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A Study on Musculoskeletal Problems and Quality of Life among Quarry Workers in Rural areas of Chamarajanagar Taluk.

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Abstract:

Background : Musculoskeletal disorders due to work affect all age groups, especially people in their working years and pattern of WRMSDs varies among different occupational groups and with different geographical locations.5 Musculoskeletal disorders take a toll on the lives of workers by affecting their activities of daily living (ADL), leading to slow economic growth of their families and results in poor overall quality of life. **Objective:** To Estimate the prevalence and patterns of various musculoskeletal problems among Quarry workers in rural areas. **Methodology :** The present cross sectional study was conducted by the Department of Community Medicine at Chamarajanagar Institute of Medical Sciences , Chamarajanagar in the first week of November 2020. A total of 100 study subjects working in different quarry in Chamarajanagar taluk were included in the study and analyzed. **Results :** Inourstudy,100 migrantworkerswereanalyzed.Meanageof subjects 34.41 ± 09.44 years. Majority (38%) of thesubjects were in the age group of 21–30 years. Majority of subjects were males (83%) and 17% were females. About 93% of thembelongedtoHindureligionand7%belongedtoMuslim religion . In our study, there was no significant difference in physical, psychological, social, and environmental domains of QoL between two groups of work. Environmental domain was lowest compared to other domains of QOL.**Conclusion:** From the present study and review of literatures, it is clearly observed that quarry workers are prone for one or the other musculoskeletalproblemsinthepast1weekor1year.Hence, principles of ergonomics and rules pertaining to Factories and ESI act has to been forced strictly on the factories to improve the

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health and QoL of quarry workers. Social and environment domain of QoL was affected in quarry workers with increase in duration of occupation.

Introduction:

Quarrying is a significant unorganised industrial sector in the nation that employs workers to produce crushed stone of various sizes according on demand, which is used as a raw material for various construction operations such as the construction of roads, highways, bridges, buildings, and canals. [1] Muscles, tendons, nerves, and bones are all affected by work-related musculoskeletal diseases (WMSDs), which are one of the most prevalent problems in the construction industry. They're linked to four key risk factors: unfavourable force, duration, repetition, and adopting immobile or uncomfortable postures. Several ergonomic studies conducted in various regions of the globe reveal that both severe and static work postures lead to the development of low back and musculoskeletal complaints. [2] Musculoskeletal problems have often resulted in financial losses due to decreased working capability. [3]

The mining and quarrying, manufacturing, and construction industries have the most musculoskeletal cases (960 new cases per 100,000 employees), which is 30 times the national average of 32 per 100,000. The construction industry likewise has the greatest prevalence of work-related MSD symptoms (1.2 to 1.6 times higher than the average in the total population).[4]

Work-related musculoskeletal diseases afflict persons of all ages, especially those in their working years, and the pattern of WRMSDs varies by occupational category and geographical region. [5] Workers' lives are impacted by musculoskeletal problems, which disrupt their activities of daily living (ADL), resulting in delayed economic growth for their families and a poor overall quality of life.[6]

Quarry workers, who are part of the unorganised work sector in rural India, are in a disadvantaged situation and are at a higher risk for WRMSDs, and there is a paucity of research on their health issues, prevalence, and requirements. As a result, this research will be carried out.

Objectives of The Study :

1. To Estimate the prevalence and patterns of various musculoskeletal problems among Quarry workers in rural areas.
2. To study the Quality of life and its social implications among Quarry workers.

Materials and Methods :

The Department of Community Medicine at Chamarajanagar Institute of Medical Sciences, Chamarajanagar, conducted this cross-sectional study from 5th of November 2020 to 20th November 2020.

The frequency of musculoskeletal issues among quarry workers was evaluated at 32% in a research conducted by Manish A Prasad et al[1] in Central India.

The formula for estimating sample size is provided below.**Sample Size (n) = $Z_{1-\alpha/2}^2$ p (1-p) / d^2**

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Here

$Z_{1-\alpha/2}^{2} =$ Is standard normal Variate [at 5% type 1 error ($p<0.05$) it is 1.96.

P = Expected proportion in population based on previous studies = 32% or 0.32

q = 1- p = 68% or 0.68

d = Absolute error or precision 10% or 0.1

Using the above values at 95% Confidence level a sample size of 84 quarry and Brick factory workers will be included in the study. Considering 10% Nonresponse a sample size of 84. A total of 100 study subjects will be included in the study

The obtained sample size were selected from the five quarries present in the study area

INCLUSION CRITERIA :

Quarry workers of either sex, aged >18years

EXCLUSION CRITERIA:

1. Subjects with Congenital Musculoskeletal Disorders
2. Subjects with disability

After getting signed informed consent, data will be gathered using a pretested and standardised questionnaire. The modified Nordic Questionnaire will be used to collect data on musculoskeletal disorders, while the WHO BREF QoL questionnaire will be utilised to collect data on quality of life. [25] The WHOQOL-BREF instrument will be validated by researchers translating it into Kannada and then back-translating it into English by another expert who is unfamiliar with the original versions. A psychiatrist will compare the back-translated version to the original to see if the things are conceptually equivalent. The WHOQOL-BREF is a 26-question measure that covers physical, psychological, social, and environmental dimensions. Each topic will be given a question, which will then be turned to a transformed score. This score will be used to determine the outcome.

The data will be compiled in Microsoft Excel, and the data will be analysed using SPSS statistical software version 22. Frequencies, proportions, and confidence intervals will be calculated as descriptive statistics. For qualitative data, the Chi-square test will be employed to determine significance. For quantitative data, the mean and standard deviation will be determined, and the significance test for quantitative data will be the Students t test. To find the connection between two quantitative variables, Pearson correlation will be used. Bar and pie graphs will be used to graphically portray the data. The correlation will be depicted using a scatter plot. A statistically significant p value of 0.05 will be considered.

Results :

A total of 100 migrant employees were examined in this study. The average age of the individuals was 34.41 09.44 years. The majority of the participants (38%) were between the ages of 21 and 30. Males made up 83 percent of the participants, while females made up 17 percent. They belonged to the Hindu faith 93% of the time and the Muslim religion 7% of the time. The quarry employees made up around 41% of the individuals who were illiterate. About 35% came from other states in India, while 12% came from different regions of Karnataka in search of job.

According to the 2019 Updated B G Prasad Classification, almost 58 percent of the

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population belongs to the Middle Class. Only 1% of the population belonged to the lower class, whereas 2% belonged to the upper class. In our study, 36 percent of participants were smokers, 32 percent were drinkers, 23% used tobacco, and 9% chewed beetle. The majority of the individuals in the survey worked as stone crushers (57%) while 43 percent worked in non-stone crushing jobs including welders, helpers, operators, and drivers.

Stone crushers worked 8.8 1.4 hours per day on average, whereas non-stone crushing workers worked 9.9 1.9 hours per day on average. This was a statistically significant difference. There was no significant difference in mean pulse rate, blood pressure, or height between stone crushers and non-stone crushers when vital signs and anthropometry were compared between different types of quarry activity. Stone crushers had a mean body mass index (BMI) of 21.5 2.8, whereas non-stone crushers had a BMI of 24.1 2.7. When compared to respondents who did not work as stone crushers, stone crushers had a lower weight and BMI.

In this study, no significant differences in physical, psychological, social, or environmental dimensions of QoL were found across two employment groups. When compared to other QOL domains, the environmental domain scored the lowest.

In our research, we discovered a negative relationship between work length and QoL dimensions. A substantial negative connection was found between the duration of work and the social and environmental domains of QoL, indicating that as the duration of occupation increased, the social and environmental domains of QoL decreased significantly. As a result, it's reasonable to assume that as the duration of life increases, so will the quality of life.

Low back complaints were the most common musculoskeletal condition in our survey, with 67 percent reporting them, followed by shoulder symptoms with 52 percent and knee symptoms with 49 percent. Elbow symptoms were the musculoskeletal condition with the lowest prevalence.

Except for ankle and foot complaints, there was no significant difference in musculoskeletal disorders between stone crushers and non-stone crushers. Stone crushers had a higher symptom rate than other workers.

Table 1: General profile of subjects in the study

Profile of study subjects		**Count**
Age	<20 years	12
	21–30 years	37
	31–40 years	26
	>40 years	25
Gender	Female	12
	Male	88
Religion	Hindu	93
	Muslim	7
Education	Illiterate	41
	Primary school	19
	Secondary school	29

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	PUC	4
	Graduate and others	7
Migration	Migrated from other states	35
	Migrated from other parts of Karnataka	13
	Local residents	52
Socio-economic status	Lower class	1
	Lower middle	17
	Middle	58
	Upper middle	22
	Upper class	2
Type of quarry work	Stone crushing	57
	Non stone crushing	43
Habits	Smoking	36
	Alcohol	32
	Tobacco chewing	23
	Chewing beetle	9

Table 2: QoL scores among subjects

QOL score	**Type of quarrywork**				***P*-value**
	Stone Crushing		**Non stone crushing**		
	Mean	**SD**	**Mean**	**SD**	
Physical domain	50.7	5.9	50.1	6.7	0.690
Psychological domain	49.1	6.2	50.4	9.1	0.436
Social domain	62.5	15.8	59.5	17.4	0.444
Environmental domain	36.7	8.7	39.0	13.4	0.578

Table 3: Correlation between duration of occupation and QoL scores

Corelation	**Duration of occupation/ day in hours**	**Physical domain**	**Psychological domain**	**Social domain**	**Environmental domain**
Duration of occupation/day in hours					
Pearson correlation	1	-0.143	-0.233	-0.385**	-0.357**
P-value		0.151	0.059	0.002*	0.001*

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n	100	100	100	100	100
QoL: Quality of life					

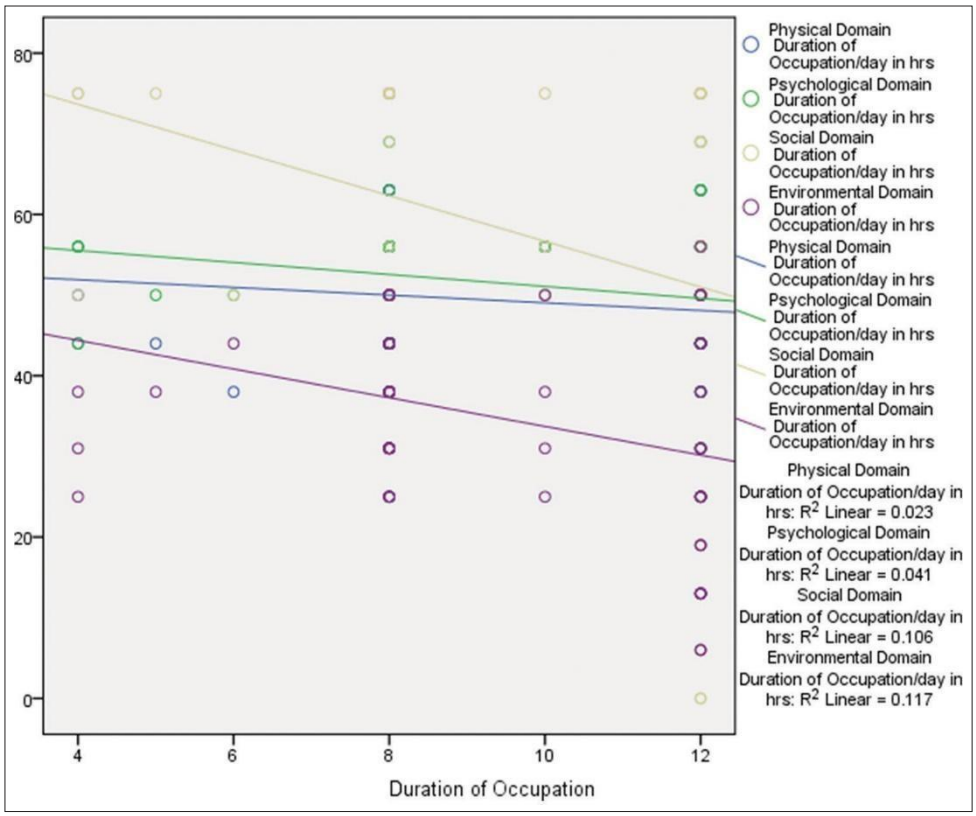

Figure 1: Scatter plot showing negative correlation between duration of occupation and quality of life domains

Discussion:

Occupation is a job that provides a consistent source of income. Occupational health is a multidisciplinary field that focuses on ensuring the health and safety of people at their workplace. Health, safety, and security are all interconnected[7]. The term "health" refers to a general sense of well–being. It encompasses not only bodily but also emotional and mental well-being[8]. The act of safeguarding an employee's physical well-being is referred to as safety. Security refers to safeguarding buildings and equipment against unwanted access, as well as ensuring the safety of personnel while on the job[9].

Work-related musculoskeletal disorders (WRMSDs) are a group of inflammatory and degenerative diseases that affect the neck, shoulders, elbows, wrists, and hands, causing discomfort and functional impairment.[10,11,12]

Occupational risks are the most common health concern among stone quarry employees, and there is a high incidence of non-practice of safety measures among them. Crushed stones are used in the construction of buildings, roads, bridges, and nearly everything else in contemporary society. In India, there are an estimated 1200 stone quarries employing around

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5,000 people. Despite the fact that stone quarries offer daily bread and financial security, labourers' working conditions are frequently hazardous and dangerous. Accidents, injuries, hearing loss, and dust-related respiratory ailments are among their major health concerns. Quarry operations such as blasting, grinding, crushing, cutting, and truck traffic contribute to noise, vibration, and dust concerns when quarry sites are constructed close to human population. [13].

The Nordic Musculoskeletal Questionnaire can be used to identify musculoskeletal issues (NMQ). This questionnaire is frequently used in epidemiological research with the goal of developing and testing a standardised questionnaire approach that allows comparison of low back, neck, shoulder, and general problems. [14,15,16,17] It is a self-administered questionnaire that comprises of structured, forced multiple-choice questions. [14,15,16,17,18] The questionnaire's goal is to answer the following question: "Do musculoskeletal problems occur in a specific population, and if yes, where do they occur?" Respondents are asked if they have had any musculoskeletal pain in the previous 12 months or in the last 7 days that has hindered them from engaging in routine activities. The NMQ has been approved as a screening instrument. 15 NMQ is reproducible and sensitive, suggesting that it will be useful in screening and surveillance..[16, 19, 20].

Quality of Life (QoL) is defined by the World Health Organization as an individual's view of their place in life in relation to their objectives, expectations, standards, and worries, as well as the culture and value systems in which they live. It is a wide notion influenced by a person's physical health, psychological condition, amount of independence, social ties, personal views, and relationship to key characteristics of their environment in a complicated way.[21, 22]

In epidemiological research, WHOQOL evaluations will allow for the collection of thorough quality of life data on a specific population, enhancing illness knowledge and the development of treatment techniques. The WHOQOL-BREF is organised into four domains..[21, 22]

A total of 114 individuals (100 percent male) were involved in another study conducted by Egwuonwu V A et al, with a mean age of 28.58 8.09 years and an age range of 16-52 years. WRMSDs were found to be prevalent in 83.30 percent of the population. The most common ailment was low back pain (90 percent). WRMSDs were identified in all of the participants' drivers and mechanics, as well as 66.67, 81.25, and 77.50 percent of blasters, crushers, and drillers, respectively. Repetitive movement and years of work experience were shown to be strongly linked to the onset of symptoms. The most important risk factor for low back pain was discovered to be task repetition.[23]

Manish A Prasad et al. conducted a research in Yelakeli, Wardha District, Central India. The majority of the workers, 63 percent, were between the ages of 21 and 40. The stone crushing sector attracted 89 percent of the workforce. 68 percent of the workers had been employed for less than 5 years. 81 percent of the workers were not wearing any safety gear.[1]

Conclusion:

According to the findings of this study and a review of the literature, quarry employees are more likely to have experienced one or more musculoskeletal issues in the previous week or

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year. As a result, ergonomic principles and standards relevant to factories, as well as the ESI Act, must be carefully implemented on the factories in order to enhance the health and quality of life of quarry employees. The social and environmental domains of QoL were impacted in quarry employees as their working time increased.

References:

1. Prasad MA, Bhagat V, Wagh V, Mudey A, Nayak S, Gaiki V. Assessment of health status of the stone quarry workers in Yelakeli, Wardha district in Central India. IJMHS 2014; 4:180–1.
2. Health and Safety Laboratory. Musculoskeletal problems in bricklayers, carpenters and plasterers: literature review and results of site visits. Sheffield: Health and Safety Executive, 2001, p 80.
3. Mufamadi NE. The study of work-related musculoskeletal disorders amongst workers in brick making factory in South Africa 2003: Master's thesis for Msc. Engineering. Sweden: Lulea University of Technology. [Last accessed on 2016 Jan]. Available from http://epubl.ltu.se/1402-1617/2003/090/Ltu-Ex-03090-Se.pdf
4. European Agency for Safety and Health at Work Fact Sheet. [Last assessed on 2016 Jan 15]. Available from: http://www.osha.europa.eu.
5. Egwuonwu VA, Abidemi TB, Aiyejunsunle CB, Ezeukwu OA, Auwal A, Okoye CE. A cross-sectional survey of work related musculoskeletal disorders prevalence and associated risk factors among quarry workers in a South Eastern Nigerian community: Int J Epidemiol. 2013 ;(11)2.
6. Inbaraj LR, Haebar OJ, Saj F, et al. Prevalence of musculoskeletal disorders among brick kiln workers in rural Southern India. Indian J Occup Environ Med 2013; 17: 71–5.
7. Sriram S, Occupational health. Health action .oct2012.volume:10(15): 9-10
8. Park K. A textbook of preventive and social medicine:occupational health.23st ed. Jabalpur. M/s banarisdasbhanot publishers.2014:745-80
9. Asirvatham R. Safety and health in industries. Health action.oct 2012.volume10(15):7-10
10. World Health Organization (WHO), "Identification and Control of Work-related Diseases", WHO Technical Report Series 174 Geneva, Switzerland 1985.
11. S Arun Vijay, Work-Related Musculoskeletal Health Disorders Among The Information Technology Professionals in India: A Prevalence Study. Int. J Mgmt Res. & Bus. Strat.2013;2(2):118-28.
12. Wragner Norbert. Safety and health in stone crushing industry. A practical manual for preventing accidents.2009, 9-12
13. Kuorinka I, Jonsson B, Kilbom A, Vinterberg H, Sorensen FB, Andersson G and Jorgensen K. Standardized Nordic questionnaires for the analysis of musculoskeletal symptoms. Applied Ergonomics 1987;18(3):233-7
14. Crawford JO. The Nordic Musculoskeletal Questionnaire. Occup Medicine 2007;57:300-1.
15. Palmer K, Smith G, Kellingray S, Cooper C. Repeatability and validity of an upper limb and neck discomfort questionnaire: the utility of the standardized Nordic questionnaire. Occup Med. 1999;49:171-5.

ISSN: 0975-3583, 0976-2833 VOL 11, ISSUE 04, 2020

16. Descatha A, Roquelaure Y, Chastang JF, Evanoff B, Melchior M, MariotC. Validity of Nordic-style questionnaires in the surveillance of upper-limb work-related musculoskeletal disorders. J Work Environ Health 2007;33(1):58-65.
17. Mehta RK and Parijat P. Associations between psychosocial risk factors and musculoskeletal disorders: application to the IT profession in India. Work 2012;2438-4.
18. Bhanderi D, Choudhary SK, Parmar L and Doshi V. Influence of psychosocial workplace factors on Occurrence of musculoskeletal discomfort in computer operators. Ind. J of Community Medicine 2007;32(3):225-6.
19. Egwuonwu VA, Abidemi T B, Aiyejunsunle CB, Ezeukwu OA, Auwal A, OkoyeCE.A Cross-Sectional Survey Of Work Related Musculoskeletal Disorders Prevalence and Associated Risk Factors Among Quarry Workers In A South Eastern Nigerian Community. The Internet Journal of Epidemiology2013;11(2):1-11.
20. WHO QOL: Measuring Quality of Life. World Health Organization, 1997.
21. Guyatt G, Feeny DH, Patrick DL. Measuring health-related quality of life. Ann Inter Med, 1993; 118: 622-629.
22. Chapter 5, Unorganised Workers In India: Issues And Concerns.*shodhganga.inflibnet.ac.in/bitstream/10603/76677/12/12_chapter%205.pdf*
23. Egwuonwu VA, Abidemi TB, Aiyejunsunle CB, Ezeukwu OA, Auwal A, Okoye CE. A Cross-Sectional Survey Of Work Related Musculoskeletal Disorders Prevalence And Associated Risk Factors Among Quarry Workers In A South Eastern Nigerian Community. The Internet Journal of Epidemiology. 2013, 11(2).