

## HEALTH HAZARDS AMONG PEOPLE RESIDING NEAR LEATHER INDUSTRIES IN UNNAO DISTRICT- A STATISTICAL REVIEW

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### **ABSTRACT:**

*Leather has had a universal appeal from time immemorial. The manufacture of leather is one of the oldest technological professions. The concept of tanning and use of leather was prevalent from time immemorial. Present study focuses on the impact of tanning industries on the health of the respondent's family members working or residing near the tanneries. In this research 1000 respondents were taken into consideration. The results show that Majority of the members complained of fever and stomach ache i.e 22.2% and 24.3% respectively Almost 19% of the members had Diabetes Almost 92 people i.e 9.2% people were suffering with cancer and 46 member i.e 14.6% people were suffering from T.B. Both the decease are caused due to toxic effects from the tannery because the patient of both is decease is not negligible. Some more rare decease of which incidence among the despondence family members is much are Irritation in eyes, feet and stomach, while urination, Itching in eyes and Stomach, Swelling in legs and Stomach and eyes, Cyst in Stomach, throat and some body parts is around 5.2%, 1.2%, 6.9% and 3.2% respectively. Notable percent i.e. 6.5% of respondents family members suffered with skin diseases and 3 members i.e. 0.3% people died of liver failure. The statistical significance of respondent's family members experienced health problems when compared with 200 controlled samples shows diseases like sugar, TB, Body Aches, Ulcers in Stomach, Respiratory disorders, Irritation in body, stomach, fever, skin diseases, swelling in stomach and body and joint pains is statistically significant when statistically significant when tested by Chi-Square significant test.*

### **INTRODUCTION:**

Leather Industry and tanning activity in particular, all over the World is linked to environmental concerns. The environmental issues are slowly gaining ground and extensive measures would need to be put in place for industries to cope with the stringent norms. Tanneries have taken considerable steps to address the issue of wastewater treatment. Tanneries are connected to wastewater treatment mechanisms, which could render the

wastewater amenable to discharge. Zero wastewater discharge is also made mandatory in some states and the tanneries have installed adequate amenities in place to attain zero wastewater discharge. However, as the environmental issues continue to exert significant force of down pulling; this is one issue that is directly connected to the sustainability of the industry.

Leather is a globally acclaimed product and there is an ever increasing demand for leather and its related products. The current trade value of the leather industry is estimated to be approximately US\$ 70 billion per year. The industry in total produces about 18 billion square feet of leather a year, with developing countries producing over 60% of the world's leather. About 65% of the world production of leather is estimated to go into leather footwear. Its major expansion has taken place in developing and newly industrialized countries rather than in developed economies. In developing and newly industrialized countries solid waste and wastewater treatments are not state of the art and there is a high labor content to the processes involved in the conversion of hides and skins into leather. The United States, Germany, and other European countries remain major importers of leather products. Countries such as China, India, Thailand, and Indonesia dominate the export of leather and leather products.

## **METHODOLOGY:**

The assignment of data collection and processing was carried out from June 2015 to Aug 2015, Oct 2015 to Dec 2015. Field research was carried out in UNNAO, Indian state of Uttar Pradesh over a period of Six months. The mixed research strategy is adopted where both qualitative and quantitative techniques were considered and aimed at producing in-depth knowledge about the research. The research survey & Experimental parameters are as shown in the Table

## **RESEARCH SURVEY PARAMETERS**

Research Methodology	Qualitative, Quantitative and Experimental techniques
Questionnaire Design	Structured questionnaire
Location	Unnao (Uttar Pradesh, India)
Total No. of Respondents	1000 – Respondents (Tannery Workers +Nearby people of tannery waste disposal sites.)
Tools Used	Statistical Package for Social Sciences(SPSS)20.0

## DATA SOURCES

The present study considers both primary and secondary data. The primary data and secondary data selected for the study are:

### Primary Data:

- Primary data is gathered personally from the respondents from the leather industry
- Data is collected from the residents of the locality near the leather industry.
- The analysis report of the Indian Institute of Toxicology on samples collected from ground water, tannery waste and urine samples.

### Secondary Data:

- Secondary data is obtained from documentary sources like Books, Journals, Reports, Conference Proceedings, Official reports, Statistics from district offices, Web sources etc.

### Sampling Design:

Convenience Sampling has been used as a sampling design for the selected study. The respondents and the samples were collected from around 123 places and some of the important places are mentioned below from where the samples were collected.

1. Akrapur Industrial Area.
2. Leather Technology Park Banthar.
3. Unnao Industrial Area Site 1.
4. Unnao Industrial Area Site 2.
5. Dahi Chauki Industrial Area

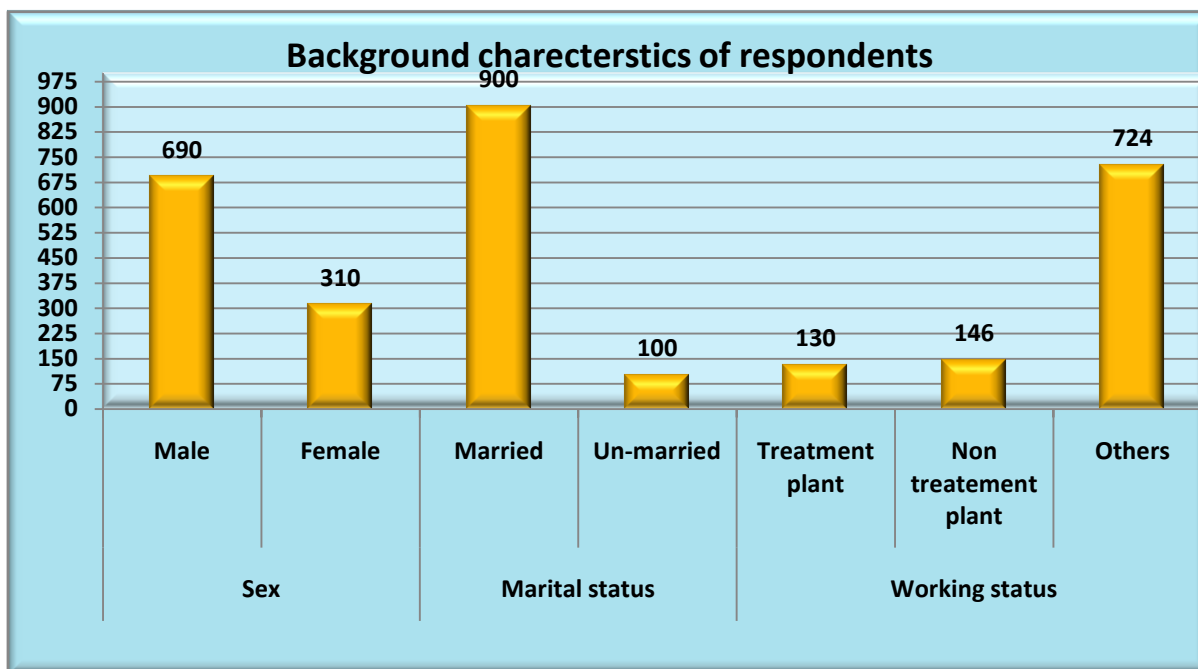
## OBJECTIVES AND HYPOTHESIS:

The prime aim of the proposed study is to perform an investigational study to understand the Environmental and Health issues developed due to the emission of toxic effluents from the tanning industry in Unnao. In order to accomplish this aim, following are the research objectives and Hypothesis:

1. To investigate and explore various factors effecting health in the people exposed to Tannery industry and Tannery waste.
2. The after effects on the human body when exposed to tannery waste disposal sites and people working in the tanneries are significantly dangerous.

<b>Background characteristics of the respondents</b>			
<b>Category</b>	<b>Indicator</b>	<b>Frequency</b>	<b>Percent</b>
Gender	Male	690	69.0
	Female	310	31.0
Age	Less than 20	63	6.3
	21 to 30	218	21.8
	31 to 40	331	33.1
	41 to 50	224	22.4
	51 to 60	114	11.4
	61 and above	50	5.0
Marital status	Married	900	90.0
	Un-married	100	10.0
Family members	Single Member	51	5.1
	2 to 4 members	302	30.2
	Five members	*-	20.0
	6 and above	447	44.7
Income	Less than 5000	437	43.7
	5000 to 10000	249	24.9
	10000 to 15000	9	.9
	More than 15000	3	.3
	DK	302	30.2
Number of children	None	113	11.3
	less than two	347	34.7
	three children	229	22.9
	More than four children	311	31.1
Working status	Working in Treatment plant	130	13.0
	Not working in treatment plant	146	14.6
	Others	724	72.4
<b>Total</b>		<b>1000</b>	<b>100</b>

Table No 1: Background Characteristics of The Respondents



**Graph No 1: Background Characteristics of the respondents**

Gender: out of total respondents 690 i.e. 69.0% respondents were males and 310 i.e. 31.0% were females.

Age: the survey covered respontas of age up to 61 and above. 6.3% respondents were less than 20 years of age followed by 21 to 30 years, 21.8%, 31 to 40 years, 33.1 %, 51 to 60 years, 11.4% and 61 and above were 5%.

Marital Status: 90% of the respondents were married and only 10% were unmarried.

Family Members: respondents who were single were 5.1% followed by multiple members in their family i.e respondents 30.2 % respondents fall under the category in 2 to 4 members followed by 5 members in a family i.e. 20% and 6 members and above were 44.7 % that means almost half of the population.

Income: in the present study 43.7% respondents had less than 5000 income, 24.9% respondents had income between 5000 to 10000 followed by .9% of respondents with income between 10000 to 15000 and .3% of respondents with income more than 15000.

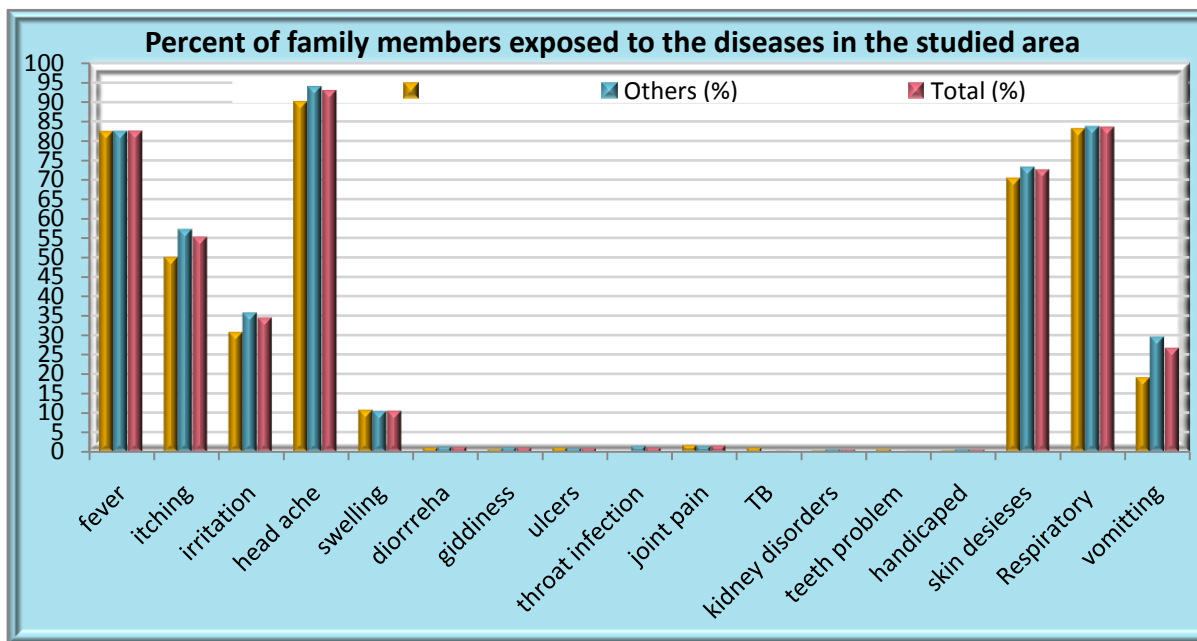
No. of Children: 11.3% respondent’s families had no children, 34.7% respondents’ families has less than 2 children flowed by 22.9% families with 3 children and 31.1% with more than four children.

Working Status: in the present study 13% of respondents worked in the treatment plant in the tannery industry and 14.6% respondents worked in the tannery but not in the treatment plant. Rest 72% respondents were the people who were either working some were out of the tannery and no were related to tannery or they were people who did not work at all.

<b>DISEASE PROFILE OF RESPONDENT'S FAMILY</b>			
<b>Indicators</b>	<b>Number</b>	<b>Percent</b>	<b>Valid Percent</b>
Body Ache	12	1.2	1.2
Breathlessness	5	.5	.5
Cancer	92	9.2	9.2
Chest Pain	9	.9	.9
Cough	5	0.5	0.5
Cough	67	6.7	6.7
Diarrhea	42	4.2	4.2
Fever	222	22.2	22.2
Giddiness	2	.2	.2
Handicapped	11	1.1	1.1
Head Ache	18	1.8	1.8
Irritation In Eyes	5	.5	.5
Irritation In Feet	5	0.5	0.5
Irritation In Stomach	18	1.8	1.8
Itching	14	1.4	1.4
Itching In Eyes	6	.6	.6
Itching In Stomach	6	.6	.6
Join Pain	9	.9	.9
Kidney Disorders	52	5.2	5.2
Leprosy	3	.3	.3
Liver Failure	3	.3	.3
Respiratory Problems	6	0.6	0.6
Skin Diseases	65	6.5	6.5
Stomach Ache	245	24.5	24.5
Sugar	190	19.0	19.0
Swelling	27	2.7	2.7
Swelling In Legs	17	1.7	1.7
Swelling In Stomach	32	3.2	3.2
Tb	146	14.6	14.6
Ulcers	32	3.2	3.2
Vomiting	25	2.5	2.5
Weakness	13	1.3	1.3
Swelling In Eyes	9	.9	.9

Cyst In Stomach	12	1.2	1.2
Cyst Inn Body	14	1.4	1.4
Cyst In Throat	8	0.8	0.8
Irritation While Urination	19	1.9	1.9
Teeth Problem And Backish Teeth	7	0.7	0.7
Piles	3	0.3	0.3
<b>Total</b>	<b>1000</b>	<b>100</b>	<b>100</b>

**Table No 2: Disease Profile in Respondent’s Family**



**Graph No 2 : Disease Profile in Respondent’s Family**

In the present study the above table shows the diseases profile of the respondent’s family members. It is shown in the table that around 24.5% of the respondents suffer with stomach ache followed with 4.2% respondents with diarrhea, 2.5% with vomiting. It is to be noted that around 9.2% respondents suffered with cancer and 14.5% of them suffered with TB; 5.2% suffered with kidney disorders. Around 65 % respondents suffered with skin diseases; 5.2% of them complained about Irritation while urination, in eyes, feet, stomach; 7.6% respondents complained about swelling issues like swelling in legs, eyes, stomach; around 3.4% suffered from cyst in body, stomach, throat; 22.2 % complained about fever constantly; 73 % complain of Cough both dry and productive In which 6.7 % of people suffered with productive cough. 0.7 % respondents suffer with teeth and gums problems in which their teeth become blackish. 1.3 complain of weakness; .9% complain of joint pains; .2 of giddiness and 0.5% of breathlessness 0.9% of respondents face chest pain and 1.2% suffer with body ache; 19 % of the respondents have sugar. 3.2% people suffer with ulcers.

Disease Profile Of Respondents Family Members By Type Of Work								
Type Of Disease	Number				Percent			
	Working In Treatment Plant (N=130)	Not Working In Treatment Plant (N=146)	Others (N=274)	Total (N=1000)	Working In Treatment Plant (N=130)	Not Working In Treatment Plant (N=146)	Others (N=274)	Total (N=1000)
Sugar	35	33	122	190	26.9	22.6	16.9	19.0
TB	43	5	98	146	33.1	3.4	13.5	14.6
Cancer	23	10	59	92	17.7	6.8	8.1	9.2
Kidney Disorders	7	5	40	52	5.4	3.4	5.5	5.2
Chest Pain	0	3	6	9	0.0	2.1	0.8	0.9
Body Ache	0	2	10	12	0.0	1.4	1.4	1.2
Stomach Ache	14	37	194	245	10.8	25.3	26.8	24.5
Handicapped	0	1	10	11	0.0	0.7	1.4	1.1
Ulcers	5	1	26	32	3.8	0.7	3.6	3.2
Breathlessness	0	0	5	5	0.0	0.0	0.7	0.5
Cough	1	1	3	5	0.8	0.7	0.4	0.5
Head Ache	0	8	10	18	0.0	5.5	1.4	1.8
Irritation In Eyes	0	0	5	5	0.0	0.0	0.7	0.5
Irritation In Stomach	1	3	14	18	0.8	2.1	1.9	1.8
Irritation In Feet	1	1	3	5	0.8	0.7	0.4	0.5
Itching	0	4	10	14	0.0	2.7	1.4	1.4
Itching In Eyes	0	1	5	6	0.0	0.7	0.7	0.6
Itching In Stomach	0	1	5	6	0.0	0.7	0.7	0.6
Cough	1	9	57	67	0.8	6.2	7.9	6.7
Diarrhea	0	7	35	42	0.0	4.8	4.8	4.2
Fever	5	38	179	222	3.8	26.0	24.7	22.2
Giddiness	0	0	2	2	0.0	0.0	0.3	0.2
Leprosy	0	0	3	3	0.0	0.0	0.4	0.3
Liver Failure	0	0	3	3	0.0	0.0	0.4	0.3



Respiratory Problems	0	2	4	6	0.0	1.4	0.6	0.6
Skin Diseases	3	14	48	65	2.3	9.6	6.6	6.5
Vomiting	0	7	18	25	0.0	4.8	2.5	2.5
Weakness	0	4	9	13	0.0	2.7	1.2	1.3
Swelling In Legs	1	3	13	17	0.8	2.1	1.8	1.7
Swelling	3	3	21	27	2.3	2.1	2.9	2.7
Join Pain	1	2	6	9	0.8	1.4	0.8	0.9
Swelling In Stomach	6	2	24	32	4.6	1.4	3.3	3.2
Swelling In Eyes	0	0	9	9	0.0	0.0	1.2	0.9
Cyst In Stomach	0	0	12	12	0.0	0.0	1.7	1.2
Cyst Inn Body	0	1	13	14	0.0	0.7	1.8	1.4
Cyst In Throat	1	3	4	8	0.8	2.1	0.6	0.8
Irritation While Urination	4	3	12	19	3.1	2.1	1.7	1.9
Teeth Problem And Brackish Teeth	0	1	6	7	0.0	0.7	0.8	0.7
Piles	0	0	3	3	0.0	0.0	0.4	0.3

**Table No 3: Cross Tabulation of profile of diseases of the respondent's family members on the basis of type of work of respondents.**

**Interpretation:** Table no 9 gives the detailed idea of health issues among members from the families of respondents both working in the tannery and not working in the tannery. Here others column belongs to the respondents who do some work but they not work in the tannery but they are the residents of the locality where the tannery is situated. Therefore the effect on them sue to water, atmosphere and soil is also considered. Around 3.4% people complained about cyst in stomach, cyst in body, cyst in throat. People suffer from teeth and gums problems, liver failure, cancer and Tb which are generally cause due to the consumption of food or water which is effected by chemicals such as chromium which is used in tanning industry.

Statistical significance of respondent's Family members experienced health problems by type of work								
Indicators	Working in Industry (N=276)	Percent	Others (N=724)	Percent	Total (N=1000)	Percent	Pearson's R	Chi-square (p-value)
Sugar	68	24.6	122	16.9	190	19.0	0.089	<b>0.005</b>
TB	82	29.7	108	14.9	190	19.0	0.169	<b>0.000</b>
Cancer	33	12.0	59	8.1	92	9.2	0.059	0.063
Kidney stone	12	4.3	40	5.5	52	5.2	-0.024	0.454
Body aches	57	20.7	212	29.3	269	26.9	0.087	0.006
Handicapped	1	0.4	10	1.4	11	1.1	-0.044	**
Ulcers	32	11.6	29	4.0	61	6.1	0.142	<b>0.000</b>
Respiratory	18	6.5	20	2.8	38	3.8	-0.088	<b>0.005</b>
Cough	12	4.3	59	8.1	71	7.1	0.066	0.036
Irritation	45	16.3	53	7.3	98	9.8	-0.135	<b>0.000</b>
Diaorrea	7	2.5	35	4.8	42	4.2	-0.051	0.105
Fever	43	15.6	179	24.7	222	22.2	-0.098	<b>0.002</b>
Giddiness	0	0.0	2	0.3	2	0.2	-0.028	**
Leprosy	0	0.0	3	0.4	3	0.3	-0.034	**
Liver failure	0	0.0	3	0.4	3	0.3	-0.034	**
Skin diseases	72	26.1	48	6.6	120	12.0	0.268	<b>0.000</b>
Vomiting	47	17.0	18	2.5	65	6.5	0.264	<b>0.000</b>
Weakness	4	1.4	9	1.2	13	1.3	0.008	**
Swelling	54	19.6	61	8.4	115	11.5	-0.156	<b>0.000</b>
Joint pain	3	1.1	6	0.8	9	0.9	0.012	**
Teeth problem	1	0.4	6	0.8	7	0.7	-0.025	**
Piles	0	0.0	3	0.4	3	0.3	-0.034	**
Cyst	5	1.8	29	4.0	34	3.4	0.054	0.087
Itching	6	2.2	20	2.8	26	2.6	0.017	0.601

Chi-square test was used to test significance for odds ratio. Control group from Working in Industry is taken as reference category. (p<0.05)

\*\* Cells have expected count less than 5.

**Table No 4: Statistical significance of respondent's Family members experienced health problems based on type of work**

**Inference:** A Chi-Square dependency test was carried out and the results show that the calculated values are less than the table values at 5% Level of Significance. Table no shows the statistical significance of the diseases among the family members of the respondents both working in tannery and not working in the tannery. This table shows

that diseases such as sugar, TB, Body aches, ulcers, respiratory problems, cough both dry and productive, irritation, fever, Skin diseases, vomiting, swelling in eyes, legs and body are highly significant which are not considered normal.

Statistical significance of respondent's family members experienced health problems by residential status								
Indicators	Residents (N=1000)	Percent	Non residents (N=200)	Percent	Total (N=1200)	Percent	Pearson's R	Chi-square (p-value)
Sugar	190	19.0	17	8.5	207	17.3	0.104	<b>0.000</b>
TB	190	19.0	8	4.0	198	16.5	0.151	<b>0.000</b>
Cancer	92	9.2	3	1.5	95	7.9	0.106	**
Kidney stone	52	5.2	6	3.0	58	4.8	0.038	0.185
Body aches	269	26.9	22	11.0	291	24.3	-0.138	<b>0.000</b>
Handicaped	11	1.1	0	0.0	11	0.9	0.043	0.136
Ulcers	61	6.1	24	12.0	85	7.1	0.059	<b>0.003</b>
Respiratory	38	3.8	22	11.0	60	5.0	0.123	<b>0.000</b>
Cough	71	7.1	13	6.5	84	7.0	-0.009	0.761
irritation	98	9.8	34	17.0	132	11.0	0.086	<b>0.003</b>
Diaorreha	42	4.2	4	2.0	46	3.8	0.043	**
Fever	222	22.2	22	11.0	244	20.3	0.104	<b>0.000</b>
Giddiness	2	0.2	2	1.0	4	0.3	-0.052	**
Leprosy	3	0.3	0	0.0	3	0.3	0.022	**
Liver failure	3	0.3	0	0.0	3	0.3	0.022	**
Skin diseases	120	12.0	10	5.0	130	10.8	0.084	<b>0.004</b>
Vomiting	65	6.5	5	2.5	70	5.8	0.064	<b>0.028</b>
Weakness	13	1.3	6	3.0	19	1.6	-0.051	0.079
swelling	115	11.5	5	2.5	120	10.0	-0.112	<b>0.000</b>
Joint pain	9	0.9	22	11.0	31	2.6	-0.237	<b>0.000</b>
Teeth problem	7	0.7	3	1.5	10	0.8	0.036	**
Piles	3	0.3	3	1.5	6	0.5	-0.063	**
Cyst	34	3.4	7	3.5	41	3.4	0.002	0.943
itching	26	2.6	13	6.5	39	3.3	0.082	<b>0.005</b>

Chi-square test was used to test significance for odds ratio. Control group from residents in the same area is taken as reference category. (p<0.05)  
\*\* Cells have expected count less than 5.

**Table No 5: Statistical significance of respondent's family members experienced health problems on the basis of residential status**

A Chi-Square dependency test was carried out and the results show that the calculated values are less than the table values at 5% Level of Significance. Table No shows the statistical outcome of the diseases in family members of respondents both residing near tannery and not residing near tannery. Here in the present research work it is shown that diseases such as sugar, TB, body aches, Ulcers, Respiratory problem, irritation in the body and other body parts, fever, skin diseases, vomiting, swelling in the body, eyes etc, joint pain and itching in the body and other parts is highly significant.

## CONCLUSION:

All the diseases discussed above are more likely to appear due to the consumption of heavy metals such as Chromium which is a common effluent from the tannery industry. This was the disease profile of respondent's family members in which around 276 respondents were working in tannery industry near their locality and to be precised the disease such as cancer, TB, skin diseases and liver problems, kidney problems, itching, irritation and swelling in the body and teeth and gum problems have appeared in more percent among the family members of respondents working in the tannery. This may be due to non use of any safety measures while working in the tannery and may also be due to consumption of chromium through food chain and in drinking water, these people belong to the locality near tannery. The presence of chromium in the water and soil is presented further disease.

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