Journal of Community Medicine and Primary Health Care. 27 (2) 93-103

JOURNAL OF
COMMUNITY HEALTH
& PRIMARY HEALTH CARE

Perception and Attitude towards Work Related Ill-health and use of Dust Mask among Crushers of Selected Quarry (Crushed Stone) Industry in Ebonyi State: Effect of Health Education.

Uwakwe K.A[1], Agu A.P[2], Ogbonnaya L.U[2], Nwonwu E.U[2], Aguwa E.N[3], Duru C.B[1]

[1]Department of Community Medicine, College of Medicine, Imo State University, Owerri.
[2]Department of Community Medicine, Faculty of Clinical Medicine, College of Health Sciences, Ebonyi State University, Abakaliki.
[3]Department of Community Medicine, College of Medicine, University of Nigeria Enugu-Campus, Enugu.

KEYWORDS

Quarry Crushers
Ill-health
Dust Mask
Health Education
Ebonyi

ABSTRACT

Background:
Quarry industry has become a major means of livelihood in Ebonyi state, but insufficient data exists on their operations and use of control measures like dust mask, with no serious attempt at comprehensive health education. The study sought to assess the effect of health education on the perception and attitude towards work related ill-health, and use of dust mask among crushers of selected quarry industry.

Methodology:
The study was conducted in the crush stone sites in Abakaliki and environs as the study group, while sites in Ishiagu, Ikenyi and Iyioge Ukwagba were the control group. Study population was 104 crushers, dust mask was provided at all sites, but health education (didactic lectures, demonstrations and interactive sections) for 8weeks was for the study group. Post-intervention evaluations were done at 3 and 6 months. Data was obtained using interviewer administered semi structured questionnaires, tally sheets and bimonthly forms, and analysed using SPSS (16.0) and Mathcad 7.

Result:
Health education was followed with: significant improvement in the proportion with good perception of work-related ill-health (P<0.00003) in the study group, but not in the control (P<0.639); more significant improvement in the proportion with good perception of dust mask in the study (P<0.00003) than control (P<0.004) group; lesser improvements in attitudes and significant improvement in the proportion that always wore dust mask, 6% to 24% (P<0.003) in the study group.

Conclusion:
Sustained periodic health education by government and private sectors is necessary, with training on dust mask usage, greater availability and provision of water-cooled caps.

Correspondence to:
K.A. Uwakwe
Department of Community Medicine, College of Medicine,
Imo State University, Owerri.
Phone: 08037434248.
Email: drkenuwa@yahoo.com

INTRODUCTION

Occupational exposure to respirable crystalline silica in dust from stone quarrying has been of concern in studies in Ebonyi State,[1,2] Nigeria[3-5] and worldwide.[6-10] This exposure is associated with silicosis, lung cancer, pulmonary tuberculosis and other pulmonary and non pulmonary diseases. In Nigeria, stone quarrying represents an unorganized sector of industry.[1] There is poor awareness of the hazards of the industry [5] and commonly poor usage of dust mask.[3] Factors associated with poor usage include lack of knowledge, discomfort, and poor perception of its importance.[5]

In Ebonyi State, the quarry industry has become a major means of livelihood for the people

and majority of the quarry workers (as in other parts of Nigeria[11]) are poor with no social welfare. The workers have not received the necessary attention from the relevant authorities as routine inspection for enforcement of extant laws is almost nonexistent as at the time of this study. Few of the workers have had any form of health education[2] and this was irregularly given by the owners of the quarries. Data in literature from the quarry industry in Ebonyi state is inadequate and there was only one report of a study that examined the workers perception of workplace hazards and usage of dust mask in the quarry industry. No health education intervention was reported.

In a resource constrained environment like ours, health education intervention and the use of simple safety measures is a practicable and feasible control measure to minimize the occupational hazards the numerous workers in the quarry industry and indeed the surrounding population are exposed to in the state.

This study sought to assess the effect of health education on the perception and attitude towards work related ill-health and use of dust mask among crushers of selected quarry (crushed stone) industry in Ebonyi**.**

METHODOLOGY

Ebonyi state in the South-East zone of Nigeria, has about 2,173,501 inhabitants and though the main occupation is farming; in the past 25 years, quarrying has grown into a major industry in the state. At the time of this study, there were72 functional crush stone plants (quarries) in the state. These were located in six sites as follows: Abakaliki and its environs in Abakaliki LGA had three sites, one each in Abakaliki-Enugu road, Abakaliki-Ogoja road and old Abakaliki-Enugu road. The remaining three sites were one each in Ishiagu in Ivo LGA, Ikenyi in Nnodo in Ebonyi LGA and Ukwuagba in Ngbo East in Ohaukwu LGA. The list of quarries was obtained from the Quarry Owners Association and the state department of Mineral and Natural Resources. The 6 sites were grouped into two: Group 1 had the 34 plants in the three sites in Abakiliki and its environs. Group 2 had the 38 plants in the other 3 sites in Ishiagu, Ikenyi and Ukwuagba. (

The group 2 was put together as the sites were a considerable distance away from the group1 to avoid trickling effect of health education). The two groups were allocated into study and control groups by balloting, with the group1emerging as the study group. Each respondent belonged to either the study or control and all the crushers who fulfilled the inclusion criteria were studied.

The study and control groups were comparable based on the following

I) The crushers in the study and control were of similar socio-economic class, literacy level and age range.

ii) Same State – The communities for both study and control have similar climatic conditions.

iii) Both analogue and automated crush stone facilities were in study and control areas.

Selection/ Inclusion Criteria:

a) Crushers/operators of automated and analogue crushing machines were included as they were available at both control and study sites.

b) Crushers who occasionally perform other duties (like stone breaking or drilling) in the quarry were also included as they were at both control and study sites.

c) Crushers must give their informed consent.

Exclusion Criteria:

a) Other workers who were not crushers.

b) Crushers who did not give their consent.

The study was carried out in 3 phases (from January through September) namely: baseline, health education and evaluation. The survey instruments were a questionnaire, bi-monthly form and tally sheet. The structured interviewer administered questionnaire written in simple clear English, was pretested among 12 crushers selected by simple random sampling from crush stone sites in Lokpa, Abia state and necessary modifications made. Questionnaires were administered by the Principal Investigator and 4 trained resident doctors all of whom were fluent in the local language. 8 secondary school leavers (2 each in the vicinity of the crush stone sites in Abakaliki, Ivo, Ebonyi and Ohaukwu LGAs) were trained as monitors on the recording of the tally sheet and bimonthly form to ensure consistency, uniformity and ease of recording of dust mask usage. They were also introduced to the management/owners of the quarry for free access but the purpose of the monitors was unknown to them.

The baseline phase comprised a baseline questionnaire survey carried out simultaneously in both study and control groups and baseline assessment of dust mask usage for four weeks. The health education consisted of lectures on health and safety, prolonged exposure to dust, quarry related ill-health / prevention and dust control in quarry industry with emphasis on dust mask for the intervention group only, for a period of 8 weeks. Lectures were followed by a section for questions, clarifications and suggestions. The principal investigator gave lectures at work sites designed to fill the knowledge gap after analysis of baseline data. Posters were used for reinforcement and demonstrations on the appropriate use of dust mask were carried out. Dust masks were provided free of charge for both the study and control groups. Each crusher was supplied with dust mask to cover the study period, each to be used not more than 2 weeks before disposal. The outer filter was to be changed each day it was used, as disposable filters were also supplied.

In evaluation, the tally sheets were secretly recorded by the 8 monitors and from there the bimonthly forms were filled. This was done during: baseline phase for 'baseline dust mask usage', immediate post-intervention phase for 'short term mask usage' and evaluation phase for 'long term mask usage'. Counting of the used filters which were dropped inside a small carton provided for each crusher served as the objective assessment by the Principal Investigator of the use of the dust mask, while the ticking of the 'used dust mask' column in the tally sheet was the subjective assessment done by the research assistants. The two usually tallied but where they differed on few occasions, the objective assessment was used. To ensure anonymity, the 2 research assistants (monitors) in each vicinity rotated among the quarries there-in. There were unscheduled weekly visits by the Principal Investigator carried out to ensure proper documentation and collect filled bimonthly forms. Three months after the baseline (in May), the same research team administered the same questionnaire on the intervention group for their perception and attitude, while the immediate post intervention usage of dust mask was obtained for one month within the same month of May for comparison with the baseline . In August, 6 months after baseline, the questionnaire was again administered for perception and attitude of respondents. For estimate of long term usage of dust mask, records were obtained same way from June to August.

The data was cleaned and analysed with SPSS version 16 and Matcard 7 professional, presented using frequency tables with relevant

proportions (for discrete variables) and relevant means and standard deviations (for continuous variables). Bivariate analysis involved X^2 test for associations between categorical variables and Z-score for (2 tail) test of proportions. To measure the size of effect of educational intervention on the change in outcome measures between the two groups, risk difference $(P_1 - P_0)$ [12] was applied as the measure of comparison and Z- score applied for test of statistics. The level of significance was set at P< 0.05.

Approval to conduct the study was given by the Ministry of Health, Ebonyi State and the Research and Ethics committee of the then EBSUTH. Approvals were gotten from the executives of the Quarry Owners Association, Abakaliki and the management and owners of the control quarries. Verbal informed consent was obtained from the participants. Participants in the control sites were given health education at the end of the study.

RESULTS

The study group had 54 crushers while the control group had 52 crushers but 2 in the control group declined, giving control group of 50 crushers. Total Consented population was 104 crushers.

Socio-demographics (Table I)

Both groups were similar in distribution according to sex (p=0.605) (63% of crushers in the study group were males while 58% in the control were males). Age range of 30-39 years had the highest frequency in the study (31.5%) and Control (46%) groups, while mean ages were 32+-11 years and 36+-9 years for the study and control groups respectively. Both groups were comparable in their age distribution, with no statistically significant difference (p=0.076). Both groups were similar in marital status distribution (p=0.148), with72% of the study and 84% of the control groups being married. The distribution of respondents according to educational status in both groups was similar (p=0.978), the highest level of education was secondary (10% in study and 10% in control). 45.2% of them had worked in quarry industry between 1-5 years, only 1% had worked above 20 years and the mean duration of service was 5+-5 years for both groups, with no statistically significant difference in the duration of service in the industry (p=0.5).

Perception of quarry work as a source of ill-health

Among the study group (Table II): At baseline about 94% of them were of the view their work could be a source of ill-health, but only 38% could state the appropriate time intervals for the diseases, this rose significantly at 6 months post intervention to 96.3% (P<0.0003). The most perceived hazard was dust by 96.3%. Only 9.5 % associated their work with silicosis, but 96.3% associated it with cough at baseline. These both appreciated to 100% at 6 months, and was significant for silicosis (P<0.00003).

Among the control group (Table III): At baseline 92% of them were aware their work could be a source of ill-health, 76 % could state the appropriate time interval for the diseases, but this only changed to 72% at 6 months. Dust was also the most perceived hazard at baseline by 98%. Only 4% associated their work with silicosis at baseline which did not change at 6 months. But all respondents associated their work with cough at baseline with minimal change 98% (P<0.843) at 6 months.

Comparative assessment (Tables **IV a&b**): Within the groups, the proportion with overall good perception of work related ill-health rose significantly from 61.4% at baseline to 96.6% (P<0.0003) at 6months for the study, but did not

Table I:Socio-demographic characteristics (N=104).

Variable	Study group	Control group	Total	X^2 P-value
	Freq (%)	Freq (%)	Freq (%)	
Sex				
Male	34 (63)	29 (58)	63 (60.6)	
Female	20 (37)	21 (42)	41 (39.4)	0.605
Age (years)				
10 to 19	7 (13)	0 (0)	7 (6.7)	
20 to 29	15 (27.8)	11 (22)	26 (25)	
30 to 39	17 (31.5)	23 (46)	40 (38.5)	
40 to 49	13 (24.1)	13 (26)	26 (25)	
50 to 59	0 (0)	2 (4)	2 (1.9)	
≥ 60	2 (3.7)	1 (2)	3 (2.9)	0.076 (Z-test)
Mean	32	36		
Standard deviation	11	9		
Educational status				
None	15 (27.8)	14 (28)	29 (27.9)	
Primary	29 (53.7)	26 (52)	55 (52.9)	
Secondary	10 (18.5)	10 (20)	20 (19.2)	0.978
Marital status				
Single	15 (27.8)	8 (16)	23 (22.1)	
Married	39 (72.2)	42 (84)	81 (77.9)	0.148

change much for the control group, 65.8% to 64.9% (P<0.639). Between groups, the change in perception of work related ill-health was positively influenced by health education, the risk of positive change was 0.343 higher in the intervention compared to the control and was significant (P<0.00003)

Perception of dust mask

Among the study group: At baseline 79.6% were aware of dust mask, but only 13% were of the view that respirator was different from dust mask. 75.9% said it could prevent respiratory disease, 94.4% said it prevents dust inhalation, while 51.9% said it should be used with other measures of safety protection. The first two parameters changed significantly at 6 months 100% (P<0.00023) and 98.1% (P<0.00003) respectively.

Among the control group: At baseline 80% were aware of dust mask, but only 12% was of the view that respirator was different from dust mask. 62% said it could prevent respiratory disease, 76% said it prevents dust inhalation, while 46% said it should be used with other measures of safety protection. The changes at 6 months for the first parameter was significant 100% (P<0.00043), but not for the second 16% (P<0.282).

Comparative assessment: Within the groups, the proportion with overall good perception of dust mask rose significantly from 59.5% at baseline to 95.8% at 6 months (P<0.00003) for the study and from 60.6% to 70% (P< 0.004) for the control. Between groups, the change in perception of dust mask was positively influenced by health education, the risk of a positive change was 0.269 higher in the study compared to control and was significant (P<0.0006).

Attitude towards work related ill-health

Among the study group: At baseline 77.8%

Table II: Perception of quarry work as a source of ill-health among study group (N=54)

Perception item	Baseline	3-months	Z-Score	P-value	6-months	P-value
	Freq (%)	Freq (%)			Freq (%)	
Can your work cause ill-health	51(94.4)	54(100)	1.76	<0.039	54(100)	<0.039
Duration at work b4 it starts	21(38.9)	53(98.1)	6.89	<0.00003	52(96.3)	<0.00003
Hazards:						
(a)Tools	50(92.5)	54(100)	2.04	<0.021	54(100)	<0.021
(b) Noise	42(77.8)	54(100)	3.67	<0.00012	54(100)	<0.00012
(c) Dust	52(96.3)	54(100)	1.43	<0.077	54(100)	<0.077
(d) Heat	41(75.9)	54(100)	3.84	<0.00006	54(100)	<0.00006
(e) Vibration	41(75.9)	53(98.1)	3.44	<0.00029	53(98.1)	<0.00029
Work related ill-health:						
(a) Malaria	9(16.7)	53(98.1)	8.56	<0.00003	53(98.1)	<0.00003
(b) Hearing loss	32(59.3)	54(100)	5.26	<0.00003	54(100)	<0.00003
(c) Silicosis	5(9.5)	54(100)	9.47	<0.00003	54(100)	<0.00003
(d) Lung cancer	26(48.1)	54(100)	61.5	<0.00003	54(100)	<0.00003
(e) TB	19(35.2)	24(44.4)	0.98	<0.163	27(50)	<0.060
(F) Bronchitis	16(29.6)	54(100)	7.66	<0.00003	53(98.1)	<0.00003
(g) Cough	52(96.3)	54(100)	1.43	<0.077	54(100)	<0.077
(h)Body pain	51(94.4)	54(100)	1.76	<0.039	54(100)	<0.039
(i)Conjuctivitis	44(81.5)	54(100)	3.32	<0.00045	54(100)	<0.00045
(j)Dermatitis	32(59.3)	54(100)	5.26	<0.00003	54(100)	<0.00003

Table III: Perception of quarry work as a source of ill-health among control group (N=50)

Perception item	Baseline	3-months	Z-Score	P-value	6-months	P-value
	Freq (%)	Freq (%)			Freq (%)	
Can your work cause ill-health	46(92)	46(92)	0	0.5	46(92)	0.5
Duration at work b4 it starts	38(76)	37(74)	-0.23	0.591	36(72)	0.676
Hazards:						
(a)Tools	43(86)	43(86)	0	0.5	43(86)	0.5
(b) Noise	43(86)	43(86)	0	0.5	43(86)	0.5
(c) Dust	49(98)	49(98)	0	0.5	49(98)	0.5
(d) Heat	35(70)	35(70)	0	0.5	35(70)	0.5
(e) Vibration	36(72)	37(74)	0.23	<0.411	39(78)	<0.244
Work related ill-health:						
(a) Malaria	5(10)	5(10)	0	0.5	6(12)	<0.380
(b) Hearing loss	34(68)	34(68)	0	0.5	33(66)	<0.584
(c) Silicosis	2(4)	2(4)	0	0.5	2(4)	0.5
(d) Lung cancer	16(32)	16(32)	0	0.5	15(30)	<0.586
(e) TB	17(34)	18(36)	0.21	<0.417	17(34)	0.5
(F) Bronchitis	11(22)	11(22)	0	0.5	11(22)	0.5
(g) Cough	50(100)	50(100)	0	0.5	49(98)	<0.843
(h)Body pain	50(100)	50(100)	0	0.5	49(98)	<0.843
(i)Conjuctivitis	50(100)	50(100)	0	0.5	49(98)	<0.843
(j)Dermatitis	33(66)	34(68)	0.21	<0.416	33(66)	0.5

felt ill-health arising from their work was 'not a normal thing', 68.5% felt it 'should be controlled', but 55.6% believed it 'could be controlled', while 61.1% really 'did care'. At 6 months the changes were not significant in the first three parameters as, 85.2% (P<0.161) felt it was 'not a normal thing', 79.6% (P<0.094) felt it 'should be controlled', but 68.5% (P<0.083) believed 'it could be controlled', while 75.9% really (P<0.049) really 'did care'.

Among the control: At baseline 50% felt it was 'not a normal thing', 66% felt it 'should be controlled', but 42% believed it 'could be controlled', while 78% really 'did care'. At 6 months there was no significant change in any of the parameters.

Comparative assessment: Within groups, the proportion with overall right attitude towards work related ill-health rose significantly from 65.7% at baseline to 77.3% (P<0.004) at 6 months in the study group, but did not show any appreciable change in the control from 59% to 58% (P<0.577). Between groups, the change in attitude towards work related ill-health was slightly positively influenced by health education, the risk of a positive change was only 0.106 higher in the study compared to the control, though significant (P=0.014).

Attitude towards dust mask

Among the study group: At baseline those who believed dust mask was 'useful' were 98.1%, was 'necessary' were 75.9%, and 'could prevent respiratory disease' were 79.6%. 96.3% felt it should be 'worn when working in dusty area', while 22.2% felt it should be 'worn only during inspection'. At 6 months there were appreciable changes but none was significant, this included 88.9% (P<0.093) believed it 'could prevent respiratory disease' and 85.2% (P<0.112) believed it was 'necessary'.

Among the control: At baseline those who believed dust mask was 'useful' were 90%, was 'necessary' were 72%, and 'could prevent respiratory disease' were 72%. 88% felt it should be 'worn when working in dusty area', while 30% felt it should be 'worn only during inspection'. At 6 months there were a few changes, but none was appreciable, for instance 68% (P<0.669) believed it 'could prevent respiratory disease' and was 'necessary', while 98%

Table IVa : Comparative assessment of perception of work related ill-health within groups

	Study goup (54)		Control group (50)	
	Baseline	**6-months**	**Baseline**	**6-months**
Proportion with good perception	61.40%	96.60%	65.80%	64.90%
% Change	+35.20%		-0.9	
Proportional change	0.352		0.009	
Z-score	18.52		-0.36	
P-value	P<0.00003		P<0.639	

Table IVb: Comparative assessment of change in perception of work related ill-health between groups

Measure of comparison	Formular	Result of health education	Z-Score	P-value
Risk difference	P_1-P_0	0.352-0.009=0.343	4.48	<0.00003

(P<0.147) felt it should be 'worn when working in dusty area'.

Comparative assessment: Within the groups, the proportion with overall right attitude towards dust mask rose significantly from 86.7% at baseline to 93.5% (P<0.002) at 6 months in the study, but the change in the control from 78% to 79.3% (P<0.345) was not significant. Between groups, the change in attitude towards dust mask was slightly positively influenced by health education, the risk of a positive change was only 0.055 higher in the study compared to the control, though not significant (P=0.079).

Appropriate use of dust mask

Among the study group: At baseline about 6% 'always' wore dust mask when working in dusty areas, while 31% 'sometimes' wore dust mask. Among those who used dust mask only 5% regularly shaved facial hair, 5% changed filter daily, and 40% disposed of mask at appropriate periods. At 6 months there were significant changes in a number of parameters as follows: 24% (P<0.003) 'always' wore dust mask when working, 74% (P<0.000005) sometimes wore dust mask, among those who used dust mask 94% (P<0.00003) changed filter daily and 98% (P<0.00003) disposed of mask at appropriate periods.

Among the control: At baseline 4% 'always' wore dust mask when working in dusty areas, 19% sometimes wore dust mask. Among those who used dust mask only 5% regularly shaved facial hairs, 14% changed filter daily and 24% disposed of mask at appropriate periods. At 6 months there were changes in a number of parameters, but the only significant change was in those who changed filters daily 48% (P=0.008).

Ratio of days of dust mask usage

Within groups, the ratio of days of dust mask usage changed significantly from 35.4% at baseline to 62% (P<0.00008) in the study group, but, for the control the change from 32.5% to 38.4% (P<0.192) was not significant. Between groups, the change in the ratio of days of dust mask usage was positively influenced by health education, the risk of a positive change was 0.207 higher in the intervention compared to the control and was significant (P<0.00004).

The factors associated with poor usage of dust mask in both groups at baseline included availability, disturbs breathing, discomfort, not remembering and lack of knowledge.

DISCUSSION

The age distribution and the fact that above 70% of the workers had primary and secondary education were similar to another study from the state, [1] and the country. [3,5] About 45.2% of the work force had spent 1-5years, which was in keeping with other quarry studies from within 80.6% [1] and outside 57.6% [5] the state, this is indicative of the high turnover of manpower in the industry, making periodic health education and training necessary. The high turnover is a positive factor, as lengthy stay in service has been shown to be a predisposing risk factor to impairment of lung function by granite dust in a Nigerian study. [13]

At baseline above 90% of each group was aware of the hazardous nature of the industry, similar to 87% of quarry workers who acknowledged the negative impact on their health. [11]

Dust was the most perceived hazard at baseline, and a study had demonstrated high exposure to respirable dust and crystalline silica in Ebonyi.[14] Only 9.5% and 4% from both study and control could associate their work with silicosis, which is in keeping with the report of poor perception of lung disease as associated ill-heath

among quarry workers. [5] This is suggestive of a general lack of in-depth knowledge of occupational diseases associated with the industry. There was a significant improvement in the proportion with good perception of work-related hazard and ill-health following health education in the study group, but no significant improvement in the control.

Perception of dust mask was good in most parameters in both groups at baseline, but for the fact that only about half (51.9% of study and 46% of control) were of the view it should be used with other measures of safety precaution. Studies have reported poor [5] and high awareness.[3] Health education had a more significant improvement on the proportion with good perception of dust mask in the study than was observed in the control group.

Majority in both groups felt work related ill-health was not normal at baseline, however a substantial proportion (44.4% of study and 58% of control) believed it could not be controlled. This is worrisome as such a group may resign to fate and influence others. Health education had a significant improvement on the proportion with overall right attitude towards work related ill-health in the study group, but there was no improvement in the control. The influence of health education on perception of work related ill-health was much more (about three times) than that on attitude. This supports the assertion that changing attitude is much slower, less direct and less certain than changing knowledge or skills, but can be done. [15]

At baseline attitude towards dust mask was good as the proportion with overall right attitude was good in both groups. Though of concern was that an appreciable proportion (22.2% of study and 30% of control) felt it should be worn only during inspection. Health education had no significant influence on the change in attitude towards dust mask between both groups.

The appropriate use of dust mask was poor among both groups at baseline, as only 6% of study and 4% of control always wore dust mask at work. This was in keeping with other studies from quarry in the country.[3,11] Likewise, only a small proportion regularly shaved facial hairs and changed filters when clogged. Health education did improve the proportion that always wore dust mask significantly to 24% in the study group, but more positive is that this few wore it appropriately. The reasons for not using dust mask in both groups at baseline included, availability, disturbs breathing, discomfort, not remembering and lack of knowledge. This was similar to factors reported in other studies like lack of knowledge, discomfort and breathing difficulty.[1,16-18]

The study by Dubois et al, showed that as facial skin temperature (measured from the naso-labial fold) increased, discomfort also increased. The subjects felt comfortable when temperature was 34°C or below, but, at temperatures above 34.5°C the face felt increasingly warm, uncomfortable and sweaty.[16] Another study showed that when the respirator air humidity was high (73%) subjects rated breathing as "slightly hard".[18] The disturbance in breathing could therefore be attributed to the increase in respirator air humidity upon the use of respiratory devices. Hence, it would appear that keeping the head and face cool during work with a respiratory device would prove beneficial both physically and physiologically.[19] This agrees with other studies which used water-cooled cap on the scalp of the head to reduce physiologic heat strain (breathing discomfort) and thermal discomfort, and to improve performance in hot environment.[20,21]

CONCLUSION

The perception of the work related ill-health

and dust mask was positively influenced by health education, but attitude towards work related ill-health was only slightly influenced, with no positive influence on attitude towards dust mask. This with the high turnover of manpower makes sustained periodic health education necessary. Though the appropriate use of dust mask improved, but there was still a huge gap on the proportion that used dust mask appropriately. With improvement in the in-depth knowledge of its usefulness, training, greater availability and provision of water-cooled caps(hood), the usage of dust mask could be better improved.

REFERENCES

1) Nwibo AN, Ugwuja EI, Nwambeke NO, et al. Pulmonary Problems among Quarry Workers of Stone Crushing Industrial Site at Umuoghara, Ebonyi State, Nigeria. The International Journal of Occupational and Environmental Medicine 2012;3:178-185.

2) Aloh HE. Appraisal of Occupational Health Hazard Among Quarry (stone) Industry Workers in Ebonyi State of Nigeria With Special Reference to Respiratory Diseases. MPH Dissertation, Department of Community medicine, University of Nigeria, Enugu Campus.2003:6-51.

3) Sufiyan MB, Ogunleye OO. Awareness and compliance with use of safety protective devices and patterns of injury among quarry workers in Sabon-Gari Local Government Area, Kaduna state North-Western Nigeria. Ann Nigerian Med 2012;6:65-70.

4) Aliyu AA, Shehu AU. Occupational Hazards and Safety Measures among Stone Quarry Workers in Northern Nigeria. Niger Med Pract 2006;2:42-7.

5) Aigbokhaode AQ, Issah EC, Isara AR. Knowledge and Practice of Occupational Safety Among Quarry Workers in a Rural Community in Edo State. Journal of Community Medicine and Primary Health Care. 2011;23(1&2):16-24.

6) Kullman GJ, Greife AL, Costello J and Hearl FJ. Occupational exposure to fibers and quartz at 19 crushed stone mining and milling operations. Am J Ind Med. 1995; 27(5):641-660.

7) Fulekar MH. Occupational exposure to dust in quartz manufacturing industry. Ann Occupational Hygi. May 1999; 43(4):269-273

8) David O, Tok B, Colin D. Quarrysafe: Hazardous Substances in Quarries February 1998:4. Internet search at http://www.Maqohsc.sa.Gov.au/ftp/mQ Hazsub.pdf

9) Rita W and Joe C. Health Hazard Evaluation Report 95-0225-2596, Abrasive Blasters, Parma and Akron, Ohio. September, 1996: 7-9. Google internet search at http://www.cdc.gov/niosh/hhe/reports.

10) Malmberg P, Hedenstrom H, Sundblad BM. Changes in lung function of granite crushers exposed to moderately high silica concentration: a 12 year follow up. Br J Ind Med 1993;50:726-731.

11) Ugbogu OC, Ohakwe J, Foltescu V. Occurrence of respiratory and skin problems among manual stone-quarrying workers. Mera: African Journal of Respiratory Medicine. March 2009: 23-26.

12) Kirkwood B. Essentials of Medical Statistics. 2nd ed. Blackwell publishing, Oxford. 1988:

148-153.

13) Urom SE, AntaI AB and Osim EE. Symptoms and lung function values in Nigerian men and women exposed to dust generated from crushing of granite rocks in Calabar, Nigeria. Nigerian Journal of Physiological Sciences 2004; 19(1-2): 41-47

14) Udeajah VN and Obini EE. Particulate Air Contamination in Abakaliki, Ebonyi State, Nigeria. Journal of Physical Sciences and Innovation, 2010:2;82-89

15) Abbath F and McMahon R. Teaching Health Care Workers. A practical guide. London Macmillan. 1989.

16) Dubois AB, Harb ZF and Fox SH. Thermal discomfort of respiratory protective devices. Am. Ind. Hyg. Assoc. J. 1990; 51(10): 550-554.

17) Hodous TK, Hankinson JL and Stark GP. Workplace measurement of respirator effects using respiratory inductive plethysmography. Am. Ind. Hyg. Assoc. J. 1989;50: 372-378.

18) Gwasdow AR, Nielsen R, Berglund IG, Dubois AB and Tremmi PG. Effect of thermal conditions on the acceptability of respiratory protective devices on humans at rest. Am. Ind. Hyg. Assoc. J. 1989; 50(4): 188-195.

19) Raven PB, Dodson AT, and Davis TO. The physiological consequences of wearing industrial respirators: A review. Am. Ind. Hyg. Assoc. J. 1979;40: 517-534

20) Konz SA and Gupta VA. Water cooled hood affects creative productivity. ASHRAE J. 1969; 11:40-48.

21) Nunneleg SA, Troutman SJ, Jr., and Webb P. Head cooling in work and heat stress. Aerosp. Med. 1971; 42: 64-68