Short Report

Platelet counts at Kamuzu Central Hospital in Lilongwe, Malawi.

Yohannie Mlombe, Francis Kachedwa, Collins Mitambo, John Chisi.

Department Of Haematology, College Of Medicine, University Of Malawi

Corresponding author: YB Mlombe, Haematology Department, College Of Medicine, P/Bag 360, Chichiri, Blantyre 3, Malawi. Email: yohanniemlombe@googlemail.com

ABSTRACT

It is not clear as to what the prevalence of quantitative abnormalities of platelets is in Malawian hospitals as full blood counts are not routinely available.

Both thrombocytosis and thrombocytopenia may be fatal. We therefore carried out a retrospective analysis of platelet counts of 1,297 randomly selected case notes of in-patients presenting to Kamuzu Central Hospital (KCH) in Lilongwe in the period 2005-2009. Platelet counts were graded into unknown, normal, mild thrombocytopenia, moderate thrombocytopenia, severe thrombocytopenia and increased counts.

The overall prevalence of thrombocytopenia was found to be 26% and that of thrombocytosis to be 5% but a relatively high percentage of patients (33%) had unknown platelet counts. Malaria patients formed the highest percentage of those with severe thrombocytopenia followed by sepsis then tuberculosis, pneumonia, epistaxis, anaemia, bleeding, and Kaposi's sarcoma. Among the study patients who died, those with severe thrombocytopenia were the highest percentage (25.8%) compared to all the other platelet count grades. A prospective study is required to assess the cost effectiveness of not doing routine full blood counts. Not obtaining routine platelet counts might be contributing to mortality in our patient population.

Keywords: Thrombocytopenia; Thrombocytosis; Malaria; Platelet count; Malawi

INTRODUCTION

It is not clear as to what the prevalence of quantitative abnormalities of platelets is in Malawian hospitals as full blood counts are not routinely available.

Thrombocytosis may lead to fatal thrombosis.[1] Severe thrombocytopenia may lead to fatal haemorrhage. Thrombocytosis can also rarely present with bleeding which is often not serious unless associated with other conditions like acquired von Willebrand disease [2] and high doses of anti-platelet therapy. [3]

We retrospectively analysed platelet counts of 1,297 randomly selected case notes of in-patients presenting to Kamuzu Central Hospital (KCH) in Lilongwe in the period 2005-2009. KCH is the main referral hospital in the central region of Malawi. Platelet counts were graded as unknown, normal (*150-450 x 10^9/L*), mild thrombocytopenia (*100-149 x 10^9/L*), moderate thrombocytopenia (*50-99 x 10^9/L*), severe thrombocytopenia *(< 50 x 10^9/L)* [4] and thrombocytosis (>450 x 10^9/L). The study was approved by the College Of Medicine Research and Ethics Committee (COMREC) in Blantyre and permission was granted to carry out the study at KCH by the hospital administration. There was no direct patient contact and no patient identifying details were recorded. Data analysis to obtain descriptive statistics was done using the statistical package SPSS (11.5.1 for Windows; SPSS Inc., Chicago, Illinois, USA).

FINDINGS AND DISCUSSION

There were 462 males (35.6%) and 835 females (64.4%). The mean age of the population was 28.9 (SD 19.3). The lowest age recorded was 7 days while the highest was 88 years.

The patients were evenly distributed among the major departments as follows: Surgery, 348 (26.8%); Internal Medicine, 342 (26.4%); Obstetrics and gynaecology, 319 (24.6%) and Paediatrics, 288 (22.2%). Except for Internal Medicine Department (in 2005) and Paediatric Department (in 2005 and 2006), where between 30 and 50 patients were studied per year, the number of patients studied per department per year was between 60 and 90 (Figure 1).

In terms of catchment area, 37.3% came from Lilongwe Urban, 29.5% from Lilongwe Rural, 26.2% were referrals from other districts within the central region, 4.5% were referred from other regions and 2.5% their sources were unknown.

Overall the patients studied had 132 different diagnoses and 40.5% of these diagnoses (53) were single diagnoses (Table 1). The commonest five conditions were: malaria (13.0%), sepsis (8.3%), abortion (6.2%), pneumonia (5.3%) and tuberculosis (TB) (3.5%). Two patients had a diagnosis of thrombocytopenia. No patient was diagnosed with thrombocytosis. HIV status was unknown in the majority of the patients (979, 75.5%). Of the rest whose HIV status was known, 68.2% (217) were HIV positive. Of those who were HIV positive 19.4% (42) were on HAART.

Many of the patients (36%) had normal platelet counts but there was an almost equal percentage of patients who had no full blood count result (33%). Similar percentages of patients had mild, moderate and severe thrombocytopenia (9%,9% and 8% of patients respectively, total 26%). Five percent of patients studied had thrombocytosis (Figure 2).

Malaria patients formed the highest percentage of those with severe thrombocytopenia followed by sepsis (Figure 3) then TB, pneumonia, epistaxis, anaemia, bleeding, and Kaposi's sarcoma. In total, five study patients presented with epistaxis and they all had full blood count results. Four of them had severe thrombocytopenia and the fifth patient had normal platelet count. Two patients were diagnosed with thrombocytopenia. They both

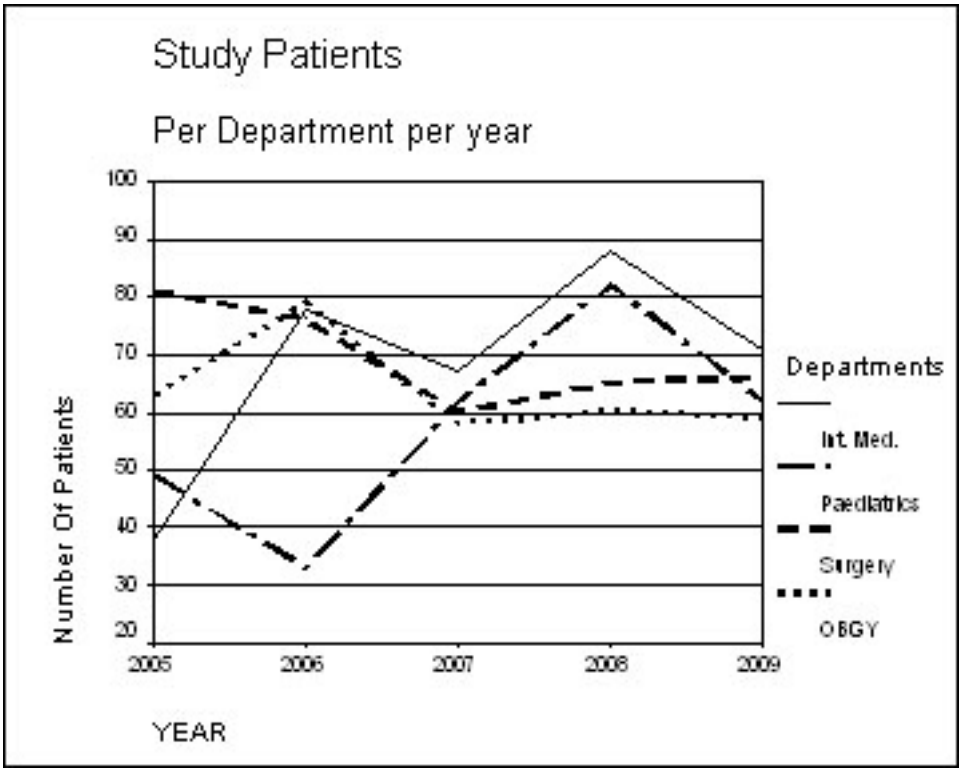

Figure 1. Int Med, Internal Medicine; OBGY, Obstetrics and gynaecology. Except for Internal Medicine Department (in 2005) and Paediatric Department (in 2005 and 2006), where between 30 and 50 patients were studied per year, the number of patients studied per department per year was between 60 and 90.

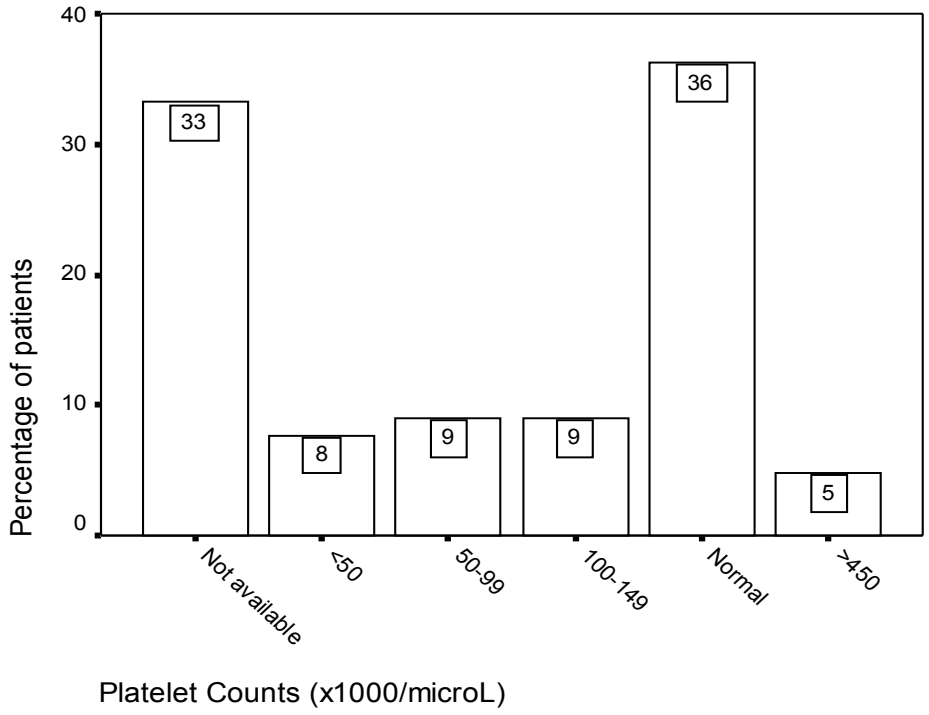

Figure 2. Many of the study patients (36%) had normal platelet counts but there was an almost equal percentage of patients who had no full blood count result (33%). Similar percentages of patients had mild, moderate and severe thrombocytopenia (9%,9% and 8% of patients respectively, total 26%). Five percent of patients studied had thrombocytosis

had severe thrombocytopenia. No diagnosis of thrombocytosis or thrombocythaemia was made. In descending order, thrombocytosis was prominent in gastroenteritis, pneumonia, sepsis and malaria (Figure 3). As the study patients were randomly picked from their respective departments and as there was a tendency to pick equal numbers of patients from each department, this study can not make any inference to the prevalence of quantitative platelet disorders at the study site. Despite this, however, the study provides a useful indicator of the kind of conditions that present to Kamuzu Central Hospital. It is thus noteworthy that diagnoses of thrombocytopenia were almost negligible despite a high prevalence of HIV among our patients. HIV has a strong association with thrombocytopenia. The five patients with thrombocytosis appear to have had reactive thrombocytosis rather than essential thrombocythaemia as they had other known diagnoses.

In terms of HIV status and platelet counts, the patients on HAART had the highest percentage (26.2%) of severe thrombocytopenia (Table 2) but it was also the group with the least percentage of (2.4%) unknown platelet counts.

The majority of patients who received platelets had severe thrombocytopenia (Table 3). One received platelet transfusion with a normal platelet count. This was a 22 year old male patient who presented to the surgical department with an acute abdomen.

Among the study patients who died, those with severe thrombocytopenia were the highest percentage (25.8%) compared to all the other platelet count grades (Table 4).

Many of the common medical conditions in our region such as malaria, bacterial infections and tuberculosis presented with platelet count abnormalities. It is well known that malaria has a strong association with thrombocytopenia. [5-6] These associations suggest that routine platelet counts in all our patients would be useful. The fact that HIV positive patients on HAART were the category with the highest percentage of severe thrombocytopenia appears to be counterintuitive as one would expect HIV positive patients not on HAART to have a higher proportion of patients with severe thrombocytopenia than those on HAART. But then the former group had the least number of unknown platelet counts suggesting that HIV positive patients are more likely to have full blood count results and

Table 1. Study patients diagnoses in descending order of frequency

Patients n (%)	Diagnosis
169 (13.0)	Malaria
108 (8.3)	Sepsis
80 (6.2)	Abortion
69 (5.3)	Pneumonia
45 (3.5)	Tuberculosis
43 (3.3)	Fibroids
40 (3.1)	Acute abdomen, gastroenteritis
37 (2.9)	Trauma
33 (2.5)	Meningitis
32 (2.5)	Cervical carcinoma, hernia
28 (2.2)	Anaemia
27 (2.1)	Renal disease
25 (1.9)	Cysts
24 (1.9)	Heart disease
21 (1.6)	Tumours, skin and musculoskeletal infections
20 (1.5)	Benign prostatic hypertrophy, breast cancer, lymphoma
16 (.2)	Esophageal cancer, abscesses
14 (1.1)	Bleeding, fistulae, masses, threatening abortions
13 (1.0)	Ectopic pregnancy
12 (0.9)	Peritonitis
10 (0.8)	Burns
8 (0.6)	Liver disease, pelvic inflammatory disease
7 (0.5)	Bladder carcinoma, hydrocele, immunosuppression, Kaposi's sarcoma, ruptured uterus, warts
6 (0.5)	Diabetes
5 (0.4)	Appendicitis, epistaxis, hydrocephalus, polyps, prostate carcinoma, rectal carcinoma, urethral stricture
4 (0.3)	Candida, goiter, hepatitis, pneumocystis jiroveci pneumonia, placenta praevia
3 (0.2)	Drug side effects, dysentery, lymphadenopathy, oesophageal varices, peptic ulcer, phimosis, postpartum haemorrhage, psychosis, rhabdomyosarcoma, sickle cell anaemia, spina bifida, thyroid carcinoma.
2 (0.2)	Adenoma, cystocele, endometrial carcinoma, git congenital abnormalities, haemorrhoids, leukemia, osteosarcoma, polyarthritis, stomach carcinoma, stroke, thrombocytopenia, tonsillitis, uterine prolapsed, uterine stones, volvulus, venous thromboembolism.
1 (0.1)	Asthma, cervical incompetence, chronic osteomalacia, cleftlip, derilium, eclampsia postpartum, emetic gravidarum, endometritis, gynaecomastia, haematemesis, hepatoma, hyaditiform mole, hypocalcemia, ingrowing toe nails, intrauterine prolapsed, keloid, kwashiorkor, lactic acidosis, lymphadenitis, lymphoproliferative disease, malignant melanoma, molar pregnancy, nasal obstruction, necrotic uterus, non reassuring fetal heart, orchitis, osteospondylitis, palatal ulcer, pancreatic carcinoma, pancreatic pseudocyst, penile carcinoma, peripheral neuropathy, phosphate poisoning, polyhydramios, post urethral ulcer, priapisms, prolonged menses, premature rapture of membranes, rectal diverticuli, retained products of conception, sarcoma, squamous cell carcinoma, schizophrenia, space occupying lesion, Steven Johnstone Syndrome, sexually transmitted infection, tongue carcinoma, upper airway obstruction, urethral calculi, uterine agenesis, uterine perforation, vault prolapse, vulvitis.

this would explain the higher numbers of severe thrombocytopenia in this group. A study done in Haiti suggested that routine platelet counts are not cost effective in HIV positive patients who are on HAART. [7] However that study noted that the cost effectiveness of routine haematological profiles in this patient population would depend on the national ARV drug regimen used and the spectrum of other comorbidities.

It is worrisome that the highest percentage of the patients who died had severe thrombocytopenia compared to the rest of the platelet count grades. It is not clear whether this means that patients with

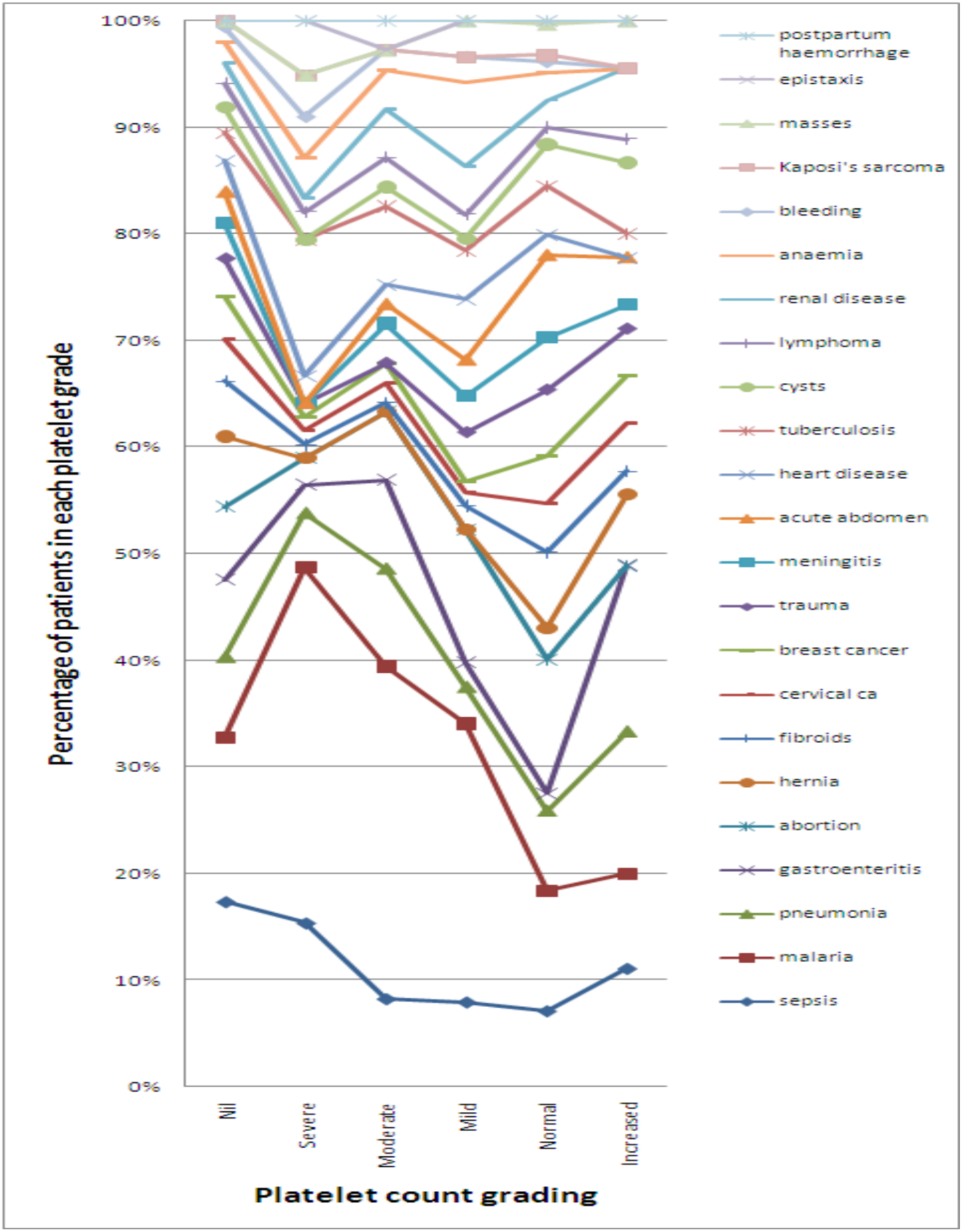

Figure 3. A 100% stacked line graph showing that malaria patients formed the highest percentage of those with severe thrombocytopenia followed by sepsis then tuberculosis, pneumonia, epistaxis, anaemia, bleeding, and Kaposi's sarcoma. In descending order, thrombocytosis was prominent in gastroenteritis, pneumonia, sepsis and malaria.

Table 2. HIV status and platelet count grades

HIV status	Parameters	Platelet count grade						Totals
		Unknown	Severe decrease	Moderate decrease	Mild decrease	Normal	Increased	
Unknown	Patients (n)	335	55	80	85	373	51	979
	Percent (%) within HIV status	34.2%	5.6%	8.2%	8.7%	38.1%	5.2%	100.0%
	Percentage (%) within plt count grade	77.7%	55.0%	68.4%	72.6%	79.4%	82.3%	75.5%
Non-reactive	Patients (n)	37	8	9	10	32	5	101
	Percent (%) within HIV status	36.6%	7.9%	8.9%	9.9%	31.7%	5.0%	100.0%
	Percentage (%) within plt count grade	8.6%	8.0%	7.7%	8.5%	6.8%	8.1%	7.8%
On HAART	Patients (n)	1	11	8	4	17	1	42
	Percent (%) within HIV status	2.4%	26.2%	19.0%	9.5%	40.5%	2.4%	100.0%
	Percentage (%) within plt count grade	0.2%	11.0%	6.8%	3.4%	3.6%	1.6%	3.2%
Reactive, not on HAART	Patients (n)	58	26	20	18	48	5	175
	Percent (%) within HIV status	33.1%	14.9%	11.4%	10.3%	27.4%	2.9%	100.0%
	Percentage (%) within plt count grade	13.5%	26.0%	17.1%	15.4%	10.2%	8.1%	13.5%
Totals	Patients n(% of total patients in study)	431(33.2)	100 (7.7)	117 (9.0)	117(9.0)	470(36.2)	62 (4.8)	1,297 (100)

HIV, Human immunodeficiency virus; HAART, Highly active anti-retroviral therapy; plt, platelet. This table shows that patients on HAART had the highest percentage (26.2%) of severe thrombocytopenia but it was also the group with the least percentage of (2.4%) of unknown platelet counts.

severe disease have severe thrombocytopenia or whether the severe thrombocytopenia contributed to the deaths. In children with malaria, the presence of thrombocytopenia has been shown to be indicative of poor prognosis irrespective of clinical condition. [8] Not obtaining routine platelet counts might be contributing to mortality in our patient population. A prospective study is required to assess the cost effectiveness of not doing routine full blood counts so that perceived savings of this approach are analysed in the context of their adverse effects.

Table 3A. Management modality and platelet count grades

Management modality	Parameter	Platelet count grade						Total
		Unknown	Severe decrease	Moderate decrease	Mild decrease	Normal	Increased	
Unknown	Patients (n)	2	0	0	0	0	0	2
	Percent (%) within management modality	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Percentage (%) within plt count grade	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
$FeSO_4$	Patients (n)	0	5	5	5	20	2	37
	Percent (%) within management modality	0.0%	13.5%	13.5%	13.5%	54.1%	5.4%	100.0%
	Percentage (%) within plt count grade	0.0%	5.0%	4.3%	4.3%	4.3%	3.2%	2.9%
FFPs	Patients (n)	0	3	4	0	6	0	13
	Percent (%) within management modality	0.0%	23.1%	30.8%	0.0%	46.2%	0.0%	100.0%
	Percentage (%) within plt count grade	0.0%	3.0%	3.4%	0.0%	1.3%	0.0%	1.0%
FFPs and platelets	Patients (n)	0	3	0	0	0	0	3
	Percent (%) within management modality	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	Percentage (%) within plt count grade	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.2%
FFPs and whole blood	Patients (n)	0	2	3	1	2	0	8
	Percent (%) within management modality	0.0%	25.0%	37.5%	12.5%	25.0%	0.0%	100.0%
	Percentage (%) within plt count grade	0.0%	2.0%	2.6%	0.9%	0.4%	0.0%	0.6%
Other modality relevant to respective diagnosis	Patients (n)	347	2	8	14	252	12	635
	Percent (%) within management modality	54.6%	0.3%	1.3%	2.2%	39.7%	1.9%	100.0%
	Percentage (%) within plt count grade	80.5%	2.0%	6.8%	12.0%	53.6%	19.4%	49.0%
No treatment given	Patients (n)	73	34	36	51	133	40	367
	Percent (%) within management modality	19.9%	9.3%	9.8%	13.9%	36.2%	10.9%	100.0%
	Percentage (%) within plt count grade	16.9%	34.0%	30.8%	43.6%	28.3%	64.5%	28.3%
Platelets	Patients (n)	0	3	0	0	1	0	4
	Percent (%) within management modality	0.0%	75.0%	0.0%	0.0%	25.0%	0.0%	100.0%
	Percentage (%) within plt count grade	0.0%	3.0%	0.0%	0.0%	0.2%	0.0%	0.3%

FFPs, fresh frozen plasma; $FESO_4$, ferrous sulphate; plt, platelet. The table shows that the majority of patients who received platelets had severe thrombocytopenia. One patient received platelet transfusion with a normal platelet count.

Table 3B. Management modality and platelet count grades (continued from table 3A)

Management modality	Parameter	Platelet count grade						Total
		Unknown	Severe decrease	Moderate decrease	Mild decrease	Normal	Increased	
Whole blood	Patients (n)	7	31	47	39	36	6	166
	Percent (%) within management modality	4.2%	18.7%	28.3%	23.5%	21.7%	3.6%	100.0%
	Percentage (%) within plt count grade	1.6%	31.0%	40.2%	33.3%	7.7%	9.7%	12.8%
Whole blood and $FESO_4$	Patients (n)	0	11	10	7	20	2	50
	Percent (%) within management modality	0.0%	22.0%	20.0%	14.0%	40.0%	4.0%	100.0%
	Percentage (%) within plt count grade	0.0%	11.0%	8.5%	6.0%	4.3%	3.2%	3.9%
Whole blood and platelets	Patients (n)	2	6	4	0	0	0	12
	Percent (%) within management modality	16.7%	50.0%	33.3%	0.0%	0.0%	0.0%	100.0%
	Percentage (%) within plt count grade	0.5%	6.0%	3.4%	0.0%	0.0%	0.0%	0.9%
Totals	Patients n(% of total patients in study)	431(33.2)	100(7.7)	117 (9.0)	117(9.0)	470(36.2)	62 (4.8)	1,297(100)

FFPs, fresh frozen plasma; $FESO_4$, ferrous sulphate; plt, platelet.

Table 4. Outcome and platelet count grades

Outcome	Parameters	Platelet count grade						Total
		Unknown	Severe decrease	Moderate decrease	Mild decrease	Normal	Increased	
Unknown	Patients (n)	0	3	4	4	5	0	16
	Percent (%) within outcome category	0.0%	18.8%	25.0%	25.0%	31.3%	0.0%	100.0%
	Percentage (%) within plt count grade	0.0%	3.0%	3.4%	3.4%	1.1%	0.0%	1.2%
Absconded	Patients (n)	0	3	0	2	11	0	16
	Percent (%) within outcome category	0.0%	18.8%	0.0%	12.5%	68.8%	0.0%	100.0%
	Percentage (%) within plt count grade	0.0%	3.0%	0.0%	1.7%	2.3%	0.0%	1.2%
Died	Patients (n)	21	34	27	11	33	6	132
	Percent (%) within outcome category	15.9%	25.8%	20.5%	8.3%	25.0%	4.5%	100.0%
	Percentage (%) within plt count grade	4.9%	34.0%	23.1%	9.4%	7.0%	9.7%	10.2%
Discharged	Patients (n)	409	43	68	86	379	55	1,040
	Percent (%) within outcome category	39.3%	4.1%	6.5%	8.3%	36.4%	5.3%	100.0%
	Percentage (%) within plt count grade	94.9%	43.0%	58.1%	73.5%	80.6%	88.7%	80.2%
Discharged on $FESO_4$	Patients (n)	1	17	18	14	42	1	93
	Percent (%) within outcome category	1.1%	18.3%	19.4%	15.1%	45.2%	1.1%	100.0%
	Percentage (%) within plt count grade	0.2%	17.0%	15.4%	12.0%	8.9%	1.6%	7.2%
Totals	Patients n(% of total patients in study)	431(33.2)	100(7.7)	117 (9.0)	117(9.0)	470(36.2)	62 (4.8)	1,297(100)

$FESO_4$, ferrous sulphate; plt, platelet. The table shows that the highest percentage of patients who died had severe thrombocytopenia compared to the other platelet count grades.

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FOOTNOTES

Contributors: JC, FK and CM were responsible for the conception and design of study protocol, they collected and analysed data and approved the final version. YM analysed data and wrote the report.

Conflicts of interest: The authors declare no competing conflicts of interest.

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