



Exposure to Noise Induced at Work and Prevention Practice Among Workers of Stone Mining Company, An Giang, 2018

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Abstract

Noise is one of the most common occupational hazards in Vietnam, causing occupational hearing impairment. Stone mining is among the high-risk working environment. This study aims to describe noise exposure and prevention practice among workers of stone mining in An Giang province. A cross-sectional study using a quantitative method was conducted in 2018. 176 noise samples were collected, and 215 workers were interviewed using a structured questionnaire. Results show that workers at grinding section exposed with the high level of noise (compared to national standards) and they did not practice adequately to protect themselves from the hazard. Workers aged above 39 years old and had more than 10-year working experience had better prevention practice than the other groups. The differences were statistically significant. It is concluded that workers were exposed to the high level of noise at work, their practice regarding hearing impairment prevention was not adequate, and age, years of working were associated factors with prevention practice among workers.

Keywords: noise, occupational exposure, prevention practice, stone mining, Vietnam

1. Introduction

Noise exposure at work is one of the most common occupational hazards. Occupational hearing impairment is also among the leading occupational diseases in all countries (Lie, A et al, 2016). Early detection and prevention of noise exposure can protect workers from permanent hearing loss.

According to the report of the Administration of Environmental Health Management, hearing loss occupied 64.4% of all occupational diseases. Noise exposure was the second-ranking hazard which occupied 14.7% of all workplace samples that did not meet national standards (Anh Luong Mai, 2017).

Mining and stone mining has been developed rapidly in recent years in Vietnam (Linh Bui Hong, 2013) Stone mining companies provide occupations for hundred thousand workers and contribute significantly to the economic development of different provinces. However, reports also showed that there were occupational health and safety issues among stone mining sector. Problems were perceptions of employers, employees on occupational health and safety, the high level of noise and dust, and limited control measures (Linh Bui Hong, 2013).

The An Giang stone mining company is located in An Giang province. The company has experienced more than ten years working in the area. The company provide stone for different construction sites in surrounded provinces. Even though labour protection council was established at the company, annual health checks were conducted regularly, occupational hazards like noise still exist and threaten the health of workers. This paper aims to discuss the situation of noise exposure and prevention practice among workers of the company.

2. Methodology

A cross-sectional study was designed using a quantitative method to collect data for both noise measurement and workers' practice. Noise data were collected following the Ministry of Health's guidance while workers' practice data were collected using a structured questionnaire.

Study sites and study period:

This study was conducted from January to August 2018 at An Giang stone mining in An Giang province, a province in the South of Vietnam. The company was founded in 1975 and upgraded since 2007. The company is one of the companies which has biggest productivities in An Giang province and in the Western Southern region of Vietnam. The productivity of the company ranges from 1.6 – 2.0 million m³ per year. The company has 4 mining areas and 17 grinding sections (See Fig 1). The company comply with national legislation on occupational health and safety; working environmental data were recorded annually. Some occupational hazards were noise, chemical, silica dust and safety hazards.

Study subjects and sample size:

176 samples were taken for noise measurement. The number of samples for each working section was:

- Mechanics section: 08 samples
- Mining section: 32 samples
- Grinding section: 136 samples

The whole sampling was applied to collect data for the practice of workers. Totally 215 workers were interviewed. Four other workers were excluded from the study as they did



Fig. 1. Administration map of Vietnam and An Giang province location and mining activity at mining sites
Rys.1. Położenie prowincji An Giang na mapie Wietnamu i Działalność górnicza w kamieniołomie

Tab. 1. Noise level at 3 types of section
Tab. 1. Natężenie hałasu na 3 sekcjach specjalistycznych

No	Sections	Noise level (dBA) ($\bar{X} \pm SD$)	Samples unmet national standard (>85 dBA)
Mechanics sections			
1	Co To site	79.08 ± 0.98	0/4
2	Ba Doi site	77.45 ± 0.76	0/4
Mining sections			
1	Co To site	99.24 ± 0.45	8/8
2	O Lam site	99.41 ± 5.66	8/8
3	An Phuong site	94.49 ± 5.67	8/8
4	Ba Doi site	97.43 ± 2.59	8/8
Grinding sections			
1	Co To site	88.28 ± 4.67	33/48
2	O Lam site	87.03 ± 5.71	23/32
3	An Phuong site	85.18 ± 2.80	4/8
4	Ba Doi site	86.65 ± 4.17	35/48
Total		176	127

not match research criteria (contracted for at least 6 months and available at the time of the data collection).

Sampling method

Environment sampling:

Noise samples were collected at 3 sections of the company. Samples were collected at the middle of morning shifts and afternoon shifts (2 samples for each position).

Mechanics sections: samples were collected at the centre of each section. There are two mechanics sections; totally 8 samples were collected.

Mining sections: there are 4 mining sections, two working positions were selected for each section, totally 32 samples were collected.

Grinding sections: there are 17 grinding chains, so totally 136 samples were collected for all 34 working positions.

Worker Sampling

The whole sample was applied, and workers were selected based on criteria:

- Contracted for at least 6 months
- Working directly at the sections (not include administration staff)
- Available at the time of data collection

Data collection

Noise measurement

Noise samples were collected in accordance with guidance from Ministry of Health 2015 (NIOEH, 2015).

+ Time of sampling during work shift: noise samples were collected two times per day based on National technical regulation 24:2016/BYT stated in Circular 24/2016/TT-BYT on regulating noise level at work (MOH, 2016)]

+ Measurement: at each working position, the noise was recorded for maximum and minimum levels.

+ Samples were collected at the hearing level of workers, a method of measurement was based on the guidance of NIOEH (depending on standing or sitting position) (NIOEH, 2015),(NIOEH, 2002) following TCVN 9799:2013 standard and 1910:95 App G OSHA – Monitoring noise level regulated by Ministry of Health (MOH, 2016)]

+ Noise level unit: dBA.

Noise meter NL-21 (RION - Japan) and noise frequency analysis equipment NX-21 SA

Data collector: Technicians from Na Giang Center for Disease Control and Prevention.

Worker practice:

Prevention practice of workers was collected by using a structured questionnaire. The questionnaire includes personal characteristics, self-report of prevention practice and associated factors. The questionnaire was developed based on questionnaires in the studies of Sung Tran Van et al. (2017) Khoa Vo Tan et al. (2016), Chan Nguyen Dang Quoc et al. (2008), and Hoa Pham Thuy et al. (2006).

Workers were interviewed during their break. Only workers voluntarily agreed to participate were chosen to be interviewed by public health professionals from An Giang Center for Disease Control and Prevention.

The questionnaire was piloted in 10 workers before the main study implemented.

After data collection, all quantitative data were cleaned, coded before processing.

Research criteria:

Noise level

Tab. 2. Noise level at audible frequency range at 3 types of section
Tab. 2. Natężenie hałasu w słyszalnym zakresie częstotliwości w 3 sekcjach

Section	Noise level dB at an audible frequency range (Hz) ($\bar{X} \pm SD$)							
	63	125	250	500	1000	2000	4000	8000
Mechanics sections	54.30 ± 5.77	62.89 ± 5.59	69.69 ± 5.52	71.29 ± 5.61	70.23 ± 6.48	66.13 ± 5.94	59.81 ± 4.51	51.31 ± 5.59
Mining sections	68.44 ± 3.13	78.49 ± 3.07	87.02 ± 1.79	90.62 ± 3.00	91.96 ± 3.20	90.85 ± 3.62	86.33 ± 1.80	76.55 ± 3.22
Grinding sections	61.86 ± 4.83	70.59 ± 3.75	78.67 ± 3.44	82.04 ± 4.36	82.65 ± 4.69	80.42 ± 6.31	74.37 ± 6.72	64.53 ± 8.24
National standard limit (QCVN 24/2016/TT-BYT)								
At working site	99	92	86	83	80	78	76	74

Tab. 3. Proportion of noise level above national standard at different octave band
Tab. 3. Proporcja poziomu hałasu powyżej normy krajowej w różnych pasmach oktawowych

Compared to national regulation		Noise level at different octave band (dB)							
		63	125	250	500	1000	2000	4000	8000
National limit		99	92	86	83	80	78	76	74
Unmet	N	0	0	31	93	134	116	95	41
	%	0.00	0.00	17.61	52.84	76.14	65.91	53.98	23.30
Met	N	176	176	145	83	42	60	81	135
	%	100	100	82.39	47.16	23.86	34.09	46.02	76.70
Total		176	176	176	176	176	176	176	176

Tab. 4. Proportion of workers using hearing protection devices and frequency of use
Tab. 4. Odsetek pracowników używających środków ochrony słuchu i częstotliwość używania

		Detail	Number (n)	Proportion (%)
Using hearing protection devices	Yes		46	21.40
	No		169	78.60
frequency of use hearing protection devices during a work shift (N = 46)	Adequate		0	0
	Non-adequate		46	100
Maintain earplugs correctly (N = 46)	Yes		22	47.83
	No		24	52.17

Tab. 5. Proportion of workers reminded others to use earplugs
Tab. 5. Odsetek pracowników przypominających innym o używaniu zatyczek do uszu

		Detail	number (n)	Proportion (%)
Reminded others to use earplugs	Yes		132	61.40
	No		83	38.60
		Total	215	100

According to the National Technical regulation 24:2016/ BYT in Circular 24/2016/TT-BYT on the acceptable noise level at (MOH, 2016)]:

+ Meet standard: Noise level ≤ 85 dBA and below frequency range.

+ Not meet the standard: Noise level > 85 dBA and above frequency range.

Prevention practice

The questionnaire includes 28 questions: 6 questions on personal details, 5 questions on knowledge, 5 questions on attitude and 12 questions on worker's practice.

The adequate practice was considered when workers reported correctly for > 8 over 12 questions (criteria based on studies of Tan Nguyen et al., 2016) et al. And Khoa Vo Tan et al. (Khoa Vo Tan, 2016).

Data analysis

Data were processed using Epidata and SPSS 18.0 software. Descriptive and regression analysis were applied.

Main variables are:

- Noise level;

- Prevention practice of workers: using protection devices, maintain earplugs, time exposed to noise per day, and break time;

- Independent variables: gender, age, years of work, ethics, education, working section.

Ethical clearance

This study was approved by Ethical Committee of Hanoi University of Public Health (Decision 121/2018/YTCC-HĐ3). This study was allowed by the company. Workers had the right to refuse to participate and can stop at any time of the study. All information was provided to workers and the company in an information sheet. The worker had no or low risk when participating in this study.

3. Results

Noise exposure at different sections of the company:

The study was conducted at three types of the section of the company (mechanics, mining and grinding section). 176 samples were taken for noise measurement. Table 1 shows noise levels in those sections of the company. Results show that almost all of the samples (127/176) of noise level av-

Tab. 6. Work schedule

Tab. 6. Plan pracy

	Detail	number (n)	Proportion (%)
Working time exposed to noise	≤ 8h/day	215	100
	> 8h/day	0	0
Break time	< 30 minutes	0	0
	≥ 30 minutes	215	100

Tab. 7. Proportion of workers had good prevention practice

Tab. 7. Odsetek pracowników stosował dobre praktyki prewencyjne

	Detail	number (n)	Proportion (%)
Prevention practice of workers	Good	46	21.40
	Not good	169	78.60
Total		215	100

erage of 3 groups of sections were higher than the allowed level regulated in National regulation (72,16%). The workers working at mining sections were exposed to the high level of noise (32/32 samples were higher than the standard limit), the highest noise level even reached a level of 100,5 dBA. Following was grinding section with 69,85% of samples higher than the standard limit. Results of noise level at mechanics sections show that all of 8 samples met the national standard. According to the Occupational Safety and Hygiene Law, the noise level at work should not exceed 85.0 dBA while working for 8 hours per day. If the noise level increase for 3 dBA, working hour per day should be cut off by half. It means that with the noise level at mining sections, workers should not expose for more than 30 minutes (with a noise level below 97 dBA).

Noise levels were also measured at different audible frequency range (from 63 Hz to 8000 Hz). According to Table 2, almost all of the unmet standard samples were samples collected at mining and grinding sections at frequency range 250 – 8000Hz. Noise level differences were highest at the frequency range of 4000Hz with a national standard limit of 76 dBA while the highest level was 94.8 dBA (the difference reached 18.8dBA). At frequency range of 1000Hz, the national standard limit is 80 dBA while the highest noise level at mining section was 97.6 dBA (the difference reached 17.6dBA)

At frequency range of 2000 Hz and 500 Hz, the study also found that mining sections and grinding sections also had noise level above national standards, while at the frequency range of 250 Hz and 8000 Hz, Only mining sections were found to have noise level above national standards of 86 dBA and 74 dBA.

Table 3 shows the proportion of noise level above the national limit at a different octave band. It was found that the noise level above the national limit was mainly at high octave band. They were at octave band of 1000Hz (76.14%), 2000Hz (65.91%) and 4000Hz (53.98%) and following by samples measured at octave band of 500 Hz (52.84%), 8000 Hz (23.3%) and 250 Hz (17.61%). The low-frequency range at a frequency of 63Hz. 125Hz had the highest percentage of samples (100%) that met national standards. All standards were regulated in Circular 24/2016/TT-BYT in 2016. The circular regulated limits of noise at different workplaces and exposure recommendations.

Prevention practice of workers

Workers working at the workplace which has noise level exceeds limit are requested to use hearing protection devices.

All devices need to meet national standards of hearing protection device. Table 4 shows the proportion of workers used hearing protection devices according to their self-reports, workers were also asked to report about the frequency of use and how they maintained their hearing protection devices. Results show that the proportion of workers had correct practice of using hearing protection devices was only 21.40%. Among 46 workers, those used hearing protection devices during the work shift, no one used them frequently.

100% of workers reported that they were equipped with simple hearing protection devices (earplugs). 100% of them also reported that the equipment was effective in reducing noise exposure. Among 46 workers who used earplugs, only 47.83% maintained and cleaned their earplugs correctly.

Workers who exposed to noise-induced at work are requested to be monitored by their colleagues and team leaders about their practice on using personal protective equipment. As showed in Table 4, only 21.4% of workers used earplugs, and non of them used the equipment adequately. Table 5 shows results on how workers remind each other to use earplugs. There were still 38.60% of workers did not remind their colleagues to wear earplugs.

According to the guidance from the Ministry of Health, workers should also be moved to other sections with lower level of noise. Reports from workers of the company show that 100% of workers were not moved to other sections with a lower level of noise during the last 12 months to the study period

According to Table 6. 100% of workers worked for less than 8 hours per day and took at least 30 minutes break. Study results also show that 100% of workers took regular annual health check. Even though workers following regular guidance about working hour while exposing to the noise level above 85 dBA, none of them follows the guidance on reducing working hour by half if noise level increased for 3 dBA (Circular 24/2016/TT-BYT).

Results on the practice of workers were calculated based on elements on wearing hearing protection devices, frequency of use, maintenance, remind others to use and taking working hour adequately. Results on Table 7 show that only 21.4% of workers had a good practice on the prevention of occupational hearing impairment.

There are several factors such as personal characteristics, working experience, working positions, knowledge on prevention of occupational hearing impairment and attitude on

Tab. 8. Factors associated with prevention practice of workers
 Tab. 8. Czynniki związane z praktyką prewencyjną pracowników

Factors	Practice	Good		Not good		P	χ^2
		n	%	N	%		
Age	≤ 39	13	10.7	109	89.3	p<0.001 (p=0.000)	19.343
	>39	33	35.5	60	64.5		
	OR = 0.217; CI95% (0.106 – 0.443)						
Years of Works	≤ 10 years	8	7.3	101	92.7	p<0.001 (p=0.000)	25.972
	>10 years	38	35.8	68	64.2		
	OR = 0.142; CI95% (0.062 – 0.322)						
Education	≤ secondary	18	18.4	80	81.6	p>0.05 (p=0.322)	0.982
	> secondary	28	23.9	89	76.1		
	OR = 0.715; CI95% (0.368 – 1.390)						
Ethnics	Kinh	34	23.0	114	77.0	p>0.05 (p=0.402)	0.703
	Khome	12	17.9	55	82.1		
	OR = 1.367; CI95% (0.657 – 2.844)						
Section	Mechanics	0	0	35	100	-	-
	Mining	31	23.7	100	76.3		
	Grinding	15	30.6	34	69.4		
Knowledge	Good	22	22.7	75	77.3	P>0.05 0.677	0.174
	Not good	24	20.3	94	79.7		
	OR= 1.149; CI 95% (0.598 – 2.208)						
Attitude	Good	17	21.5	62	78.5	P>0.05 0.973	0.001
	Not good	29	21.3	107	78.7		
	OR = 1.012; CI 95% (0.515 – 1.988)						

the risk of having an occupational hearing impairment. Results are shown in Table 8.

According to Table 8, workers older than 39 years old were 4.6 times more likely had better practice than workers under 39 years old. Workers had more than 10 years working were 7.1 times more likely had better practice than the others. The differences were statistically significant with $p < 0.0001$.

Tables 3.8 also shows that workers with a higher level of education had better practice; workers who were Kinh ethnic had a better practice than other ethnics. However, the differences were not statistically significant. There was also no statistical evidence of an association between knowledge and attitude of workers and prevention practice.

4. Discussion

Results in this study showed 72.16% of samples did not meet national technical regulation. This proportion was higher than that of the study of Kien Nguyen The et al. (2013) with 48.0% of samples. Another cross-sectional study at different stone mining areas showed a level of noise ranged from 85.5 dBA to 102.7 dBA.

The noise level that higher than national limit was mostly at the high frequency of range, highest at 1000Hz (76,14%), 2000 Hz (65,91%), following by 4000Hz (53,98%) and 8000Hz was 23,30%. Similar results were also found in the study of Khanh Nguyen Quang et al. (2002) showing the high noise level at a frequency of range from 1000 – 8000Hz, and this was the main cause of permanent hearing loss in workers.

This study shows that 21.40% of workers had good prevention practice. This proportion was lower than that of study of Khoa Vo Tan (Khoa Vo Tan, 2016) was 25% and Sung Tran Van (Sung Tran Van et al. 2017) 26,5% but slightly higher than that of study of Rus RM, Daud A, Musa KI, Naing L.(2008) was 19,36%.

The proportion of workers used hearing protection devices was 21,4%. This result was lower than in the study of Chan Nguyen Dang Quoc (2006) (37,4%). All of the workers were equipped with earplugs. However, workers did not use them

frequently. Percentage of workers used earplugs frequently in this study was lower than that of study of Sung Tran Van 37,1% (Sung Tran Van et al. 2017), Vo Tan Khoa 15,79%(Khoa Vo Tan, 2016), Gabrielle H. Saunders (2014)

+ Maintain earplugs and take annual health check: In this study, the proportion of workers maintain earplugs adequately was 47,83% These results show that workers did not recognize the risk of using uncleaned earplugs. 100% of workers had an annual health check, this was much higher than in the study of Khoa Vo Tan 97,76% (Khoa Vo Tan, 2016) and Thuy Hoang Minh (97,6%)(Thuy Hoang Minh, 2011).

+ Switching of work tasks: 100% of workers did not change their section or positions, even though the company identified some cases of hearing impairment.

+ Provide hearing protection devices and monitoring of use: The company provided earplugs for 100% of workers, this similar to results of the study of Khoa Vo Tan (100%) (Khoa Vo Tan, 2016). However, the company did not monitor the use of earplugs; only 61,4% reported that the company supervised that use of earplugs, no punishment was announced.

+ Work schedule and break: The company organized working time adequately with a working hour less than 8 hours and at least 30 minutes break.

Age and years of working at the company were factors associated with prevention practice in this study. It was found that the older age, the better practice. This result is different from that of Vo Tan Khoa (Khoa Vo Tan, 2016), and Sung Tran Van (2017).

No statistical differences between ethnic groups, education groups. No association between knowledge and attitude of workers with prevention practice. These results were different from that of Sung Tran Van study. In Tran Sung Van study, workers with better knowledge had better practice on hearing lost prevention (Sung Tran Van et al. 2017).

5. Conclusions and recommendations

This study shows results on the noise level at the stone mining company. Mining and grinding sections were sections

where workers exposed with high noise level with noise level ranged from 97.43 – 99.49 dBA for grinding sections and 85.18 – 88.28 dBA for mining sections.

The proportion of workers who had good prevention practice was relatively low (21.40%).

Factors associated with the good practice were the age of workers and years of working at the company

It is recommended that the company should take actions to reduce the noise level at mining and grinding sections and to educate workers and to monitor the compliance of workers especially those who are younger than 39 years old and have less than 10 years of working experiences

Literatura – References

1. Anh Luong Mai (2017), Effects of working environment to occupational injuries and diseases, National Institute of Occupational Safety and Health., available at <http://vnniosh.vn/moitruonglamviec/details/id/6917/Anh-huong-cua-moi-truong-lao-dong-doi-voi-van-de-tai-nan-lao-dong-benh-nghe-nghiep>, accessed on 09/12/2017.
2. Chan Nguyen Dang Quoc and Bui Dai Lich (2006), Knowledge, attitude and practice on occupational hearing impaire prevention among workers of some factories in Ho Chi Minh city., Ho Chi Minh city journal of Medicine, 12(4), pp. 226 - 228.
3. Chan Nguyen Dang Quoc and Bui Dai Lich (2008), Situation of hearing impaire in some factories in 2006 and 2007, Ho Chi Minh city journal of Medicine, 12(3), pp. 178 - 179.
4. Gyamfi CK et al. (2016), "Noise Exposure and Hearing Capabilities of Quarry Workers in Ghana: A Cross-Sectional Study.", J Environ Public Health, 2016.
5. Hoa Pham Thuy, Nguyen Xuan Tam and Hoang Thi Minh Thao (2006), Working environment and occupational diseases of workers in some sectors in Tay Nguyen highland, report, Medical Publishing house, pp. 265 - 273.
6. Khanh Nguyen Quang, Nguyen Thi Toan and Dang Ngoc Tuan (2002), Noise at work and hearing loss among workers at airplane company in Vietnam., University project report, National Institute of Environmental and Occupational Health.
7. Khoa Vo Tan (2016), Noise exposure at work and knowledge, attitude, practice on hearing loss prevention among workers at An Giang cement company, 2016, Master thesis, Hanoi University of Public Health.
8. Kien Nguyen The et al. (2013), An evaluation of working environment and occupaitonal health on mining sectors in Dong Nai, Journal of Preventive Medicine, Issue XXIII, Vol 10(146), p. 293.
9. Linh Bui Hong (2013), Occupational Health and Safety among high risk sectors in Vietnam - Challenges and solutions, Administration on Occupational Safety available at <http://antoanlaodong.gov.vn/catld/pages/chitiettin.aspx?IDNews=1208>, access on 09/01/2018.
10. Lie, A., Skogstad, M., Johannessen, H.A. et al (2016). Occupational noise exposure and hearing: a systematic review. Int Arch Occup Environ Health 89, 351–372 (2016). <https://doi.org/10.1007/s00420-015-1083-5>
11. Ministry of Health (2016), QCVN 24:2016/BYT National Technical Regulation on Noise and occupational exposure.
12. Musa KI Daud A Rus RM, Naing L. (2008), "Knowledge, attitude and practice of sawmill workers towards noise-induced hearing loss in Kota Bharu, Kelantan", Malaysian Journal of Medical Sciences, 15(4), tr. 28 - 34.
13. National Institute of Environmental and Occupational Health (2015), Environmetnal and Occupational Technical Guideline, Medical Publishing House.
14. National Institute of Environmental and Occupational Health (2002), nvironmetnal and Occupational Technical Guideline, Medical Publishing House.
15. Sung Tran Van (2017), Noise pollution and hearing loss prevention among workers at Viet Thang food processing company , 2017, Master thesis, Hanoi University of Public Health.
16. Tan Nguyen (2016), Hearing loass and associated factors among workers at Hyundai vinasin company, Master thesis, Hanoi University of Public Health, Hà Nội.
17. Thu Vu Van (2011), Chapter I: Sound and Noise "in Textbook Occupational Noise and Vibration , Labour Publishing house, p. 13.
18. Hoang Minh Thuy (2011), Health status of workers exposing to industrial noise and reults from piloted intervention, Doctor thesis National institute of Hygine and Epidemiology,.
19. Saunders GH and Dann SM & et al (2014), "Development and evaluation of a questionnaire to assess knowledge, attitudes, and behaviors towards hearing loss prevention", Int J Audiol, 53(4), tr. 209 - 218.

Narażenie na hałas podczas pracy i praktyka prewencyjna wśród pracowników pracujących w kamieniołomach w rejonie prowincji An Giang, 2018

W kamieniołomach na rejonie prowincji An Giang występuje szereg źródeł lub procesów emitujących hałas, który powoduje uciążliwość akustyczną przede wszystkim na stanowiskach pracy. Część procesów/źródeł pozostaje poza możliwościami zastosowania wyciszeń użycie materiałów wybuchowych w kopalni czy stosowanie ciężkiego sprzętu do transportu urobku. Uciążliwe dźwięki mogą być szkodliwe nie tylko dla słuchu, ale mają negatywny wpływ na cały organizm. Niniejsze badanie ma na celu opisanie narażenia na hałas i praktyk zapobiegawczych wśród pracowników górnictwa kamienia w prowincji An Giang. W 2018 roku przeprowadzono badanie przekrojowe metodą ilościową. Pobrano 176 próbek hałasu i przeprowadzono wywiady z 215 pracownikami za pomocą ustrukturyzowanego kwestionariusza. Wyniki pokazują, że pracownicy sekcji szlifowania narażeni byli na wysokim poziomie hałasu (w porównaniu z normami krajowymi) i nie ćwiczyli odpowiednio, aby chronić się przed zagrożeniem. Pracownicy w wieku powyżej 39 lat i mający ponad 10-letnie doświadczenie zawodowe mieli lepsze praktyki profilaktyczne niż inne grupy. Stwierdzono, że pracownicy byli narażeni na wysokim poziomie hałasu w miejscu pracy, ich praktyka w zakresie profilaktyki wad słuchu nie była adekwatna, a wiek, lata pracy były czynnikami związanymi z praktyką profilaktyczną wśród pracowników.

Słowa kluczowe: zanieczyszczenie hałasem, narażenie zawodowe, praktyka profilaktyczna, wydobywanie kamienia, An Giang