**Study type:**

This study was a cross-sectional observational study.

**Place & period of study:**

The study was carried out in the stone quarries of Companiganj and Gowainghat Upazila, Sylhet.

The study was carried out during the time of one year after acceptance of the protocol. This study period was divided into 2 phases. First phase included problem identification, literature review, protocol writing, questionnaire preparation and pre testing. Second phase included data collection, analysis and report writing. Schedule of study period is attached in the appendices (Appendix - XXX).

**Target population & Study population:**

All stone quarry workers of Companiganj and Gowainghat Upazila, Sylhet were the target population.

Target population fulfilling the following eligibility criteria within the given period were enrolled in the study as study population.

***Eligibility criteria:***

* Workers in the age range of 25 years to 60 years.
* Workers who have been working for at least five years in the quarry.

***Exclusion criteria:***

* Workers with history of lung disease even before they started working at the quarry.
* Workers who are not interested to participate in the study.

**Quality assurance strategy:**

All the data will be kept confidential. Only the researcher and ethical committee members will get full access to the data. Every record will be cross-checked by the supervisor.

**Addressing Ethical Issues:**

* The study protocol will be submitted for the approval of the ethical review committee of Sylhet MAG Osmani Medical College, Sylhet.
* Informed written consent will be taken from each of the respondents before taking any interview. A co-worker will be the witness of taking informed consent.
* The purpose and method of the study, confidentiality of the interviews, risks and benefits of participating in the study, respondent’s right to participate voluntarily and right to withdraw at any point will be explained in the local language from a printed handout.
* All information will be collected with complete respect to the worker’s wish and without any force or pressure.

**Determinations of sample:**

Sample size is calculated using Cochran’s formula considering 5% level of significance, 5% precision level (permissible error) and prevalence of chronic obstructive pulmonary diseases among stone quarry workers 13.7% (john dement et al., 2015).

The formula is: n =

Where, n = estimated sample size

Z = 1.96 (in 95% Confidence Interval)

p = prevalence, 13.7% (0.137),

q = 1- 0.12 = 0.87,

d = permissible error, 5% (0.05)

So, sample size (n) = 

= 180

Calculated sample size is 180 but in this study 200 samples will be taken.

**Sampling method:**

Consecutive sampling method was used to recruit the required number of patients in the study.

**Variables studied:**

* **Main outcome variable:** Number of COPD patient exposed to silica dust.
* **Confounding variables:**

1. Duration of Smoking

2. Length of service

3. Use of biomass fuel in cooking

4. low socioeconomic condition.

**Operational Definitions:**

* FEV1: The volume of air that the patient is able to exhale in the first second of forced expiration after a maximal inspiration
* FVC: The total volume of air that the patient can forcibly exhale in one breath after a maximal inspiration
* FEV1/FVC: The ratio of FEV1 to FVC expressed as a percentage.
* COPD: Subjects with compatible history and forced expiratory volume in 1 second and forced vital capacity ratio (FEV1/FVC) value of less than 0.7 will be regarded as COPD patients.

**Procedure of Data collection:**

* This study will be conducted on the stone quarries of Sylhet, specifically on the quarries that have stone crusher machines.
* Total 10 visits will be made. On each visit, data will be collected from 20 respondents.
* Prior to each day of data collection an advocacy meeting will be arranged with the local elites and the respective industry owner. They’ll be informed in detail about the study and permission will be taken.
* An announcement will also be made on the day before data collection in the quarry area mentioning `health checkup will be done for the employees working for 5 years or more'.
* After relevant history taking, workers fulfilling the inclusion criteria will be informed about the study goals. Among them who’ll agree to participate voluntarily, will be taken as samples.
* Informed written consent will be taken from the respondents.
* Study population will be divided into two group: smoker and non-smoker.
* Workers will be interviewed face to face using the semi-structured questionnaire.
* Baseline spirometry will be performed for all the participants of the study. Spirometry will be carried out using a calibrated portable spirometer.
* Spirometry will be done with participants sitting at ambient temperature and after at least 10 minutes of rest.
* The subjects will be asked to exhale into the spirometer as forcefully as possible after maximum inspiration.
* The parameters measured will be forced vital capacity (FVC) and forced expiratory volume in one second (FEV1). FEV1/FVC ratio will be calculated from the measured data.
* Study participants with value of FEV1/FVC of less than 0.7 will be examined with post-bronchodilator test according to the ATS / ERS guideline, 15 minutes after the administration of 400 micrograms of salbutamol.
* Subjects with forced expiratory volume in 1st second and forced vital capacity ratio (FEV1/FVC) value of less than 0.7 will be regarded as COPD patients.
* The stages of COPD will also determine according to GOLD criteria.
* All relevant data will be recorded in data collection sheet designed for this study.

**Laboratory Procedure:**

**Data collection:**

Data were collected in a pre-designed data collection sheet containing the variables of interest (Appendix – XXX).

**Statistical analysis:**

* Data will be processed manually and analyzed with the help of SPSS (Statistical package for social sciences) Version 25.0
* Quantitative data will be expressed as mean and standard deviation.
* Qualitative data will be expressed as frequency and percentage.
* Appropriate test & analysis will be done to find out level of significance and correlation.
* A probability ‘p’ value of < 0.05 will be considered as significant.

**Flow chart for the steps of study:**

