Part 2
Quality of care

Chapter 5. Impact of combat events on first responders: experiences of the armed conflict in Uruzgan, Afghanistan

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Injury. In press

ABSTRACT

Introduction: Care for battle casualties demands special skills from medics, nurses and tactical commanders. To date, no inventory has been performed evaluating the first responders (medics, nurses and tactical commanders) around battle casualties.

Method: This observational cohort study was conducted amongst the first responders (n=195) who were deployed to Southern Afghanistan (2009-2010) in three Marine companies. The survey focused on four main topics: (1) participants general background, (2) exposure to combat (casualty) situations, (3) self-perceived quality of care (1 [low] to 10 [high]) in the pre-hospital phase, and (4) the effects of combat stressors on professional skills and social environment using the Post Deployment Reintegration Scale (PDRS) and the Impact of Event Scale-Revised (IES-R).

Results: 71% of the eligible Dutch tactical commanders, medics, and nurses participated in this survey. Most (14/16) medics and nurses scored their pre-deployment training as sufficient. The overall self-perceived quality of care score was above average (7.8). Most (80%) of the participants were exposed to battle casualties. There were no significant differences regarding rank, gender, age and military task using the impact of event scale and PDRS, except for a worse score on the work negative, family positive and personal positive subscales ($p<0.05$) in the PDRS for the first responders in comparison to the armed forces norm score.

Conclusion: The quality of care in the pre-hospital phase was considered adequate, symptoms of post-traumatic stress in this group was low. Active involvement of co-combatants and the social support network are essential in adaption after exposure to combat events. Further research is necessary to identity predisposing preventable high stress factors, and to compose a “waterproof” aftercare program.

BACKGROUND

Units deployed to armed conflicts are at high risk of exposure to combat events. Observations and experiences from the Dutch armed forces (DAF) deployed to Afghanistan are potentially useful for improving pre-deployment training and post-deployment care of military personnel. This exposure to combat events can be direct (as active combatant) or indirect (non-combatant). Recently, the DAF participated in two North Atlantic Treaty Organization (NATO) led military missions: Operation Enduring Freedom and the International Security Assistance Force (ISAF) mission in Afghanistan.[1-7] The Netherlands was lead nation in Uruzgan province between 2006 – 2010, deploying Task Force Uruzgan (TFU). During that period, Dutch service members were frequently exposed to high intensity combat.[1-5] The medical support organisation (MSO) in Southern Afghanistan during the ISAF operations was a multinational joint service with a wide range of capabilities, delivering care in a hostile and austere environment. The NATO Allied Joint Medical Support Doctrine (AJP-4.10) [5] is the capstone document on which the MSO is based, but it is not an unchangeable holy doctrine [9] (Figure 1). The main component of TFU was located at the Multi National Base Tarin Kowt (MBTK), a second base was located at Deh Rawod, and the MSO was adapted to this local situation in Uruzgan province (Supplemental data 1). Tactical Combat Casualty Care (TCCC) [10-12] comprises a set of trauma management guidelines customized for use on the battlefield. This doctrine was first

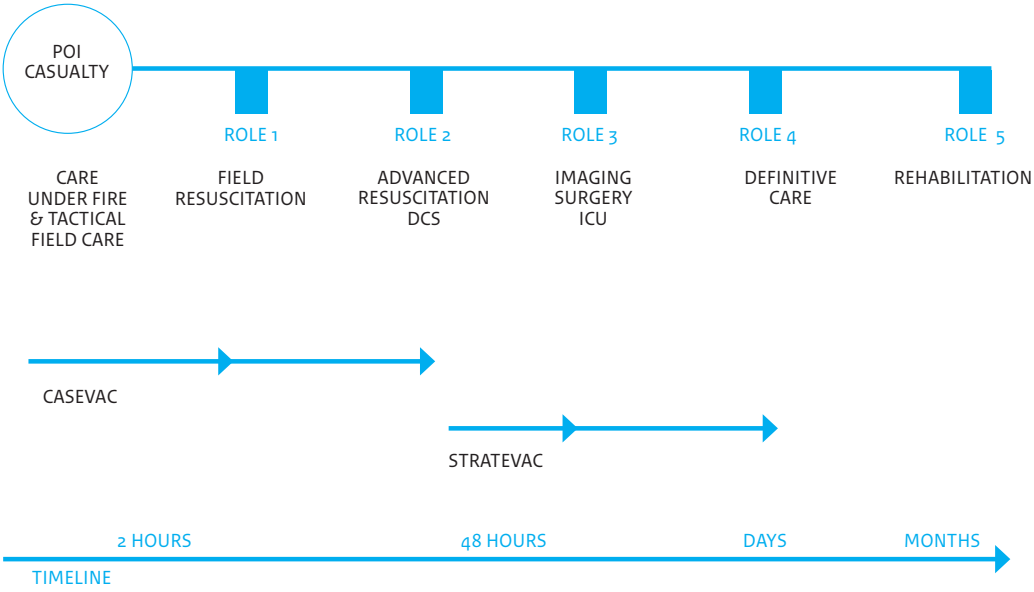

Figure 1: *Schematic overview of the treatment phases in the medical support organization in relation to time and availability of medical care.*

POI indicates point of injury; *DCS*: damage control surgery; *ICU*: intensive care unit; *CASEVAC*: Casualty Evacuation; *STRATEVAC*: Strategic Evacuation.

introduced in the United States Special Operations community, but the conflicts in Iraq and Afghanistan have seen TCCC become the standard in most NATO coalition forces. The balance between good medicine and good tactics during a combat mission is a continuous process of situational awareness (SA) and right judgement, both by tactical commanders and medical service members. Combat medics and their tactical unit commanders have three objectives while providing care during a combat mission; (1) maximize the probability in fulfilling the unit's mission successfully, (2) provide the best possible care for the (individual) casualty, and (3) minimize additional casualties. This (instinctively contradicting) balance could cause high mental stress for these first responders. Care for battle casualties (BCs) demands special skills from the Dutch deployed service members.The pre-hospital phase seems to be the most substantial opportunity to improve the outcome of BCs, especially the first "platinum" 10 minutes after an injury. [3-13] However, there is no objective measurement to evaluate the quality of care (QoC) in the pre-hospital phase and the impact of violent incidents on the first responders or "the direct circle". To date, no systematic inventory, using structured questionnaires, has been performed evaluating "the direct circle" around battle casualties in the pre-hospital phase and the impact of pre-hospital variables on the post-deployment phase. The impact of combat stressors could be much higher than generally assumed. The primary aim of this study was to assess the medical preparedness, deployment experiences, predisposing factors for post-traumatic stress disorder (PTSD), and post-deployment impact on Dutch medics, nurses, tactical commanders and enablers serving in Afghanistan. The secondary aim was to identify possible improvements in pre-deployment training, long term post-deployment evaluation and re-integration.

MATERIALS AND METHODS

This observational cohort study was approved by the Ministry of Defense (MOD), the Institutional Review Board and the Medical Ethics Committee of Leiden University, the Netherlands. During the period studied (June 2009-August 2010), three companies of the Royal Netherlands Marine Corps (RNLMC) were deployed to MBTK in Southern Afghanistan in 4-5 month periods as part of TFU. These companies contained 10 medics, 10 nurses, 90 tactical commanders (all ranks [officers and non-commissioned officers [NCO]]), and 85 attached enablers (e.g. signal operators, specialised tactical support). These 195 service members were considered as first responders or direct circle around a BC. The tactical commanders could be nominated as on-scene commanders [OSC] during a specific task. There is no international consensus about the term medic. In this study we excluded the basic medically trained combatants (combat life savers [CLS]), but included pre-hospital trauma life support (PTLS) and special forces (SF) medics. The PTLS and SF Medic provide more advanced medical assistance, then basic medically trained combatants based on TCCC principles (respectively 6 and 12 week courses). The participants were divided into five rank groups namely; junior enlisted (E1-E4), senior enlisted (E5-E9), warrant officers (WO1-WO2), junior officers (O1-O3) and senior officers (O4-O10).

Assessment

All (195) identified participants received an online questionnaire in the last quarter of 2013 (mean ~3 years after deployment), two digital reminders and in case of no response a reminder by telephone. The first part of the questionnaire (Supplemental data 2) was based on current literature[2, 4, 5, 10, 13], and screened for validity and relevance by an expert board of Dutch military medical specialists (Delphi method). It focused on three main topics: (1) participants general background, (2) exposure to combat (casualty) situations, and (3) self-perceived QoC in the pre-hospital phase (QoC was described as the subjective judgment by the participants, and expressed in a numeric variable from 1 [low] to 10 [high]); in this study we defined a score of 7 as “average”. The subgroups of the participants only answered questions applicable for their task. The second part focused on effects of combat stressors on professional skills and social environment using the Post Deployment Reintegration Scale (PDRS)[14] and the Impact of Event Scale-Revised (IES-R)[15]. The PDRS contains 36 items and is a multidimensional measure of post deployment reintegration experiences/ attitudes. It is designed to reflect a continuum of positive and negative experiences of military personnel in personal, family, and work domains. Each domain is split into a positive and negative subscale (score 0 – 5). On negative subscales higher scores indicate more negative attitudes and on positive subscales higher scores indicate more positive attitudes. Internal consistency reliability and construct validity were studied with positive outcomes for the six subscales[14]. Reference points for the separate subscales were developed by analyzing scores of 3000 Canadian service members, who had recently returned from a mission in Afghanistan[15]. The IES-R consists of a 22-item self-report measure that assesses traumatic stress. Responses are given on a 5-point scale, scoring 0 (not at all), 1, 2, 3 and 4 (extreme) and render a total score (ranging from zero to 88). The IES-R has good psychometric properties[16]. There is no specific cut-off score, in this study we used a cut-off score of 33 and above for the assessment of PTSD[16].

The basic categorical variables were expressed as mean, standard deviation (SD), and range. In all cases $p < 0.05$ was considered statistically significant using the independent sample t-test. Statistical analyses were performed using a computerized software package, SPSS (Version 20, IBM Corporation, Armonk, New York).

RESULTS

Of the 195 online distributed questionnaires (Figure 2), 10 (5%) were distributed to medics, 10 (5%) to nurses, 90 (48%) to tactical commanders, and 85 (42%) to enablers. The response rate was 71% (139/195). The 127 completed questionnaires were included in the analysis, 12 were excluded (5/12 did not leave MBTK [therefore were not regarded as the direct circle around a BC], 5/12 refused to participate in the full survey, and 2/12 did not state the reasons for non-participation). Respondent information and demographics are provided in Table 1. Most (95%) of the participants were male. Almost ninety percent of the participants were aged between 20 and 40. The mean number of deployments (duration ≥28 days) of the participants was 2 (1-8). Ninety one percent of the participants were still in active duty. None of the participants stated exposure to combat related events as reason for no longer being in service. Twenty percent have been on other missions since their deployment with TFU.

Self-perceived score of pre-deployment medical training and required skills

Most (14/16) medics and nurses scored their pre-deployment training as sufficient, 57% (4/7) of the medics stated that they felt the need for a more formal emergency department residency. Ninety percent (14/16) of the medics and nurses inserted an intravenous drip during their deployment, 90% were successful at the first attempt. Thirty one percent (5/16) of the medics and nurses applied a tourniquet during their deployment, all were successful in stopping the bleeding. Sixty nine percent (88/127) of the participants suggested a more formal medical role for the CLSs, because they are always most forward in the combat theatre and considered capable for these lifesaving duties by all participants.

Self-perceived quality of care and information transfer

The participants were asked to score the QoC, the results are presented in Table 2. The overall score of the participants was above average (7.8). Seventeen percent (22/127) of the participants were not exposed directly to BCs during their deployment, 46% (59/127) of the participants were exposed to 1-5 BCs, and 31% (40/127) to more than 5. All exposed OSCs filled out a NATO 9-liner/MIST. The NATO 9-liner/ MIST are standard documents used for the evacuation of a BC from the battle scene, containing information such as location, wartime, security of pick-up site, number of patients by precedence, special equipment required, patient nationality and status. Ninety nine (76/77) percent of the OSCs consider the 9-liner/ MIST an effective tool for medical information transfer. Only, nineteen percent (3/16) of the medics and nurses felt the need for direct contact with a medical specialist (surgeon/ anesthesiologist) at the point of injury (POI) during treatment of a BC. Seventy four (94/127) percent of the participants stated that real-time aids could contribute to a better SA for the medical personnel in the role 2 MTF.

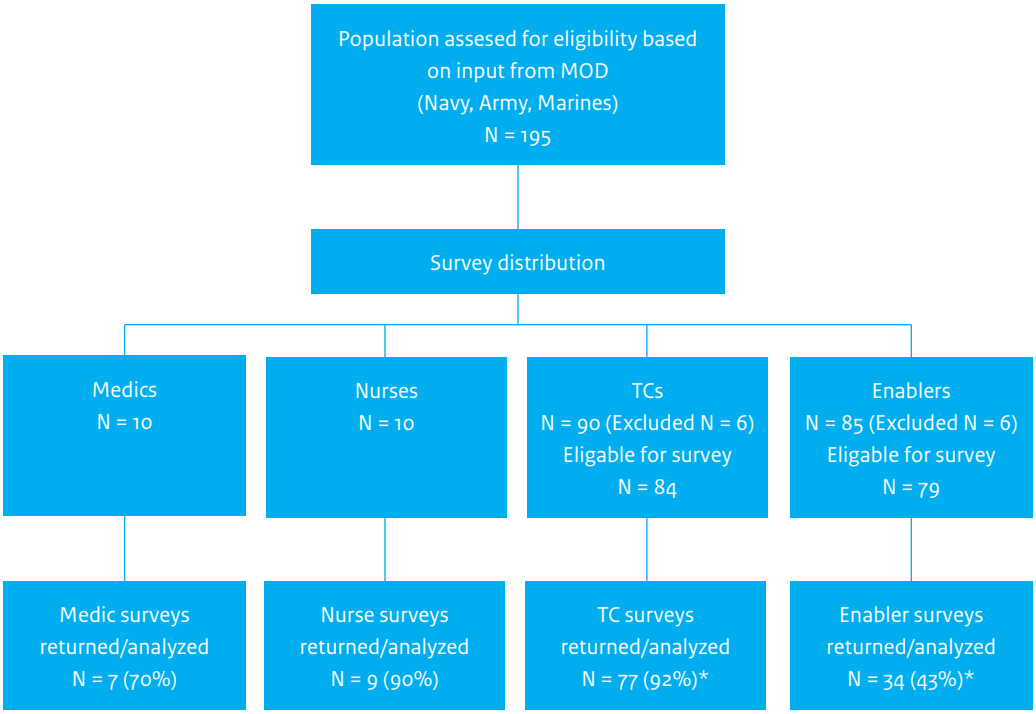

Figure 2: *CONSORT diagram for questionnaire lessons learned deployed medics, nurses, tactical commanders and enablers to Southern Afghanistan.*

TC indicates tactical commanders; *MOD:* Ministry of Defense; *N*: number.
*Calculated without the excluded cases

Characteristic	During deployment (n)	Present (n)
Mean age (range)	24 (20-53)	NA
Sex (%)		
Male	121 (95.3)	NA
Female	6 (4.7)	NA
Marital Status		
Married	52	57
Registrated partner	43	44
Relationship	18	9
Single	14	17
Children %	42	61
Active duty (%)	NA	116 (91.3)
Rank		
E1-E4	50	21
E5-E9	48	58
WO1-WO3	2	8
O1-O3	21	18
O4-O6	6	11
Mean years of active duty (SD)	11 (7.1)	13 (7.2)
Mean deployment history (range)	2 (1-8)	NA
Function		
Medic	7	NA
Nurse	9	NA
Tactical commander	77	NA
Enabler	34	NA
Total	**127**	**NA**

Table 1: *Demographics of the deployed medics, nurses, tactical commanders, and enablers (n=127).*

E1-E4 indicates junior enlisted; *E5-E9* senior enlisted; *WO1–WO3:* warrant officers; *O1–O3:* junior officers; *O4–O6:* senior officers; *SD:* standard deviation; *NA:* not applicable.

Mean QoC (SD)	Medic	Nurse	Tactical commander	Enabler	Total
Point of injury[a]	7.4 (1.6)	8.2 (1.6)	7.8 (1.7)	7.8 (1.7)	7.8 (1.6)
IC point of injury	7.4 (1.5)	8.3 (1.5)	7.9 (1.7)	7.7 (1.6)	7.9 (1.6)
Information transfer[b]	7.8 (1.6)	7.8 (1.6)	7.4 (1.7)	7.8 (1.5)	7.6 (1.5)
Crashroom[c]	8.0 (1.7)	7.7 (1.6)	7.4 (1.9)	7.7 (1.6)	7.5 (1.7)
Role 2 general[d]	8.2 (1.6)	8.2 (1.6)	7.4 (1.8)	8.2 (1.7)	7.6 (1.8)
IC Role	7.6 (1.5)	8.2 (1.5)	7.7 (1.7)	8.2 (1.8)	7.8 (1.6)

Table 2: *Quality of care scored by the deployed medics, nurses, tactical commanders, and enablers (n=127).*

QoC indicates Quality of care; *SD:* standard deviation; *IC:* international collaboration.
[a]Subjective score on 10 point scale of quality of care at the point of injury, [b]subjective score of information transfer from point of injury to role 2/3, [c]subjective score quality of care in crashroom, [d]subjective score quality of care at the role 2/3 in general, scores are expressed as mean values (1=lowest –10=highest).

Phase	Direct circle around BCs	SCBC	Medics/ nurses	Specialist medical care	Military commanders (e.g. TRiM)	Stress management	Social support Family and relation
Pre hospital Care							
Care under Fire	+	+	-	-	-	-	-
Tactical Field Care	+	+	+	-	-	-	-
Evacuation Care	+	+	+	NA	NA	NA	NA
Initial care unit after RTB	+	NA	+	NA	+	+	NA
MTF							
Role 1	+	NA	+	-	-	-	+
Role 2	-	NA	-	+	+	-	+
Role 3	-	NA	-	+	+	-	+
Role 4	+	NA	-	+	+	-	+
Reintegration	+	NA	+	+	+	+	+

Table 3: *A schematic overview of proposed involvement matrix in the medical support organisation*

MTF indicates medical treatment facility; *SCBC:* self-care and buddy care; *RTB:* return to base, *TRiM*: Trauma Risk Management; *NA*: not applicable.
The score was expressed in a symbol plus (+) or minus (-), in this study we defined a positive response of ≥25% as cut-off value.

Effect on professional skills and social environment

Eighty one (103/127) percent of all participants stated that prior to deployment they were given sufficient information on the nature and severity of the injuries of BCs they could face during deployment. One hundred percent of the participants described a positive influence of their deployment on their professional military skills. Team spirit ("esprit de corps") and realistic training ("train as you fight") were mostly (respectively 30% and 25%) mentioned as force multiplier. Twenty four percent (30/127) described a positive effect on their personal development, 4% (5/127) described a negative effect on their personal development. Twelve percent (15/127) described a negative influence on their social support network (relational problems, even leading to divorces), 5% (6/127) a positive effect. Twenty two percent (28/127) felt the need to meet an independent professional coach to talk about their experiences at some point after deployment, 78% (99/127) did not feel this need at any point in the post deployment phase. All participants used their direct colleagues for discussion and feedback during and/ or after deployment. Sixty five (82/127) percent of the participants suggested more involvement for the direct circle around a BC in both the rehabilitation and reintegration phase of the BC. We composed an involvement-matrix for key-players and peers in the subsequent treatment and rehabilitation stages. This overview is expressed in Table 3. Twelve (15/127) percent of the participants stated the need for a social support online network. Sixty two (80/127) percent of the participants did have a Trauma Risk Management session (TRiM)[17] directly after a BC, 39% (50/127) did have TRiM after 4-6 weeks. Seventy two (92/127) percent was positive about the mandatory (2 days) Third Location Decompression (TLD)[18,19] period in Crete. TLD refers to the initial process, undertaken by military personnel at the end of an operational deployment, whereby adjustment from military operations commences.

Post deployment

Using the IES, no significant differences regarding rank, gender, age and military task, also in assessment of the subscales (intrusion, avoidance en hyper arousal), were discovered. The mean score was 5.3 (SD 9.3), three OSCs scored above the cut off value for PTSD (respectively 38, 44 and 45). The PDRS showed a significantly different ($p<0.05$) outcome in the work negative, family positive and personal positive subscales (compared to the Canadian norm values[14]), represented in Table 4. Regarding rank, gender, age and military tasks there were no significant differences.

There were no clear war zone-related factors which influenced scores in the IES or PDRS domains. This includes the following variables: engagement in direct combat, whether there was a BC in their unit, interval between deployments, and the total number of deployments.

PDRS Score (SD)	**Medics/nurses/TCs**	**Canadian control**	**P-value**
WP	3.63 (0.83)	3.51 (0.77)	0.09
WN	2.29 (0.86)	3.51 (0.77)	<0.001*
FP	2.94 (0.92)	3.15 (0.98)	0.02*
FN	2.06 (0.90)	2.01 (0.94)	0.55
PP	3.04 (1.03)	3.38 (0.91)	<0.001*
PN	1.81 (0.68)	1.82 (0.83)	0.88

Table 4: *Post deployment reintegration scale by the deployed medics, nurses, tactical commanders, and enablers (n=127).*

PDRS indicates Post deployment reintegration scale; *SD:* standard deviation; *TC:* tactical commander.
The full PDRS scale has 36 items. Within each of the three domains, 6 items assess negative and 6 items assess positive aspects of reintegration; thus, there are 6 PDRS subscales (Work Positive *(WP)*, Work Negative *(WN)*, Family Positive *(FP)*, Family Negative *(FN)*, Personal Positive *(PP)*, Personal Negative *(PN)*). Each item on the scale is rated on a 5-point scale (ranging from 1= Not at all true to 5= Completely true). Scores for each of the six PDRS subscales are computed separately by creating a mean score for each.
*statistically different p<0.05 (independent sample t-test)

DISCUSSION

This study represents the first large-scale systematic survey using structured questionnaires evaluating the direct circle around BCs in both the pre-hospital phase and its impact on the (long term) post-deployment phase. Almost all medics and nurses scored their pre-deployment training as sufficient for dealing with severely injured BCs. Most (80%) of the participants were exposed to BCs. The QoC was generally perceived as good. Most (99%) of the OSCs described the 9-liner/MIST as an effective tool, 74% OSCs stated that real time assets could enhance the SA of medical personnel. Interestingly, only few (<5%) of the medics and nurses stated the need for direct communication with a medical specialist (e.g. surgeon or anesthesiologist). The participants gave two explanations: (1) that providing more information can be a time-consuming and distracting task for the OSC during combat situations, (2) that direct communication with a medical specialist would not have changed the outcome of the BCs. Nevertheless, good communication is beneficial in triage and therefore might have improved the outcome of a BC (e.g. direct evacuation to a role 3 MTF with neurosurgical capabilities in case of a severe head trauma). Hoencamp et al.[2] described that 75% of the surgeons and anesthesiologists had the feeling they did not receive enough information. It could be argued that with the current technical possibilities it is feasible to equip the commanding officer and his troops with one way "real time" imaging (e.g. helmet camera's, and biometric function assessment). Using this real-time imaging, it might be possible to gain SA at the POI for the medical specialist, without using precious time of the OSC during direct combat. This enhanced situational awareness may reduce stress levels for the medical specialist, due to early "active" involvement in the pre-hospital process. The cost (and weight for the combatant) of such electronic devices may outweigh the benefits, but this is beyond the scope of this study.

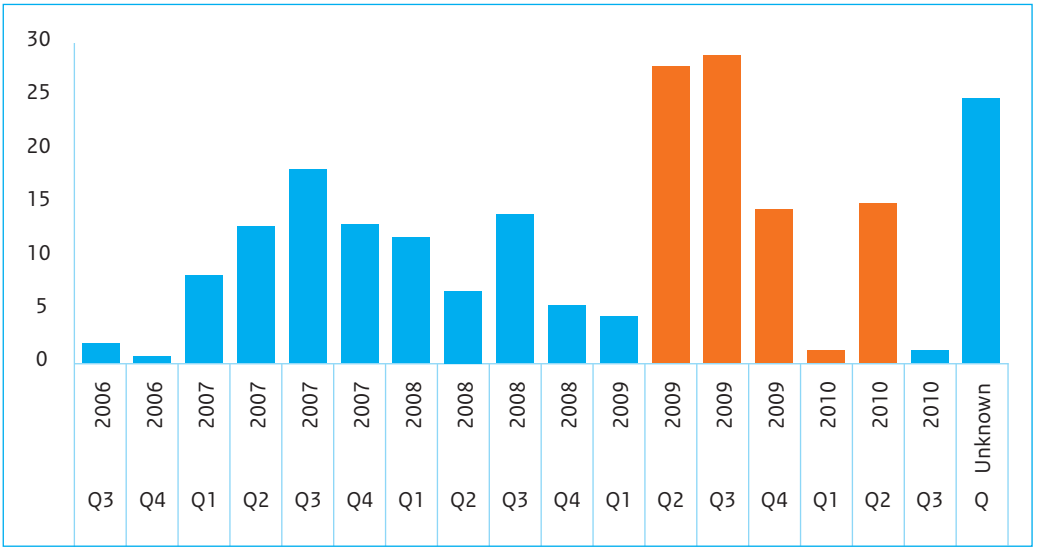

Figure 3: *Distribution of Dutch battle casualties in relation to time of year (n=210)[5].*

Q indicates quarter of year; *Q unknown* represents the unknown case dates. Orange bar: studied period.

After the initial pre-hospital care and subsequent evacuation a (combat) unit faces a challenge; how to deal with the consequences of combat events and BCs. Currently, the focus is mainly on the acute phase after injury. The participants emphasise the need for a more hybrid approach, including first responders, indirect involved service members, family and friends to manage the effect of combat events. Only three participants were above the cut-off value from the IES-R scale for PTSD. This low overall score is interesting since they are removed from their conventional identity and social support system, and they are deprived of a sense of control and physical comforts. Yet, they must witness and immerse themselves in the often gruesome results of armed conflict. The significant worse scores on the PDRS subscales, illustrate the impact of deployments. The units were deployed in the period with the highest casualty rate of Dutch service members [5] (Figure 3), apart from the continuous high casualty rate/MTF admissions of Afghan national security forces and local nationals (~20% children) [1, 4]. Perhaps good preparation as well as unit cohesion has resulted in low incidence of combat stress-related disorders. Research demonstrated that medical personnel in military units are highly vulnerable to PTSD, and also that protective effects of unit cohesion increases as warzone stress exposure intensifies [20]. Contrary to what has been found in other studies psychological health outcomes beyond PTSD, such as psychological distress, multiple physical symptoms, fatigue and heavy drinking were not found in this study [21]. The role of co-combatants and social support network cannot be overemphasized. The proposed key player involvement-matrix could be very useful in the reintegration process. As this matrix expresses the involvement of every stakeholder after an combat event per phase. A quarter of the participants recognized the importance of "esprit de corps" and realistic training programs ("train as you fight") as force multipliers. Interestingly, the response rate in the enablers (attached units) was significantly lower compared to the OSCs and medics. This might indicate the team bonding in the combat units. This confirms the need for attention for group dynamics (e.g crew resource management and mission command or "auftragstaktik") and realistic training. The newly developed TRiM screening functioned adequately. Despite participation being obligatory, the compliance in attending TRiM was too low, and serious attempts should be installed to raise it to 100%. During the deployment of TFU, TRiM was only used by the Marine companies, following the positive results in the British Armed Forces [17]. According to the participants, TRiM was useful as a signalling and peer group stress management system. The Dutch MOD has meanwhile implemented the TRiM in the Royal Netherlands Navy. Given these results, implementation of TRiM as a stress management system in other parts of the DAF should be considered. While the majority of service members will transition from the armed conflict to home life in a seamless manner, some will struggle to find their place after leaving the sometimes hostile environment of the theatre of military operations. Being involved in an armed conflict, a mass casualty situation, a terrorist attack or a natural disaster like an earthquake, changes people. For many of those, these are life changing experiences [22-25]. This study tried to outline areas of anticipated difficulty in the reintegration experience, and to alert (mental) health practitioners to specific areas that could be problematic. The problems of reintegrating those who served in armed conflicts or were exposed to disasters will not cease. The recommendations in this study are not limited to military medicine, and might be useful in civilian and disaster medicine. Identifying predisposing factors [26] to prevent PTSD, could be very effective in combination with low impact screening tools, such as TriM. Electronic aids like "apps", might be useful as a screening or monitoring tool, in particular for mental health conditions [27]. It is a general responsibility to mobilize government agencies, create public-private partnerships, and invest our resources to mitigate the approaching veteran's health care needs, the impact on our social services, and the costs to society[28].

There are some factors that need to be taken into account. One of the limitations of this study was that we could not use explicit criteria to assess the appropriateness of care delivered on the battlefield, therefore an implicit review was used. There are two common methods used to determine "appropriateness of care": implicit review and explicit review. In implicit review, where a reviewing panel determines the "appropriateness of care" for each BC by comparing the actual process of care against his or her own knowledge and opinion of what optimal care is, versus an explicit review, involving well-defined criteria. Secondly, this is a retrospective study, with a delay (mean ~3 years) between exposure and assessment. We were interested in the long term impact of the deployment on the personnel, but could have performed multiple time point assessment to assess trajectories of the results that were presented here. Thirdly, we used the Canadian reference values for the PDRS, as Canada has a reintegration process that is similar to the Netherlands. Moreover, the life standard is comparable to the Netherlands, and recent comparative analysis demonstrated similar approaches to mental health in the deployment cycle across NATO countries [29]. Nevertheless, it would be interesting to re-validate these norm values in the DAF. Lastly, the questionnaires and cut off values used are only tools to score PTSD, and might have resulted in under- or overestimation of the post deployment impact. The PTSD rate was low compared to governmental organisations [30,31], and warrants further assessment.
This study represents the first assessment of the effects of combat events in a combined (bottom-up) approach (research on pre-deployment preparation, physical and mental health) evaluating the direct circle around battle casualties in both the pre-hospital phase and its impact on the (long term) post-deployment phase. The Wounded Warrior Recovery Project (WWRP) could be very illustrative for long term consequences of combat events[32], and collaboration in this project could be beneficial for the DAF.

In conclusion, there is no (global) golden emergency system, timeline, after care or "standard fit" in armed conflicts. Our results show that the QoC in the pre-hospital phase was considered adequate, but that further optimization is possible in the post-deployment care. The proposed key player involvement matrix could be very useful in the reintegration process. Electronic aids, like screening and post deployment (therapeutic) management tools, could facilitate in achieving this aim. The PTSD rate in the RNLMC (with attachments) deployed to Southern Afghanistan was low using the IES. Further research is necessary to identify predisposing preventable high stress factors and compositing of a "waterproof" aftercare program (e.g. fully integral TRiM) as initial warning for more specialist (mental) care.

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Supplemental data 1. Description of the medical support organisation

The NATO coalition forces operate with a standardized model of evacuation and (surgical) treatment phases, that can be adapted to several situations depending on different geographical and battle type related factors. This model is based on a system with progressively sophisticated levels of medical support in the chain of events when taking care of a battle casualty (BC).

Role 0 (battlefield and evacuation):

This includes Self Care and Buddy Care (SCBC). This is basic assistance that can be provided by all combatants to treat basic circulation- airway, breathing, and circulation (c-ABC) problems.

Evacuation from the point of injury

This is a critical phase where military tactics, time, information flow and communication are essential. This phase is performed by military tactical commanders, and military nurses trained according to Tactical Combat Casualty Care (TCCC) doctrine and Battlefield Advanced Trauma Life Support (BATLS) principles. The NATO 9-liner/ MIST is used as a formal document for Medical Evacuation (MEDEVAC) or Casualty Evacuation (CASEVAC). This 9-line medical evacuation message is a series of phonetic letters, numbers, and basic descriptive terminology used to transmit essential evacuation information such as location, (war) time zone, security of pick-up site, number of patients by precedence, special equipment required, patient nationality and status.

Medical Treatment Facilities (MTF)

Role 1 MTF:

This level is the first level of care in which medical professionals are situated. Care at these facilities is aimed at initial life and limb saving (mostly non-surgical) procedures. On our forward operating base in Dew Rawod there was a role 1 MTF. Care in this phase is generally performed by military nurses (AMV), general duty medical officers (AMA / GDMO) and general practitioners (GP). All of them are trained according to Battlefield Advanced Trauma Life Support (BATLS) principles. If more extensive surgical interventions are required, the patients are transported to a higher echelon.

Role 2 MTF:

At this level of care subsequent, emergency resuscitation and damage control surgery is performed by military medical specialists, mainly anesthesiologists and surgeons. In addition to a Role 2 Enhanced (E), a Role 2 MTF Light Manoeuvre (LM), medical care is limited to life-and-limb saving and damage control surgery, with is a short holding capacity. A Role 2 MTF should be easily accessible and in a safe area. On Multi National Base Tarin Kowt there was a Role 2E MTF with additional (e.g. intensive care unit [ICU], radiological imaging) facilities.

Supplemental data 1. continued

Secondary Evacuation
Moving the patient to a Role 3 MTF or civilian hospital (by helicopter or tactical ambulance) is called MEDEVAC or Strategic Evacuation (STRATEVAC). At these higher echelons, more specialist care is available and a longer length of hospital stay is possible. The MTFs are designed to provide theatre secondary health care within the restrictions of the Theatre Holding Policy.

Role 3 MTF:
At this level in the Medical Support Organization, there are facilities for deployed hospitalization and the elements to support it. It basically includes surgical interventions at primary surgery level, ICU, nursing beds and diagnostic support. Depending on mission characteristics it includes a mission-tailored variety of clinical specialties, focused on the provision of emergency medical care. During the Dutch operations in Uruzgan province, this task was in most cases fulfilled by the Multinational Role 3 MTF, located at Kandahar Airfield (KAF).

Role 4 MTF:
Located at the end of the evacuation and treatment chain, the Role 4 MTF provides the full spectrum of definitive medical care that could (or should) not be delivered in theatre. It includes definitive high care specialist surgical and medical procedures, reconstructive surgery and (long term) rehabilitation facilities. Role 4 care can be provided by military hospitals, but also in cooperation with the national, civilian, health care system. This combined service was provided in the Central Military Hospital and the University Medical Centre Utrecht.

Rehabilitation
This is the phase that follows after the sometimes intensive in-hospital treatment.

Supplemental data 2. Questionnaire lessons learned deployed medics, nurses, tactical commanders and enablers to Southern Afghanistan (translated from the original Dutch questionnaire)

BG = Battle Group
ETA = Estimated Time of Arrival
MIST = Mechanism of injury, Injuries, vital Signs, Treatment
SA = Situational Awareness
BC = Battle Casualty
MTF = Medical Treatment Facility
OSC = On-scene Commander
POI = Point of Injury
PDRS = Post Deployment Reintegration Scale
IES-R = Impact of Event Scale - Revised

Phase 1/2

How many Dutch battle casualties (BCs) did your unit (with you directly involved as OSC or medic/military nurse) see during the deployment?
How many BCs from attached units (ANA/ ANP/ Coalition Forces) did you and your unit see during the deployment?
This may also be an estimate.
How many times did you have to fill out a 9-liner?
How many times did you have to fill out a MIST?
How many times did your unit have to fill out a 9-liner for BCs?
How many times did your unit have to fill out a MIST for BCs?
On average, how much time did it take you to fill out a 9-liner for a BC?
    0-5 minutes, 5-10 minutes, 10-15 minutes, > 15 minutes
On average, how much time did it take you to fill out a MIST for a BC?
    0-5 minutes, 5-10 minutes, 10-15 minutes, > 15 minutes
Was the 9-liner a clear and adequate tool for passing on information?
    No, because
    Too long, Too complicated, Incomplete, Unclear, Other:
Was the MIST a clear and adequate tool for passing on information?
    No, because
    Too long, Too complicated, Incomplete, Unclear, Other:
Is it necessary to give the Combat Life Saver (CLS) a more formal role in the pre-hospital phase to improve the quality of care at the POI?
How many times did you apply an intravenous drip during your deployment?
    On average, how many attempts did you require to carry out the procedure satisfactorily?
How many times did you apply a tourniquet during your deployment?
    Did the tourniquet have an immediate effect?
Did you feel that you needed direct contact with a medical specialist (surgeon/anaesthetist) at the POI during treatment of a BC?

Supplemental data 2. continued

In your opinion, would real-time aids contribute to better and more useful information for medical personnel in, for example, the Role 2 MTF?

Which real-time aids?

Video (helmet camera), Direct radio link, One-way radio link (from POI to higher echelon), Other:

No, because?

Slow work down, Act as a distraction, Other:

In your opinion, would real-time aids contribute to better and more useful information at the POI during treatment of a BC?

Which real-time aids?

Video (helmet camera), Direct radio link, One-way radio link (from POI to higher echelon), Other:

No, because?

Not necessary, High risk of passing on incorrect information, Other:

In retrospect, which of the training courses or learning occurrences listed below were the most useful to you as the medic at the POI (the time between occurrence of the injury and departure of the helicopter)?

Not applicable to me (OSC)

Mission-specific training, Paramedical training (Defence Medical Training Institute), Unit training during work-up period, Previous personal experience, Other (civilian) training course, Colleagues' experiences, Other:

What do you feel you lacked as a medic during treatment of a BC at the POI?

Not applicable, I was OSC / Military Physician

Nothing, Sufficient personal preparation for the mission, The right scenario training (old-school unrealistic work-up path), The right equipment, The right coaching, The right communication equipment, Other:

What was your perception of international medical cooperation after an incident had occurred (1 = very poor 10 = very good)?

At POI

At Role 2

Could you now assess the quality of care/information handover during the following 4 phases (1 = very poor 10 = very good)?

Quality of care at Point of Injury

Quality of information handover from POI to Role 2 MTF (e.g. 9-liner, ETA*, MIST**, triage)

Quality of care in trauma room (the "crash room")

General quality of care at the Role 2 MTF

Did you perceive a big difference in the quality of care per BC at the POI?

In retrospect, were you given sufficient information on the nature and severity of the injuries of BCs you might have to treat?

By whom?

Direct superior in the armed forces, Previously deployed colleagues, Mission-specific training instructor, Training at the Defence Medical Training Institute, Other:

Supplemental data 2. continued

When did you become aware of this?
When I first heard that there was a NLD casualty, When I experienced it for myself, Only after the casualty had been evacuated, Only after my deployment, Other:
What is your assessment of the overall treatment and care of casualties from your unit (1 = very poor 10 = very good)?

Phase 3/4 - Social support

Please indicate in the table below in which phase the various members of personnel should be involved in the treatment and care of BCs. Some combinations are by definition not possible (such as parents in phase 1).
The phases of the medical treatment process are:
Phase 1: Pre-hospital phase. This is the phase between the BC receiving the wound at the Point of Injury (POI) and the first treatment in a higher echelon, including transport.
Phase 2: Hospital (Role 2 MTF) phase. This is treatment of the BC in a hospital.
Phase 3: First rehabilitation phase until six months after BC received the wound (could be in either Afghanistan or the Netherlands).
Phase 4: Second rehabilitation phase from six months after BC received the wound (in the Netherlands).

Colleagues (from unit)
Direct superior in armed forces
Medic / Military nurse involved at POI
Medical specialist (e.g. surgeon/ anaesthetist)
Battle Group Commander
Parents/family
Partner
Friends
Spiritual welfare officer/Chaplain
Defence Social Services Agency
Rehabilitation specialist
Colleagues network
Other
Do you think it useful for the first medic on the scene to be involved in the BC's aftercare path?
For me *personally:*
Do you think it useful for the first medic on the scene to be involved in the BC's aftercare path? For the *BC:*
What advice do you have for improving phase 3/4?

Phase 3/4 - Personal

Receiving social support can be both helpful and pleasant. However, not everyone finds it easy to ask for help. The idea that you have to solve all your own problems can also lead to isolation.

How would you describe yourself when asking for social/mental support from partner/family/friends.
Before deployment, During deployment after a BC in my unit
I ask for help very easily, I seldom ask for help, I almost never ask for help, I do not ask for help

Supplemental data 2. continued

Do you (or did you in the past) feel the need to be part of a social network (a kind of facebook community) for former deployed personnel, fellow sufferers and war veterans?
Have you (sometimes) felt the need to discuss your deployment experiences and the consequences thereof with an independent 'coach'?
With who else?
Direct superior in armed forces, Spiritual welfare officer//Chaplain, Home GP/Military physician, Defence Social Services Agency, Psychologist/ Psychiatrist, Colleagues network, Other:
Have you discussed your experiences with an independent 'coach'?
Why?
With who else?
Direct superior in armed forces, Spiritual welfare officer/Chaplain, Home GP/ Military physician, Defence Social Services Agency, Psychologist/ Psychiatrist, Colleagues network, Other:

Phase 3/4 – Colleagues network
Did you have a first TRiM (Trauma Risk Management) interview 72 hours after the incident?
If yes:
Individually, As part of a group
What was the reason for this?
What did you think of the first TRiM interview?
Did you have a second TRiM interview 4 to 6 weeks after the incident?
If yes:
Individually, As a group
What was the reason for this?
What are your thoughts on the decompression period on Crete?
Positive, Negative, No decompression period
After the mission, did you discuss your work experiences (i.e. in the medical domain) with your colleagues?
What stopped you from doing so?
How has your deployment to Uruzgan affected your personal and professional lives in the Netherlands? In the area of:
Medical skills and competences?
Personal development?
Your home situation?
Would you again like to be deployed in the role of medic (possibly as a secondary task) in the future?
Not applicable, I was OSC/Signals Operator
Have you ever considered following a medical training course?
Not applicable, I was OSC/Signals Operator/ military physician/nurse
Looking back on your deployment and the period after your deployment with BG-10/11/12 (up until today)
What experience with BG 10/11/12 did you find to be very positive?
What experience with BG 10/11/12 did you find to be very negative?
What advice would you give to your current or future colleagues when preparing for deployment as a medic (next to their military tasks)?
What question would you have like to have answered but is missing in this questionnaire?