

Original Article

A study on health aspects of agate workers in Shakarpura- Khambhat

Deepak B Sharma¹, Tushar A Patel¹, Amit Mohan Varshney²

¹Assistant Professor, ²Resident -2nd year, Community Medicine, P.S. Medical College, Karamsad

Contact : Deepak B. Sharma, Email: drdeepak1105@gmail.com

Abstract:

Background: Workers working in the agate industries are dying of silicosis in regular interval for last 40 years in Khambhat. The agate industry is a household industry in the Khambhat region of Gujarat and its surrounding villages⁽¹⁾.

Objectives: To find the:

1. Age and sex distribution of studied agate workers
2. Occurrence of tuberculosis in agate workers and the number of times the TB treatment was taken
3. Number of deaths in the family because of agate work.
4. Health problems if any and type of health problems

Methods: Cross sectional study involving 98 agate workers engaged in grinding work

Results: One family member in 22 families had died because of working as agate grinder. 25(25.5%) cases were diagnosed of having tuberculosis and had taken AKT (DOTS). Out of these 25 persons who were diagnosed to be having TB, 1 person did not take the treatment, 15(60%) got this disease only once and had AKT (DOTS) once; whereas 6(24%) workers had taken AKT (DOTS) twice. On asking about the current health problem, 85(86.7%) replied that they were having one or the other health problems. 78(79.6%) replied that there remains bodily pain after work and 75(76.5%) said malaise is there.

Conclusions: The condition of the agate workers is pitiable. They are working in the agate industry and putting their lives at risk for silicosis and silico-tuberculosis.

Keywords-Agate, TB, Silicosis, Silico-Tuberculosis, TB treatment, Death of family members, Health problems

Introduction:

Among the occupational diseases, silicosis is the major cause of permanent disability and mortality. It is caused by inhalation of dust containing free silica or silicon dioxide (SiO₂)⁽²⁾. Year after year, both in developed and developing countries,

overexposure to respirable dust containing crystalline silica causes disease, temporary and permanent disabilities, and death. Silicosis results in conditions such as lung fibrosis and emphysema. The form and severity in which silicosis manifests itself depend on the type and extent of exposure to silica dusts: chronic, accelerated and acute forms are all recognized. In later stages the critical condition can become disabling and is often fatal. A frequent cause of death in people with silicosis is pulmonary tuberculosis (silico-tuberculosis).

Grinding the stone on grinding (emery) wheels driven by electricity at a speed of 2-3,000 RPM generates large amount of dust. The generated dust contain fine dust of the size 2-5 micron size which, when inhaled reaches alveoli of lungs. The dust contains more than 90% of free silica.

Thus Silica particles get settled in lungs causing Silicosis-a deadly disease. Large numbers of workers, men and women, till date have died of Silicosis. Number of families has been completely wiped off. Large numbers of children have been left orphans. The widows have their own specific problems of livelihood. Elders loss support when youngsters in the family die of silicosis, when they need the support most⁽³⁾.

Though more finished products made in a profiteering industry the exhaust system have not been installed or has not become mandatory for the manufacturer to reduce the inhalation of silica dust, one of the most important preventive steps to save the workers from silicosis. The colours of the agate may mesmerize us but it takes away the colours of the lives of the workers and family.

The problem of silicosis is much more severe in the unorganized sector of industries like

slate pencil cutting, stone cutting and agate industry. The flaw here is that most industries

belonging to the unorganized sector do not fall under the purview of the statutory tools such as the Factories Act aimed to protect the health and safety of the working population. Moreover, the employers lack the will to provide safe working environment for the workers. It is probably economic compulsions that the workers choose to work in hazardous environments and are subjected to exploitation⁽⁴⁾.

Aims and Objectives:

The following study is carried out to find the:

1. Age and sex distribution of agate workers
2. Occurrence of tuberculosis in agate workers and the number of times the TB treatment was taken
3. Number of deaths in the family because of agate work.
4. Health problems if any and type of health problems

Materials and methods:

Subject recruitment procedure: People engaged in grinding work of agate stones.

Inclusion criteria: 98 agate workers engaged in grinding work

Exclusion criteria: Persons engaged in mining, drying, frying, and polishing of agate stones.

Methodology of the study: Cross sectional study involving 98 agate workers in Shakarpura

Sampling method- Cross sectional study

Sample size-

Total agate grinders in Shakarpura village in Khambat are around 200. We decided to interview half of this agate grinder population which makes it to 100. So a total of 100 agate workers were decided for study but 2 persons did not responded well and the information was not collected adequately in these two cases, so total study participants became 98.

Questionnaire method was used for interviewing the workers. A total of 30 minutes was allotted for each worker and the questionnaire was filled taking necessary information.

The analysis is done by EPI-info package and the results were interpreted in terms of %, mean, S.D, median, χ^2 test, Odds ratio

Results :

65(66.3%) agate workers were males and 33(33.7 %) were females. Maximum workers were from the age groups 30-50 in both male (70.8%) and female (74.0%).

Table 1 shows age & sex wise distribution of agate workers

Age	Male (%)	Female (%)	Total (%)
15-20	1(1.5)	1(3.1)	2(2.1)
20-25	5(7.7)	4(12.5)	9(9.3)
25-30	9(13.8)	1(3.1)	10(10.3)
30-35	15(23.1)	5(15.6)	20(20.6)
35-40	12(18.5)	9(28.1)	21(21.6)
40-45	9(13.8)	10(30.3)	19(19.4)
45-50	10(15.4)	0(0.0)	10(10.3)
50-55	0(0.0)	2(6.3)	2(2.1)
55-60	2(3.1)	1(3.1)	3(3.1)
>60	2(3.1)	0(0.0)	2(2.1)
Total	65(100.0)	33(100.0)	98(100.0)

Mean age – 35.94 years, S.D-8.91 years, Median-35years, Mode- 40 years

Table 2-Distribution of study subjects by literacy status

Literacy status	No (%)
Illiterate	21(21.4%)
Primary	60(61.2%)
Secondary	15(15.3%)
HS	1(1.0%)
Graduate	1(1.0%)
Total	98(100.0%)

Out of 98 agate workers 21 (21.4%) were illiterate. Maximum number of workers 60 (61.2%) were having primary education. This is illustrated in **Table 2** as distribution of agate workers by literacy status

Table 3-Distribution of study subjects by years of work

Years of Work	No (%)
<1 year	1(1.0)
1-2	4(4.1)
2-5	26(26.5)
5-10	37(37.8)
10-15	15(15.3)
15-20	5(5.1)
>20	10(10.2)
Total	98(100)

Out of 98 workers, 37 (37.8%) has worked for 5-10 years followed by 26 (26.5%) workers who has worked for 2-5 years.15 (15.3%) workers has worked for 10-15 years and 10 (10.2%) workers has worked for >20 years.

Table 4-Distribution of study subjects according to the death of family members because of agate work

Family members died	Families
0	48
1	22
2	4
3	1
4	1
5	1
6	2

In 22 families one family member died because of working as agate grinder. In 2 families 6 family members died because of working as agate grinder.

Table 5- Distribution of study subjects by sex and the TB status

Status of TB	Female (%)	Male (%)	Total (%)
Yes	7(26.92)	18(27.69)	25(25.51)
No	26(78.78)	47(72.30)	73(74.48)
Total	33(100)	65(100)	98(100)

Value Upper OR 0.703 1.903
 CI Lower 0.2597
 Value p value (2tail) 0.4837 0.4868
 Chi test Not significant

7(26.92%) females and 18 (27.69%) males were prescribed AKT (DOTS).

Table 6- Distribution of study subjects by the number of times TB treatment was taken

Number of times TB Rx taken	No (%)
1	15(60.0%)
2	6(24.0%)
3	3(12.0%)
Nil	1(4.0%)
Total	25(100.0%)

Out of the 25 persons who were diagnosed to be having TB*, 1 person did not took the treatment,15 (60%) got this disease once and had taken AKT (DOTS); whereas 6 (24%) person had taken AKT (DOTS) twice and in 3(12%) cases three times the treatment was taken because of reinfection.

Based on the workers history of taking AKT (DOTS) ,as workers were told that they are suffering from TB and the diagnosis is hardly STB or silicosis. Owing to occupational exposure, it would have been STB or silicosis.

Table 7-Distribution of study subjects by current health problem

Health problem if any	No (%)
No	13(13.3%)
Yes	85(86.7%)
Total	98(100.0%)

On asking about the current health problem, 85 (86.7%) replied that they were having one or the other health problems

Table 8: Distribution of study subjects by the type of health problem

Health Problem	No (%)
Cough	26(26.5)
Fever	18(18.4)
Decreased weight	50(51)
Malaise	75(76.5)
Bodily pain	78(79.6)
Breathlessness	42(42.9)

78 (79.6%) replied that there remains bodily pain after work, 75 (76.5%) said malaise was there. 50 (51%) complained of weight loss whereas 42 (42.9%) said that they feel breathless. 26 (26.5%) said that they were having cough and 18 (18.4%) had fever

Discussion:

In the present study a total of 98 agate workers are studied. Out of these 98 workers, 66.3% were males and 33.7 % were females. Maximum workers were from the age groups 30-50 in both male (70.8%) and female (74.0%). 21.4% agate workers were illiterate. Maximum number of workers 60 (61.2%) were having primary education.

In 22 families one family member died because of working as agate grinder. In 2 families 6 family members died because of working as agate grinder. 7(26.92%) females and 18 (27.69%) males were prescribed AKT (DOTS). The PUCL Bulletin stated that the prevalence of silicosis in male and female agate grinders was 39.8% and 34.2% respectively. About 19% of the male agate grinders and 22% of female agate grinders developed silicosis within five years. The overall prevalence of tuberculosis amongst

male and female agate grinders was 37.4% and 40.3% respectively⁽¹⁾.

Rastogi SK stated that the prevalence of pulmonary tuberculosis was very high in both agate workers and controls (15.5% and 12.1%, respectively), probably because of poor socio-economic and unhygienic living conditions.⁽⁵⁾ Out of the 25 persons (25.51%) who were diagnosed to be having TB*, 1 person did not take the treatment, 60% got this disease once and had taken AKT (DOTS); whereas 6(24%) person had taken AKT (DOTS) twice and 3(12%) cases three times the treatment was taken because of reinfection.

All the workers were exposed to silica dust as a part of their work, but the diagnosis was tuberculosis only in all these cases and not the silicosis or silico-tuberculosis. The workers were put to AKT (DOTS) treatment and other symptomatic treatment only. The PUCL Bulletin mentioned that the facts of Silicosis menace among the workers have been suppressed by traders, employers and Government machineries. The workers treated in the hospitals are never or hardly diagnosed as silicosis. In apprehension of losing jobs, the workers themselves hide their infections⁽¹⁾.

TB is curable while Silicosis is incurable. Though Silicosis is a compensable disease under Workman Compensation Act, there is not a single case of claim, due to complex social situation. Once the worker gets the disease his condition becomes pitiable. In many cases there is no one to look after and one is compelled to work till death, lest he & his family would not be able to get evening meal. Large numbers of women work as grinders and hence death rate among women is also high⁽³⁾.

On asking about the current health problem, 86.7% replied that are having one or the other health problems. 79.6% replied that there remains bodily pain after work, 76.5% said malaise is there. 51% complained of reduction in weight whereas 42.9% said that they feel breathless. 26.5% said that they were having cough. 18.4% had fever.

In the April 1998 issue of "Outlook India" Saira Menezes mentioned the results of

a study conducted by the Industrial Toxicology Research Centre which compelled the Gujarat High Court to examine the conditions of agate workers. According to the article, the expert panel comprised of the National Institute of Occupational Health (NIOH) and the Office of the Labour Commissioner. Some 40 per cent of the male workers and 37 per cent of the female workers displayed various symptoms of silicosis: dry cough, breathlessness, fever and gradual weight loss. Indicating that the numbers might have seen a sizeable increase since then, Dr H.N. Saiyed, director, NIOH, reveals: "The 'akik' workers are not covered under any health programme. There are no specialists to treat them, no diagnostic facilities. Medicines meant for TB are used to combat silicosis as the disease has no cure⁽⁶⁾.

With a view to improve the working environment and prevent the factory workers from being exploited, the Gujarat state government has decided to extend the provisions of Factories Act even to units with just one worker. This may help them fix the responsibilities for occupational hazards in cases of silicosis and silico-tuberculosis among the agate workers of Khambhat and the stone quartz grinders⁽⁷⁾.

In the absence of specific therapy for silicosis, there is a need for planning a National strategy for the prevention and control of silicosis. The concern for prevention and control should be focused on unorganized sector like stone-cutting for slate pencil, Artisans involved in working with stones, some areas of construction sector, Glass and bangle workers and Agriculture workers⁽⁴⁾.

Acknowledgement: We would like to acknowledge Departmental Head- Dr Vasudev Rawal for guidance and support during the study. Agate workers' responsive behavior needs to be acknowledged without which the study would not have been possible. (N.B-Akik is Gujarati word for agate).

References:

1. Silicosis - A Death Trap for Agate Workers in Gujarat ,PUCL Bulletin 2008 March, XXVIII(03).
2. Park K. Park's Textbook of Preventive and Social Medicine,

- (20th ed.), Banarsi Das Bhanot, Jabalpur, 711; 2009.
3. <http://www.lac.org.hk/en/modules/magazine/article.php?articleid=64/> accessed on 29 Sept. 2010
4. Kulkarni GK. Prevention and control of silicosis: A national challenge. Indian Journal of Occupational and Environmental Medicine. 2007 December; 11(3).
5. Rastogi SK, Gupta BN, Chandra H, Mathur N, Mahendra PN, Husain T. A study of the prevalence of respiratory morbidity among agate workers. Epidemiology Division, Industrial Toxicology Research Center, Mahatma Gandhi Marg, Lucknow, India. Int Arch Occup Environ health. 1991; 63(1):21-6.
6. <http://www.outlookindia.com/article.aspx?205384> accessed on 27 July 2010.
7. <http://www.expressindia.com/latest-news/now-factories-act-applicable-to-units-even-with-one-worker/406767/> accessed on 29 Sept 2010.