Prevalence of Disease and Non-battle Injury, Anxiety and Depression in the Royal Thai Armed Forces during the Operation of the United Nations in Burundi

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Objective: *To determine the prevalence and impact of common disease and non-battle injuries (DNBI) among the military personnel deployed to the operations of the United Nations (UN) in Burundi from June to December 2005.*
Materials and Methods: *The study population consisted of 175 Thai military personnel. A pre- and post deployment questionnaire assessing demographic data, general health, dental problems, underlying disease and health risk behaviors was performed. The information of DNBI was collected weekly. Data on initial visits for 27 DNBI categories were complied at the unit and event data on morbidity measures for each DNBI category were aggregated for all reporting units on a weekly basis. Anxiety and depression were assessed using the Hospital Anxiety and Depression (HAD) scale.*
Results: *The majority of the troops was in good health at pre- and post deployment. The total weekly initial visit DNBI rate was 337.6 visits per 1,000 persons, which was rather high compared to the Joint Chiefs of Staff (JCS) reference rate. The most common DNBI categories were respiratory illnesses (21.9%), medical/surgical injuries (19.8%) and recreational injuries (15.5%).*
Conclusion: *The present data indicated that despite modern preventive medicine measures, illnesses and non-battle injuries were still common, which had a significant impact on military readiness and operational efficiency.*

Keywords: *Anxiety, Burundi, Depression, Military Personnel, War, Wounds and Injuries*

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Non-battle injuries and illnesses have been shown to have a significant adverse impact on military operations, resulting in more hospitalizations and lost personnel-days than combat casualties in every war[1-3]. Since Thailand has a number of troops deployed for peacekeeping operations in different geographical places, military health care planners and providers should have a clear understanding of all health risks encountered in the region and the impact of common non-battle injuries and illnesses during military missions. The information will be used to establish prevention strategies in order to enhance personal readiness and performance directly affecting the operational efficiency of the unit.

However, to date, the information of illnesses and non-battle injuries among Thai military troops deployed to such operations is rather limited. The only illnesses and non-battle injuries information of Thai military troops deployed to the peacekeeping operations was from the study of Myint and colleague in 2007[4]. They determined hepatitis E virus (HEV)

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seroconversion occurring in Thai soldiers deployed to East Timor, Afghanistan, and Iraq, as part of the UN multinational forces. The data indicated that Thai soldiers were at risk of getting HEV infection in these endemic areas. Thus we aimed to assess the incidence and impact of the illnesses and non-battle injuries in Thai troops deployed to the peacekeeping operation. We conducted a systematic survey of disease and non-battle injury (DNBI) among soldiers currently on deployment and returning to Thailand after their operation in Burundi during June to December 2005.

Material and Method

One hundred and seventy five Thai military personnel working in Burundi on their deployment to support UN operations (Peacekeeping operation) were enrolled in this study. The study was approved by the Royal Thai Army, Institutional Review Board, Medical Department. The information of the enrolled persons was collected from June through December 2005. A pre-deployment questionnaire, assessing demographic data, general health, dental problems, underlying diseases and health risk behaviors, was carried out.

The information of DNBI was collected weekly. Each week trend analysis was conducted, a summary was complied, and any significant changes in DNBI rate was reported to the Surgeon's Office. Integrity checks were conducted on all data to ensure validity. Data on initial visits for 27 DNBI categories were complied at the unit and event data on morbidity measures for each DNBI category were aggregated for all reporting units on a weekly basis.

A post deployment questionnaire was carried out at the end of the operation before returning to Thailand. The questionnaire included general health and dental problems. Anxiety and depression were assessed using the Hospital Anxiety and Depression (HAD) Scale[5]. Demographic data of the patients were presented as mean, standard deviation and percentage.

Results

Demographic data including age, gender, marital status, rank, military branches, weight, height and blood group of these 175 Thai military personnel are shown in Table 1. Their ages ranged from 22 to 56 years with the mean age of 38.3 years. Their weight and height ranged from 140 to 185 cm and 46.5 to 95 kg with the mean weight and height of 168.4 cm and 68.8 kg, respectively. All but one person worked in Burundi for six months. One person, who was sent back to Thailand in the 4th month, had uncontrolled diabetes mellitus (DM) with the complication of diabetic retinopathy.

The pre-deployment questionnaire indicated that the majority of the troops were in good health (89.7%). Six persons, who had underlying diseases, *i.e.*, two persons with DM (1.1%) and four persons with hypertension (HT) (2.3%) were revealed. Approximately

Table 1. Demographics of 175 Thai military personnel

Characteristics	Number
Age (year) (Range)	38.3 (22-56)
Height (cm) (Range)	168.4 (140-185)
Weight (kg) (Range)	68.8 (46.50-95)
Branch (%)	
Army	152 (86.9%)
Air Force	7 (4.0%)
Marine	16 (9.1%)
Rank	
Commissioned officer	30 (17.1%)
Noncommissioned officer	145 (82.9%)
Status	
Single	33 (18.9%)
Married	138 (78.9%)
Divorced	4 (2.3%)
Blood group	
O	67 (38.3%)
A	33 (18.9%)
B	55 (31.4%)
AB	20 (11.4%)

Table 2. Comparison of BMI of 175 Thai military personnel at the time of pre- and postdeployment

BMI	Predeployment	Postdeployment*
Underweight	5 (2.9%)	4 (2.3%)
Normal weight	104 (59.4%)	114 (65.1%)
Overweight	59 (33.7%)	51 (29.1%)
Obese	7 (4.0%)	5 (2.9%)

* One person was sent back

Table 3. Psychological status of 174 Thai military personnel

	Anxiety	Depression
Normal	126 (72.4%)	156 (89.7%)
Mild	45 (25.9%)	12 (6.9%)
Moderate	2 (1.1%)	6 (3.4%)
Severe	1 (0.6%)	0 (0%)

25% of the troops had dental problems. The results from the questionnaire also showed that 6.9% and 2.3% of the troops had contraindication for working and consultation with a psychologist in the past year, respectively.

The post deployment questionnaire indicated that after six months in Burundi, the general health of the troops was good (91.4%). Of 175 military personnel, 5.1% and 18.9% had general health problems and dental problems, respectively. Psychiatric problems were found in 15.4% of the population. Approximately 18% were concerned that the Burundi environment might cause health problems.

Body mass index (BMI) of the troops at the time of pre- and post-deployment were compared. Troop personnel with normal BMI increased from 59.4% to 65.1%. The percentage of the troops, who were overweight and obese, decreased.

The Hospital Anxiety and Depression scale (HAD) was used to evaluate military personnel at the 5th month of deployment. The result is shown in Table 3. For patients with mild depression or mild anxiety, close observation and further assessment were conducted. Sleep and anxiety management and exercises were advised for these patients. Those with moderate depression or anxiety were treated with medication and psychotherapy. A patient suffering from severe anxiety was admitted and treated by the psychiatrist at the level II hospital.

Weekly DNBI reports from 175 Thai military personnel were collected. During 27 weeks, a total of 4,725 personnel-weeks of data were collected. The total weekly initial visit DNBI rate was 337.6 visits per 1,000 personnel-weeks (Table 4). When compared with the Joint Chiefs of Staff (JCS) reference rate, which is 40 initial visits per 1,000 personnel-weeks, the initial visit DNBI rate in this study was rather high[6]. It was found that the number of categorical DNBI initial visit rates was higher than the JCS reference rates including dermatologic conditions, infectious GI, ophthalmologic injuries, respiratory illnesses, recreational injuries, working injuries, and unexplained fever. However, several categorized DNBI rates were lower, including heat/cold injuries, motor vehicle injuries, other injuries, combat/operational stress, other psychiatric disorders and sexually transmitted diseases. The DNBI categories of the total injuries, respiratory illnesses and other medical/surgical injuries were among the highest, 77.0, 72.1, and 65.6 visits per 1,000 person-weeks, respectively.

Table 4. Summary of the DNBI initial visit rate

DNBI category	Initial visit rate[1] (mean)	JCS reference DNBI rate[2] (mean)
Dermatologic condition	23.7 (0, 57.1)	5
Infectious GI	8.3 (0, 40.2)	5
Gynecologic conditions	0 (0, 0)	5
Heat/ cold injury	0 (0, 0)	5
Total Injury	77.0 (11.5, 155.2)	ND
Recreational	51.2 (0, 103.5)	10
Motor vehicle	0 (0, 0)	10
Working	18.5 (0, 46.0)	10
Others	7.4 (0, 28.6)	10
Ophthalmologic injury	10.2 (0, 23.0)	1
Mental health	0.2 (0, 5.7)	ND
Combat/operational stress	0 (0, 0)	1
Other psychiatric disorder	0 (0, 0)	1
Respiratory illness	72.1 (5.7, 280)	4
Sexually transmitted disease	0 (0, 0)	5
Unexplained fever,	3.4 (0, 40.2)	0
Other, medical/surgical injury	65.6 (22.9, 126.4)	ND
Total DNBI	337.6 (40.06, 905.91)	40 (Footnotes)

JCS suggested referent rates (initial visits per 1,000 person-weeks)
Rate calculated as initial visits per 1,000 female personnel-weeks
ND, Not described
Excludes gynecological events

Table 5. Days of sick in quarter (SIQ), light duty, hospital admission and bed day rates by DNBI category

DNBI category	DNBI rate (n/1,000 person-weeks)			
	SIQ days	Light duty days	Hospital admission	Bed days
Dermatologic condition	24	17	0	0
Infectious GI	1	4	0.03	0.4
Gynecological condition	0	0	0	0
Heat/cold injury	0	0	0	0
Total injury	77	715	0.2	33
Recreational	51	255	0	0
Motor vehicle	0	0	0	0
Working	18	44	0.2	7.7
Other	7	13	0	0
Ophthalmologic condition	10	10	0.4	17.1
Mental health	0.2	0.09	0.2	0.1
Combat/operational stress	0	0	0	0
Other psychiatric disorder	0	0	0	0
Respiratory illness	72	123	0	0
Sexually transmitted disease	0	0	0	0
Unexplained fever	3	7.7	0.6	7.3
Other, medical/surgical illness	65	46	0.2	27.9
Total DNBI	328.2	1234.8	1.8	93.6

With respect to morbidity outcomes, 328.2 Sick in Quarter (SIQ) days, 1234.8 light duty days, 1.8 hospital admissions, and 93.6 hospital bed days per 1,000 personnel-weeks were reported. Respiratory illnesses, other medical/surgical problems and recreational injuries were the most common DNBI categories resulting in SIQ days to be given (Table 5). Recreational injuries, respiratory illness, and other medical/surgical problems were the most common DNBI categories for which days of light duty were given. Hospital admission rates were relatively low compared with initial visit rate. Unexplained fever, ophthalmologic injuries, and other medical/surgical admissions accounted for the top three. The average length of stay for a hospital admission was 27.9 per 1,000 personnel-weeks. Other medical/surgical injuries, ophthalmologic injuries, and working injuries were found to have the longest bed days. No hospital admissions and bed days for dermatologic conditions, heat/cold injuries, recreation injuries, motor vehicle injuries, other injuries, combat/operational stress, other psychiatric disorders, respiratory illnesses or sexually transmitted diseases were reported.

Discussion

The present research is the first study of DNBI rate among Thai military personnel. In this study, we found differences in DNBI reference rates from JCS among the Thai military personnel deployed in Burundi. The diseases with high incidence were similar to previous reports despite the differences in place, operation, season and manning[1-3]. The four most commonly reported diagnoses during U.S. military deployments over the last 15 years have been non-battle orthopedic injuries, respiratory infections, skin diseases, and gastrointestinal infections[7]. The total DNBI rate was much greater than the JCS reference rate. The higher DNBI rate was the result of high incidence of dermatologic conditions, infectious GI, ophthalmologic injuries, respiratory illnesses, recreational and working injuries and unexplained fever. Respiratory illness was the most common problem among personnel quite possibly the result of the operation time, *i.e.*, rainy season. In addition, barracks were also crowded and poorly ventilated. The second most common problem was recreational injury. Improper training in the field and lack of safe recreational instruments may have caused the injury. The unexpectedly high rates of ophthalmologic injuries might be associated with foreign bodies since a rice mill was located nearby the quarters. Moreover, two persons suffered from diabetic retinopathy and subconjunctival hemorrhage.

The lost work days because of sickness in the quarters and hospitalization were highest among respiratory illnesses (21.9%), other medical/surgical

injuries (19.8%), and recreational injuries (15.5%). Equally as important as initial visit incidence is morbidity associated with DNBI. These data suggest that efforts to reduce the incidence or to minimize the morbidity would likely have a significant impact on reducing the burden of lost personnel-days.

The overall rate of light duty days given was nearly four times higher than SIQ days (1234.8 vs. 328.2 per 1,000 personnel-weeks). These two morbidity outcomes and the deployment impact are uncertain, but is an important consideration for prioritizing the impact of individual DNBI categories. The relative proportion of individual DNBI categories accounting for light duty days was highest for recreational illnesses (20.6%), respiratory illnesses (9.9%), other medical/surgical injuries (3.7%), and working injuries (3.6%), with dermatologic conditions, other injuries, ophthalmologic injuries unexplained fever, approximately 1% each. Within the injury category, recreational injuries were given more light duty days compared with the other injury categories. This finding reflects the need to be aware of the dangers and demands of military personnel, and need for health protection. Hospital admission rates were low with 1.8 admissions for very 1,000 person-weeks, unexplained fever (30.7%), ophthalmologic injuries (22.7%), and other medical/surgical injuries (11.5%) accounting for the highest proportion of these admissions. The HAD scale could identify a number of military persons with psychological problems. Although the percentage was minimal, the prevalence rate of these problems may increase and become critical if proper prevention is not maintained.

The limitations of this study were that data were only collected from a single operational theater. Other studies have shown that the operational theater could impact reported DNBI rates[8-10]. Another limitation was the surveillance period time of the operation. Previous studies reported significant differences in DNBI rates during war time compared with peace time[9, 10]. Additional factors that could affect the DNBI rate included operational history, environment of the operational area and disease prevention or health promotion that can change disease and injury rates during operation time.

The present data indicated that despite modern preventive medicine measures, illnesses and non-battle injuries were still common and had a significant impact on military readiness and operational efficiency. The military should continue improving the surveillance, prevention, and management of common disabling illnesses. This could improve the quality of life for the troops.

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ความชุกของโรคที่มิได้เกิดจากการรบ ความเครียด และอาการซึมเศร้า ในทหารไทยที่ปฏิบัติหน้าที่ในบุรุนดี

สุรกานต์ สาหร่ายทอง, พจน์ เอมพันธุ์, ราม รังสินธุ์, วิโรจน์ อารีย์กุล, มฑิรุทธ มุ่งถิ่น, สุธี พานิชกุล

วัตถุประสงค์: *เพื่อหาความชุกและผลของโรคที่มิได้เกิดจากการรบในทหารที่ไปปฏิบัติหน้าที่ให้กับสหประชาชาติในประเทศบุรุนดีระหว่างมิถุนายนถึงธันวาคม ปี พ.ศ. 2548*

วัสดุและวิธีการ: *การศึกษานี้ได้ศึกษาในทหารไทย 175 นาย โดยให้ตอบแบบสอบถามในช่วงก่อนและหลังปฏิบัติหน้าที่ ซึ่งจะเป็นคำถามเกี่ยวกับลักษณะทั่วไป สถานะสุขภาพ ปัญหาทางทันตกรรม โรคประจำตัว และปัจจัยเสี่ยงสุขภาพ ข้อมูลโรคที่มิได้เกิดจากการรบจะถูกเก็บทุกสัปดาห์ โดยแบ่งข้อมูลการมาตรวจครั้งแรกเป็น 27 จำพวก ซึ่งจะจำแนกเป็นหน่วยและสถานการณ์ที่เกิด นอกจากนี้ยังตรวจค้นความเครียดและอาการซึมเศร้าโดยใช้ Hospital Anxiety and Depression (HAD) scale*

ผลการศึกษา: *ทหารส่วนใหญ่มีสุขภาพที่ดีทั้งช่วงก่อนและหลังปฏิบัติการ ค่า total weekly initial visit DNBI rate คือ 337.6 ต่อ 1,000 คน-สัปดาห์ ซึ่งค่อนข้างสูงเมื่อเทียบกับ The Joint Chiefs of Staff (JCS) reference rate โดยโรคที่พบได้บ่อยที่สุดคือ โรคระบบทางเดินหายใจ (21.9%) โรคทางอายุรกรรม/ศัลยกรรม (19.8%) และการบาดเจ็บจากการออกกำลังกาย (15.5%)*

สรุป: *จากผลการศึกษาพบว่าโรคที่มิได้เกิดจากการรบยังพบได้บ่อย ทั้งมีเวชกรรมป้องกันที่ทันสมัย ซึ่งจะส่งผลต่อความพร้อมและประสิทธิภาพของการปฏิบัติหน้าที่ของทหาร*