

The causes and numbers of hospital admissions and deaths during the Korean War

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Purpose: The aim of this study is to present the causes and numbers of hospital admissions and deaths at hospital of Korean soldiers including civilian worker during the Korean War.

Methods: The *War History of Rear Troops of the Korean War (confidential)* published in 1955 by the Republic of Korea Army Headquarters was reviewed.

Results: During the war, 397,519 patients were admitted to hospitals (wounded in action, 53.9%; wounded on duty, 5.2%; due to disease, 40.9%). Most of the admitted patients were service members (92.4%), while the remaining were non-soldiers (7.6%). Among the 397,519 patients admitted to hospitals, 11,537 patients (2.9%) died. Most of the patients who died were service members (87.9%), and the remaining were non-soldiers (12.1%). The yearly numbers of died on duty did not vary much. The yearly number of deaths from diseases was lower in 1950, but suddenly increased in the next year and continued thereafter. Injuries accounted for more than three-fifths of the causes of death (n=7,444, 60.1%). Respiratory diseases corresponded to almost a quarter (n=2,799, 22.6%; 1,611 pulmonary tuberculosis and 1,188 other respiratory diseases). The most common category of causes of death was wounds (gunshot or stab; n=3,199, 25.8%), followed by wounds from fragments (n=3,173, 25.6%), pulmonary tuberculosis (n=1,611, 13.0%), and other respiratory diseases (n=1,188, 9.6%). Among the common causes of death, percentages of wounds and wound by fragments decreased over time; however, the deaths from respiratory disease increased.

Conclusions: These findings reflect several aspects of the public health and social situation during the Korean War.

Keywords: Korean War; Mass casualty incidents; Patient admission; Cause of death; Mortality

INTRODUCTION

Background

Military hospitals are often reserved for the use of military per-

sonnel and their dependents. In war, military providers are pulled from their peacetime roles into the turmoil. Thereafter, military medicine should prepare personnel ready for war even in peacetime. Statistics such as the numbers and causes of admis-

sions and deaths from previous wars are practical indices for preparing facilities for future wars.

Over 70 years have passed since the end of the Korean War (Jun 25, 1950- Jul 27, 1953), which constituted an example of ill-prepared military medicine among the forces of the Republic of Korea. The exact causes and numbers of hospital admissions and deaths of Korean soldiers during the Korean War have not been reported in scientific journals because the data were only available in confidential reports.

Objectives

The aim of this study is to present the causes and numbers of hospital admissions and deaths at hospital of Korean soldiers including civilian worker during the Korean War.

METHODS

The *War History of Rear Troops of the Korean War* (confidential) published in 1955 by the Republic of Korea Army Headquarters was reviewed [1].

Other references were searched from PubMed (“Korean War” AND “medicine and death”). Among the 36 references, only one article presented the cause of death of prisoners of war during the Korean War [2].

The causes of death during the Korean War were classified into

21 categories. To reflect an organizational perspective, these causes were grouped into five departments (surgery, internal medicine, psychiatry, infection, and minor departments).

RESULTS

During the war, 397,519 patients were admitted to hospitals (wounded in action, 53.9%; wounded on duty, 5.2%; due to disease, 40.9%). The yearly number of admissions of wounded in action began to decrease in 1952, but yearly admissions due to disease gradually increased throughout the war (Table 1, Fig. 1). Most of the admitted patients were service members (military of-

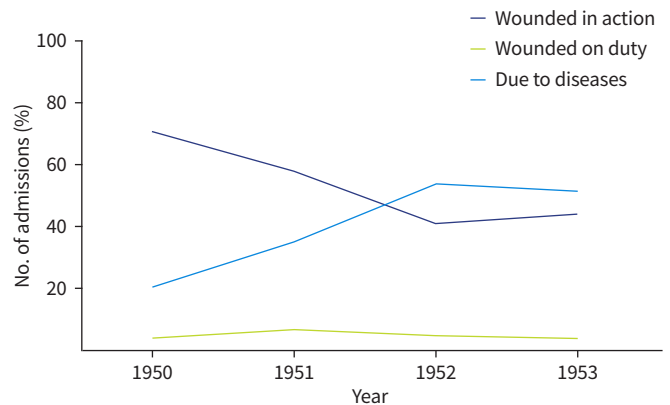


Fig. 1. Number of admissions during the Korean War.

Table 1. Number of admissions during the Korean War

Year	No. of admissions (%)			
	Total	Wounded in action	Wounded on duty	Due to diseases
1950				
Serviceperson	89,476 (95.6)	66,350 (70.9)	3,875 (4.1)	19,251 (20.6)
Non-soldier	4,078 (4.4)	2,407 (2.6)	721 (0.8)	950 (1.0)
Subtotal	93,554 (100)	68,757 (73.5)	4,596 (4.9)	20,201 (21.6)
1951				
Serviceperson	99,542 (94.7)	58,383 (55.6)	5,800 (5.5)	35,359 (33.6)
Non-soldier	5,519 (5.3)	2,529 (2.4)	1,368 (1.3)	1,622 (1.6)
Subtotal	105,061 (100)	60,912 (58.0)	7,168 (6.8)	36,981 (35.2)
1952				
Serviceperson	102,246 (91.5)	45,255 (40.5)	4,841 (4.3)	52,150 (46.7)
Non-soldier	9,425 (8.5)	624 (0.6)	585 (0.5)	8,216 (7.4)
Subtotal	111,671 (100)	45,879 (41.1)	5,426 (4.8)	60,366 (54.1)
1953				
Serviceperson	76,056 (87.2)	37,237 (42.7)	3,064 (3.5)	35,755 (41.0)
Non-soldier	11,177 (12.8)	1,417 (1.6)	424 (0.5)	9,336 (10.7)
Subtotal	87,233 (100)	38,654 (44.3)	3,488 (4.0)	45,091 (51.7)
Total				
Serviceperson	367,320 (92.4)	207,225 (52.1)	17,580 (4.4)	142,515 (35.9)
Non-soldier	30,199 (7.6)	6,977 (1.8)	3,098 (0.8)	20,124 (5.0)
Total	397,519 (100)	214,202 (53.9)	20,678 (5.2)	162,639 (40.9)

fficers and soldiers, 92.4%), while the remaining were non-soldiers (7.6%).

Among the 397,519 patients admitted to hospitals, 11,537 patients (2.9%) died (1.8% in 1950, 3.5% in 1951, 2.5% in 1952, and 3.9% in 1953) (Table 2, Fig. 2). Most of the patients who died were service members (military officers and soldiers, 87.9%), and the remaining were non-soldiers (12.1%). The yearly numbers of died on duty did not vary much (Table 2, Fig. 3). The yearly number of deaths from diseases was lower in 1950 (65 deaths),

but suddenly increased in the next year and continued to increase thereafter (Table 3, Fig. 3).

The most common department related to the causes of death was surgery, corresponding to 7,691 out of 12,382 deaths (62.1%), followed by internal medicine (n = 3,818, 30.8%) (Table 4). Injuries accounted for more than three-fifths of the causes of death (n = 7,444, 60.1%). Respiratory diseases corresponded to almost a quarter (n = 2,799, 22.6%; 1,611 pulmonary tuberculosis and 1,188 other respiratory diseases). The most common category of

Table 2. Number of deaths during the Korean War

Year	No. of deaths (%)			
	Total	Killed in action	Died on duty	Due to diseases
1950				
Serviceperson	1,481 (85.8)	1,377 (79.8)	42 (2.4)	62 (3.6)
Non-soldier	245 (14.2)	198 (11.5)	44 (2.5)	3 (0.2)
Subtotal	1,726 (100)	1,575 (91.3)	86 (4.9)	65 (3.8)
1951				
Serviceperson	3,250 (88.3)	1,787 (48.6)	170 (4.6)	1,293 (35.1)
Non-soldier	431 (11.7)	225 (6.1)	86 (2.3)	120 (3.3)
Subtotal	3,681 (100)	2,012 (54.7)	256 (6.9)	1,413 (38.4)
1952				
Serviceperson	2,487 (89.9)	1,019 (36.8)	133 (4.8)	1,335 (48.2)
Non-soldier	284 (10.2)	87 (3.1)	21 (0.8)	176 (6.4)
Subtotal	2,771 (100)	1,106 (39.9)	154 (5.6)	1,511 (54.5)
1953				
Serviceperson	2,923 (87.0)	1,009 (30.0)	141 (4.2)	1,773 (52.8)
Non-soldier	436 (13.0)	42 (1.3)	14 (0.4)	380 (11.3)
Subtotal	3,359 (100)	1,051 (31.3)	155 (4.6)	2,153 (64.1)
Total				
Serviceperson	10,141 (87.9)	5,192 (45.0)	486 (4.2)	4,463 (38.7)
Non-soldier	1,396 (12.1)	552 (4.8)	165 (1.4)	679 (5.9)
Subtotal	11,537 (100)	5,744 (49.8)	651 (5.6)	5,142 (44.6)



Fig. 2. Mortality rate of the admitted patients.

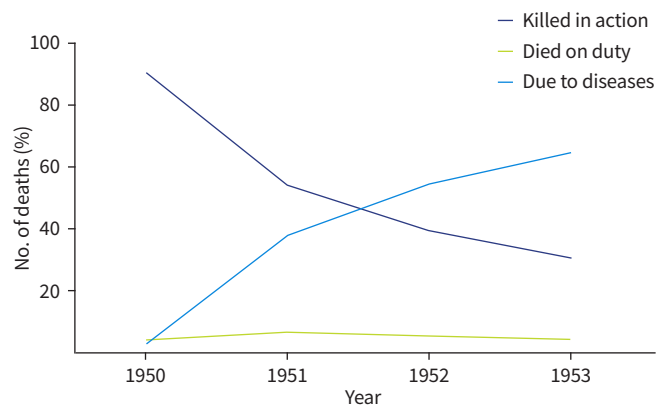


Fig. 3. Causes of death of the admitted patients during the Korean War.

Table 3. Mortality rate of admitted patients

Year	Ratio (%)			
	Total	Killed to wounded in action	Died to wounded on duty	Died to wounded from diseases
1950				
Serviceperson	1.7	2.1	1.1	0.3
Non-soldier	6.0	8.2	6.1	0.3
Subtotal	1.8	2.3	1.9	0.3
1951				
Serviceperson	3.3	3.1	2.9	3.7
Non-soldier	7.8	8.9	6.3	7.4
Subtotal	3.5	3.3	3.6	3.8
1952				
Serviceperson	2.4	2.3	2.7	2.6
Non-soldier	3.0	13.9	3.6	2.1
Subtotal	2.5	2.4	2.8	2.5
1953				
Serviceperson	3.8	2.7	4.6	5.0
Non-soldier	3.9	3.0	3.3	4.1
Subtotal	3.9	2.7	4.4	4.8
Total				
Serviceperson	2.8	2.5	2.8	3.1
Non-soldier	4.6	7.9	5.3	3.4
Total	2.9	2.7	3.1	3.2

causes of death was wounds (gunshot or stab; $n = 3,199$, 25.8%), followed by wounds from fragments ($n = 3,173$, 25.6%), pulmonary tuberculosis ($n = 1,611$, 13.0%), and other respiratory diseases ($n = 1,188$, 9.6%) (Table 4, Fig. 4).

Among the common causes of death, the relative percentages of wounds and wound by fragments decreased over time. However, the proportion of deaths from respiratory disease increased (Fig. 5).

DISCUSSION

In the early morning hours of June 25, 1950, the Democratic People's Republic of Korea (i.e., the North Korean Army) began a bombardment across the 38th Parallel, which was followed by an invasion of heavily armed troops supported by armor [3,4].

When the Korean War erupted in June 1950, the US military was caught by surprise and was ill-prepared to go to war. Military medicine was short on personnel and not ready for war. Military providers were pulled from their peacetime roles, sometimes even from training programs, and thrust into the turmoil.

Training in combat skills and military casualty care for medical personnel in the early days was scant because of the exigencies of the war [5,6]. Military medicine and the doctors, nurses, medics,

and corpsmen had to improvise and improve during constantly changing conditions while under intense pressure from the enemy [7].

The Korean War was an incubator for new concepts and rapid advances in health systems, which enhanced military medical care and ultimately improved civilian healthcare for people around the world. Examples of these innovations include mobile hospitals, helicopter evacuation, blood collection and delivery, and personal protective gear, which were developed or matured as a direct result of the conflict in Korea and have saved countless lives [8].

In 1951, the US Army and Marine Corps had 40,895 casualties (33,365 in the Army and 7,530 in the Marine Corps) that were wounded in action, among whom 1,069 died (2.6%; 829 in the Army, 243 in the Marine Corps). In the same year, 58,383 Korean service members were admitted due to being wounded in action, and among them 1,787 (3.1%) died [6]. The mortality rate of patients admitted due to being wounded in action was significantly higher among Koreans than among US combatants (odds ratio, 1.176; 95% confidence interval, 1.089–1,270; $P < 0.001$) (Table 5).

Limitations

This study has limitations. It depends on one confidential data (*War History of Rear Troops of the Korean War*) published by the

Table 4. Causes of death of admitted patients during the Korean War

Category	Total (n=12,382)	Year			
		1950 (n=1,726)	1951 (n=3,681)	1952 (n=2,771)	1953 (n=4,204)
Surgery department					
Wounds	3,199 (25.8)	1,011 (58.6)	1,114 (30.3)	521 (18.8)	553 (13.2)
Wounds from fragments	3,173 (25.6)	563 (32.6)	1,108 (30.1)	692 (25.0)	810 (19.3)
Other injury	1,072 (8.7)	23 (1.3)	290 (7.9)	286 (10.3)	473 (11.2)
Other general surgery	247 (2.0)	3 (0.2)	65 (1.7)	59 (2.1)	120 (2.8)
Subtotal	7,691 (62.1)	1,600 (92.7)	2,577 (70.0)	1,558 (56.2)	1,956 (46.5)
Internal medicine department					
Disease of the respiratory system					
Tuberculosis	1,611 (13.0)	38 (2.2)	430 (11.7)	456 (16.5)	687 (16.3)
General	1,188 (9.6)	52 (3.0)	307 (8.3)	315 (11.4)	514 (12.2)
Disease of the digestive system	404 (3.3)	10 (0.6)	69 (1.9)	84 (3.0)	241 (5.7)
Disease of the circulatory system	156 (1.2)	3 (0.2)	27 (0.7)	24 (0.9)	102 (2.4)
Disease of the genitourinary system	115 (0.9)	2 (0.1)	28 (0.7)	23 (0.8)	62 (1.5)
Metabolic disease	320 (2.6)	3 (0.2)	50 (1.4)	74 (2.7)	193 (4.6)
Endocrine disease	24 (0.2)	0	1 (0.1)	7 (0.2)	16 (0.4)
Subtotal	3,818 (30.8)	108 (6.3)	912 (24.8)	983 (35.5)	1,815 (43.1)
Psychiatry department					
Psychiatric disease	113 (0.9)	4 (0.2)	12 (0.3)	33 (1.2)	64 (1.5)
Disease of the nervous system	20 (0.2)	1 (0.1)	6 (0.2)	7 (0.2)	6 (0.2)
Subtotal	133 (1.1)	5 (0.3)	18 (0.5)	40 (1.4)	70 (1.7)
Infection department					
Epidemic disease	364 (2.9)	5 (0.3)	83 (2.3)	112 (4.0)	164 (3.9)
Other infectious diseases	249 (2.0)	6 (0.3)	57 (1.5)	54 (2.0)	132 (3.1)
Subtotal	613 (4.9)	11 (0.6)	140 (3.8)	166 (6.0)	296 (7.0)
Other departments					
Dermato-urinary disease	7 (0.1)	0	5 (0.1)	0	2 (0.1)
Disease of eye and adnexa	6 (0.1)	0	1 (0.1)	0	5 (0.1)
Disease of the ear and nose	12 (0.1)	1 (0.1)	3 (0.1)	0	8 (0.2)
Disease of the nasopharynx	3 (0.0)	0	1 (0.1)	0	2 (0.1)
Dental disease	66 (0.5)	1 (0.1)	13 (0.3)	24 (0.9)	28 (0.7)
Other	33 (0.3)	0	11 (0.2)	0	22 (0.5)
Subtotal	127 (1.1)	2 (0.1)	34 (0.9)	24 (0.9)	67 (1.7)

Values are presented as number (%).

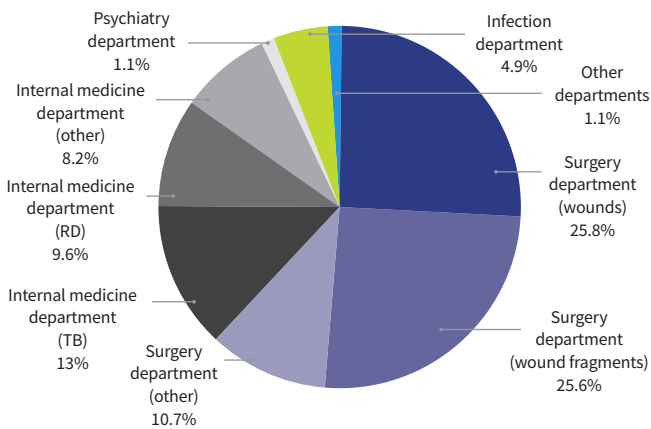


Fig. 4. Common causes of death of the admitted patients during the Korean War according to the departments. TB, pulmonary tuberculosis; RD, other respiratory diseases.

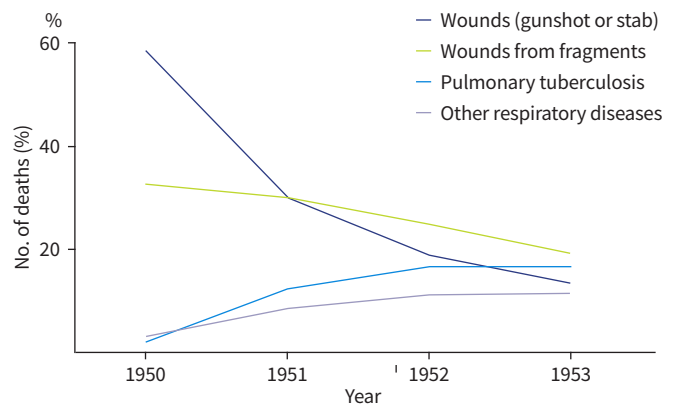


Fig. 5. Changes in the relative percentages of common causes of death of admitted patients during the Korean War.

Table 5. Comparison of the Korean and US personnel who were admitted due to being wounded in action

Army	Outcome			OR	95% CI	P-value
	Died	Survived	Total			
Total	2,856	96,422	99,278	1.176	1.089–1.270	<0.001
Korea	1,787	56,596	58,383			
USA	1,069	39,826	40,895			

OR, odds ratio; CI, confidence interval.

Republic of Korea Army Headquarters, thereafter limited source of data of classification of specific cause of death. Further study will be needed about the injury at the military hospital in these days and comparing the 21st century data to the war data 70 years ago.

Conclusions

Republic of Korea experienced two wars: the Korean War (1950–1953) and Vietnam War (1964–1974). Although 70 years has passed, this study presents valuable information about the causes and numbers of hospital admissions and deaths of Korean service members during the Korean War. These findings reflect several aspects of the public health and social situation in Korea during the Korean War. These data will become the basics for preparing for the wars which might happen in the future.

ARTICLE INFORMATION

Author contributions

Conceptualization: KH; Formal analysis: HK; Funding acquisition: KH; Methodology: KH, CYP; Project administration: KH; Visualization: HK; Writing—original draft: KH; Writing—review & editing: CYP. All authors read and approved the final manuscript.

Conflicts of interest

Kun Hwang and Chan Yong Park are Editorial Board members of the *Journal of Trauma and Injury*, but were not involved in the peer reviewer selection, evaluation, or decision process of this article. The authors have no other conflicts of interest to declare.

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Data availability

Data analyzed in this study are available from the corresponding author upon reasonable request.

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