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Title: Are Psychological debriefing groups after a potential traumatic event suitable to prevent the symptoms of PTSD?

Short Title: A systematic search of literature on debriefing groups after a traumatic event

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1) Introduction

Posttraumatic stress disorder (PTSD) is among the most debilitating chronic psychiatric diseases. PTSD can last for years and is often comorbid with other psychiatric disorders, especially mood disorders, anxiety disorders and substance use disorders (Kessler, 1995), leading to a general burden and high socioeconomic costs. Depending on sociodemographic features, such as the income of the country of residence, the lifetime prevalence of PTSD varies from 1.3 to 12.2% and from 0.2 to 3.8% within 12 months after a potentially traumatic event (PTE) (Koenen et al., 2017). PTSD classically arises after individuals face a PTE. An event can be qualified as a PTE when a person is exposed to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence (American Psychiatric Association, 2013). It has been reported that the lifetime prevalence rate of exposure to PTEs in the general population is over 70%, and 30.5% of people will be exposed to at least 4 PTEs in their lives (Benjet et al., 2016).

To decrease the occurrence of PTSD in individuals who have faced a PTE, several approaches have been developed. Historically, the first structured intervention to be proposed was the Critical Incident Stress Debriefing (CISD). The CISD is a brief group intervention that lasts for less than 2 hours and was developed for groups of rescuers in 1983 (Mitchell, 1983). It is classically composed of 7 different phases: (1) introduction, where the debriefers explain the goal and process of the debriefing, (2) facts, where each participant in the debriefing describes his or her position during the event, (3) thoughts, where each participant describes what he or she thought during the event, (4) reaction phase, where emotional reactions and feelings are explored, (5) symptoms phase, which allows each participant to describe his or her physical, emotional, behavioral reactions since the PTE occurred, (6) teaching, in which the debriefers provide information on common reactions after a PTE, and (7) re-entry phase, in which a

summary of the process is provided by one debriefer. If administered to children, the intervention may include some adaptations, such as the use of drawings or role playing, to facilitate expression and communication. It focuses on people directly exposed to a PTE. It differs from psychotherapy, as it is a short and early intervention, it principally does not target any clinical population but anyone exposed to a PTE, and it seeks help before the potential occurrence of PTSD.

Since its first implementation, psychological debriefing (PD) has been widely used and extensively modified. For instance, individual debriefing, which was thought to facilitate the inclusion of participants in clinical studies, was proposed instead of group debriefing. This approach has also been proposed not only to rescuers but also to victims, to people exposed to repeated PTEs or to a unique event, etc. The clinical usefulness of PD has also been regularly evaluated in clinical trials with various methodologies, outcomes and targeted populations, leading to conflicting findings. Although some studies reported that PD might decrease the occurrence of PTSD, others reported that PD has no preventive effect (Lee et al., 1996) or even that individual PD might increase the occurrence of PTSD (Bisson et al., 1997). In a meta-analysis of studies evaluating the effectiveness of PD after a PTE, Rose and colleagues reported that PD had no beneficial effect on either the specific symptoms of PTSD or other nonspecific psychiatric symptoms that may occur after a PTE, such as depression and anxiety (Rose et al., 2002). Following these works, it was suggested that PD not be systematically offered to victims in clinical settings after a PTE. It was recommended to wait at least 2 weeks after the PTE and to propose therapy only for those who sought help and who presented specific or nonspecific PTSD symptoms (Forbes et al., 2007; Roberts et al., 2009).

However, these recommendations should be considered with caution. Actually, when considering the studies on PD in detail, it should be acknowledged that debriefing has often been practiced in inappropriately. As examples, debriefing was administered to participants

even if the event they had to cope with did not fully meet the definition of a PTE (Lee et al., 1996); PD was administered by debriefers who were either not sufficiently trained in the intervention or who were trained but did not have a background in mental health (Carlier et al., 1998; Mayou et al., 2000). More critically, PD was administered at an individual level, although it was designed to be a group intervention (Bisson et al., 1997; Conlon et al., 1999; Lee et al., 1996; Sijbrandij et al., 2006). Administering PD at an individual level instead of at a group level is an important methodological variation that may have influenced clinical outcomes and thus limits the conclusions that can be drawn from the previous meta-analyses. In a nonsystematic review of studies investigating the efficacy of group intervention after a PTE, Prieto and colleagues highlighted that PD could be affect PTSD symptoms and nonspecific symptoms under the condition that PD was administered to a group and not at an individual level (Prieto et al., 2010). They also suggested that applying a PD intervention that is close to the original CISD intervention proposed by Mitchell and colleagues may lead to better outcomes (Prieto et al., 2004).

Following these observations, we proposed to conduct a systematic and critical evaluation of studies where witnesses or victims received psychological debriefing intervention in psychological debriefing groups (PDGs) after a PTE. The aim of this review is therefore to perform a systematic inventory of empirical studies to assess the impact of psychological debriefing groups (PDGs) on PTSD symptoms and to evaluate their methodological quality.

2) Material And Methods

A systematic review was conducted following the recommendations of the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) guidelines (Liberati et al., 2009).

2.1. Eligibility

The inclusion criteria were as follows: i) full-length original articles published in the English language and in peer-reviewed journals; ii) studies that included a control group; iii) participants were directly exposed to a PTE according to the DSM-IV and DSM-5 criteria; iv) PDG was provided or at least offered to the victims; v) quantitative assessment was performed or the participants fulfilled standardized psychometric scales; and vi) specific symptoms of PTSD were evaluated. There were no age restrictions for inclusion and no time limit between the PTE and PDG.

Studies were excluded from the qualitative synthesis when the following criteria were identified: i) only individual debriefing was provided; and ii) the article was a literature review, letter to the editor or case report.

2.2. Research strategy

We conducted a systematic search in the PubMed, PubPsych and PsycINFO databases until October 2020 using the following MESH words with no limitation of date: (“debriefing” AND “Crisis Intervention”[Mesh]) AND ((“Stress Disorders, Traumatic, Acute”[Mesh]) OR (“Stress Disorders, Post-Traumatic”[Mesh])). We also examined the citation lists of the identified publications for additional studies and used the related article function of the PubMed database for other relevant sources of data. Two investigators (PV and LL) independently screened the title, abstract and key words of each reference identified by the search and applied the inclusion and exclusion criteria. For each potentially eligible reference, the same procedure was applied to the full-text article. Discrepancies between the reviewers were resolved via discussion with a third investigator (NP).

2.3. Data extraction

Two investigators (PV and LL) independently extracted the following data (when available): i) the type of traumatic event and the category of victims (civilians or trained staff); ii) demographic data (number of participants, age, sex); iii) characteristics of PDG including the delay between PTE exposure and PDG, the level of expertise of the debriefing practitioner, the group cohesion (i.e., whether participants from the group knew each other before the PTE); and iv) psychometric scales used as study outcomes.

2.4. Quality assessment

The quality of each study was assessed with the QualSyst checklist, which is used to assess the quality of quantitative studies. The QualSyst checklist evaluates the quality of research by encompassing a broad range of methodological criteria and was found to have high reliability (Kmet et al., 2004). This is a 14-item checklist allowing the assessment of research questions, objectives, study design, subject and comparison group, definitions of outcomes, sample size, analytic methods, confounding factors and reports of results. The items were scored depending on the degree to which the specific criteria were met (“yes” = 2, “partial” = 1, “no” = 0). A summary score was calculated for each article by summing the total score obtained across relevant items and dividing it by the total possible score (i.e., $28 - (\text{number of “n/a”} \times 2)$). One reviewer carried out full quality assessments (QualSyst), and a 25% random sample was extracted and evaluated by a second reviewer (NP). In case of discrepancies, these issues were resolved by a third reviewer (JB).

2.5 Data Analysis

Due to the large discrepancies between the design and methods of the included studies (type of PTE, type of the participants, delay between the PTE and the PDG, assessed outcomes, type of control group), it was not possible to conduct a reliable meta-analysis. By combining the 5 studies that provided the necessary material to run a meta-analysis (i.e., Pre/post means

and SD values in the group debriefing and in the control group): Thabet et al., 2005; Adler et al., 2008; Wu et al., 2011; Tuckey et al., 2014; Tarquinio et al., 2016, we observed a very high between studies heterogeneity ($I^2=99.76\%$, Q p-value<0.0001). We therefore choose to conduct a qualitative synthesis of the literature and to not report results from the meta-analysis.

3) Results

3.1. Search results and eligibility

As shown in Figure 1, 790 articles were identified in the databases, and 66 full-text articles were read after the exclusion of duplicates. Among the 66 full-text articles read, 55 articles were excluded. Thus, 11 articles fulfilled all the inclusion criteria and were eligible for quality assessment and qualitative review.

****PLEASE INSERT FIGURE 1 ABOUT HERE****

3.2. Quality Assessment

The overall methodological quality of the 11 retrieved articles was estimated to be between 0.5 and 0.96 (possible scores ranged from 0.0 to 1.0). The mean methodological quality score was 0.76. The study by Wu et al. 2012 had the highest methodological quality (0.96), followed by the study by Adler et al. 2009 (0.88). When paying more attention to the QualSyst score, the included studies could be divided into 2 categories: the oldest studies until (Matthews, 1998) had a QualSyst score < 0.7, whereas all the more recent studies had higher scores (Table 1).

****PLEASE INSERT TABLE 1 ABOUT HERE****

3.3. Qualitative synthesis

To report the results of the included studies more clearly, we sorted them into 3 categories: i) studies where the PDG was provided more than one month after PTE exposure in civilians; ii) studies where the PDG was provided within one month following PTE exposure in civilians; and iii) studies where the PDG was provided within one month following PTE exposure in rescue professionals and soldiers.

3.3.1 Studies where the PDG was provided more than a month after PTE exposure in civilians

In a controlled study, Stallard and colleagues included a group of students who witnessed a bus accident. PDG was administered 90 days after the PTE. The clinical impact of PDG on PTSD symptoms was assessed with the Impact of Event Scale (IES-R) in 5 participants. The authors found a significant effect of the PDG on the IES score ($t = 6.73$, $p < 0.01$) (Stallard and Law, 1993). Chemtob and colleagues assessed the clinical efficacy of a PDG administered 6 months after people from Hawaiian Island faced Hurricane Iniki in 1992. In this partly controlled study, PTSD symptoms in two groups of 25 and 18 participants were evaluated using the IES before and after PDG. To provide partial control of the passage of time, the second group was pretested when the first group was retested. After the PDG, participants from the two groups had a lower IES score than at baseline ($F_{(1,40)} = 21.13$; $p < 0.001$), with no significant difference between groups ($F_{(1,40)} = 2.62$; $p > 0.11$) (Chemtob et al., 1997). Chemtob and colleagues developed a second study in a pediatric sample. After a screening step, children identified as having developed PTSD symptoms 2 years after a PTE

were allocated to therapeutic intervention groups. In a randomized controlled design, they received either a group intervention (n = 176) or an individual treatment (n = 73). Participants reported a significant reduction in self-reported trauma symptoms, as assessed with the Kuai Recovery Inventory (KRI) ($F_{(1,208)} = 51.34$; $p < 0.001$). However, no significant differences were observed between the group and individual interventions ($F_{(1,208)} = 1.97$; $p = ns$). PTSD symptoms were assessed with the Children PTSD Reaction Index (CRI) in a subsample of 21 treated children and 16 controls. A significant decrease in PTSD symptoms was observed in the treatment group compared to controls ($t_{34} = 2.76$; $p = 0.01$) (Chemtob et al., 2002).

3.3.2 Studies where the PDG was provided within one month following the PTE in civilians

In a nonrandomized controlled study, Matthews and colleagues evaluated PTSD symptoms in care workers who experienced a PTE in their workplace. The study was divided in 2 areas of inclusion. In the first inclusion area, where a PDG was offered but not mandatory, one group received the proposed debriefing intervention (n = 14), while a control group (control group 1, n = 18) did not take part in any debriefing. In the second inclusion area, where PDG was not available, a second control group (control group 2, n = 31) also completed the survey. The PTSD symptoms assessed with an adapted short version of the Impact of Event Scale (IES) were higher in control group 2 than in the other two groups. In the area where PDG was available, PTSD symptoms were higher in the debriefing group (Mann–Whitney $U=340$; $p=0.04$) (Matthews, 1998). In a randomized controlled study, Tarquinio and colleagues (Tarquinio et al., 2016) compared the clinical relevance of PDG (n = 23) with 2 groups of eye movement desensitization reprocessing (EMDR, n = 37), administered at 2 different time points. The authors found that early recent event protocol - RE-EMDR (provided up to 48 h post PTE, n = 19) and delayed RE-EMDR (provided between 48 h and 96 h post PTE, n = 18) decreased the PTSD symptoms as assessed with the PCLS at 3 months follow-up, without any

difference between both groups (PCLS total: RE-EMDR 31.5 (+/- 4.1) $p < 0.0001$; delayed RE-EMDR 36.6 (+/- 3.6) $p < 0.0001$). In contrast, the PDG group did not show any significant change, regardless of follow-up time (PCLS total: pretest 51.6 (+/- 4.1); 48 h follow-up 52.04 (+/- 2.7); 3 months follow-up 52.7 (+/- 5.1); $p = 0.64$).

In addition to Chemtob and colleagues and Stallard and colleagues (Chemtob et al., 2002; Stallard and Law, 1993), a third study conducted by Thabet and colleagues evaluated the clinical effects of PDG in children. In this nonrandomized controlled study, a debriefing-like intervention was compared to an educational program and a control group without any intervention. The debriefing-like intervention was an adaptation of Mitchell's debriefing, allowing the children to use drawings to facilitate emotional communication and expression. All the children were refugees living in camps during an ongoing war. No significant difference was identified between the debriefing group and the educational group or between the debriefing group and the control group in terms of the Child Post Traumatic Stress Reaction Index (CPTSD-RI) ($F_{(2; N = 111)} = 0.54$) (Thabet et al., 2005).

3.3.3 Studies where the PDG was provided within one month after a PTE in professionals of rescue and soldiers

Five studies included in this review reported the effect of PDG on professional groups repeatedly exposed to PTEs. These studies all provided the PDG within one month following the PTE. Deahl and colleagues conducted a 2-arm randomized controlled study (RCT) in a group of 106 British soldiers after they returned from a 6-month-long peacekeeping duty. The soldiers were randomly allocated to receive either PDG therapy or no intervention at all. At baseline, the scores obtained on scales assessing PTSD symptoms were very low. No statistically significant difference was found between groups in terms of the IES total score at either the 3-month ($p=0.86$), 6-month ($p = 0.05$) or 1-year ($p = 0.19$) follow-up (Deahl et al.,

2000). Adler and colleagues conducted an RCT including a large sample of soldiers engaged in peacekeeping deployment. The soldiers had shared exposure to a range of occupational stressors over their 6-month deployment (rather than a specific PTE), and they were assigned to one of three conditions: stress management classes ($n = 359$), PDG ($n = 312$) or no intervention control group ($n = 281$). Baseline measures were taken prior to the deployment and immediately prior to condition allocation; follow-up measures were rated 3–4 months and 8–9 months after the intervention. PDG failed to reduce symptoms of PTSD relative to the other conditions. However, in soldiers most exposed to mission stressors, the PDG was associated with reduced PTSD symptoms compared with stress management (Post Traumatic Check List Scale (PCLS): $p < 0.01$; $d = 0.12$), with no significant difference between the PDG group and the group without intervention. The effect size was small, and it is worth noting that few participants in the study reported exposure to significant stressors during deployment (Adler et al. 2008). To compare different types of post-deployment early intervention, the same group of authors developed a second large RCT including American soldiers returning from a 12-month deployment. Participants received one out of 4 interventions and completed standardized scales up to 4 months after the intervention took place. The intervention was either a PDG program (the so-called Battlemind debriefing) ($n = 271$), a brief stress educational program ($n = 242$) or so-called Battlemind training in its small ($n = 272$) or large version ($n = 274$) depending on the number of attendees per session. The Battlemind training program uses a cognitive and skill-based approach and emphasizes safety, relationships, and common physical, social and psychological reactions to combat. When the whole sample was compared, there was no significant difference between the different interventions in terms of their abilities to reduce PTSD symptoms. When focusing on the subgroup with the highest level of combat stress exposure at a 4-month follow-up, the PDG group (Coef = -3.80; SE = 1.91; $p < 0.05$) and small (Coef = -6.33; SE = 2.18; $p < 0.001$) and

large (Coef = -5.80; SE = 1.99; $p < 0.01$) battlemind training groups had reduced PTSD symptoms, as assessed with the PCLS, than the educational stress program group (Adler et al., 2009). Finally, in a 3-arm randomized controlled study, Wu and colleagues compared the effect of the 512 Psychological Intervention Model (512 PIM Model), a slightly modified version of CISD promoting cohesion between participants, with that of CISD and no intervention. The participants were soldiers deployed on a rescue mission after a major earthquake. At the 2- and 4-month follow-ups, PTSD symptoms significantly decreased in the 512 PIM group compared to the CISD and no-intervention groups ($p < 0.01$). There was no difference between the CISD group and the group without any intervention ($p = 0.23$) (Wu et al., 2012).

In another group of qualified staff with repeated exposure to PTEs, Tuckey and colleagues evaluated the effect of PDG on PTSD symptoms in a randomized controlled study. Sixty-seven firefighters were randomly assigned to one of three treatment conditions: (1) PDG, (2) no treatment, or (3) stress management education. Compared to the other two treatments, the PDG was not associated with any significant effect on PTSD symptoms, as measured with the IES-R (Tuckey and Scott, 2014). (See Table 2)

****PLEASE INSERT TABLE 2 ABOUT HERE****

4) Discussion

Here, we aimed to review studies investigating the clinical relevance of PDG on PTSD symptoms. Although PDG was developed almost 40 years ago, only a few studies evaluating its therapeutic effect have been published. The systematic search yielded 11 articles that met our inclusion criteria.

4.1) Effect of PDG on PTSD symptoms

Only two of the eleven included studies reported that the PDG decreased the typical symptoms of PTSD, such as re-experience, avoidance and hypervigilance (Chemtob et al., 1997; Stallard and Law, 1993). Two additional studies reported significant results only in a subgroup of participants with a high level of traumatic exposure or who received a slightly modified version of the CISD (Adler et al., 2008; Wu et al., 2012). The last seven studies included did not favor PDG over a control approach to improve symptoms of PTSD after a PTE (Adler et al., 2009; Chemtob et al., 2002; Deahl et al., 2000; Matthews, 1998; Tarquinio et al., 2016; Thabet et al., 2005; Tuckey and Scott, 2014).

Since the development of PDG, the group dimension has been considered a central element of the intervention, but this group dimension must meet two main criteria: 1- the ideal group size should be between 5 and 10 participants, and 2- the different participants should know each other before the PTE (e.g., professional group). These fundamental aspects may facilitate the expression of emotions, feelings and thoughts, allow better empathy among participants and, in turn, make storytelling (the basic ingredient of debriefing) more emotionally regulated across participants. However, these 2 crucial criteria were not met in several studies included in this review: in three studies, the debriefed participants did not know each other before the PTE (Chemtob et al., 2002, 1997; Thabet et al., 2005); in one study, the PDG included at most 2 participants (Tarquinio et al., 2016). Interestingly, Wu and colleagues reported a significant effect only after a CISD-based group intervention that particularly promoted group cohesion, suggesting that this is a major parameter that improves the clinical outcome (Wu et al., 2012). By subcategorizing the included PDG studies, we also observed a severe lack of intrapopulation replication, with only six studies investigating the effects of PDG on civilian PTE victims and five studies investigating the effects of PDG on professional rescuers/military participants. While professionals are a group of interest for research on

PTSD, they are repeatedly exposed to PTEs, they are trained to face PTEs, and they probably develop coping mechanisms that could alter their responsiveness to PDG.

Another factor of heterogeneity between studies was the latency between the PTE and PDG, which varied from hours to several years. To put the problem in perspective, the two extreme latencies we included were adopted by Tarquinio and colleagues, who offered PDG in the first 2 days after PTE, and Deahl and colleagues, who offered PDG one to two years after the PTE. The PTE is still ongoing in the study conducted by Thabet and colleagues. Originally, Mitchell proposed that CISM take place between 2–10 days after the PTE (Mitchell, 1983). In contrast, the comparison between 2 different PDG administration latencies (less than 10 h after PTE and 48 h after PTE) revealed that immediate PDG had a greater effect on the number and severity of PTSD symptoms than delayed PDG (Campfield and Hills, 2001). Although no clear conclusion should be drawn, the only three significant positive studies included offered PDG between one and three months after the PTE (Chemtob et al., 1997; Stallard and Law, 1993; Wu et al., 2012). Additional studies are needed to confirm this trend. In the study of Thabet and colleagues, the PTE was still ongoing. Although this contrasts with a basic criterion of first psychological aid, which consists of first protecting the victim from further exposure to threat (Raphael et al., 1996), this is also a good illustration for the configuration where this important type of protection may not be possible in the case of a continuous traumatic situation (CTS) like living in a war zone or being repeatedly exposed to terrorist attacks. A continuous traumatic situation involves several conceptual differences in contrast to a time-limited PTE (and located in the past). First, evaluating whether victims experiencing a CTS have PTSD symptoms is particularly challenging because there may be a high risk to interpret emotional and behavioral reactions as PTSD symptoms although they actually should be considered as adaptive behavior to a continuous threat. Thus re-experiencing, avoidance and hyper vigilance would respectively switch to distress to an

imminent threat, adaptive evasion of danger, adaptive alertness (Hoffman et al., 2011). The second aspect is a consequence from the first one. From a therapeutic perspective, helping the individuals exposed to a CTS to manage the stress created by this abnormal situation and helping them to distinguish between reality-based reactions and symptomatic reactions to trauma reminders during a CTS appear more relevant than reprocessing a past PTE (Nuttman-Shwartz and Shoval-Zuckerman, 2016). Decreasing trauma symptoms may also threaten these individuals who must continue to live with real threats. So PDG may not be the most relevant therapeutic tool for individuals exposed to a CTS.

Finally, the PDG was carried out by an experienced clinician trained in the technique in only 8 out of the 11 included studies; this was the case in the 2 studies where the PDG alleviated the PTSD symptoms (Chemtob et al., 1997; Stallard and Law, 1993) and in 6 studies that reported nonsignificant results (Adler et al., 2009; Deahl et al., 2000; Tarquinio et al., 2016; Thabet et al., 2005; Tuckey and Scott, 2014; Wu et al., 2012). Interestingly, the PDG was administered by an experienced clinician in studies with the best methodological quality according to the QualSyst tool (Adler et al., 2009, 2008; Tarquinio et al., 2016; Thabet et al., 2005; Tuckey and Scott, 2014; Wu et al., 2012). However, to the best of our knowledge, the influence of the level of expertise of the debriefing practitioner has never been strictly evaluated.

Beyond these factors of heterogeneity in the included designs, the interpretation of their findings is restricted by several methodological flaws. For instance, some studies only presented pre/post comparisons (Chemtob et al., 1997; Stallard and Law, 1993), and some were controlled by inactive groups (Deahl et al., 2000; Matthews, 1998). Thus, the observed changes in clinical measures could arise due to factors that were not directly related to the intervention, drastically increasing the risk of inflated effect size. Similarly, the conclusions of

Matthews and colleagues should be interpreted with caution since they exacerbated the problem of selection bias by allowing their participants choose for themselves whether to be a part of the active group (Matthews, 1998). Finally, it is important to note that designs with small sample sizes, such as Stallard's (n=7) and Matthews' (n=14) studies, are more likely to miss an effect that is actually present by inflating the Type II error rate.

4.2) Effect of debriefing groups on nonspecific symptoms

PTSD is often accompanied by less specific symptoms, such as anxiety, depression, sleep disturbances and comorbid diseases, such as alcohol use disorders or anxiety disorders. If the impact of PDG on these nonspecific symptoms is of major interest, the large heterogeneity in the type of nonspecific symptoms assessed prevented us from including these results in this systematic review. However, it is noteworthy that most studies evaluating anxiety seem to report a beneficial effect of PDG (see (Shalev et al., 1998) and (Stallard and Law, 1993) for positive results; (Deahl et al., 2000) for nonsignificant results), while most studies evaluating depression did not find any significant effect (see (Stallard and Law, 1993) for positive results; see (Adler et al., 2009; Thabet et al., 2005; Wu et al., 2012) for nonsignificant results). Similar to specific symptoms, Wu and colleagues reported that anxiety and depression were decreased only in the group administered the version of the PDG that had been adapted to promote group cohesion. Finally, PDG has been associated with reduced alcohol misuse in some studies (Deahl et al., 2000; Tuckey and Scott, 2014) but increased alcohol misuse by Adler and colleagues (Adler et al., 2008).

4.3) Perspectives

In the late 1990s and 2000s, published trials and meta-analyses (Rose et al., 2002) led to the conclusion that psychological debriefing did not have any benefit and should not be offered

after exposure to a PTE. This conclusion was repeatedly reaffirmed by several guidelines with high visibility (Bisson et al., 2019; Forbes et al., 2007; NICE Guidance, 2018). In addition, some trauma-focused psychotherapies, such as cognitive behavioral therapy (CBT) and eye movement desensibilization reprocessing (EMDR), have attracted increasing attention in the scientific literature, as they seem effective in preventing PTSD symptoms (Kornør et al., 2008; Lewis et al., 2020; Roberts et al., 2010), even if their high technicity may limit their dissemination. However, in light of the results reported in our review, the previous work concluding on the inefficacy of PDG is nuanced because of the methodological flaws of current available studies. Our review displayed a high level of heterogeneity in the design of the included studies and a lack of replication in the features that may be critical to deliver PDG (type of included participants, timing to deliver PDG.). Moreover, from a statistic perspective, the way the data analysis was conducted in the included studies is not appropriate to firmly conclude to the ineffectiveness of PDG. Bayesian statistics should have to be conducted to rigorously prove the absence of clinical effect in PDG.

Moreover, the reported rare effect of PDG on PTSD symptoms among all included studies could also be explained by the hypothesis that PDG has little impact on psychopathology. Indeed, the PDG may be considered a kind of social sharing of emotion. If social sharing of emotion is a ubiquitous behavior in humans, it remains questionable whether it facilitates emotional recovery (Rimé et al., 1998). Thus, at an individual level, assessing the effect of PDG on some aspects of global functioning, especially at work (days of missed work for medical reasons, perceived efficiency at work, increased recognition, job satisfaction, and quality of life), could be more accurate. At the group level, it could be more relevant to focus on parameters relevant for group functioning (communication at work; effectiveness at work, social support, etc.). Brom and Kleber reported that PDG may affect these functional outcomes more than specific psychiatric symptoms (Brom and Kleber, 1989).

This review was focused on PDG. As short intervention delivered at a group level, PDG's design is particularly suitable for early intervention after a collective PTE, especially for the victims who may have little interest for a more sophisticated and often longer psychological support. But other group interventions for victims of a PTE were also developed. Either the content of the intervention was deeper just like in the Multiple Stressor Debriefing Model (MSDM, (Armstrong et al., 1991)) or the intervention was more intensive (Kleber and Velden, 2009) and/or composed of multiple sessions just like the Brief Prevention Program (BP, (Foa et al., 1995)). Evaluating systematically these interventions would be a valuable add in the topic early intervention after a PTE.

Given the methodological heterogeneity of the reviewed studies, it seems necessary to further investigate the effectiveness of various parameters, such as the group size, group dynamics, time window and debriefer training. To expand the knowledge on PDG, future studies should also focus on i) the subjective traumatic level of the PTE before patients are enrolled in PDG; ii) whether the control group is active; iii) the effect of PDG on nonspecific symptoms such as anxiety, depression, alcohol misuse and quality of life; iv) comparisons of PDG with individual PD; v) sociodemographic characteristics that could influence the response to the PDG; vi) outcomes that are relevant for the global functioning of the individuals exposed to a PTE and at a group level including communication style, effectiveness at work..

5) Conclusion

Existing literature suggests that PDG has no significant effect on specific symptoms of PTSD but could have a beneficial effect on nonspecific PTSD symptoms associated with PTE exposure. However, the methodological quality of the available studies is heterogeneous; some bias still remains and prevents any firm conclusion on the therapeutic potential of PDG.

Further studies are required to elucidate its potential beneficial effect on nonspecific symptoms and the optimal guidelines that should be applied.

Conflict of Interest

None

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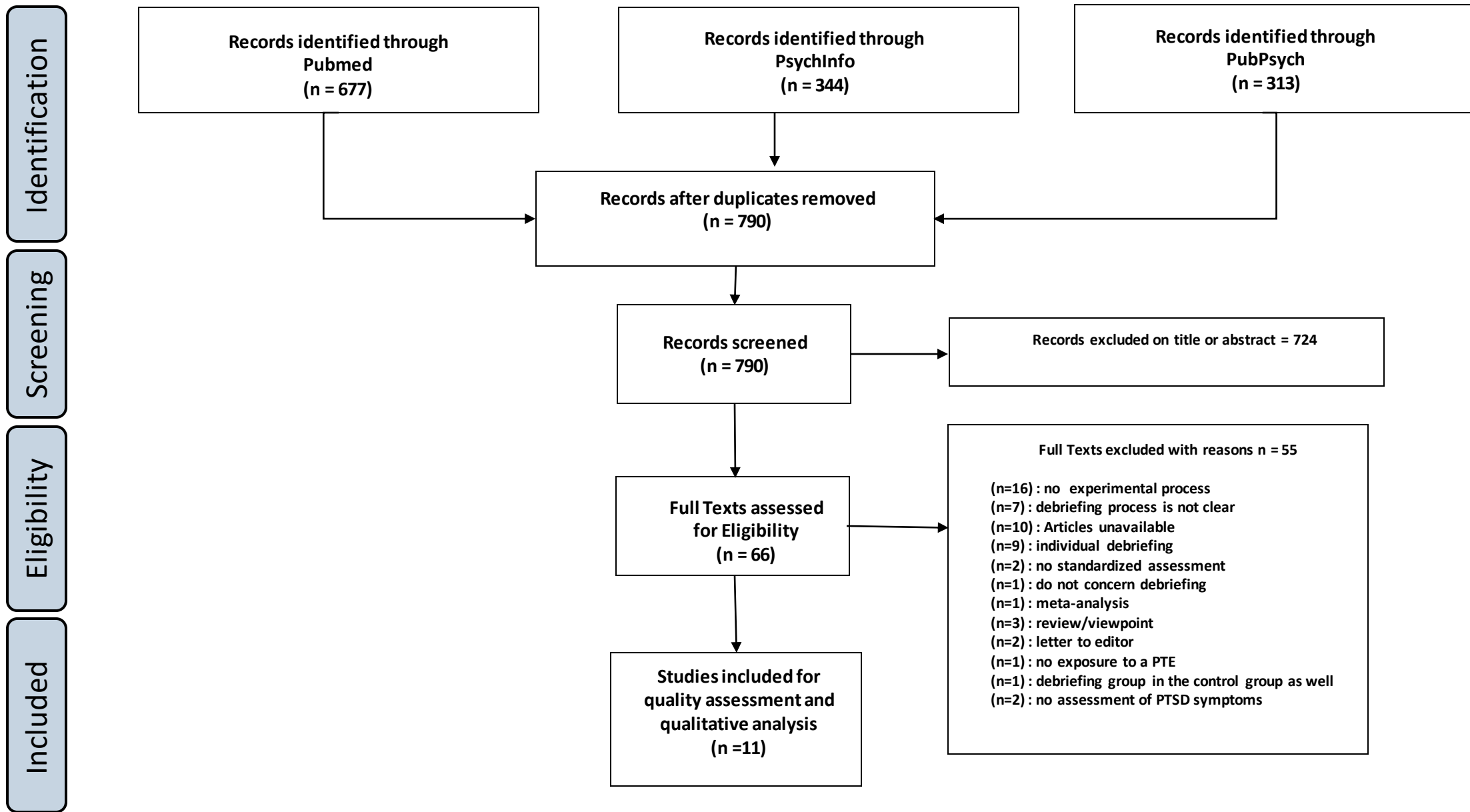


Figure 1 : PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram.

to measurement / misclassification bias? Means of assessment reported?												
9)Sample size appropriate?	1	1	2	2	2	1	2	1	1	1	1	1
10)Analytic methods described/justified and appropriate?	2	2	2	2	2	2	2	2	1	2	0	0
11)Some estimate of variance is reported for the main results?	2	2	2	2	2	2	2	2	2	1	1	1
12)Controlled for confounding?	2	0	2	2	2	2	1	1	0	0	0	0
13)Results reported in sufficient detail?	2	2	2	2	2	2	1	0	2	1	1	1
14)Conclusions supported by the results?	2	2	2	2	2	2	1	2	1	2	2	2
Total	21	19	25	23	22	20	19	22	13	13	13	13
QualSyst Score	0.81	0.73	0,96	0.88	0.85	0.83	0.79	0,85	0.59	0.54	0,5	0,5

Table 1. Quality assessment of studies with the QualSyst method

Authors	Study type	Type of traumatic event	N in group debriefing	Type of control intervention (n)	Sex	Mean Age +/- SD	Delay after the PTE (days)	Level of expertise of the debriefing practitioner	Group cohesion	Outcome / Timing of assessment (days post debriefing)	Key findings
Stallard et al. 1993	Non randomized controlled study	Victims of a school bus accident	7 (paediatric)	1 st group no intervention (24) 2 nd group intervention (126)	1M / 6F	Debriefing group: 15.64 +/- 0.5	90	Experienced Clinician 2 X 3h-debriefing sessions	Yes	IES / 90	-Significant reduction at the IES after PDG (n=5)
Chemtob et al. 1997	Non randomized partly controlled study	Victims of Hurricane	25	waiting list (18)	9M / 34F	Debriefing group: 41.7 +/- 10.8 Waiting list group: 42.1 +/- 10.0	180	Experienced Clinician	No	IES / 90	-Significant reduction at the IES after the PDG and the waiting list -Both avoidance and intrusion sub scores were decreased after PDG
Matthews et al. 1998	Non randomized controlled study	Victims of assault (Social workers and nurses)	14	1 st group no intervention (18) 2 nd group no intervention (31)	14M / 49F	NA	1-7	Qualified staff	Yes	Non validated scale adapted from IES / NA	-In the area where PDG was available, PTSD symptoms were higher in the debriefed group -Post traumatic symptoms where significantly higher in the group where no PDG was available.
Deahl et al. 2000	Randomized controlled study	Peacekeepers (long time deployment)	54	no intervention (52)	106M / 0F	24.0 (range 18 – 38)	1-2	Experienced clinician One X 2h debriefing session	Yes	IES PTSS-10 / 90; 180; 365	-Low scores on IES and PTSS in both groups at baseline. -No statistical difference between groups regardless of timing of follow-up

Chemtob et al. 2002	Randomized single blind controlled study	Victims of Hurricane	176	individual debriefing (73)	97M / 152F	8.85	2 years	3 school counsellors 1 social worker	No	KRI CRI / 365	-no difference between group in the KRI -lower CRI score in the treated group compared to the untreated group
Thabet et al. 2005	Non randomized controlled study	War refugees	47 (paediatric)	teacher education (22) no intervention (42)	59M / 52F	Debriefing group: 12.9 Teacher education: 12.3 No intervention: 11.7	PTE still ongoing	Experienced clinicians in the debriefing group Teachers in the teacher education group	No	CPTSD-RI / 90	-No significant clinical change in any intervention
Adler et al. 2008	Randomized controlled study	Peacekeepers (6 months deployment)	312	No intervention (281) Stress management (359)	924M / 28F	NA	Just after coming back from deployment	Military personnel trained to deliver debriefing	yes	PEK PCLS / 90; 240	-No significant difference between PDG and the control intervention, for the whole sample -In patients with the highest level of traumatic exposure, PDG was associated with less PTSD symptoms compared to stress management but not to no intervention
Adler et al. 2009	Randomized controlled study	Soldiers (12 months combat deployment)	271	Stress education (243) Small Battlemind Training (272)	1006M / 51F	NA	Just after coming back from deployment	Experienced clinicians (Military personnel trained to deliver debriefing as group co-leader)	yes	PCLS / 120	-No significant difference for PTSD symptoms between interventions at the whole sample level -If high level of combat exposure, patients from the PDG and battlemind training groups reported fewer PTSD

				Large Battlemind Training (274)							symptoms than those from the educational stress group
Wu et al. 2011	Randomized controlled study	Military rescuers (earthquake)	372	No intervention (389)	NA	Debriefing group : 20.1 +/-3.9 512 PIM : 19.8 +/-3,6 No intervention ; 20.2 +/-3.5	30	Experienced clinicians	Yes	SI-PTSD / 30 ; 60 ; 120	-PTSD symptoms decreased in the group of participants receiving a slightly modified version of CISD promoting cohesion -No significant difference between the traditional CISD group and the sample receiving no intervention
Tuckey et al. 2014	Randomized controlled study	Firefighters	20	Education group (28) Screening group (19)	98M / 24F	NA	3	Experienced clinicians	Yes	IES K10 / 30	-No effect of PDG on posttraumatic stress and psychological distress
Tarquinio et al. 2016	Randomized controlled study	Victims of a violent event (employees)	23	RE-EMDR (19) delayed RE-EMDR (18)	14 M / 9F	CISD: 34.7 +/- 5.5 RE-EMDR: 35.3 +/- 6.7 Delayed RE-EMDR: 33.4 +/- 5.6	In the first 2 days	Experienced clinicians	Yes	PCLS SUDS / 90	-No significant improvement in the PDG (group size of 2 patients max by group)

PDG : Psychological debriefing group; **IES**: Impact of Event Scale; **PTSS-10**: Post Traumatic Symptoms Scale 10 items; **KRI**: Kauai Recovery Inventory; **CRI**: Child PTSD Reaction Inventory; **CPTSD-RI**: Child Post Traumatic Stress Reaction Index; **PEK**: Peacekeeping Events Scale; **PCLS**: Post traumatic Check List; **PTE**: Potential Traumatic ; **SI-PTSD** : Structured Interview for PTSD ; **PIM 512** : Psychological Intervention Model 512 ; Event; **RE-EMDR**: Recent Event – Eye

Movement Desensibilisation Reprocessing; **K10**: Kessler-10; **SUDS** : Subjective Unit of Distress Scale; **CISD**: Critical Incident Stress Debriefing; **NA**: not available

Table 2 : Main results from included studies investigating debriefing groups after a PTE