

A day in the life of a paediatric surgeon: a PAPSA research study

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Objectives This study aimed to create a snapshot picture of the global workload of paediatric surgeons and identify differences between countries.

Methods Surgeons from 13 paediatric surgical units in different countries across the world were asked to record the number and type of admissions to the paediatric surgery service over a 24-h period from 8 a.m. on 23 May 2012.

Results Data were recorded for 13 units from 13 countries: 11 low and middle income countries (LMICs) and two high-income countries (HICs). Dar es Salaam, Tanzania, had the greatest number of admissions. Two units in HICs had the lowest number of admissions, other than the Nigerian unit, which only had three admissions due to a hospital strike on the day surveyed. The percentage of emergency admissions ranged from 38 to 83%. Those units with the highest number of total admissions tended to also have the highest proportion of emergencies. Trauma was the most frequently reported admission reason, accounting for 18% of admissions. However, there were no cases of trauma in HIC units.

Introduction

Surgery is an essential component of healthcare in all settings, even in the most resource-limited countries. Worldwide, the volume of surgery is large and there is a growing recognition of the importance of surgical disease [1].

Paediatric surgery is a small and relatively new surgical speciality in many countries, especially within the developing world. Little is known about the workload of paediatric surgeons in many countries, particularly in low and middle income countries (LMICs) [2]. It is highly likely that there is a huge variation in what constitutes paediatric surgery practice across different countries.

The aim of this study was to create a snapshot picture of the workload of paediatric surgeons worldwide, specifically in terms of the volume and type of surgical conditions. Gaining insights into the epidemiology of paediatric surgery globally is essential to help define areas where resources are needed, in terms of both workforce and training [3].

Methods

A global prospective epidemiological study was undertaken. Paediatric surgical units across the Pan-African Paediatric Surgery Association (PAPSA) network were identified and members were contacted and invited to participate. Those that responded positively, consenting to take part, were subsequently included in the study. Each unit was requested to register the study locally according to individual local policies. As the data did not require any

Conclusion The spectrum of paediatric surgery differs between countries, in particular between LMICs and HICs. Units in LMICs tend to have a greater number of admissions, including a wider variety of conditions and a higher proportion of emergency work. Paediatric surgery in LMICs faces many challenges. This highlights the importance of training specialist paediatric surgeons in these countries. Further data are still needed to fully outline the burden of disease in paediatric surgery, especially in LMICs. *Ann Pediatr Surg* 12:29–35 © 2016 Annals of Pediatric Surgery.

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patient-identifiable information or any change in usual practice, formal ethical approval was not required.

Each unit was asked to document all admissions to their paediatric surgical service over a 24-h time period. Information recorded included basic epidemiological data (sex and age), basic clinical information (diagnosis or reason for admission) and type of admission (elective or emergency). Alongside the admissions data, each unit was asked to provide an estimate of the size of the local population of the catchment area served by the unit. Data were documented using a standardized excel spreadsheet (Fig. 1) sent out through email to each unit before the data collection period.

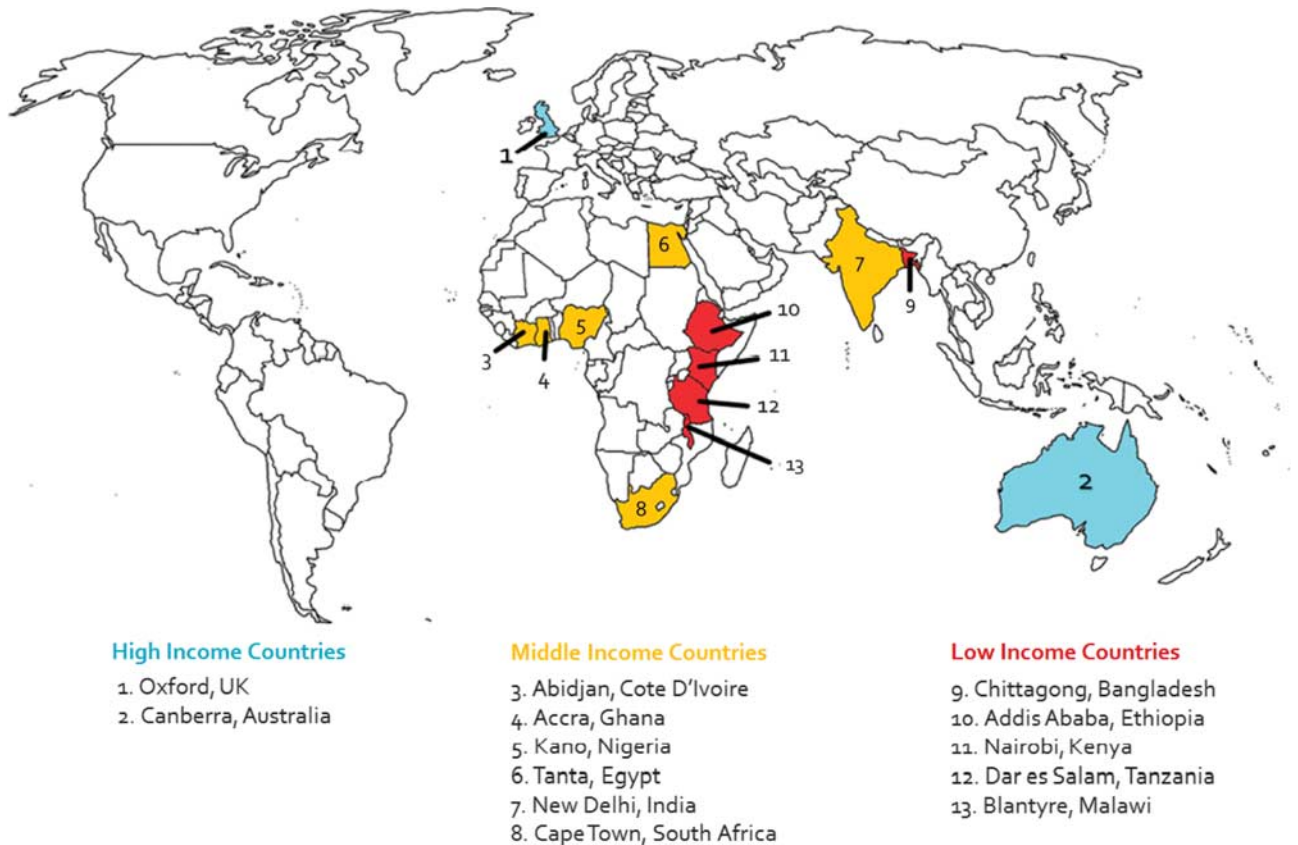
Data collection began at 8 a.m. on 23 May 2012 and finished at 8 a.m. the following day, 24 May 2012.

Data were returned through email and collated centrally. Analysis was undertaken using Excel software (Microsoft Corporation), and admission data by country were represented graphically using StatPlanet online software (StatPlanet, StatSilk, Sydney, Australia). Units were divided into two groups: those situated in LMICs and those in high-income countries (HICs). The volume of admissions, proportion of emergency admissions and most frequent reasons for admission were then compared between the two groups.

Results

In total, 13 paediatric surgical units participated in the study, each based in a different country across the world

Fig. 2



Map demonstrating the location of each of the 13 participating unit, along with the economic classification of each of these countries.

Table 1 Epidemiological and admission data for each participating paediatric surgery unit

Country of unit	Population	Unit	Catchment area population	Total admissions in 24 h per unit	Emergency admissions [n (%)]
Tanzania	48 million	Muhimbili Hospital	2.35 million	35	23 (66)
Kenya	43 million	Kijabe Hospital	710 445	31	24 (77)
South Africa	53 million	Red Cross Children's Hospital, Cape Town	3.74 million	30	19 (63)
Egypt	87 million	Tanta University Hospital	2 million	29	24 (83)
Ghana	25 million	Korle Bu Hospital	4 million	28	19 (69)
Cote D'Ivoire	24 million	Yopougon Teaching Hospital	12 million	27	16 (59)
Bangladesh	155 million	Chittagong Medical College Hospital	15 million	24	12 (50)
Malawi	16 million	Queen Elizabeth Central Hospital	16 million	21	9 (43)
Ethiopia	92 million	Tikur Anbessa Hospital	3.05 million	17	7 (41)
India	1.2 billion	All India institute of Medical Sciences, New Delhi	7.7 million	15	6 (40)
Australia	23 million	Canberra Hospital	550 000	13	5 (38)
UK	63 million	Oxford University Hospital	650 000	10	5 (50)
Nigeria	169 million	Ahmadu Bello University Hospital	25 million	3 ^a	2 (67)

^aHospital strike on that day in the Nigerian centre.

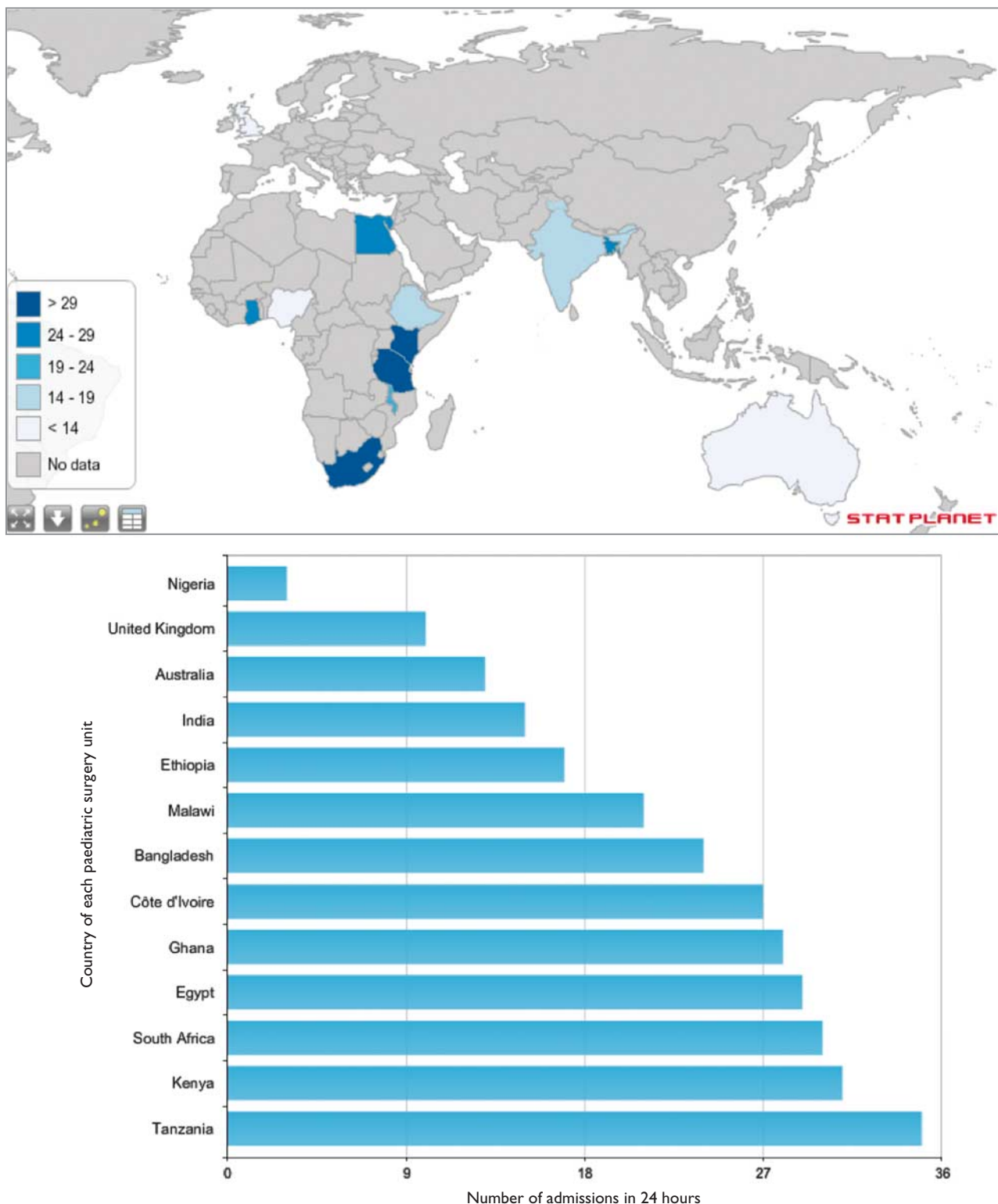
and, in particular, provides insight into differences observed between the HICs and the LMICs, both in terms of the structure of paediatric surgical services and their workload.

The data are limited by the small number of units from HICs; therefore, comparison between data from HICs and LMICs could not be analysed statistically. As the data were collected over a single 24-h time period, the data from each unit may not always be fully representative of that unit's true activity. For example, Ahmadu Bello Hospital in Nigeria had an unusually low number of

admissions because of a staff strike during the 24-h study period. In addition, there will be a degree of heterogeneity within the results as all hospitals and paediatric surgery units will be structured differently, and hence the results must be interpreted with this in mind.

Although the number of participating units from HICs was very small, there were still differences observed between those units in HICs and those in LMICs. More specifically, the LMIC units served a larger population and had a greater number of admissions with a higher proportion of emergency workload.

Fig. 3



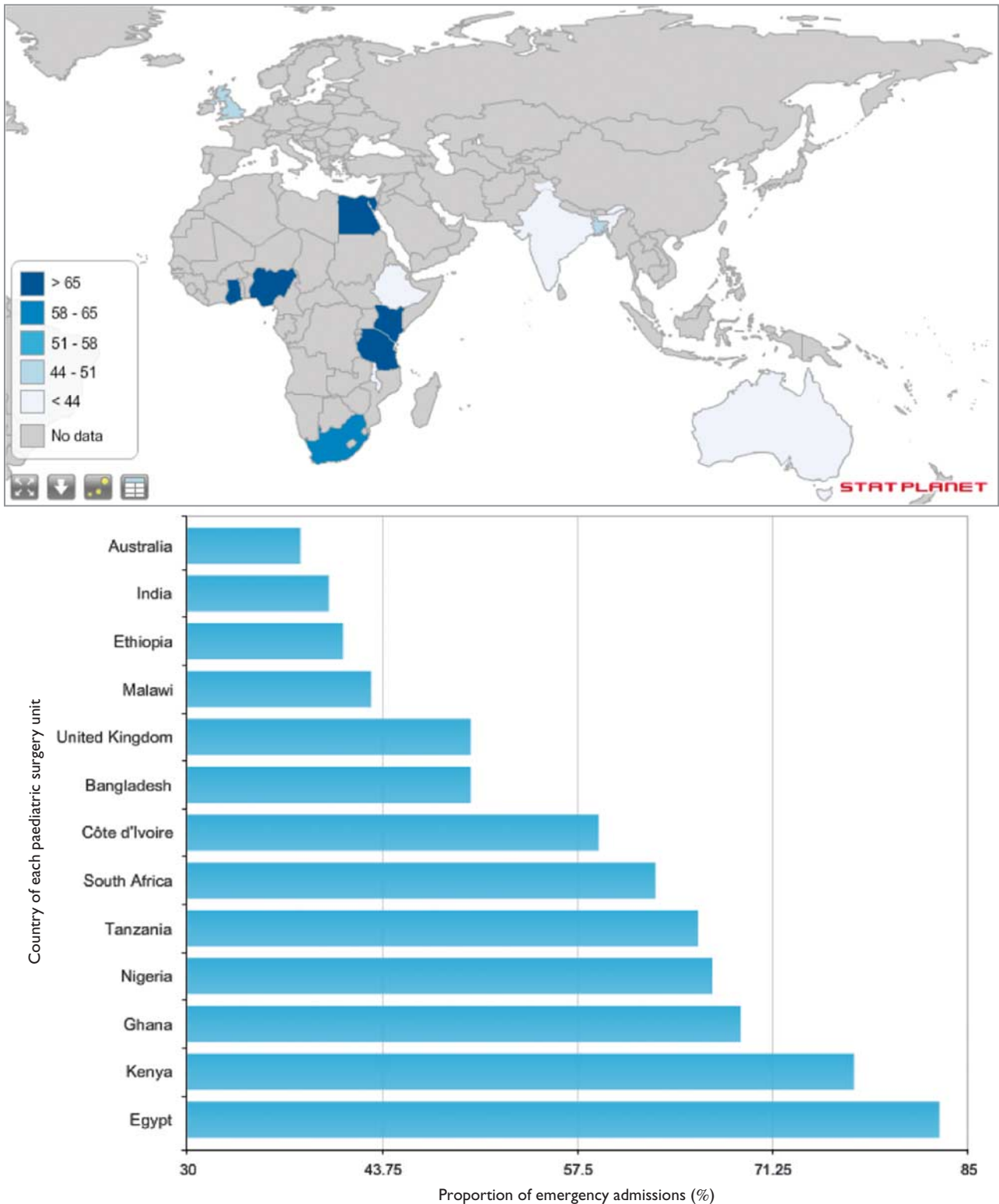
Map and bar chart demonstrating the total number of admissions within 24 h per unit in each country participating in the study (created using Statplanet online tool, StatPlanet, StatSilk, Sydney, Australia).

Paediatric surgery is a broad speciality, which includes a huge variety of pathology, which was demonstrated by a large range of different reasons for admissions. The units based in LMICs did tend to manage a wider variety of conditions. Paediatric subspecialization in these countries is rare. Therefore, conditions in HICs that would be

managed by the surgical specialities – for example, hydrocephalus – are often managed by the general paediatric surgeon.

Overall, the most frequent reason for admission was trauma, with LMICs experiencing a particularly high

Fig. 4



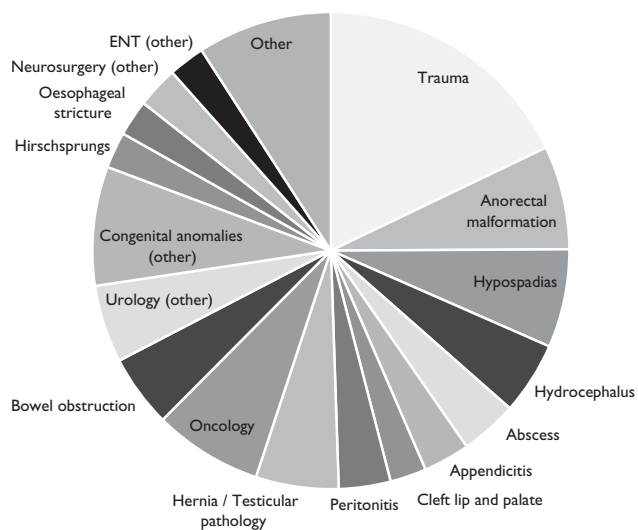
Map and bar chart demonstrating the proportion of emergency admissions in each unit during the 24-h study period (created using Statplanet online tool).

volume of paediatric trauma compared with HICs. Trauma has been reported as a significant problem in LMICs. Previous epidemiological studies in sub-Saharan Africa suggest that trauma accounts for almost half of all paediatric surgical admissions and significant morbidity and mortality [4–6]. South Africa has a high prevalence of

trauma cases. This is the leading cause of death in children over the age of 5 years, and the rates of interpersonal violence affecting children is more than double the corresponding rates in LMICs [7–9]. Data on the burden of paediatric trauma in LMICs is beginning to grow. This study supports the suggestion that paediatric

Table 2 Comparison of admissions to units within low and middle income countries with those in high-income countries

	Low and middle income countries	High-income countries
Catchment area population	> 700 000	< 700 000
Number of admissions in 24 h	> 15	< 15
Average proportion of emergency admissions (%)	60%	44%
Most frequent reason for admission	Trauma	Anorectal malformation

Fig. 5

Pie chart demonstrating the reasons for admission to paediatric surgery units. Conditions that were seen more rarely have been broadly categorized in to subspecialty area.

trauma is a significant public health issue in LMICs. Many HICs have developed public health initiatives and trauma prevention programmes to reduce the frequency of injuries and road traffic accidents. This may account for the lower number of trauma-related admissions, which has been documented in this study. Growing evidence suggests that injury prevention strategies and management of trauma should be a particular focus for LMICs [6,10,11]. Further data are still needed to understand the full impact of trauma on child health in LMICs.

Variation between HIC units and LMIC units have previously been demonstrated in some single unit comparison studies [12,13]. It is recognized that the spectrum of neonatal conditions differs between HICs and LMICs. This is likely to be because of delayed presentation and poor access to neonatal intensive care in LMICs. For example, necrotizing enterocolitis is a condition that is more frequent in HICs. This usually occurs in premature babies and typically presents on day 5–7 of life and can rapidly progress to become life-threatening; therefore, in LMICs with limited neonatal intensive care, these babies sadly do not survive. Another potential reason for any disparity in neonatal conditions is the difference in access to prenatal care. Many congenital

disorders, such as neural tube defects, are more commonly detected prenatally in mothers in HICs. This allows for planning for the baby to be delivered and the immediate postoperative care to be undertaken in a paediatric surgery unit. However, in addition to this, there is a higher rate of termination of pregnancies where a significant congenital abnormality has been detected, potentially resulting in lower numbers of these conditions in HICs [12]. Significant differences in the spectrum of neonatal conditions were not identified here; however, this is likely due to the rarity of these conditions and the data collection time period being only 24 h, meaning the numbers of these conditions were small.

Mortality and morbidity associated with paediatric surgical conditions remain high in LMICs [14]. In addition, delayed access to paediatric surgery in LMICs has been shown to result in a greater burden of disease in a comparison with HICs [13]. Although paediatric surgery is likely to be a cost-effective way to reduce childhood mortality rates and significant lifelong disability [15], many LMICs have very few trained paediatric surgeons for the relative size of their population, and often limited or no training facilities [16]. This study provides insight into the spectrum of paediatric surgery across the world and highlights where further research is needed to identify specific areas, such as trauma, on which to focus future initiatives. Paediatric surgery in LMICs faces many challenges, including lack of facilities, manpower shortages, late presentations and poverty [2,16,17]. These countries seem to experience a greater workload, with a higher proportion of emergency work and a wider variety of condition. In addition, these countries have a much larger childhood population, often accounting for up to 40–50% of the overall population. Therefore, training specialist paediatric surgeons in LMICs are essential to provide the care needed for these children. Some developments are already happening with local initiatives, such as partnerships between paediatric surgery units from HICs and LMICs [18,19], and awareness of the problem is growing [20,21]. However, further data are still needed to fully outline the global burden of paediatric surgical disease and trauma so that this can be addressed in a targeted and sustainable way. Following on from this study, PAPSA has undertaken a further survey investigating paediatric trauma admissions in more detail and is currently awaiting analysis.

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Conflicts of interest

There are no conflicts of interest.

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