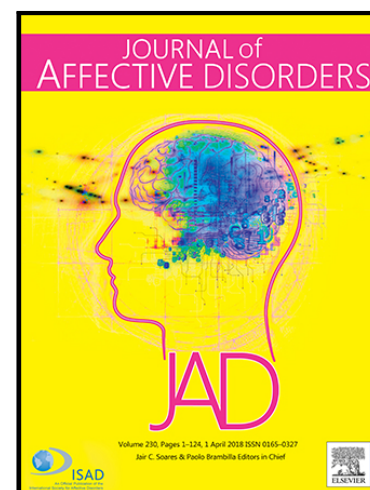


## Accepted Manuscript

Changing patterns in the prevalence of Posttraumatic Stress Disorder, Major Depressive Episode and Generalized Anxiety Disorder over 24 months following a Road Traffic Crash: Results from the UQ SuPPORT Study

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### Highlights

- Prospective study of Posttraumatic Stress Disorder, Major Depressive Episode and Generalized Anxiety Disorder over 24 months in insurance claimants after a motor vehicle crash.
- Prevalence of at least one psychiatric disorder over the 24 months ranges from 48.2 to 52.5%
- Comorbidity is common at between 20.8% and 27.1% over the 24 months.
- There is substantial variability in the diagnoses with over 42.3% having unstable diagnostic patterns over the 24 months.
- Those with a diagnosis of PTSD were more likely to continue to meet a psychiatric diagnosis at 24 months.

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**Changing patterns in the prevalence of Posttraumatic Stress Disorder, Major Depressive Episode and Generalized Anxiety Disorder over 24 months following a Road Traffic Crash: Results from the UQ SuPPORT Study.**

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Short title: Psychological disorders following road traffic crash

Keywords: Assessment/Diagnosis; Depression; GAD/generalized anxiety disorder; PTSD/Posttraumatic Stress Disorder; Life Events/Stress

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## ABSTRACT

**Objective:** To examine the prevalence and changing patterns of PTSD, Major Depressive Episode (MDE), and Generalized Anxiety Disorder (GAD) in adult claimants who sustained a non-catastrophic injury in a road traffic crash (RTC) in Queensland, Australia. **Method:** Participants ( $N = 284$ ) were assessed at approximately 6, 12, and 24 months post-RTC using the Composite International Diagnostic Interview (CIDI) modules for PTSD, and CIDI-short form for MDE, and GAD. **Results:** The prevalence of at least one of these disorders was 48.2%, 52.5%, and 49.3%, at 6, 12, and 24 months, respectively. Comorbidity was common (20.8% at 6 months, 27.1% at 12 months, and 21.1% at 24 months) and only 33.1% of participants never met PTSD, GAD, or MDE criteria. A substantial proportion of participants (42.3%) had an unstable diagnostic pattern over time. Participants with multiple diagnoses at 6 months were more likely to continue to meet diagnostic criteria for any disorder at 12 and 24 months than participants with a single diagnosis. Participants with PTSD (with or without MDE/GAD) were more likely to meet criteria for any disorder at 24 months than participants with another diagnosis. Preinjury psychiatric history increased the likelihood of any disorder at 24 months post-injury, but did not significantly increase the likelihood of PTSD.

**Conclusions:** People injured in a RTC are at risk of having complex psychological presentations over time. Interventions to prevent mental disorders, especially PTSD, in the early post-injury period are needed to prevent chronic psychological injury, including consideration of comorbidity and dynamic course.

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## INTRODUCTION

The worldwide social and economic impact of road traffic crashes (RTCs) is substantial. The World Health Organization estimates that 20-50 million non-fatal injuries occur annually and describes the situation as a “global epidemic” [1]. These non-fatal injuries are associated with significant disability [2]. Although the ongoing physical disability associated with RTCs is well described, it is increasingly recognized that psychological morbidity following RTC-related injury also has substantial economic, social, and personal cost [3, 4].

Individuals injured in RTCs may experience long-lasting mental health consequences that affect their psychological functioning, post-injury recovery and long-term health-related quality of life [5, 6]. Involvement in RTCs has been associated with the development of certain psychological disorders [5, 7, 8], including post-traumatic stress disorder (PTSD). In many instances involvement in RTC is also associated with a compensation process that has been found to adversely impact on the psychological health of the claimant [9], including PTSD severity [10]. PTSD is one of the most common psychiatric disorders that develops following RTC-related injury [11, 12] and has been shown to interfere with recovery [13-15]. Understanding the influence of PTSD on the development of other psychological disorders commonly observed following RTCs, such as major depressive disorder (MDE) and generalized anxiety disorder (GAD) [16-19], is needed for better treatment planning.

Much of previous research on RTC-related injury and psychological consequences has focussed on seriously injured samples [20, 21]. However, psychological sequelae can also occur following minor injuries [22]. It is also established that psychological disorders can develop following RTC-related injury, however, it is less understood how those diagnoses change or remit over time.

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In the broader psychopathology literature, comorbidity of psychological disorders is common [23] and diagnostic stability within individuals is low [24]. Previous research has found that 58% of adults with a psychiatric diagnosis following serious injury at 3 and 12 months maintained the same diagnosis across time [25]. This, therefore, suggests that diagnostic status does not remain stable for a substantial minority of seriously injured people. Variation in the type and timing of psychiatric symptom presentation following an injury has also been demonstrated [22, 23, 26], with one study finding that 44% of participants not diagnosed with PTSD at 3 months had delayed-onset PTSD at 24 months [26].

Given that research on the prevalence, course and comorbid nature of psychological disorders has mainly focussed on severely injured cohorts, the purpose of this study was to examine these issues in a non-catastrophic injury population. The aim was to describe the changing prevalence of psychological disorders among individuals with minor injuries from a RTC over a 24-month period. A secondary aim was to examine whether a preinjury, or early (i.e. within 6 months) post-injury, psychological diagnosis influenced the likelihood of developing later psychological diagnoses.

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## METHOD

### Participants and procedure

The protocol for UQ SuPPORT has been previously published [5]. In brief, UQ SuPPORT is a longitudinal cohort study with three assessment time points post-RTC (Time 1 = 3-6 months; Time 2 = 12-15 months; Time 3 = 24 months). The study investigates the physical and psychological outcomes of claimants within the Queensland common law 'fault-based' Compulsory Third Party (CTP) motor vehicle insurance scheme who sustained predominately minor (not severe or critical) injuries following a RTC. Claimants were identified via the Queensland regulatory body, the Motor Accident Insurance Commission (MAIC), between April 2009 and September 2010.

Inclusion criteria were: (1) Driver/passenger of a car/motorcycle, cyclist, or pedestrian involved in a RTC, (2) maximum Abbreviated Injury Scale (AIS) severity  $\leq 3$ , (3) aged  $\geq 18$  years, (4) sufficient English speaking ability, (5)  $< 3$  months between RTC and claim notification, (6) Australian resident. Exclusion criteria were: (1) cognitive impairment (assessed by trained interviewers during initial interview), and (2) severe physical condition preventing completing of interview/survey (e.g., stroke, paralysis).

A total of 3,146 eligible claimants were invited to participate in the study approximately 3 months post-RTC. Of those eligible, 382 (12%) initially consented, with 372, 366 and 347 responding at Time 1, Time 2 and Time 3, respectively.. The study design complied with the Declaration of Helsinki and was approved by the Medical Research Ethics Committee at The University of Queensland.

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## Measures

Psychiatric diagnoses were determined using the Composite International Diagnostic Interview module for PTSD (CIDI-PTSD) [27] and the CIDI-Short Form (CIDI-SF) [28] for MDE and GAD via Computer Assisted Telephone Interviews (CATI) at each time point. Diagnoses were based on the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) criteria [29]. A positive diagnosis was classified as 1, and the absence of a diagnosis as 0. Where full PTSD diagnosis was not met, subclinical PTSD was defined as  $\geq 1$  symptom from each of the re-experiencing, avoidance and hyperarousal clusters, with problem duration  $\geq 1$  month and some disruption to normal life.

Demographic and injury information such as age, gender, level of education, road user type and Injury Severity Score (ISS) were collected at the first time point. Participants were also asked if they had ever seen a mental health professional and been given a diagnosis, with those receiving a diagnosis coded as 1 (psychiatric history) and all others were coded as 0 (no psychiatric history). Further information is available in the study protocol [5].

## Data analysis

Of the 372 participants included at 6 months, 88 (25.7%) were excluded because they did not complete the CATI interview at all three time points. Excluding those with missing data enabled clearer inspection of changes in psychiatric diagnoses over time. Differences between included and excluded cases were examined using chi-squared and two-sample t-tests.

Prevalence at each time point was calculated separately for PTSD, MDE and GAD, in addition to estimates for  $\geq 1$  and  $\geq 2$  of the above disorders. Cochran's Q and McNemar tests examined statistical differences in prevalence over time. To explore changing patterns in



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psychiatric diagnoses over time, the following three groups were created: 1) No psychiatric disorder (i.e., did not meet diagnostic criteria for PTSD, MDE or GAD), 2) PTSD diagnosis - with or without MDE and/or GAD (termed 'PTSD  $\pm$  other') and 3) MDE and/or GAD diagnosis (termed 'Other only'). Group membership and movement between groups over time was determined and presented graphically in Figure 1. Participants were also classified as having a stable (i.e., where the diagnostic group was the same at all three time points) or unstable pattern of psychiatric diagnoses over time.

A series of logistic regression analyses assessed the effect of different psychiatric disorder combinations at 6 months (i.e. 'early' diagnosis) on the likelihood of any psychiatric diagnoses (i.e., 1 = Yes PTSD and/or MDE and/or GAD; 0 = No PTSD, MDE or GAD) at 12 and 24 months. Where zero cell counts were present in cross tabulations between predictor and outcome, exact logistic regression analysis was used as it produces more accurate inference when one-way causation is present [30]. The likelihood of a subsequent psychiatric diagnosis at 12 and 24 months was explored for the following comparisons at 6 months: 1) PTSD  $\pm$  other compared with Other only), 2) Single diagnosis compared with multiple diagnosis, and 3) PTSD + other compared with MDE + GAD (i.e., splitting participants with multiple diagnoses into two groups). The relationships between early subclinical PTSD and subsequent psychiatric diagnoses, and between prior psychiatric history and subsequent psychiatric history, was also explored using logistic regression analysis Stata SE 12 (64-bit) was used for all analyses, with  $p < .05$  (two-tailed) denoting statistical significance.

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## RESULTS

For the 284 participants included in the analysis, age ranged from 19 to 94 years ( $M = 49.3$ ,  $SD = 14.8$ ), with 62.3% ( $n = 177$ ) being female and 69.4% ( $n = 197$ ) having a university education. Participants were predominantly drivers or passengers injured in the RTC ( $n = 221$ , 77.8%), and 62.3% ( $n = 177$ ) had sustained superficial injuries (ISS 1–3). Finally, 75% ( $n = 213$ ) reported no psychiatric history prior to the RTC. When these characteristics were compared to the 88 participants excluded from analysis, the groups differed only in terms of age ( $t(370) = -2.54$ ,  $p < .05$ ) (see Table 1).

-- Insert Table 1 about here --

### Prevalence of mental disorders.

Approximately 50% of participants at each time point met diagnostic criteria for at least one psychiatric diagnosis (Table 2). Over the 24-month time period, prevalence ranged between 24.7-26.1% for PTSD, 27.5- 32.0% for MDE and 19.4-29.9% for GAD, with a statistically significant difference in these proportions found only for GAD ( $p = 0.001$ ).

-- Insert Table 2 about here --

### Transitions over time of psychological disorders

Figure 1 highlights the complex pattern of change between different diagnostic groups over the 18-month period. For example, of the 147 participants who had no psychiatric disorder at 6 months, 40 (27.2%) met diagnostic criteria at 12 months (PTSD, MDE or GAD), of which 14 (35%) returned to not meeting diagnostic criteria at 24 months.

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**Diagnostic stability.** Overall, 57.7% ( $n = 164$ ) of participants were classified in the same diagnostic group at 6, 12 and 24 months, while 42.3% ( $n = 120$ ) changed group assignment over time (Table 3). A total of 15.1% ( $n = 43$ ) of participants met diagnostic criteria for PTSD  $\pm$  other at *each* time point, while 107 (37.7%) participants met diagnostic criteria for PTSD at *any* time point. In addition, 9.5% ( $n = 27$ ) were classified as Other only (i.e., MDE and/or GAD only) at each time point, and 33.1% ( $n = 94$ ) consistently had no psychiatric diagnosis. There were 23 participants (8.1%) who had PTSD, MDE and/or GAD at all time points, but the type of diagnostic group was not consistent over time. In addition, 50 participants (17.6%) met criteria for a psychiatric diagnosis at two of the three time points, and 47 (16.6%) met criteria for a psychiatric diagnosis at one of the three time points (see Table 3).

**Shifting between diagnostic groups.** The percentage of participants who shifted from one diagnostic group to another between 6 and 12 months was similar: That is, 10/74 participants (13.5% ) shifted from PTSD  $\pm$  other at 6 months to Other only at 12 months, while 8/63 participants (12.7%) shifted from Other only at 6 months to PTSD  $\pm$  other at 12 months. Likewise, the percentage of participants shifting from one diagnosis to another between 12 and 24 months was also similar: Regardless of the original pathway, 7/50 participants (14%) shifted from Other only at 12 months to PTSD  $\pm$  other at 24 months, and 6/59 participants (10.1%) shifted from PTSD  $\pm$  other at 12 months to Other only at 24 months.

**Late onset, relapse, and remission.**

Of the participants with a diagnosis at 6 months post-injury, 6/137 (4.4%) reported relapsing (i.e., no diagnosis at 12 months, but some diagnosis at 24 months), and 20/137 (14.6%) remitted by 12 months (i.e., no diagnosis at 12 and 24 months). Of those with a

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diagnosis at 12 months post-injury, 30/149 (20.1%) remitted by 24 months. The percentage of participants with late onset diagnosis in the Other only category was 29/147 (19.7%) at 12 months and 10/107 (9.3%) at 24 months. The percentage of participants with late onset diagnosis in the PTSD  $\pm$  other category was 11/147 (7.5%) at 12 months and 3/107 (2.8%) at 24 months.

-- Insert Table 3 about here --

### **Different psychiatric disorder combinations (PTSD, MDE and/or GAD) and the likelihood of future psychiatric diagnoses**

Participants diagnosed with PTSD at 6 months (with or without other diagnoses;  $n = 74$ ) were 2.30 (95% CI: 1.06 – 5.01) times more likely to meet diagnostic criteria for any disorder at 24 months, but not at 12 months, compared to participants with other diagnoses (Table 4). Compared to participants with a single diagnosis, those with multiple diagnoses at 6 months were more likely to meet diagnostic criteria for any disorder at 12 months (OR = 14.25, 95% CI: 3.22 – 63.01) and 24 months (OR = 2.94, 95% CI: 1.26 – 6.88) (Table 4). In terms of the type of multiple diagnosis present at 6 months, there was no significant difference ( $p > 0.05$ ) in the likelihood of any subsequent disorder for those with PTSD + MDE/GAD compared with Other only at 12 and 24 months.

-- Insert Table 4 about here --

### **The relationship between subclinical PTSD and future psychiatric diagnoses**

At 6 months, 13 participants (4.6%) were classified as meeting thresholds for subclinical PTSD. All 13 participants were originally classified as having no psychological disorder. At 12 months, 61.5% ( $n = 8/13$ ) of those with subclinical PTSD at 6 months met diagnostic criteria for any disorder, and these participants were not significantly different to

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those with clinical PTSD ( $N = 61/74$ ; 82.4%) in their likelihood of meeting criteria for any disorder (OR = 0.34, 95% CI = 0.10 – 1.12) (Table 5). There was also no statistically significant difference, at 12 months, between those with subclinical and clinical PTSD in their likelihood of meeting criteria for MDE/GAD (OR = 0.34, 95% CI = 0.10- 1.14) (Table 5). By 24 months, those with subclinical PTSD were less likely to meet diagnostic criteria for any disorder (OR = 0.07, 95% CI: 0.02 – 0.30), PTSD (OR = 0.09, 95% CI: 0.02 – 0.43), and MDE/GAD (OR = 0.20, 95% CI: 0.04 – 0.98), when compared to those with clinical PTSD.

-- Insert Table 5 about here --

### **The influence of preinjury psychiatric history**

Of the 284 participants, 71 (25.0%) reported having a psychiatric diagnosis prior to the RTC. Psychiatric history was not associated with the likelihood of developing a disorder at 6 or 12 months post-RTC (Table 6). However at 24 months post-RTC, participants who reported a psychiatric history were 2.33 times more likely (95% CI: 1.33 – 4.07) to meet criteria for any disorder, and 2.15 times more likely (95% CI: 1.24 – 3.71) to meet criteria for MDE/GAD, than those with no psychiatric history. There was no difference in the likelihood of meeting diagnostic criteria for PTSD between those with and without a prior psychiatric history at any time point (Table 6).

-- Insert Table 6 about here --

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## DISCUSSION

The aim of this study was to describe the prevalence and patterns of change over time in psychological disorders among adults with a RTC-related injury. A secondary aim was to examine whether early diagnosis of a psychological disorder predicted subsequent development of a psychological disorder. The major findings of this study were 1) the prevalence of mental disorders following RTC-related minor injury was high (approximately 50%), 2) a substantial proportion of participants (42.3%) had an unstable diagnostic pattern over time, 3) adults with an early diagnosis of PTSD (with or without comorbid MDE/GAD) were more likely to have a psychological diagnosis at 24 months post-injury compared to participants with other diagnoses, and 4) participants with multiple diagnoses were more likely to have a later psychological diagnosis at 12 and 24 months post-injury than participants with a single diagnosis. Overall, these findings are consistent with previous literature suggesting that psychological disorders are relatively common following RTC-related injury and are predictive of long-term mental health-related outcomes [12, 13, 31].

### **Prevalence and patterns of psychological diagnoses across time**

This study showed that the number of participants diagnosed at each time point was consistently high, with 48.2%, 52.5%, and 49.3% of the sample having at least one of the examined DSM-IV diagnoses at 6 months, 12 months, and 24 months, respectively. Only 33.1% of the sample never met diagnostic criteria for the examined disorders, meaning that 66.9% of the sample had a diagnosis at some point during the 24 month study period. This figure is up to twice that previously reported by Mayou and colleagues [32]. However, the difference in prevalence rates may be accounted for by their use of self-report measures to assess psychiatric outcomes or consecutive recruitment, whereas our study used diagnostic interviews and an opt-in recruitment process. The current study's prevalence rates are higher

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than the lifetime (45%) and 12-month prevalence (20%) of mental health disorders in the Australian population (Australian Bureau of Statistics, 2007), suggesting that RTC survivors are an at-risk population for mental health problems. Our findings also suggest that psychological problems in this population are persistent, as no significant difference in overall prevalence was found over time. The persistently high prevalence rate of psychological disorders in this population highlights the need to consider the chronic mental health ramifications of a RTC-related injury.

The percentage of participants meeting diagnostic criteria for PTSD (26.1%, 24.7%, and 26.1% at 6 months, 12 months, and 24 months, respectively) is similar to that of other Australian studies that assessed participants hospitalized for a RTC-related injury at 6 months post-injury [33-35] and is within the 6-45% prevalence range established in a systematic review on PTSD following adult road traffic injury [12]. During the 24 months post RTC, 107 (37.7%) participants had PTSD with or without comorbidity.

The percentage of participants meeting diagnostic criteria for MDE (27.8%, 32%, and 27.5% at 6, 12 and 24 months, respectively) and GAD (19.4%, 29.9%, 21.8% at 6, 12, and 24 months, respectively) were similarly high. The prevalence of these disorders is higher than a previous study that found 18% and 10% of car accident survivors reported clinically significant anxiety and depression symptoms, respectively, at four months post-injury[7]. The prevalence of depression, not often studied following minor RTC, was also higher in our study than the 8% prevalence rate previously reported in a study of RTC survivors from the United Kingdom [31]. Although the number of participants meeting diagnostic criteria for the individual disorders is relatively high, the number of participants who have a comorbid psychological diagnosis (20.8%, 27.1%, and 21.1%, at 6, 12, and 24 months, respectively) is also of concern given that comorbidity of mood and anxiety disorders has been associated

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with chronicity and severity of psychopathology, relapse, and psychosocial functioning [36]. This study's finding that comorbidity is relatively common concurs with research that has found that PTSD is often comorbid with depression and anxiety [32, 37].

There was considerable movement between diagnostic categories between 6, 12, and 24 months post-injury. In this sample, 44% of participants had an unstable diagnostic profile over time. Management of this group likely presents a substantial clinical challenge. The shift between diagnostic categories was similar for each of the categories between 6 and 12 months, and 12 and 24 months, suggesting that no particular diagnostic category was any more likely to change over time. Collectively, these findings suggest a need for interventions to address dynamic presentations of psychiatric problems following RTC-related injury.

### **Influence of early psychological diagnosis on later psychological diagnosis**

A secondary study aim was to examine the influence of pre-morbid and early psychological diagnosis on the development of later psychological diagnosis. Comorbidity at 6 months was found to increase the likelihood of meeting diagnostic criteria for any disorder at 12 and 24 months, compared to a single diagnosis. This finding highlights the need to recognize and treat comorbidity early. We also found that participants diagnosed with PTSD at 6 months were 2.3 times more likely to meet diagnostic criteria for any mental disorder at 24 months, but not at 12 months, compared to participants with other diagnoses (i.e., MDE/GAD). Therefore, an early diagnosis of PTSD and MDE/GAD are similar in terms of their relationship to having any psychological diagnosis at 12 months post-injury, but that PTSD particularly may increase the risk of longer term psychological problems. We also examined whether the identification of subclinical PTSD could identify participants at risk of future psychological disorders. Although our sample size was small ( $n = 13$ ), we found that early subclinical PTSD was similar to clinical PTSD in terms of its relationship to having any



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disorder and having MDE/GAD at 12 months post-injury. These findings suggest that the development of traumatic stress responses may be an important determinant of the development of other associated psychopathology. This has implications for the formulation and treatment of mental health problems following traumatic injury in that traumatic stress may underlie other presentations and therefore intervention should prioritise its amelioration.

Research has reported that premorbid psychiatric problems is associated with poor post-injury outcomes [38-40]. In the current study, 25% of respondents reported a history of psychological diagnosis, which is similar to the 12-month prevalence of psychological disorders in the Australian general population [41]. However, we found no significant relationship between premorbid psychiatric problems and a psychological diagnosis at 6- or 12-months post-injury. Although a premorbid psychological diagnosis increased the risk of long term psychological problems (i.e., at 24 months), this factor may not be a useful indicator of early psychological problems (i.e., 6-12 months post-injury).

### **Limitations.**

In terms of limitations, we were unable to measure psychiatric diagnoses during the acute injury period because our first assessment did not occur until approximately 6 months post-injury. Other limitations include the low initial response rate, the retention rate of 65% (although typical of studies with this follow-up length [7, 42]), and that participants included in the analysis were found to be significantly older than those who were excluded. These factors may affect the generalizability of the study findings. It is also possible that this study did not capture individuals with very minor injuries who may be less likely to lodge a claim. Similarly, individuals who make claims under this scheme (i.e., those not at fault) may have different outcomes from those at fault for the RTC who are not eligible to claim. Therefore,

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the study findings may only apply to adults who lodge a claim following a RTC, rather than those with a RTC-related injury generally.

### *Conclusion*

We found noticeable variations in the type and course of psychological diagnoses among participants with predominately minor injuries in the 24 months following a RTC. The complexities of the type and course of symptoms presents challenges for the clinical management of this population. This study has implications for service delivery and intervention planning. Our findings suggest a need for repeated diagnostic assessment over time in a RTC cohort. Our results also support the need for early recognition and treatment of psychological problems to prevent persistent or new psychological diagnoses. Given the comorbidity of psychological diagnoses in this sample and participants' movements between diagnostic categories over time, the development and testing of a comprehensive trans-diagnostic approach in this population may be beneficial. Overall, this study extends the literature on the long term psychological outcomes following non-catastrophic injury sustained in a RTC by demonstrating the high prevalence and variable patterns of psychological diagnoses over time.

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ACCEPTED MANUSCRIPT

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**Table 1. Comparison in demographics, injury factors and psychiatric history between participants included in analysis and those excluded due to non-response for at least one time point.**

Characteristic	Included in analysis (n = 284)	Excluded from analysis (n = 88)	p-value
<b>Age [Mean (SD)]</b>	49.3 (14.8)	44.7 (15.1)	0.012
<b>Gender [n (%)]</b>			0.976
Female	177 (62.3%)	55 (62.5%)	
Male	107 (37.7%)	33 (37.5%)	
<b>Highest education level [n (%)]*</b>			0.500
High school	87 (30.6%)	18 (26.5%)	
Tertiary	197 (69.4%)	50 (73.5%)	
<b>Road user type [n (%)]</b>			0.129
Driver/passenger	221 (77.8%)	77 (87.5%)	
Cyclist	44 (15.5%)	9 (10.2%)	
Pedestrian	19 (6.7%)	2 (2.3%)	
<b>Injury Severity Score (ISS) [n (%)]<sup>†</sup></b>			0.267
Superficial (ISS 1-3)	177 (62.3%)	61 (71.8%)	
Minor (ISS 4-8)	72 (25.4%)	17 (20.0%)	
Moderate (ISS 9+)	35 (12.3%)	7 (8.2%)	
<b>Psychiatric history [n (%)]<sup>‡</sup></b>			0.559
Yes – any prior diagnosis	71 (25.0%)	17 (21.8%)	
No prior diagnosis	213 (75%)	61 (78.2%)	

Note: Comparisons between included and excluded participants were conducted using a *t*-test for age, a chi-squared test for gender, highest education level, ISS, and psychiatric history, and Fisher's exact test for road user type (given cell sizes < 5).

\*Highest education level: n= 68 in the excluded group

<sup>†</sup> ISS: n = 85 in the excluded group

<sup>‡</sup> Psychiatric history: n = 78 in the excluded group

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**Table 2.** Prevalence [n (%)] of psychiatric diagnoses at 6, 12 and 24 months post-RTC (n = 284).

DSM-IV diagnosis	6 months	12 months	24 months	Q
Posttraumatic Stress Disorder (PTSD)	74 (26.1%)	70 (24.7%)	74 (26.1%)	0.50
Major Depressive Episode (MDE)	79 (27.8%)	91 (32.0%)	78 (27.5%)	3.08
Generalized Anxiety Disorder (GAD)	55 (19.4%) <sup>a</sup>	85 (29.9%) <sup>a,b</sup>	62 (21.8%) <sup>b</sup>	14.78**
At least 1 above DSM-IV diagnosis	137 (48.2%)	149 (52.5%)	140 (49.3%)	2.41
At least 2 above DSM-IV diagnoses	59 (20.8%) <sup>a</sup>	77 (27.1%) <sup>a</sup>	60 (21.1%)	7.22*

Note: Percentages sharing common superscripts across time points are statistically different at  $p < .017$

(Bonferroni adjustment) according to follow up McNemar's tests of paired proportions. Q = Cochran's Q statistic for the overall test of difference between three matched proportions.

\* $p < .05$ ; \*\* $p < .01$



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**Table 3: Number (%) of participants meeting diagnostic criteria for stable and unstable patterns of psychiatric disorders over the three time points ( $n = 284$ )**

	<i>n</i> (%)
<b>Stable diagnostic group at 6, 12 &amp; 24 months</b>	<b>164 (57.7%)</b>
<i>No psych disorder</i>	94 (33.1%)
<i>PTSD<math>\pm</math> other</i>	43 (15.1%)
<i>Other only</i>	27 (9.5%)
<b>Unstable diagnostic group between 6, 12 and 24 months</b>	<b>120 (42.3%)</b>
<i>PTSD <math>\pm</math> other OR Other only at three time points<sup>1</sup></i>	23 (8.1%)
<i>PTSD <math>\pm</math> other OR Other only at two time points<sup>2</sup></i>	50 (17.6%)
<i>PTSD <math>\pm</math> other OR Other only at one time point<sup>3</sup></i>	47 (16.6%)

Note:

No psych disorder = did not meet diagnostic criteria for PTSD, MDE or GAD

PTSD  $\pm$  other = met diagnostic criteria for PTSD with or without MDE and/or GAD

Other only = met diagnostic criteria for MDE and/or GAD only

<sup>1</sup> Meets at least one diagnosis at any three time points (PTSD  $\pm$  other or Other only), but never the same diagnosis for all time points.<sup>2</sup> Meets at least one diagnosis at any two time points (PTSD  $\pm$  other or Other only) AND meets the no psych disorder group at any one time point.<sup>3</sup> Meets a diagnosis at any one time point (PTSD  $\pm$  other OR Other only) AND meets the no psych disorder group at any two time points.

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**Table 4: Comparison between different mental disorder combinations at 6 months and the likelihood of meeting diagnostic criteria for any disorder\* at 12 and 24 months**

Type of disorder at 6 months	At 12 months		At 24 months	
	<i>n</i> (%) any disorder <sup>†</sup>	Odds Ratio (95% CI)	<i>n</i> (%) any disorder <sup>†</sup>	Odds Ratio (95% CI)
<b>PTSD vs Other diagnoses</b>				
MDE &/or GAD ( <i>n</i> = 63)	48 (76.2%)	1	41 (65.1%)	1
PTSD ( <i>n</i> = 74)	61 (82.4%)	1.47 (0.64 – 3.37)	60 (81.1%)	2.30 (1.06 – 5.01)*
No disorder <sup>†</sup> ( <i>n</i> = 147)	40 (27.2%)	0.12 (0.06 – 0.23)***	39 (26.5%)	0.19 (0.10 – 0.37)***
<b>Single vs Multiple diagnoses</b>				
Single ( <i>n</i> = 78)	52 (66.7%)	1	51 (65.4%)	1
Multiple ( <i>n</i> = 59)	57 (96.6%)	14.25 (3.22 – 63.01)***	50 (84.8%)	2.94 (1.26 – 6.88)*
No disorder <sup>†</sup> ( <i>n</i> = 147)	40 (27.2%)	0.19 (0.10 – 0.34)***	39 (26.5%)	0.19 (0.11 – 0.35)***

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\* $p < .001$ <sup>†</sup> No PTSD, MDE and/or GAD

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**Table 5: Comparison between clinical and subclinical PTSD at 6 months and the likelihood of meeting diagnostic criteria for 1) Any disorder 2) PTSD and 3) MDE/GAD at 12 and 24 months**

Type of disorder at 6 months	At 12 months		At 24 months	
	<i>n</i> (%) meeting criteria	Odds Ratio (95% CI)	<i>n</i> (%) meeting criteria	Odds Ratio (95% CI)
<b>1) Likelihood of meeting diagnostic criteria for any disorder<sup>†</sup></b>				
Clinical PTSD ( <i>n</i> = 74)	61 (82.4%)	1	60 (81.1%)	1
Subclinical PTSD ( <i>n</i> = 13)	8 (61.5%)	0.34 (0.10 – 1.21)	3 (23.1%)	0.07 (0.02 – 0.30)***
No PTSD ( <i>n</i> = 197)	80 (40.6%)	0.15 (0.08 – 0.28)***	77 (39.1%)	0.15 (0.08 – 0.29)***
<b>2) Likelihood of meeting diagnostic criteria for PTSD</b>				
Clinical PTSD ( <i>n</i> = 74)	51 (68.9%)	1	50 (67.6%)	1
Subclinical PTSD ( <i>n</i> = 13)	5 (38.5%)	0.28 (0.08 – 0.96)*	2 (15.4%)	0.09 (0.02 – 0.43)**
No PTSD ( <i>n</i> = 197)	14 (7.1%)	0.03 (0.02 – 0.07)***	22 (11.2%)	0.06 (0.03 – 0.12)***
<b>3) Likelihood of meeting diagnostic criteria for MDE/GAD</b>				
Clinical PTSD ( <i>n</i> = 74)	48 (64.9%)	1	35 (47.3%)	1
Subclinical PTSD ( <i>n</i> = 13)	5 (38.5%)	0.34 (0.10 – 1.14)	2 (15.4%)	0.20 (0.04 – 0.98)*
No PTSD ( <i>n</i> = 197)	74 (37.6%)	0.33 (0.19 – 0.57)***	68 (34.5%)	0.59 (0.34 – 1.01)

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

<sup>†</sup> any of PTSD, MDE and/or GAD

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**Table 6: Influence of pre-RTC psychiatric diagnoses on the likelihood of meeting diagnostic criteria for 1) Any disorder 2) PTSD and 3) MDE/GAD at 6, 12 and 24 months post RTC**

Pre-RTC mental health status	At 6 months		At 12 months		At 24 months	
	<i>n</i> (%)	Odds Ratio (95% CI)	<i>n</i> (%)	Odds Ratio (95% CI)	<i>n</i> (%)	Odds Ratio (95% CI)
<b>1) Likelihood of meeting diagnostic criteria for any disorder<sup>†</sup></b>						
No prior psych dx (n=213)	102 (47.9%)	1	106 (49.8%)	1	94 (44.1%)	1
Prior psych dx (n = 71)	35 (49.3%)	1.06 (0.62 – 1.81)	43 (60.6%)	1.55 (0.90 – 2.68)	46 (64.8%)	2.33 (1.33 – 4.07)**
<b>2) Likelihood of meeting diagnostic criteria for PTSD</b>						
No prior psych dx (n=213)	55 (25.8%)	1	53 (24.9%)	1	51 (23.9%)	1
Prior psych dx (n = 71)	19 (26.8%)	1.05 (0.57 – 1.93)	17 (23.9%)	0.95 (0.51 – 1.78)	23 (32.4%)	1.52 (0.85 – 2.74)
<b>3) Likelihood of meeting diagnostic criteria for MDE/GAD</b>						
No prior psych dx (n=213)	76 (35.7%)	1	91 (42.7%)	1	69 (32.4%)	1
Prior psych dx (n = 71)	27 (38.0%)	1.11 (0.63 – 1.93)	36 (50.7%)	1.38 (0.80 – 2.36)	36 (50.7%)	2.15 (1.24 – 3.71)**

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\* $p < .001$ . ns if 95% CI spans 1.00

<sup>†</sup> any of PTSD, MDE and/or GAD

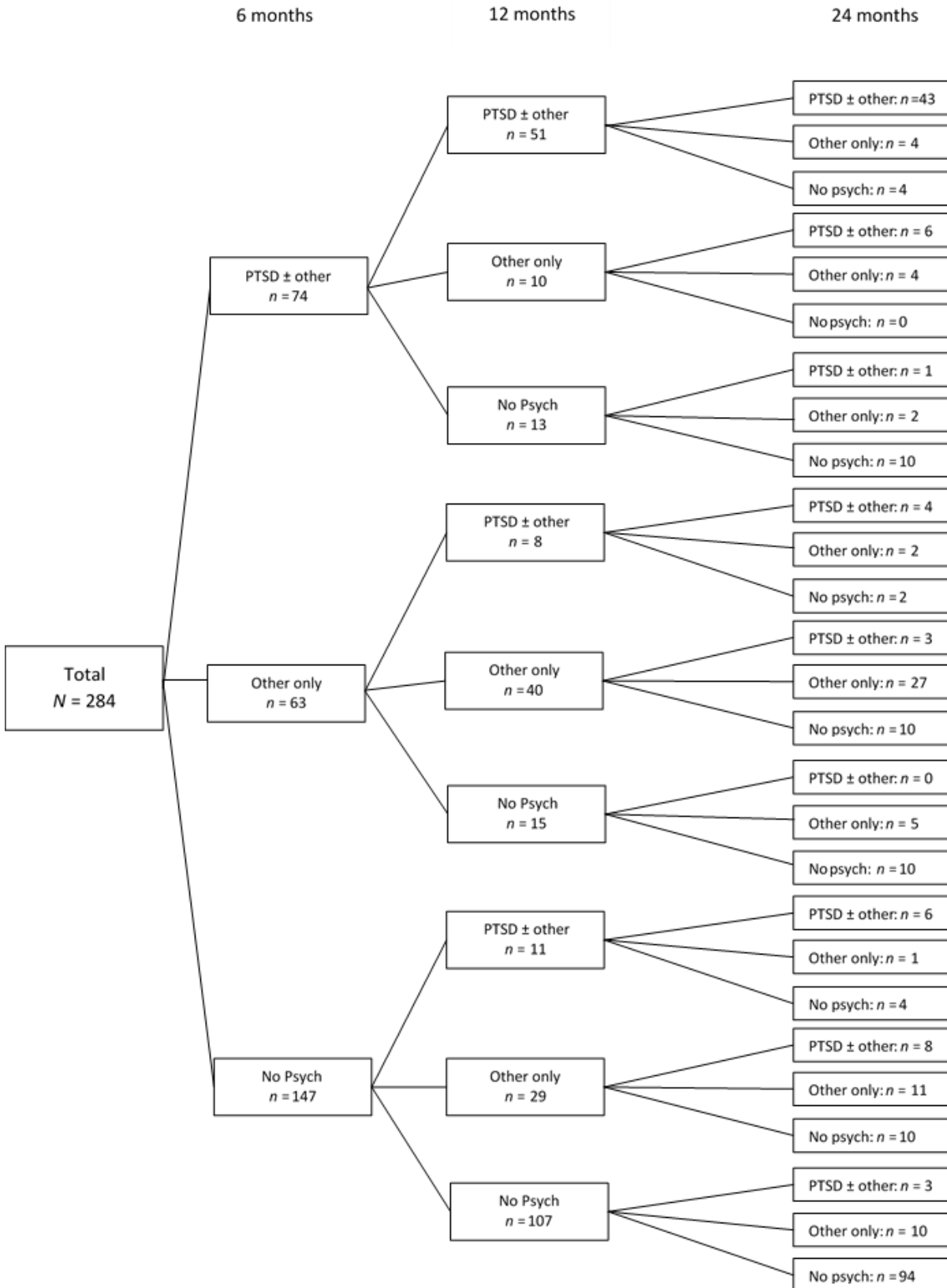
Note:

No Psych = did not meet diagnostic criteria for PTSD, MDE or GAD

PTSD ± other = met diagnostic criteria for PTSD with or without MDE and/or GAD

Other only = met diagnostic criteria for MDE and/or GAD only

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**Figure 1. Transition in the number of participants meeting diagnostic criteria for psychiatric disorders between 6, 12 and 24 months post RTC ( $n=284$ ).**