

Military Psychiatry for Armed Forces on Operations

Psychiatric Research and Development in the Bundeswehr 2010–2020

**German Armed Forces Centre for Military Mental Health
(Psychotrauma Centre)**



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Introduction

The study and treatment of psychological disorders associated with military action and operations has a long socio-historical tradition. Descriptions of emotional responses to combat stress and their considerable psychosocial ramifications date back as far as classical antiquity. One example is Homer's description of Achilles rampaging outside Troy.

With shell shock at the western Front in World War I and gastric ailments in the German Wehrmacht in World War II, such reactive phenomena first occurred in such numbers that available medical and logistical capacities were pushed to their limits.

Scientific studies of the wars of the modern era, such as the Vietnam War or the Gulf Wars, also concluded that combat stress results in various psychological responses and disorders (e.g. the Gulf War syndrome).

For many years after World War II, psychiatry in the Bundeswehr was defined by the principles of diagnosis and of assessing soldiers' fitness for military service. This changed when missions abroad commenced in the early 1990s. For the first time, the number of cases of mental illness that were directly attributable to deployments abroad increased, first slowly, then more and more noticeably from the early 2000s.

As a result of this increase, the need for substantial improvements to the therapeutic concepts employed at Bundeswehr hospitals and for newly developed treatment options became evident. The main focus was and remains on post-traumatic stress disorders. It soon became clear that the experiences of other armed forces in earlier war scenarios were only somewhat applicable to the Bundeswehr as an army on operations that is also a parliamentary army with the guiding principle of citizens in uniform.

Thus there arose a need for innovative scientific expertise that could inform and drive the necessary developments and changes. To this end, the German Bundestag in 2008 decided to create the German Armed Forces Centre for Military Mental Health (Psychotrauma Centre) for the Bundeswehr to meet these challenges. The Bundeswehr quickly provided the personnel and material needed to establish the initial capability, which was developed further in the following years.

Thus the Psychotrauma Centre of the Bundeswehr was established as part of Berlin Bundeswehr Hospital. In its current structure it combines clinical and scientific expertise. The centre is the only one of its kind in Germany. Its purpose is to advance the knowledge of the origin, diagnosis, prevention, treatment and aftercare of psychological disorders – whether related to deployment abroad or not – through scientific projects and to generate a direct health benefit for affected soldiers and their psychosocial environment.

Cooperation with other institutions and organisational elements of the Bundeswehr is essential, as is providing them with advice and support in accomplishing their missions. Besides the network of military structures, the cooperation of military psychiatry and the Psychotrauma Centre with the project for pastoral care of the Military Office of the Protestant Church for the Bundeswehr on the one hand and with the Soldiers and Veterans Foundation (SVS) of the German Bundeswehr Association on the other are particularly positive examples.

The first important project of the Psychotrauma Centre started in 2009. A large-scale and high-quality prevalence study on mental illness in the Bundeswehr was commenced and conducted over the following years in cooperation with the Technische Universität Dresden. This extensive study produced scientifically sound data on the disease burden of mental disorders and the conditions under which they arise. This data became the main basis for further developments and projects in psychosocial care in the Bundeswehr. A 12-month prevalence of 20-23% of soldiers experiencing mental illness was the wake-up call needed to develop or improve preventive and therapeutic countermeasures.

Some of these measures will be presented in this introduction and explored in more detail over the following chapters.

One of the research fields that developed from the project is the on-going and very successful cooperation of the Psychotrauma Centre with the Bundeswehr Psychological Service. The effectiveness of the latter's computer program CHARLY was assessed in a longitudinal controlled study. Since CHARLY was shown to be superior to standard preventive measures before deployment abroad, it has been adopted as part of standard procedure in the Medical Service and will be extended to other branches of service.

Psychiatric-psychotherapeutic treatment and especially treatment of psychotrauma had already had been increasingly established in Bundeswehr hospitals since the mid-1990s. It was unclear, however, whether treatments taken from the civilian sector had a positive and sustainable effect on soldiers. Several controlled trials at the Psychotrauma Centre proved that inpatient treatment had been clinically effective in up to 80% of soldiers, which was a significantly greater percentage than in untreated control groups. In 2015, this research was honoured with an award by the *Deutschsprachige Gesellschaft für Psychotraumatologie (DeGPT)*, an association for psychotraumatology active in German-speaking countries.

Despite these successes of trauma therapy in Bundeswehr facilities, many patients still experienced residual symptoms. This is why the Psychotrauma Centre of the Bundeswehr continues to search for innovative therapeutic approaches in order to address symptoms that show a limited response to established treatments.

Serious games are one such example of an additional therapeutic module in trauma therapy. Initial study results are expected in 2017.

Another project includes integrative, interdisciplinary therapeutic approaches to managing often profoundly disturbing and traumatic experiences made on deployment abroad. In close cooperation with the military chaplaincy, especially the project for pastoral care of the Military Office of the Protestant Church, a therapeutic approach was conceived that puts personal values and moral injuries of deployed soldiers at the heart of treatment. Initial studies have shown a close connection between these injuries and the development of psychiatric symptoms. Therapy based on morals and values is perceived by patients as very helpful and current scientific evaluations show encouraging results.

Mental illness has a significant impact on the social environment of those affected. Patients' families thus play a vital role in the healing process. That is why the therapeutic and scientific work of the Psychotrauma Centre also focuses on studying the stress that partners and children of traumatised soldiers experience as well as on developing treatment options tailored to them. This is done in cooperation with the project for pastoral care of the Military Office of the Protestant Church and Ulm University.

This work has produced not only a number of scientific studies but also a book for children of traumatised soldiers and several information brochures. The

publications of the Psychotrauma Centre are available free of charge and are in high demand.

Recently, the clinical and scientific interests of the Psychotrauma Centre have been expanding to include the area of technology-based methods and techniques. In mid-2016 the first scientifically sound German-language app for soldiers with psychological trauma was developed and released. The app provides psychoeducation and guidance on self-help (e.g. tips on how to respond in an emergency, relaxation techniques etc.) and is constantly developed and improved by the Psychotrauma Centre in cooperation with the Technische Universität Dresden. The app is flanked by other services of the Psychotrauma Centre, such as online counselling and internet-based forms of psychotherapy (e.g. online PTSD therapy or treatment of depression).

In recent years, the Psychotrauma Centre of the Bundeswehr has developed into a well-connected central point of contact and a competence centre for mental illness, whether related to deployments abroad or not. This was achieved in close cooperation with the psychiatric departments of Bundeswehr hospitals and university medical clinics with specialty services as well as with the psychosocial services of the Bundeswehr. Its great appeal is also evident in many civilian and military lecture events and conferences in a national and international context. This is underscored by a scientific congress for further training and discussion that is organized by the Psychotraumacentre every year in early December to discuss new trends in psychotraumatology with a broad military and civilian expert audience.

We must nevertheless now maintain and further develop the good standard of military psychiatry in the Bundeswehr in order to consolidate the advances already made. The results of the previously mentioned Bundeswehr prevalence study suggest that, as a result of deployments abroad, thousands of active and retired soldiers of the Bundeswehr have developed clinically significant mental health problems that remain untreated.

Visits to Bundeswehr psychiatric facilities are thus likely to increase over the next years. Given the level of psychiatric expertise available in the military, these facilities are unrivalled in Germany and civilian measures can be merely supplementary. An important challenge will thus be the sustainable development and appropriate adjustment of the personnel and material structures of existing treatment facilities at Bundeswehr hospitals and psychiatric specialty clinics.

This process will continue to be supported by the scientific expertise of the Psychotrauma Centre. This support should include large-scale international civil-military cooperation projects. One such example is a scientific project recently initiated at the Psychotrauma Centre to prevent depression and suicide. The goal is to prevent a rise in depressive disorders, which are sometimes associated with suicidal tendencies. The main goal of these activities is to improve the long-term quality of life and daily stability of soldiers who sustained psychological injury while serving their country.

This reader sums up key research results and services provided by German military psychiatry and in particular the Psychotrauma Centre with the aim of providing a condensed account of the development process of recent years based on choice examples. Conclusions will also be drawn from the results of finished projects regarding necessary future measures and structural changes. The reader will serve as encouragement to get actively involved in the extensive and constructive process of improving psychosocial care for German soldiers.

Conclusions

Over the last 20 years, psychiatry in the Bundeswehr has undergone extensive changes, which found their expression in the foundation and development of the German Armed Forces Centre of Military Mental Health (Psychotrauma Centre) as a centre of scientific expertise.

Various research projects of the Psychotrauma Centre have contributed to an extensive data set, which in turn stimulated further developments in the fields of diagnosis, prevention, therapy and evaluation of mental disorders in the German armed forces.

NOTE:

The individual chapters aim to be self-contained and self-explanatory, which is why overlaps in terms of content could not be entirely avoided.

For reasons of clarity, not all recent research articles in the field of military psychiatry could be included in the main text. A complete anthology of all abstracts can be found in the appendix.

For better reading no gender adaption was made. Both genders are addressed if not otherwise stated.

Topic 1: Mental health in Bundeswehr soldiers since the start of missions abroad: trends and risk profiles

For the Bundeswehr, participation in international missions in the various crisis regions worldwide has brought about profound changes in terms of psychological responses of deployed soldiers and consequently the significance of mental illness in the medical care system.

Epidemiological studies (Bundeswehr prevalence study) conducted between 2009 and 2013 of soldiers deployed to Afghanistan and a control group of soldiers who had never been deployed produced the first conclusive results. More than 20% of all soldiers with or without deployment experience were diagnosed with a mental illness (deployed soldiers: affective disorders 7.8%; PTSD 2.9%; anxiety disorders 10.8%; somatoform disorders 2.5%; alcohol abuse and addiction 3.6%).

Deployed soldiers run a higher risk of experiencing combat-related or other traumatic events. The prevalence of PTSD (OR: 2.4), anxiety (OR: 1.4), and alcohol abuse (OR: 1.9) was much higher among them than among soldiers without deployment experience. Pre-existing mental disorders increased the risk significantly.

Wittchen HU, Schönfeld S, Kirschbaum C, Trautmann S, Thurau C, et al. (2013) Rates of Mental Disorders Among German Soldiers Deployed to Afghanistan: Increased Risk of PTSD or of Mental Disorders In General? *J Depress Anxiety* 2:133. doi:10.4172/2167-1044.1000133

According to recent surveys, mental illness is also widespread among Germany's civilian population. Those disorders, however, differ from those experienced by military personnel. It should also be noted that soldiers must face exceptional challenges in terms of mental stability due to the demanding nature of their responsibilities.

The 12-month prevalence of psychiatric disorders in deployed soldiers is somewhat similar to that in a comparable civilian sample. It is lower in soldiers with no history of deployment. Significant differences between military personnel and civilians regarding prevalence of individual diagnoses were only apparent for alcohol and nicotine dependence, with lower values in both military samples. Elevated rates of panic, agoraphobia and PTSD were observed in deployed soldiers with high combat exposure.

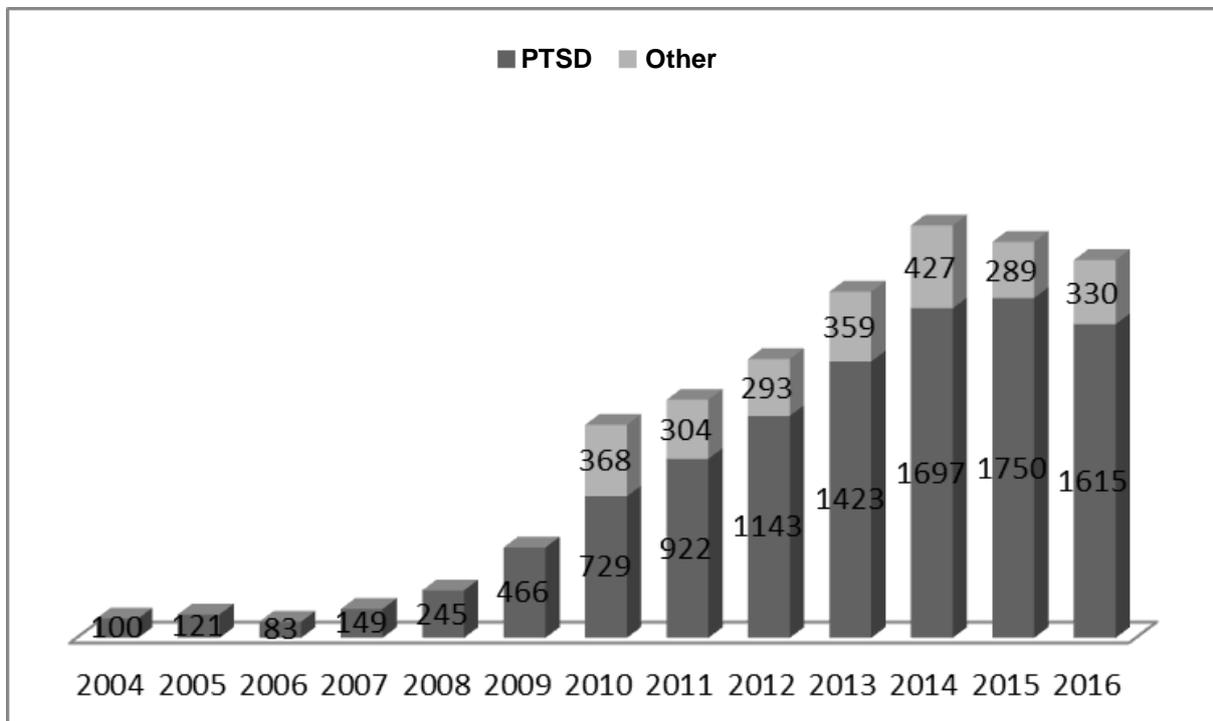
Trautmann, S., Goodwin, L., Höfler, M., Jacobi, F., Strehle, J., Zimmermann, P., & Wittchen, H. (2017). Prevalence and severity of mental disorders in military personnel: A standardised comparison with civilians. *Epidemiology and Psychiatric Sciences*, 26(2), 199-208. doi:10.1017/S204579601600024X

These changing rates of prevalence are not only evident in epidemiological field studies but also in the health care systems of Bundeswehr hospitals.

Evaluation of Bundeswehr statistics on hospitals and general practitioners showed that significantly more Bundeswehr soldiers sought inpatient or outpatient treatment for mental disorders in 2006 than in 2000. The differences were mainly due to a rise in acute stress reactions (F43). The proportion of psychiatric patients, especially those with acute stress reactions, among the total number of inpatients treated at Bundeswehr hospitals also increased.

GES-2009-1 | Zimmermann, P; Hahne, HH; Ströhle, Andreas (2009) Psychiatrische Erkrankungen bei Bundeswehrsoldaten. Veränderungen in der Inanspruchnahme medizinischer Versorgungssysteme im Vergleich der Jahre 2000 und 2006. Trauma und Gewalt 3(4):316–327

Since 2010, the Psychotrauma Centre has kept statistics on deployment-related mental illness and treatment cases in the Bundeswehr. They showed a considerable increase over several years in the number of patients seeking treatment for mental disorders at psychiatric facilities of the Bundeswehr. Since 2014, however, the statistics have plateaued at a high level. This development is partly due to the limited capacities of Bundeswehr hospitals. As a result, the needs of soldiers with deployment-related disorders compete for available resources with those of their fellow soldiers with other, non-deployment-related symptoms.



Military missions abroad carry a high risk of psychological traumatisation. Data from 2010 to 2011 show that an increasing number of soldiers made initial contact with psychiatric and psychotherapeutic services after their return from deployment. Particularly the increase in the number of female soldiers first presenting with symptoms of deployment-related stress is notable. The share of Kosovo returnees was greater than that of soldiers returning from Afghanistan. Most patients first seeking help were diagnosed with a stress reaction, with affective disorders being the second most common diagnosis. Findings suggest that the increase in incidence is specific to gender and area of deployment.

GES-2012-3 | Kowalski J, Hauffa R, Jacobs H, Höllmer H, Gerber W, Zimmermann P (2012): Deployment-Related Stress Disorder in German Soldiers: Utilization of Psychiatric and Psychotherapeutic Treatment. *Deutsches Ärzteblatt International* 109(35-36):569–575 DOI: 10.3238/arztebl.2012.0569.

On missions, too, surveys were conducted in local Field Hospitals on the utilisation of the services provided by deployed psychiatrists until 2014. These surveys revealed a shift in disorders diagnosed between 2009 and 2012. As hostilities decreased, so did diagnoses of acute stress reaction and post-traumatic stress disorder, while the number of cases of adjustment disorder due to work-related or personal conflicts increased.

A comparison of deployment-related psychiatric diagnoses in the years 2009 and 2011/12 revealed a significantly higher occurrence of acute stress disorder in 2009, while in 2011/12 there were a greater number of cases of adjustment disorders. This diagnostic discrepancy can hypothetically be traced back to the different kinds of stressors the soldiers were facing during their deployment.

GES-2012-7 | Ungerer J, Weeke, A, Zimmermann P, Jenuwein M, Petermann F, Kowalski J (2013): Akute psychische Störungen deutscher Soldatinnen und Soldaten in Afghanistan. *Zeitschrift für Psychiatrie, Psychologie und Psychotherapie* (2013), 61, pp. 273-277. DOI: 10.1024/1661-4747/a000170.

A more recent study confirmed this trend. It noted a significant increase in depressive symptoms and sleep disorders, but not in PTSD, in soldiers during the course of deployment.

In a prospective study comparing 118 soldiers deployed to Afghanistan with a non-deployed control group (N=146), the former group was found to experience increased depressive symptoms, reduced quality of sleep and daytime sleepiness. The most important predictor of poor quality of sleep during deployment was impaired quality of sleep before deployment. The number of soldiers with impaired sleep quality decreased significantly after deployment. Teaching techniques to improve sleep before deployment could presumably improve the quality of sleep during deployment.

GES-2017-1 | Danker-Hopfe H, Sauter C, Kowalski JT, Kropp S, Ströhle A, Wesemann U, Zimmermann P (2017): Sleep quality of German soldiers before, during and after deployment in Afghanistan-a prospective study. *J Sleep Res.* 2017 Apr 4. doi: 10.1111/jsr.12522. [Epub ahead of print]

Increased rates of nicotine dependence during deployment, as was found to be the case in a cohort study of combat forces, is highly relevant in terms of health policy.

A comparison between the nicotine consumption of a mechanised infantry battalion deployed to Afghanistan and one stationed in Germany showed tobacco dependence to be significantly increased in the deployed group. This increase can be attributed to the circumstances and burdens specific to deployment that the group experienced.

GES-2014-2 | Wesemann U, Schura R, Kowalski J, Kropp S, Danker-Hopfe H, Rau H, Ströhle A, Thiele J, Zimmermann P (2015): Association of Deployment and Tobacco Dependence among Soldiers. *Gesundheitswesen* 2015 Oct 22. DOI: <http://dx.doi.org/10.1055/s-0035-1559707> [Epub ahead of print].

Owing to the considerable prevalence of mental illness among soldiers, one research area of the Psychotrauma Centre focuses on risk and protection factors. The Bundeswehr prevalence study has already identified pre-existing mental health problems, the number of experienced stressors, lack of social support and difficulties in regulating emotion as relevant predictors.

Using standardised diagnostic interviews (CIDI) with integrated questionnaires, 358 male soldiers were examined before and 12 months after their deployment for risk factors of PTSD, depression and anxiety disorders. Stressful experiences, a lack of social support and difficulties in emotion regulation were significant risk factors, especially with regard to later PTSD symptoms.

GES-2015-5 | Trautmann S, Schoenfeld S, Heinrich A, Schafer J, Zimmermann P, Wittchen H (2015): Risk factors for common mental disorders in the context of military deployment: a longitudinal study. *European Psychiatry* Vol. 30, p 303
DOI:10.1016/S0924-9338(15)30244-3

Coping with the everyday stress of military service in Germany or abroad and the level of training associated with that service seem to be important factors. Deployed members of the Special Forces Command, for instance, experienced lower stress levels on operations.

Special forces soldiers deployed abroad experience less chronic stress than their peers serving in Germany. Deployment is considered a challenge and the intense operational training that such soldiers have undergone could have a preventive effect under field conditions.

GES-2015-3 | Ungerer J, Kowalski J, Kreim G, Hauffa R, Kropp S, Zimmermann P (2015): Chronischer Stress bei Spezialkräften der Bundeswehr. Unterschiedliches Stresserleben bei Kommandosoldaten im alltäglichen Dienst und Auslandseinsatz. *Trauma und Gewalt* 9(3):236-243

Signs in the risk profile also point towards individual factors. During clinical treatment, traumatised soldiers in leadership positions (officers) reported fewer trauma symptoms (intrusions) than fellow service members with less responsibility.

A study of 74 soldiers treated for PTSD in inpatient or outpatient settings analysed correlations between the severity of PTSD at the beginning of treatment, symptom clusters and psychosocial parameters. Soldiers with deployment-related PTSD experienced significantly more hyperarousal than soldiers with PTSD unrelated to deployment. Trauma symptoms such as intrusive thoughts were significantly less pronounced in soldiers in leadership positions than in soldiers from other ranks. In soldiers with delayed onset of PTSD, overall severity and intrusive thoughts were also less pronounced.

GES-2012-7 | Jenuwein M, Zimmermann P, Ungerer J, Fuchs S, Beudt S, Jacobsen T, Alliger-Horn C, Gerber WD, Niederberger U, Petermann F, Kowalski J (2012): Zum Schweregrad der Posttraumatischen Belastungsstörung im militärischen Kontext. Zeitschrift für Psychiatrie, Psychologie und Psychotherapie (2012), 60, pp. 309-314. DOI: 10.1024/1661-4747/a000131.

Furthermore, the personal values and moral standards of soldiers seem to influence the frequency and severity of mental illness in the military context. During assignment abroad, soldiers may experience events that conflict with their deeply held values and standards. This can cause moral injuries to develop alongside mental disorders.

A questionnaire-based study of soldiers returning from deployment showed personal values of soldiers (especially hedonism, benevolence and universalism) had a significant effect on the probability and severity of PTSD and other psychological symptoms after deployment. These findings could contribute to the further development of therapeutic approaches.

GES-2014-4 | Zimmermann P, Firnkes S, Kowalski J, Backus J, Siegel S, Willmund G, Maercker A (2014): Personal values in soldiers after military deployment: associations with mental health and resilience. European Journal of Psychotraumatology 5:1-9. DOI: 10.3402/ejpt.v5.22939.

Personal values of soldiers have an effect on the severity of alcohol dependence and should be given more weight in the diagnosis and therapy of alcohol disorders. In a study of soldiers receiving inpatient treatment for alcohol dependence, the value type of hedonism was found to have a significant positive association with symptom severity, while that of stimulation was found to be negatively associated. Confidence in abstinence increased significantly during therapy, with a positive influence of tradition on treatment outcome.

GES-2015-11 | Zimmermann P, Kahn C, Alliger-Horn C, Willmund G, Hellenthal A, Jaekel R, Schomerus G, Wesemann U (2015): Assoziation von Werteorientierungen mit der Schwere einer Alkoholabhängigkeit bei Soldaten in qualifizierter Entzugsbehandlung. Nervenheilkunde 10:803-808

Moral injuries play an important role in the pathogenesis of mental disorders after distressing experiences during deployment abroad. Combat experiences involving civilians seem to have a particularly strong effect on the mental health of military personnel of the German armed forces. This effect seems to be mediated by the construct of moral injury.

GES-2017-2 Hellenthal A, Zimmermann P, Willmund G, Lovinusz A, Fiebig R, Maercker A, Alliger-Horn C: Einsatzerlebnisse, Moralische Verletzungen, Werte und psychische Erkrankungen bei Einsatzsoldaten der Bundeswehr. Verhaltenstherapie 2017 (in press)

Soldiers repatriated to Germany because they cannot cope with the operational environment for health reasons (aeromedical evacuation) are a particularly important target group of risk analyses.

A comparison between a questionnaire-based survey of ISAF soldiers and the medical records of soldiers from the same contingent who were repatriated for mental health reasons showed that the risk of repatriation varied among those soldiers. Rank and lower age of soldiers who had participated in combat as well as soldiers deployed to Kunduz were at a particularly high risk.

GES-2015-2 | Zimmermann P, Seiffert A, Herr K, Radunz N, Leonhard R, Gallinat J, Heß J (2015): Risk Factors for Mental Health Aeromedical Evacuation Among German Armed Forces Soldiers Deployed to Afghanistan. *Military Behavioral Health* 3(1):23–28. DOI: 10.1080/21635781.2014.995247.

Conclusions

The data collected on risk profiles and development trends of mental disorders among deployed soldiers suggests that participation in missions abroad can have a negative impact on the mental health. Specific groups at risk of developing a mental illness on deployment can be identified.

The outlined risk profiles should primarily be communicated to leaders in the armed services and the Medical Service in order to provide certain vulnerable groups with specialised care before, during and after deployment, for instance in the form of structured preventive measures (see also Topic 3). Those measures should focus on mental stress in the narrower sense but should also take into consideration broader dimensions of human experience such as personal values. One option could be specific moral-ethical training.

Topic 2: Changes in brain structure and physiology in the context of psychological trauma

In recent years, a number of studies have focused on physiological and structural changes of the brain as well as hormonal changes after traumatic experiences. They have been conducted in military and non-military contexts. Post-traumatic disorders were shown to extensively affect major regulatory processes of the human body. In some cases it was even possible to visualise the impact with medical imaging procedures. Among other things, post-traumatic disorders are associated with a dysregulation of various stress hormone systems, particularly noradrenaline and cortisol.

With effective pharmacologic and psychotherapeutic treatment, such changes are often reversible.

The development of disorders left untreated in the long term, on the other hand, explains why health problems such as PTSD are often associated with an increased risk of cardiovascular or metabolic disease and ultimately with an increased mortality rate.

Initial studies of this issue have been conducted at the Psychotrauma Centre and suggest that heart rate variability declines considerably in soldiers with post-traumatic stress disorder as well as general work-related stress. In the course of psychotherapy, however, cardiac activity can significantly improve again.

PTSD is associated with comprehensive disruption of various physiological regulation mechanisms that could be measured with the parameters of heart rate variability (HRV). A systematic review showed a correlation between PTSD and reduced HRV. HRV could therefore be a potential marker for disorders and could complement clinical diagnosis and follow-up in patients with PTSD.

PHY-2015-5 | Sammito S, Thielmann B, Zimmermann P, Böckelmann I (2015): Einfluss einer Posttraumatischen Belastungsstörung auf die Herzfrequenzvariabilität als Marker des autonomen Nervensystems – eine systematische Literaturübersicht. Fortschritte der Neurologie Psychiatrie 83(1):30-7. DOI: 10.1055/s-0034-1398779

A first cross-sectional comparison of HRV parameters of Bundeswehr soldiers with and without deployment-related disorders suggests that HRV, especially SDNN, can be used as an objective parameter of stress in different work-related forms of stress and for measuring the severity of symptoms in PTSD patients.

IN PREPARATION | Paus F, Sammito S, Willmund G, Zimmermann P I (2017): Die Herzratenvariabilität (HRV) als Marker für Stressbelastung und Symptomlast bei Posttraumatischer Belastungsstörung (PTBS) im militärischen Kontext

It became evident that there are similar correlations for the hormone TNF-alpha.

In the search for humoral predictors of the severity and course of PTSD, TNF- α serum concentration and its soluble receptors as well as ethnicity, age and BMI as influencing variables have to be taken into account.

PHY-2016-1 | Himmerich H, Wolf J, Zimmermann P, Bühler A, Holdt L, Teupser D, Kirkby K, Willmund G, Wesemann U (2016): Serum Concentrations of Tumor Necrosis Factor- α and its Soluble Receptors in Soldiers with and without Combat-related Posttraumatic Stress Disorder: Influence of Age and Body Mass Index. Chinese Medical Journal (Engl) 129(6):751-752. DOI: 10.4103/0366-6999.178039

Psychiatric treatment is associated with changes in serum concentrations of TNF- α and its soluble receptors (sTNF-R) p55 and p75. TNF- α concentration increases under the influence of treatment while levels of sTNF-R p55 and sTNF-R p75 decrease significantly. This suggests that both specific inpatient psychotherapy and non-specific supportive outpatient treatment for PTSD are associated with changes in the TNF- α system. This may represent an immunological effect of psychotherapy.

PHY-2016-3 | Himmerich H, Willmund G, Zimmermann P, Wolf J, Bühler A, Kirkby K, Dalton B, Holdt L, Teupser D, Wesemann U (2016): Serum concentrations of TNF- α and its soluble receptors during psychotherapy in German soldiers suffering from combat-related PTSD. Psychiatria Danubina 28(3):293-298

In the Bundeswehr prevalence study, hair cortisol concentrations were found to be correlated with the development of deployment-related post-traumatic symptoms.

A study of soldiers before and 12 months after deployment showed that low hair cortisol concentrations at the beginning of deployment (which suggest previous traumatic stress exposure) can be a marker for subsequent development of PTSD upon renewed trauma exposure.

EXTERNAL PUBLICATION | Steudte-Schmiedgen S, Stalder T, Schönfeld S, Wittchen H, Trautmann S, Alexander N, Miller R, Kirschbaum C (2015): Hair cortisol concentrations and cortisol stress reactivity predict PTSD symptom increase after trauma exposure during military deployment. Psychoneuroendocrinology (59): 123-33 doi: 10.1016/j.psyneuen.2015.05.007

The cerebral structure and metabolism in different brain regions can be analysed with functional MRI. In patients with severe symptoms of post-traumatic stress disorders, there were significant changes in the neurotransmitters GABA and glutamate in brain regions associated with emotion regulation.

A study comparing soldiers diagnosed with deployment-related PTSD with healthy soldiers who had been exposed to trauma showed that in all subjects glutamate levels increased significantly with the severity of combat-related stress and overall stress. In addition, the severity of PTSD symptoms had a significant positive association with GABA concentration.

Dissertation | Labuhn E (2017): Auswirkungen einsatzbedingter psychischer Belastungsniveaus auf die Aktivierung des Anterioren Cingulum bei Bundeswehrsoldaten mit und ohne Posttraumatische Belastungsstörung.

Deployment duration seems to affect the extent of cerebral changes. With an increasing total number of deployment days, smaller brain volumes (associated with damage) were observed in the prefrontal cortex as well as in the anterior cingulate cortex.

In a recent study project, the impact of repeated or long-term operational stress exposure on brain structure was analysed in a sample of 27 combat trauma-exposed soldiers using voxel-based MRI morphometry. The study found evidence of a negative correlation between the duration of deployment and grey matter volume in the ventromedial prefrontal cortex (vmPFC) and the dorsal anterior cingulate cortex (ACC). A negative correlation was also found between deployment-related grey matter volumes and psychological symptoms, but not between military deployment as such and psychological symptoms. A greater total number of deployment days thus seems to be correlated with smaller regional brain volumes in individuals exposed to deployment stress irrespective of disorders such as PTSD.

PHY-2017-1 | Butler O, Adolf J, Gleich T, Willmund G, Zimmermann P, Lindenberger U, Gallinat J, Kühn S. Military deployment correlates with smaller prefrontal gray matter volume and psychological symptoms in a subclinical population. *Transl Psychiatry*. 2017 Feb 14;7(2):e1031. doi: 10.1038/tp.2016.288.

Treatment seems to have a protective effect, however. In patients receiving inpatient psychotherapy, the volume of the hippocampus, a region where emotions are processed, significantly increased compared with a control group.

A comparison of imaging data of soldiers with deployment-related PTSD after treatment and soldiers with PTSD on a waiting list showed a significant increase in hippocampal volume in treated patients as well as a tendency towards an increase in volume of the amygdala.

Submitted | Butler O, Willmund G, Gleich T, Gallinat J, Kühn S, Zimmermann P

(2017): Hippocampal gray matter increases following psychological treatment for posttraumatic stress disorder.

Conclusions

Mental illness, especially following deployment, should be considered part of an extensive physical and mental network of finely attuned physiological processes with measurable correlates. This idea can contribute to destigmatisation and a change of mindset in the Bundeswehr, as mental disorders are more and more perceived as almost as "objective" as physical injuries resulting from deployment.

What is more, links between physiological markers and mental disorders can be used to identify objective measurable variables to diagnose and evaluate the existence and severity of mental disorders and to visualise the recovery process by documenting the positive change in markers.

Due to the highly complex nature of these correlations, however, such physiological indicators must not be considered or used as evidence, e. g. in assessment processes. They will always remain a supplementary tool for a medical professional to gain a psychological impression.

Topic 3: Prevention is better than cure

In recent years, the prevention of mental stress and disorders has become increasingly important in both the civilian and the military sector, where it falls under the responsibility of the Bundeswehr Psychological Service. This is due not only to the increasing stressors of the job, such as deployment abroad, but also to the realisation that effective prevention can pre-empt or alleviate symptoms. Furthermore, prevention facilitates early detection and treatment as patients are well informed and prepared even before symptoms appear, allowing them to take the appropriate steps once they do develop a disorder.

Prevention can be implemented at various points of the care system. Comprehensive routine screening for psychological symptoms *before* potential exposure to stressors or trauma can raise awareness among those potentially affected and serve as the starting point for further primary prevention. Screening *after* exposure, however, can also aid in early diagnosis of possible disorders and motivate those affected to seek treatment sooner.

In recent years, the Bundeswehr has recognised the importance of such measures and has begun implementing them under the direction of the Psychological Service (mainly based on the Psychological Fitness framework). A psychological screening procedure has been conceived and is scheduled to be put into practice from 2018. Every soldier will be screened at the start of their career and again at regular intervals throughout their time of service, especially before and after deployment abroad.

This screening is meant to raise awareness and motivate soldiers to seek out further preventive measures. The purpose is not, however, to single out affected soldiers or exclude them from missions. Otherwise, a high rate of resistance and dissimulation is to be expected.

A requirement for efficient and effective screening is choosing tools that ensure great accuracy – even compared with diagnosis by qualified personnel – but also require little time and few resources and do not interfere with preparations for military deployment.

As part of the Psychological Fitness framework, a pilot study conducted by the Psychological Service examined Bundeswehr soldiers (N=361) before and after deployment to Afghanistan using self-assessment and clinical interviewing instruments. Using a binary logistic statistical model based on these interviews, the study was able to differentiate – with 70 and 75% sensitivity and 75 and 86% specificity – between participants who before and after deployment either had good psychological resources at their disposal or not.

Submitted | Wesemann U, Ungerer J, Willmund GD, Kreim G, Zimmermann P, Stein M, Bühler A, Kaiser J, Kowalski JT (2017): Assessing Psychological Fitness in the Military - Development of an Effective and Economic Screening Instrument

The Bundeswehr is working hard on developing effective preventive measures for suspected emotional stress discovered during screening or for possible stressors such as deployment abroad.

Education (psycho-education) plays a central role in primary prevention. An additional promising approach seems to lie in preparing for stress through virtual exercises in combination with active relaxation as well as improving social skills in order to be able to rely on social support networks should stress occur. Studies have repeatedly shown that a supportive social environment is an essential element of preventing mental illness.

Bundeswehr studies have given hints that such a combined approach activates and strengthens personal resources, which play an important role in the development of psychological symptoms.

Traumatic operational experiences affect the personal resources of soldiers. A decrease in personal resources is significantly connected with the overall severity of trauma symptoms, depressive symptoms and the general severity of symptoms. A lack of personal resources significantly increases the overall severity of trauma symptoms, depressive symptoms and the general severity of symptoms.

GES-2015-10 | Alliger-Horn C, Kretschmer T, Hessenbruch I, Tagay S, Zimmermann P (2015): Wie Ressourcen die Symptombildung von Einsatzsoldaten beeinflussen. Eine empirische Prüfung anhand des Essener-Ressourcen-Inventars (ERI). Trauma, Zeitschrift für Psychotraumatologie und ihre Anwendung 13(3):74-81

Using modern media seems an appropriate way of providing standardised prevention that is motivating and effective in terms of learning theory. In cooperation with civilian partners, the Bundeswehr Psychological Service has therefore developed the computer-based blended-learning platform CHARLY. In a 1.5-day group seminar, participants learn about the above preventive elements in an almost playful multimedia approach. In cooperation with the Psychotrauma Centre, an evaluation study was successfully carried out among medical personnel.

The comparison of the learning platform CHARLY with routine training shows that a computer-based, adaptive learning platform with standardised content on stress prevention is superior to personal, non-standardised stress training. This was proven when, in a randomised controlled longitudinal trial of medical personnel, symptoms after deployment to Afghanistan were shown to be significantly less severe.

TGV-2016-1 | Wesemann U, Kowalski J, Jacobsen T, Jacobsen T, Beudt S, Jacobs H, Fehr J, Büchler J, Zimmermann P (2016) Evaluation of a technology-based adaptive learning and prevention program for stress response - a randomized controlled trial. *Military Medicine* 181(8): 863-71. DOI: 10.7205/MILMED-D-15-00100

After the exposure to a stressful event, measures of *secondary prevention* can affect the process of coping or, as the case may be, the development of disorders. Again, psycho-education seems to be highly important and should be offered as a low-threshold (possibly anonymous) service as feelings of shame and a resulting fear of stigmatisation are often associated with mental illness, particularly in hierarchical systems such as the military, which may make it harder for patients to seek the help they need.

In secondary prevention, new media are thus also a highly useful way of first making contact. They are complemented by personalised counselling services, such as the 24/7 helpline of the Psychotrauma Centre (0800-5887957).

Low-threshold psychosocial support services that make use of new media are becoming increasingly important. Online services, helplines and the computer-based programme CHARLY are important elements of military psychosocial support systems. The needs of different target groups should be considered.

TGV-2013-1 | Zimmermann, P, Alliger-Horn C, Willmund G, Dunker S, Kowalski J (2013): Integration moderner Medien in das psychosoziale Versorgungsangebot deutscher Soldaten. *ZPPM Zeitschrift für Psychotraumatologie, Psychotherapiewissenschaft, Psychologische Medizin* 11(2):35-49

A recently released smartphone app called *Coach PTBS* can provide young people in particular with easy access to the elements of prevention outlined above. It was developed by the Psychotrauma Centre and the Technische Universität Dresden and, since its release a year ago, has been downloaded several thousands of times.



Secondary prevention as a post-deployment health care measure has a long tradition in the Bundeswehr. For years now, post-deployment seminars have been compulsory for all returning service members. In a face-to-face group setting, moderators provide information and suggest coping strategies. The idea is not, however, to provide actual therapy. Modified post-deployment seminars for certain target groups, such as explosive ordnance disposal technicians or emergency physicians, have been successfully tested (Psychotrauma Centre – unpublished data).

More intensive and extended preventive treatment programmes as another form of secondary prevention have also been common practice for several years. In an unbureaucratic process, soldiers who have experienced increased exposure to deployment stressors can apply for such inpatient treatment at a civilian facility at the expense of the Bundeswehr. These facilities do not claim to offer professional psychotherapy either but they can strengthen resources and thus contribute to preventing the development of disorders. Furthermore, the programmes provide participating soldiers with a sense of recognition and appreciation by their employer and are thus met with a very positive response.

Participants consider sports and exercise programmes particularly important and useful.

In a study, 500 participants in a 3-week preventive inpatient programme and 60 control subjects were assessed using the PTSS-10 questionnaire and an evaluation instrument of the German pension insurance fund. Approval of the programme in general and of the sports and exercise module in particular was very high.

PRV-2015-1 | Zimmermann P, Kowalski J, Niggemeier-Groben A, Sauer M, Leonhardt R, Ströhle A (2015): Evaluation of an inpatient preventive treatment program for soldiers returning from deployment. Work 50(1):103–110. DOI: 10.3233/WOR-131665.

Conclusions

The data presented here suggest that prevention of mental illness after extremely stressful experiences, such as deployments abroad, is possible. It should be based on targeted, health-related screening which, however, should be strictly separated from personnel selection so as not to jeopardise acceptance among soldiers.

Effective prevention requires command personnel be substantially trained in the fundamentals dealing with staff members experiencing psychological stress. Ideally, such training should already be part of their NCO/officer training.

Screening and prevention will be part of the tasks of future leaders and will become ever more significant.

Topic 4: Clinical research on treatment methods: what is effective?

Treating mentally ill soldiers, especially after deployment abroad, is one of the primary tasks of Bundeswehr hospitals and psychiatric services at specialist medical centres. These facilities combine expertise in psychotherapy and psychotraumatology with extensive military operational experience.

In recent years, inpatient care settings have been developed that are specifically adapted to the needs and special circumstances of military patients.

Overviews of current developments in the fields of prevention, treatment and assessment of mental disorders in the Bundeswehr are available in the literature.

UBS-2016-2 | Zimmermann P, Wesemann U, Willmund G, Alliger-Horn C (2016): Traumafolgestörungen in der Bundeswehr Konzepte der Prävention und Behandlung. *Nervenheilkunde* 6: 391-395

That is why a scientific evaluation of the treatment methods applied in Bundeswehr hospitals was required. This is not only owed to the duty of care that the armed forces have toward their soldiers but also allows the Bundeswehr to position itself as a responsible employer in public perception and the media.

The trauma therapy technique of eye movement desensitisation and reprocessing (EMDR) has proven particularly practical and effective for soldiers. Controlled studies, which in 2015 were honoured with a research award by the *Deutschsprachige Gesellschaft für Psychotraumatologie*, an association for psychotraumatology active in German-speaking countries, strongly suggest large effect sizes.

In a study of Bundeswehr soldiers diagnosed with PTSD, the effectiveness of eye movement desensitisation and reprocessing therapy (EMDR) and imagery rescripting and reprocessing therapy (IRRT) in trauma therapy was examined. Both methods showed large effect sizes in the treatment of war-traumatised soldiers.

BEM-2015-2 | Alliger-Horn, C, Mitte K, Zimmermann P (2015): Vergleichende Wirksamkeit von IRRT und EMDR bei kriegstraumatisierten deutschen Soldaten. *Trauma und Gewalt* 9(3):204-215

In an effectiveness study (pre-post design) comparing soldiers with a control group, EMDR was shown to be significantly more effective at reducing symptoms of PTSD or depression after exposure to traumatic events.

BEM-2016-1 | Köhler K, Eggert P, Lorenz S, Herr K, Willmund G, Zimmermann P, Alliger-Horn C (2017): Effectiveness of Eye Movement Desensitization and Reprocessing (EMDR) in German Armed Forces Soldiers with Posttraumatic Stress Disorder (PTSD) under Routine In-Patient Care Conditions. *Military Medicine* – in press

The therapy outcomes were influenced by various factors which in future will be taken into account when planning therapeutic processes.

The number of traumatic incidents and the sum of comorbidities in soldiers are key predictors for short- and long-term changes in trauma and disorder symptoms in the course of therapy.

BEM-2014-1 | Alliger-Horn, C, Zimmermann P, Mitte K (2014): Prädiktoren für den Behandlungsverlauf kognitiv-behavioraler Gruppentherapie einsatzbedingter Erkrankungen deutscher Bundeswehrsoldaten. Verhaltenstherapie 24(4):244–251

These approaches, however, are not equally suited to all soldiers thus injured on deployment. Some symptoms often persist despite treatment. Even though this problem is also known in the civilian sector, the scientific efforts of the Psychotrauma Centre are focused on additional, military-specific approaches that address this issue more thoroughly and thus allow for more comprehensive recovery.

For instance, it became evident that the development of psychological symptoms was closely linked to soldiers critically reflecting on their personal values and moral injuries occurring during deployment.

A study among returning soldiers showed that personal values (especially hedonism, benevolence and universalism) have a significant impact on depressive, anxiety, somatoform syndromes and PTSD.

GES-2015-12 | Zimmermann P, Firnkens S, Kowalski J, Backus J, Alliger-Horn C, Willmund G, Hellenthal A, Bauer A, Petermann F, Maercker A (2015): Zusammenhänge zwischen Psychischer Symptomatik und Persönlichen Werten bei Bundeswehrsoldaten nach einem Auslandseinsatz. Psychiatrische Praxis 42(8):436-42. DOI: 10.1055/s-0034-1370242

Moral injuries play an important role in the pathogenesis of mental disorders after stressful experiences during deployment abroad. Combat experiences involving civilians seem to have a particularly strong effect on the mental health of military personnel of the German armed forces. This effect seems to be mediated by the construct of moral injury.

GES 2017-2 | Hellenthal A, Zimmermann P, Willmund G, Lovinusz A, Fiebig R, Maercker A, Alliger-Horn C: Einsatzerlebnisse, Moralische Verletzungen, Werte und psychische Erkrankungen bei Einsatzsoldaten der Bundeswehr. Verhaltenstherapie 2017 (in press)

Accordingly, personal values can influence psychotherapeutic processes. This was ascertained in a first pilot study of soldiers with alcoholism.

Personal values of soldiers have an impact on the severity of alcohol dependence and can be useful in its diagnosis and treatment. The value type of hedonism has a significant positive association with symptom severity, while that of stimulation is negatively associated. Confidence in abstinence increased significantly during therapy, with a positive influence of tradition on treatment outcome.

GES-2015-11 | Zimmermann P, Kahn C, Alliger-Horn C, Willmund G, Hellenthal A, Jaeckel R, Schomerus G, Wesemann U (2015): Assoziation von Werteorientierungen mit der Schwere einer Alkoholabhängigkeit bei Soldaten in qualifizierter Entzugsbehandlung. Nervenheilkunde 10:803-808

In the search for suitable therapeutic approaches that adequately address the issues of morals and values, the concept of acceptance and commitment therapy (ACT) was one of those eventually chosen. A first, still unpublished pilot study suggests that this form of treatment can improve psychological symptoms and also trigger a change in personal values.

The study examined the effectiveness of acceptance and commitment therapy (ACT) in outpatient treatment of Bundeswehr soldiers in a group diagnosed with a variety of different disorders. The results suggest that outpatient ACT is effective in treating an inhomogeneous group with a variety of disorders.

Submitted | Rau H, Köhler K, Kunde J, Zimmermann P, Koch M, Löpke C, Siegel S, Willmund G: Acceptance and Commitment Therapy im militärischen Kontext- Veränderung von Wertorientierungen und psychischer Gesundheit. Eine Pilotstudie. PPM (submitted)

A additional cognitive-behavioral three-week group concept of the Psychotrauma Centre specifically designed for soldiers with deployment-related mental disorders is even more focused on the challenge of coping with operational experiences. The original version already had a positive effect on psychological symptoms.

In the course of studying the effects of values and morals on the mental health of soldiers, this group therapy was further developed and tailored to those specific issues. A first evaluation of 16 participants showed that the phenomenon of shame, which can often greatly increase the suffering of those affected and delay the therapeutic process, can be positively influenced to a significant degree. This mainly plays out as aggression towards oneself and others as a result of shame (publication submitted).

A comprehensive and lasting psychotherapeutic process of change also requires treatment of comorbidities and any fundamental personality problems that may exist alongside the underlying disorder. The Bundeswehr hospitals thus offer group programmes dedicated to those issues.

The Psychotrauma Centre has evaluated several of those group settings and has found evidence of their effectiveness, for example in the treatment of alcoholism, group therapy for personality structure deficits (social skills group training) as well as in group treatment of neurotic relationship conflicts (short-term inpatient group psychotherapy).

Inpatient short-term group psychotherapy of Bundeswehr soldiers diagnosed with neurotic disorders showed significantly better results than a control group. In combination with additional setting components, such therapy may even be helpful in improving psychological symptoms. It may even have the potential to be applied in prevention.

BEM-2008-1 | Zimmermann P, Kröger N, Willmund G, Ströhle A, Heinz A, Hahne H (2008): In-patient, short-term group psychotherapy - a therapeutic option for Bundeswehr soldiers?
DE28 3800 0000 5 1 -8

Inpatient psychiatric treatment settings have a favourable effect on symptom severity in military personnel with avoidant personality traits.

BEM-2013-2 | Zimmermann, P, Alliger-Horn C, Kowalski J, Plate S, Wallner F, Wolff E, Ströhle A (2013): Treatment of avoidant personality traits in a German armed forces inpatient psychiatric setting. *Military Medicine* 178(2):213–217

Involving families in the treatment process is of great importance for successful recovery. Many studies have shown the quality of social support to be a key influencing factor affecting the mental well-being of people under stress, particularly in a military context.

A systematic literature review revealed that group cohesion and support from relevant social groups, such as fellow soldiers, the public and the armed forces in general, have a substantial protective effect on deployment-related post-traumatic disorders in soldiers.

PSU-2013-2 | Waltereit R, Kowalski J, Zimmermann P (2013): Kohäsion und soziale Unterstützung des Soldaten in relevanten gesellschaftlichen Gruppen. Einfluss auf einsatzbedingte psychische Traumastörungen. *Trauma und Gewalt* 7(1):2–8

Bundeswehr hospitals support families with outpatient open group settings or with events over several days. The latter enjoy the financial, personnel and conceptual support of the Soldiers and Veterans Foundation of the German Bundeswehr Association and the pastoral care project of the Military Office of the Protestant Church. The families of those affected in particular experienced improvements in stress levels and quality of life as well as a sense of mutual support.

In 2011, psychoeducative seminars for spouses of traumatised soldiers were developed and held for the first time. An open study showed that the seminars led to an improvement of quality of life and sense of support that was significant and evident in catamnesis, particularly in the partners of the traumatised soldiers.

PSU-2015-1 | Wesemann U, Jensen S, Kowalski J, Gewandt A, Kröger C, Fischer C, Rose C, Zimmermann P (2015): Einsatzbedingte posttraumatische Belastungsstörung im sozialen Umfeld von SoldatInnen. Eine explorative Studie zur Entwicklung und Evaluierung eines Angehörigenseminars. *Trauma und Gewalt* 9(3):216-225

An innovative therapeutic approach to supporting families lies in animal-assisted interventions. A pilot study by the Psychotrauma Centre suggested that horse-assisted therapeutic seminars have a significant impact on the mental health of couples dealing with post-traumatic disorders (publication submitted).

Conclusions

Overall, the effectiveness of inpatient treatment of mentally ill Bundeswehr soldiers is based on a profound set of data. The concept of treating soldiers returning from deployment in multi-modal psychotherapeutic settings in Bundeswehr hospitals with the involvement of their families has proven successful. The relevant resources should be flexibly adapted to individual demand in order to avoid long waiting times and resulting chronification.

At the same time, treatments should be adapted to the operational scenarios in which the traumatic experience originated.

Civilian inpatient and outpatient facilities are an indispensable addition to Bundeswehr resources, especially as they offer specialised programmes that are unavailable in the Bundeswehr, as well as in preliminary and follow-up treatment.

Topic 5: Beyond the horizon: Innovative, technology-based methods in prevention and treatment

In recent years, a broad field of research into technology-based methods using new media has developed in the Bundeswehr, particularly in support of psychotherapeutic concepts and to prevent mental illness. Certain groups who may be critical towards conventional approaches, such as young people, may be more responsive to those methods and motivated to take part in an intervention. Such approaches could also expand and intensify the experience of psychotherapy through improved opportunities for systematisation and increased use of visual aids.

Low-threshold psychosocial support services that make use of new media are becoming increasingly important. Online services, helplines and the computer-based programme CHARLY are important elements of military psychosocial support systems. A variety of services tailored to the needs of the different user groups should be available.

TGV-2013-1 | Zimmermann, P, Alliger-Horn C, Willmund G, Dunker S, Kowalski J (2013): Integration moderner Medien in das psychosoziale Versorgungsangebot deutscher Soldaten. ZPPM Zeitschrift für Psychotraumatologie, Psychotherapiewissenschaft, Psychologische Medizin 11(2):35–49.

In terms of prevention, the Bundeswehr Psychological Service has developed the computer programme CHARLY and evaluated it in cooperation with the Psychotrauma Centre. CHARLY is a blended-learning approach that teaches important basics of psychosocial ramifications of deployment-related stress in a 1.5-day seminar, from comprehensive information on stress training to relaxation techniques and social skills training. A first randomised controlled longitudinal trial has shown CHARLY to have conclusive advantages over conventional methods of prevention.

A comparison of the learning platform CHARLY with routine training showed that a computer-based, adaptive learning platform with standardised content on stress prevention is superior to personal, non-standardised stress training. This was proven when, in a randomised controlled longitudinal trial of medical personnel, symptoms after deployment to Afghanistan were shown to be significantly less severe.

TGV-2016-1 | Wesemann U, Kowalski J, Jacobsen T, Jacobsen T, Beudt S, Jacobs H, Fehr J, Büchler J, Zimmermann P (2016) Evaluation of a technology-based adaptive learning and prevention program for stress response - a randomized controlled trial. Military Medicine 181(8): 863-71. DOI: 10.7205/MILMED-D-15-00100

A common issue for patients with pre-existing stress or disorders is their fear of stigmatisation or damage to their career. At such a stage of orientation, internet-based information and contact portals can facilitate access to care.

The German-language websites *Angriff-auf-die-Seele.de* and *PTBS-Hilfe.de* have proven helpful. Additionally, once there is an interest in therapy, the free and

anonymous 24/7 helpline operated by the Bundeswehr (0800-5887957) as well as dedicated outpatient trauma consultation offers at Bundeswehr hospitals can help organise further steps quickly and efficiently.

A pilot study evaluated 116 online inquiries submitted via the online counselling portal *Angriff auf die Seele* by August 2009 in terms of content, the users and the missions referred to.

Soldiers returning from Afghanistan (and/or their relatives) used the website significantly more often than members of the Kosovo and Bosnia contingents. Referrals to outpatient consultations within the Bundeswehr were made in 12.1% of cases while 1.7% were referred to the civilian sector and 4.3% received immediate inpatient psychotherapy at a Bundeswehr hospital.

The evaluation of this low-threshold contact portal indicates the importance of online counselling for professionals exposed to high levels of psychosocial stress. Such services can pave the way for starting therapeutic measures and thus make it possible to start therapy earlier.

TGV-2010-1 | Zimmermann, Peter; Alliger-Horn, Christina; Wallner, Hannah; Barnett, Winfried; Meermann, Rolf (2010): Psychosoziale online-Beratung für Bundeswehrsoldaten mit einsatzbedingten psychischen Störungen. *Trauma und Gewalt* 4 (3), S. 242–249.

An analysis of 542 calls to the Bundeswehr PTSD helpline (0800 588 7957) between May 2009 and July 2011 showed that active-duty soldiers and veterans used the helpline most frequently, followed by their relatives and spouses. The extent to which this low-threshold helpline is used suggests that relatives are keen to understand the mental disorders that soldiers are affected by.

TGV-2011-1 | Gabriel U, Jacobsen T, Hauffa R, Zimmermann P, Kowalski J (2011): Evaluation des telefonischen Beratungsangebotes für Soldaten mit einsatzbedingten psychischen Belastungen und deren Angehörige. *Wehrmedizinische Monatsschrift* 55(10):228–230

There are currently several projects at the PTZ in Berlin that will considerably expand the available range of multimedia options if positively evaluated.

For instance, treatment of post-traumatic stress disorder is supported by serious gaming. After each trauma therapy session, participants play computer-based concentration games intended to stimulate and intensify the effects of psychotherapy. Possible differences to a control group can be detected with functional MRI. Findings will likely be published in 2017.

In the context of scientific studies, the Psychotrauma Centre has also recently initiated internet-based psychotherapy. It is not intended to replace face-to-face therapy in the Bundeswehr hospitals but may supplement them. It could, for example, help bridge any waiting times before the start of treatment or after inpatient therapy has been completed by providing useful options that support patients and thus influence the therapeutic process. The results of the evaluation are not available yet.

An app used for both prevention and therapy was developed by the Psychotrauma Centre in cooperation with the Technische Universität Dresden and the University of the Armed Forces in Munich and released in mid-2016 (“Coach PTBS”). This free-of-charge app combines information with practical exercises, such as a mood tracker and relaxation exercises. The app is also currently under evaluation.

Conclusions

Technology-aided approaches are proving successful in support of therapeutic and preventive concepts in the Bundeswehr, particularly in light of the widespread fear of stigmatisation among soldiers as well as the additional media options available. They should be further developed and researched as they could be used in work-related rehabilitation of soldiers with deployment-related disorders.

They can, however, merely supplement and not replace face-to-face contact between therapist and patient.

Topic 6: Conclusions, perspectives and research orientation beyond 2020

Pooling psychiatric and psychotherapeutic treatment with clinically oriented research has been the guiding principle of the Psychotrauma Centre ever since its founding. This principle also serves to facilitate developing the psychosocial capacities of the Medical Service and the Bundeswehr in a direction that is practical and patient-oriented. Research that focuses on patients and their needs will allow for quick implementation of innovative research products in clinical practice, as exemplified by the case of the *Coach PTBS* app.

In recent years, the focus has been on supervising epidemiologic research, evaluating interventions and expanding, developing and scientifically analysing psychotherapeutic treatment options. A number of projects that had already been started at the Bundeswehr Institute of Occupational and Environmental Health were continued and implemented.

In the past seven years, successful cooperative partnerships with many national and international partners have been established, including with researchers at Bundeswehr Universities, Hannover Medical School, Ludwig-Maximilians-Universität Munich, Charité Hospital in Berlin, Humboldt-Universität Berlin, Freie Universität Berlin, Technische Universität Dresden, Leipzig University, the Max Planck Institute of Psychiatry in Munich and the Max Planck Institute for Human Development in Berlin.

At present, all cooperation efforts are focused on establishing an international joint research group of the military and science community. A key aspect of the future orientation of the Psychotrauma Centre is therefore the internationalisation of projects or even multinational multicentre studies that allow for long-term comparative assessments. We have to broaden our horizon if we want to share in the knowledge of other nations.

A first pilot study conducted in cooperation with Leipzig University Hospital and King's College London, for instance, produced innovative insights into neuroimmunological changes in patients with disorders resulting from trauma, including in military samples. Together with other biomarkers, such as parameters of heart rate variability or magnetic resonance imaging, this points to mental illness and psychotherapeutic processes indeed being measurable with biomarkers. These findings will be further studied over the next years. They also show that the oft-postulated strict separation of body and mind is outdated in modern medicine.

Ongoing register studies focusing on the epidemiology of mental illness, on the way psychiatric and psychotherapeutic services are used or on suicidal risk constellations will particularly benefit from the joint use of data sets. In this context, the work in NATO Research Groups is implemented by military psychiatrists and the Psychotrauma Centre in several areas and will continue to be expanded in future.

In the US and many European countries, research efforts have been expanded since the start of military missions in Iraq and Afghanistan; interventions and psychometric instruments have been developed. Successful programmes from other countries can be adapted and implemented, saving us time developing our own.

One example is the MAGEN programme, originally developed by the Israel Defence Forces, which serves as a health care instrument for self and buddy aid in highly stressful situations. The British and Dutch Armed Forces partly adopted a similar programme as troop training. In a pilot project in 2016, the Psychotrauma Centre began using and evaluating a MAGEN-based curriculum.

The results of the prevalence study show that German soldiers make little use of psychological services. Chronicity is often the result. An analysis of this behaviour showed that soldiers affected by such health problems feel stigmatised and therefore often avoid opening up about being mentally ill or in need of treatment. In the years to come, structured anti-stigmatisation concepts, such as the HOP (Honest, Open, Proud) programme developed by US researchers and adapted to German needs, will help patients be more open and confident in dealing with their mental health issues.

Stigmatisation of PTSD patients persists. Thanks to growing public recognition of the disorder, however, the situation has improved considerably, especially compared with other mental health issues such as addiction or depression. Yet such disorders, if chronic, often lead to extreme physical deterioration and thus increased mortality.

In 2014, analyses of the prevalence study already proved that anxiety or depressive disorders, addictive and somatoform disorders are much more common after deployment than PTSD. These symptoms, which are also common in civilian samples, were found in 20% of examined soldiers over the span of 12 months.

The focus of intervention research has in recent years rightly been on the treatment of PTSD, as those capabilities were in great demand and needed to be expanded in the course of the ISAF mission. In coming years, however, other mental illnesses, such as anxiety and depressive disorders, will have to become a research priority. These disorders often occur at the same time as so-called comorbid disorders and can be a direct result of a traumatic event. With a view to ensuring the long-term mental health of soldiers, low-threshold interventions shall be developed and evaluated over the next years so as to facilitate an early, uncomplicated and competent start of treatment at the preclinical stage of general medical care.

Additionally, psychotherapeutic treatment and prevention provided by Bundeswehr facilities and civilian partners should place a greater focus on the epiphenomena of coping with deployment experiences. This includes changes in personal values but also feelings of guilt and shame that are closely associated with the development of psychiatric symptoms.

At the same time, interdisciplinary cooperation and the accompanying research are essential, as already practiced with the pastoral care project of the Military Office of the Protestant Church and the Soldiers and Veterans Foundation of the German Bundeswehr Association.

In the medium and long term, international networking is needed in the area of interventions if we are to benefit from the experiences of others, learn from one another and possibly establish uniform NATO standards of treatment and research.