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Original Research

Prevalence of Post-Concussion and Post-Traumatic Stress Symptoms One Month after Mild TBI: A Descriptive Observational Study

Mulyadi Mulyadi [1*], Lenny Gannika[2], Rizki Rivaldo Najoan[3], Rahmat Hidayat Djalil[4], Santo Imanuel Tonapa[5]

1School of Nursing, Faculty of Medicine, Sam Ratulangi University, Manado, Indonesia.

2School of Nursing, Faculty of Medicine, Sam Ratulangi University, Manado, Indonesia.

3Department of Ear, Nose, and Throat (ENT), Faculty of Medicine, Sam Ratulangi University, Manado

4School of Nursing, Faculty of Health Sciences, Muhammadiyah University of Manado (UMMA), Indonesia

5Faculty of Health Sciences, Galuh University, Ciamis, West Java, Indonesia

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A B S T R A C T

Mild traumatic brain injury (mTBI) frequently leads to post-concussion symptoms (PCS) and post-traumatic stress disorder (PTSD), both of which may hinder recovery if not identified early; however, research on these conditions remains limited. This study aimed to determine the prevalence of PCS and PTSD one month after mTBI and to describe demographic and clinical characteristics, including age, gender, education, employment, injury mechanism, and comorbidities. This study employed a descriptive observational design using descriptive statistics. A purposive sampling technique recruited 65 patients based on predefined inclusion and exclusion criteria. PCS was measured using the Rivermead Post-Concussion Symptoms Questionnaire, and PTSD was assessed using the PTSD Checklist for DSM-5. Data were collected from August to November 2024 at Prof. Dr. R.D. Kandou Hospital, Manado, North Sulawesi. Descriptive statistics were applied to analyze PCS, PTSD, and demographic characteristics. The results reported that of 65 patients with mild traumatic brain injury (mean age 30.69 years, 67.7% male), most had >9 years of education (60.0%) and were unemployed (61.5%). Motor vehicle crashes were the leading cause of injury (46.2%). One month post-injury, 33.8% experienced post-concussion symptoms, and 21.5% reported symptoms of post-traumatic stress disorder. Conclusion: PCS and PTSD are common in the early phase after mTBI, particularly among young men and those injured in motor vehicle crashes. These findings highlight the importance of early symptom recognition, patient education, and psychological support, as well as strengthened road safety measures to reduce the impact of mTBI.

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* Corresponding author.
E-mail addresses: mulyadi@unsrat.ac.id

INTRODUCTION

Mild traumatic brain injury, widely recognized as a concussion, is the most frequently occurring brain injury, accounting for 70–90% of traumatic brain injuries worldwide (Dewan et al., 2019). Although many patients recover within days to weeks, a substantial proportion report symptoms that persist beyond the acute phase, commonly termed post-concussion symptoms. These symptoms include headache, dizziness, sleep disturbance, fatigue, poor concentration, and irritability (McInnes et al., 2017). Evidence indicates that 20–40% of individuals report persistent symptoms at one month post-injury (Thomas et al., 2017; Voormolen, Haagsma, et al., 2019). Within the Indonesian context, the burden of mild head injury remains substantial, with the National Basic Health Survey reporting a prevalence of 11.9%, predominantly resulting from motorcycle-related traffic accidents (Ministry of Health, 2018).

Psychological sequelae may also emerge after mTBI. Post-traumatic stress disorder has been observed in a notable subset of patients following injuries that are distressing or perceived as life-threatening. Early PTSD symptoms, such as hyperarousal, intrusive thoughts, and avoidance, have been reported in 10–25% of patients at one month post-injury (Stein et al., 2019). The co-occurrence of PCS and PTSD is clinically important because the syndromes share overlapping features and may contribute to prolonged recovery and increased healthcare needs(van der Vlegel, Polinder, Mikolic, et al., 2021).

Participant characteristics are associated with symptom persistence. Young adults, particularly males, are more likely to sustain mTBI; however, females frequently report more severe and persistent PCS. Lower educational attainment, pre-injury psychiatric history, and substance use have also been linked to delayed recovery (Hiploylee et al., 2017; Iverson et al., 2017). These factors underscore the value of describing demographic and clinical profiles alongside symptom outcomes.

Despite growing literature on post-injury trajectories, evidence at the one-month time point remains inconsistent with respect to concurrent assessment of PCS and PTSD. Previous studies have varied in their tools and definitions, contributing to inconsistent prevalence estimates. In Indonesia, evidence at one month post-injury remains limited, underscoring the need for descriptive prevalence data. This gap is important because the one-month mark is a clinically meaningful checkpoint when persistent symptoms begin to influence work, family roles, and service use, and when timely intervention may prevent longer-term disability(Patricios et al., 2023; van der Vlegel, Polinder, Toet, et al., 2021).

This study applies a brief conceptual framework in which key demographic and clinical variables are used to contextualize early post-injury outcomes and strengthen the interpretation of one-month PCS and PTSD prevalence. Guided by this framework, the study aims to determine the one-month prevalence of PCS and PTSD following mTBI and to describe the demographic and clinical characteristics of individuals experiencing these conditions.

METHOD

The study employed a descriptive observational design using purposive sampling to include patients who met specific clinical criteria relevant to the study objectives. Data were collected from participants one month after the injury and were obtained consecutively from eligible patients attending the Surgical Clinic and Neurosurgery Clinic at Prof. Dr. R.D. Kandou Hospital, Manado, North Sulawesi, during August-November 2024. Inclusion criteria were adults (≥18 years) diagnosed with mTBI and able to communicate in Indonesian, while patients with unrelated major medical conditions or hearing impairment were excluded. All participants had previously received standard care in the Emergency Unit or inpatient unit, in accordance with hospital protocols. In total, 65 individuals who met the mTBI criteria were enrolled in the study.

The instrument used in this study included: 1) Demographic and clinical characteristics questionnaire, which collected data on age, gender, education level, employment status, mechanism of injury, and comorbidities. 2) The Rivermead Post-Concussions Symptoms Questionnaire (RPQ). The RPQ was applied to evaluate both the presence and intensity of post-concussion symptoms at one month post-injury. The tool encompasses 16 frequently reported symptoms, such as headache, dizziness, nausea or vomiting, sensitivity to noise, sleep problems, fatigue, irritability, low mood or tearfulness, frustration or impatience, forgetfulness, reduced concentration, slowed thinking, blurred or double vision, light sensitivity, and restlessness. The RPQ total score is the sum of all 16 items, excluding ratings of 1 (King et al., 1995). Scores range from 0 to 64, with higher scores indicating more severe symptomatology. In this study, the classification was based on previous research, in which patients with mTBI were considered to have post-concussion symptoms if they reported three or more symptoms with a score of 2 (mild) or higher (Voormolen, Polinder, et al., 2019). The Indonesian version of the RPQ has demonstrated good reliability, with a Cronbach's alpha of 0.90 (Fikriyanti et al., 2014). 3*)The Post-Traumatic Stress Disorder Checklist (civilian version) (PCL-5).* The PTSD Checklist for DSM-5 (PCL-5) is a widely used instrument for assessing post-traumatic stress disorder symptoms. It consists of 20 items corresponding to the 20 PTSD criteria outlined in the DSM-5. Each item is rated on a five-point Likert scale ranging from 0 ("not at all") to 4 ("extremely"). A cutoff score of 33 or higher is typically used to indicate probable PTSD (Stein et al., 2019; van der Vlegel et al., 2021). Among individuals with mTBI, the PCL-5 demonstrated excellent reliability, with an internal consistency (Cronbach's alpha) of 0.91 (Mulyadi et al., 2023).

Ethical approval for this study was granted by the Research Ethics Committee of RSUP Prof. Dr. R. D. Kandou Manado (No: DP.04.03. D.XV/356/2024). The rights of all participants were respected, data confidentiality was ensured, and written informed

consent was obtained prior to enrollment. Data were analyzed using IBM SPSS Statistics version 24. Descriptive statistics were utilized to address the study objectives. Prior to analysis, a data-cleaning procedure was conducted to exclude incomplete responses; consequently, no missing data were present in the final analytic dataset. The prevalence of PCS and PTSD one month after mTBI was reported as frequencies and percentages. Demographic and clinical characteristics were summarized using frequencies and percentages for categorical variables (gender, education, employment status, comorbidity, and mechanism of injury) and means with standard deviations for continuous variables (age).

RESULT

This study included 65 patients with mTBI who were discharged from the hospital and attended follow-up visits at the Surgical or Neurosurgery Clinics within one month.

Table 1. Descriptive statistics of participants (n=65)

	Mean ± *SD*	Frequency (%)	Range
Demographic characteristics			
Age	30.69 ± 15.11		18-68
Gender			
Male		44 (67.7%)	
Female		21 (32.3%)	
Education			
≤ 9 Years		26 (40.00%)	
> 9 Years		39 (60.00%)	
Employment status			
Not employed		40 (61.50%)	
Employed		25 (38.50%)	
Mechanism of Injury			
Motor vehicle crashes (MVCs)		30 (46.20%)	
Fall		9 (13.80%)	
Sport injury		14 (21.50%)	
Occupational accident		12 (18.50%)	
Comorbidity			
Yes		7 (10.80%)	
No		58 (89.20%)	

Note: *SD,* Standard deviation.

Table 1 presents the participants' characteristics. The mean age was 30.69 years (SD = 15.11), ranging from 18 to 68 years, and approximately two-thirds were male (67.7%). The majority had more than nine years of education (60.0%), and 61.5% were unemployed at the time of assessment. Motor vehicle crashes were the most common mechanism of injury (46.2%), followed by sports-related injuries (21.5%), occupational accidents (18.5%), and falls (13.8%). Overall, the comorbidity burden was low, with only 10.8% reporting any comorbid conditions one month post-injury.

Table 2. Prevalence of PCS and PTSD symptoms in mTBI (n=65)

mTBI	Frequency (%)	95 % CI
Post-Concussion Symptoms		
mTBI with PCS	22 (33.80%)	22.3 – 45.3
mTBI without PCS	43 (66.20%)	54.7 – 77.7
Total mTBI	65 (100%)	
Post-Traumatic Stress Disorder		
mTBI with PTSD symptoms	14 (21.50)	11.5 – 31.5
mTBI without PTSD symptoms	51 (78.50)	68.5 – 88.5
Total mTBI	65 (100%)	

Table 2 presents the prevalence of persistent PCS and PTSD among individuals with mild traumatic brain injury. Of the 65 patients, 22 (33.8%; 95% CI: 22.3–45.3) experienced PCS, while 43 (66.2%; 95% CI: 54.7–77.7) did not. PTSD symptoms were reported by 14 patients (21.5%; 95% CI: 11.5–31.5), with the remaining 51 patients (78.5%; 95% CI: 68.5–88.5) not reporting PTSD symptoms. Although most patients did not report ongoing symptoms, a notable minority continued to experience physical, cognitive, or psychological effects. PCS was more prevalent than PTSD, illustrating a differential pattern of symptom persistence within the cohort and highlighting variability in recovery trajectories following mTBI.

DISCUSSION

This study examined the one-month prevalence of PCS and PTSD following mTBI, and described associated demographic and clinical characteristics. At one month post-injury, 33.8% of participants reported PCS and 21.5% screened positive for PTSD symptoms. These findings underscore the dual burden of physical and psychological sequelae in the early recovery phase, a critical period when symptoms begin to affect daily functioning, role resumption, and care needs.

The prevalence of PCS in this study was 33.8%, consistent with earlier findings indicating that 35.4% of individuals with mTBI developed PCS symptoms (Suwaryo et al., 2024). Fikriyanti et al. identified dizziness, headache, fatigue, forgetfulness, and slowed thinking as the most frequent complaints in Indonesian patients (Fikriyanti et al., 2014). In a prospective study from the Netherlands, Abdulle and van der Naalt similarly noted that dizziness, fatigue, and headache were the most prevalent symptoms within the first month after injury, with many patients reporting difficulties in concentration and daily task performance (Eman Abdulle & van der Naalt, 2020). Other international studies have reported comparable prevalence of PCS within the first three months, typically ranging between 30% and 40% (McIntosh et al., 2025; van der Naalt et al., 2017). Collectively, these results emphasize that PCS is not only common but also heterogeneous, with symptom clusters varying between populations. This reinforces the heterogeneous nature of PCS and the need for early recognition and patient education regarding

symptom management.

PTSD symptoms were observed in 21.5% of participants, consistent with civilian mTBI studies reporting prevalence between 15% and 30% (Stein et al., 2019; Van Praag et al., 2019). PTSD often co-occurs with PCS and is associated with prolonged somatic complaints, reduced functional outcomes, and slower return to work (Polinder et al., 2018). Routine psychological screening and early intervention using validated tools such as the PCL-5 are recommended to improve recovery trajectories.

The demographic and injury characteristics observed in our study are also consistent with global TBI epidemiology. The sample was predominantly young (mean age 30.69 years) and male (67.7%), with motor vehicle crashes representing the leading mechanism of injury (46.2%). This aligns with global data showing that road traffic injuries disproportionately affect young males and remain the leading cause of death among individuals aged 5-29 years (World Health Organization, 2023). This trend aligns with the male predominance and relatively young mean age found in our sample, similar to studies reporting male proportions of 60-80% and motor vehicle crashes as the leading cause of TBI, particularly in low- and middle-income countries undergoing rapid motorization (Gu et al., 2025). Although most participants were young men, the study did not analyze associations between age, sex, and PCS. Therefore, these descriptive characteristics should be interpreted cautiously.

A high proportion of participants were unemployed (61.5%), partly due to the large number of students, reflecting the link between TBI and socioeconomic vulnerability (Cuthbert et al., 2015; van der Vlegel, Polinder, Toet, et al., 2021). Although assessed only at one month post-injury, these findings highlight the importance of early vocational screening and referral. Overall, the combination of physical symptoms, psychological distress, and socioeconomic challenges underscores the need for holistic, patient-centered care. Early identification of PCS and PTSD, along with supportive interventions, can help patients recover more effectively and improve long-term outcomes.

This study has several limitations. The sample was relatively small and drawn from a single site. In addition to clinic-based participants, some data were obtained through direct follow-up of patients from the Emergency Department, which may have introduced differences in sample characteristics. Data were collected only at one month post-injury, so the long-term course of symptoms could not be assessed. Symptom reporting was also based on self-report, which may be influenced by recall bias. To minimize these issues, strict inclusion and exclusion criteria were applied, standardized instruments were used to enhance comparability, and validated questionnaires with clear instructions were provided to reduce recall bias. Future research should follow patients for longer periods and in more varied settings to better understand how PCS and PTSD change over time. Studies are also needed to test supportive approaches, such as nurse-led education, psychological care, and vocational guidance, that can help patients recover not only physically but also emotionally, enabling a confident return to daily life and social roles.

CONCLUSION

This study fulfilled its objective by describing the prevalence of PCS and PTSD within one month following mTBI, showing that both conditions were relatively common in the early recovery phase. The demographic and clinical characteristics align with international evidence, with young men and motor vehicle crashes representing the predominant population and injury mechanism, while also reflecting local challenges such as high unemployment.

As a descriptive study, these findings highlight the need for routine symptom screening and patient education during early follow-up. Future analytic studies are warranted to examine factors associated with PCS and PTSD.

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REFERENCES

Cuthbert, J. P., Harrison-Felix, C., Corrigan, J. D., Bell, J. M., Haarbauer-Krupa, J. K., & Miller, A. C. (2015). Unemployment in the United States after traumatic brain injury for working-age individuals: prevalence and associated factors 2 years postinjury. *J Head Trauma Rehabil*, *30*(3), 160-174. https://doi.org/10.1097/htr.0000000000000090

Dewan, M. C., Rattani, A., Gupta, S., Baticulon, R. E., Hung, Y. C., Punchak, M., Agrawal, A., Adeleye, A. O., Shrime, M. G., Rubiano, A. M., Rosenfeld, J. V., & Park, K. B. (2019). Estimating the global incidence of traumatic brain injury. *Journal of Neurosurgery*, *130*(4), 1080-1097. https://doi.org/10.3171/2017.10.Jns17352

Eman Abdulle, A., & van der Naalt, J. (2020). The role of mood, post-traumatic stress, post-concussive symptoms and coping on outcome after MTBI in elderly patients. *Int Rev Psychiatry*, *32*(1), 3-11. https://doi.org/10.1080/09540261.2019.1664421

Fikriyanti, Kitrungrote, L., & Songwathana, P. (2014). The Post Concussion Symptom Experience and Quality of Life in Indonesian Persons With Mild Traumatic Brain Injury. *Songklanagarind Journal of Nursing, Vol. 34 No.2*

Gu, D., Ou, S., & Liu, G. (2025). Global burden of road injuries and their attributable risk factors from 1990 to 2021: A systematic analysis for the global burden of disease study

2021. *Prev Med Rep*, *53*, 103051. https://doi.org/10.1016/j.pmedr.2025.103051

Hiploylee, C., Dufort, P. A., Davis, H. S., Wennberg, R. A., Tartaglia, M. C., Mikulis, D., Hazrati, L. N., & Tator, C. H. (2017). Longitudinal Study of Postconcussion Syndrome: Not Everyone Recovers. *Journal of Neurotrauma*, *34*(8), 1511-1523. https://doi.org/10.1089/neu.2016.4677

Iverson, G. L., Gardner, A. J., Terry, D. P., Ponsford, J. L., Sills, A. K., Broshek, D. K., & Solomon, G. S. (2017). Predictors of clinical recovery from concussion: a systematic review. *Br J Sports Med*, *51*(12), 941-948. https://doi.org/10.1136/bjsports-2017-097729

King, N. S., Crawford, S., Wenden, F. J., Moss, N. E. G., & Wade, D. T. (1995). The Rivermead Post Concussion Symptoms Questionnaire: a measure of symptoms commonly experienced after head injury and its reliability. *Journal of Neurology 242 : 587-592*.

McInnes, K., Friesen, C. L., MacKenzie, D. E., Westwood, D. A., & Boe, S. G. (2017). Mild Traumatic Brain Injury (mTBI) and chronic cognitive impairment: A scoping review. *PLoS One*, *12*(4), e0174847. https://doi.org/10.1371/journal.pone.0174847

McIntosh, S. J., Vergeer, M. H., Galarneau, J.-M., Eliason, P. H., & Debert, C. T. (2025). Factors Associated With Persisting Symptoms After Concussion in Adults With Mild TBI: A Systematic Review and Meta-Analysis. *JAMA Network Open*, *8*(6), e2516619-e2516619. https://doi.org/10.1001/jamanetworkopen.2025.16619

Ministry of Health. (2018). *Indonesia Basic Health Survey (Riskesdas) 2018*. Jakarta: Badan Litbangkes Retrieved from https://www.depkes.go.id/resources/download/info-terkini/materi_rakorpop_2018/Hasil%20Riskesdas%202018.pdf

Mulyadi, M., Harianto, S., Tonapa, S. I., & Lee, B. O. (2023). Early Quality-of-Life Changes in Mild Traumatic Brain Injury: A Prospective Study. *Journal of Trauma Nursing*, *30*(2), 75-82. https://doi.org/10.1097/JTN.0000000000000706

Patricios, J. S., Schneider, K. J., Dvorak, J., Ahmed, O. H., Blauwet, C., Cantu, R. C., Davis, G. A., Echemendia, R. J., Makdissi, M., McNamee, M., Broglio, S., Emery, C. A., Feddermann-Demont, N., Fuller, G. W., Giza, C. C., Guskiewicz, K. M., Hainline, B., Iverson, G. L., Kutcher, J. S.,…Meeuwisse, W. (2023). Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport-Amsterdam, October 2022. *Br J Sports Med*, *57*(11), 695-711. https://doi.org/10.1136/bjsports-2023-106898

Polinder, S., Cnossen, M. C., Real, R. G. L., Covic, A., Gorbunova, A., Voormolen, D. C., Master, C. L., Haagsma, J. A., Diaz-Arrastia, R., & von Steinbuechel, N. (2018). A Multidimensional Approach to Post-concussion Symptoms in Mild Traumatic Brain Injury. *Front Neurol*, *9*, 1113. https://doi.org/10.3389/fneur.2018.01113

Stein, M. B., Jain, S., Giacino, J. T., Levin, H., Dikmen, S., Nelson, L. D., Vassar, M. J., Okonkwo, D. O., Diaz-Arrastia, R., Robertson, C. S., Mukherjee, P., McCrea, M., Mac Donald, C. L., Yue, J. K., Yuh, E., Sun, X., Campbell-Sills, L., Temkin, N., Manley, G. T.,…Zafonte, R. (2019). Risk of Posttraumatic Stress Disorder and Major Depression in Civilian Patients After Mild Traumatic Brain Injury: A TRACK-TBI Study. *JAMA Psychiatry*, *76*(3), 249-258. https://doi.org/10.1001/jamapsychiatry.2018.4288

Suwaryo, P. A. W., Kadir, F., Omar, A., & Singh, S. K. D. (2024). Prevalence of Persistent Post-Concussion Syndrome in Adults After Mild Traumatic Brain Injury. *Nurse Media Journal of Nursing*, *14*(2). https://doi.org/10.14710/nmjn.v14i2.56529

Thomas, M., Skilbeck, C., Cannan, P., & Slatyer, M. (2017). The Structure of the Rivermead Post-Concussion Symptoms Questionnaire in Australian Adults with Traumatic Brain Injury. *Brain Impairment*, *19*(2), 166-182. https://doi.org/10.1017/BrImp.2017.26

van der Naalt, J., Timmerman, M. E., de Koning, M. E., van der Horn, H. J., Scheenen, M. E., Jacobs, B., Hageman, G., Yilmaz, T., Roks, G., & Spikman, J. M. (2017). Early predictors of outcome after mild traumatic brain injury (UPFRONT): an observational cohort study. *The Lancet Neurology*, *16*(7), 532-540. https://doi.org/10.1016/s1474-4422(17)30117-5

van der Vlegel, M., Polinder, S., Mikolic, A., Kaplan, R., von Steinbuechel, N., Plass, A. M., Zeldovich, M., van Praag, D., Bockhop, F., Cunitz, K., Mueller, I., Haagsma, J. A., The Center-Tbi, P., & Investigators. (2021). The Association of Post-Concussion and Post-Traumatic Stress Disorder Symptoms with Health-Related Quality of Life, Health Care Use and Return-to-Work after Mild Traumatic Brain Injury. *J Clin Med*, *10*(11). https://doi.org/10.3390/jcm10112473

van der Vlegel, M., Polinder, S., Toet, H., Panneman, M. J. M., & Haagsma, J. A. (2021). Prevalence of Post-Concussion-Like Symptoms in the General Injury Population and the Association with Health-Related Quality of Life, Health Care Use, and Return to Work. *J Clin Med*, *10*(4). https://doi.org/10.3390/jcm10040806

Van Praag, D. L. G., Cnossen, M. C., Polinder, S., Wilson, L., & Maas, A. I. R. (2019). Post-Traumatic Stress Disorder after Civilian Traumatic Brain Injury: A Systematic Review and Meta-Analysis of Prevalence Rates. *J Neurotrauma*, *36*(23), 3220-3232. https://doi.org/10.1089/neu.2018.5759

Voormolen, D. C., Haagsma, J. A., Polinder, S., Maas, A. I. R., Steyerberg, E. W., Vuleković, P., Sewalt, C. A., Gravesteijn, B. Y., Covic, A., Andelic, N., Plass, A. M., & von Steinbuechel, N. (2019). Post-Concussion Symptoms in Complicated vs. Uncomplicated Mild Traumatic Brain Injury Patients at Three and Six Months Post-Injury: Results from the CENTER-TBI Study. *J Clin Med*, *8*(11). https://doi.org/10.3390/jcm8111921

Voormolen, D. C., Polinder, S., von Steinbuechel, N., Vos, P. E., Cnossen, M. C., & Haagsma, J. A. (2019). The association between post-concussion symptoms and health-related quality of life in patients with mild traumatic brain injury. *Injury*, *50*(5), 1068-1074. https://doi.org/10.1016/j.injury.2018.12.002

World Health Organization. (2023). *Road traffic injuries*. https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries