

PATIENT RECEPTION AND TREATMENT OUTCOMES OF THE VIETNAMESE LEVEL 2 FIELD HOSPITAL ROTATION 6 IN THE UNITED NATIONS PEACEKEEPING MISSION IN SOUTH SUDAN

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ABSTRACT

Objectives: To assess patient reception and treatment outcomes at the Vietnamese Level 2 Field Hospital 2.6 during its deployment in South Sudan from September 2024 to September 2025.

Subjects and methods: A retrospective, descriptive study was conducted on 2,652 patients who presented to Vietnamese Level 2 Field Hospital 2.6 during the deployment period. Disease patterns were classified according to the ICD-10 classification.

Results: The mean patient age was 39.7 ± 8.6 years, with a male-to-female ratio of 4.04:1. Diseases of the digestive system were the most common (20.4%), followed by musculoskeletal disorders (15.5%). Ninety-three patients required hospitalization, with a mean length of stay of 4.75 ± 2.0 days. All patients were treated without complications; 10 cases were referred to higher-level facilities. Thirty-two surgeries were performed (17 major, intermediate and 15 minor surgeries), all with complete recovery and no intraoperative or postoperative complications.

Conclusions: During the mission period from September 2024 to September 2025, Vietnam Level 2 Field Hospital 2.6 examined and treated a total of 2,652 patients and performed surgical procedures on 32 patients. All surgeries were conducted in strict accordance with established protocols, ensuring absolute safety, with no intraoperative or postoperative complications recorded.

Keywords: Field Hospital, Peacekeeping, South Sudan.

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1. INTRODUCTION

The United Nations Mission in South Sudan (UNMISS) was established in 2011 to support peacekeeping operations and humanitarian activities in South Sudan. Since 2018, the Vietnamese Level 2 Field Hospital (L2FH) has assumed medical duties in the Unity Sector under UNMISS, succeeding the United Kingdom Level 2 Field Hospital. The Vietnamese L2FH is capable of performing life-saving surgical procedures, limb- and vision-saving interventions, emergency resuscitation, postoperative care, and treatment of internal medical conditions. In addition, the hospital provides dental examination and treatment services, as well as basic laboratory investigations including blood and urine tests, radiography, and ultrasonography. The facility is capable of providing outpatient care for up to 40 patients per day and inpatient treatment for 20 patients, with a maximum hospitalization duration of seven

days [1]. Vietnamese L2FH rotation 6 consisted of 63 personnel and was deployed to Bentiu, Unity State, South Sudan, from September 26, 2024, to September 25, 2025. The hospital was responsible for ensuring healthcare services for 3,658 United Nations personnel stationed in the Unity Sector under UNMISS, including more than 2,000 military and police personnel and 1,494 civilian staff members working for the United Nations [2]. Under actual operational conditions in the mission area, despite numerous challenges such as extreme heat, frequent flooding and infectious disease outbreaks, limited infrastructure, shortages of medical resources and logistical support, as well as operating in a conflict-affected environment, the hospital successfully fulfilled its professional and medical mission.

In order to contribute scientific evidence for improving the preparedness of peacekeeping forces in general, and the medical corps of the

Vietnam People's Army in particular, in terms of training, personnel organization, and medical equipment deployment, thereby enhancing the capacity to successfully accomplish United Nations missions, we conducted this study to evaluate the admission and treatment outcomes of Vietnamese Level 2 Field Hospital rotation 6 in South Sudan during its deployment period from September 2024 to September 2025.

2. SUBJECTS AND METHODS

2.1. Subjects

The study population consisted of 2,652 patients who received examination and treatment at Vietnamese L2FH rotation 6 in South Sudan from September 28, 2024, to September 24, 2025.

Patients with incomplete medical records or records lacking sufficient information for the study variables were excluded from the analysis.

2.2. Methods

- Study Design: This was a retrospective cross-sectional descriptive study.

- Sample Size: Convenience sampling was applied, including all medical records of patients who received examination and treatment at Vietnamese L2FH rotation 6 and had sufficient information for the study.

- Study Procedures: Data were collected by accessing the hospital database system and compiling a list of patients treated at the field hospital. Medical records meeting the study criteria were selected, and study variables were extracted using a standardized data collection form.

- Study Variables:

+ Characteristics of the study population: age, sex, and working unit.

+ Disease patterns: classified according to the World Health Organization International Classification of Diseases, 10th Revision (ICD-10), including conditions requiring surgical/interventional management, inpatient treatment, and aeromedical evacuation.

+ Treatment outcomes: discharge status, referral to higher-level facilities, complications, and length of hospital stay.

- Ethical considerations: The study was conducted with the approval of Vietnamese L2FH rotation 6 and the Vietnam Department of Peacekeeping Operations, and complied with all applicable institutional regulations. Patient information was kept strictly confidential, and

the study was performed solely using archived medical records and stored data. The authors declare that there were no conflicts of interest related to this study.

- Statistical Analysis: Data were analyzed using SPSS version 20.0. Continuous variables were presented as mean \pm standard deviation, while categorical variables were expressed as frequencies and percentages.

3. RESULTS

3.1. Patient characteristics

Table 1. Patient characteristics

Variables		No. of patients (n = 2,652)	Percentage (%)
Age	≤ 30	348	13.1
	31-40	1,169	44.1
	41-50	811	30.6
	51-60	293	11.0
	≥ 61	31	1.2
Gender	Male	2,126	80.2
	Female	526	19.8
Unit	Military	908	34.2
	Police	795	30.0
	Civilian	949	35.8

The mean age of the study population was 39.7 \pm 8.6 years. Most patients were between 31 and 50 years of age (74.7%), were male (80.2%), and belonged to military personnel (34.2%) or police forces (30.0%).

3.2. Disease Patterns

The most common disease groups were diseases of the digestive system (20.4%) and musculoskeletal disorders (15.5%).

Table 2. Disease Patterns

Diseases		No. of patients (n = 2,652)	(%)
Certain infectious and parasitic diseases	Malaria	69	2.6
	FIAI*	47	1.8
	Others	125	4.7
	Total	241	9.1
Neoplasms		26	1.0
Diseases of the blood and the immune mechanism		13	0.5
Endocrine and metabolic diseases		73	2.8

Diseases		No. of patients (n = 2,652)	(%)
Mental disorders		10	0.4
Nervous system		82	3.1
Eye		51	1.9
Ear		44	1.7
Circulatory system		106	4.0
Respiratory system	Upper respiratory	108	4.1
	Lower respiratory	26	1.0
	Total	134	5.1
Digestive system	Oral cavity	237	8.9
	Others	306	11.5
	Total	543	20.4
Skin diseases		96	3.6
Musculoskeletal disorders		411	15.5
Urological diseases		85	3.2
Obstetrics and Gynecology		42	1.6
Injuries, wounds	Injuries	229	8.6
	Wounds	37	1.4
	Total	266	8.7
Others**		429	16.2

*: Foodborne infection and intoxication;
 **: Vaccination, health screening, and postoperative follow-up

- Characteristics of malaria and foodborne infection/intoxication patterns over time

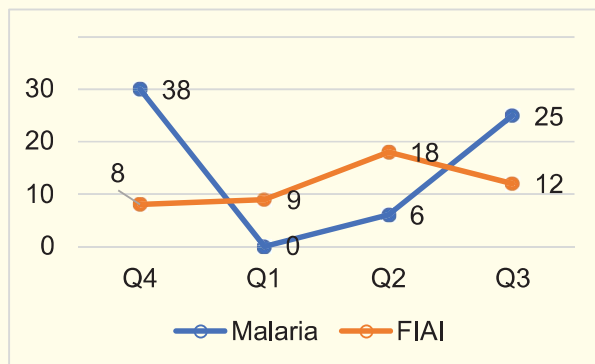


Figure 1. Characteristics of malaria and foodborne infection and intoxication (FIAI) patterns over time.

The highest number of malaria cases was recorded in the fourth quarter of 2024, with 38 cases, while the highest number of foodborne infection and intoxication cases was observed in the second quarter of 2025, with 18 cases

3. Characteristics and outcomes of inpatient treatment

- Distribution of inpatient diseases (n = 93):

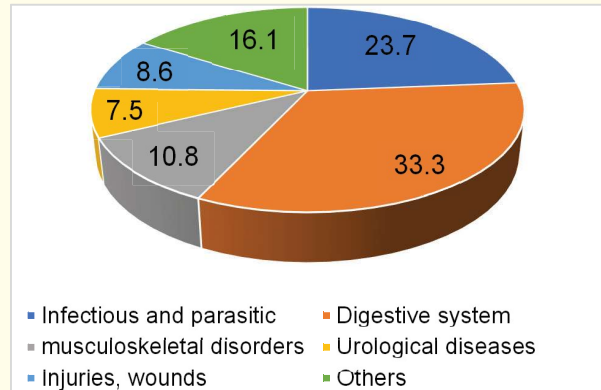


Figure 2. Distribution of inpatient diseases.

Among the 2,652 patients who received examination and treatment at Vietnamese L2FH rotation 6, 93 cases (3.5%) required inpatient treatment (Figure 2). Among these hospitalized patients, digestive system diseases accounted for 33.3% of cases, while infectious and parasitic diseases accounted for 23.7%, including 9 cases of malaria and 5 cases of foodborne infection and intoxication. A total of 10 out of 93 patients (10.8%) required aeromedical evacuation to higher-level medical facilities, including 3 cases of gastrointestinal diseases, 2 hematological disorders, 2 cardiovascular diseases, 1 musculoskeletal disorder, 1 urological disease, 1 infectious disease, and 1 obstetrics and gynecology condition.

- Length of hospital stay: ranged from 1 to 10 days, with a mean duration of 4.75 ± 2.0 days.

- Characteristics and outcomes of surgical treatment

Table 3. Distribution of Surgical Diseases

Diseases	Type of surgery	
	Minor	Major and intermediate
Soft tissue tumor	3	1
Hemorrhoids	0	3
Acute appendicitis	0	5
Inguinal hernia	0	3
Injuries	12	3
Others	0	2
Total (No., %)	15 (46.9)	17 (53.1)

During the deployment period, a total of 32 patients underwent surgical procedures, including

17 cases (53.1%) of major and intermediate surgery and 15 cases (46.9%) of minor surgery. The major surgical procedures were mainly related to gastrointestinal diseases, including acute appendicitis (5 cases), hemorrhoids (3 cases), and inguinal hernia (3 cases). Minor surgical procedures were primarily performed for the management of soft tissue injuries

No intra-hospital complications or adverse events were recorded during the hospitalization period. All postoperative patients had stable outcomes and were discharged from the hospital, with no cases requiring referral to higher-level medical facilities.

4. DISCUSSION

4.1. Characteristics of patients receiving examination and treatment at Vietnamese L2FH rotation 6

During one year of deployment at the United Nations Mission in South Sudan (UNMISS), Vietnamese Level 2 Field Hospital No. 6 provided medical examination and treatment for more than 2,650 patients. The hospital served military personnel, police officers, and civilian staff working for the United Nations. Therefore, most patients were of working age, with only 31 patients (1.2%) aged 61 years or older, while the 31-50-year age group accounted for 74.7% of all cases. The mean age of the study population was 39.7 ± 8.6 years. These findings are consistent with the characteristics of peacekeeping personnel, who are predominantly young and medically fit to work in challenging operational environments. The mean age observed in our study was lower than that reported by Le Viet Anh et al. (2024) [3], in which Vietnamese L2FH rotation 4 admitted and treated 1,474 patients during a 14-month deployment period, with patients under 40 years old accounting for 96.74% of cases. A study by Bailey et al. (2017) [4] reported that the mean age of patients receiving medical care at the United Kingdom L2FH in the Unity Sector was 32 years.

The proportion of female patients in this study was 19.8%, which was higher than that reported by Le Viet Anh [3] (10.24%) and Bailey et al. (2017) [4] (14%). This finding is consistent with the policy and ongoing efforts of the United Nations to increase female participation in United Nations peacekeeping forces to approximately 20%. Armed forces personnel, including military and police officers, accounted for a high proportion of patients receiving medical examination and treatment (64.2%), which was similar to the findings reported by Le Viet Anh [3] (66.96%), but lower than that

reported by Bailey et al. [4] (80%). In our study, military and police personnel mainly originated from Ghana, Mongolia, Pakistan, and India. Most civilian patients were South Sudanese nationals. This distribution may be explained by the fact that Ghana, Mongolia, and Pakistan contributed the largest numbers of permanently deployed troops in the Unity Sector, with 970, 850, and 274 military personnel, respectively. In addition, the majority of civilian staff contracted to work for the United Nations in the Unity Sector were South Sudanese nationals, accounting for more than 1,494 individuals [2]. Civilian patients represented 35.8% of all cases in our study (949 patients).

4.2. Disease Patterns

The study findings (Table 2) showed that patients presenting to Vietnamese L2FH rotation 6 had a wide spectrum of medical conditions, ranging from common diseases such as gastrointestinal disorders and infectious and parasitic diseases to less common conditions, including hematological and mental disorders. These results were similar to those reported in the study of Vietnamese L2FH rotation 4, in which gastrointestinal diseases accounted for 22.5% and infectious diseases for 12.42% of all cases [3]. In our study, 100% of patients belonged to the category of non-battle-related diseases and injuries. This may be explained by the absence of major military conflicts in the operational area during the deployment period of Vietnamese L2FH rotation 6. According to the study by Le Viet Anh [3], only one patient treated at Vietnamese L2FH rotation 4 sustained a battle-related injury. These findings differ markedly from those reported by Yongqiang Z et al. [5], in which the Chinese L2FH deployed to the United Nations Multidimensional Integrated Stabilization Mission in the Central African Republic (MINUSCA) in Mali treated 176 battle-related injuries among 217 patients. Therefore, field hospitals deployed in peacekeeping missions must maintain constant readiness for emergency care and surgical management of combat-related injuries in the event of armed conflict in the mission area.

The next most common disease group consisted of infectious and parasitic diseases, among which malaria and foodborne infection and intoxication were the two conditions of particular interest in this study. During the deployment period, 69 cases of malaria and 47 cases of foodborne infection/intoxication were recorded. As shown in Figure 1, the peak incidence of malaria occurred during the fourth quarter of 2024, coinciding with the rainy season, which provides favorable conditions for mosquito breeding and disease transmission.

In 2015, a United Nations report indicated that approximately 4,000-8,000 malaria cases per week were recorded among 150,000 residents in the United Nations Protection of Civilians (PoC) site in Bentiu [6]. Regarding foodborne infection and intoxication, the peak incidence in our study occurred during the second quarter of 2025. This may be explained by the dry season conditions, during which flies proliferate rapidly, creating challenges for environmental sanitation and food safety control. Therefore, deployed units should implement appropriate environmental hygiene and disease prevention measures, particularly in dining facilities, kitchens, and food preparation areas. Non-specific preventive measures, such as proper food covering, regular food safety inspections, and education on hygiene practices within military units, should be strengthened and effectively coordinated.

Musculoskeletal disorders and injuries/wounds also accounted for a high proportion of the disease burden, representing 15.5% and 8.7% of cases, respectively. Due to the nature of their duties, United Nations personnel are frequently required to carry heavy equipment during patrol missions and perform physically demanding tasks, placing them at increased risk for musculoskeletal disorders and injuries. In 2012, David G et al. [7] reported that among Swedish military personnel deployed on peacekeeping missions in Afghanistan, 75% experienced at least one musculoskeletal disorder during a six-month deployment period.

Notably, our study recorded 10 out of 2,652 patients (0.4%) presenting with mental disorders, and none of these patients required referral to higher-level medical facilities. This proportion was considerably lower than that reported in the study of Vietnamese L2FH rotation 4, in which 14 out of 1,464 patients (0.96%) were diagnosed with mental conditions [3]. Under the stressful operational conditions of peacekeeping missions, United Nations personnel are frequently exposed to risk factors associated with mental health disorders. Therefore, since 2024, the United Nations has required Level 2 Field Hospitals to include psychiatrists or mental health nurses/psychological support personnel in order to provide timely counseling and mental health care for patients. This represents a notable improvement in the medical support system. However, further long-term studies are needed to evaluate the effectiveness of this policy.

4.3. Surgical and inpatient treatment outcomes

During the deployment period, Vietnamese L2FH rotation 6 provided inpatient treatment for 93

out of 2,652 patients, accounting for 3.5% of all cases. This proportion was lower than that reported by Le Viet Anh [3] (4.1%). No complications or adverse events were recorded among hospitalized patients. A total of 10 out of 93 inpatients (10.8%) required referral to higher-level medical facilities for further treatment due to limitations in treatment capacity or the lack of specialized diagnostic equipment. This referral rate was lower than that reported in the study by Le Viet Anh [3], in which the rate was 16.39%. Among the referred patients, 3 cases involved gastrointestinal diseases and 2 cases involved hematological disorders.

The mean length of hospital stay was 4.75 ± 2.0 days, ranging from 1 to 10 days. According to United Nations regulations, L2FH are authorized to retain patients for inpatient treatment for up to 7 days. However, in several cases involving complex conditions that remained within the hospital's treatment capacity, we reported to the Chief of medical officer and obtained approval to extend hospitalization up to 10 days. This approach allowed patients to recover and be discharged without referral to higher-level medical facilities, thereby reducing the number of patient transfers and lowering the costs associated with aeromedical evacuation.

The study recorded 32 out of 2,652 patients (1.2%) requiring surgical intervention. Among these cases, 15 patients underwent minor surgical procedures, including wound suturing and excision of small soft tissue tumors; these patients were discharged to their units on the same day without requiring hospitalization. In addition, 17 patients underwent intermediate or major surgical procedures, including 3 cases of acute appendicitis, 2 cases of appendiceal peritonitis, 3 cases of inguinal hernia, 2 cases of closed fractures, and 1 case of a complex finger injury. Vietnamese L2FH rotation 6 was the first medical unit authorized by the Chief of medical officer to perform internal fixation procedures for closed fractures. This achievement reflects the credibility and professional capability of the Vietnamese L2FH within the mission area. A study by Bailey et al (2017) [4] conducted at the United Kingdom Level 2 Field Hospital in the Unity Sector reported a surgical rate of 12 out of 286 patients (4.2%). During the period from 2007 to 2012, the Bangladesh L2FH in Liberia performed 83 major surgeries and 567 minor surgical procedures, with acute appendicitis accounting for 44.57% of all major surgical cases [8].

5. CONCLUSION

During the deployment period from September 2024 to September 2025, Vietnamese Level 2 Field Hospital rotation 6 provided medical examination and treatment for 2,652 patients, including 32 patients who underwent surgical procedures. All medical and surgical interventions were performed in accordance with standard protocols, ensuring absolute safety, with no recorded complications or adverse events during the treatment process

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