

Health impacts of war: case studies of New Zealand veterans of the First World War

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ABSTRACT

AIM: Armed conflict remains a tragic feature of the modern world and so it is necessary to continue to study its health impacts. Even the study of historical conflicts is relevant given that certain health impacts are common to most wars e.g., post-traumatic stress disorder (PTSD).

METHODS: This study built on a previous quantitative analysis of a randomly selected group of 200 New Zealand veterans from the First World War (WWI). From this sample we selected 10 cases that illustrated particular themes around morbidity impacts.

RESULTS: The theme of severity of impacts was illustrated with a case who was severely wounded and died from suicide when back in New Zealand, and another case with severe PTSD. The theme of the high frequency of non-fatal conditions was revealed with cases illustrating new diagnoses (a case with n=8 diagnoses), hospitalisations for new conditions (n=6), non-fatal injury events (n=3) and for sexually transmitted infections (n=3). The theme of chronic debility as a consequence of various conditions was illustrated with cases who had suffered from being gassed or having gastroenteritis, malaria or pandemic influenza.

CONCLUSION: These 10 selected cases reiterate how severe and extensive the morbidity burden for military personnel in WWI could be. Also illustrated is how the morbidity could contribute to adverse impacts on some of their lives after returning to New Zealand.

The study of the impacts of war remains a relevant topic given how warfare remains a tragic part of the modern world. As of early 2024, there were major conflicts relating to the Russian invasion of Ukraine, and also one involving Israel in Gaza. One monitoring agency has detailed over 110 armed conflicts around the world: throughout the Middle East and North Africa (over 45), the rest of Africa (over 35), in Asia (21), Europe (7) and Latin America (6).¹

Different settings and weapons used in various armed conflicts will produce a variety of patterns of harm to the health of the military personnel involved. But some of the health impacts from wars spanning the last 150 years have similarities—including such conditions as post-traumatic stress disorder (PTSD), albeit with variant manifestations.^{2,3,4} The conflict in Ukraine even involves trench warfare,⁵ which has similarities to the situation in the First World War (WWI).

Recent work has studied the morbidity impacts of WWI on New Zealand veterans.⁶ This involved examining the archival military files of a random sample of 200 personnel drawn from all participating personnel. The results showed that these veterans experienced a very high

morbidity burden, e.g., 94% had at least one new condition diagnosed during their military service. Furthermore, the relative severity of these conditions was reflected by the high level of hospitalisation (89% at least once, with a mean of 1.8 hospitalisations for new conditions per individual). Indeed, over half of all these personnel (59%) were at some stage deemed no longer fit for military service. The study concluded that “*the overall morbidity burden of this military force in WWI was very high, and much higher than the previous official estimates*”. This high burden of morbidity was also compatible with an earlier study of New Zealand soldiers from Central Otago,⁷ the burden of influenza in the New Zealand military in 1918,⁸ and as described in other work.⁹ Nevertheless, this previous study focussed on quantitative analyses and did not illustrate a range of qualitative issues. Therefore, in this current study, a more qualitative approach was taken with the consideration of 10 illustrative cases.

Further key background to New Zealand and WWI includes the estimate of 98,950 military personnel serving overseas and 7,036 serving on home territory in the New Zealand Expeditionary Force (NZEF).¹⁰ An estimated 18.2% of these personnel died during the war and up to the end of 1923.

The official number of personnel wounded or suffering illness was 41,317 (equivalent to 39.0% of all NZEF personnel). As of 31 March 1921, a total of 40,227 veterans had lodged claims for war pensions for war-related disability and 17,612 dependents had also lodged war pension claims (for the period September 1915 to 1921).¹¹ Of all these claimants, 89% were granted war pensions.

Methods

Cases for this qualitative study were all drawn from previous work involving archival military files on 200 military personnel in the New Zealand military who were involved in WWI.⁶ These personnel were a random sample of all participating personnel (albeit with some exemptions⁶). We chose to select illustrative cases along the lines of the following three themes:

- Severity of health outcomes (i.e., overall outcome and for PTSD);
- High frequency of conditions (i.e., new diagnoses; hospitalisations for new conditions; non-fatal injury events; sexually transmitted infections [STIs]);
- Debility as a consequence of various conditions (i.e., after being gassed, having gastroenteritis, malaria or pandemic influenza).

Data collection

The individual-level data primarily came from a publicly available online archive of military files.¹² Key information had been abstracted by the authors for the previous study,⁶ but the files on the selected 10 cases were all re-examined for this study (all by at least the first author). Lifespan data were collected via additional genealogical research as previously detailed.⁶ War pension data were collected by examining the “War Pension Card Index” (code=6825) held by Archives New Zealand. Additional data that could potentially inform long-term outcomes were searched for using the names of the individuals, e.g., in online legal documents¹² and in online New Zealand electoral rolls.

Ethics statement

Ethical approval for this study was provided through the University of Otago Human Ethics Committee process (Category B Approval, D22/030).

Results

The 10 cases covering the three themes are detailed in the table below. The theme of severity of impacts was illustrated with two cases. One died from suicide after their return to New Zealand with a serious head wound (Case A). The second was a severe case of “shell shock”/PTSD (Case B). The theme of high frequency of conditions was illustrated with a case with multiple new diagnoses (n=8 new diagnoses; Case C), a case of repeated hospitalisations for new conditions (n=6; Case D), a case of repeated non-fatal injury events (n=3; Case E) and one with multiple sexually transmitted infections (n=3; Case F). The theme of chronic debility as a consequence of various conditions was illustrated with cases who had suffered from being gassed (Case G) and having gastroenteritis (Case H), malaria (Case I) and pandemic influenza (Case J).

Discussion

This qualitative study of 10 cases has further illustrated how severe the morbidity burden for military personnel in WWI could be. At the extreme end of the spectrum was premature death from suicide in 1919 (Case A). The cause of this man suffering depression is not precisely known, but it could reflect the collective impact of: i) his permanent facial injuries (with this reason in the official record), ii) having been “left weak and depressed” from pandemic influenza (with these issues mentioned by the Coroner), iii) the deaths of his brothers in 1916 (killed in action) and in 1918 (pandemic influenza), and iv) other possible wider societal factors that were common at the time, e.g., difficulty for veterans obtaining work in the post-war period.

These cases also illustrate the potentially long-term nature of some of the impacts, e.g., from PTSD (Case B) and debility from poisonous gas, gastroenteritis, malaria and pandemic influenza (Cases G to J). Unfortunately, there was limited long-term outcome information on these individuals from the sources we examined, other than occupational/address data from archival sources and lifespan. To better understand these outcomes would probably require very in-depth genealogical research and might not even be feasible in some cases. Even so, we know from other information that some injuries and illnesses among veterans had impacts for many years (see this review¹³), and there is a pattern of

Table 1: Ten cases illustrating aspects of the morbidity experience among New Zealand military veterans of WWI.

Feature/ characteristic	Details
Severity of outcome/condition	
Worst outcome: head wound and then committed suicide when back in New Zealand (Case A)	<p>Case A appeared to have the worst war-related outcome of the sample of 200 personnel. He died from suicide in 1919, with this being officially attributable to his war service given his injuries sustained during the war. In the Battle of the Somme in September 1916 he had suffered shrapnel injuries to the head. As a result of this he developed a permanent one-sided facial paralysis. His treatment involved 3.5 months in three facilities (two hospitals and a convalescent facility). He was discharged as no longer physically fit for war service and arrived back in New Zealand in June 1917. A medical board recommended he get a war pension with an assessment that his “<i>capacity for earning a full livelihood in the general labour market is lessened by ... ½</i>”. Archival data (pension card collection) confirm that he was given a war pension. He died at age 31 years from a self-inflicted gunshot in mid-1919, which was 2 years and 8 months after his injury on the Somme, and 4 years and 5 months after enlistment. The Coroner reported that his suicide was while he was mentally depressed, and that he had suffered from influenza during the epidemic from which he had been left weak and depressed. There were no data identified on his post-war occupational status (his name was not listed in the 1919 Electoral Roll).</p> <p>He was one of three brothers who enlisted for WWI. One was killed in action in 1916 (2 weeks before Case A’s own injuries), and the other brother died in the 1918 influenza pandemic.</p>
PTSD example: “shell shock” that was “severe” (Case B)	<p>Of the personnel in the sample who were described as having “shell shock”, we identified the case where this was described as “severe”, Case B. He was first described as having “shell shock” in July 1916 and was managed by a field ambulance and then a casualty clearing station in France. Following this, he was transferred to a depot at Étaples (a major site for quartering Commonwealth troops and with many hospitals), although it was not clear what he did at the depot (possibly on light duties). But in November 1916 he was admitted to a hospital in France with “old shell shock” and then transferred to a hospital in the United Kingdom (UK). In January 1917 he was transferred to a convalescent facility and classified as “unfit”. He was then “invalided” back to New Zealand in a hospital ship, arriving in March 1917. Archival data (pension card collection) indicated he was given a war pension. Electoral roll data indicate he worked as a freezing worker and labourer and had four different residential addresses between 1919 and 1931 with his wife (including in two different regions). After 1931 his residential address was more stable (only two moves). He died at age 84 years in the early 1970s.</p>
High frequency of conditions/hospitalisations	
Highest number of new diagnoses: eight (Case C)	<p>Case C had a total of eight new diagnoses during his more than 4 years of military service (of which he spent 3 years and approximately 5 months overseas). This was the highest number of new diagnoses for any individual in the sample of 200 personnel. He had poor dentition (needing dental attention); had two separate injuries (both gunshot wounds); myalgia (November 1916); influenza (January 1917); pneumonia (December 1917); an STI; and was put on sick leave for a non-specified reason (December 1918). Of these conditions, he was hospitalised for four of them: both the gunshot injuries, the myalgia and the STI. He was “dangerously ill” with pneumonia during one injury-related hospitalisation and was invalided back to New Zealand twice (once after an injury at Gallipoli, Turkey; and then, after returning to service in France, he was declared unfit for military service due to chronic pulmonary disease). Unlike most of the other cases detailed in this table, he did not have a pension card indicating a war pension (based on a search of archival data). Archival data (Police Gazettes) indicate he was involved in two separate criminal offenses during the 1920s, when he was identified as a labourer. He died at age 58 years in the early 1940s.</p>

Table 1 (continued): Ten cases illustrating aspects of the morbidity experience among New Zealand military veterans of WWI.

Feature/ characteristic	Details
Highest number of hospitalisations for new conditions: six (Case D)	<p>Case D had the highest number of hospitalisations for new conditions (six) in the sample of 200 personnel. His first hospitalisation was in “Salonika” (the modern-day city of Thessaloniki, Greece) in February 1916. This was for post-inoculation fever and while the name of the vaccine was not stated, it was probably typhoid vaccine. After recovery he was next “admitted” to a hospital in Moascar (a military camp near Ismailia in Egypt) in April 1916. He was subsequently “discharged” after an unknown period with no stated diagnosis. His third hospitalisation was in September 1916 at a hospital in Amiens (France) for around 2 weeks and with no diagnosis stated. He was discharged but then re-admitted 2 weeks later with pyrexia of unknown origin (PUO), (so we classified these two sequential hospitalisations as probably related to the same diagnosis). His fourth hospitalisation was in January 1917, again to a hospital in Amiens. This was for a sprained ankle and he was discharged after several days. His fifth hospitalisation was to a hospital in Wisques (France) with PUO in November 1918. His sixth hospitalisation was to a ship’s hospital in May 1919. This was for several days but with no diagnosis given. Of note was that this individual was in the medical corps, but it was clearly stated that he was “admitted” and then “discharged”, as opposed to being placed in a hospital for work purposes. Archival data (pension card collection) indicated he was given a war pension. In post-war legal documents and media reports he was described as a farmer who was involved in a local rifle club and Home Guard. He was married and only had three different residential addresses in the post-war period (electoral roll data). He died at age 79 years in the early 1970s.</p>
Most non-fatal war injury events: three (Case E)	<p>Several cases in the sample had three non-fatal injury events, but only for Case E were these all from gunshot or artillery shells (i.e., the others also involved accidents or being gassed). The first of these was a “GSW head” (a gunshot wound to the head), in August 1915 at Gallipoli, Turkey. He was treated on a hospital ship and then spent nearly 5 weeks at a hospital in Malta. The second injury involved being “sick & blown up by shell” in September 1916. For this he was hospitalised in France for a week. At this time, he was also reported as having a “urethral stricture” that may or may not have been related to this injury event. The third injury event involved gunshot wounds to his left arm and right thigh at Passchendaele (Belgium) in October 1917. These wounds were treated in the field (dressing station/field ambulance) and he returned to duty after a little over 2 weeks.</p> <p>Another health problem during his service was bronchitis, with this involving 3 weeks in a UK hospital (December 1917). It was for this condition that he was discharged from the military as no longer fit and was recommended for a war pension by a medical board. Archival data (pension card collection) confirmed that he was given a war pension. He was listed in electoral rolls as a shepherd and appears to have never been married. He died at age 70 years in a residential facility for war veterans in the mid-1950s.</p>
Highest number of different STI diagnoses: three (Case F)	<p>Case F had three different STI diagnoses, the highest number in the sample of 200 personnel. The first of these was the diagnosis of “gonn”, presumably gonorrhoea, in January 1919, with this managed at a casualty clearing station. But several days later he was hospitalised in Étapes, France with “V.D.S.C.”, an abbreviation used for the STI of “venereal disease soft chancre”. Then, in March 1919, he was admitted to hospital with “V.D.S.”, the abbreviation used for syphilis.</p> <p>Other diagnoses that this man had during his military service were trench mouth, scabies (twice) and being hospitalised on the ship voyage back to New Zealand (no diagnosis given). Archival data (pension card collection) indicated his war pension was “declined”, without any specific details for this identified. In post-war legal documents he was described as a carpenter and having had a divorce in the 1930s. Electoral roll data indicate three other occupational descriptions (cabinetmaker, labourer and handyman) and six different post-war residential addresses. He spent 1 month in jail in the early 1930s. He died at age 58 years in the mid-1950s.</p>

Table 1 (continued): Ten cases illustrating aspects of the morbidity experience among New Zealand military veterans of WWI.

Feature/ characteristic	Details
<i>Debility associated with various conditions</i>	
Debility as a result of being gassed (Case G)	Of the personnel in the sample who were gassed, the link with subsequent debility was most unambiguous in Case G. He was injured by phosgene gas in Flanders (Belgium) in November 1917, and was managed in a field ambulance and casualty clearing station. But he had a persisting cough and shortness of breath and when hospitalised in March 1918 he was reported as having “severe” debility. A medical board assessment in September 1918 declared that he had breathlessness and permanent debility as a result of the gas poisoning. In May 1918 he left on a ship back to New Zealand and was discharged from the military in September 1918. He was recommended for a war pension with an assessment stating he had a permanent disability and that his “ <i>capacity for earning a full livelihood in the general labour market is lessened by ... ½</i> ”. Other archival data confirm he was given a war pension (pension card collection). In the post-war period he worked as a farmer and as a grocer, and had three changes of residential address shown in the electoral rolls (along with his wife). He died at age 81 years in the late 1960s.
Debility following gastroenteritis in the Gallipoli Theatre (Case H)	The most unambiguous case of debility following gastroenteritis at Gallipoli (Turkey) was Case H. He was first admitted to a hospital ship at ANZAC Cove (Gallipoli) with tonsillitis in August 1915. But 3 days later, he was also given the diagnosis of gastroenteritis. He was treated in hospital in Cairo (Egypt). Subsequently, he was invalided back to New Zealand on a ship in September 1915. The final medical board assessment in his records in April 1916 noted gastroenteritis with consequent debility with only “slight” progress in recovery. He was recommended for a war pension with an assessment that his “ <i>capacity for earning a full livelihood in the general labour market is lessened by ... ¼</i> ”. Archival data confirm that he was given a war pension (pension card collection). In post-war documents he was described as a retired butcher, was a Justice of the Peace and stood for the office of mayor. Electoral roll data indicate he also worked as a fruiterer, had a wife, and lived nearly all his post-war life in just one town. He died at age 73 years in the late 1960s.
Debility from malaria (Case I)	Although a number of personnel experienced malaria-related debility, this was most unambiguous for Case I (i.e., he had no other reported conditions that could have contributed to debility). He was diagnosed with “severe” malaria in October 1918 when in the vicinity of Gaza, Palestine. This resulted in him being hospitalised in Heliopolis (Egypt) for 2 weeks, and then he had 2 weeks in a convalescent facility. He was discharged from the military as no longer being fit due to “malarial debility” in March 1919. In total, he had spent only 1 year and 2 months outside of New Zealand. Archival data indicated he was given a war pension (pension card collection). Post-war documentation and electoral roll data suggest he worked as a coal miner, farmer and labourer, and was married. He appears to have had only two different residential addresses after WWI. He died at age 58 years in the mid-1950s.
Debility following likely pandemic influenza (Case J)	Several of the military personnel in the sample had a diagnosis of “debility” following influenza infection—but only Case J had this at a time that would fit with pandemic influenza in late 1918. That is, in mid-December 1918 he was diagnosed with “influenza” and hospitalised at Outreau (France). In mid-January 1919 he was transferred to a hospital in the UK for a week and then to a convalescent facility. A medical board assessment in late January described him as having “debility following influenza” with a minimum recovery time of 3 months. He left by ship to New Zealand in March 1919 and he had a normal discharge from the military in May 1919 (i.e., with no further mention of his health status). A search of archival data (pension card collection) found no pension card, suggestive that he was not given a war pension. In post-war archival documents and electoral rolls, his occupation was “salesman”. He had three different post-war addresses and appeared to have never married. He died at age 70 years in the early 1950s.

premature death among these New Zealand veterans of WWI.^{14,15} Similarly, an Australian study found higher mortality after 1921 for particular WWI veterans (e.g., those who were discharged as medically unfit),¹⁶ and research has also shown that exposure to mustard gas in WWI was associated with increased risk of lung cancer death.¹⁷

Case C had a total of eight new diagnoses, with these spanning injuries (two separate occasions of gunshot wounds), three different infections, poor dental health and two poorly defined conditions. This high tally reflects typical exposure to hazards on the battlefield and to unsanitary and crowded living conditions for many WWI personnel. Many of these health problems could have been prevented with knowledge available at the time and better planning and resourcing, e.g., in terms of injury prevention,¹⁸ food quality¹⁹ and preventing diseases associated with crowding.^{20,21} The approach to preventing STIs by military authorities was also initially problematic, but it did improve over the course of the war.^{22,23}

This study drew its 10 cases from a relatively small (n=200) random sample out of the total of 105,986¹⁰ New Zealand military personnel serving in WWI. As such, it is likely that some cases in the total military force would have suffered even more severe morbidity or even

more extensive multi-morbidity than the cases considered here.

The limitations of the data used in this type of study have been discussed elsewhere, along with an inter-observer reliability assessment of data from these military files.⁶ But these 10 cases also directly illustrate some of the limitations. For example, there were sometimes vague and unclear diagnoses (e.g., “myalgia” experienced by Case C or the lack of a diagnosis for two of the hospitalisations for Case D). Also, it is possible that with the different STI diagnoses for Case F, there could have been an incorrect provisional diagnosis that was not subsequently changed in the records before another diagnosis was obtained shortly afterwards. Furthermore, the “PUO” experienced by Case D in November 1918 and the “sick leave” experienced by Case C in December 1918 could well have been from pandemic influenza.

Conclusions

These 10 selected cases reiterate how severe and extensive the morbidity burden for military personnel in WWI could be. Also illustrated is how the morbidity could contribute to adverse impacts on some of their lives after returning to New Zealand.

COMPETING INTERESTS

Nil.

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