



## A CROSS SECTIONAL STUDY ON ASSESSMENT OF SYMPTOMS IN WORKERS OF STONE CRUSHER ZONE OF YAMUNANAGAR DISTRICT OF HARYANA DUE TO DUST EXPOSURE AND TO ANALYSE KNOWLEDGE AND PRACTICE OF OCCUPATIONAL HEALTH AMONG THEM.

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### ABSTRACT:

**Introduction:** Stone mining and crushing leads to generation of excessive dust which contains silica. The workers involved in this industry are continuously exposed to dust. The nature of work in stone crusher zone and use of primitive tools predispose them to various other occupational hazards. Hence adequate knowledge of occupational health & safety is required.

**Objectives:** To study prevalence of symptoms due to dust exposure in stone crusher workers and to analyse awareness regarding occupational safety among them.

**Method:** It is a cross sectional study involving 200 stone crusher worker in Yamunanagar district of Haryana. A common set of questions was asked and data collected was further analysed.

**Results:** Cough was the most common symptom present in 65.5% individuals. The incidence of cough increased as duration of exposure to dust increased. No pre placement & periodic medical examinations were held. Use of Personal Protective Equipments is very rare. Awareness regarding health insurance scheme is limited to just 8.5% study participants.

**Conclusion:** The stone crusher workers are at higher risk of developing respiratory symptoms due to constant exposure to dust. The practice of using mask & other protection equipments is very rare. Study population had very low awareness about health insurance schemes as a result majority of individuals are not insured under any such schemes.

### KEYWORDS:

HEALTH INSURANCE, OCCUPATIONAL HAZARDS, OCCUPATIONAL HEALTH, SILICA, STONE CRUSHER ZONE.

### INTRODUCTION:

Stone contains approximately 100% free silica and the stone crushing process liberates huge amount of respirable crystalline silica dust in working environment.<sup>[1]</sup> Numerous stone crushing industries and individuals in developing countries generate a lot of air borne particulate matters and these workers are often ignorantly exposed to these dust.<sup>[2]</sup> Dust particles range from 1 to 100  $\mu\text{m}$  in diameter and when deposited in lungs, they have the potential to cause harm either locally or elsewhere in body.<sup>[3]</sup>

Stone mining and crushing is the major source of employment and livelihood in peripheral belt of Yamunanagar district which touches the foot hills of outer Himalayas (Shivalik Range). The land in this region is endowed with immense deposits of small to medium sized stones which are first mined then crushed and further processed. Thereafter this material is transported to various construction sites in Uttar Pradesh, Haryana, Himachal Pradesh and Delhi.

This stone crusher zone has about 200 such crusher units involving more than 2500 workers. Due to the nature of their work these individuals are constantly exposed to

variable sized dust particles.

This study aims at analysing the prevalence of various symptoms associated with dust exposure and to determine knowledge & practice of occupational health among these workers.

### AIM & OBJECTIVES:

1. To study the prevalence of various symptoms due to dust exposure in the workers of stone crusher zone of Yamunanagar.
2. To analyse the knowledge and practice of occupational safety in these workers.
3. To study awareness and utilisation of health insurance schemes.

### METHODOLOGY:

The study is cross sectional conventional type. 200 workers were randomly selected from different stone crushers. A common set of questions was asked. The data was collected from 10 July to 30 August 2020. This data was further analysed on MS Excel. Statistical significance was set at p- value 0.05.

**RESULTS:**

All the study participants are male. Table 1 shows majority of workers fall in the age group of 20-40 year and least in the age group of 60 years & above.

15.5% of study participants were uneducated. 27% were primary educated. 18% educated upto middle school 19% upto secondary level. Only 20.5% workers had educational qualification of higher secondary & above (Table-3).

66% study participants had some awareness regarding the consequences of working in stone crusher industry. However this knowledge is variable based on the educational status of the individual as shown in Table-3.

The workers had variety of symptoms like dyspnoea, cough, hoarseness of voice, chest pain, fatigue, dermatitis, dry eye. Cough was the most common symptom, found in 65.5% workers (Table-4).

As shown in Table-5 No worker had undergone pre placement medical examination. Even after exposure to dust particles for several years not even a single individual underwent periodic medical examination from a qualified doctor.

The practice of using Personal Protective Equipments (PPE) is very rare. Table-6 shows Only 2% wear proper mask during working hours. There is no practice of using boots, helmets, sun glasses, face shields. Hand washing with adequate soap and water before meals is practised only by 15.5 % individuals. Yoga and exercise is only done by 4% study participants.

Only 8.5% individuals had awareness regarding health insurance schemes. But no individual was insured under ESI scheme. Although 14.5% individuals were aware regarding Ayushman Bharat Yojna, only 4.5% had the Ayushman Bharat Card (Table-7).

**DISCUSSION:**

As per table 4, crusher zone workers had developed variety of symptoms. Most of the symptoms involved respiratory system. Cough was the most common symptom present in 65.5% individuals. Similar results were quoted by M. Aghilinejad etal in their study.<sup>[4]</sup>

The presence of cough was further correlated with duration of exposure. It was found that increased duration of exposure to dust predisposes to cough. This fact was statically proven with  $\chi^2$  value of 48.865, p value < 0.00001 (Table-8)

The study shows that 66% individuals have awareness regarding consequences of working in this industry. They were aware that working in crusher zone may lead to breathing problems, lung damage, allergy, lung cancer, dehydration, heat stroke, mechanical injuries like fractures and crush injury. The knowledge regarding these consequences was correlated with educational status of participants. It was found that more educated individuals had better awareness regarding the consequences. ( $\chi^2$  value = 62.1951)[Table-9]

Safe work and workplace for increased production and

higher productivity are necessary and hence promotion and protection of safe work and workplace are the complementary aspects of industrial development.<sup>[5]</sup>

The tools used for mining and crushing by the zone workers are primitive. Using such primitive tools generate excess dust and has high risk of causing injuries. During manual crushing the stone pieces can injure the eyes and face. Accidental fall of heavy stones on foot may cause crush injuries and fractures. Hence, use of personal protective equipments like mask, gloves, face shield, boots and goggles is very important. Since most of these crushing units are located near forest there is a potential risk of bite by snake, scorpion and other poisonous insects. Wearing of boots can provide protection against such incidences. The study shows that mask is used just by 2% study participants. Other protective equipments like boots, helmets, goggles, face shields are not even used by a single individual. Similar results were highlighted by SP Yadav etal in their study.<sup>[6]</sup>

A Study done in Khurda district of Orissa by Perry Gottesfeld etal shows that simple methods like crushing the stones under water spray can reduce the excess dust formation.<sup>[7]</sup> This simple technique is rarely followed in the zone.

During the study it was found that no stone crusher unit had basic first aid facility. There is no provision of adequate soap and water for regular hand wash and no rest rooms for workers. The basic facility of toilet and clean drinking water is missing in many of the units. Similar findings were quoted in the study done on stone quarry workers by AA Aliyu etal.<sup>[8]</sup>

Otto van Bismarck inaugurated the first social insurance legislation in 1883 and the first workers compensation law in 1884. The first of their kind in western world.<sup>[9]</sup> India introduced ESI act on similar lines in 1948.<sup>[10]</sup>

More recently Ayushman Bharat Yojna was launched in year 2018.<sup>[11]</sup> But the workers working in this zone are not drawing any benefit from these schemes as the awareness regarding such schemes is just limited to 8.5% study participants. No worker was insured under ESI scheme and only 4.5% individuals have Ayushman Bharat Card. A study done by Maumita Ghosh in Darjeeling district also highlights the similar fact.<sup>[12]</sup>

**CONCLUSION:**

- 1) The stone crusher workers are at higher risk of developing respiratory symptoms due to constant exposure to dust.
- 2) The practice of using mask & other protection equipments is very rare.
- 3) Study population had very low awareness about health insurance schemes as a result majority of individuals are not insured under any such schemes.

**RECOMMENDATIONS**

- 1) Workers should use personal protection equipments like masks, goggles, boots, face shield etc. These

equipments should be provided by the employer and workers should be educated regarding the importance of using these equipments.

2) Personal hygiene practices like regular washing of hands and eyes should be encouraged.

3) Regular medical check up should be held. The workers should be screened for other co morbidities like diabetes, hypertension, tuberculosis etc.

4) All crusher units should have basic first aid facility along with clean drinking water, toilet and restroom facility.

5) Workers should be covered under insurance schemes to promote health & prevent financial burden on them.

**TABLE 1:- AGE GROUP OF WORKERS WORKING IN STONE CRUSHER ZONE.**

AGE GROUP	WORKERS	PERCENTAGE
< 20	24	12
20-40	88	44
40-60	68	34
> 60	20	10
TOTAL	200	-

**TABLE 2:- DURATION OF EXPOSURE TO DUST DUE TO WORK IN CRUSHER ZONE.**

DURATION OF EXPOSURE	FREQUENCY	PERCENTAGE
< 5yrs	52	26
5-10 yrs	88	44
> 10 yrs	60	30

**TABLE 3:- EDUCATIONAL STATUS OF WORKERS AND AWARENESS OF CONSEQUENCES OF WORKING IN STONE CRUSHER ZONE.**

Educational Status	Frequency (%)	Awareness of consequences	
		Yes	No
Uneducated	31 (15.5)	4	27
Primary	54 (27)	38	16
Middle	36 (18)	20	16
Secondary	38 (19)	30	8
Higher secondary & above	41 (20.5)	40	1
TOTAL	200	132(66%)	68(34%)

**TABLE 4:- FREQUENCY OF VARIOUS SYMPTOMS IN THE WORKERS**

SYMPTOMS	FREQUENCY (%)
Dyspnoea	47 (23.5)
Cough	131 (65.5)
Hoarseness of voice	20 (10)
Chest pain	36 (18)
Fatigue	101 (50)

Dermatitis	33 (16.5)
Asthmatic attacks	15 (7.5)
Dry Eye	43 (21.5)
Rhinitis	41(20.5)
Wheezing	09(4.5)

**TABLE 5:-MEDICAL EXAMINATION HELD BEFORE OR AFTER PLACEMENT IN CRUSHER ZONE.**

Medical Examination	Yes (%)	No (%)
Before Placement	00(0)	200(100)
Periodic examination after placement	00(0)	200(100)

**TABLE 6:- USE OF PERSONAL PROTECTIVE EQUIPMENTS (PPE) AND PRACTICE OF PERSONAL CARE & HYGIENE**

Practice	Yes (%)	NO (%)
Use of proper mask	4(2)	196(98)
Use of boots, helmets, face shield, sunglasses	00(0)	200(100)
Washing of hands with soap and water before food	31(15.5)	169(84.5)
Frequent washing of eyes with water	17(8.5)	183(91.5)
Yoga & respiratory exercises	08(4)	192(96)

**TABLE 7:-AWARENESS REGARDING HEALTH INSURANCE SCHEMES**

	Yes (%)	No (%)
Awareness of health insurance schemes	17(8.5)	183(91.5)
Insured under ESI Scheme	00(00)	200(100)
Awareness about Ayushman Bharat Scheme	29(14.5)	171(85.5)
Have Ayushman Bharat Card	0.9(4.5)	191(95.5)

**TABLE 8:-CORRELATION BETWEEN PRESENCE OF COUGH AND DURATION OF EXPOSURE**

COUGH PRESENT	DURATION OF EXPOSURE (years)		
	<5	5-10	>10
YES(131)	14	65	52
NO (69)	38	23	8

( $\chi^2 = 48.865, p < 0.00001$ , significant at  $p < 0.05$ )

**TABLE 9:- CORRELATION BETWEEN AWARENESS OF CONSEQUENCES OF WORKING IN CRUSHER ZONE AND EDUCATIONAL STATUS OF STUDY POPULATION.**

Awareness of consequences	Education Status				
	Uneducated	Primary	Middle	Secondary	Higher secondary & above
Yes	4	38	20	30	40
No	27	16	16	8	1

( $\chi^2 = 62.1951$ ,  $p < 0.00001$ , significant at  $p < 0.05$ )

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