


Coping with COVID-19 in United Nations peacekeeping field hospitals: increased workload and mental stress for military healthcare providers

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ABSTRACT

Introduction This study aimed to explore the impact of COVID-19 on the United Nations peacekeeping field hospitals where medical supply and manpower are extremely insufficient.

Methods A level II hospital was deployed in Wau, South Sudan, as the regional referral centre of the United Nations Mission in South Sudan (UNMISS). It had a total strength of 63 personnel with 47 medical staff (average age 38.3±8.0 years, 33 men). A new 'appointment–triage–disinfection' work pattern was adopted to cope with the COVID-19 outbreak in the mission. Data on medical service statistics and workload before/after the outbreak were collected and compared. The mental health of staff was analysed from the quarterly psychological survey, including Perceived Stress Scale (PSS)-10, Generalised Anxiety Disorder (GAD)-7 and Patient Health Questionnaire (PHQ)-9.

Results The number of outpatients decreased slightly after the COVID-19 outbreak (41.9±11.9 to 37.6±11.8 per week, $p=0.49$), whereas the weekly hospital length of stay of inpatients increased significantly (0.4±1.0 to 3.1±3.9 days, $p=0.02$). Total weekly working hours increased from 1884.9±34.1 to 2023.5±67.3 hours ($p<0.001$). Elevated mental stress (PSS-10: 4.3±2.4 in February to 7.5±3.9 in May, $p<0.001$; GAD-7: 4.0±2.3 to 9.4±4.0, $p<0.001$; PHQ-9: 2.1±1.2 to 3.2±2.4, $p<0.001$) was documented among healthcare providers after the outbreak. The threat of COVID-19 infection, delay in rotation and family-related concerns constituted the main stressors.

Conclusion COVID-19 imposes a huge pressure on peacekeeping field hospitals. Increased workload and mental stress among frontline healthcare providers deserve the attention of UNMISS officials. Facilitating the rotation of the medical staff might potentially improve the operational readiness of the hospital by bringing in well-trained personnel and sufficient medical supplies.

INTRODUCTION

Since its outbreak in December 2019, COVID-19 has spread at an unprecedented speed worldwide. While the Americas becomes the most pandemic area with over 10 million confirmed cases as of 11 August 2020, the number of COVID-19 cases is also escalating rapidly in Africa, where response capacity has been assessed substantially limited due to lack of medical resources.¹

Under Chapter VII of the United Nations (UN) Charters,² the United Nations Mission in South Sudan (UNMISS) has been deployed in this African

Key messages

- ▶ United Nations peacekeeping field hospitals represent health facilities with limited medical supplies and human resources.
- ▶ Coping with COVID-19 in such circumstances requires flexible work patterns.
- ▶ Increased workload and mental stress among frontline healthcare providers deserve more attention from United Nations Mission in South Sudan officials.

country since July 2011 with the mandate to promote peace and to protect civilians. Regional level II hospitals have been established in each sector (Juba, Wau, Bentiu, Bor and Malakal) to offer medical service to UN civilian and military staff working in their respective area of responsibility, and^{3 4} since the outbreak of COVID-19 in South Sudan in April 2020, they became the regional referral centre to admit and treat confirmed cases that need hospitalisation. However, unlike other medical facilities of the world, these UN field hospitals are characterised by annual rotation of medical staff, limited access to medical supplies, shortage of manpower and poor infrastructure. Coping with COVID-19 in such circumstances could therefore represent a high occupational risk for healthcare providers.

It has been recognised that peacekeeping operations, military lifestyle and anti-epidemic clinical practice could all contribute to increased mental stress.^{5–7} Standing on the frontline of the anti-COVID-19 pandemic in peacekeeping missions, healthcare providers in UN field hospitals might be influenced by these multiple stressors at the same time and, therefore, might suffer from more mental stress. Yet so far, few bodies of research have targeted this special population. The current study was designed to investigate the impact of the COVID-19 pandemic on the work pattern, workload and mental stress of frontline healthcare workers in a UN level II field hospital of UNMISS.

METHODS

Study design and participants

The 10th batch of the UN level II hospital was deployed in the city of Wau, South Sudan, in September 2019, with a total strength of 63 personnel. The planned tour of duty was 12 months and, due to the COVID-19 pandemic, was extended by 2 months. The first suspect case of COVID-19 presented to our



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Table 1 Demographics of the healthcare providers in the United Nations level II hospital

Variables	No. (proportions) / mean±SD
Number of healthcare providers	47
Age (years)	38.3±8.0
Male	33 (70.2%)
Position	
Doctors	22 (46.8%)
Nurses	17 (36.2%)
Technicians/pharmacists	8 (17.0%)
Department	
Outpatient	12 (25.5%)
Inpatient	16 (34.0%)
Emergency	9 (19.1%)
Lab/radiology/pharmacy	10 (21.3%)

No., number.

hospital in March 2020, while the first confirmed case was received in July 2020. By memorandum of understanding (MOU), there were 47 medical staff, including 22 doctors, 17 nurses and 8 technicians/pharmacists. Detailed demographic information is listed in Table 1. The daily work could be categorised into medical duties (working in the inpatient, outpatient, emergency and lab/radiology/pharmacy departments) and non-medical duties (including military duties, such as sentry post, and hygiene/antiepidemic duties, such as disinfection of the hospital).

Data collection

South Sudan confirmed its first case of COVID-19 on 5 April 2020. The work pattern (triage protocol and disinfection frequency) of the hospital before and after this time was presented and analysed. The medical reports were reviewed to

determine the weekly number of patients visiting/staying in the hospital. Shift schedules of the medical and non-medical duties were accessed to calculate the weekly working hours of the medical staff. The pre-COVID-19 and post-COVID-19 workloads were then compared.

Results of the quarterly mental health survey (performed in the first week of November 2019, then in February, May and August 2020), including Perceived Stress Scale (PSS)-10, Generalised Anxiety Disorder (GAD)-7 and Patient Health Questionnaire (PHQ)-9, were obtained and analysed by the unit psychologist to assess the mental status of these military healthcare providers. Results before and after April 2020 were compared to understand the potential impact of the COVID-19’s outbreak on the mission. An extra anonymous survey was performed to gather information on the main concerns of the team members. Psychological counselling was provided to those experiencing severe stress.

Statistical analysis

Descriptive statistics were applied to present demographic data in forms of mean±SD or number/proportion. The Kolmogorov-Smirnov test was applied to assess the distribution of data. Pre-COVID-19 and post-COVID-19 weekly working hours in each department were compared using Student t-test and Mann-Whitney test in line with their correspondence distribution. Quarterly mental stress scores were compared using paired t-tests. Categorical data were compared using Fisher probabilities. PASW Statistics software (IBM, Armonk, New York, USA) was used for statistical analysis. The significance level was set to be $p < 0.05$.

RESULTS

Shift in workflow

Prior to the first confirmed case in South Sudan (September 2019–April 2020), the triaging of patients with suspect infectious disease in the UN level II hospital had been doctor-based (Figure 1A). All patients were registered at the reception and

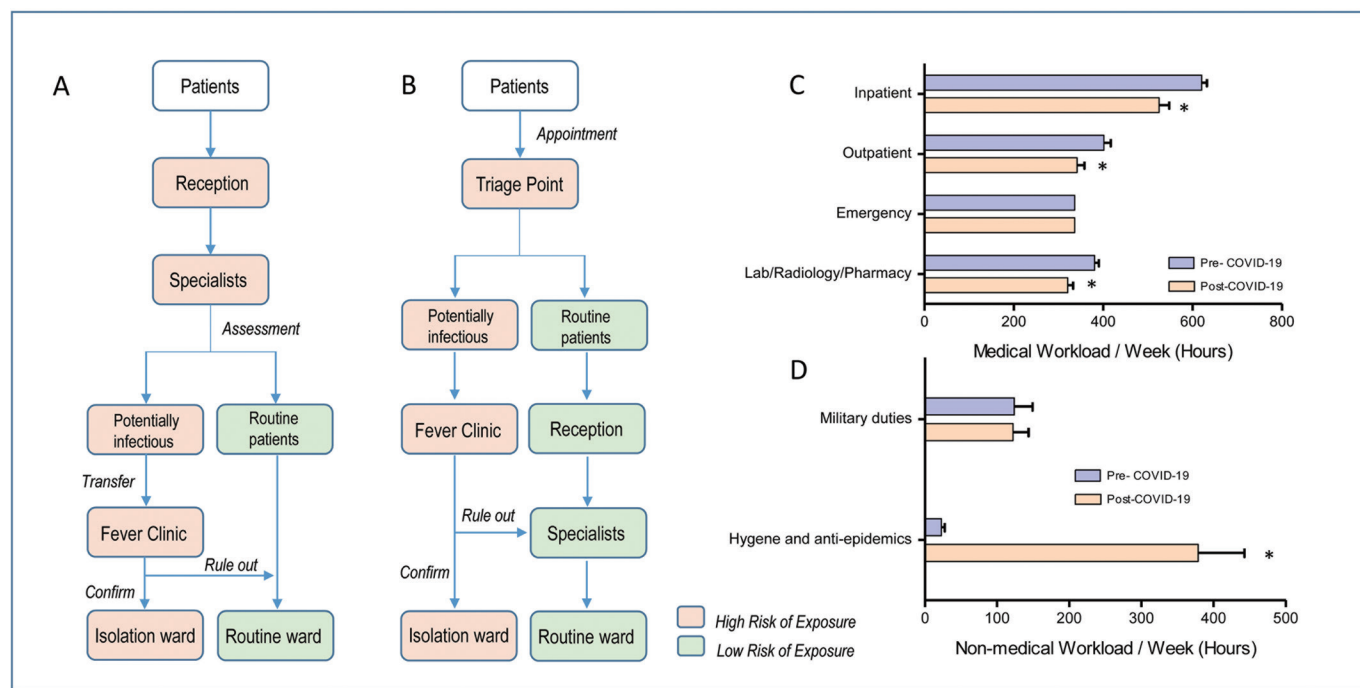


Figure 1 Change in work pattern and workload after the COVID-19 outbreak in the United Nations Mission in South Sudan. (A) Workflow before the COVID-19 outbreak, (B) workflow after the COVID-19 outbreak, (C) comparison of medical workload before and after the outbreak, and (D) comparison of the workload of non-medical duties before and after the outbreak.

then distributed to specialists according to their complaints. It was the responsibility of the individual specialist to recognise potentially infectious cases and refer them to the fever clinic for further diagnosis and treatment. The disinfection of the hospital was performed on a weekly basis.

Since April 2020 (the first confirmed case in South Sudan), a standard triaging system has been established in the hospital that involved the following three steps (Figure 1B):

1. Appointment of visit. All patients (except emergency) presenting to the hospital should have their appointment made in advance by telephone or e-mail, with details of their clinical symptoms as well as travel and contact history provided. The appointments were then assessed by experts of infectious disease to decide their level of risk (routine cases or potentially infectious cases).
2. Triage point. A triaging point was set up at the entrance of the hospital. Based on the individual's level of risk and temperature, patients were triaged either to the fever clinic or routine clinic.
3. Disinfection of the hospital. The high-risk exposure area (triage point, fever clinic and isolation room) was disinfected with sodium hypochlorite solution two times a day (11:30 and 16:30), while the rest of the area was disinfected once a day (16:30).

Workload

There was a slight decrease in the weekly number of patients visiting the hospital (outpatient/emergency departments) from 41.9 ± 11.9 to 37.6 ± 11.8 since the outbreak of COVID-19 ($p=0.49$). In contrast, the weekly hospital length of stay (inpatient department) increased from 0.4 ± 1.0 to 3.1 ± 3.9 days ($p=0.02$). Time spent in routine medical work decreased from 1738.4 ± 26.8 to 1523.0 ± 21.0 hours/week ($p<0.001$), which was transferred to an increased non-medical duty from 146.6 ± 24.5 to 500.5 ± 71.5 hours ($p<0.001$) (Figure 1C,D). Hygiene and antiepidemic workload constituted the main part of the non-medical duties after the COVID-19 outbreak, which increased from 22.7 ± 4.6 to 378 ± 64 hours/week ($p<0.001$). Overall, working hours increased from 1884.9 ± 34.1 to 2023.5 ± 67.3 hours/week ($p<0.001$).

Mental health survey

There was a significant increase in mental stress after the COVID-19 outbreak. The average PSS-10 score increased from 4.3 ± 2.4 in February to 7.5 ± 3.9 in May ($p<0.001$), and further to 15.1 ± 8.2 in August ($p<0.001$) (Figure 2A). Meanwhile, GAD-7 and PHQ-9 scores also climbed from 4.0 ± 2.3 and 2.1 ± 1.2 in February to 9.4 ± 4.0 ($p<0.001$) and 3.2 ± 2.4 ($p<0.001$) in May, and reached 12.1 ± 4.9 ($p<0.001$) and 3.6 ± 2.6 ($p=0.11$) in August (Figure 2B,C). Five healthcare workers (10.6%) visited the psychologist due to sleep deprivation before the COVID-19 outbreak in the mission, compared with three (6.4%) afterward ($p=0.714$).

Concerns regarding the COVID-19 escalated with the increasing number of confirmed cases in UNMISS (Figure 2D). In February, only 7/47 (14.9%) of the medical staff voted for COVID-19 as the main concern, which increased to 31/47 (66.0%) in May ($p<0.001$) and 43/47 (91.5%) in August ($p=0.002$). Family-related concerns remained another major stressor throughout the year. Notably, we documented the delay in rotation (36/47, 76.6%) also played an important role in increasing the mental stress of the healthcare providers in August, 1 month prior to the scheduled rotation time.

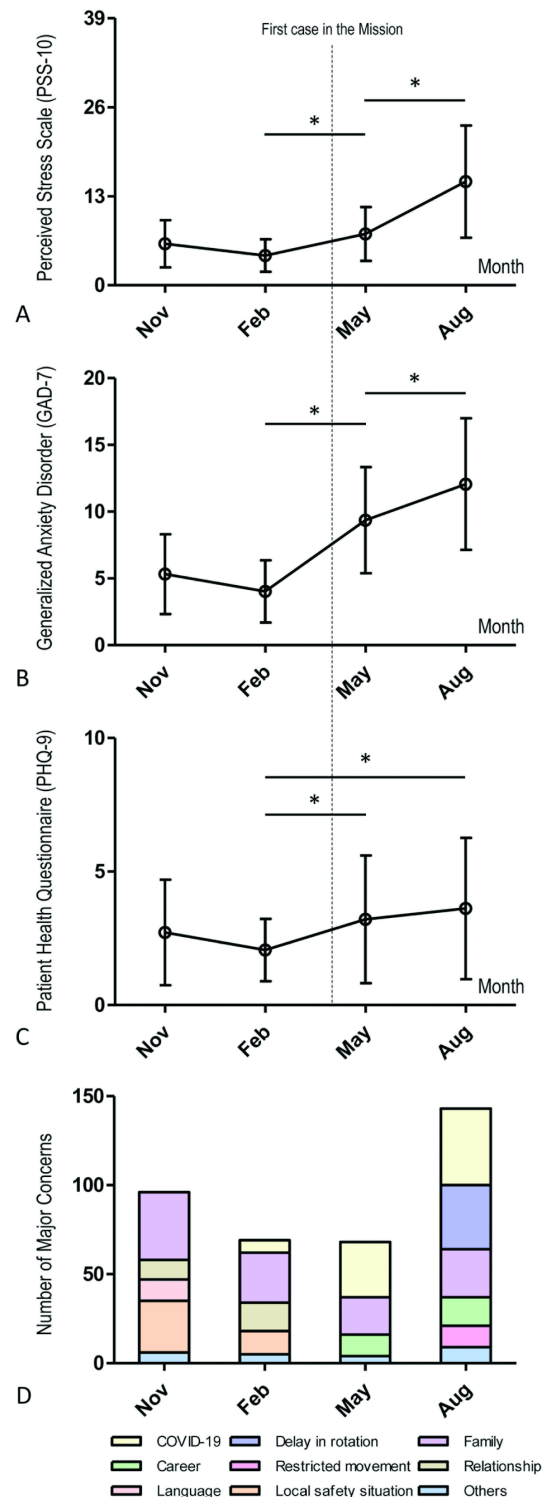


Figure 2 Quantitative mental stress analysis of the frontline medical workers since the deployment in United Nations Mission in South Sudan. (A) Perceived Stress Scale score, (B) Generalised Anxiety Disorder score, (C) Patient Health Questionnaire score and (D) major concerns.

DISCUSSION

To our knowledge, this was the first study that systematically reported the impact of COVID-19 on UN peacekeeping hospitals. These field hospitals represent health facilities with extremely limited medical supplies and human resources. A shifted workflow of the hospital was applied in line with the

available resources, and elevated mental stress was documented among healthcare providers after the outbreak of COVID-19 in the region.

The antiepidemic protocol differs in varied levels of hospitals.^{8,9} In facilities where medical resources are relatively sufficient, a comprehensive precaution strategy, including a proper layout of the hospital, full personal protective equipment (PPE) sets and enhanced training on the medical staff, could be applied.¹⁰ In peacekeeping field hospitals, however, the shortage of PPE and the difficulty in its resupply has imposed a huge strain on the healthcare service. In an effort to consume PPE rationally, we applied a new ‘appointment–triage–disinfection’ protocol in the hospital, which allowed us to flexibly adjust the number of healthcare workers on duty, depending on the appointment of patients. We observed decreased working hours on routine medical work after the COVID-19 outbreak (Figure 1C), possibly due to the decline in the number of outpatients and the corresponding reduction of medical workers on duty. However, a sharp increase in hygiene/antiepidemic workload was documented after COVID-19, which was in accordance with the new work pattern where intensive disinfection of the working place was required to minimise the risk of transmission in the hospital. The overall workload of medical staff became heavier, along with the new antiepidemic strategy.

It has been observed that healthcare providers are disproportionately affected by COVID-19 during the pandemic and could be the carrier of the virus.^{11,12} Research has shown that frontline medical staff may suffer from a high level of mental strain due to the threat of being infected, the shortage of protective equipment, the lack of rest and isolation from their families.⁷ Besides, the peacekeeping mission itself has been recognised as a risk factor for mental health issues, possibly due to isolation, ambiguity, powerlessness, danger and boredom.¹³ The reported incidence of post-traumatic stress disorder ranged from 8% to 15% in the peacekeeping operations.^{13,14} Our study demonstrated elevated stress, depression and anxiety among our medical staff after the outbreak of COVID-19 in the mission, which, in our opinion, was understandable as all these stressors are compounded in UN field hospitals.

In such circumstances, the delay in staff rotation and extended tour of duty would in no doubt further increase the psychological stress among the medical staff as demonstrated by the survey of our research. The COVID-19 pandemic represents an unforeseeable public health event. By MOU, most of the UN field hospitals are not prepared with sufficient manpower and medical supplies to deal with it. For example, the current 47 medical strength in our unit could not fully cover the increased hygiene and antiepidemic duties after the pandemic while maintaining their routine medical work, so we had to increase their workload. From our perspective, UNMISS level II medical facilities need to be enhanced with additional strength, including personnel with both specialised training and PPE in line with local epidemics, which could only be achieved by facilitating the rotation. Postponing the rotation would not benefit the pandemic control but, on the contrary, would increase the mental stress of the healthcare providers and impair their decision-making ability and quality of interaction with patients.¹⁵ Meanwhile, results of the elevated mental stress under the COVID-19 pandemic also indicate the necessity of including disaster medicine teaching in the predeployment training programme.

Several limitations exist in this study. Apart from the retrospective, observational and non-randomised nature of this research, we only analysed data from one hospital containing

47 medical staff. The small sample size may lead to imprecise results, and the conclusion was therefore not robust. Another limitation lied in the design of the questionnaires in the quarterly mental health survey. The Impact of Event Scale—Revised might represent a better tool in assessing the influence of a major public event such as COVID-19 on mental stress. A large-scale, multicentre analysis is now anticipated to draw a more convincing evidence.

CONCLUSION

The severe shortage of medical supplies and human resources impose a huge strain on the UN field hospitals when coping with the COVID-19 pandemic. Increased workload and mental stress among frontline healthcare providers deserve serious attention of UNMISS officials. Facilitating the rotation of the medical staff might potentially improve the operational readiness of the hospital by bringing in well-trained personnel and sufficient medical supplies.

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Competing interests None declared.

Patient consent for publication Not required.

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