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RESEARCH ARTICLE

# Psychological treatment utilization following motor vehicle accident exposure: An exploratory longitudinal study

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## Abstract

**Background**: Motor vehicle accidents (MVAs) are associated with elevated psychological distress, yet many affected individuals do not seek psychological treatment, despite it being generally available within the health care system.

**Objective**: This exploratory prospective cohort study examined psychological distress, psychological treatment utilization, and perceived barriers over 12 months among individuals with and without MVA exposure.

**Methods**: Individuals with ($n$ = 60) and without ($n$ = 108) MVA exposure completed two online surveys 12 months apart. Psychological distress was assessed using the Brief Symptom Checklist and the Posttraumatic Stress Disorder Checklist for DSM-5. Utilization of psychological treatment and perceived barriers were also measured. Analyses compared distress between groups, examined associations between distress and treatment utilization, explored an indirect association of MVA exposure with treatment utilization via baseline distress, compared perceived barriers, and examined continuity in treatment utilization over time.

**Results**: MVA-exposed individuals reported higher distress than unexposed individuals ($d$ = 0.53, confidence interval [CI]: 0.14–0.92). MVA exposure was not associated with treatment utilization ($b$ = –0.10, CI: –0.74–0.55), but it was indirectly associated through elevated baseline distress ($b$ = 0.25, CI: 0.05–0.45). No group differences emerged in perceived barriers. Previous psychological treatment was associated with treatment utilization during follow-up independent of baseline distress ($b$ = 2.43, CI: 1.04–3.99).

**Conclusion**: MVA-exposed individuals reported persistently elevated psychological distress but were no more likely than unexposed individuals to receive psychological treatment. These exploratory findings suggest that specific factors may limit help-seeking following MVAs despite elevated psychological distress. Future research should identify these factors using larger samples and more comprehensive barrier assessment.

***Keywords:*** Motor vehicle accident; Psychological distress; Help-seeking behavior; Psychological treatment; Barriers to mental health care

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## 1. Introduction

Motor vehicle accidents (MVAs) are among the most common traumatic events worldwide.[1] In the European Union, 20,380 deaths due to road traffic accidents were recorded in 2023, the majority of which involved motor vehicles.[2,3]

Motor vehicle accidents can result in persistent psychological distress that ranges from transient stress reactions to severe mental disorders. While approximately one-quarter of MVA-exposed individuals develop posttraumatic stress disorder (PTSD),[4] depression and anxiety disorders are also common.[5] Importantly, functional impairment following trauma exposure is not limited to diagnosable mental disorders. Individuals with subthreshold symptoms may nevertheless experience substantial impairment in daily functioning and quality of life.[6] From a public health perspective, understanding help-seeking behavior in the full spectrum of psychological distress is therefore important.

Effective psychological interventions are available for PTSD, depression, and anxiety disorders.[7-9] Nevertheless, utilization of psychological treatment remains substantially below need,[10,11] specifically among MVA-exposed individuals.[12] From a health psychology perspective, understanding the factors that facilitate or hinder help-seeking is essential because delayed or absent treatment may contribute to the persistence of psychological distress after traumatic events.[13] Psychological treatment utilization represents an important health behavior influenced by psychological, social, and structural factors.[14] Understanding the role of MVA exposure in the help-seeking process and identifying differences in help-seeking behavior between MVA-exposed and unexposed individuals are essential to improve targeted outreach to MVA-exposed individuals experiencing persistent psychological distress and to improve long-term psychological health in this population.

A range of psychological and structural barriers to mental health care have been identified. Low mental health literacy, i.e., limited knowledge about mental disorders, their symptoms, and treatments, predicts reduced help-seeking in both trauma-exposed and general populations.[15] Stigma, including fears of negative consequences if one's mental health problems become known, is another frequently reported barrier.[16] Some individuals turn to maladaptive coping strategies, such as self-medication,[17] which may inhibit functional coping strategies, such as help-seeking, although findings are inconsistent.[18] Trauma-specific barriers, such as fear of discussing the accident in therapy, may also deter treatment, though their relative importance remains unclear.[15]

Structural and organizational factors can further impede access. These include anticipated costs, time demands, travel distance, and limited treatment availability.[15] In Germany, long waiting times, averaging 20 weeks, pose a significant obstacle.[19] Facilitators of help-seeking behavior include positive prior experiences with health care providers, encouragement from social networks, and previous psychological treatments, whereas negative experiences or discouragement may inhibit it.[20] Sociodemographic and cultural factors are also relevant: Conformity with traditional male gender roles, older age, low socioeconomic status, and migration history have each been associated with lower mental health care utilization in the general population.[21-24] However, these factors have not been systematically investigated in MVA-exposed samples, which encompass more men than women.[25]

In summary, MVA exposure is associated with elevated risk for persistent psychological distress, yet treatment utilization remains low. Although previous studies have examined psychological distress following MVAs[4,5] and others have investigated barriers to mental health care,[15,26] these research traditions have rarely been integrated. In particular, little is known about how MVA exposure, psychological distress, perceived barriers, and psychological treatment utilization jointly unfold over time in comparison with individuals without MVA exposure. Comparing exposed and unexposed individuals within a longitudinal design may help identify whether differences in treatment utilization simply reflect elevated psychological distress or whether additional barriers to help-seeking may exist following MVA exposure.

The present longitudinal study explored psychological distress, utilization of psychological treatment, and perceived barriers between MVA-exposed and unexposed individuals at two time points 12 months apart. Specifically, we first examined whether MVA-exposed individuals reported higher psychological distress than unexposed individuals. Second, we explored whether higher baseline psychological distress was associated with more subsequent treatment utilization and whether distress statistically accounted for any association between MVA exposure and treatment utilization. Third, we explored whether perceived barriers differed between exposed and unexposed individuals. Finally, we examined whether prior treatment utilization predicted continued engagement in psychological treatment and explored longitudinal changes in psychological distress among individuals who did and did not utilize treatment during the study period.

## 2. Materials and methods

### 2.1. Ethical considerations

This research was approved by the Ethics Committee of the Department of Psychology at Julius-Maximilians-Universität Würzburg. All participants provided written informed consent in accordance with the Declaration of Helsinki[27] and minors could participate only with parental consent. Participant data were pseudonymized at data collection using a coding list and anonymized for data analysis.

### 2.2. Participants

Data were drawn from a larger project on MVA-related psychological distress and driving performance conducted in Würzburg, Germany.[28] This exploratory prospective cohort study included a baseline online survey, a face-to-face interview conducted at the University of Würzburg outpatient clinic for psychotherapy in the Department of Psychology, and a driving performance test conducted in the surrounding area of Würzburg (the latter was not included in the present study). The study is reported following the Strengthening the Reporting of Observational Studies in Epidemiology guidelines. The baseline survey and interview constituted the first measurement time point (T0) and were conducted between October 2020 and August 2022. All participants were invited to complete a follow-up online survey (T1) approximately one year later (50–54 weeks after baseline; up to three invitations by email; sampling period: September 2021 to August 2023).

Inclusion criteria were: (i) individuals aged 17–70 years, (ii) those in possession of a valid car driver's license, (iii) those self-identifying as an active driver, and (iv) individuals with either experience of a severe MVA as driver or passenger within the past 3–30 months (August 2018 to November 2021) or no lifetime MVA experience. An MVA was defined as severe if it involved at least one injury or required vehicle towing.

The target sample size for the original project was determined by practical and resource constraints and should therefore be regarded as a convenience sample. Recruitment aimed to include at least 40 MVA-exposed participants and 40 matched unexposed controls (matched on gender, age, driving experience, and familiarity with the local road network). No formal *a priori* power analysis was conducted. To facilitate interpretation of statistically non-significant findings, a post hoc sensitivity analysis was conducted to estimate the smallest effect sizes that could be detected with 80% power at $\alpha = 0.05$, given the available sample sizes.

Participants were recruited via online advertisements and a participant panel. Recruitment for the baseline survey was closed once 41 MVA-exposed participants and their matched controls had completed the interview.

For the present analyses, we included all individuals who completed at least the first scientific item of the T0 online survey. The baseline sample comprised 168 participants (Figure 1), of whom 82 (48.8%) completed the interview. At T1, 102 participants (60.7%) completed the follow-up online survey, and 60 (35.7%) completed all three components.

Sociodemographic characteristics are presented in Table 1. Among interview participants, 15 (18.3%) met diagnostic criteria for an affective disorder or anxiety disorder and 6 (7.3%, all MVA-exposed) met diagnostic criteria for PTSD.

**Table 1. Sample characteristics at baseline**

| Characteristic | MVA (*n* = 60) | No MVA (*n* = 108) |
|---|---|---|
| Age (years) | 33.22 (15.17) | 34.78 (14.44) |
| Gender | | |
| Male | 32 (53.3%) | 39 (36.1%) |
| Female | 28 (46.7%) | 69 (63.9%) |
| BSCL T0 | 0.55 (0.48) | 0.33 (0.36) |
| PCL-5 | | |
| Above cut-off | 5 (8.5%) | 6 (5.7%) |
| Below cut-off | 54 (91.5%) | 100 (94.3%) |
| (Missing) | 1 | 2 |
| Years of education | | |
| Less than 9 years | 1 (2.9%) | 0 (0.0%) |
| 9 years | 1 (2.9%) | 2 (3.0%) |
| 10 years | 9 (25.7%) | 20 (29.9%) |
| 12 to 13 years | 24 (68.6%) | 45 (67.2%) |
| (Missing) | 25 | 41 |
| Lifetime number of therapies | | |
| 0 | 34 (82.9%) | 37 (90.2%) |
| 1 | 3 (7.3%) | 3 (7.3%) |
| 2 | 4 (9.8%) | 1 (2.4%) |
| (Missing) | 19 | 67 |

Note: Lifetime number of therapies: lifetime number of reported therapies before the MVA (MVA group) or more than 30 months prior to T0 (no MVA group). Data are presented as mean (standard deviation) for metric variables, and *n* (%) for categorical variables.
Abbreviations: BSCL T0: Brief Symptom Checklist Global Severity Index at T0; MVA: Motor vehicle accident; PCL-5: Posttraumatic Stress Disorder Checklist for DSM-5.

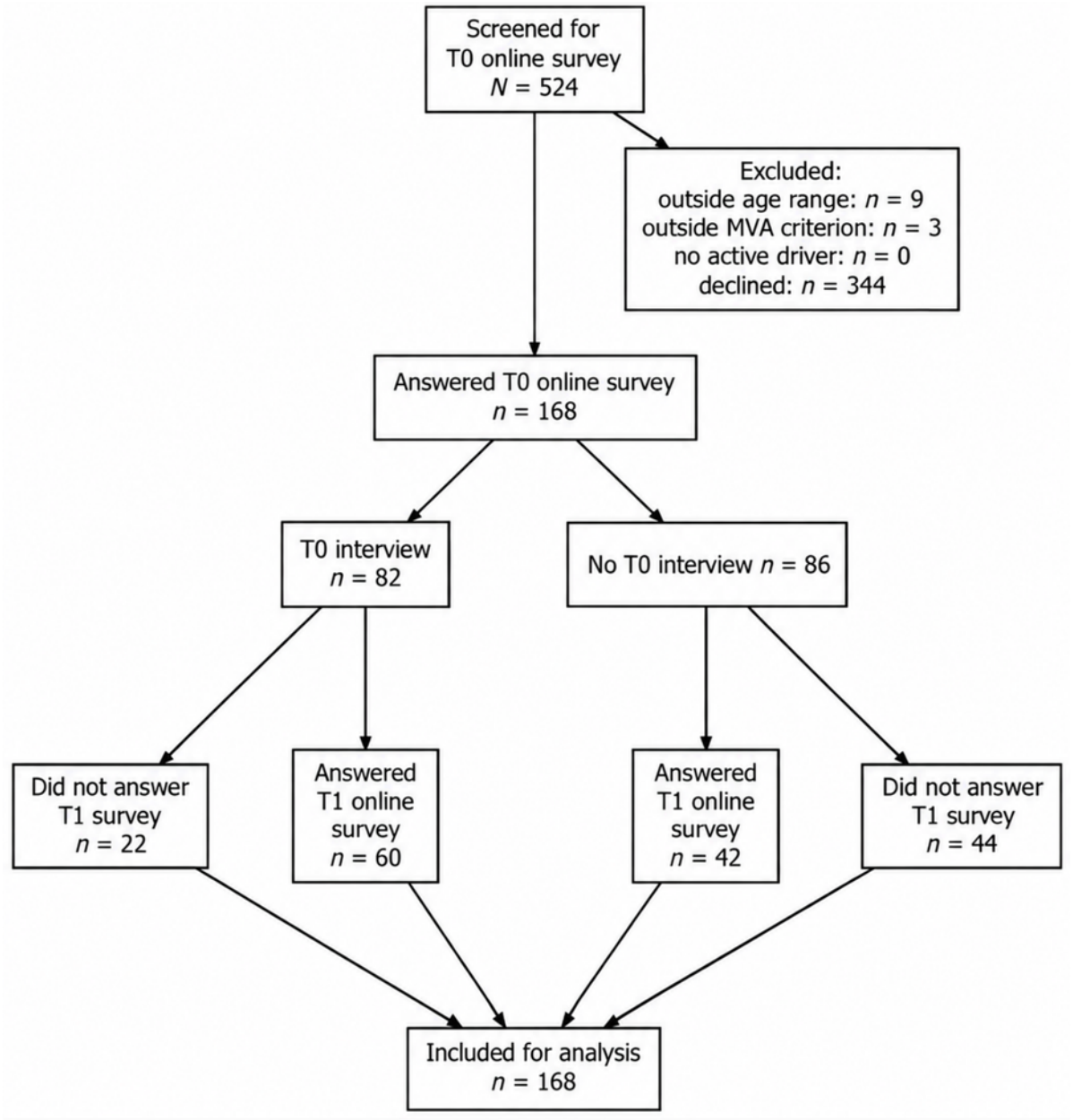



**Figure 1.** Flow chart of participant progression through the study. The figure shows the number of participants at each study stage (Screened for the T0 online survey, answered the T0 online survey at least until the first scientific item, completed the T0 interview, and completed the T1 online survey), as well as the number who dropped out between consecutive stages.

### 2.3. Procedure

Eligibility and matching criteria were verified at survey entry. The T0 survey assessed MVA characteristics (for exposed participants, Table 2), current psychological distress, and current and lifetime help-seeking behavior.

Participants who had experienced an MVA within the past 3–30 months, along with matched controls, were invited to a face-to-face interview with a clinical psychologist on average, 6.70 (standard deviation [SD] = 8.67) weeks after the T0 online survey. The interview included a structured clinical assessment for DSM-5 disorders, a detailed mental health treatment history, and questionnaires on self-medication and perceived barriers to psychological treatment. MVA-exposed participants additionally completed a structured interview on accident

characteristics. Participants received 100€ for completing the interview and driving performance test.

**Table 2. Accident characteristics**

| Characteristics | Statistics ($n$ = 60) |
|---|---|
| Months since accident | 15.00 (8.02) |
| Vehicle used | |
| Motor bike | 14 (23.3%) |
| Truck | 1 (1.7%) |
| Car driver | 30 (50.0%) |
| Car passenger | 12 (20.0%) |
| Other | 3 (5.0%) |
| AFQ: Fear of death | |
| Yes | 13 (21.7%) |
| No | 37 (61.7%) |
| Not sure | 10 (16.7%) |
| AFQ: Saw injury or death | |
| Yes | 23 (38.3%) |
| No | 35 (58.3%) |
| Not sure | 2 (3.3%) |
| AFQ: Lost conscience | |
| Yes | 6 (10.0%) |
| No | 52 (86.7%) |
| Not sure | 2 (3.3%) |
| AFQ: Accident-related disability | 1.40 (2.04) |
| AFQ: MVA-related avoidance | 0.99 (1.07) |
| AFQ: Dream of accident | |
| Yes | 24 (40.0%) |
| No | 25 (41.7%) |
| Not sure | 11 (18.3%) |
| AFQ: Fear driving | |
| Yes | 13 (21.7%) |
| No | 42 (70.0%) |
| Not sure | 5 (8.3%) |
| AFQ: Get upset while driving | |
| Yes | 26 (43.3%) |
| No | 27 (45.0%) |
| Not sure | 7 (11.7%) |
| AFQ: Instruct driver while being a passenger | |
| Yes | 32 (53.3%) |
| No | 25 (41.7%) |
| Not sure | 3 (5.0%) |
| AFQ: Drive less | |
| Yes | 18 (30.0%) |
| No | 38 (63.3%) |
| Not sure | 4 (6.7%) |
| AFQ: Expect another accident | |
| Yes | 22 (36.7%) |
| No | 24 (40.0%) |
| Not sure | 14 (23.3%) |
| AFQ: React like anyone else | |
| Yes | 9 (15.0%) |
| No | 18 (30.0%) |
| Not sure | 33 (55.0%) |

Note: Data presented as mean (standard deviation) for metric variables, and $n$ (%) for categorical variables.
Abbreviation: AFQ: Accident Fear Questionnaire.

All T0 survey participants were re-contacted 50 to 54 weeks later to complete a follow-up online survey (T1). This follow-up survey assessed socioeconomic status and migration history and re-assessed current psychological distress, past-year and current help-seeking behavior, self-medication, and perceived barriers to psychological treatment. Participants received 10€ for completing the T1 online survey.

## 2.4. Measures

Help-seeking behavior, perceived barriers to psychological treatment, and self-medication were assessed using study-specific questionnaires developed for the present project. The questionnaires are publicly available on the OSF Registry (https://osf.io/dmjn9/).

### *2.4.1. Psychological distress*

Distress was assessed at T0 and T1 with the Brief Symptom Checklist (BSCL), German version[29] and the Posttraumatic Stress Disorder Checklist for DSM-5, German version (PCL-5).[30] The BSCL is a 53-item self-report measure rated on a five-point Likert scale (0 "not at all" to 4 = "very strongly"), yielding a Global Severity Index with excellent internal consistency in the present sample ($\alpha_{sample}$ = 0.96). The PCL-5 assesses current PTSD symptoms with 20

items rated on a five-point scale (0 "not at all" to 4 = "very strongly"), producing a total score with excellent internal consistency ($\alpha_{sample}$ = 0.95), with values at or above the cut-off value of 33 indicating high risk of PTSD.

#### 2.4.2. Mental disorder diagnosis

Current mental disorders were assessed at T0 with the Mini-DIPS Open Access,[31] a structured clinical interview for DSM-5 disorders. We focused on PTSD, anxiety disorders, and mood disorders, consistent with prior research linking these conditions to MVA exposure.

#### 2.4.3. Help-seeking behavior

Current and past help-seeking from six formal sources (telephone counseling, face-to-face counseling, non-medical practitioner, general practitioner, psychiatrist, psychotherapist) and three informal sources (partner, family, friends) were assessed at T0 and T1 with nine dichotomous self-generated items ("Have you sought help from any of the following persons because of psychological difficulties?"). Help-seeking from psychotherapists was not assessed in more detail. During T0 interviews, participants reported all episodes of mental health service utilization, including duration, primary problem domain, and providers consulted.

#### 2.4.4. Barriers toward psychological treatment

Perceived barriers were assessed at T0 and T1 with 14 self-generated items (e.g., "There are not enough psychotherapists in my area") rated on a five-point Likert scale (0 "totally disagree" to 4 "totally agree").

#### 2.4.5. Self-medication

Substance use for coping was assessed at T0 and T1 with six self-generated items (e.g., "I drink alcohol.") rated from 1 ("never") to 5 ("daily").

#### 2.4.6. Socioeconomic status

Socioeconomic status was assessed at T1 using the multidimensional index proposed by Lampert *et al.*[32] The index combines information on education, occupation, and household income. Following the published scoring procedure, each component was categorized and assigned a point value according to its distribution in the German population. The resulting scores were summed to yield a composite index ranging from 3 to 21, with higher scores indicating higher socioeconomic status. The composite score can also be categorized as low, medium, or high socioeconomic status.

#### 2.4.7. Motor vehicle accident characteristics

Accident characteristics (3 characteristics, rated as present, not present, or not sure), injury-related disability (single item, rated on a nine-point Likert scale from 0 "not at all" to 8 "severely disabled"), accident-related fear (7 items, rated as present, not present, or not sure), and accident-related avoidance (10 items, nine-point Likert scale from 0 "Would not avoid it" to 8 "Always avoid it") were assessed at T0 with the Accident Fear Questionnaire (AFQ).[33] The avoidance subscale demonstrated good internal consistency ($\alpha_{sample}$ = 0.82). Additional details were obtained during the T0 interview with the Motor Vehicle Accident Interview,[34] a 47-item structured interview with open-ended, categorical, and Likert-format responses.

### 2.5. Data analysis

Analyses were conducted in R (version 4.4.2)[35] and the R packages *lavaan* (version 0.6.19),[36] *lme4* (version 1.1.36),[37] *papaja* (version 0.1.3)[38], and *performance* (version 0.13.0).[39]

Mean scores were calculated for the BSCL and PCL-5. No item-level missing data occurred for either scale at T0 or T1. Dichotomous variables for time point, MVA exposure, and help-seeking behavior were dummy-coded. Given the exploratory nature of the study, analyses were conducted using available data (listwise deletion per analysis). Missingness ranged from 0.0% to 52.6% and was primarily attributable to non-participation in interviews or follow-up surveys (Table S10).

Statistical significance was set at $\alpha = 0.05$. To account for multiple testing, *p*-values and corresponding confidence intervals were adjusted using the Bonferroni method.

First, psychological distress at T0 was compared between MVA-exposed and unexposed individuals using two-sided independent-samples *t*-tests. Within the MVA-exposed group, linear regression examined the association between time since the accident and baseline psychological distress.

Logistic regression models were used to examine (i) whether baseline psychological distress predicted psychological treatment utilization during the subsequent 12 months, (ii) associations of gender, age, and socioeconomic status with psychological treatment utilization prior to T0 while adjusting for baseline psychological distress, (iii) whether accident-related disability was associated with subsequent treatment utilization before and after adjustment for baseline psychological distress, and (iv) whether psychological treatment and other mental health care utilization prior to T0 predicted treatment utilization during follow-up before and after adjustment for baseline psychological distress. The contribution of hometown size was evaluated by comparing nested logistic regression models with and without hometown size, each time adjusting for baseline

psychological distress, using an *F*-test.

A mediation analysis using diagonally weighted least squares estimation explored whether baseline psychological distress statistically mediated the association between MVA exposure and subsequent psychological treatment utilization by estimating total, direct, and indirect effects.

Group differences between MVA-exposed and unexposed individuals, as well as individuals with and without psychological treatment utilization prior to T0, in perceived barriers to psychological treatment at T0 were examined using independent-samples *t*-tests, whereas differences in self-medication were examined using Wilcoxon rank-sum tests.

Finally, changes in psychological distress between T0 and T1 were examined using linear mixed-effects models with random intercepts for participants. Fixed effects comprised time point (dummy-coded with 0 indicating T0), psychological treatment utilization during the 12 months following T0 (dummy-coded with 0 indicating no treatment), and their interaction.

## 3. Results

### 3.1. Elevated psychological distress following motor vehicle accident experience

We first examined whether psychological distress at T0 differed between individuals with and without MVA exposure. Consistent with our expectations, MVA-exposed participants reported higher symptom severity than unexposed individuals on both the BSCL ($t$[96.91] = 3.19, $p_{Bonf.}$ = 0.004, $d$ = 0.53), and the PCL-5 ($t$[99.93] = 4.05, $p_{Bonf.}$ < 0.001, $d$ = 0.68). Within the MVA-exposed subgroup, exploratory analyses indicated no evidence of an association between time since MVA exposure and psychological distress at T0 (BSCL: $b$ = 0.00, 95% confidence interval [CI] [0.00,0.00], $t$(58) = 0.56, $p$ = 0.576 ; PCL-5: $b$ = 0.00, 95% CI [0.00,0.00], $t$(57) = 0.11, $p$ = 0.910).

### 3.2. Psychological distress as a predictor of treatment utilization

Consistent with our expectations, higher psychological distress at T0 was associated with a greater probability of psychological treatment utilization during the subsequent 12 months (BSCL: $b$ = 0.79, 98% CI [0.26,1.43], $z$ = 3.12, $p_{Bonf.}$ = 0.004, PCL-5: $b$ = 1.55, 98% CI [0.62,2.68], $z$ = 3.44, $p_{Bonf.}$ = 0.001).

Exploratory mediation analyses further examined whether baseline psychological distress statistically accounted for the association between MVA exposure and subsequent psychological treatment utilization. For the BSCL, the indirect association via psychological distress was statistically significant ($b$ = 0.25, 95% CI [0.05,0.45], $z$ = 2.44, $p$ = 0.015), whereas there was no evidence of a direct ($b$ = −0.34, 95% CI [−0.95,0.26], $z$ = 1.11, $p$ = 0.269) or total association ($b$ = −0.10, 95% CI [−0.74,0.55], $z$ = 0.29, $p$ = 0.771) between MVA exposure and treatment utilization (Figure 2). Comparable patterns were observed using the PCL-5 (Figure S1). Fit indices are not reported because the mediation models were saturated.

### 3.3. Sociodemographic characteristics and treatment utilization

Exploratory analyses provided no evidence of associations between psychological treatment utilization prior to T0 and gender ($b$ = 0.34, 95% CI [−0.48,1.19], $z$ = 0.80, $p$ = 0.425), age ($b$ = 0.02, 95% CI [−0.01,0.04], $z$ = 1.37, $p$ = 0.169), socioeconomic status ($b$ = −0.14, 95% CI [−0.35,0.07], $z$ = −1.30, $p$ = 0.195), or hometown size ($F$[4] = 0.42, $p$ = 0.792) after adjusting for baseline psychological distress (BSCL). The association between migration history and psychological treatment utilization could not be examined because only four participants reported a migration history.

### 3.4. Potential barriers to treatment utilization

Exploratory analyses compared perceived barriers to psychological treatment between MVA-exposed and unexposed individuals at T0 (Figure 3). Across both groups, the most frequently endorsed barrier was "could not find a therapist," followed by "fear of therapist rejection," "fear of insurance-related disadvantages," and "knowledge-related barriers" (Table S1).

Barriers with minimal endorsement ("distance to therapist's office": mean = 0.20, SD = 0.55), "dissuaded by a family member": mean = 0.13, SD = 0.47, "dissuaded by a health care professional": mean = 0.09, SD = 0.32) were excluded from inferential analyses. We found no evidence of differences between MVA-exposed and unexposed participants in perceived barriers (all $p_{Bonf.} \geq 0.364$, Table S2) or self-medication frequencies (all $p_{Bonf.} \geq 0.648$, Table S3).

Within the MVA-exposed subgroup, exploratory analyses indicated that higher accident-related disability as assessed with the AFQ at T0 was associated with a greater probability of psychological treatment utilization during follow-up ($b$ = 0.79, 95% CI [0.29,1.58], $z$ = 2.56, $p$ = 0.011). This association remained after adjustment for baseline psychological distress (Table S4).

### 3.5. Continuities in treatment utilization

Consistent with our expectations, psychological treatment prior to T0 was strongly associated with psychological

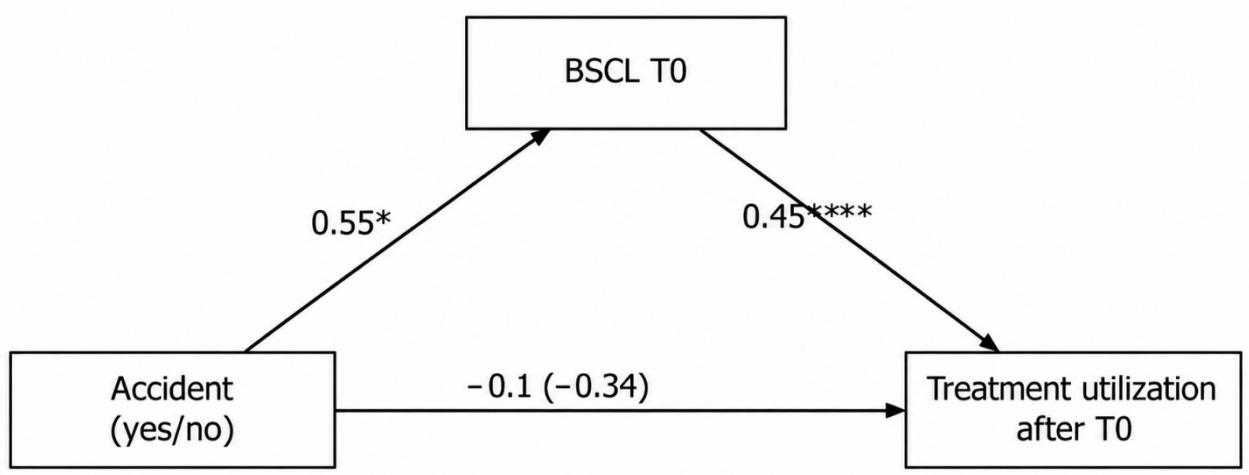



**Figure 2.** Exploratory mediation model examining the association between motor vehicle accident (MVA) exposure and psychological treatment utilization during follow-up through psychological distress at T0 (measured using the Brief Symptom Checklist [BSCL]). Numbers represent standardized regression coefficients. The coefficient in parentheses denotes the direct association between MVA exposure and treatment utilization during follow-up after accounting for psychological distress; the coefficient outside the parentheses represents the total association. Statistical significance determined at * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

treatment utilization during follow-up ($b$ = 2.58, 95% CI [1.39,3.90], $z$ = 4.10, $p < 0.001$). This association remained after adjustment for baseline psychological distress ($b$ = 2.43, 95% CI [1.04,3.99], $z$ = 3.29, $p$ = 0.001) (Table S5).

Additional exploratory analyses indicated that previous contact with other mental health providers was likewise associated with subsequent psychological treatment utilization (Table S6). Participants with psychological treatment prior to T0 also reported fewer knowledge-related barriers at baseline (Table S7).

### 3.6. Trajectories of psychological distress

Finally, we examined whether psychological treatment during the follow-up period was associated with differences in the trajectory of psychological distress between baseline and follow-up. Linear mixed-effects models indicated no evidence of a differential change in distress between participants who did and did not receive psychological treatment during follow-up (BSCL: $b$ = 0.17, 98% CI [−0.02,0.35], $t$[95.77] = 2.01, $p_{Bonf.}$ = 0.095; PCL-5: $b$ = 0.18, 98% CI [−0.13,0.49], $t$[96.60] = 1.31, $p_{Bonf.}$ = 0.387) (Figure 4, Table S8).

## 4. Discussion

Motor vehicle accident exposure is associated with persistent psychological distress, including PTSD, anxiety, and depression, yet access to effective treatments such as psychological treatment often remains limited. This exploratory prospective cohort study followed MVA-exposed and unexposed individuals over one year to examine psychological distress, psychological treatment utilization, and perceived barriers to treatment. Building on previous research, we examined whether MVA-exposed individuals reported higher psychological distress, whether baseline distress was associated with subsequent treatment utilization, whether perceived barriers differed between groups, and whether prior treatment utilization was associated with continued help-seeking over time. In addition, we explored changes in distress in relation to treatment status.

Consistent with prior work,[4,5] MVA-exposed individuals reported substantially higher distress and PTSD symptoms than unexposed individuals, even though accidents occurred, on average, 18 months earlier. These findings are consistent with previous evidence suggesting that psychological distress may remain elevated long after an MVA[40] and support continued attention to the early identification of individuals experiencing persistent psychological distress following an MVA.

As expected, higher psychological distress was associated with a greater likelihood of psychological treatment over the following year, consistent with previous research suggesting that symptom burden is associated with help-seeking.[22] When controlling for differences in psychological distress, we did not observe differences in treatment utilization related to sociodemographic characteristics.

Although the mediation model suggested that

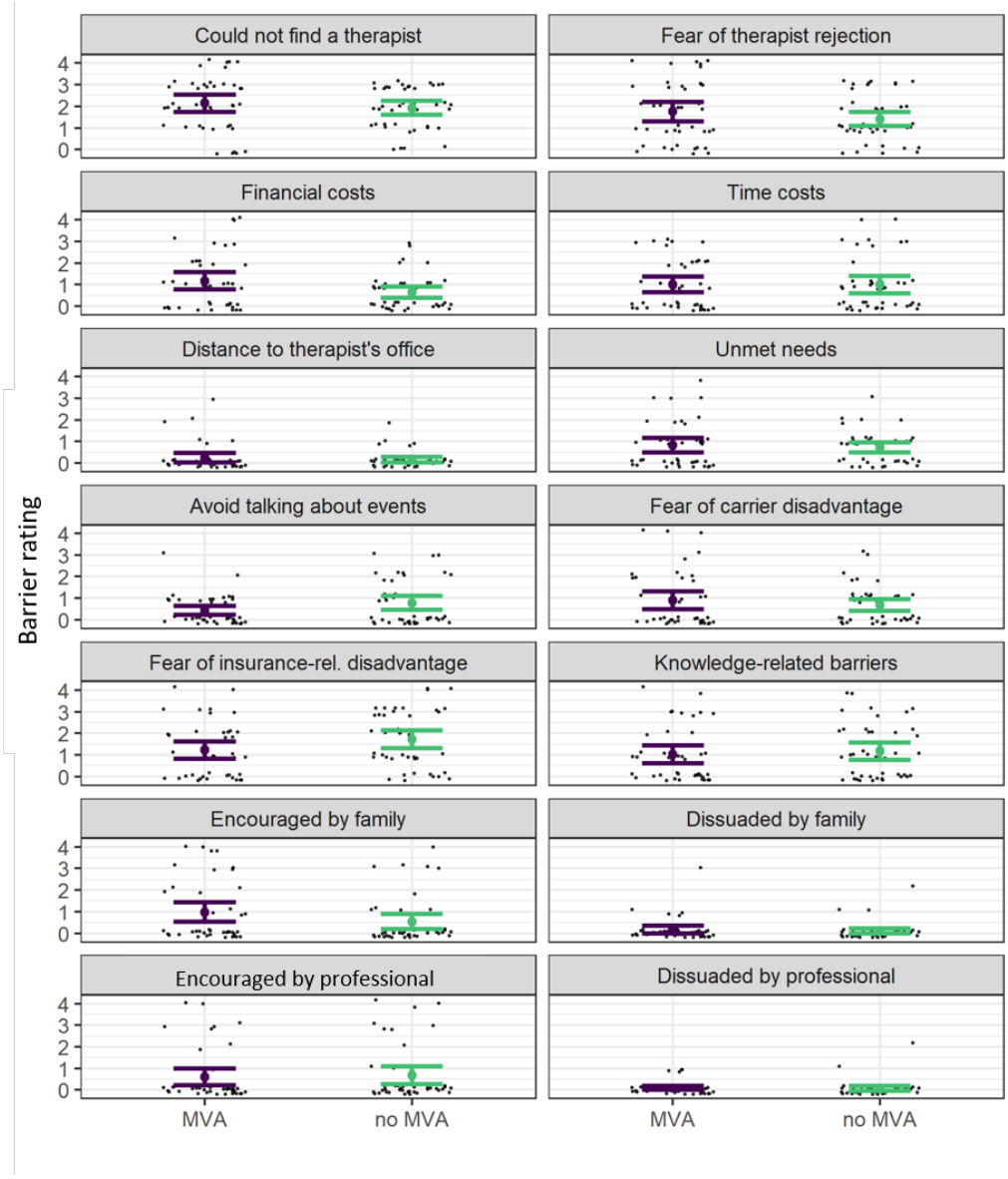



**Figure 3.** Perceived barriers to psychological treatment at T0 by motor vehicle accident (MVA) exposure status. Each facet displays one perceived barrier, with MVA-exposed and unexposed participants shown on the x-axis. Higher values on the y-axis indicate stronger endorsement of the respective barrier. Black dots represent individual participant responses, colored dots indicate group means, and error bars represent 95% confidence intervals around the group means. Fear of insurance-rel. disadvantage: Fear of insurance-related disadvantages.

psychological distress may statistically account for part of the association between MVA exposure and subsequent treatment utilization, MVA exposure itself was not associated with a higher probability of receiving treatment. Given the exploratory nature of the analysis, this pattern should be interpreted cautiously. Rather than indicating a specific mechanism, it suggests that psychological distress alone may not fully explain help-seeking following an MVA and that additional determinants remain to be identified.[41] Several potential explanations received little support in the present data. MVA-exposed participants did not report higher endorsement of the assessed barriers or more frequent self-medication than unexposed participants. Likewise, accident-related disability was associated with a greater, rather than lower, probability of subsequent psychological treatment utilization, even after accounting for psychological distress. Together, these findings suggest that the discrepancy between elevated distress and unchanged treatment utilization is unlikely to be explained by the factors assessed in the present study.

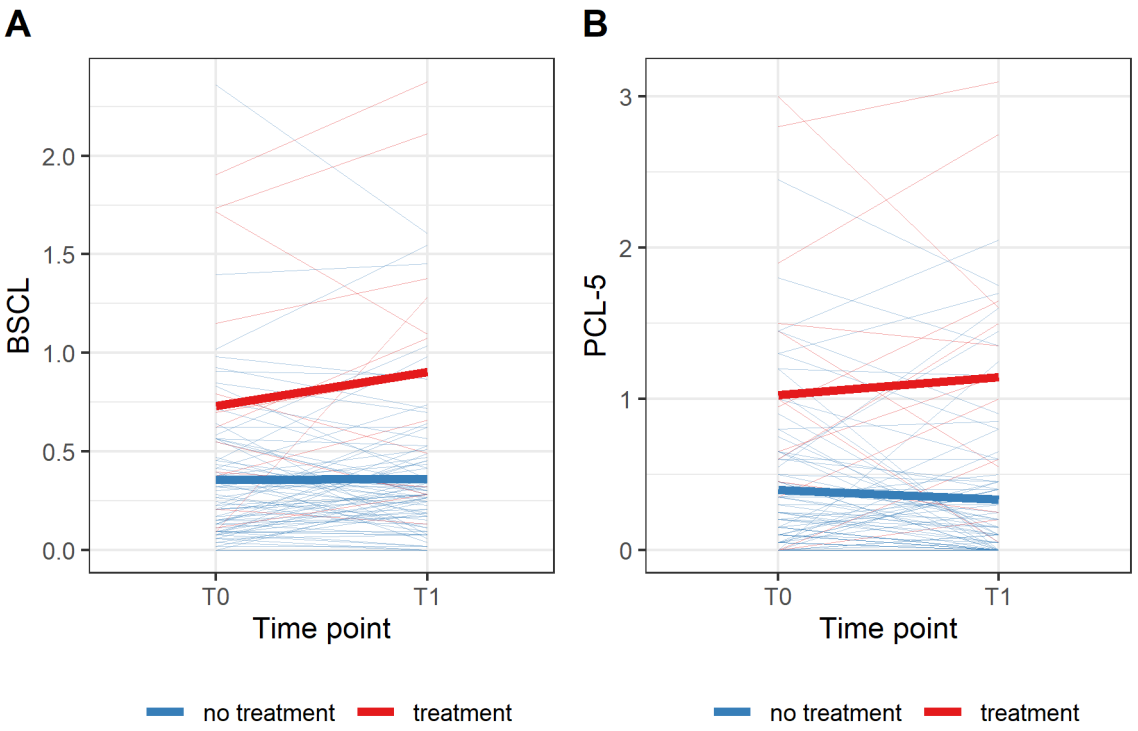



**Figure 4.** Development of psychological distress during follow-up as measured by (A) the Brief Symptom Checklist (BSCL) and (B) the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) in participants with non-missing data on psychological treatment ($n = 102$), stratified by treatment utilization during follow-up. The y-axis represents questionnaire scores and the x-axis represents time points (T0 and T1). Thin lines depict individual participant trajectories, while thick lines represent model-estimated trajectories.

Consequently, future studies should investigate additional determinants of help-seeking following MVAs. Potential candidates include trauma-related mental health literacy, beliefs about the causes and treatability of psychological symptoms, attribution of symptoms to the accident or its physical consequences, and other individual or health care system factors that were not captured in the present study.[42]

Although MVA-specific barriers were not identified, perceived structural barriers were frequently endorsed in both groups, with difficulty finding a therapist and fear of therapist rejection emerging as the most common obstacles. This pattern is consistent with broader evidence that structural aspects of mental health care remain important barriers to treatment access in Germany.[19]

Consistent with earlier studies,[20] treatment utilization showed strong continuity. Individuals with prior psychological treatment or other mental health service contact were more likely to engage in psychological treatment during the study period. One possible explanation is that prior treatment experience is associated with greater mental health literacy and familiarity with service pathways, lowering knowledge-related barriers, which were indeed less frequently reported among those with treatment history. These findings suggest that initial contact with the mental health care system may constitute a critical access threshold, highlighting the potential importance of simplifying first contact to improve overall access to psychological treatment.

Contrary to expectations, psychological treatment during follow-up was not associated with overall stronger distress reduction. This analysis should not be interpreted as an evaluation of treatment effectiveness, given the observational design and limited information on the timing, duration, and type of psychological interventions. An alternative explanation is that individuals with greater or more persistent psychological distress were also more likely to initiate treatment during follow-up. Consequently, this observational comparison cannot distinguish between differences in treatment effectiveness and differences in the clinical characteristics of individuals who did and did not receive treatment. Differences between MVA-exposed and unexposed individuals in symptom development over time could not be further elaborated due to limitations in sample size.

## 5. Limitations

Key strengths of the present study include its longitudinal design, which enabled the prospective examination of psychological distress and help-seeking over a one-year period, and the inclusion of both MVA-exposed and unexposed participants within a common study framework. Nevertheless, the findings should be interpreted in light of several important limitations.

First, the observational, exploratory design precludes causal conclusions. In particular, psychological distress was not assessed prior to MVA exposure, making it impossible to determine the extent to which between-group differences reflected pre-existing vulnerability rather than consequences of the accident itself.

Second, the study sample was subject to several potential sources of selection bias. Participants were originally recruited for a study on driving performance and therefore had to be active drivers. Individuals who permanently discontinued driving following an MVA, and who may be at particularly high risk for persistent psychological distress, were consequently not represented. In addition, participation was voluntary, which may have introduced further self-selection. Together, these factors may have limited the generalizability of the findings and may have led to an underestimation of psychological distress following MVA exposure.

Third, attrition between baseline and follow-up was substantial (39.3%), and analyses were based on available cases. Although observed differences between completers and non-completers were limited to baseline interview participation (Table S9), attrition may still have biased the findings through associations with unmeasured characteristics related to psychological distress or help-seeking. Because no plausible imputation model could be specified for the heterogeneous longitudinal outcomes examined in this exploratory study, we considered available-case analyses to be the more transparent approach.

Fourth, the sample size was determined by feasibility and available resources rather than a formal *a priori* power analysis. Consequently, the study should be regarded as exploratory, and statistically non-significant findings should not be interpreted as evidence for the absence of associations. A post hoc sensitivity analysis indicated that the available sample provided 80% power to detect standardized between-group differences of at least $d \geq 0.45$, suggesting that smaller but potentially clinically relevant effects may have gone undetected.

Fifth, several constructs, including perceived barriers to psychological treatment and self-medication, were assessed using study-specific single-item measures that have not undergone formal psychometric validation. Measurement error and limited construct coverage may therefore have attenuated associations and contributed to the absence of group differences. In particular, potentially relevant determinants of help-seeking, such as trauma-related mental health literacy, were not comprehensively assessed.

Finally, the interval between MVA exposure and baseline assessment varied considerably, averaging more than one year since the accident. As a result, the study primarily reflects longer-term psychological adaptation following MVAs and may have missed associations that are more pronounced during the acute post-accident period. Furthermore, only two assessment time points limited the investigation of temporal dynamics among psychological distress, help-seeking, and perceived barriers.

## 6. Conclusion

In this exploratory study, MVA-exposed individuals reported higher levels of psychological distress than unexposed participants, and greater distress was associated with subsequent psychological treatment utilization. However, MVA exposure itself was not associated with a higher probability of receiving psychological treatment, suggesting that psychological distress alone may not fully explain help-seeking behavior following an MVA. The observed continuity in help-seeking further suggests that previous contact with the mental health care system may represent an important access threshold. Although this study did not identify MVA-specific barriers, it highlights the need to better understand the psychological and health care system factors that shape help-seeking after an MVA. Future research using larger samples, validated measures, and more comprehensive assessments of help-seeking processes is needed to identify these determinants and to inform strategies for improving timely access to psychological care for individuals experiencing persistent psychological distress following MVA exposure.

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## Conflict of interest

The authors declare no conflict of interest.

## Author contributions

*Conceptualization*: All authors
*Data curation*: Franziska Epe-Jungeblodt.
*Formal analysis*: Franziska Epe-Jungeblodt.
*Investigation*: All authors
*Methodology*: All authors
*Writing - original draft*: Franziska Epe-Jungeblodt
*Writing - review & editing*: Marta Andreatta, Katja Bertsch

## Ethics approval and consent to participate

The Ethics Committee of the Department of Psychology at Julius-Maximilians-Universität Würzburg approved this research (Approval No. GZEK 2020-70, Date: September 23, 2020; Approval No. GZEK 2021-54, Date: July 26, 2021; and Approval No. GZEK 2023-11, Date: February 2, 2023). All participants gave written informed consent in accordance with the Declaration of Helsinki, and minors could participate only with parental consent. Participant data were pseudonymized at data collection using a coding list and anonymized for data analysis.

## Consent for publication

Participants consented to the use of their anonymized raw data for scientific purposes This includes scientific analyses of the anonymized raw data and publication of the results. Participants did not consent to their anonymized raw data being made publicly available via public data repositories. Therefore, the raw data is not publically available.

## Availability of data

Questionnaires without copyright protection, such as the questionnaires on perceived barriers and health care utilization, are publicly available on the OSF repository (https://osf.io/dmjn9/; code is available at https://osf.io/nceqw/). Participant data are not publicly available for privacy reasons.

## Further disclosure

The authors used ChatGPT-5.5 (OpenAI, 2025) to assist with stylistic editing and language revision, including ensuring grammatical correctness and suggesting phrasing improvements for text generated by the authors. All scientific content, including study design, data analyses and interpretation, and conclusion, were generated by the authors, and all AI-assisted content has been manually verified by the authors for accuracy and originality.

## References

1. Benjet C, Bromet E, Karam EG, *et al*. The epidemiology of traumatic event exposure worldwide: results from the World Mental Health Survey Consortium. *Psychol Med*. 2016;46(2):327-343.

   doi: 10.1017/S0033291715001981

2. European Commission. *Facts and Figures: Gender*. European Road Safety Observatory. Brussels, Belgium: European Commission, Directorate General for Transport; 2025. Accessed November 5, 2026. https://road-safety.transport.ec.europa.eu/document/download/1e7b4666-fb5c-435e-bc45-82ed910d3549_en?filename=ff_gender_2025.pdf

3. Eurostat. Persons killed in road accidents by type of vehicle. Published 2025.

   doi: 10.2908/TRAN_SF_ROADVE

4. Bhateja A, Kumar P, Gaidhane S, *et al*. Post-traumatic stress disorder among road traffic accident survivors: a systematic review and meta-analysis. *Transp Res Interdiscip Perspect*. 2025;30:101374.

   doi: 10.1016/j.trip.2025.101374

5. Kovacevic J, Miskulin M, Degmecic D, *et al*. Predictors of mental health outcomes in road traffic accident survivors. *J Clin Med*. 2020;9(2):309.

   doi: 10.3390/jcm9020309

6. Fischer IC, Na PJ, Harpaz-Rotem I, Marx BP, Pietrzak RH. Prevalence, correlates, and burden of subthreshold PTSD in US veterans. *J Clin Psychiatry*. 2024;85(4).

   doi: 10.4088/JCP.24m15465

7. Cuijpers P, Miguel C, Harrer M, *et al*. Cognitive behavior therapy vs control conditions, other psychotherapies, pharmacotherapies and combined treatment for depression: a comprehensive meta-analysis including 409 trials with 52,702 patients. *World Psychiatry*. 2023;22(1):105-115.

   doi: 10.1002/wps.21069

8. Gaskell C, Simmonds-Buckley M, Kellett S, *et al*. The effectiveness of psychological interventions delivered in routine practice: systematic review and meta-analysis. *Adm Policy Ment Health*. 2023;50(1):43-57.

   doi: 10.1007/s10488-022-01225-y

9. Öst LG, Enebrink P, Finnes A, *et al*. Cognitive behavior therapy for adult post-traumatic stress disorder in routine clinical care: a systematic review and meta-analysis. *Behav Res Ther*. 2023;166:104323.

   doi: 10.1016/j.brat.2023.104323

10. Brandstetter S, Dodoo-Schittko F, Speerforck S, *et al*. Trends in non-help-seeking for mental disorders in Germany between 1997-1999 and 2009-2012: a repeated cross-sectional study. *Soc Psychiatry Psychiatr Epidemiol*. 2017;52(8):1005-1013.

    doi: 10.1007/s00127-017-1384-y

11. Sharifian N, LeardMann CA, Kolaja CA, *et al*. Factors associated with mental healthcare utilization among United

States military personnel with posttraumatic stress disorder or depression symptoms. *Am J Prev Med*. 2025;68(2):289-299.

doi: 10.1016/j.amepre.2024.10.006

12. Auerbach K, Surges F. *Versorgung Psychischer Unfallfolgen* [Accident-Related Mental Health Care]. Bremen, Germany: Fachverlag NW in Carl Ed. Schünemann KG; 2019. [In German]. Accessed November 5, 2026. https://www.amazon.de/Versorgung-psychischer-Unfallfolgen-Bundesanstalt-Strassenwesen/dp/3956064747
13. Nordbrandt MS, Vindbjerg E, Mortensen EL, Carlsson J. Chronicity of posttraumatic stress disorder and comorbid pain as predictors of treatment response for trauma-affected refugees. *J Trauma Stress*. 2022;35(5):1393-1404.

doi: 10.1002/jts.22839

14. Hammer JH, Vogel DL, Grzanka PR, *et al*. The integrated behavioral model of mental health help seeking (IBM-HS): a health services utilization theory of planned behavior for accessing care. *J Couns Psychol*. 2024;71(5):315-327.

doi: 10.1037/cou0000754

15. Kantor V, Knefel M, Lueger-Schuster B. Perceived barriers and facilitators of mental health service utilization in adult trauma survivors: a systematic review. *Clin Psychol Rev*. 2017;52:52-68.

doi: 10.1016/j.cpr.2016.12.001

16. Huff NR, Dunderdale L, Kellogg AJ, Isbell LM. Factors related to help-seeking and service utilization for professional mental healthcare among young people: an umbrella review. *Clin Psychol Rev*. 2024;114:102504.

doi: 10.1016/j.cpr.2024.102504

17. Hawn SE, Cusack SE, Amstadter AB. A systematic review of the self-medication hypothesis in the context of posttraumatic stress disorder and comorbid problematic alcohol use. *J Trauma Stress*. 2020;33(5):699-708.

doi: 10.1002/jts.22521

18. Sheerin C, Berenz EC, Knudsen GP, *et al*. A population-based study of help seeking and self-medication among trauma-exposed individuals. *Psychol Addict Behav*. 2016;30(7):771-777.

doi: 10.1037/adb0000185

19. Singer S, Maier L, Paserat A, *et al*. Wartezeiten auf einen Psychotherapieplatz vor und nach der Psychotherapiestrukturreform. *Psychotherapeut*. 2022;67(2):176-184.

doi: 10.1007/s00278-021-00551-0

20. Schreiber V, Renneberg B, Maercker A. Seeking psychosocial care after interpersonal violence: an integrative model. *Violence Vict*. 2009;24(3):322-336.

doi: 10.1891/0886-6708.24.3.322

21. Kamali M, Edwards J, Anderson LN, Duku E, Georgiades K. Social disparities in mental health service use among children and youth in Ontario: evidence from a general, population-based survey. *Can J Psychiatry*. 2023;68(8):596-604.

doi: 10.1177/07067437221144630

22. Loef B, Meulman I, Herber GCM, *et al*. Socioeconomic differences in healthcare expenditure and utilization in The Netherlands. *BMC Health Serv Res*. 2021;21(1):643.

doi: 10.1186/s12913-021-06694-9

23. Üzümçeker E. Traditional masculinity and men's psychological help-seeking: a meta-analysis. *Int J Psychol*. 2025;60(2):e70031.

doi: 10.1002/ijop.70031

24. Wuthrich VM, Frei J. Barriers to treatment for older adults seeking psychological therapy. *Int Psychogeriatr*. 2015;27(7):1227-1236.

doi: 10.1017/S1041610215000241

25. Statistisches Bundesamt (Destatis). *Verkehrsunfälle 2021* [Road Traffic Accidents in 2021]. Wiesbaden, Germany: Statistisches Bundesamt (Destatis); 2022. Accessed February 22, 2023. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Verkehrsunfaelle/Publikationen/Downloads-Verkehrsunfaelle/verkehrsunfaelle-zeitreihen-pdf-5462403.pdf?__blob=publicationFile&v=18 [In German].
26. Lui JC, Sagar-Ouriaghli I, Brown JSL. Barriers and facilitators to help-seeking for common mental disorders among university students: a systematic review. *J Am Coll Health*. 2024;72(8):2605-2613.

doi: 10.1080/07448481.2022.2119859

27. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA*. 2013;310(20):2191-2194.

doi: 10.1001/jama.2013.281053

28. Tomzig M, Metzulat M, Hoffmann S, Kenntner-Mabiala R, Epe-Jungeblodt F. *Einfluss psychischer Unfallfolgen auf die verkehrssicherheitsrelevante Fahrkompetenz verunfallter Pkw-Fahrer* [Influence of Psychological Consequences of Accidents on the Road Safety-Relevant Driving Competence of Car Drivers Involved in Accidents]. Bergisch Gladbach, Germany: Bundesanstalt für Straßenwesen; 2024. [In German]. Accessed November 5, 2026. https://www.bast.de/DE/Publikationen/BerichteBASt/Berichte/unterreihe-m/2024-2023/m350.html
29. Franke GH. *BSCL: Brief-Symptom-Checklist*. Göttingen, Germany: Hogrefe; 2017.
30. Krüger-Gottschalk A, Knaevelsrud C, Rau H, *et al*. The German version of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): psychometric properties and

diagnostic utility. *BMC Psychiatry*. 2017;17(1):379.

doi: 10.1186/s12888-017-1541-6

31. Margraf J, Cwik JC. *Mini-DIPS Open Access: Diagnostisches Kurzinterview bei psychischen Störungen* [Mini-DIPS Open Access: Short Diagnostic Interview for Mental Disorders]. Bochum, Germany: Ruhr-Universität Bochum; 2017. [In German].

    doi: 10.13154/RUB.102.91

32. Lampert T, Hoebel J, Kuntz B, Müters S, Kroll LE. Messung des sozioökonomischen Status und des subjektiven sozialen Status in KiGGS Welle 2 [Assessment of socioeconomic status and subjective social status in KiGGS wave 2]. *J Health Monit*. 2018;3(1). [In German].

    doi: 10.17886/RKI-GBE-2018-016

33. Kuch K, Cox BJ, Direnfeld DM. A brief self-rating scale for PTSD after road vehicle accident. *J Anxiety Disord*. 1995;9(6):503-514.

    doi: 10.1016/0887-6185(95)00029-N

34. Blanchard EB, Hickling EJ. *After the Crash: Psychological Assessment and Treatment of Survivors of Motor Vehicle Accidents*. 2nd ed. Washington, DC: American Psychiatric Association; 2004.

    doi: 10.1037/10676-000

35. R Core Team. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing; 2023. Accessed November 5, 2026. https://cran.r-project.org/doc/manuals/r-release/fullrefman.pdf

36. Rosseel Y. lavaan: an R package for structural equation modeling. *J Stat Softw*. 2012;48(2):1-36.

    doi: 10.18637/jss.v048.i02

37. Bates D, Mächler M, Bolker B, Walker S. Fitting linear mixed-effects models using lme4. *J Stat Softw*. 2015;67(1):1-48.

    doi: 10.18637/jss.v067.i01

38. Aust F, Barth M. papaja: prepare reproducible APA journal articles with R Markdown. 2023. Accessed November 5, 2026. https://www.rdocumentation.org/packages/papaja/versions/0.1.4/topics/papaja

39. Lüdecke D, Ben-Shachar MS, Patil I, Waggoner P, Makowski D. performance: an R package for assessment, comparison and testing of statistical models. *J Open Source Softw*. 2021;6(60):3139.

    doi: 10.21105/joss.03139

40. Kenardy J, Shannon LE, Shourie S, *et al*. 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. *J Affect Disord*. 2018;236:172-179.

    doi: 10.1016/j.jad.2018.04.090

41. Hayes AF. Beyond Baron and Kenny: statistical mediation analysis in the new millennium. *Commun Monogr*. 2009;76(4):408-420.

    doi: 10.1080/03637750903310360

42. Saint Arnault D, Zonp Z. Understanding help-seeking barriers after gender-based violence: validation of the Barriers to Help Seeking-Trauma version (BHS-TR). *Arch Psychiatr Nurs*. 2022;37:1-9.

    doi: 10.1016/j.apnu.2021.12.004