



PROCEEDING

*Improving Quality of Life Through
Multi Sector Collaboration*

4th UPHEC

**UNIVERSITAS AHMAD DAHLAN
INTERNATIONAL CONFERENCE
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“Improving Quality of Life Through Multi Sector Collaboration”

ROYAL AMBARUKMO HOTEL- YOGYAKARTA, INDONESIA

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Carpal Tunnel Syndrome on Traditional Boat Driver in Kutai Kartanegara District of East Kalimantan

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Article Info

Keyword:

Carpal Tunnel Syndrome
Traditional Boat,
Driver.

ABSTRACT

A cross-sectional study was conducted on 45 drivers of traditional boat in Kutai Kartanegara to identify carpal tunnel syndrome (CTS) prevalence and its risk factors. The independent variables consisted of age, vibration, heat pressure, working period, working time, and history of disease, while the dependent variable was CTS. The research instruments used were Phalen test, vibration analyzer, heat stress area monitor and questionnaire. Chi square and multiple logistic regression were applied to identify the correlation between CTS prevalence and other parameters. The results showed that the CTS prevalence of 82.2% was found, and it correlated significantly with age ($p=0,000$), vibration ($p=0,000$), length of work ($p=0,000$), working period ($p=0,000$), and history of disease ($p=0.019$). History of disease, length of work, and exposure of vibration are the most dominant variables affecting CTS. It is suggested for stake holders to improve the primary prevention efforts.

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1. INTRODUCTION

Kutai Kartanegara is one of districts in East Kalimantan traversed by Mahakam River. In addition of land transportation, one type of transportation that is still used by people in this area is boat. This type of water transport is used in informal sector which is an alternative transportation and used by the public to serve transport from one place to another on the banks of Mahakam river. The ships are still operated manually and have not yet applied the principles of occupational health and safety, causing boat drivers to be at risk for occupational diseases. One type of occupational diseases caused by long and repeated excessive emphasis on the arm up to the wrist and exacerbated by vibration exposure is carpal tunnel syndrome (CTS).

CTS is a suppression of the median nerve, extending between the forearm to the hand inside the carpal tunnel with symptoms of pain, numbness, and paresthesias (tingling or burning) (Jagga, 2011; Lewanska, 2017). CTS is associated with work combination of strength and repetition of the finger motion in a long period of time. CTS can be triggered by exposure to vibration or due to un-ergonomic positions that occur over a long time (Bridger, 2009). National Health Interview Study (NHIS) estimates, in USA, the reported CTS prevalence among adult populations is 1.55% (2.6 million) and is more common in women than in men ranging from 25 to 64 years of age, with the highest prevalence in women aged > 55 years (Luckhaupt, 2013).

CTS is a musculoskeletal disorder of the upper limbs that has caused considerable material loss. The estimated medical costs to be paid for CTS exceed \$2 billion per year, mainly because the patients have to undergo surgery. Meanwhile, losses due to non-medical costs are much greater. CTS experienced by a workforce results in a loss of 27 working days. An estimate of 18% of workers developing CTS is reported to leaving their jobs within 18 months. It was concluded that CTS has resulted in decreasing work productivity and increasing disability rate (Stapleton, 2006; US Bureau of Labor and

Statistic, 2012; Foley, 2007). In Indonesia, national research on occupational CTS has never been done. Nevertheless, studies in some areas of certain types of work have proven that CTS incidents are found in Bank employees (Saerang, 2015), garment workers (Tana, 2004), and jasmine pickers (Kurniawan, 2008).

CTS risk factors consist of occupational factors (working at high speed, repetitive motion, heavily-loaded work using wrists and vibration exposure) and non-occupational factors (sex, age, body mass index, smoking habits, and pregnancy status) (Maghsoudipour, 2008). This study aims to determine the prevalence of CTS in boat drivers in Kutai Kartanegara (district of East Kalimantan province in Indonesia) and analyze the factors that influence it.

2. RESEARCH METHOD

The cross-sectional study was conducted from October until December 2016 on all boat drivers (45) in Kutai Kartanegara district of East Kalimantan province, Indonesia. The independent variables consist of age, working period, working time, vibration, heat stress, and history of disease, while the dependent variable is CTS. To examine the symptoms of CTS Phalen test method (Massy-Westrop, 2000) was used. Vibration analyzer was used to measure the vibration exposure. Heat stress area monitor was used to examine the heat pressure of the working environment. Age, working period, working time, and history of disease were examined by using a questionnaire. The data analysis was done by using chi square (bivariate) and logistic regression test (multivariate) with $\alpha=0.05$.

3. RESULTS AND ANALYSIS

Out of the 45 drivers, they were all male, mostly over the age of 30 (84.4%), with education level of mostly high school (53.3%). Most of them had a working period of over 4 years (82.2%), average length of work of more than 8 hours per day (91.9%) (see table 1). Most respondents experienced CTS (82.2%), with the following details: left hand complaints of 24.4%, right hand complaints of 28.9% and complaints on both hands of 28.9%; the types of CTS experienced by the workers were mostly pain (46.5%) and tingling (31%); most CTS occurred at an uncertain time, whether at work or when not working (55%); the locations of complaint were mostly on the thumb, forefinger, middle finger and ring finger (51.7%); most of respondents had a history of illness that could complicate CTS (80%), including diabetes mellitus (8 people), rheumatoid arthritis (16 people), injuries (8 people), gastritis (3 persons) and typhoid (1 person). The heat pressure or ambient temperature exceeded the threshold limit value of 33.90 C (51.1%) and most respondents were exposed to hand and arm vibration (see table 2).

The statistical test showed that age ($p=0,000$), vibration exposure ($p=0,000$), working time ($p=0,000$), working period ($p=0,000$), and history of disease ($p=0,019$) were related to the CTS. Meanwhile, heat pressure was not related to CTS ($p=0,649$) (see table 3). Age, working period, working time, history of disease, exposure to vibration, and exposure to heat stress had a significant partial effect ($\text{sig} < 0.05$). Nagelkerke R Square (0.867) indicated the ability of independent variables in explaining the dependent variable was 86.7%, the remaining 13.3% was explained by other variables outside this study. The magnitude of influence can be seen from the value of Exp (B) or also called Odds Ratio (OR) for each variable, i. e. age (0.34), working period (1.1), working time (5.3), history of disease (9.8), exposure of vibration (4.4), and exposure to heat pressure (2.3). It can be concluded that history of disease, working time and exposure of vibration are the three most dominant variables affecting the incidence of CTS in traditional boat drivers in Kutai Kartanegara.

3.1. Prevalence of Carpal Tunnel Syndrome

The prevalence of CTS in traditional boat drivers in Kutai Kartanegara was 82.2% ($n=45$). The location of CTS complaints was mostly on the thumb, forefinger, middle finger and ring finger (51.2%). The type of CTS complaints was dominated by pain (46.6%) and tingling (28.8%). The result indicated that CTS experienced by traditional boat driver in Kutai Kartanegara was very serious and required immediate control action. Unresolved CTS will adversely affect both the physiology of the body and the work. As reported by Faucet et al (Faucett, 2000), physiologically, unresolved CTS will lead to worse conditions such as disability due to sensory damage and motor nerve function. Meanwhile, from the socio-economic aspect, CTS can cause social and economic losses, including job loss and job change.

These results may complement previous studies in other district in Indonesia and some country which conclude that the prevalence of CTS in bank employees in Bitung was 28% ($n=47$) (Saerang, 2015), in garment workers in Jakarta was 20.3% ($n=814$) (Tana, 2004), in jasmine pickers in Purbalingga was 47.2% ($n=72$) (Kurniawan, 2008), in grinding workers in Surabaya was 87.2% ($n = 43$) (14), in

traditional soccer-making workers in India was 66.67% (n=70) (Kumar, 2016), in female visual display unit workers in Italy was 7.6% (n=48) (Ricco, 2016), in female hairdressers in Turkey was 74.3% (n=150) (Demiruyek, 2018), in non-medical hospital staff in Taiwan was 51.9% (n=144) (Chiang, 2017), in US working population was 7.8% (n=4321) (Dale AM, 2013), and in nurses in Kuala Lumpur was 7.5% (n=80) (Ithin, 2012)

3.2. Result of bivariate analysis

Age, working period and working time are related to CTS. The results reinforce previous studies who conclude that the incidence of CTS is associated with age and working period (Kumar, 2016; Ricco, 2016; Atcheson, 1998). Age and working period are associated with the incidence of CTS due to the increasing age of bone degeneration and this condition will occur at the age of 30 where degeneration occurs in the form of tissue damage, alteration of tissue into scar tissue, fluid reduction that causes the stability of the bone and muscle to be reduced (Demiruyek, 2018). The longer a person works, the longer the emphasis on the median nerve is, which will aggravate carpal tunnel syndrome (Chiang, 2017). To reduce the severity of CTS due to old age and working period, it is advisable to reduce workload and working hours, provide adequate rest, and work properly (Lutmann, 2003).

We found that vibration exposure was associated with CTS. The result is in line with previous studies which conclude that exposure to vibration in the arm, excessive emphasis on wrist and repetitive movement are significantly associated with an increase in the incidence of CTS. Vibration exposure is associated with CTS because the vibration will increase muscle contraction. Static contraction that makes the blood circulation not smooth increases accumulation of lactic acid and eventually causes or aggravates muscle soreness (Barcenilla, 2012; Van Rijn, 2009). To reduce the adverse impact of vibration exposure, drivers are advised to take some control measures as suggested by Work Safe Alberta (Government of Alberta, 2010) such as: buying/using low vibration engine, reducing boat engine speed, performing routine maintenance, using vibration damping pads on steering boats, and using anti-vibration gloves.

Heat pressure is not related to CTS. The results do not support previous studies which conclude that the increase in heat temperature causes increased pressure on the median nerve and further reduces the pressure on the carpal and median nerve ligaments with a suggestion to apply cold compress (Laymon, 2015). Exposure to cold temperature or excessive heat can cause decreased agility, sensitivity, and muscle strength so that the worker movements become sluggish with a difficulty to move, accompanied with decreased muscle strength. Different environment temperature from body temperature on a high extent can make the body energy be used excessively to adapt to the environment. If there is not a sufficient energy supply, there will be a shortage of energy supply in the muscle that can cause muscle pain (Tarwaka, 2010). In this study, the work location of the driver was in an open space where no extreme heat exposure occurred due to the use of a boat protective roof. This is why CTS is not affected by heat exposure in this study.

We found that repetitive movement is related to CTS. The results are consistent with previous study by Newington (Newington, 2016) who concludes that repetitive movement is a significant factor that affects the incidence of CTS and Bridger (Bridger, 2009) who concludes that repetitive activity, rapid movement, wrong position/ posture, and carrying a heavy load can stimulate the pain receptor nerve. Pain occurs because the muscles receive pressure due to continuous workload without giving a chance to relax. To reduce the severity of CTS due to repetitive movement, it is advisable to avoid manual handling of heavy objects, reduce mass of objects or number of handlings per day, and reduce repetition frequency (Lutmann, 2003).

History of disease has been associated with CTS. In this study, 35.6% of respondents suffered from rheumatoid arthritis, 17.8% suffered from diabetes mellitus, and 46.6% suffered from gastritis, typhoid and injury. The results are consistent with previous studies which conclude that CTS can be caused or can be aggravated by some metabolic diseases (such as diabetes, amyloidosis, obesity, pseudo gout, hypothyroidism, mucopolysaccharidosis and various arthropathies) and other diseases such as hormonal diseases, vascular diseases and diseases related to allergic reactions (Atcheson, 1998; Bugajska, 2007). Based on these results, to prevent and improve the rheumatoid arthritis conditions experienced by drivers, we recommend that drivers do physical activity exercises. According to Cooney, et al. (Cooney, 2011), regular physical activity exercises can be improved with cardiorespiratory fitness and cardiovascular health, increased muscle mass, reduced adiposity (including attenuated trunk fat), improved strength, and physical functioning, all achieved without exacerbation of disease activity or joint

damage. For other health problems experienced by the drivers, we recommend them to do routine medical check-up and obey the doctor's advice. They can improve their health conditions through the implementation of a clean and healthy lifestyle.

3. 3 Result of multivariate analysis

History of disease, working time and vibration exposure are the three most dominant variables affecting CTS in traditional boat drivers in Kutai Kartanegara. The results are consistent with previous studies which conclude that neuropathic factors (such as diabetes, vitamin deficiency, exposure to toxins, alcoholism), extrinsic factors (such as a history of post-traumatic arthritis), and occupational factors (such as false posture for a long time, repetitive movement, vibration exposure) are the primary risk factor that are often associated with CTS (Ibrahim, 2012). The implications of these results are priorities in the management and prevention of CTS in the future. Health and safety stakeholders are advised to improve the health status of boat drivers, improve health safety knowledge and perception, and assist in improving working conditions.

4. CONCLUSION

The prevalence of Carpal Tunnel Syndrome in traditional boat drivers in Kutai Kartanegara was 82.2% (n=45). Age ($p=0,000$), working time ($p=0,000$), working period ($p=0.000$), repetitive movement ($p=0,000$), vibrational exposure ($p=0,000$), and history of disease ($p=0.019$) are associated with CTS incidence. Exposure to heat stress is not related to CTS ($p=0.649$). History of disease, working time and vibration exposure are the most dominant variables affecting CTS. It is recommended to increase primary prevention efforts by health workers, such as socialization of CTS disease, prevention and treatment, increased knowledge and perceptions about CTS, and safe boat driving, improvement of work environment, restrictions on working time in accordance with government regulations, regular muscle exercise, and further medical examination/health monitoring by health personnel.

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REFERENCES

- Asworth, N,L. Carpal Tunnel Syndrome. *BMJ Clinical Evidence*. 2014:1114.
- Atcheson SG, Ward JR, and Lowe W. Concurrent Medical Disease in Work-Related Carpal Tunnel Syndrome. *Arch Intern Med*. 1998;158(14):1506-1512
- Barcenilla, A, March, LM, Chen, JS, Sambrook,. PM. Carpal Tunnel Syndrome and Its Relationship to Occupation: A Meta-Analysis. *Journal of Rheumatology*. 2012;51:250-261.
- Bridger, R. S. Introduction to Ergonomics. Broken Sound Parkway NW: CRC Press; 2009.
- Bugajska, J, Jedryka-Góral, A, Sudół-Szopińska, I, Tomczykiewicz, K. Carpal Tunnel Syndrome in Occupational Medicine Practice. *Int. Journal of Occupational Safety and Ergonomics (JOSE)*. 2007;13(1):29-32.
- Chiang CL, Liao CY and Kuo HW. Postures of upper extremity correlated with carpal tunnel syndrome (CTS). *Int J Occup Med Environ Health*. 2017;30(2):281-290
- Cooney JK, Law RJ, Matschke V, et al. Benefits of exercise in rheumatoid arthritis. *J Aging Res*. 2011; Article ID 681640;(14p). DOI:10.4061/2011/681640
- Dale AM, Harris-Adamson C, Rempel D, Gerr F, Hegmann K, Silverstein B, Burt S, Gang A, Kapellusch J, Merlino L, Thiese MS, Eisen EA, Evanoff B. Prevalence and incidence of carpal tunnel syndrome in

- US working populations: pooled analysis of six prospective studies. *Scand J Work Environ Health*. 2013;39(5):495–505
- Demiruyek BE and Gundogdu AA. Prevalence of carpal tunnel syndrome and its correlation with pain amongst female hairdressers. *Int Journal Occup Med and Environ Health*. 2018;31(3):333-339
- Faucett J, Blanc PD, and Yelin W. The impact of carpal tunnel syndrome on work status: Implication of job characteristics for staying on the job. *J Occup Rehab*. 2000;10(1):55-69
- Foley, M, Silverstein, B. The Economic Burden of Carpal Tunnel Syndrome: Long-Term Earnings Of CTS Claimants In Washington State. *American Journal of Industrial Medicine*. 2007;50:155–172.
- Government of Alberta, Employment and Immigration. Best Practices-Vibration at the work site. Jan 2010. (cited 2018 April 25). Available from: https://work.alberta.ca/documents/WHS-PUB_gs007.pdf
- Ibrahim I, Khan WS, Goddard N, S. Carpal Tunnel Syndrome. *The Open Orthopaedics Journal*. 2012;6:69-76.
- Ithnin A, Kong D, and Venkataraman S. Occupational risk factors for carpal tunnel syndrome among nurses in medical. *Int J Public Health Reseachr*. 2012;2(2):137-143
- Jensen, JC. Development of Neck and Hand-wrist Symptoms in Relation to Duration of Computer Use at Work. *Scandinavian Journal of Work Environment and Health*. 2003;29:197-205.
- Kumar, S, Muralidhar, M. Analysis for Prevalence of Carpal Tunnel Syndrome in Shocker Manufacturing Workers. *Advances in Production Engineering & Management*. 2016;11:126–140.
- Kurniawan, B, Jayanti, S, Setyaningsih, Y. Faktor Risiko Kejadian Carpal Tunnel Syndrome (CTS) pada Wanita Pemetik Melati di Desa Karangcengis, Purbalingga (Risk Factors of Carpal Tunnel Syndrome (CTS) Occurrence in Female Melati Pickers in Karangcengis Village, Purbalingga). *Jurnal Promosi Kesehatan Indonesia*. 2008;3:31-37.
- Laymon, M, Petrofsky, J, McKivigan, J, Lee, H, Yim, J. Effect of Heat, Cold, and Pressure on The Transverse Carpal Ligament and Median Nerve: a Pilot Study. *Medical Science Monitor*. 2015;21:446-451
- Luttmann A, Jager MA, Griefahn B, et al. Preventing musculoskeletal disorders in the workplace. Geneva: WHO; 2003.
- Lewańska, M, Walusiak, J. Is Ulnar Nerve Entrapment at Wrist Frequent Among Patients with Carpal Tunnel Syndrome Occupationally Exposed To Monotype Wrist Movements? *Int Journal of Occupational Medicine and Environmental Health*. 2017;30(6):17-30.
- Luckhaupt, SE, Dahlhamer, JM, Ward, BW, Sweeney, MH, Sestito, JP. Prevalence and Work-Relatedness of Carpal Tunnel Syndrome in The Working Population United States 2010. *National Health Interview Survey*. *American Journal of Industrial Medicine*. 2013;56: 615–624.
- Maghsoudipour, M, Moghimi, S, Deghhaan, F, Rahimpanah, A. Association of Occupational and Non-occupational Risk Factors With The Prevalence of Work Related Carpal Tunnel Syndrome. *Journal of Occupational Rehabilitation*. 2008;18:152-156
- Massy-Westroop N, Grimmer K, Bain G. A systematic review of the clinical diagnostic test for carpal tunnel syndrome. *J Hand Surg*. 2000;25(1):120-127
- Newington, L, Harris, CE, Walker-Bone, K. Carpal Tunnel Syndrome and Work. *Best Pract. Res. Clin. Rheumatol*. 2016;29:440-453.

- Pangestuti, A.A, Widajati, N. Faktor Yang Berhubungan Dengan Keluhan Carpal Tunnel Syndrome Pada Pekerja Gerinda di PT DOK dan Perkapalan Surabaya (Factors Associated With Carpal Tunnel Syndrome Complaints In Gerinda Workers at PT DOK and Shipping Surabaya). *The Indonesian Journal of Occupational Safety and Health*. 2014;3(1):14–24.
- Ricco M, Cattani S and Signorelli C. Personal risk factors for carpal tunnel syndrome in female visual display unit workers. *Int J Occup Med Environ Health*. 2016;29(6):927–936.
- Saerang, D, Kembuan, MK. Insiden Carpal Tunnel Syndrome Berdasarkan Anamnesis Pada Karyawan Bank di Kota Bitung Sulawesi Utara (Carpal Tunnel Syndrome Incidence Based on Anamnesis At Bank Employees in Bitung City North Sulawesi). *Journal E Clinic (Ecl)*. 2015;3:1.
- Stapleton, MJ. Occupation and Carpal Tunnel Syndrome. *ANZ Journal of Surgery*. 2006;76: 494–496.
- Suma'mur, PK. *Higene Perusahaan dan Kesehatan Kerja (Occupational Health and Industrial Hygiene)*. Jakarta:PT Gunung Agung; 1999,.
- Tana, L, Halim, FS, Delima, Ryadina. W. Carpal Tunnel Syndrome pada Pekerja Garmen di Jakarta (Carpal Tunnel Syndrome on Garment Workers in Jakarta). *Buletin Penelitian Kesehatan*. 2004;32:73-82
- Tarwaka. *Ergonomi Industri, Dasar-Dasar Pengetahuan Ergonomi dan Aplikasi di Tempat Kerja (Fundamental of Ergonomic and application in the workplace)*. Surakarta: Harapan Press; 2010.
- US Bureau of Labor and Statistics, US Department of Labor, 2011. Nonfatal occupational injuries and illnesses requiring days away from work, 2010. USDL report number: 11-1612. Retrieved October 3, 2012, from: <http://www.bls.gov/news.release/osh2.nr0.htm>
- Van Rijn, RM, Huisstede, BM, Koes, BW, Burdorf, A. Associations Between Work Related Factors and The Carpal Tunnel Syndrome. A Systematic Review. *Scandinavian Journal of Work Environment and Health*. 2009;35:19-36.
- Winn, FJ, Krieg, EF. The Regression Model for Carpal Tunnel Syndrome. *Proc Society for Experimental Biology and Medicine*. 1989;192:161–165.

Attachment:

Table 1. Characteristics of Traditional Boat Drivers in KutaiKartanegara District of East Kalimantan (n=45)

Characteristic	Category	Frequency	%
Age (years)	< 30	7	15,6
	≥ 30	38	84,4
Education	Elementary school	10	22,2
	Junior high school	11	24,4
	Senior high school	24	53,3
Working period (years)	< 4	8	17,8
	≥ 4	37	22,2
Working time (hours/day)	< 8	4	8,9
	≥ 8	41	91,9

Table 2. Distribution of carpal tunnel syndrome (CTS) in Traditional Boat Drivers in KutaiKartanegardistrict of East Kalimantan

Variables	Category	Frequency	%
CTS	Yes	37	82,2
	No	8	17,8
Hand affected CTS	Right	11	24,4
	Left	13	28,9
	Right and Left	13	28,9
Type of CTS complaint	Pain	21	46,6
	Tingling	13	28,8
	A sense of shock	4	8,8
	Weak	5	11,1
	Difficulty of grasping	2	4,4
Location of CTS complaint	Thumb, forefinger, middlefinger and ringfinger	23	51,2
	Palm	7	15,5
	Another place	15	22,2
Time of CTS complaint	When working	10	22,2
	Evening	10	23,3
	Uncertain	25	55,5
History of disease	Yes	36	80
	No	9	20
Type of disease	Diabetes mellitus	8	17,8
	Rheumatoid arthritis	16	35,6
	Injury	8	17,8
	Gastritis	3	6,7
	Typhoid	1	2,2
Heat pressure	< 33,9 ^o C	22	48,9
	≥ 33,9 ^o C	23	51,1
Vibration	< 74,5 m ² /sec	19	42,2
	≥ 74,5 m ² /sec	26	57,8

Table 3. Association between CTS prevalence with age, vibration, heat stress, working time, working period and history of disease

Independent Variables	CTS				Total		P Value	
	No		Yes		n	%		
	N	%	n	%				
Age (years)	< 30	5	71,4	2	28,6	7	100	0,000
	≥ 31	3	7,9	35	92,1	38	100	
Vibration	< 74,5 (low)	8	42,1	11	57,9	15	100	0,000
	≥ 74,5 (high)	0	0	26	100	30	100	
Heat pressure	< 33,9 (low)	5	22,7	17	77,3	22	100	0,646
	≥ 33,9 (high)	3	13	20	87	23	100	
Working time	< 8 hours	7	77,8	2	22,2	9	100	0,000
	≥ 8 hours	1	2,8	35	97,2	36	100	
Working period	< 4 years	7	87,5	1	12,5	8	100	0,000
	≥ 4 years	1	2,7	36	97,3	37	100	
History of disease	No	4	44,4	5	55,6	9	100	0,019
	Yes	4	11,1	32	88,9	36	100	

BIOGRAPHIES OF AUTHORS

	<p>I am Iwan Muhammad Ramdan. I have completed my Doctoral degree with CGPA 3.87 (out of scale 4) and Master degree with CGPA 3.56 (out of scale 4) at GadjahMada University of Indonesia. I got government scholarship in Both Doctoral and Masters degree. I am a lecturer and researcher at Department of Occupational Health and Safety, Public Health Faculty Mulawarman University. My research interest in occupational health and safety both formal and informal sectors. I have already participating in international and national conference on public health which had been held in Asean and Australian region. I am active member of Indonesia Public Health Association, Indonesian Ergonomic Association and also Asian Pacific Academic Consortium for Public Health. I actively conduct research to improve the health conditions of the informal sector in East Kalimantan.</p>
	<p>I am Fauzi Ridwan, I have completed my bachelor degree with 3.59 CGPA (out of scale 4) at Public Health Faculty Mulawarman University. I am interested to learn more about health and safety because in this field there are still many challenges. I want to help the government in reducing the number of workplace accidents and occupational diseases. I am active in scientific meetings related to health and safety. I also aspire to go to college to pursue a master so it can explore the science of health and safety, and can be beneficial for the industry and labor in Indonesia.</p>