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Prevalence of Skin Diseases and Non-Communicable Diseases in Mining Area and its Association with Causing Factor in People Living Around Mining Area of Joda Block, Keonjhor

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Abstract:
Background*: The main aim of this study was to evaluate the association between skin disease, non-communicable diseases and its causing factors in mining area of Joda, Odisha.*
Methods*: We conducted a community-based,Multivariate logistic Regression model to investigate the association by Using self-report questionnaire to assess skin diseases, non-communicable and vector borne diseases are used as a reference group to compare the skin diseases and vector borne diseases. The data of 106 people were available for analysis in this Study. Multiple regression models controlling for confounding factors to include various variables were performed to explore the relationship between skin diseases, non-communicable diseases and its causing factors in mining area of Joda*
Results: *It is found that skin diseases is less common in younger people in mining area. Farmers Have less skin diseases as compared to mining labour. People who took a bath in the river have more skin diseases as compare to other diseases. And All these variables are significant (p value <0.05) . Multiple regression analysis indicated skin diseases is associated with age , sex ,occupation and source of water*
Independently and significantly.
Conclusion: *.Hence in our study we concluded that the majority of person affected by skin diseases 76% then 17% Non-communicable diseases and followed by 5.6 % vector borne diseases, Skin diseases were more prevalent in mining area. Iron ore play one of the key factors for skin diseases . Farmers have less skin disease, so agriculture should be promoted in mining area. It can minimize skin diseases. A person who used the river for bathing had more skin diseases as compared to other diseases.*
Keywords: *Skin diseases, Joda, multivariate logistic regression factors,*

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I. Introduction

Odisha come under the mineral rich states in India. According to sources of directorate of Mines, Government of Odisha, there are more than 26 types of minerals found in the state. But the state Government has identified 13 minerals such as iron ore, bauxite, chromite, coal, limestone, dolomite, fireclay, china clay, nickel ore, mineral sand, manganese, graphite, quartz/quartzite/silica, as major minerals.

Total minerals are widely distributed in 25 districts out of 30 districts. In odisha there are top 6 districts, where mining activities are being undertaken rampantly include Keonjhar (31.28%), Sundergarh (20.03%), Angul (10.24%) followed by Jharsuguda (8.87), Koraput (6.3%) and Mayurbhanj.

There are approx605 mining leases covering an area of 99,931.55 Hectare in the state which have been granted with mining leases before 31st Dec 2005. The iron ore deposits of Orissa are found in five distinct geographic zones; (1) BonaiKeonjhar,(2) Gandhamardhan, (3) Tomka-Daitari, (4) Gorumahisani-Badampahar (5) Hirapur.

The district Keonjhar is occupied an important place in minerals in the state, Odisha. There is a huge reserves of high-grade Iron ore, Manganese Chromite along with other minerals such as Limestone, Dolomite, Nickel, Granite, Pyrophyllite, stone, Gold, platinum etc. The dominant among the heavy metals in the region

which is Iron Ore is known to interfere with normal body fluid regulation and can also precipitate as the oxide occurring as stains on materials that comes in contact with it[1](Samananth and Muthikrishnam, 1990).

Skin Diseases Are increasingly rapidly worldwide and the majority of people are affected in mining area , my study area is skin diseases in villages around mining area of Joda block so my study is prevalence of skin diseases and non-communicable in mining area and its association with its causative factors in mining area . .Heavy physical work, severity of the working conditions, workplace injuries and combined occupational dust exposure are the major causes of occupational morbidity and mortality [2]

The pattern of skin diseases in India is influenced by the developing economy, level of literacy, social backwardness, varied climate, and industrialization, access to primary health care, and different religious ritual and cultural factors. Skin changes are affected with aging due to passage of time, photo‐ aging due to exposure to the sun.The cutaneous signs of skin are xerosis, fine wrinkling, thinning of skin, loss of elasticity, seborrheic keratosis, coarse deep wrinkling,

Skin tag, etc. the prevalence of skin diseases in the general population Has varied from 7.86% to 11.16% in various studies. Skin diseases also pose huge financial and psychological burden for the patients and their families.

Various environmental epidemiological studies indicated that exposure to iron dust dust contributed to health risks.[3]However, there are very minimal data available on the prevalence of the skin disease in this population, especially in central rural India. Improvement in the standard of living, education of the general public, improvement in the environmental sanitation, and good nutritious food may help us to bring down the skin diseases in this area.

Therefore, prevention by identifying the risk factor is the Most effective approach especially in resource restrained settings of Central India.

We also used on-line databases from the National Institute for Occupational Safety and Health Institute (NIOSH) website (2010), PubMed and a reference book (de Groot 2008)[4].

II. Materials and Methods

This chapter highlights an overview of the multinomial Logistic regression model, how the model parameter estimates Were obtained, and the asymptotic properties of the Parameter estimates as well as the derived fitted models.

It was a community‐ based, observational study inwhich we prospectively recruited general population In villages around mining area (Pimpadgaon, Kutki, Tadodi,Dindoda, Hiwara, and Takli kite) beginning October1, 2011, through March 2012. We obtained approval From the institutional review board before we started the study.

All study participants were enquired about the potential risk factors of skin diseases through a questionnaire. The Variables in this questionnaire included demographic Variables (age, gender, place, or residence); socioeconomic variables (education, material object, possession, occupation); and self‐ reported history of diabetes mellitus, hypertension, and tuberculosis. History of smoking tobacco in the form of active cigarettes or bidi (with quantification) and exposure to passive smoking along with history of alcohol consumption, history of chewable tobacco, and family history of skin diseases were taken.

We examined the entire eligible study participant clinically for height and weight by standard methods. This study was conducted by the author in various camps in mining areas of Joda block of Keonjhar District. The Diagnosis was entirely based on clinical assessment of the dermatologists and medicine specialist at the field, and in collaboration with medicine and skin department of PMCH patna RIMS ranchi and I care Institute of medical Sciences & Research &Dr.B.C Roy Hospital Haldia ,purbamidnapur and In hospital no dermatological investigations were conducted. About 100% patients attending the camps agreed to participate in the study. There were no dropouts. We Diagnosed the diseases and then categorized them in 3 group Follows:

1) skin diseases
2) Non Communicable disease
3) Vector borne diseases

III. Statistical analysis

All data were abstracted on a standardized data Collection form. We used the XL sheet for data entry andenterThe data electronically and used statistical software SPSS (version 10, Stata Corporation, Texas, USA). We use the odds ratio, variance and pseudo R Square Likelihood Ratio And chi square test to analysis the data and show the association. A level of $P < 0.05$ was used to indicate statistical significance in all analyses. And we

use the multivariate logistic regression method to show the association of skin diseases,non-communicable diseases and its causation factors.

IV. Result

Among the surveyed population, 53.8% were female And 46.2% were male participants.Participants are categorizedinto 2groups by age. No of Participants whose age is less than 40 years were 53.8% and 47.2% participants were more than 40 years.

Table 1 shows that participants who were included in my study area, the majority of peopleuse the river for bathing than ponds and lastly tubewell. 49.1% people lives more than 5km from mining industry, 57.5 % people lives in 1 to 5km from the mining industry and 26.5 % people lives in less than 1 km from mining industry 53.8 % people always take protection before going anywhere .46.2% participants did not take protection. 43.4% participants were farmer by occupation and 56.6 % participants were mining workers 33% participants told us that they changed clothes every day before going anywhere and 67% participants don't change clothes everyday

Majority of participants were Hindu 57.5% by religion,sarna were 24.5%,Muslim were 15.1% and Christian were 2.8% .

Table 2 shows that model of study is fit for this research (chi square = 41.056, df =24, p= 0.16) and because here p value <0.05, so it is significant

Table 3 show that deviance is 1, it means deviation in our model is perfect.

Table 4 it show that age is associated with outcome skin diseases and no communicable diseases and it is also significant. (Chi square= 0.156, df = 2, p value = 0.04), Sex is also important variables which associated with these three outcome skin diseases, Non communicable diseases and vector borne diseases. Here vector borne diseases is reference group. Itisstatistically significant (chi square=0.770, df=2, 0.281).

Distance from the mining industry is an important variable which is associated with diseases (chi-square =4.6,df=4, p value=0.033) and it rejects the null hypothesis so it is also statistically significant.

Kar*et al* in his study concluded that pattern of skin diseases mostly depends not only on environmental factors but also on occupation, socioeconomic status, literacy, and age of the patients [5] .

Source of water what participants used for bathing is one variable among all variable is associated with these 3 outcome, and it is statistically significant because null hypothesis P value < 0.05 (chi square =14.98, df=4 p value=0.05).

Protection taken by participants is one of the important variables which is associated with these 3 outcome, it is also statistically significant (chi square = 9.3,df =2, P Value=0.009).

Participants who have a different type of occupation is associated with outcome skin diseases, non-communicable diseases, vector borne diseases .and it is statistically significant (chi square = 2.98, df=2, p value = 0.022)

Change of clothes every day is one of the important variables among all variable it is also associated with outcome variable skin diseases, non-communicable and vector borne diseases .and it is statistically significant(chi square= 2.13, df=2 ,P value = 0.034)

Religion is also an important variable but p value > 0.05 (chi square = 5.12, df=6 p value = 0.517) so it accepts null hypothesis .so it is not statistically significant .and it is not associated with these 3 outcome variable so we cannot consider this

Variable in our study.

Table-1

		N	Marginal Percentage
Typeofdiseases	skin diseases	81	76.4%
	Non communicable diseases	19	17.9%
	vector born diseases	6	5.7%
age	less than 40 years	57	53.8%
	more than 40 years	49	46.2%
sex	male	50	47.2%
	female	56	52.8%
distanceofminingindustry	500 meter to 1 km	14	13.2%
	1km to 5 km	40	37.7%
	more than 5 km	52	49.1%

	river	61	57.5%
sourceofwater	ponds	28	26.4%
	tubewel	17	16.0%
protectiontaken	yes	57	53.8%
	no	49	46.2%
occupation	agriculture	46	43.4%
	iron ore mining	60	56.6%
changeclotheveryday	yes	35	33.0%
	no	71	67.0%
religion	hindu	61	57.5%
	muslim	16	15.1%
	christian	3	2.8%
	sarna	26	24.5%
Valid		106	100.0%
Missing		0	
Total		106	
Subpopulation		91[a]	

a. The dependent variable has only one value observed in 88 (96.7%) subpopulations.

Table-2

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	139.200			
Final	98.146	41.054	24	.016

Table-3

	Chi-Square	df	Sig.
Pearson	254.223	156	.000
Deviance	93.987	156	1.000

Table-4

Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	98.146[a]	.000	0	.
age	98.302	.156	2	0.042
sex	98.916	.770	2	.0281
distanceofminingindustry	102.756	4.610	4	. 033
sourceofwater	113.127	14.981	4	.005
protectiontaken	107.515	9.368	2	.009
occupation	101.134	2.988	2	.022
changeclotheveryday	100.281	2.135	2	.034
religion	103.360	5.214	6	.517

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Table-5

Parameter Estimates

Typeofdiseases[a]	Variables	B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
skin diseases	Intercept	4.183	2.707	2.387	1	.122			
	[age=1]	-.360	1.174	.094	1	.0459	.698	,070	6.971
	[age=2]	0[b]	.	.	0	.	.	.	.
	[sex=1]	-1.046	1.492	.492	1	.034	.351	.019	6.546
	[sex=2]	0[b]	.	.	0	.	.	.	.
	[distanceofmining industry=1]	-3.026	1.900	2.536	1	.011	.049	.001	2.010

	[distanceofmining industry=2]	-1.218	1.531	.633	1	.426	.296	.015	5.941
	[distanceofmining industry=3]	0[b]	.	.	0	.	.	.	.
	[sourceofwater=1]	4.990	1.868	7.131	1	.008	146.875	3.771	5720.188
	[sourceofwater=2]	3.771	1.714	4.839	1	.028	43.420	1.508	1249.879
	[sourceofwater=3]	0[b]	.	.	0	.	.	.	.
	[protectiontaken=1]	-1.667	1.397	1.424	1	.0233	.189	.012	2.917
	[protectiontaken=2]	0[b]	.	.	0	.	.	.	.
	[occupation=1]	-1.327	1.655	.644	1	.0422	.265	.010	6.792
	[occupation=2]	0[b]	.	.	0	.	.	.	.
	[religion=1]	-.457	1.846	.061	1	.804	.633	.017	23.585
	[religion=2]	-2.358	2.257	1.091	1	.296	.095	.001	7.895
	[religion=3]	15.947	9502.582	.000	1	.999	8423374.288	.000	.[c]
	[religion=4]	0[b]	.	.	0	.	.	.	.
	[changeclothesevery day=1]	.051	1.214	.002	1	.0466	1.053	.097	11.374
	[changeclothesevery day=2]	0[b]	.	.	0	.	.	.	.

Table-6

Type of diseases	variables	B	Std Error	Wald	Df	Significant	Exp(B)	95% CI for (Exp)	
								Lower bound	Upper bound
Non communicable diseases	Intercept	1.577	2.927	.290	1	.590			
	[age=1]	-.185	1.244	.022	1	.0482	.831	.073	9.523
	[age=2]	0[b]	.	.	0	.	.	.	.
	[sex=1]	-1.307	1.570	.693	1	.0405	.271	.012	5.875
	[sex=2]	0[b]	.	.	0	.	.	.	.
	[distanceofminingindustry=1]	-2.606	2.032	1.645	1	.0200	.034	.001	3.960
	[distanceofminingindustry=2]	-1.811	1.588	1.301	1	.254	.163	.007	3.675
	[distanceofminingindustry=3]	0[b]	.	.	0	.	.	.	.
	[sourceofwater=1]	3.786	1.942	3.801	1	.041	44.101	.980	1984.292
	[sourceofwater=2]	3.481	1.810	3.699	1	.034	32.507	.936	1129.144
	[sourceofwater=3]	0[b]	.	.	0	.	.	.	.
	[protectiontaken=1]	.194	1.484	.017	1	0396	1.214	.066	22.263
	[protectiontaken=2]	0[b]	.	.	0	.	.	.	.
	[occupation=1]	-2.260	1.725	1.716	1	.019	.104	.004	3.068
	[occupation	0[b]	.	.	0	.	.	.	.

	=2]								
	[religion=1]	.751	1.997	.141	1	.707	2.118	.042	106.160
	[religion=2]	-1.915	2.441	.615	1	.433	.147	.001	17.630
	[religion=3]	.038	.000	.	1	.	1.039	1.039	1.039
	[religion=4]	0[b]	.	.	0	.	.	.	.
	[changeclothheveryday=1]	.899	1.277	.496	1	.0481	2.458	.201	30.002
	[changeclothheveryday=2]	0[b]	.	.	0	.	.	.	.

a. The reference category is: vector born diseases.

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

V. Discussion

A large-scale, community-based, multinomial logistic regression model was conducted to estimate the association between skin diseases and non-communicablediseases with its causative factors in mining area, which affects the health of the general population. Here vector borne diseases was used for reference group to estimate the skin disease and non-communicable diseases. People living in village around mining area were affected by skin diseases. So a study was conducted among the population in nearby villages in Joda block of keonjhor district and a health camp was arranged by our team then affected people were filtered after that they categorized into 3 groups on the basis of diseases skin diseases, non-communicable diseases and vector borne diseases A multilevel multinomial logistic regression model was considered to predict the probability of being

In Table 5 In our study it was seen that skin diseases were less common in younger (<40 years age group compared to older age group (>40 years) .younger people had 0.360 less skin diseases in comparison of vector borne diseases (95% CI 0.070 -6.9, SE-1.1 df -1 p value – 0.04) and it is also statistically significant Male group in mining area had less skin diseases in comparison to female group. Maleparticipants have 1.046 times less affected skin diseases in compare to vector borne diseases. Here p value < 0.05 (95% CI 0.019 -6.5, SE-1.4, df -1, p value-0.034). So it is statistically significant It was found that villagers who were close to mining area have less skin diseases as compared to vector borne diseases . Here p value is < 0.05. So it is statistically significant (95% CI -0.001-2.01, SE-1.9 df-1, and p value -0.01)

In our study it was seen participants who were regularly Bathing in river had 4.9 times more skin diseases as compared to person who used tubewell .here p value is <0.04 (95% CI 3.7 -5720.0 , SE-1.8 df -1 ,P value -0.008) so it is statistically significant .Water polluted by heavy metals like Iron, Copper, Lead and Zinc has become a striking problem because of its health consequences on the inhabitant (Rasheed *et al*, 2014)[6].

People who used ponds for bathing have 3.7 times more skin diseases as compared to people who used tubewell. (95% CI 1.5-1249, SE -1.7 df-1, and p value- 0.028) .it is also statistically significant. Investigating the consequences of heavy metal pollution has become a global issues because of the danger these elements portent for plants, animals and human health[7] (Oyekunle*et al*, 2012) Protection taken by participants have 1.667 times less skin diseases as compared to vector borne disease .it was seen that here p value is < 0.05 , so it is statistically significant (95% CI- 0.012-2.19 , SE-1.3 ,df-1 , Pvalue-0.02) .

It was seen that farmer by occupation have 1.3 times less skin disease as compare mining labour is also statistically significant because p value is < 0.05 (95% CI -0.010-6.7 , SE-1.6 df-1 P value-0.04) Participants who have change clothes every day were less skin diseases as compared to who don't change the clothes everyday it is also statistically significant (95 % of CI 0.97-11.37 , SE- 1.2 ,df-1 , P value-0.04) It was seen that Hindu have 0.457 less skin disease as compared to vector borne diseases but it is insignificant. So it can't include in our study.

In table 6, In our study it was seen that Non communicable diseases were less common in younger (<40 years age group compared to older age group (>40 years) .younger people had 0.1850 Non communicable diseases in comparison of vector borne diseases (95% CI 0.073 -9.5 , SE-1.2df -1 p value – 0.04) and it is also statistically significant Male group in mining area had Non communicable diseases diseases in comparison to female group. Male participants have 1.3 Noncomunicable diseases in comparison to vector borne diseases. Here p value < 0.05 (95% CI 0.012 -5.8, SE-1.5, df -1, p value-0.04). So it is statistically significant It was found that villagers who were close to mining area have 3.7 times more Non communicable

diseases as compared to vector borne diseases . Here p value is < 0.05. So it is statistically significant (95% CI -0.001- 3.9, SE-1.9 df-1, p value -0.03)

In our study it was seen participants who were regularly Bathing in river had 3.7 times more Non communicable diseases as compared to person who used tubewell .here p value is <0.04 (95% CI 0.980 - 1984.0 , SE-1.9 df -1 ,P value -0.04) so it is statistically significant . People who used ponds for bathing have 3.4times more non communicable diseases as compared to people who used tube well.(95% CI 0.936-1129, SE - 1.8 df-1, and p value- 0.038) .it is also statistically significant.

Protection taken by participants have 0.19 times more non communicable diseasescompared to vector borne disease .it was seen that here p value is < 0.05 , so it is statistically significant (95% of CI- 0.66-22.33 , SE-1.4 ,df-1 , Pvalue-0.03) .

It was seen that farmer by occupation have 2.20 times less Non communicable diseases as compare mining labor is also statistically significant because p value is < 0.05 (95% CI -0.004-3.7 , SE-1.7 df-1 P value-0.019)

Participants who have change clothes every day were suffered of 0.89 times non communicable diseases as comparedto who don't change the clothes everyday it is also statistically significant (95 % CI 0.201-30.37 , SE- 1.2 ,df-1 , P value-0.04) It was seen that Hindu have 0.751 times non communicable disease as compared to vector borne diseases but it is insignificant. So it can't include in our study.

VI. Conclusion

Hence in our study we concluded that the majority of people affected by skin diseases 76% then 17% Non-communicable diseases and followed by 5.6 % vector borne diseases .in our study it was seen that person who live close to mining area less affected by skin diseases and non-communicable diseases . A person who engaged in agriculture by occupation were less affected in skin diseases as compared to mining labor participants who take protection had less skin diseases. Person who change clothes everyday had a less skin diseases. A person who used the river for bathing had more skin diseases as compared to other diseases.

VII. Conflict of interest

There are no conflicts of interest

VIII. Recommendation

People shouldn't use the river for their daily purpose either bathing or drinking People should take protection to minimize the skin diseases, more tube well should be installed. Maximum people should engage in agriculture in mining area, it can minimize the skin diseases.

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