ORIGINAL ARTICLE

Non battle injury and surgical diseases observed in mixed military population at UN hospital Darfur, Sudan

Kaleem Akhtar, Misbah Rashid Waraich, Rao Khalid Mehmood, Farha Javaid, Usman Riaz, Rizwan Ahmed

Abstract

Objective: To study the frequency and type of non-battle injury and surgical diseases amongst multi-national peacekeepers at tertiary care hospital in United Nations mission in Darfur, Sudan.

Study design: Descriptive case-series study.

Place and duration of study: Department of General Surgery of United Nations peacekeeping mission (UNAMID) level III Hospital at Darfur, Sudan from January 2019 to December 2019.

Material and Methods: All personnel of UNAMID Sudan, of either gender who reported in Outdoor Patient Department with presentation suggesting a non-battle injury or surgical disease and managed either conservatively or operated upon were included in this study. While cases that were shifted or referred to other departments were excluded.

Results: A total of 1516 patients were included in this study. The mean age was 35.35 years and standard deviation was 7.09. Out of those, 93.3% (n= 1414) were males and 6.7% (n=101) were females. The majority of patients had musculo-skeletal diseases 311(20.5%) followed by non specific abdominal pain 276 (18.2%), genito-urinary tract diseases 258 (17%), Road traffic accident and Trauma 117 (7.7%), Acute appendicitis 93 (6.1%), Perianal diseases 85(5.6%), Hernias 70 (4.6%), Superficial skin lumps 67(4.4%), Viscous Perforation 2 (0.1%), Intestinal obstruction 1 (0.1%), others 236 (15.6%), there was no fatal outcome, giving a mortality rate of 0%.

Conclusion: The commonest non-battle injury and surgical disease in this study was musculo skeletal diseases followed by non-specific abdominal pain, genito-urinary tract diseases, road traffic accident & trauma, acute appendicitis, perianal diseases, hernias and superficial skin lumps, UN level III hospital is the biggest field military medical set up of UNAMID Sudan, which is catering needs of United Nations peacekeepers from 50 countries by providing emergency surgical care to holistic management of allied surgical specialties.

Keywords: Military population, non-battle injury, UN and African Union Hybrid Mission (UNAMID)

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Armed Forces Hospital, Gizan, KSA
K Akhtar
U Riaz
R Ahmed

DHA Medical Centre, Lahore
MR Waraich

Barnsley Hospital, NHS Foundation Trust, England
RK Mehmood

Shamshad Aslam Hospital, Wah Cantt
F Javaid

Correspondence:
Dr. Kaleem Akhtar
Consultant General and laparoscopic Surgeon
Armed Forces Hospital, Gizan, KSA.
Cell No:00966582393544
email: doctorkaleem77@yahoo.com

Introduction:

UNAMID is a combined, United Nations and African Union Hybrid Mission of almost 50 countries, contributing Military, Paramilitary and Civilian Peacekeepers.[1] This Mission was established on 31st July 2007, with the approval of Security Council of UN resolution 1769.[2] United Nations field Hospital Darfur is a 125 bedded, fully equipped level III medical facility located in Nyala Darfur, Sudan. It was established on 8th July 2009 and is providing indoor and outdoor health care facilities to military and non-military staff of United Nations. Health care facilities available in this hospital include Medical, Surgical and all allied specialties. This Hospital is covering a population of more than

Table 1: Demographic profile of peacekeepers at UN hospital, Darfur (n=1516)

Variable	n (%)
Male	1414 (93.3)
Females	101 (6.7)
Age	
(20-40 year)	1182(77.9)
(40-60 year)	333(21.9)
Countries	
Nigeria	231(15.2)
Egypt	181(11.9)
Ethiopia	179(11.8)
Bangladesh	174(11.5)
Tanzania	170(11.2)
Nepal	168(11.1)
Pakistan	127(8.4)
Rwanda	58(3.8)
Senegal	38(2.5)
Sierra Leone	35(2.3)
Burkina Faso	35(2.2)
China	27(1.8)
Misc	93(6.1)

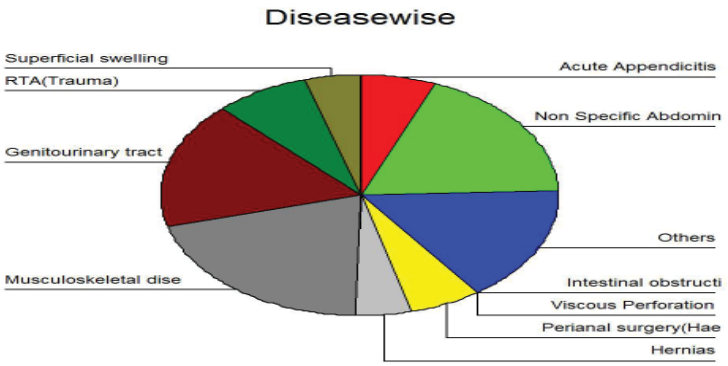

Figure 1L Non Battle injury and surgical Diseases pattern at UN Level III Hospital, Darfur (n=1516)

25,000 with capacity of treating almost 100 ambulatory patients per day. Level III hospital can also operate ten major surgical cases in one day.

The UNAMID multiethnic population strength in Nyala was 26,308, all of which is dependent on this UN Hospital. Total military personnel were 22,061 including 17,050 military soldiers, 4,747 Para military troops and 264 military observers. The civilian staff was 4,247, comprising of 1,121 International civilian personnel, 2,658 local civilian staff and 468 United Nations volunteers. The main contributing countries according to their strength were; Nigeria 3,794, Rwanda 3,196, Egypt 2,430, Ethiopia 1,634, Senegal 1,293, Burkina Faso 939, Bangladesh 935, Tanzania 875, South Africa 800, Pakistan 630, China 315, Nepal 315, Jordon 280, Indonesia 140, Sierra Leone 130. The female staff consisted of 522 female police officers and 510 female military troops.[3]

Non battle injury and surgical diseases had always been a major problem for deployed military units and has historically accounted for more mortality and morbidity than the war casualties.[4] The Disease pattern also varies with the geographical area, in different races, age groups and in people from different regions of the world.[5] Few international studies are available on the epidemiological patterns of non-battle injury and surgical diseases in mixed military population. This study was carried out on multinational peacekeepers that were deployed in the field. The aim of this study is to illustrate the Frequency and pattern of non-battle injury and surgical diseases amongst multi-ethnic patients reporting at United Nations Level III hospital. This study will help to identify the variety of disease patterns amongst different races which will further help to formulate the organizational infra-structure and work load planning for establishing a quality surgical health care facility in field environment.

Material and Methods:

This descriptive case-series study was carried out in surgical department of UN Level III hospital in a retrospective manner by taking data recorded in patient's file, admission register and operation theater register. The obtained data was entered into the data sheet of SPSS version 16 for further assessment and analysis. The inclusion criterion was to include all patients with presentation suggesting a non-battle injury or surgical disease that was later managed in surgical unit. These were either admitted through out-patient department (OPD) or emergency department or shifted to surgery department from allied departments, or operated upon on an outpatient basis. The cases that were shifted

Table 2: Frequency of non-battle injury and surgical diseases at UN hospital, Darfur (n=1516)

Disease	n (%)
Musculoskeletal disease (Backache)	311(20.5)
Non Specific abdominal pain	276(18.2)
Genito-urinary diseases (Scrotal diseases, UTI)	258(17.0)
RTA (Trauma)	117(7.7)
Acute appendicitis	93(6.1)
Perianal diseases (Hemorrhoid, Fissure, Fistula, Abscess)	85(5.6)
Hernias	70(4.6)
Superficial swelling (Lipoma, keloid, sebaceous cyst)	67(4.4)
Viscous perforation	2(.1)
Intestinal obstruction	1(.1)
Others	236(15.6)

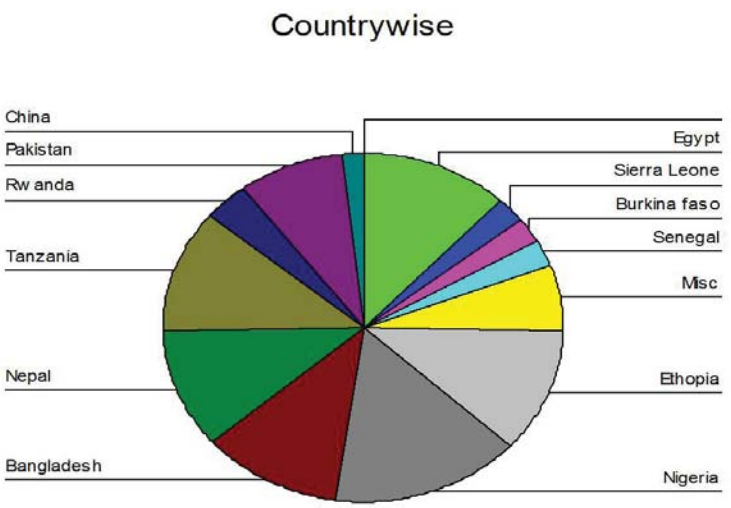

Figure 2: Non Battle injury and surgical Diseases Countrywise pattern at UN Level III Hospital, Darfur (n=1516)

to other departments and those who left hospital against a medical advice were excluded from this study. The variables noted and analyzed were patient's demographic data, country, provisional and final diagnosis, disease pattern and the final outcome. All the data was analyzed by using descriptive statistics of SPSS version 16.

Results:

A total of 1,516 peacekeeper reported to general surgical department of the hospital for different surgical problems during one year period. Age of the patients ranged from 20 to 60 years, the mean age was 35.35 years and standard deviation was 7.09. Out of those, 93.3% (n= 1414) were males and 6.7% (n=101) were females. Demographic features with country wise frequencies of patients are shown in table 1. Main bulk of patients was of African origin while Bangladeshi patients from Asia were the only non-African majority presenting with non-battle injury and surgical diseases. Others were Nigeria 231(15.2%), Egypt 181(11.9%), Ethiopia 179(11.8%), Bangladesh 174(11.5%), Tanzania 170(11.2%). The lowest number of patients was from China 27(1.8%). Disease frequency is shown in table 2.

The majority of patients had musculo skeletal diseases 311(20.5%) followed by non specific abdominal pain 276(18.2%), genitourinary tract diseases 258(17%), Road traffic accident and Trauma 117(7.7%), Acute appendicitis 93(6.1%), Perianal diseases 85(5.6%), Hernias 70 (4.6%), Superficial skin lumps 67 (4.4%),Viscous Perforation 2 (.1%), Intestinal obstruction 1 (0.1%), and Misc were 236 (15.6%).

The country-wise disease pattern is shown in table 3. Majority of Patients were diagnosed with musculoskeletal diseases, mostly with lower backache pain and general body aches. Out of 311 patients, 48 (15.4 %) were from Bangladesh, 46 (14.7%) from Tanzania and 39 (12.5%) from Ethiopia. The second most common disease pattern was non-specific abdominal pain, mostly with upper abdomen pain. Out of 276 patients with non specific abdominal pain, 43(15.5%) were from Tanzania, 42(15.2%) from Nepal, 33(11.9%) from Nigeria and 31(11.2%) from Bangladesh. The third common disease which patients were diagnosed with was genito-urinary tract diseases, mostly reported with urinary tract infection. Out of 258 patients of Genito-urinary tract diseases 48(18.6%) were from Bangladesh, 46(15.5%) from Nigeria and 36(11.6%) from Nepal. Fourth reported non-battle injury was road traffic accidents (RTA), out of 117 RTA cases, 48(41.0%) were from Nigeria, 22(18.8%) from Nepal and 9(7.6%) from Bangladesh. Acute Appendicitis was the fifth commonly reported disease, out of 93 acute appendicitis patients, 23(24.7%) were from Egypt, 13(13.9%) from Ethiopia and Nigeria. The perianal diseases including hemorrhoids, fissure and fistula, were

Table 3: Country wise non-battle injury and Surgical diseases Pattern at UN hospital, Darfur (n=1516)

Country	Acute Appendicitis	Non-specific abdominal pain	Viscous perforation	Intestinal obstruction	Perianal Surgeries	Hernias	Musculoskeletal diseases	Genitourinary tract diseases	RTA (Trauma)	Superficial swellings	Others	Total
Egypt	23	34	1		12	7	35	17	8	20	24	181
Sierra Leone	1	7			4	3	4	3	2	3	8	35
Burkina faso	2	6			2	2	2	3	0	2	15	34
Senegal	4	4			5	3	8	4	2	2	6	38
Ethiopia	13	29			13	17	39	20	8	6	34	179
Nigeria	13	33	1		8	12	34	46	48	17	19	231
Bangladesh	5	31			5	6	48	48	9	2	20	174
Nepal	4	42			15	6	30	36	22	2	11	168
Tanzania	5	43			13	3	46	26	8	2	24	170
Rwanda	2	9			0	4	10	19	2	2	10	58
Pakistan	6	23			3	2	31	25	0	7	30	127
China	9	3			0	0	4	3		0	8	27
Misc	6	12		1	5	5	20	8	7	2	27	93
Total	93	276	2	1	85	70	311	258	117	67	236	1516

sixth frequently reported ailment at surgical department, out of 85 patients with perianal diseases, 15 (17.6%) were from Nigeria and 13 (17.2%) each from Ethiopia and Tanzania. Hernias were the seventh common disease, out of 70 hernia cases, 17 (24.2%) were from Ethiopia, 12 (17.7%) from Nigeria and 7(10.0%) from Egypt. Eighth common disease pattern was superficial skin swellings mostly lipomas, keloids and sebaceous cysts, out of 67 superficial skin swelling patients, 20 (29.8%) were from Egypt, 17 (25.3) from Nigeria and 7 (10.4%) from Pakistan.

Discussion:

The global burden of surgical diseases is 28-32%. Management of non-battle injury and surgical diseases is expensive and has a huge impact on resources of health system.[6] These non-battle injuries and surgical diseases have been observed with an increasing frequency in underprivileged areas of world like Africa.[7] Each year, injuries kill more than five million people, accounting for 1 in 10 deaths worldwide.[8,9] Non-battle injury is defined as any injury not directly attributable to hostile action or terrorist activity or caused by conflict.[10]

This study is amongst the few studies which were conducted in multiracial and multicultural mixed military population consisting of more than 50 countries' military and paramilitary personnel, who were actively involved in military operations. When deployed in battle field, beside war or operational casualties, a general surgeon must be prepared to coup up with the common non-battle injury and surgical emergencies and diseases[11,12] which are usually encountered in regular surgical clinics.[13] In a field hospital, different factors which affect the working milieu of field surgical units are type of war casualties, work load, admissions of non-battle injury and surgical diseases and available mode of evacuation with distance to next higher centre.[14,15] Similarly different factors which influence the planning & outcome of combat military operation are nature and number of non-combat injuries and surgical disease, psychological and physical stresses as a result of frequent move and deployment, aggravation of undiagnosed or pre-existing diseases due to hostile environment.[16,17] Hence non-battle injury and surgical diseases not only affects the outcome of combat military operations but also puts extra work load and financial set back to the organization. So there is dire need to address these factors before deployment in mission area.

Due to reasons mentioned above, such type of studies are useful for surgeons and institutions

for well-timed preparation, training and composition of staff for establishment of field hospitals, which will eventually affect the morale and fighting capability of soldiers. The most commonly encountered non battle injury and surgical diseases in peacekeepers according to our study is musculo skeletal diseases, almost same ratio is described in a study conducted related to peace keeping operations in South America.[18] Most of them were with lower backache and generalized body aches. In our study, out of 311 patients, 48(15.4%) were from Bangladesh, 46(14.7%) from Tanzania and 39(12.5%) from Ethiopia. In majority of these patients pre-disposing cause was physical stress, over work, frequent travelling and hard nature of deployment. 10% patients had pre-deployment symptoms of back pain and were already using some analgesics. Education of the soldiers about the care of back muscles, proper rest and sleep is important to avoid back muscle related problems. The second common surgical disease was non-specific abdominal pain, mostly presenting with upper abdomen pain. Out of 276 non-specific abdominal pain patients, 43(15.5%) were from Tanzania, 42(15.2%) from Nepal, 33(11.9%) from Nigeria and 31(11.2%) from Bangladesh. An important confounding co factor in such cases was heavy and spicy meal at night. Education of masses to use less spices and having regular walk after eating heavy meals will help reduce such cases. 2% patients were already using off and on antacids. The Genito urinary tract related diseases were the third most common non-combat surgical disease in UN peacekeepers & mostly reported cases were diagnosed with UTI. Out of 258 patients, 48(18.6%) were from Bangladesh, 46(15.5%) from Nigeria and 36(11.6%) from Nepal. Most of them had history of poor intake of water and guard related prolonged standing duties in dry and hot field area. In order to evade such dehydration related diseases, we have to educate the soldiers about proper intake of oral fluids especially during deployment in torrid conditions. The fourth common non-battle injury reported as per our study was trauma related to road traffic accidents (RTA). Out of 117 RTA cases, 48(41.0%) were from Nigeria, 22(18.8%) from Nepal and 9(7.6%) from Bangladesh. Common cause of RTA was over speeding, night driving and sandstorm. By strict check on over speeding, avoiding night drive and driving in the prescribed speed limits can prevent the road traffic accident in far-flung deployment under stressful conditions. The fifth common cause of seeking the surgical treatment was acute appendicitis. Out of 93 acute appendicitis patients, 23(24.7%) were from Egypt, 13(13.9%) equally from Ethiopia and Nigeria. Majority of these patients with acute appendicitis were from Egypt and likely cause of this was low fiber and heavy fat diets. Similar percentage of acute appendicitis has been reported in another study conducted during military operation in Afghanistan by Andrew C, Halingsworth, RAMC, Douglas M, Bowley et al.[19] Educating the soldiers about taking high fiber diet in the form of fruits along may help reduce burden of appendicitis. The sixth common reason to report in surgical department was Perianal diseases, mostly with haemorrhoid, fissure, fistula and abscess. Out of 85 patient, 15(17.6%) were from Nigeria and 13(17.2%) each from Ethiopia and Tanzania. Cause was constipation due to consumption of low fiber diet and inadequate intake of oral fluids. In order to prevent these diseases, regular education of soldiers regarding healthy diet is essential. Seventh commonly reported disease was hernias, mostly inguinal hernias. Out of 70 cases of hernia patients, 17(24.2%) were from Ethiopia, 12(17.7%) from Nigeria and 7(10.0%) from Egypt. 60% of them had hernia before their deployment in the mission area, hence necessitating a strict pre-deployment medical check up to reduce such presentation in field hospitals.

The weaknesses of this study is that the number of peacekeepers from diverse geographical areas are different in ratio and small in sample size, more precise results can be ascertained by increase in sample size and equal samples of population from different countries of the world. Lowest number of patient from China reported because of their well equipped level II hospital, 70% of the peacekeepers were from African countries, so surgical conditions prevalent

in these regions were also witnessed in the study. This study also indicates that there is insufficient pre deployment selection and screening from the country of their origin. These conditions affect the efficiency of peacekeepers in operational areas,[20] where hostile environment, physical & psychological stresses and severe weather condition can further aggravate the pre existing surgical diseases.

Conclusion:

Musculo skeletal diseases, non specific abdominal pain, genito urinary tract diseases and trauma due to road traffic accidents are the most common non battle injury and surgical diseases among peacekeepers. Majority reported cases were of African descent. Different factors which can influence the disease pattern and presentation of non-battle injury and surgical diseases in a field hospital are pre-deployment presence of disease, area and duration of deployment, physical training to coup up the severe conditions, race or ethnicity and geography, and level I and level II UN hospital support status. Strict Screening for surgical diseases must be done before selecting the soldiers for deployment in field environment, as stressful harsh conditions can aggravate their pre existing surgical disease consequently which has impact on hospital admissions and increases the work load and also has adverse effects on their performance in operational area.

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Role and contribution of authors:

Kaleem Akhtar, collected the data, references and did the initial writeup.

Misbah Rashid Waraich, collected the data and helped in interpretatio of data.

Rao Khalid Mehmood, collected the references and helped in introduction writing.

Farha Javaid, collected the data, references and also helped in discussion writing.

Usman Riaz, collected the data and helped in result writing.

Rizwan Ahmed, critically review the article and made final changes.

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