

Workers Survived from Commuting Road Crashes: Who Are They?

Nurrul Hafeezah Sahak¹, Kulanthayan K.C Mani¹, Titi Rahmawati Hamedon¹, Krishna Gopal Rampal² and Kathirkamanathan Vythialingam³

1. *Universiti Putra Malaysia, Department of Community Health, Faculty of Medicine and Health Sciences, Serdang, Malaysia*

2. *Cyberjaya University College of Medical Sciences, Cyberjaya, Malaysia*

3. *Perdana University, School of Occupational Therapy, Serdang, Malaysia*

Abstract: Commuting road crashes are road traffic crashes that involve workers while travelling in the course of work. The more worker travels, the higher the probability of the occurrence of commuting road crashes. The aim of this study was to determine baseline sociodemographic, employment and injury and characteristics of injured workers who survived from commuting road crash. Eligible 200 workers who were involved in commuting road crash were identified and invited to be part of this study. Sociodemographic, employment and injury-related questions were distributed to identified and consented injured workers. Majority (79.5%) of the respondents were aged 25 years old or older, male (86.0%), married or divorced (63.5%), and attained secondary and below education level at secondary or below (66.0%). Most of the injured workers consisted of blue-collar workers (69%), had fracture injury (93.0%), and had injury to their lower limbs (48.5%). A higher percentage (63.5%) of injured workers had returned to work compared to those who were still not working (36.5%) after involved in commuting road crash. Commuting road crashes are common to blue collar workers as they are more prone to use motorcycles to commute due to cheaper price compare to other type of transportation such as car.

Key words: Commuting road crash, road traffic crash, sociodemographic characteristics, blue collar workers.

1. Introduction

Workers depend on road transportation for easy access to the workplace and vice versa. However, with the increasing number of vehicles on the road, especially during peak hours when workers commute, the risk of being involved in a road traffic crash (RTC) is also increasing.

Commuting road crashes are part of RTC that involve workers. According to past literature on commuting road crashes from different countries of the world like Finland [1], Austria [2] and Saudi Arabia [3] it can be summarized that commuting road crashes are RTCs that cause injuries to workers due to the course of work while travelling in either direction

between work or a work-related training place and the:

- i) workers residence
- ii) place where workers usually take their meals
- iii) place where workers usually receive their remuneration.

Data from Malaysia Social Security Organization (SOCSSO) indicated that 89.3% of Malaysian commute to work using own vehicles. Only 8.7% commute using transportation provided by employer and 1.9% take public transport. Majority (68.8%) of workers who involved in commuting road crash were on morning shift and 52.1% of injured workers involved in crash during commuting to work.

Commuting road crashes cause economic losses to injured workers, their families as well as to the country. During long absenteeism from employment due to commuting road crashes, those injured workers do not receive full monthly income salary from their

Corresponding author: Nurrul Hafeezah Sahak, professor; research fields: transport system, fault detection and fuel cell system. E-mail: abdel.aitouche@hei.fr.

respective employers. Although the injured workers receive approximately 80% of their average daily income from the SOCSO temporary disablement benefit during their medical leave, the amount is not enough for their expenses in order to maintain their pre-injury lifestyle, especially for those who are the breadwinner of the family. Work-related disablement of household heads is proven to cause major economic hardship for families due to the loss of earnings [4, 5].

Economic losses may also arise from the cost of treatment and labour lost. In more serious cases, family members need to take time off work to care for the injured workers during the treatment or recovery period as injured workers struggle to take care of themselves at home [6] due to pain and the functional limitations for self-management. Disability due to commuting road crashes affect all ages but the most affected are those in the young and productive years of their life.

According to the World Health Organization (WHO), RTCs cost most countries 3% of their gross domestic product (GDP). In 2016, RTCs cost Malaysia an estimated RM 9.21 billion. Malaysian Institute of Road Safety Research (MIROS) estimates that death due to RTC cause the country an average of RM 1.2 million, RM120,000 for severe injury and RM 12,000 for light injury in medical cost, productivity loss and other pay-outs.

Commuting road crashes may also have implications such as a limitation in the social activities of the injured workers due to physical pain or low self-esteem. As a result, psychological consequences like depression, anxiety or stress may arise among these commuting road crash victims and their family members. This may lead to a reduction in the quality of life of the injured workers [7].

In different countries, the return to work (RTW) rates among injured workers differ, which might be due to the different definitions of RTW, different types of work-related injuries or the time of RTW rate being calculated (example 6- or 12-months

post-injury). In China, a retrospective cohort study on work-related injury reported that 92.9% of injured workers in the study on RTW had resumed work at the seven months follow-up [8]. Lower RTW rates, ranging between 65 and 72%, were found in French RTW-related studies [9]. Generally, according to a review article, RTW rates for 71 worldwide studies ranged between 29% and 100% with a median rate of 67% [10].

On top of this, the differences in the RTW rates are also due to the different types of rehabilitation received by injured workers. Researchers [4, 11, 12] reported and believed that effective rehabilitation is able to minimize the physical consequences of commuting road crashes so that injured workers are able to get RTW as soon as possible after being involved in a commuting road crash.

2. Materials and Method

2.1 Study design

This was a randomized controlled trial study with allocation concealment. This study was part from a bigger study on the effectiveness of self-management intervention among commuting crash survivors. Participants who consented to be in the study were originated from Social Security Organization (SOCSO) RTW Program.

SOCSO was appointed as the government statutory body to provide protection for workers who suffer from accidents arising from work including commuting road crashes. The coverage of protection for this kind of injury is provided under the Employment Injury Insurance Scheme, one of the benefits under this scheme is rehabilitation and its RTW Program is part of the rehabilitation. SOCSO has taken the initiative to provide multidisciplinary rehabilitation (physical and vocational rehabilitation) to the injured insured workers in order to enhance their productivity and efficiency after being involved in work-related accidents.

2.2 Participants

To be eligible for this study, potential participants were selected based on the inclusion criteria, i.e., vehicle driver, passenger, motorcyclist, cyclist or pedestrian, involved in a commuting crash, newly reported case (within the year 2014/2015), and there was no plan for RTW within the next month.

2.3 Exclusion criteria

A worker will not be chosen based on the exclusion criteria - had sick leave for longer than 52 weeks

2.4 Recruitment

The principal investigator assessed the eligibility of respondents who had agreed to participate in the SOCSO RTW programme. Participants were identified by the researcher with the referral from the SOCSO case managers. Case managers are the person-in-charge of each RTW case, right from the identification of eligible injured workers to participate in the RTW programme up to the six months' follow-up after they have returned to the labour market. The role of the case manager is to manage each case of employment injury, give full support to the RTW programme participant, and identify suitable rehabilitation services to facilitate them to return to work. The case manager is also responsible for mediating the link between all the parties involved in the RTW

programme (employee, employer, family member, and health professionals) to ensure the success of the RTW. Informed written consent was obtained from the study participants after the purpose and nature of the procedure had been fully explained to them.

2.5 Instrumentation

Participants were required to answer a set of questionnaires - sociodemographic, employment and injury-related questions.

2.6 Data analysis

The descriptive statistics were the mean (standard deviation) or number (percentage). All analyses were performed using SPSS software version 20.0.

3. Results

3.1 Response rate

A total of 209 injured workers were approached during the recruitment period to assess their eligibility for participating in the study. From that figure, nine persons were excluded because they did not meet the inclusion criteria (five persons) or declined to participate (four persons).

3.2 Injured workers' sociodemographic characteristics

Table 1 shows the distribution of the sociodemographic characteristics of the respondents. The overall mean

Table 1 Injured workers' sociodemographic characteristics.

Respondents characteristics	Frequency N (%)	Mean±SD
Age (year)		32.3±8.2
≤ 24	41 (20.5)	
≥ 25	159 (79.5)	
Gender		
Male	172 (86.0)	
Female	28 (14.0)	
Marital status		
Single	73 (36.5)	
Married/ divorced	127 (63.5)	
Highest education level		
Secondary education and below	132 (66.0)	
Tertiary education	68 (34.0)	

Table 2 Injured workers' employment and injury characteristics.

Respondents characteristics	Total N (%)	Mean \pm SD
Occupation category		
Blue-collar workers	138 (69.0)	
White-collar workers	62 (31.0)	
Monthly income (RM)		2232.8 \pm 1079.2
\leq 2312	138 (69.0)	
\geq 2313	62 (31.0)	
Nature of injury		
Fracture	186 (93.0)	
Tear	11 (5.5)	
Dislocation	3 (1.5)	
Location of injury		
Neck	1 (0.5)	
Trunk	4 (2.0)	
Upper limb	67 (33.5)	
Lower limb	97 (48.5)	
Multiple injuries	31 (15.5)	

Table 3 Work status rate.

Work status	Frequency
RTW	125 (63.5%)
Not RTW	72 (36.5%)

age of 200 participants was 32.3 years ($SD = \pm 8.2$). The majority (79.5%) of the respondents were aged 25 years old or older, male (86.0%), married or divorced (63.5%), and attained secondary and below education level at secondary or below (66.0%).

3.3 Injured workers' employment and injury characteristics

Table 2 shows the distribution of the employment and injury characteristics of the respondents. The majority (69.0%) of the respondents consisted of blue-collar workers, had fracture injury (93.0%), and had injury to their lower limbs (48.5%). The overall mean monthly income received by the respondents in this study was RM 2232.8 ($SD = \pm RM 1079.2$).

3.4 Return to Work (RTW) rate

The work status of the injured workers was categorised as either RTW or not RTW. A higher percentage (63.5%) of injured workers had returned to work compared to those who were still not working (36.5%) after involved in commuting road crash

4. Discussion

This study's findings recorded that the highest percentage of study participants involved in the commuting road crashes were aged 25 years old or older. This study's finding was similar to previous study [13] as both studies were conducted among workers who were involved in commuting road crashes in Malaysia for different time periods.

Males recorded the highest percentage of participants in this study compared to their counterparts and this finding was in agreement with the current RTC scenario in Malaysia, as commuting road crashes are also part of RTCs. Interestingly, past studies [14, 15] also agreed that more male workers than female workers were involved in work-related accidents.

This study's findings are similar to other study [16] in terms of being married and the likelihood of being involved in commuting road crashes. The education level in this study was classified into two categories, and the findings showed that most of the injured

workers had secondary or lower education level. Those with lower educational level have a higher risk of being involved in RTCs as they tend to disobey traffic safety rules, such as not wearing safety helmets in a proper way and speeding [17].

The pre-injury employment information of injured workers in this study was classified into blue-collar and white-collar jobs. The blue-collar jobs or more physically demanding job tasks were the most common type of pre-injury employment among the injured workers in both the intervention and the control group. For this study, most of the blue-collar workers worked as dispatch riders or postmen, which required them to travel as part of the nature of their job. All the injured workers in this study were using a motorcycle at the time of the crash. Thus, this group of workers had a higher risk of getting involved in commuting road crashes compared to workers who spend most of their working hours in the office.

According to the Malaysia Department of Statistics, the mean monthly income among Malaysian workers in 2015 was RM 2312. Therefore, this study indicated that the majority of the injured workers received a monthly income that was below the country's mean monthly income. Low socioeconomic status of an individual could increase their risk of being involved in an RTC as they are more prone to use motorcycles to commute to work [17]. This could be because motorcycles are a relatively cheap option for transportation and for dealing with traffic congestion. Therefore, this could be the reason why all the injured workers in this study were involved in commuting road crashes due to motorcycle (two-wheeler) which is a risky vehicle compare to car or public transport (four-wheel).

This current study had similar findings to other studies [17, 18] where motorcycle crashes caused the highest percentage of injury to lower limbs. The reason for this was due to the gravitational force and velocity of the motorcycle at the time of the commuting road crash [19].

Prolonged absenteeism as a result of commuting road crashes is a major problem as it has a domino effect that not only affects the injured worker who is off work, but also other related parties in terms of the economy, mental health, and HRQOL. Therefore, getting RTW as soon as possible is crucial to curb this problem before it gets worse, as according to the rule of thumb for RTW, the longer a person remains off work, the higher the risk of ongoing work disability [20] and the greater the chances of permanent disability [21] which may lower the probability of getting RTW [22,23].

5. Conclusions

Workers who work as blue-collar workers had low socioeconomic status, as their monthly income was lower than the country's mean monthly income. They opted for a cheaper mode of transportation, which is the motorcycle for commuting. Thus, this increased their risk of getting involved in commuting road crashes.

Acknowledgments

This research was supported via seed funding from the Social Security Organization (SOCSO), Malaysia.

References

- [1] Nenonen, N. (2013). Analysing factors related to slipping, stumbling, and falling accidents at work: Application of data mining methods to Finnish occupational accidents and diseases statistics database. *Applied Ergonomics*, 44 (2), 215–224. <http://doi.org/10.1016/j.apergo.2012.07.001>.
- [2] Halla, M., & Zweimüller, M. (2013). The effect of health on earnings: Quasi-experimental evidence from commuting accidents. *Labour Economics*, 24, 23–38. <http://doi.org/10.1016/j.labeco.2013.04.006>.
- [3] Elshinnawey, M. A., Fiala, L. E., Abbas, M. A., & Othman, N. (2008). Road traffic injuries in Saudi Arabia, and its impact on the working population. *The Journal of the Egyptian Public Health Association*, 83 (1-2), 1–14. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/18992200>.
- [4] Hyder, A. A. (2004). Road safety is no accident: a call for global action. *Bulletin of the World Health Organization*, 82(4), 240. Retrieved from

- <http://www.ncbi.nlm.nih.gov/pubmed/15259249>.
- [5] Geziary, H. A., El Sayed, H., Hussain, S. J., & Sakr, H. I. (2004). Road safety: the potholes of neglect. *East Mediterr Health J*, 10(3), 252–259. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=16212199.
- [6] Franze, C., Bjonstig, U., & Jansson, L. (2006). Injured in traffic: Experiences of care and rehabilitation. *Accident and Emergency Nursing*, 14, 104–110. <http://doi.org/10.1016/j.aen.2006.01.003>.
- [7] Baranyi, A., Leithgöb, O., Kreiner, B., Tanzer, K., Ehrlich, G., Hofer, H. P., & Rothenhäusler, H.-B. (2010). Relationship between posttraumatic stress disorder, quality of life, social support, and affective and dissociative status in severely injured accident victims 12 months after trauma. *Psychosomatics*, 51, 237–247. [http://doi.org/10.1016/S0033-3182\(10\)70691-5](http://doi.org/10.1016/S0033-3182(10)70691-5).
- [8] He, Y., Hu, J., Yu, I. T. S., Gu, W., & Liang, Y. (2010). Determinants of return to work after occupational injury. *Journal of Occupational Rehabilitation*, 20(3), 378–386. <http://doi.org/10.1007/s10926-010-9232-x>.
- [9] Poulain, C., Kernéis, S., Rozenberg, S., Fautrel, B., Bourgeois, P., & Foltz, V. (2010). Long-term return to work after a functional restoration program for chronic low-back pain patients: A prospective study. *European Spine Journal*, 19(7), 1153–1161. <http://doi.org/10.1007/s00586-010-1361-6>.
- [10] Athanasou, J. A. (2005). Return to work following whiplash and back injury: a review and evaluation. *Medico-Legal Journal*, 73(Pt 1), 29–33. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15881444.
- [11] Al-Dawood, K. M. (2000). Direct impact of non-fatal occupational injuries. *Saudi Medical Journal*, 21(10), 938–41. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11369957>.
- [12] Khorasani-Zavareh, D., Khankeh, H. R., Mohammadi, R., Laflamme, L., Bikmoradi, A., & Haglund, B. J. a. (2009). Post-crash management of road traffic injury victims in Iran. Stakeholders' views on current barriers and potential facilitators. *BMC Emergency Medicine*, 9, 8. <http://doi.org/10.1186/1471-227X-9-8>.
- [13] Oxley, J., Yuen, J., Ravi, M. D., Hoareau, E., Mohammed, A., & Bakar, H. (2013). Commuter motorcycle crashes in Malaysia: An understanding of contributing factors. *Annals of Advances in Automotive Medicine*, 57, 45–54.
- [14] Charbotel, B., Martin, J. L., & Chiron, M. (2010). Work-related versus non-work-related road accidents, developments in the last decade in France. *Accident Analysis and Prevention*, 42(2), 604–611. <http://doi.org/10.1016/j.aap.2009.10.006>.
- [15] Christie, N., Beckett, K., Earthy, S., Kellezi, B., Sleney, J., Barnes, J., ... Kendrick, D. (2016). Seeking support after hospitalisation for injury: A nested qualitative study of the role of primary care. *British Journal of General Practice*, 66(642), e24–e31. <http://doi.org/10.3399/bjgp15X688141>.
- [16] Prang, K.-H., Berecki-Gisolf, J., & Newnam, S. (2015). Recovery from musculoskeletal injury: the role of social support following a transport accident. *Health and Quality of Life Outcomes*, 13, 97. <http://doi.org/10.1186/s12955-015-0291-8>.
- [17] Alicioglu, B., Yalniz, E., Eskin, D., & Yilmaz, B. (2008). Injuries associated with motorcycle accidents. *Acta Orthopaedica et Traumatologica Turcica*, 42(2), 106–111. <http://doi.org/10.3944/AOTT.2008.42.2.106>.
- [18] Bayan, P., Bhawalkar, J. S., Jadhav, S. L., & Banerjee, A. (2013). Profile of non-fatal injuries due to road traffic accidents from a industrial town in India. *International Journal of Critical Illness and Injury Science*, 3(1), 8–11. <http://doi.org/10.4103/2229-5151.109409>.
- [19] Singh, R., Singh, H. K., Gupta, S. C., & Kumar, Y. (2014). Pattern, severity and circumstances of injuries sustained in road traffic accidents: a tertiary care hospital-based study. *Indian Journal of Community Medicine*, 39(1), 30–4. <http://doi.org/10.4103/0970-0218.126353>.
- [20] Clay, F. J., Newstead, S. V., Watson, W. L., & McClure, R. J. (2010). Determinants of return to work following non-life-threatening acute orthopaedic trauma: A prospective cohort study. *Journal of Rehabilitation Medicine*, 42(2), 162–169. <http://doi.org/10.2340/16501977-0495>.
- [21] Lambeek, L. C., van Mechelen, W., Knol, D. L., Loisel, P., & Anema, J. R. (2010). Randomised controlled trial of integrated care to reduce disability from chronic low back pain in working and private life. *BMJ*, 340, c1035–c1035. <http://doi.org/10.1136/bmj.c1035>.
- [22] Hepp, U., Moergeli, H., Buchi, S., Bruchhaus-Steinert, H., Sensky, T., & Schnyder, U. (2011). The long-term prediction of return to work following serious accidental injuries: a follow up study. *BMC Psychiatry*, 11(1), 53. <http://doi.org/10.1186/1471-244X-11-53>.
- [23] Reme, S. E., Hagen, E. M., & Eriksen, H. R. (2009). Expectations, perceptions, and physiotherapy predict prolonged sick leave in subacute low back pain. *BMC Musculoskeletal Disorders*, 10, 139. <http://doi.org/10.1186/1471-2474-10-139>.