

Type 2 Diabetes; Affecting Factor & Prevalence among Mining Workers: A Case Study of NMDC Bachel, Dantewada (Chhattisgarh)

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Abstract: *Diabetes mellitus (DM) is one of the most common non-communicable diseases (NCDs) globally. It is the fourth or fifth leading cause of death in most high-income countries and there is substantial evidence that it is epidemic in many economically developing and newly industrialised countries. The number of people with type 2 diabetes is increasing in every country 80% of people with diabetes live in low- and middle-income countries. The greatest numbers of people with diabetes are between 40 to 59 years of age. 183 million people (50%) with diabetes are undiagnosed; Diabetes caused 4.6 million deaths in 2011. Diabetes has no obvious clinical symptoms and not been easy to know, so that many diabetes patient unable to obtain the right diagnosis and the treatment (IDF, 2010). To assess the factors which are responsible the trend and prevalence of type 2 diabetes among mining workers, the study had been done by researcher. For above study, NMDC Iron ore mine of Bachel, Dantewada (Chhattisgarh) was selected. It has been observed that there can be undesirable consequences for those working shifts outside standard daytime hours, particularly those covering the night or with early morning starts. For example, shift work may result in: disruption of the internal body clock; fatigue; sleeping difficulties; disturbed appetite and digestion; reliance on sedatives and/or stimulants; social and domestic problems, which in turn can affect performance, increase the likelihood of errors and accidents at work and might have a negative effect on health which leads the metabolic disorder like diabetes.*

Keywords: *NCDs (Non-Communicable Diseases), NMDC (National Mineral Development Corporation)*

I. Introduction

Diabetes is a common chronic disease, which constitutes the leading cause of mortality all over the world and has rapidly become a global health problem with rapid worldwide increasing population growth, aging, urbanization and increasing prevalence of obesity and physical inactivity indicating the urgent need to prevent diabetes and its complications rather than simply treat it, once established. Changes in work patterns from heavy labour to sedentary, the increase in computerization and mechanization, and improved transport are just a few of the changes that have had an impact on human metabolism (Zimmet et. al, 2001). It is difficult to overstate the importance of the relationship between lifestyle and the risk of developing type 2 Diabetes. A recent study demonstrated that both women and men who have a BMI > 35 kg/m² had a 20-fold increase in their risk of developing diabetes compared to people with a BMI of 18.5–24.9 kg/m² (Field et. al, 2005). Furthermore, prospective studies have demonstrated that lifestyle in the form of bad routine life sharply increases the likelihood of developing type 2 Diabetes in high-risk individuals who have impaired glucose tolerance or impaired fasting glucose. Therefore, it is important to take the early detection, prevent and treat diabetes disease, especially for Type 2 Diabetes which is the most common type in people older than 40- 45 who are overweight.

This paper had attempted to explore the prevalence and factors of type 2 Diabetes which affecting mining workers, its trend, the popular responses in NMDC Bachel, Dantewada (Chhattisgarh).

II. Methodology

A Purposive sampling was used for study and 179 Diabetic along with non diabetic employees of NMDC Bachel, Dantewada in Chhattisgarh were selected and only after ascertaining that the respondents fit into the sampling frame they were selected. It has been stated that this district have more or less same topography and other features. Idea behind this is that these regions are mostly inhabited by all groups i.e. tribal, rural and urban from different states as they are the employees of Mining.

The investigator has visited frequently and measured the sugar levels of the respondents at before and after breakfast mornings. Mean of the three readings was reported; Blood Sugar and routine assessment with food habit were collected from selective employees of the NMDC Bachel of 30-60 years age during the period

March-June 2013 by different kind of research tools i.e. schedule, FGDs, observation, interview, Pedigree (for Genetical history), assessment of medical history etc.

After collection of data through the primary source it has been coded and a code book was prepared. The data were entered into a master chart very meticulously. Thereafter, it was processed into the computer through MS EXCEL package. Later, the computerized data was taken in print form and the same was cross checked with the master chart to find out error(s), if any. After getting the processed data, percentage and other statistical measurements were derived.

III. Result & Discussion: Major Findings

The chapter discusses about the Result of the present study about Demography as well as the Blood Sugar among the Industrial employees of NMDC Bachel. Present study mainly focuses on the affecting factors on Blood Sugar among the Industrial employees in given parameters.

Number of Diabetic Patient

Table 1 reveals that 155 respondents are diabetic out of 179 employees. The highest number of employees 78.77% suffering from type 2 diabetes. 2.79% employees are Pre-Diabetic. It is observed that only 13.40% are normal means Non Diabetic, where 5.04% respondents are dependent upon Insulin out of 155 diabetic patients. This Table shows that the respondents are very fond of Type two Diabetes and those who suffering with insulin dependent Diabetes, are also with Type 2 Diabetes, they are in old age group and not taking proper care to maintain Blood sugar that's why they depend on Insulin.

Table 1: Diabetic Profile

Diabetic Patient	Yes		No		Total	
	No.	%	No.	%	No.	%
Insulin dependent	8	4.88	1	6.67	9	5.04
Non Insulin dependent	132	80.48	9	60	141	78.77
Pre-Diabetic	4	2.45	1	6.67	5	2.79
Non Diabetic	20	12.19	4	26.66	24	13.4
Total	164	100	15	100	179	100

Duration of Diabetes

From the study of table 2 the highest numbers (73.54%) of diabetic patients have been suffering for five years. Only 10.33% people are suffering for ten years. 16.13% respondents are suffering in between 5 to 10 years only. As well as chronic fatigue, there is some evidence associating long-term exposure to shift work and the following ill health effects: (Costa G., 1996) gastrointestinal problems such as indigestion, abdominal pain, constipation, chronic gastritis and peptic ulcers; cardiovascular problems such as hypertension, coronary heart disease increased susceptibility to minor illnesses such as colds, flu and gastroenteritis. Shift work may also exacerbate existing health problems such as diabetes, asthma, epilepsy and psychiatric illness. Moreover, the effectiveness and potential toxicity of some drugs may vary depending on the time they are taken as the dose-response patterns of many drugs follow a circadian pattern.

Table 2: Duration of Diabetic Patient

Duration	Number	%
<5yr	114	73.54
5yr-10yr	25	16.13
10yr<	16	10.33
Total	155	100

Routine of Meals Intake

Table 3 reveals that highest percentage 46.37% of employees has no proper time to take their breakfast, lunch and dinner. They do Shift duty which are morning, night and day shift. 44.13% respondents observed that they have no time to maintain routine of meal intake because of their heavy workload. Only 2.23% people take their meals timely because they are in high level post. 3.91% reported that their routine is not certain. I observed that this kind of respondents are not aware of, to maintain routine life and rest 3.36% are depend upon the routine of duty to manage their life style. So, it is the big factors that affect the industrial employees' health and that kind of routine life and life style create a hurdle in their life.

A happy social and domestic life is an important foundation for health and well-being. The amount and quality of time spent with family and friends can, however, be affected by unusual patterns of work. (Monk T H., 1992) A worker who experiences a disrupted social or domestic life may feel isolated, moody or depressed, which can affect their health and performance at work and all of these affect the routine of meals intake.

Table 3: Daily Routine of Meals Intake

Daily Routine	(n=179)
	%
Timely	2.23
No Proper Time	44.13
Weekly Change	46.37
Not Certain	3.91
Depend upon Duty	3.36

Correlation with Unsystematic Routine

Table 4 depict that the prevalence of diabetes is high among those people who generally do Shift duty because, shift duty is the main reason that create hurdle to maintain life and by this they suffer many kind of Physical and Social disorder. It is clear from the table those who don't do shift duty 12.30% is non-diabetic.

Table 4: Respondent Relation with Unsystematic Routine

Routine of Work	Routine duty of the Respondents					
	Diabetic		Non diabetic		Total	
	No.	%	No.	%	No.	%
Shift duty	00	00	01	4.17	1	0.56
Weekly change	145	93.55	01	4.17	146	81.56
Mainly Gen.shift some time shift duty	02	1.29	02	8.30	4	2.23
Mainly shift duty some time gen. shift	05	3.26	00	0.00	5	2.79
Simple shift duty always A,B, or night	01	0.65	00	0.00	1	0.56
Non- shift duty	02	1.25	20	83.33	22	12.30
Total	155	100	24	100	179	100

Rates of diabetes appear to be higher among shift workers (Knutsson, A., 2003) and higher rates of obesity are also more often seen in shift workers (Suwazono, Y, et al., 2008). Shift workers are also more likely to smoke and follow a poor diet which is also risk factors of the condition (Zhao, I & Turner C., 2008). Extended periods of sitting, such as seen in many mining jobs, is associated with increased waist circumference and increased mortality rate.

By nature, humans are active and perform best during the day and need to sleep at night when performance is generally poorer. We follow this innate pattern because of an internal body clock, located in the brain which sets the daily cycle of biological activities, such as chemical and hormone release that influence body activity. For example, heart rate, blood pressure and body temperature are increased during the day. At night they are reduced and we slow down and feel sleepy. This daily cycle is known as the circadian rhythm and explains why we eat and sleep at similar times each day (Minors D S and Waterhouse J M, 1990). External factors or cues such as daylight, meal times, clocks and working hours help to regulate this internal body clock, and play an important role in keeping our bodies in step with the world around us.

Our internal body clock can change gradually, but for most people it is resistant to the abrupt changes in the sleep/wake cycle that are required by shift-work schedules or flying across time zones. This can be cause of our natural daily rhythms to become out of tune with those of the world around us. This is the reason why we can feel 'out of sorts' and less able to function to the best of our ability when we do not get enough sleep.

Preventive Measures

Lifestyle modification such as sound sleep, routine life/discipline life, weight control, increased physical exercise, and smoking cessation which are potentially beneficial in preventing diabetes mellitus and its complication (Leung G M, Lam K, 2000). People should be encouraged to adopt the preventive interventions of diabetes like maintaining normal body weight (BMI 18.5–24.9 kg/m²), engage in regular aerobic physical activity such as brisk walking (at least 30 minute per day, most days of the week), limit consumption of alcohol and consume a diet rich in fruits, vegetables, low fat dairy products. Several studies of community-based non-communicable disease prevention projects attempted to prevent the onset of diabetes through life style modification, reduction in obesity or through pharmacological mean and clearly demonstrated risk factors reduction by healthy life style bring a huge benefit to the public(SEARO,2003).There is no cure for diabetes. However, a shift worker can manage or delay diabetes through following aspects:

- Make sure supervisors and team members with responsibility for shift-working arrangements are aware of the risks associated with shift work and can recognise shift work-related problems.
- Control overtime and shift swapping by monitoring and recording hours worked and rest periods. Discourage workers from taking second jobs.
- Make provision in the work schedule to allow adequate rest for those workers carrying out standby/on-call duties or overtime.
- Provide training and information for workers, their families and management on the risks associated with shift

work and on coping strategies. This may help workers to cope better with shift work.

- Make provision to release staff for foreseeable training, development and communication needs.
- Encourage interaction between workers and provide a means of communication for lone workers.
- Agree on, and ensure timing and procedures for transmitting information to the next shift team are followed at all times.
- Encourage workers to inform their doctor about their working arrangements.
- Promote healthy living strategies such as increasing exercise and improving diet.
- Ensure that free health assessments are provided for night workers.

There is considerable bad routine of life, lacking of physical exercise and least knowledge about diabetes in the population. Level of education is a significant predictor of optimum knowledge and perceptions of risk factor, symptoms, complications and prevention of diabetes. It is significant observation of the studied population is they have high living risk factors, so it's important to implement that 40+ aged people should have to do routine work in a day means of no shift duty.

IV. Conclusion

It has been observed that a routine life is playing as key factor for the prevalence of type 2 Diabetes among mining workers of NMDC Bachel. The increased risk of type 2 diabetes in the workforce has implications both for productivity and employee wellbeing. Increased rates of absenteeism are seen in employees with an existing chronic disease as well as those with chronic disease risk factors. Unsystematic routine can affect blood sugar levels and blood glucose control can also affect employees' sleep, which results in trouble sleeping. Difficulty getting a good night's rest could be a result of a number of reasons, from hypos at night, to high blood sugars, sleep apnea, being overweight or signs of neuropathy. If anyone has blood sugar levels that are either too high or too low overnight, they may find themselves tired through the next day. Lethargy and insomnia can both have their roots in blood sugar control and can be a key in re-establishing a healthy sleep pattern.

Type 2 diabetes, along with other chronic diseases, is emerging as a new priority for workplace health and safety professionals in the mining sector. Due to a range of existing risk factors, mining sector employees are at increased risk of developing type 2 diabetes. This has been further confirmed by evidence based risk assessments conducted with 179 mining employees and key risk factors for the mining employees are being overweight or obese, being inactive and having predominately workforce by unsystematic routine.

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