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The Netherlands

## At mission's end: the long-term impact of deployment on mental health

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### Citation

Wal, S. J. van der. (2022, December 13). *At mission's end: the long-term impact of deployment on mental health*. Retrieved from <https://hdl.handle.net/1887/3497430>

Version: Publisher's Version

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**Note:** To cite this publication please use the final published version (if applicable).



# CHAPTER 1

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GENERAL INTRODUCTION

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It was a day intended to bring closure. On June 24, 2021 a twenty-year period of Dutch military involvement in Afghanistan was put to an end through the transfer of two flags. One flag had flown on 'Kamp Holland' in Tarin Kowt, Uruzgan, the other one on 'Kamp Marmal' in Mazar-e-Sharif. The last deployed soldiers would return home in the coming days. It was not just a distinctive moment in Dutch military history that marked the end of an era. It was also a moment of closure and remembrance for the almost 30,000 Dutch veterans who had committed themselves to provide peace and security in a country they knew little or nothing about. This commitment was not without risk. On June 24, 2021, the sacrifices made were symbolized by 25 empty chairs. Chairs that were intended for the soldiers who did not return home safely.

First, let's go back to 2001. The United States declared the war on terrorism after the September 11, 2001 terrorist attacks. As stated by President George W. Bush, *"a war against all those who seek to export terror, and a war against those governments that support or shelter them"*<sup>1</sup>. The United States exerted tremendous pressure on the Afghan regime to extradite the instigators of the terror attacks. When the government in Kabul refused, the United States decided to overthrow the Taliban regime. In addition to military action, the United States and its coalition allies would provide humanitarian aid to the citizens of Afghanistan. The International Security Assistance Force (ISAF) was established pursuant to the Bonn Agreement. This agreement outlined that a peace force, mandated by the United Nations Security Council, would assist the Afghan authorities in maintaining security in Kabul and the surrounding areas by training the Afghan National Security Forces and rebuilding government institutions<sup>2</sup>. However, it gradually engaged in the broader war in Afghanistan and more intensive combat against the Taliban insurgency<sup>3</sup>. In October 2003, the United Nations Security Council authorized NATO to expand ISAF's area of operations beyond Kabul. In phase I, Provincial Reconstruction Teams (PRTs) were deployed in the northern provinces. In phase II, ISAF's area of operations was extended to the western provinces. During phase III, NATO became operational in the south. Finally, in the fall of 2006, when entering phase IV, NATO took command of the whole of Afghanistan<sup>3</sup>.

The Dutch contribution to ISAF started when the Dutch government made an infantry company available at the end of 2001. Over time, the Dutch armed forces contributed in several ways to the ISAF mission. Of particular interest for the present dissertation is the contribution to the PRTs from June 2004 until October 2006 in the northern province of Baghlan and the contribution to Task Force Uruzgan (TFU) from August 2006 until August 2010 in the southern part of Afghanistan. The PRT assessed humanitarian needs and implemented, in cooperation with local communities, small-scale reconstruction projects, and supported the central government in its efforts to maintain and extend its

authority. TFU's task was to maintain order in the province of Uruzgan so that properly functioning public administration and reconstruction were possible<sup>4</sup>. In total, 24,844 Dutch soldiers contributed to ISAF and its mission<sup>2</sup>.

Apart from the reason for the mission, its final achievements or its political sensitivity, this dissertation is above all about the military personnel who served in Afghanistan, from the infantry soldier to the military nurse or the logistics officer. Most of them described their deployment as a positive experience. They finally received the chance to perform the tasks they trained for and which may have been the reason for them to join the army in the first place. Perhaps even more importantly, they experienced a sense of comradeship that one can hardly encounter in civilian life. Despite these mostly positive memories, all of them encountered negative feelings or stressful events during their deployment. Being exposed to enemy fire, witnessing people suffering, seeing a colleague injured or even killed, or getting rejected by the local population are only a few examples of frequently reported stressors<sup>5</sup>.

After homecoming, the majority of deployed personnel adapted relatively easily to normal life, which indicates the great remarkable of this group of individuals. Unfortunately, this was not the case for all of them. Back home, they have experienced many kinds of difficulties. Commonly reported issues are persistently re-experiencing a traumatic event, trying to avoid situation and feelings that are reminiscent of the event, having negative thoughts and feelings, and experiencing increased arousal<sup>6</sup>. The development of posttraumatic disorder (PTSD) symptoms is not unusual. Besides PTSD symptoms, aggressive behaviour, generalised anxiety, feelings of sadness and emptiness, sleeping problems, and unexplained physical complaints are also commonly seen. Several veterans have taken the brave step to speak publicly about their experiences within the aftermath of their deployment. This has resulted in a wide variety of valuable stories captured in books, interviews, and documentaries<sup>7-11</sup>.

It is of great importance that the personal stories of our Afghanistan veterans are told, shared and preserved. Their stories are often shocking and gripping, but essential for our society to develop a more realistic view of war and its consequences. For this purpose, it is also of great relevance to record the impact of military missions on deployed soldiers more scientifically. And this is precisely the reason why the Prospective Research In Stress-related Military Operations (PRISMO) study was initiated in 2005. At that time, there were only very few longitudinal studies in military cohorts, and available cross-sectional studies in PTSD showed major shortcomings. The PRISMO study is a large prospective cohort study in a group of Dutch ISAF veterans with a follow-up period of ten years. The aim of this study was twofold. First, it aimed to provide

epidemiological evidence to record the long-term consequences of military deployment on mental health. This may include for example the extent of PTSD or depression symptoms in the veteran population. Epidemiological information like this can be included in the decision-making process for future military missions and may help to adapt military mental health care to the needs of veterans. Secondly, the PRISMO study aimed to map the role of different biological and psychological factors that may contribute to the development of stress-related mental health symptoms. Identification of such factors can eventually inform the development of pre-deployment screening tools or interventions to reduce the development of mental health symptoms after deployment. The combination of longitudinal research and the inclusion of biological variables made PRISMO a unique study in the field.

Prospective cohort studies in deployed military personnel have proven to be invaluable to the investigation of the consequences of deployment on mental health. Since the introduction of the diagnosis of PTSD in the third edition of the Diagnostic and Statistical Manual of Mental Disorders<sup>12</sup> in 1980, the long-term impact of psychological trauma has gained a more widespread recognition, also in a military context. Catalysed by society's concern regarding the mental health of military service members involved in the recent military missions in the Balkans, Iraq, and Afghanistan, several prospective military cohort studies were designed and implemented in the United Kingdom, the United States and The Netherlands. In contrast to cross-sectional studies, cohort studies allow the examination of symptom trajectories over time, the differentiation of risk factors from the consequences of developing a mental disorder, and the temporal effect of risk factors on these disorders. Cohort studies have therefore changed the research field and moved it forward. The PRISMO study was the first in the world to assess both biological and psychological measures in a large cohort of deployed military personnel using a prospective design, with measurements before and up to ten years after deployment. Later, other studies have followed this model. Other examples of important prospective longitudinal studies that address the impact of military service and deployment are Army STARRS<sup>13</sup>, the Fort Campbell Cohort<sup>14</sup>, the King's Cohort<sup>15</sup>, the Marine Resilience Study<sup>16</sup>, and the Millennium Cohort<sup>17</sup>.

Throughout the years, the value of the PRISMO-study has been demonstrated. In addition to various individual scientific publications on a range of subjects such as health care utilization<sup>18</sup>, impaired sleep<sup>19</sup>, and personality<sup>20</sup>, two dissertations have been published<sup>21,22</sup> that were entirely based on the PRISMO cohort. Each of them made their unique contribution to the pool of knowledge on military trauma and mental health, with the same strong conviction to identify risk factors for post-deployment mental health problems that may ultimately contribute to the prevention of severe mental

distress in future veterans. This is also true for the present dissertation. I had the privilege to conduct the final measurement in the PRISMO cohort in order to assess the long-term impact of military deployment on mental health. Using the collected data, I was able to paint a picture of the mental health of ISAF veterans ten years after they returned home from Afghanistan, and to present some initial leads for the prevention of combat-related mental health symptoms.

To guide you through these findings in the coming chapters, I will first give a detailed overview of the goals, methods, and previous scientific output of the PRISMO study (chapter 2). Next, I will describe the long-term development of respectively PTSD symptoms and agoraphobia, anxiety, depression, and hostility symptoms, and the risk factors associated with those symptoms (chapters 3 and 4). Then, I will report the findings of a study in epigenetics. This chapter describes the associations between the development of PTSD symptoms and longitudinal changes in the DNA methylome of deployed military personnel (chapter 5). Finally, I will present a random forest method to predict the development of PTSD symptoms up to ten years after deployment using pre-deployment variables (chapter 6). With this dissertation, I intended to provide a scientific basis identifying the critical components of the picture that has emerged from the personal stories of thousands of veterans: military trauma may also manifest several years after the actual exposure and may impact everyday life even longer.

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