprehensive analysis of the time trends and heterogeneity in the distribution of diabetes burden across all states of India between 1990 and 2016.[4] In this study the states were placed in four groups based on Epidemiological Transition Level (ETL) defined on the basis of the ratio of DALYs (Disability Adjusted Life Years) from communicable diseases to those from non communicable diseases and injuries combined, with a low ratio denoting high ETL and vice versa.4 Jharkhand has been put under low ETL group and it showed an increase in crude prevalence from 4.7% (4.1 – 5.2%; 95% UI) in 1990 to 6.6% (5.9 – 7.3%; 95% UI) in 2016 with an average percentage change of 42.5% (38.0 – 47.2%). Age standardized prevalence per 100 (95% UI) showed an overall average percentage change of 35.8% (31.6 – 39.9%) from 1990 to 2016.[4]

Scheduled tribes (STs) are the most marginalized communities in India. Although infections and malnutrition still dominate their health status, like the rest of India, the problem of non communicable diseases (NCDs) including DM should not be ignored. DM is multifactorial and along with various risk factors, genetics also plays important role in its etiology. As the STs are highly endogamous, tribe specific information on the pattern of this disease would provide important leads about the role of genetics in the pathogenesis of DM.[5]

Jharkhand is a land of 32 different types of Scheduled tribes (Sts). As per 2011 census report, the scheduled tribe (ST) population of Jharkhand state is 8,645,042 of the total population 32,988,134 (Approximately 26.21%).[6,7] We did not find any data on the prevalence of DM in tribal population of Jharkhand state. The results of a multi centric study conducted by Deo et al on a similar group of tribal subjects in Maharashtra state showed the prevalence of DM to be 6.7%.8 This study also concluded that the prevalence of non communicable diseases including DM is still very low in STs and it is probably due to near absence of the risk factors such as obesity, sedentary lifestyle and hyperlipidemia.8 Furthermore, all these risk factors are directly or indirectly influenced by other socio demographic indicators like literacy rate, per capita income, standard of living, cultural beliefs and practices, ethnicity etc. and tribal communities are particularly different from general population in terms of all these parameters.

Relevance of Study

The hypothesis that we kept in mind during the conceptualization of this study was to test the fact of low prevalence of type 2 DM in scheduled tribes due to all the factors mentioned above. Although we could not take our study as a true prevalence study due to low sample size, it would be quite prudent to observe the occurrence of type 2 DM in tribal parents of Medical students studying at RIMS, Ranchi as no study has been conducted till date targeting tribal diabetics of Jharkhand state. This can be the door opener for further researches in this field and it is the prime reason why we chosen to conduct this study.

Aims & Objectives

Aim of our study was to find out the occurrence of type 2 DM in parents of tribal medical students studying at RIMS, Ranchi and belong to Jharkhand state in comparison to that in their peers and also to find ways to educate this group of people for DM & its complications.

Objectives of this research work were as follows:
1. Comparison of data from tribal study group with that of non tribal peer group.
2. To observe if there is any difference in the occurrence of type 2 DM between these two groups due to differences in genetics and other etiological risk factors and their determinants.

Study Design

Our study was a questionnaire based cross sectional study conducted during 2018 – 2019. This small study has been extracted from an another research which was being conducted in the Department of Physiology, Rajendra Institute of Medical Sciences (RIMS), Ranchi to assess the Indian Diabetes Risk Scores (IDRS)9, 10 of young medical students coming to our department. As the history of diabetes in parents is one of the components of IDRS scoring system9, 10, we decided to conduct this study to assess the occurrence of type 2 DM in parents of tribal medical students studying at RIMS, Ranchi and belonging to Jharkhand state and comparing the data with their non tribal peers.

Materials & Methods

262 medical students were recruited in the study out of which 50 were from different scheduled tribe communities indigenous to Jharkhand state. 212 non tribal students belonging to same geographical region of India i.e. Jharkhand & Bihar state were selected as control group. Geographical difference was minimized by excluding the students from both study arms who were from other states of the country. A structured questionnaire was passed to them. The same was made available to the study subjects in online format also. All the participants of our study submitted their filled questionnaire either in offline or online mode. An informed consent was also supplied to all the participants to voluntarily share the required information. Although it was purely a questionnaire based observational study without any active intervention, ethical clearance was obtained from Institutional Ethical Committee (IEC) of RIMS, Ranchi. Data was processed and analyzed accordingly.

2x2 contingency tables were prepared and the two groups were compared using Fisher's exact test. P values were calculated for statistical significance in case of each table of comparison.

Observation

Table: 01

Groups	One or Both Parents Diabetic	No Parents Diabetic	Total
Tribal Parents	14 (28.00%)	36 (72.00%)	50
Non Tribal Parents	53 (25.00%)	159 (75.00%)	212
Total	67	195	n = 262
P value = 0.7190; Not significant			

This is a 2x2 contingency table between two study groups. Out of the parents of 50 tribal students included in our study, 14 (28.00%) students gave the history of diabetes in one or both of their parents whereas the parents of 36 (72.00%) students had no history of diabetes. 53 (25.00%) of their non tribal peers had one or both parents diabetic and 159 (75.00%) did not have diabetic parents. We found two tailed p value = 0.7190 which showed there is no statistical significant difference between the two groups.

The bar diagram included here is showing that the percentage occurrence of diabetes among the parents of both tribal and non tribal students was almost same.

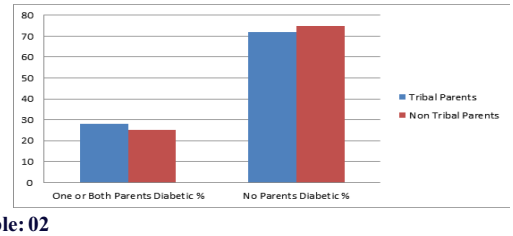
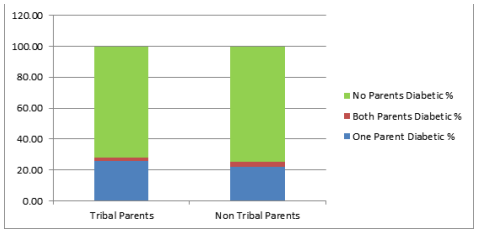


Table: 02

Groups	One Parent Diabetic	Both Parents Diabetic	No Parents Diabetic	Total
Tribal Parents	13 (26.00%)	01 (2.00%)	36 (72.00%)	50
Non Tribal Parents	47 (22.17%)	06 (2.83%)	159 (75.00%)	212
Total	60	07	195	n = 262
P values = 0.5779 & 1.0000; Not significant				



This table is showing that 13 (26.00%) tribal students gave the history of diabetes in either his or her mother or father and 01 (02.00%) student said that both of his or her parents were diabetic. On comparison with their non tribal peers we observed that 47 (22.17%) students had at least one diabetic parent whereas 06 (2.83%) gave us the history of diabetes in both of their parents. We did not observe any significant difference between the two groups (two tailed p values were 0.5779 and 1.0000 respectively). Results were plotted in attached bar diagram.

Discussion

Two very important findings we observed in our study. First one is the occurrence of type 2 DM is quite higher both among the tribal and non tribal parents we included in our study than the prevalence of the disease in general population. Second important finding we noted is the nearly equal (Tribal parents 28% & Non tribal parents 25%) occurrence of type 2 DM in tribal as well as in non tribal parents contrary to our assumption where we hypothesized that occurrence of DM among the parents of tribal students would have been less in comparison to that among the parents of their non tribal peers.

Let us discuss our observations one by one. Most of the subjects from both of our study groups were urban residents. Also, majority of them were from affluent socio economic class & were enjoying a sedentary life style too. Multivariate regression analysis of a study conducted by R. M. Anjana et al showed that urban residence (OR 1.3; 95% CI 1.1, 1.5; $p = 0.001$) & income status (OR 1.3; 95% CI 1.2, 1.4; $p < 0.001$) were significantly associated with DM along with other risk factors like age, male gender, family history of DM, abdominal obesity, generalized obesity & hypertension.[11] our results are also in accordance with these findings and justified the same facts.

Coming to our second important observation, i.e. the occurrence of type 2 DM was found to be almost equal, rather a bit higher in tribal parents than that in non tribal parents (tribal parents 28.00%, Non tribal parents 25.00%; p value = 0.7190, no significant difference). This finding can be explained by the famous thrifty gene hypothesis, an important genetic basis for the pathogenesis of type 2 DM. It was a very old concept proposed in 1962 by James Neel, a geneticist at the University of Michigan. According to this hypothesis, evolutionary pressures in the form of food scarcity throughout human history led to the selection of thrifty genes (genes that predispose to metabolic thrift to protect against the detrimental impact of famine on survival and reproductive fitness). These genes were adaptive during our evolution, but in our modern scenario of resource rich environment are maladaptive and lead to obesity.12 so, a civilization or community initially lived in a “poor fed state” suddenly transitioned into a “well fed state” is at a higher risk of developing obesity & insulin resistance subsequently leading into type 2 DM. The reason behind relatively higher prevalence of DM in developing world countries, like in India, can be partly explained by this hypothesis. People from tribal communities fit more accurately into this concept and hence higher occurrence of type 2 DM in our tribal study group is not an unusual finding.

Conclusion

We concluded from our study that the occurrence of type 2 DM was higher in our both study groups in comparison to the prevalence in general population most likely because of the urban setting of residence, affluent socioeconomic status and sedentary lifestyle. Furthermore, tribal group had a bit higher occurrence of type 2 DM (but no significant difference with peer group) may be because of the

concept of thrifty genotype.

Magnitude of DM cases is increasing very rapidly and it is emerging as a major clinical and public health problem in India. Very limited research works have been done targeting the tribal communities in spite they are particularly at a higher risk. In addition, there is poor penetration of awareness programs into them. Therefore, much detailed studies must be done to get appropriate data regarding these vulnerable groups and targeted and specified diabetes education programs must be launched to combat the issues effectively.

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Conflict of interest
The authors declare that there is no conflict of interest associated with this manuscript.

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