

Training insurance claim handlers in evidence-based management of whiplash-associated disorder claims: A controlled trial

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Abstract

Purpose

To assess whether Best Practice Whiplash (BPW) training improves claim handlers' knowledge, attitudes, and self-efficacy in risk screening and evidence-based management of whiplash-associated disorder (WAD) claims.

Methods

A non-randomized controlled trial was conducted among 53 Dutch insurance claim handlers, including an intervention group ($n = 23$) and a wait-listed control group ($n = 30$). Training focused on 1) identifying risk factors for poor recovery and 2) applying evidence-based treatment recommendations tailored to the claim's stage. Primary outcomes included knowledge, attitudes, self-efficacy and self-rated ability to manage WAD claims. Between-group differences were assessed from baseline (T0) to four weeks post-training (T1), intervention group retention effects were evaluated from T0 to ten weeks post-training (T2).

Results

Knowledge ($p < .001$) and self-efficacy ($p = .002$) increased significantly between T0 and T1 in the intervention group compared with controls, satisfaction with ability to handle WAD claims not significantly. Improvements in knowledge and self-efficacy maintained at T2. Participants generally expressed positive attitudes towards BPW recommendations, however, provided tools usage remained limited. Reported barriers included delayed or absent contact with claimants, frequently due to legal representation.

Conclusions

BPW training was associated with improvements in claim handlers' knowledge and self-efficacy regarding evidence-based WAD claim management. Improvements did not translate into widespread implementation of BPW tools.

Introduction

Road traffic accidents were projected by the WHO to become the third leading cause of global disease burden in terms of disability by 2030 [1] and the incidence of non-catastrophic injuries resulting from such accidents has indeed increased over time [2]. To support recovery from these injuries, many countries have injury compensation and rehabilitation systems aimed at facilitating recovery and return to work following road traffic accidents [3, 4]. Depending on the legal and insurance framework, injured individuals may be eligible for compensation through first- or third-party insurance. Compensation may cover income loss, limitations in daily activities and caregiving, and uninsured medical care. Recovery is shaped by the context of the insurance compensation system in which it takes place [5, 6], making management of insurance claims an integral part of the broader occupational rehabilitation process.

Of all injury compensation claims, those related to chronic non-specific symptoms following non-catastrophic traffic accidents – especially whiplash-associated disorder (WAD) – present a particular challenge [7]. Although most individuals improve over time, approximately 20% of WAD patients develop persistent symptoms [8–10]. This subgroup mainly consists of individuals reporting neck pain and pain-related disability without objectively verifiable injury, corresponding to WAD grades I–II [11], complicating both clinical management and insurance claim handling, particularly with regard to prognosis, treatment, and return to work expectations. WAD is associated with poorer health, prolonged sickness absence, and limitations in self-care and household activities [12–16]. Individuals with WAD may also experience frustration and feel misunderstood by their social environment and liable insurance party [17–19]. For insurers, WAD claims create substantial compensation and administrative costs, while the need to resolve claims fairly without hindering recovery, increasing demand for better recovery support and optimizing claim handling processes.

Considerable effort has therefore been directed toward improving recovery for WAD. Three complementary streams of literature have emerged. The first concerns early identification of risk factors for delayed recovery or chronicity [20–22]. Both the whiplash-specific screening tool (WhipPredict) and the modified generic short-form Örebro Musculoskeletal Pain Screening Questionnaire (SF-ÖMPSQ) have been found to predict poor recovery following WAD with acceptable accuracy [23]. Risk stratification of claims may enable targeted allocation of resources and may facilitate appropriate treatment and rehabilitation pathways.

The second body of literature focuses assessment, prognosis, and evidence-based management of WAD. Foundational work by the Quebec Task Force established the widely used WAD classification system and provided an early framework for assessment and management of WAD [11]. Subsequently, systematic reviews have evaluated interventions, informing clinical practice guidelines and recommendations for the management of WAD for both the acute and chronic phases of recovery. [24–27].

A third stream concerns the role of insurance system and claim handling. Client-insurer relationships, claim handling practices, and the involvement of legal representatives all affect recovery trajectories [15, 28]. Changes in compensation scheme design and claims management approaches are also associated with differences in WAD health outcomes, suggesting that insurance systems may facilitate or hinder recovery [5, 6]. Integrated medical and psychosocial perspectives may support better outcomes. For example, targeted support for claimants with poor initial health status or low recovery expectations have been associated with improved health outcomes [29]. These findings have contributed to a growing view that insurance systems and liable parties may

therefore act as recovery facilitators, not only compensators [3]. Herein, claim handlers occupy a central position, acting as the primary interface between injured individuals and the compensation system [30, 31].

Recent work has sought to integrate these three bodies of literature, combining clinical evidence with prognostic, psychological, occupational, and claims-related considerations [7]. By synthesizing evidence concerning early risk screening, evidence-based treatment, and recovery support for insurers and other stakeholders involved in personal injury claims, the so called the “Best Practice Whiplash (BPW)” guidelines for WAD claim handling were created [7]. The current study will field-test these newly developed Best Practice Whiplash (BPW) recommendations at a major Dutch insurance company. Participating claim handlers were offered training in evidence-based early risk screening and stage-appropriate WAD claims management. The primary objective was to evaluate how training affected claim handlers’ knowledge and attitudes towards risk screening and evidence-based treatment of WAD. Secondary objectives assessing effects on self-efficacy, training satisfaction and perceived proficiency in WAD claim handling.

Materials and methods

Study design

A non-randomized controlled trial comprised of an intervention - and a wait-listed control group. To assess the effect of the training, outcomes of the claim handlers who received the training first (intervention group) were compared with those of claim handlers who had not yet received the training (waiting control group). In addition to efficacy outcomes, claim handlers’ satisfaction with the training were explored. The intervention group received the BPW training in September 2024, while the control group received the same training three months later, in December. Measurements were conducted at baseline (T0) in both groups, at four weeks post-training (T1) in both groups, and at ten weeks post-training in the intervention group only (T2).

Participants

Claim handlers serve as the primary interface between victims and the insurance system’s coordination of benefits, ultimately charged with achieving optimal outcomes and controlling costs [30]. Because of their pivotal role in the claim process, claim handlers were chosen as participants in our study over medical advisors, who, by Dutch regulation, cannot communicate directly with victims if legally represented. Claim handlers from the second-largest third-party insurer in The Netherlands were included in this study. The company employs approximately 150 claim handlers, who collectively process thousands of WAD claims annually. Prior approval for the study was obtained from company management. Potential participants were initially contacted by the first author via email. Informed consent was obtained through a mandatory consent question included in the baseline questionnaire (T0) administered via Qualtrics. Claim handlers were excluded if they did not process WAD claims, were unable to attend the in-person training session on either scheduled date (training was not offered online due to its interactive nature), were unwilling or unable to complete the online questionnaires, and/or did not provide informed consent.

Procedure

Participants were allocated to groups based on their availability for the training dates. Questionnaires were programmed in Qualtrics and distributed via email, including a link to the online survey. Both groups completed a baseline questionnaire at the start (T0). The intervention group (A) subsequently received the training in September 2024; the control group (B) received the same training three months later. Four weeks after Group A’s training, both groups completed a second questionnaire (T1A for Group A and T1B for Group B). Group A then completed a third and final questionnaire (T2A) three months post-training, December 2024. Later that week, the control group (Group B) received the same training. Approximately one month later, Group B completed their final questionnaire (T2B). A schematic overview of the participant flow through the trial is presented in figure 1.

Intervention

The training was developed to enable claim handlers to acquire knowledge on: 1. Risk factors with an increased likelihood of delayed recovery and chronicity, and how to screen for these factors; 2. Evidence-based effective treatment recommendations for WAD I-II, as well as treatments shown to be ineffective; 3. Best practices recommendations and instruments for WAD I-II claim handling.

An earlier version of the training was pilot tested in January 2024 by the first author during a scientific presentation for insurance doctors/medical advisors at a meeting of the Dutch Association of Medical Advisors in Private Insurance Matters. Minor adjustments were subsequently made based upon attendee feedback and discussions within the research team. The definitive training session lasted two hours, was given by the first author and took place at the insurer’s headquarters during office hours. The session included an interactive PowerPoint presentation and the use of relevant case studies for illustration and group discussion.

At the training, several recommendations and instruments were provided to participants: 1. The Dutch version of the Modified Version of the Short-Form Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ-SF), 2. The Best Practices Whiplash (BPW) Recommended WAD I-II claim handling document, 3. Acute and chronic WAD I-II treatment flowcharts. The OMPSQ-SF is a validated screening instrument for predicting future disability in individuals with WAD and other non-specific musculoskeletal conditions that interfere with work functioning. It has relatively few false positives and demonstrates moderate sensitivity and specificity [23]. The OMPSQ has been studied in the Netherlands primarily in the context of low back pain [32], but not yet specifically for neck pain, validation for neck pain populations is currently only available in German [33]. The “Best Practices Whiplash (BPW) – Recommended WAD I–II claim handling” instrument comprised an overview of evidence-based effective and ineffective therapies[7], supplemented with a self-developed, practical step-by-step plan for claim handlers. The WAD treatment flowcharts, one for the acute phase (from day 1 to 3 months post-injury) and one for the chronic phase (from 3 months to 1 year post-injury), were based on the draft fourth edition Whiplash Guidelines SIRA: Guidelines for the management of acute whiplash-associated disorders – for health professionals (*unpublished material shared by its authors*). The flowcharts were substantially adapted by the first author to

align with the Dutch insurance- and claim handling context. Prior to implementation, flowcharts were reviewed for medical accuracy by two independent insurance physicians not affiliated with the project. During the training, participants engaged in paired exercises using the BPW instruments, including asking screening questions. Participants also individually applied the recommendations and newly acquired knowledge to hypothetical versions of their own current cases, including risk assessments and claim-handling strategies, followed by paired discussions.

Outcome variables

Knowledge about risk factors and therapies was measured using 20 multiple-choice questions with answers consisting of true/false/don't know. Participants were presented with ten statements about predictive factors, six of which were proven; for instance: 'If a victim reports severe pain, this is a predictor of persistent symptoms' and 'A victim's own expectations about the duration of the pain symptoms are predictive'. Other statements were factitious, such as: 'If a victim is self-employed, this is a proven positive predictive factor' and 'A large Delta V is an important predictor of chronic symptoms'. Measurement points were at T0 (baseline), T1A (intervention group 4 weeks after training), T1B (control group after 4 weeks wait), T2A (intervention group 10 weeks after training) and T2B (control group 4 weeks after training). Knowledge questions were recoded: correct answers were coded 1, incorrect and 'don't know' were coded 0. Missing data were coded 0 as well. A sum score was then calculated, ranging from 0 to 20.

We measured *self-efficacy* in handling WAD I-II claims using two questions, consisting of a question about confidence in their own knowledge and a question about confidence in their own skills. Each question had five items, scored on a 5-point Likert scale (1 = very little confidence, and 5 = a great deal of confidence). Measurements were at baseline (T0) and at 4 weeks after the first training (T1A and T1B). For each measurement, we calculated a mean score per participant; a higher score representing greater confidence in their own knowledge and skills. Sum scores were also created for self-efficacy, resulting in a range of 10-50 for self-reliance for the two questions combined. Questions (originally in Dutch) addressing knowledge were about risk factors, effective therapies, role of victim's expectations, screening tools and promoting recovery. *Ability* questions included queries on screening, assessing efficacy and timeliness of treatments followed, encouraging victims and taking necessary action.

Attitudes (opinions and experiences) regarding the BPW Recommendations, flowcharts, and OMSPQ-SF usefulness were measured by scoring seven statements using a Likert scale (ranging from 1 = 'strongly disagree' to 5 = 'strongly agree'). For each measurement, we calculated a mean score per participant, a higher score representing a more positive attitude towards the recommendations and instruments. These questions were asked once: four weeks after the training for both groups. Two open-ended questions explored participants' attitudes, allowing them to specify whether they had used the recommendations in their daily work – or not, and elaborate on reasons for doing so.

Satisfaction with personal WAD claim handling skills was one question with an answer scale from 1 – 10 about the extent to which the participant was satisfied with their current ability to handle WAD claims, at baseline (T0) and at 4 weeks after the training (T1A and T1B).

Satisfaction with the *training* was measured once; all participants (intervention plus control) were asked four weeks after completion of the training (T1A and T2B) to respond to four statements about the training on a 5-point Likert scale. The questions addressed whether participants considered the training 1) enjoyable, 2) clear and logical, 3) understandable, 4) suitable to their level. Sum scores were calculated here as well, leading to total scores of 4-16.

Outcome variables were based on previous research by Snippen et al. [2022], who developed and evaluated a training for improving knowledge, attitudes and self-efficacy for professionals in a (workers' disability) social insurance setting.

Data analysis

Analyses were performed using SPSS version 28. Descriptive statistics were used (frequencies, percentages, means, standard deviations) to describe the study sample.

Differences in baseline characteristics were tested with t-tests for continuous variables and chi-square tests for categorical variables. Analyses were conducted per-protocol, excluding participants for whom responses were not completed. We also performed intention to treat analyses using the last observation carried forward approach, thereby including the participants lost to follow-up.

We assessed between-group differences in knowledge, self-efficacy and satisfaction with own skills between baseline (T0) and 4 weeks later (T1A and T1B) using an analysis of covariance (ANCOVA), applying a significance level of 0.05, using the baseline measurement as a covariate. Secondary analyses were performed adjusting for demographic characteristics (gender, age, work hours, and work experience). Partial Eta Squared effect sizes were calculated, where effects sizes of 0.01, 0.06, and 0.14 were considered to be respectively small, medium and large in magnitudes[34].

The retention of changes in knowledge, self-efficacy and satisfaction with own skills between baseline (T0) and second follow-up measurement of participants in the intervention group 10 weeks after baseline (T2A) were analyzed using paired t-tests and nonparametric related tests in case normality was violated.

Participants' answers to the open questions addressing whether or not and why they actually used the recommendations and tools provided were thematically categorized. Categories were based upon earlier research by Cabana et al. [35], who identified barriers for physicians to follow professional guidelines, i.e. (lack of) awareness, familiarity, agreement, self-efficacy, outcome expectancy, (in)ability to overcome the inertia of previous practice, and external factors influencing guideline adoption.

Attitudes

Attitudes towards the various tools (BPW recommendations, OMPSQ-SF screener, and treatment flowcharts) scores were combined for both intervention and control group at 4 weeks after the training (T1A and T2B).

Results

Sample description and Representativeness of the sample

At baseline, 53 participants filled out the questionnaire, of which 23 participants were assigned to the intervention group (group A) and 30 to the control group (Group B). Sixty-two percent of participants were female; no participant chose “other” as gender option. The mean age of the whole group was 47 years (SD=10.6). The majority (60%) worked full-time (33-40 hours per week); 40% worked part-time (<32 hours per week). The two smaller and two larger contract groups were consolidated into resp. part-time and full-time to simplify analyses, as was done for years of experience (two groups with up to 15 years and two with over 16 years of experience). Most participants (59%) had 16-25+ years of experience of working as a claim handler in the field of liability insurance (See table 1). At baseline, the intervention and control group were similar with regard to demographic and work characteristics. Participants who filled out T1 (n=37) and those who were lost to follow-up at T1 (n=16) were no different in gender nor workhours, but those lost to follow up were younger ($t(51) = 2.40, p = .020$) and were more likely to have <15 years of work experience ($df=1, n= 51) = 4.79, p=.029$) compared to those who filled out the T1 questionnaire.

Table 1. Baseline characteristics of participants

	All participants	Intervention Group A	Control Group B
Gender			
Female	33 (62%)	18	15
Male	20 (38%)	5	14
Age (mean, SD)	47 (10.6)	46.7 (9.87)	48.7 (11.47)
Contract			
Part-time 8-32 hr/wk	21 (40%)	12	9
Full-time 33-40 hr/wk	32 (60%)	11	21
Work experience			
0-15 yrs	22(41%)	8	14
16-25+ yrs	31(59%)	15	16
Total	53	23	30

The magnitude of positive change in outcome scores in the intervention group was significantly greater than in the control group for knowledge, $F(1, 27) = 23.21, p < .001, \eta_p^2 = .462$ and self-efficacy $F(1, 28) = 8.727, p = .006, \eta_p^2 = .238$). There was no significant main effect of the intervention for satisfaction with own skills $F(1, 24) = 0.79, p = .384, \eta_p^2 = .032$). Partial eta squared effect sizes ranged from $\eta_p^2 = .032$ to $\eta_p^2 = .462$, representing small to large effects (Table 2).

Table 2 Changes in Knowledge, Self-efficacy and Satisfaction with own skills

* = statistically significant

	Baseline (T0)		4-wks later (T1A & T1B)		Mean change score (T0 - T1A) & (T0 - T1B)	
	intervention n, mean, +/-sd	control n, mean +/-sd	intervention n, mean +/-sd	control n, mean +/-sd	intervention n, mean [95% CI]	control n, mean [95% CI]
Knowledge	n=22	n=30	n=11	n=21	n=10	n=21
of risk factors and therapies	12.91 +/- 3.24	11.10 +/- 2.66	17.00 +/- 2.10	11.00 +/- 2.61	3.00 [1.38;4.62]	-0.45 [-1.72;0.82]
Self-efficacy	n=22	n=30	n=10	n=23	n=9	n=22
in knowledge and skills	31.62 +/- 4.85	32.30 +/- 7.30	38.5 +/- 7.04	34.35 +/- 7.12	6.22 [0.67;1.61]	0.41 [-1.63;2.45]
Satisfaction	n=21	n=27	n=10	n=19	n=9	n=18
with own skills	6.43 +/- 1.17	6.37 +/- 1.67	7.20 +/- 0.92	6.74 +/- 1.24	0.56 [-0.22; 1.33]	0.17 [-0.69; 1.02]

After additionally adjusting for demographic characteristics, the effect of the intervention remained significant for knowledge ($F(1, 23)=13.59, p=.001, \eta_p^2 = 0.371$) and self-efficacy ($F(1, 24)=7.113, p=.013, \eta_p^2 = 0.229$). The effect on satisfaction with skills remained non-significant ($F(1, 20)=1.576, p=.224, \eta_p^2 = 0.073$). The intention to treat analyses had no influence on the main conclusions, although somewhat less strong: knowledge and self-efficacy were still significant (respectively $p = .005, \eta_p^2 = 0.153$; $p = .023, \eta_p^2 = 0.102$); satisfaction with skills was still non-significant ($p = .584, \eta_p^2 = 0.007$).

Ten participants of the intervention group (45%) completed the second follow-up questionnaire ten weeks after the training. These participants were included in the retention of change analyses. As illustrated in figure 2, there were no statistically significant within-group differences between the 4-week post-trial follow-up and the ten week follow-up for knowledge ($t(9)=-1.811, p=.070$), self-efficacy ($t(7)=-1.366, p=.214$) or satisfaction with regard to own skills ($t(7)=1.000, p=.317$).

Attitudes towards provided instruments

A total of 23 participants (n=11 in group A; n=12 in group B) completed the evaluation form after finishing the training module. Almost all participants (95.6%) (strongly) agreed the BPW Recommendations were useful and an equally large percentage of 87% (strongly) agreed to the statement that the recommendations contribute to WAD claim handling. However, only 43.5% of participants (strongly) agreed to have used the recommendations. Well over half (60.9%) of participants (strongly) agreed that the screening questions of the OMPQ-SF are useful, while 39.1% (strongly) agreed that they used the OMPQ-SF screener.

Over three quarters (78%) of participants (strongly) agreed that the flow charts for Acute and Chronic WAD are useful, 26.1% (strongly) agreed that they used the flowchart. Percentages representing attitudes towards the provided tools are shown in figure 3.

Satisfaction with the training

Of all participants (Group A at T1A and Group B at T2B combined), 73.9% answered 'completely agree' to questions about the enjoyability of the training; 65.2% thought it was completely clear and logical; 78.3% considered the training completely understandable, and 73.9% said it was suitable. There was no difference between group A and B in their total satisfaction score ($t(21) = 1.16, p = .130$).

Participants (n=29) who claimed to have actively utilized the BPW recommendations, reported doing so because of the 'structure and reference materials provided', including 'guidance on (in)effective therapies'. The recommendations were believed to 'facilitate screening', enabling 'early' and 'quick' intervention. The 'endorsement by the two universities involved' (VU and UMCG) added to user acceptance of the guidelines, which were deemed 'concrete' and aiming to 'ensure a smooth recovery for the claimant'. One user stated: *'the effectiveness of the recommendations is a key motivator for me'*.

The main reasons why the 20 participants did not utilize the recommendations were classified thematically, using the framework established by Cabana et al. [35][1999], who identified barriers to following clinical practice guidelines for physicians. Of these potential barriers, three themes appeared to be the most relevant in our group, namely knowledge, motivation and external factors. Barriers from the first theme, knowledge, were illustrated by responses such as: *'No, I didn't think about it'* and: *'No, not yet'*, implying limited awareness or partial implementation (4 out of 20; 20%). Insufficient motivation to utilize the recommendations appeared to bar three participants stating: *'It does not provide a solution. These are tools that can be used, but every claimant is different, and it is sometimes difficult to motivate someone or steer them in the 'right' direction'* and: *'I rely on my own experience and intuition'*, signaling a lack of perceived effectiveness (1 out of 20; 5%) and: *'Red flags will come up naturally during conversation, I don't really follow the list nor ask the victim to rate their pain' / 'Not suitable in conversation'* suggesting a perceived incompatibility with case handling (2 out of 20; 10%). External factors as barriers to embracing the recommendations were most often cited; first and foremost a lack of early contact with WAD victims (7 out of 20; 35%): *'Often I get whiplash claims not until after a year (passed on by colleague) therefore it's difficult to follow the recommendations and flowchart'* and: *'9 out of 10 times I don't do the intake myself'*. Indirect communication, only via legal representatives was named by 4 out of 20 participants (20%): *'I only work with legal representatives, which*

means I receive significantly less information. They always phrase things in a similar manner. When conducting an intake directly with the claimant, I can make a much better assessment'. Finally, time constraints due to workload was cited by 1 claim handler (5%) 'Often, the process already follows the described approach. Additionally, due to workload, it is practically impossible to follow all steps in a timely manner. Keeping track of a schedule is unfeasible.

Discussion

This study evaluated the effectiveness of a targeted training designed to improve claim handlers' knowledge, attitudes, and self-efficacy regarding risk screening and evidence-based management of WAD. Findings indicate that the training significantly improved knowledge and self-efficacy, suggesting it may be useful for strengthening evidence-informed WAD claims management within insurance settings. Although mean scores for self-rated satisfaction with skills in managing WAD claims increased following the training, this change did not reach statistical significance.

Participants generally expressed positive attitudes toward the recommendations, however, reported application of the instruments provided remained limited. Notably, the screening instrument (OMSPQ-SF) was perceived as the least useful and was also least frequently used. This finding is particularly noteworthy given concerns raised by management prior to the project that this instrument might not be received well by claimants or their legal representatives. More specifically, concerns were expressed that the OMSPQ could negatively influence claimants' expectations regarding recovery and potentially result in adverse publicity for the organization. In addition, several medical advisors informally indicated concerns regarding potential nocebo effect, whereby negative expectations about prognosis or recovery adversely affect health outcomes [36–38]. Although, to our knowledge, the potential for such effects in relation to the OMSPQ has not been established and was beyond our study's scope, these concerns may have influenced usage of the instrument. Further research is needed to determine whether such concerns are justified and how they may affect implementation of prognostic screening tools within claims management settings.

The study also provided insight into claims handlers' perceptions of utility and applicability of BPW recommendations, as well as barriers to their implementation and adherence. Most barriers identified were external in nature and related primarily to procedural and organizational constraints. In more than half of the cases in which recommendations were not implemented, participants reported limited opportunities for early and direct contact with WAD claimants, often due to the involvement of legal representatives. This finding is noteworthy, as previous research has highlighted the importance of the relationship between claims handlers and claimants for effective claim management and resolution [3]. Not being able to establish a direct and personal relationship may have several consequences. For example, limited direct contact may reduce opportunities to build trust, understand claimants' needs and concerns, and address factors that may influence recovery and return to normal activities.

Workload emerged as another important barrier, hindering claim handlers' ability to invest time and effort required to apply the recommendations consistently in daily practice. These findings suggest that successful implementation of the BPW recommendations may depend not only on claims handlers' knowledge and skills, but also on organizational conditions that facilitate timely communication and engagement with claimants.

Strengths and limitations

This study has several strengths. To our knowledge, it is the first to evaluate a training program aimed at improving WAD claim handling within the Dutch commercial insurance sector. In addition, the training content and recommendations were based on established WAD guidelines and materials developed by a multidisciplinary research group in Australia, supplemented by evidence identified through our own literature review. The BPW recommendations were further strengthened by integrating legal and psychological research, thus broader than if solely based on medical evidence. A further strength is the use of validated questionnaires, several of which were developed by and applied in a comparable study by Snippen et al. [39]. Finally, the assessment of multiple outcomes, including knowledge, attitudes, self-efficacy and self-reported behavior, provided a comprehensive evaluation of training effects.

Several limitations should also be acknowledged. First, the study may have been subject to potential selection bias and confounding, as claim handlers with a greater interest in WAD management or professional development may have been more likely to participate. Second, the original study design was a randomized controlled trial, however, due to scheduling constraints several participants mentioned unavailability at either training date. To avoid a reduced number of participants in both groups, the design was modified into a non-randomized controlled trial. Although this decision improved feasibility and participation, it may have increased the risk of baseline differences between groups. Finally, the relatively small sample size and substantial loss to follow-up (27/53 = 51%) reduced statistical power and may limit both the internal validity and the generalizability of our findings. Consequently, the results should be interpreted with appropriate caution and confirmed in larger studies.

Implications for future research and practice

The findings have several implications for both research and practice. First, future implementation could be extended by including other stakeholders involved in WAD claims management, particularly legal representatives of WAD victims. Given that limited direct communication with WAD victims emerged as a major barrier to following the recommendations, legal representatives may play a key role in facilitating their earliest application. First signs of support from the Dutch legal community suggest that broader implementation may be feasible: a personal injury lawyer argued that the recommendations should be adopted as the professional standard for a thorough approach to whiplash cases ¹. Further research is needed to assess their true acceptability and uptake among legal professionals. Second, successful implementation of BPW recommendations within insurance company settings may require organizational changes in addition to training. The findings indicate that claim handlers need time for early, direct contact, screening, and regular communication with WAD victims throughout the claims process. Organizational policies and workload demands should therefore be aligned with the practical requirements of evidence-based WAD claims management. Third, greater involvement of medical advisors may further aid implementation of recommendations. Future training initiatives could therefore be extended to medical advisors involved in WAD claims. In addition, improving communication and collaboration between claim handlers and medical advisors throughout the claim process may facilitate more consistent application of recommendations and enhance their

potential impact. Finally, further research is needed to evaluate the effectiveness of BPW recommendations on claimant outcomes. Longitudinal studies with extended follow-up could assess whether their implementation contributes to improved recovery, return to work and claimant satisfaction. Such research would provide important evidence regarding both the clinical and economic value of evidence-based WAD claims management.

Conclusion

In conclusion, the BPW training here evaluated was associated with significant improvements in claim handlers' knowledge and self-efficacy regarding evidence-based management of WAD. While organizational and procedural barriers may constrain implementation in practice, the training shows promise as an approach to support evidence-informed claims management. Future research should determine whether this produces lasting changes in professional practice and, ultimately, improved recovery and return-to-work outcomes.

Declarations

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Ethical approval

The protocol was submitted to the Ethics Committee for Legal and Criminological Research (CERCO), Faculty of Law, VU University Amsterdam. CERCO did not identify any ethical objections to the conduct of the study.

Informed consent

Voluntary informed consent was obtained from all participants in the study.

Author contributions

All authors contributed to the conception and design of the study. AR and NE developed the questionnaires and invitation letter; SB and AA reviewed the content. AR developed and gave the training sessions; NE, SB and AA reviewed the content of the training. AR performed the data collection, AR and NE the data analysis. AR drafted the manuscript, with support of NE and SB. All authors have contributed to the critical revision of the main intellectual content of the manuscript and have approved the final version.

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Competing interests

Neither the aforementioned Association of Insurers nor ASR had any input on research design, analysis or drafting of the manuscript. SB has no relevant financial or non-financial competing interests to report. None of the authors report any potential conflicts of interest, such as business or family interests.

Data availability statement

Data can be available upon reasonable request to the corresponding author.

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Footnotes

1. https://www.tijdschrift-lens.nl/art/100-4987_Whiplashzaken-observaties-van-een-letselschadeadvocaat

Figures

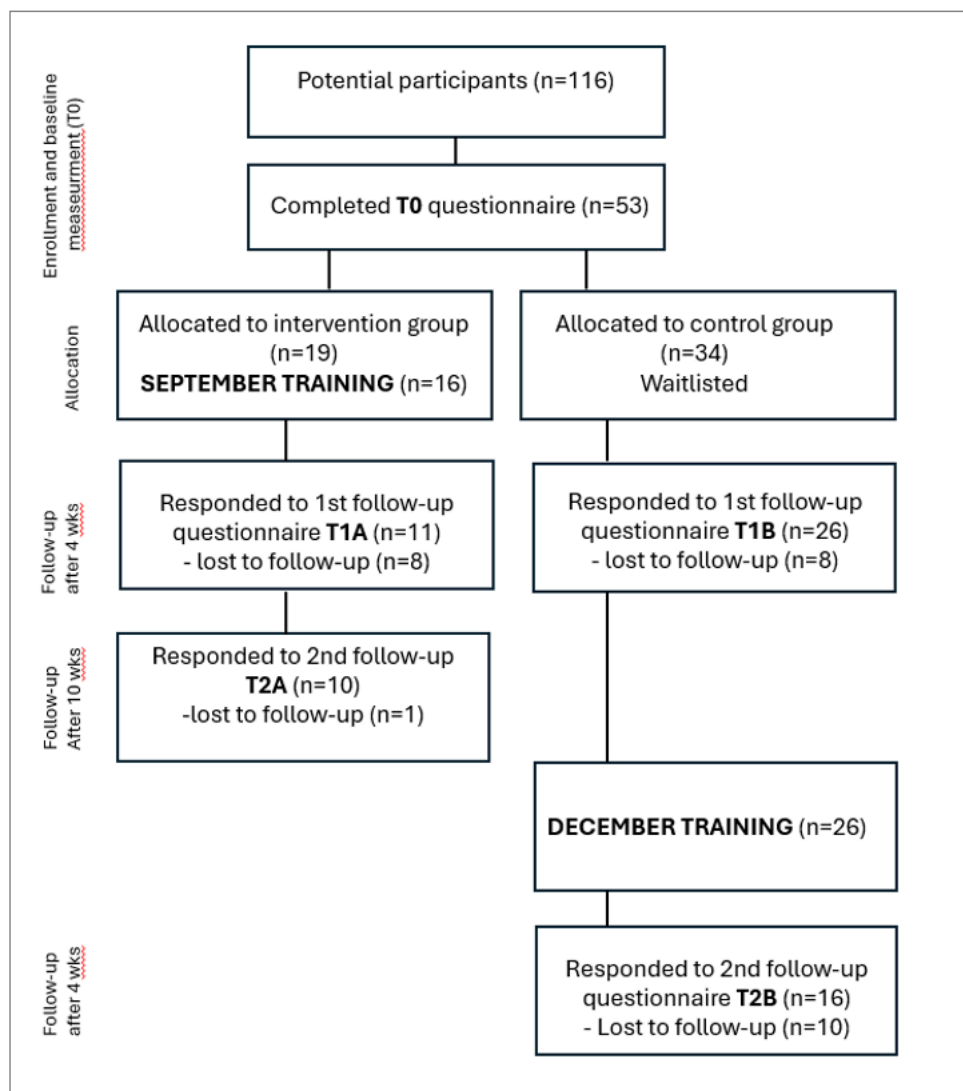


Figure 1

Flowchart of participants throughout the trial

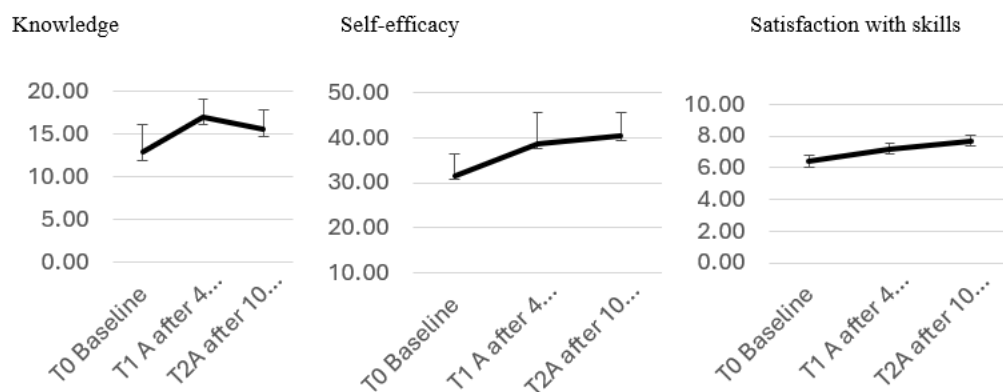


Figure 2

Changes over time for the outcome variables for participants in the intervention group

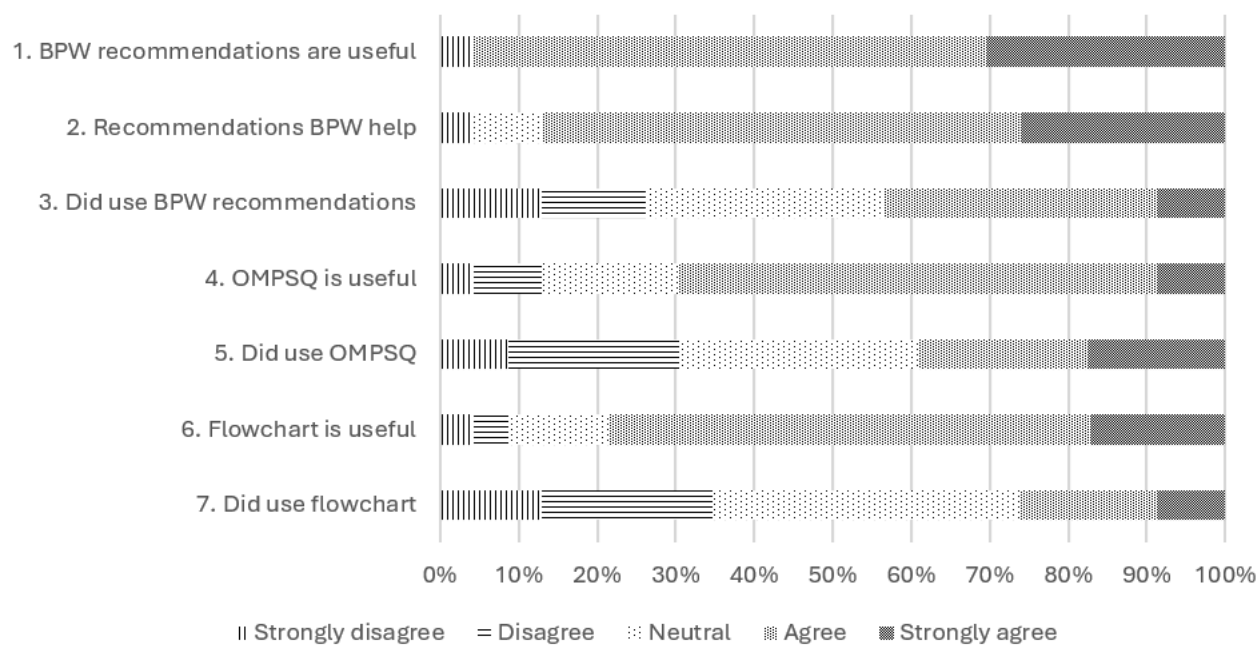


Figure 3

Attitudes Towards Provided Instruments

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