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EDITORIAL

MITIGATING THE IMPACT OF COVID-19 ON PHARMACOVIGILANCE

Abraham Aseffa, MD, PhD, Sileshi Lulseged, MD, MMed, Eysau Makonnen, PhD[3,4]

COVID-19 is changing the pharmacovigilance (PV) landscape. Traditionally, regulatory authorities used to follow well developed standard procedures to ensure safety of new products and had ample time to review the evidence. Low-and-middle-income countries (LMIC) are benefited from stringent reviews made by well-established regulatory systems in more advanced countries.

The urgency posed by the COVID-19 pandemic for development of new drugs, vaccines, diagnostics and medical devices demands accelerated procedures with rapid assessment in a short time frame under high public scrutiny and more transparency. Conditional market authorizations means that real world monitoring of medicines, diagnostics and vaccines on the market becomes critical. Regulatory authorities may need to sponsor observational studies to generate relevant safety data. Signal management required establishing causality of adverse events. Regulatory authorities need to participate actively in guiding requirements for vaccine trials such as duration of follow ups during Phase III trials, and set standards together collaboratively.

All these add a big strain on the PV systems, especially on those which have less capacity (1). Only 27% of national medicine regulatory authorities (NMRAs) have Maturity Level 3 on the Global Bench-marking Tool of the WHO, a tool which assesses the capacity to perform the functions required to ensure medicines, vaccine and other health products actually work and do not harm patients (2).

The other aspect is the impact of the disruptions caused by COVID-19 on health systems and ongoing PV activities. Workforce assignments to additional responsibilities reduce time for PV work. Lock downs have interrupted communications between the PV centers of NMRAs and health professionals, patients as well as the public at large. Adverse event reporting is given less emphasis under the pandemic due to competing priorities. Resources and funding for these activities are very limited. On the other hand, irrational prescribing prevails frequently with the ongoing pandemic, especially in intensive care units. Exposure to certain medicines may affect risk of infection or clinical course of COVID-19 (as had been noted for nonsteroidal anti-inflammatory drugs, hydroxychloroquine and chloroquine). The quality of safety data is affected by the change in the epidemiology of the virus and measures taken to control the disease. The changing thresholds of testing, hospitalization or admission into intensive care units (ICU) and the variable exposure risks, with differences in adherence to quarantine measures or self-medication complicate data analysis.

What it means in general is that collection of a high-quality data is more challenging but essential (3). Risk communication and engagement with the public is critical to combat false claims (infodemics), and this requires reliable real-time data (4). This means that it's high time for more vigilance and documentation and a greater need for leveraging internal capacity in particular for LMIC. Accelerated approvals mean with limited safety data at hand but expected to be gathered in future in countries going forward. Export bans of medical technologies and priority medicines are leading to supply chain stock-outs. Local manufacturing of medical products and innovations add additional challenges to regulatory authorities. Shortage enhances the risk of substandard and counterfeit medical products.

This is the time which calls upon for more vigilance and stronger collaboration among regulatory authorities (5). Inefficient regulatory systems can themselves be barriers to make safe and effective products available. Adopting comprehensive laws, such as the African Union Model Law (6,7) and harmonization of technical requirements of products could be some of the means to speed up capacity strengthening in LMIC. Close collaboration among regulatory authorities, sharing experiences in regulatory decisions, working on social media communications together, sharing knowledge and scientific data and creating platforms to stay connected could mitigate the risks posed by COVID-19 on PV in LMIC. LMIC regulatory authorities should collaborate closely with research and academic institutions in their countries to generate evidence they would need for effective response (for example to probe spontaneous reports in databases, conduct observational studies (8) or adjust communication strategies with

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health care professionals, patients and the public to combat fake news, or monitor relevant publications to keep up with the avalanche of information on COVID-19.

Regulatory systems need to rise up to the challenges posed by COVID-19 to ensure that pharmacovigilance plays its essential role in the COVID-19 response. In Ethiopia, where the COVID 19 pandemic is on the rise, it is necessary to prevent public health damage from this complex pandemic as early as possible. Pharmacovigilance should be one of the priority interventions to this end. It is important that regulatory bodies ensure manufacturers and importers fulfil the required documentations and put in place efficient authorization processes to meet urgent public health needs, while protecting the public from unsafe and poor-quality medical products related to the diagnosis and prevention of COVID-19. The directive recently issued by the Ethiopian Food and Drug Authority (EFDA) (9), which provides directions for COVID-19 medical products conditional approval and import permit authorization is a useful step in the country's effort to guide and monitor the national response to the pandemic. Further measures need to be taken to strengthen pharmacovigilance in the broader sense, while keeping efficiency in perspective.

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Adekunle Olatayo Adeoti, Joseph Olusesan Fadare, Tobiloba Elebiyo, Ayodele Seluwa. *Ethiop Med J, 2020, Vol. 58, No. 4*

ORIGINAL ARTICLE

TREATMENT OUTCOMES OF TUBERCULOSIS PATIENTS AT EKITI STATE UNIVERSITY TEACHING HOSPITAL, NIGERIA

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ABSTRACT

Introduction: *Tuberculosis (TB) is a major public health challenge in developing countries. Clinical audit of treatment outcome is a major indicator of the performance of the TB control programme.*
Objectives: *The aim of this study was to evaluate tuberculosis treatment outcomes and associated factors among patients attending the directly observed tuberculosis short-course (DOTS) facility in a tertiary healthcare center in Nigeria.*
Methods: *An eight-year retrospective study of registered TB patients from October 2008 to November 2016. The treatment outcome of patients was categorized using the national TB Control programme guideline.*
Results: *A total of 592 complete patients' records were reviewed. There was a slight male preponderance (322, 54.4%) and their mean (SD) age of registered patients was 38 (± 0.6) years. Most of the TB cases were newly diagnosed (537, 90.7%) and four hundred and three patients (68.1%) had successful treatment outcome. Pulmonary tuberculosis (520, 87.8%) and (72, 12.2%) extra-pulmonary TB (EPTB) were as reported. More than half of the PTB patients (339, 65.1%) had smear-positive PTB, while (181, 34.8%) smear-negative PTB. Predictors of unsuccessful TB treatment outcome were EPTB (OR 11.4 CI 2.30-57.5 p-value=.003) and TB/HIV co-infection (OR 0.08 CI 0.025-0.24 p = .0005). TB/HIV co-infection accounted for 13% of patients and this was found to be associated with female gender (OR 2.5 CI 1.48-4.22, p-value≤.0001) and EPTB (OR 0.2 CI 0.27-12.90, p-value=.032).*
Conclusion*: An unsatisfactory treatment success rate was observed in this study. There is an urgent need to address cases lost to follow-up and properly collaborate in the TB/HIV programme.*

INTRODUCTION

Tuberculosis (TB) is a major public health challenge, with high incidence in the developing countries including Nigeria (1,2). Following the TB global emergency declared in 1993 by the World Health Organization (WHO), it has become one of the top ten leading cause of mortality and morbidity globally (3-5). The global tuberculosis report of 2019 estimated 10 million new tuberculosis cases and 1.5 million TB-related deaths (5,6). Nigeria has the highest TB incidences in Africa and contributes to the major new cases of TB diagnosed globally (6).

The re-emergence of TB has resulted in the implementation of the standardized directly observed treatment, short-course (DOTS) in the Stop TB Strategy to scale up TB prevention and control in 1993 [7]. This was reviewed as the goal to achieve 85% successful treatment outcomes in TB patients was set by the WHO in 2008 using strategies such as ensuring drug adherence and completion of anti-TB drugs by patients under the supervision of healthcare worker or treatment supporters (8,9).

Favourable reports on the DOTS programme have been recorded in many countries including poor-resource settings, however, there has been variable successes in some African countries including Nigeria (10,11). Despite the implementation of the DOTS programme in Nigeria since 2001, with over 3000 DOTS centers across the nation, approximately 460,000 new cases of TB are still been reported annually. Hence, there is a need for an evaluation of the treatment outcome in every facility (12,13).

The current initiative by the WHO is the END TB strategy, aimed at reducing the death rate in TB patients by 90% by the year 2030 (14). According to the WHO in the 2019 global reports on tuberculosis; the estimated incidence of TB in Nigeria was 219 per 100 000 population with only 24% of the total burden of the disease in the country being notified in 2018 (6). Several studies conducted in different regions of Nigeria have evaluated the effectiveness of the DOTS programme but only a few focused on the treatment outcome of the disease. (9,11,15).

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Moreover, the TB/HIV co-infection rate and its association with TB treatment outcomes have not been assessed at our DOTS center as a part of the auditing service. Thus, this study was conducted to evaluate TB treatment outcomes, determine the prevalence of TB/HIV co-infection and the predictors of treatment outcome at the Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti, Nigeria.

PATIENTS AND METHOD

Study design: This is a cross-sectional study with data collected retrospectively on all registered TB patients from October 2008 to November 2016.

Study setting: The study was conducted in EKSUTH, a tertiary health center located in Ado-Ekiti, south western, Nigeria. The DOTS center at the hospital operates in agreement with National TB and leprosy programme of Nigeria. Sputum specimen of patients that was positive to acid-fast bacilli and/or Xpert MTB/RIF assay was referred to as smear positive PTB patients. Smear negative PTB patients were diagnosed based on clinical features and chest radiographic findings suggestive of tuberculosis. Histopathological test of extra-pulmonary tissues and Xpert MTB/RIF of specimen was used to diagnose EPTB.

Data collection: Patients' treatment outcomes were evaluated according to the six outcome categories recommended by WHO and IUATLD (International Union Against Tuberculosis and Lung Disease). These categories are the cured, treatment completed, treatment failure, loss to follow-up, died, and not evaluated (16).

Data were retrieved from the TB register using extraction sheet designed by the study investigators to capture the study variables which included socio-demographic status, microbiological, radiological and clinical data. The socio-demographic variables included the age, gender, body weight at baseline and monthly follow-up visits. Information on sputum smear microscopy of acid fast bacilli (AFB) and Xpert MTB/RIF (Cepheid., New Jersey, USA) results at baseline as well as completion of treatment were also recorded. Clinical data consisted of the category of TB at the start (new, relapse, lost to follow-up, failure), types of TB (pulmonary or extra-pulmonary), treatment outcome and radiological findings of chest X-ray (CXR).

Statistical analysis

All data were entered, cleared, and analyzed using the SPSS Statistics software package version 25.0 (IBM SPSS). Descriptive data were expressed in proportion, mean and standard deviation. value was set at .05 to indicate a statistically significant difference.

Ethical Consideration

Ethical approval was obtained from the institutional ethical committee of the Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria. Consent waiver was also granted as the study was retrospective which entailed document review. To ensure confidentiality, the data were extracted without any personal identifier.

RESULTS

Socio-demographics of TB patients

A total of 592 tuberculosis patients' record were reviewed. The gender distribution of the patients as presented in Table 1, indicated a slight male preponderance (322, 54.4%) and the mean age of 38 ± 0.6 years. Likewise, the majority of the patients were newly diagnosed of tuberculosis (537, 90.7%) cases. The data distribution based on the site of tuberculosis as presented in Table 1, shows that the majority of the patients (520, 87.8%) had pulmonary tuberculosis while (72, 12.2%) were extra-pulmonary tuberculosis. More than half of the PTB patients (339, 65.2%) had PTB smear positive, while the remaining were (181, 34.8%) smear negative. TB/HIV co-infection cases were 77 (13%).

Table 1: Demographics of TB patients

Variable		Frequency	Percentage (%)
Sex	Male	322	54.4
	Female	270	45.6
Age group (years)	>20	31	5.2
	20-39	328	55.5
	40-59	155	26.2
	60-79	66	11.2
	≥ 80	11	1.9
TB registration status	New	537	90.7
	Relapse	16	2.7
	Failed	4	0.7
	Transferred in	6	1.0
	others	29	4.9
Chest x-ray	Suggestive	208	35.6
	Not suggestive	374	64.4
Site of TB	Pulmonary	520	87.8
	Extra-pulmonary	72	12.2
Type of PTB	Smear+	339	65.1
	Smear-	181	34.8
HIV status	Positive	77	13.0
	Negative	515	87.0
Duration of treatment (months)	≤ 6	314	53.2
	≥ 6	276	46.8

Treatment outcomes

The treatments were in two categories, the first category involved new tuberculosis cases (559, 96.4%) in which oral anti-tuberculosis drugs were administered while the second category involved patients administered anti-tuberculosis drugs and injection due to a relapse or the failure of previous treatments (21, 3.6%). The majority of the cases 580 (98%) were sensitive to the first-line anti-TB treatment drug while 12 (2%) were resistant (rifampicin resistant from Gene Xpert MTB/RIF test).

The mean treatment success rate (TSR) of the 8 years period was 68.1% (403/592) while the cases of treatment failure; loss to follow-up and death were excluded. As presented in Table 2, about half of the cases recorded completed treatments 281 (47.5%), 122 (20.6%) were cured, 140 (23.6%) were lost to follow-up, 10 (1.7%) treatment failed, 37 (6.3%) patients died and 2 (0.3%) were not evaluated.

Table 2: TB treatment outcomes of study participants

Treatment outcomes	Frequency	Total
Successful		403 (68.1)
Cured	122 (20.7)	
Treatment completed	281 (47.5)	
Unsuccessful		186 (31.4)
Loss to follow-up	137 (23.1)	
Treatment failure	10 (1.7)	
Died	37 (6.3)	
Not evaluated	2 (0.3)	

Table 3: Logistic regression analysis showing potential predictors of treatment outcomes

Variables	Treatment outcomes		OR (95%CI)	p-value
	Unsuccessful n (%)	Successful n (%)		
Sex				
Male	2 (9.6)	208 (90.4)	Ref	
Female	17 (8.0)	195 (92.0)	0.6(0.23 – 1.15)	0.276
Age groups (years)				
>20	0	26(100.0)	Ref	0.998
20-39	26(10.0)	234(90.0)	0.000	0.998
40-59	11(10.2)	97(89.8)	0.000	0.998
60-79	7(15.2)	39(84.8)	0.000	0.998
≥ 80	1(12.5)	7(87.5)	0.000	0.998
TB Registration status				
New	32(8.1)	364(87.1)	Ref	
Relapse	1(8.3)	11(87.7)	0.000	0.998
Failed	0	3(100.0)	0.000	0.997
Transferred in	0	6(100.0)	0.000	0.999
Resistant	6(54.5)	5(45.5)	0.000	0.006
Others	0	15(100.0)	0.000	1.000
Type of PTB				
Smear+	19(5.6)	320(94.4)	Ref	
Smear-	22(12.2)	159(87.8)	1.4(0.3 – 6.127)	0.690
Site of TB				
Pulmonary	40(7.7)	480(92.3)	Ref	
Extra-pulmonary	17(23.6)	55(76.4)	11.4(2.30 – 57.5)	0.003
Treatment category				
I	32(7.60)	388(92.1)	Ref	
II	1(9.1)	10(90.9)	0.000	0.998
Duration of treatment				
≤6	19(7.9)	223(92.1)	Ref	
≥6	18(9.1)	180(90.9)	1.3(0.55 – 3.38)	0.5000
Chest x-ray				
Suggestive	19(13.4)	123(86.6)	Ref	
Not suggestive	18(5.8)	293(94.2)	0.5(0.12 – 1.92)	0.299
HIV status				
Negative	31(7.5)	384(92.5)	Ref	
Positive	16(20.7)	61(79.2)	0.08(0.025 – 0.24)	0.0005

NB: the calculations excluded unknown cases

Treatment success rate, TB/HIV co-infection and associated factors

Multiple logistic regression analysis in Table 3, shows the associated predictive factors for unsuccessful treatment outcomes as extra pulmonary TB (OR 11.4; 95% CI 2.3 -57.5, p = 0.003), and TB/HIV co-infection (OR 0.08; 95% CI 0.025 -0.24, p = 0.0005).

NB: the calculations excluded unknown cases

As shown in Table 4, findings from this study indicated a significant association between TB/HIV co -infection; female gender (OR 2.5; 95% CI 1.4 - 4.22, p = 0.01) and EPTB (OR 0.2; 95% CI 0.04-12.90, p = 0.032).

Table 4: Logistic regression analysis showing the association between TB/HIV co-infection cases and patients' sex, age and types of TB

Variables		TB/HIV co-infection		OR (95% Cl)	p-value
		Yes n (%)	No n (%)		
Sex	Male	29 (10.9)	237 (89.1)	Ref	
	Female	48 (21.6)	178 (78.9)	2.5 (1.48 – 4.22)	0.001
Age	>20	0	25 (100)	Ref	
	20-39	49 (17.7)	228 (82.2)	0.000	0.999
	40-59	26 (19.7)	106 (80.3)	0.4 (0.41 –3.00)	0.340
	60-79	1 (2.1)	47 (97.9)	0.3 (0.27 -2.7)	0.299
	≥ 80	1 (10)	9 (90)	4.9 (0.27 –89.0)	0.279
Site of TB	Pulmonary	55 (10.6)	465 (89.4)	0.2(0.27 -12.90)	0.032
	Extra-pulmonary	12(25.5)	35 (74.5)	Ref	
Type of PTB	PTB+	43 (12.7)	296 (87.3)	Ref	
	PTB-	34 (18.7)	149 (82.3)	3.4(0.49-23.26)	0.211

DISCUSSION

In this study, the treatment success rate was suboptimal (68.1%), predominantly males and new TB cases who were mostly young adults between the ages 20 and 39 years. The predictive factors for unsuccessful treatment outcomes were TB/HIV co-infection and extra-pulmonary TB site. TB/HIV co-infection accounted for 13% of cases and was particularly associated with female gender and EPTB.

The documented TB cases in our study cuts across all age groups but the highest percentage in the young adults of productive age. Also, these cases were more prevalent amongst the male gender which is similar to findings in other regions in Nigeria (17,18). The energetic and active role of young adults could also explain their exposure to TB which could account for most cases found in this age group.

However, the gender difference in tuberculosis could be due to the involvement of the X-linked genes in the innate and adaptive immune system as well as the protective effects of female sex hormones and the variations in metabolic activities in the defense mechanism (19,20).

In our study, high proportion of new cases (90.7%) were documented which was similar to other related studies (90.4% to 98.5%) of new TB cases in Nigeria (18,21). This might be due to the increase awareness on the symptomatology and manifestation of TB on the media and high index finding in the medical facilities. Also, patients seeking alternative treatment modalities before presenting at the medical facility and those lost to follow up after slight improvement in their clinical state could responsible for the spread of TB among susceptible individuals (15).

Furthermore, the rise in the prevalence of non-communicable diseases like diabetes mellitus and chronic kidney disease in Nigeria as well as poor socio-economic status, overcrowding, malnutrition, poor ventilation could account for the new cases of TB (12,22).

The TSR from our study of 68.1% was lower than the WHO target set for the Millennium Development Goal (MDG) of 85% and the milestone target set globally for 2025 of > 90% (23, 24). Likewise, it is also lower than the national report and some previous studies in Nigeria which treatment success rate ranges between 75.7% and 80.2% (5,22-25). Similarly, numerous African studies have also reported suboptimal TSR in South Africa (80%-82.2%) [25, 26]; Uganda (39%) (27); Zimbabwe (70%) (28); and Nigeria (57.7%) (29).

This sub-optimal treatment success rate is due to the high cases of loss to follow-up observed in our study. Although, the sparse distribution of housing scheme with few occupancies could reduce the transmission of this airborne disease within our locality, the need to complete the treatment would further improve the treatment outcome.

The prevalence of HIV amongst the TB patients was 13% in our study. However, the global tuberculosis report of 2019 reported prevalence of TB/HIV co-infection of 24.7% in Africa (6). The lower prevalence in our study could be explained by the reason of our center is situated in a region with lowest prevalence of HIV/AIDS (0.7%) in the country as HIV is a major risk factor for the development of TB (30).

Furthermore, patients with EPTB also had higher probability of unsuccessful treatment outcomes when compared with pulmonary TB cases. This difference in the treatment outcomes could be due to the comorbidities like HIV which often coexist with EPTB and issues with medication adherence due to the prolonged duration of treatment and the resultant unfavourable outcome (31,32).

Conclusion

The treatment success rate in the study was lower than the national and global target. This indicates a need for proper follow-up and integration of TB/ HIV control programmes with proactive measures in the intensified screening process towards improving the treatment outcome of tuberculosis.

Limitation

This study has a limitation of being based on retrospectively collected data. However the audit of the control programme would help improve our practice and intensify efforts on the lost patients with the aim of reducing the disease burden.

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Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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Baidoo Richard Ogirma, Odei-Ansong, Francis, Baidoo Ebikela Ivie. *Ethiop Med J, 2020, Vol. 58, No. 4*

ORIGINAL ARTICLE

CHOICES FOR OPERATIVE MANAGEMENT OF FRACTURES IN A DEVELOPING COUNTRY

Baidoo Richard Ogirma, FWACS[1*], Odei-Ansong Francis, FWACS[1], Baidoo Ebikela Ivie, FWACS[1]

ABSTRACT

Introduction: *Fracture fixation in poor countries is hampered by lack of financial resources. It is important to define what fracture types present for surgery to channel scarce resources appropriately.*
Objectives: *This study describes the commonest fractures treated surgically, and operative fixation methods used in patients who presented for operative fracture fixation.*
Methods: *A retrospective review of all patients who have had operative fixation of fractures at the Cape Coast Teaching Hospital and St. Joseph Orthopaedic hospital located in the Central and Eastern Regions of Ghana, respectively, between January 2016 to December 2018. We reviewed the operation records of 1,168 for their age, gender, fractured bone, type of fracture, operative fixation method and devices used for fixation.*
Results: *A total of 1,168 patients were treated operatively irrespective of age in the three-year period reviewed. Male (817) to females (351) ratio of 2.3:1. Only hip fractures (60%) were more common in females. The 21 – 40 years age group had the highest number of fractures (50% of femur fractures, 52% of tibial and 56% of forearm fractures) and operative procedures. Plate osteosynthesis was found to be the most preferred method of fixation for the major long bones - femur 360 (66 %), humerus 69 (78%), radius and ulna 81 (78%).*
Conclusion: *Scarce resources should be channelled towards acquiring the requisite instrumentation and skill set for the fixation of tibial and femur fractures in the short term as these fractures represent the most commonly fixed fractures in a resource poor setting.*
Keywords: *Fractures, operative fixation method, orthopaedic services, hospitals.*

INTRODUCTION

The operative management of fractures has evolved dramatically over the last century with the introduction of devices and procedures that enhance fracture healing, permitting a quick return to pre-injury functional levels and overall better outcomes (1.2). It is also evident that musculoskeletal injuries are on the rise with a disproportionately large number of severe and fatal injuries occurring in countries with limited resources (3) and these injuries are projected to rise over the next few decades (4).

There are still huge gaps in access to surgical care especially in developing/Low-Middle Income Countries (LMICs) like the sub-Saharan countries of Africa (5,6). It is inevitable that when musculoskeletal injuries occur in these parts of the world, victims often allow these conditions to run their natural courses or seek the services of traditional bone setters with sometimes devastating consequences like limb loss and life -changing deformities (7,10).

A lot of non-operative methods currently employed in the treatment of fractures may be outdated, unreliable with inconsistent results and overall not cost-effective (11,12), but the availability of skill and requisite facilities for the operative fixation of fractures when required is in short supply and there are several barriers to accessing surgical intervention for fracture care (13).

Trauma systems and registries are unavailable and as a result there is little or no information as to what kinds of fractures are treated operatively and what methods of fracture fixation are employed by the few trained surgeons working in such deprived environments. It is difficult for hospital managers and health officials who want to acquire orthopaedic implants and instrumentation for treatment centres in poor countries to determine what kinds of cases present for surgical treatment and by extension what implants/instrumentation will be cost effective.

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The purpose of this retrospective study was to describe the fractures most commonly treated operatively in a setting where most fractures are handled by traditional bone setters, type of fractures and operative fixation methods offered to patients presenting for orthopaedic care in two hospitals in Ghana.

METHODS

This study reviews all patients who have had operative fixation of fractures at two hospitals with established orthopaedic services. The Cape Coast Teaching Hospital is located in the Central region of Ghana and serves as the main referral facility for the Central and Western regions while the St. Joseph Orthopaedic hospital, located in Koforidua in the Eastern region of Ghana, with a bed capacity of 400 has been offering orthopaedic services for more than four decades. We set out to identify what fractures are treated operatively in a society where fracture care is dominated by unorthodox/traditional practitioners.

Operation records of 1,168 consecutive patients who had operative fracture fixation over a three-year period (Jan 2016 – Dec 2018) were reviewed retrospectively.

Information obtained includes age, gender, fractured bone, type of fracture, operative fixation method and devices used for fixation. Ethical clearance for use of secondary data was sought and obtained from the ethical committee of the Cape Coast Teaching Hospital.

RESULTS

A total of 1,168 fractures were treated operatively in all age groups in the three-year period reviewed. Femoral shaft fractures (549) were the most commonly operated upon representing 47% of all fracture fixations. Tibial, humeral and forearm fractures recorded (22%), (8%) and (9%) respectively. Clavicular, Pelvic, Ankle, Patellar, Hand and Hip fractures collectively made up the remaining 14% of operatively managed fractures (Figure 1). Males (817) accounted for 70 % of the cases and females made up 30 %. There were more males in all fracture categories except for hip fractures where females (44) accounted for 60% (Figure 2). The 21 – 40 years age group had the highest number of procedures. This group accounted for 50% of femur fractures, 52% of tibial and 56% of forearm fractures.

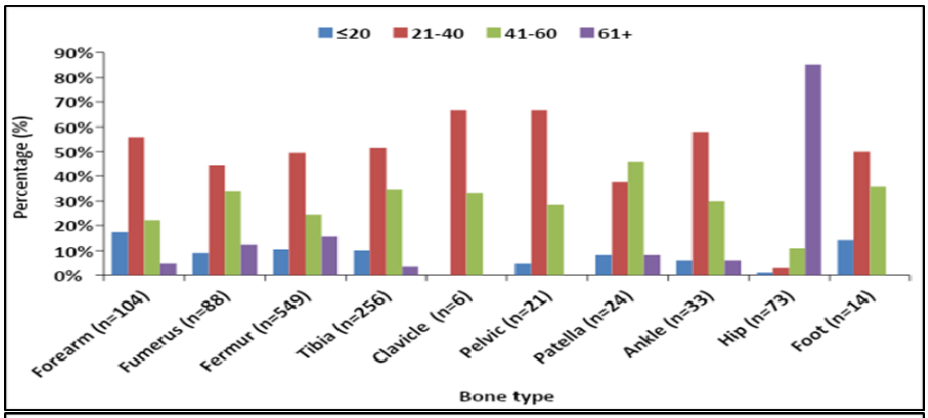

Figure 1: Age distribution of patients with operated fractures (n=1168).

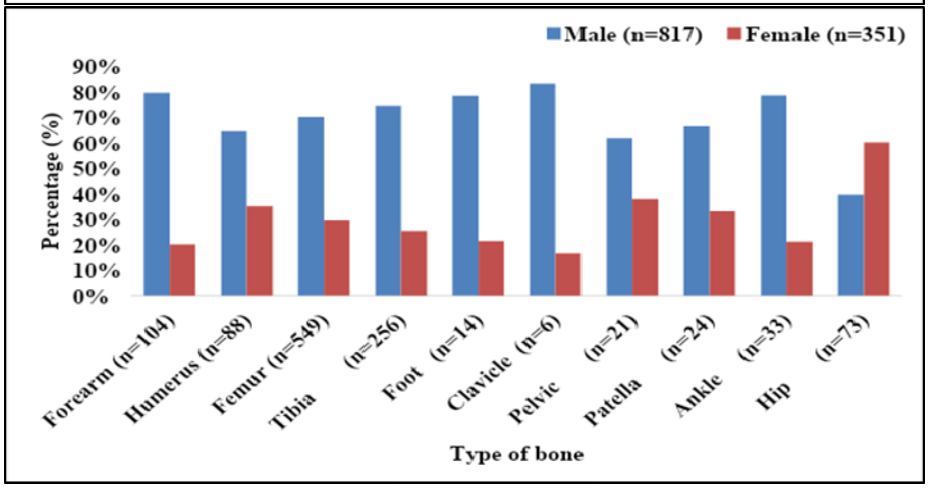

Figure 2: Sex distribution of patients with operated fractures (n=1,168)

Plate osteosynthesis was the preferred method of fixation for the major long bones - femur 360 (66 %), humerus 69 (78%), radius and ulna 81 (78%). One hundred (30%) of femoral fractures were treated by intramedullary nailing with intramedullary nailing being employed in 22 (9%) of tibial fractures.

The commonest fracture requiring external fixation was the tibia being required in 116 (45%) of tibial fractures. Only in 19 (3%) of femoral fractures were external fixators applied. Overall, 30 (3%) required primary amputation with the majority (70%) in patients with tibial fractures (Figure 3).

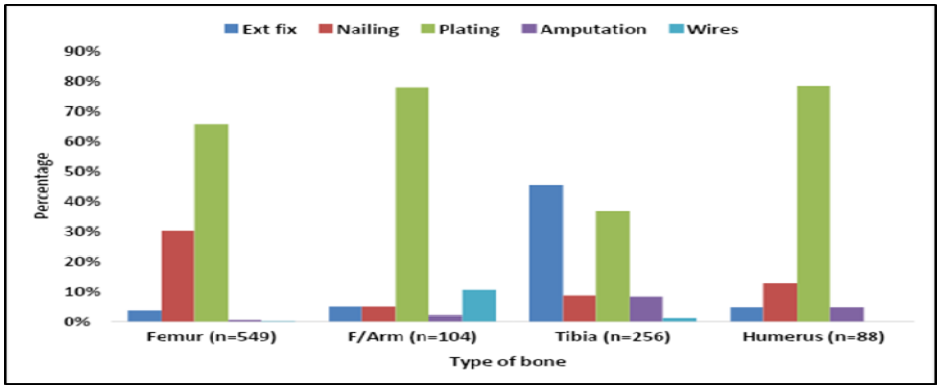

Figure 3: Operative procedures for long bone fractures (n=997).

DISCUSSION

Though a decision to have operative fixation of fractures in LMICs is not a straight-forward one as it is influenced by a complex interplay of sociocultural, financial, infrastructural and technical factors (12.13), there is an increasing number of patients who are opting for orthodox methods of fracture fixation. Knowing what fractures individuals will want treated surgically will go a long way in enhancing planning and provision of resources for orthopaedic surgical care.
Our study reveals that femur shaft fractures were the most common fractures treated operatively accounting for 47% of all operations. A Tanzanian study showed a similar preponderance of femur fractures presenting to hospital for treatment and being treated by locked intramedullary nailing (14). Although locked IM nailing is the gold standard for treating femur shaft fractures (12), our study showed that plating is still a popular method of fixation for femur fractures probably due to both hospitals not being on the Surgical Implant Generation Network (SIGN) programme and plating is relatively easier in a resource poor setting than locked IM nailing for some fracture configurations (15). For an environment where traction is still in use for treating femur fractures, any acceptable method of fracture fixation is still more cost effective (11).

The commonest operative procedure performed for tibial fractures was external fixation which mirrors studies at KCMC which showed a relatively decreased use of IM nailing for tibial fractures (16) as non-operative fracture techniques/traditional bone setting techniques are utilized in treating closed tibial fractures.

Surprisingly, our results reveal a higher use of plate fixation for tibial shaft fractures compared to IM nailing despite evidence that the latter procedure yields better results (15). In keeping with other studies in the sub-region the 21- 40 age group had the highest operative intervention for all types of fractures apart from hip fractures which were predictably more in those greater than 60 years (11.17). There were more surgical interventions in males than females. This can be explained by worldwide statistics which show more males with fractures in individuals less than 60 years.

Ankle fractures are relatively common but most patients in this part of the world opt for non-operative means/treatment by traditional bonesetters (18,19). Our study showed that ankle fractures accounted for only 33 (3%) of all operated fractures.

Conclusion

As more patients begin to acquiesce to having operative fracture fixation when indicated, it is imperative to define what fractures are most commonly treated operatively in this sub region and this study answers that question. Fractures of the femur and tibial shafts represented an overwhelming majority of such fractures. This will imply that scarce resources should be channelled towards the fixation of these fractures using methods with the most reliable outcomes. In planning instrumentation and implant use for hospitals, it becomes imperative to dedicate a greater percentage of funds for acquisition of implants and instrumentation for fixation of femur and tibial shaft fractures.

This is not to say that less frequently operated fractures should be ignored, but when planning surgical units, a great deal of care should go into preparing for the most commonly fixed fractures.

Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists

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Habtamu Mesele, Abraha Hailu, Mache Tsadik. *Ethiop Med J, 2020, Vol. 58, No. 4*

ORIGINAL ARTICLE

PREVALENCE AND CHARACTERISTICS OF INTERSTITIAL LUNG DISEASES IN AYDER COMPREHENSIVE SPECIALIZED HOSPITAL, MEKELLE, ETHIOPIA

Habtamu Mesele, MD[1*], Abraha Hailu, MD[2], Mache Tsadik, PhD[3]

ABSTRACT

Introduction: *Interstitial lung diseases represent a large number of conditions that involve the parenchyma of the lung, the perivascular and lymphatic tissues. The causes are not known for most patients. Knowledge of local prevalence and characteristics of the case will help to design preventive measures for those who are at high risk. Thus, this study aimed to determine the prevalence and characteristics of interstitial lung disease among patients visiting specialized hospital.*

Methods: *A facility based retrospective cross-sectional study design was employed and 595 patients' charts were reviewed. Patients with interstitial lung disease were employed using consecutive sampling method presented during the study period. Further analysis was done for those individuals presented with the diagnoses of interstitial lung disease. Data were collected using data extraction format by the trained hospital nurse working in the chest clinic. SPSS software version 20 was used analysis*

Results: *The prevalence of interstitial lung disease was 8.4%. The top three causes of morbidity in chest clinic among 595 patients were Asthma, Post Tuberculosis Bronchiectasis and Interstitial Lung Disease respectively. The mean age of patients was 55 years and female patients accounted for 52%.*

Conclusion: *Interstitial Lung Disease is the third common diagnosis in chest clinic. Idiopathic Interstitial Pneumonias are the leading types out of which Nonspecific Interstitial Pneumonitis is the most common. This is an alarm to give due attention to the prevention, diagnose and manage of Interstitial Lung Disease*

Key words: *Interstitial Lung Disease, Ethiopia, lung diseases, Idiopathic Interstitial Pneumonia*

INTRODUCTION

Interstitial Lung Diseases (ILDs) are a large number of conditions that involve the parenchyma of the lung, the alveoli, the alveolar epithelium, the capillary endothelium, and the spaces between those structures—as well as the perivascular and lymphatic tissues (1). The term Interstitial Lung Disease, in general, implies inflammatory-fibrotic infiltration of the alveolar walls (septa) resulting in profound effects on the capillary endothelium and the alveolar epithelial lining cells (2). It is also defined as the presence of cellular proliferation, cellular infiltration, and/or fibrosis of the lung parenchyma not due to infection or neoplasia (3).

The disorders in this heterogeneous group are classified together because of similar clinical, roentgenographic, physiologic, or pathologic manifestations (1). In many of the ILDs, interstitial fibrosis follows injury to the gas-exchanging units. This injury increases alveolar permeability, enabling the serum contents to enter the alveolar spaces. Fibroblastic proliferation and excessive collagen deposition, the histologic hallmarks of ILD, occur either as a direct result of the injury, as a result of an inflammatory cell response that releases pro-inflammatory and pro-fibrotic cytokines, or as a consequence of the regenerative and reparative processes taking place at the epithelial and endothelial surfaces (2).

The term ''Interstitial Lung Disease'' is synonymous with ''Diffuse Parenchymal Lung Disease'' (4). It is classified into four clinically distinct groups: [A] ILD of known association (e.g., Collagen Vascular Disease, Hypersensitivity Pneumonitis (HP) Secondary to exposures), [B] granulomatous ILD (e.g., Sarcoidosis), [C] other rare ILDs (e.g., Lymphangioleiomyomatosis (LAM), Pulmonary Langerhans Cell Histiocytosis (PLCH)), and [D] idiopathic diseases (Idiopathic Interstitial Pneumonias [IIPs] (5). The most recent revision of the classification of IIPs divides these into three categories: [A] major IIPs (includes Idiopathic Pulmonary Fibrosis [IPF]; Idiopathic Non-Specific Interstitial

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Pneumonia [NSIP]; Respiratory Bronchiolitis-Interstitial Lung Disease [RB-ILD]; Desquamative Interstitial Pneumonia [DIP]; Cryptogenic Organising Pneumonia [COP] and Acute Interstitial Pneumonia [AIP]), [B] rare IIPs (includes Idiopathic Lymphoid Interstitial Pneumonia (LIP) and Idiopathic Pleuro-parenchymal Fibroelastosis), and [C] unclassifiable IIPs (6).

The cause of ILD is not known for most of the cases. Some studies found association with history of bacterial and viral infection, genetic background, geographic location, radiation, occupational exposure to chemicals, smoking, gender, age of a patient and drugs (7-12).

Chest radiography is usually the first method of detecting a diffuse lung process. In up to 10% of cases, the chest radiograph may look normal despite the presence of a diffuse parenchymal lung disease, especially early in the disease course (13). In more established disease, bilateral reticular infiltrates, hazy opacities, and reduced inspiratory lung volumes on chest radiographs should prompt consideration of ILD (14). High Resolution Computerized Tomography (HRCT) of chest is indicated for all except a small proportion of patients for whom a specific diagnosis is strongly suggested by the standard chest radiograph. In some patients, a specific diagnosis can be obtained from the CT appearances alone; a correct first choice diagnosis is made by HRCT in 75–90% of patients with various major ILDs, including sarcoidosis, silicosis, IPF, lymphangitis carcinomatosis, and PLCH (15). A surgical lung biopsy is necessary for a confident clinico-pathologic diagnosis except in cases with a typical clinical–radiological picture of UIP/IPF. Biopsy is not always necessary to make a clinical diagnosis (5).

Much remains unknown or debatable for many of these ILDs, notably issues of prevalence, incidence and mortality rates (15). The information gap is worse in our continent, Africa mainly in the sub-Saharan countries. There is no study done on prevalence of ILD in the current study area. This study aimed to determine the prevalence and characteristics of ILD in Ayder Comprehensive Specialized Hospital (ACSH), chest clinic, which will help to design interventions to prevent the problem and ease of management.

PATIENTS AND METHODS

Facility based retrospective cross-sectional study was conducted among 595 patients' chart at chest clinic of ACSH, Mekelle, Ethiopia. Ayder Referral Hospital is Located in Northern Part of Ethiopia 780 Km far from Addis Ababa.

The hospital renders its service to nearly 10 million population in its catchment areas of the Tigray, Afar and North-eastern parts of the Amhara Regional States. It has a total capacity of about 500 inpatient beds in four major departments and other specialty units. Ayder Referral Hospital is also used as a teaching hospital for the College of Health Sciences, Mekelle University. The institution has undergraduate and postgraduate programs (Residency, fellowship and PhD programs)

The university hospital has specialist and subspecialist Doctors in radiology, internal medicine, surgery, Pediatrics and child health, Gynecology and obstetrics among others. The chest unit started giving service since 2011 with regular follow up of patients. It has now one pulmonologist, one internist, one internal medicine resident and two nurses. The clinic is equipped with bronchoscopy, spirometer, and lung biopsy sets.

Initially, incomplete charts were excluded from review and those charts with complete information were considered for review. All completed charts of patients seen at the outpatient chest clinic of ACSH in two years period from December 1, 2016 to November 30, 2018 were consecutively evaluated and only those subjects with the diagnosis of ILD by chest Computed Tomography were included in the study.

Data were collected by trained nurses using the data extraction format developed after the review of the contents of the patients' chart to avoid missing important variables. Data collectors were nurses who were trained for one day on how to fill the format and how to keep the patient confidentiality. The data collectors were from the chest clinic in ACSH. The collected data didn't contain any patient identifier.

To ensure the quality of data, all ILD patients were diagnosed by chest HRCT scan and Bronchoalveolar lavage (BAL) was done for 3 patients (6%) (Two IPF and one NSIP) and lung biopsy was done for two patients (one NSIP and one Hypersensitivity pneumonitis). Moreover, 5% of the charts were checked for consistency by the principal investigator. HRCT scan reading was conducted by one radiologist, and one pulmonologist and intensive care specialist.

Descriptive analysis was done using SPSS software version 20. Simple descriptive analysis such as mean, median, proportion, percentage, ratios, frequency distribution was used. The results were presented using tables, graphs and texts based on type of data. And the results are narrated and summarized using texts.

These operational definitions are used in this study:
ILD: Inflammatory-fibrotic infiltration of the lung parenchyma evidenced by high-resolution computed tomography (HRCT)

HRCT: A CT technique in which thin-slice chest images are obtained and post-processed in a high-spatial-frequency reconstruction algorithm. This technique obtains images with exquisite lung detail, which are ideal for the assessment of diffuse interstitial lung disease.

Bronchoalveolar Lavage: Is a diagnostic method of the lower respiratory system in which a bronchoscope is passed through the mouth or nose into an appropriate airway in the lungs, with a measured amount of fluid introduced and then collected for examination.
Lung biopsy: Is a procedure for obtaining a small sample of lung tissue for examination. The tissue is usually examined under a microscope, and may be sent to a microbiological laboratory for culture.

Ethical issue was approved by the Institutional Review Board of research and community service, college of health sciences, Mekelle University and permission letter was obtained from the medical director of the hospital. Any patient identifier was not recorded or documented during data collection to ensure confidentiality. Ethical approval was obtained from the Ethical Review Board of Mekelle University College of Health Sciences with the reference number ERC 1579/2019.

RESULTS

There were a total of 595 patients seen at the clinic from December 2016 to November 2019. The commonest diagnoses in the clinic were Asthma followed by post TB Bronchiectasis and ILD. Fifty patients (8.4%) had a diagnosis of ILD by chest Computed Tomography imaging which was commented by radiologists; these were further analyzed. The mean age of patients presented with ILD was 55 years with range of 24 - 80 years old.

Among the patients presented with ILD, eleven types of ILDs were diagnosed. The leading type ILD was NSIP accounting 44% followed by IPF (30%) and %) RA-ILD (6%). LIP and HP each accounted about 4% while LAM, COP, PLCH, Sarcoidosis, Silicosis and Bysinosis each contributed 2% to the burden of ILD. The ILD types NSIP and RA were higher among females compared to male patients accounting for about 59.1% and 66.7% respectively.

In contrast, IPF was higher among male patients compared to females accounting for nearly 3/4th of the cases (Figure 1).

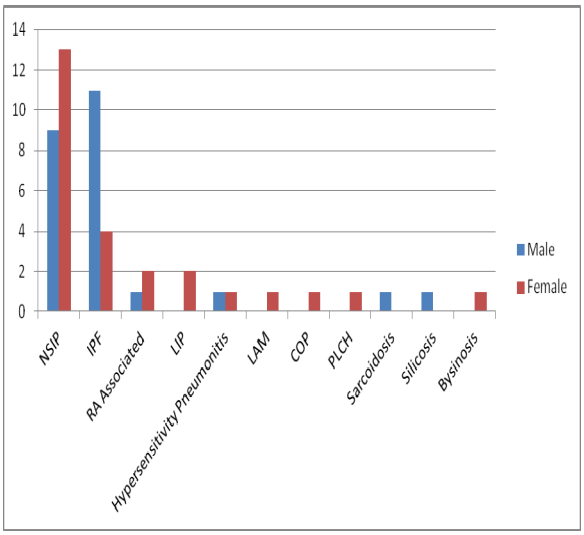

Figure 1: Gender variation in interstitial lung disease subtypes, chest clinic, Ayder Comprehensive Specialized Hospital, Mekelle. December 2016 to November 2019.

NSIP: Non Specific Interstitial Pneumonitis, IPF: Idiopathic Pulmonary Fibrosis, RA: Rheumatoid Arthritis, LAM: Lymphangioleiomyomatosis, COP: Cryptogenic Organizing Pneumonia, PLCH: Pulmonary Langerhans Cell Histiocytosis.

NSIP was found more in patients between 51-60 years old accounting 36.4% followed by those 31-40 years old and patients above 70 years old in equal frequency accounting 18.2% of NSIP. IPF was more common in patients whose age was above 61 years accounting 66.6% of IPF. All three patients with the diagnosis of RA associated ILD were between 41 to50 years. Both LIP patients and a patient with Silicosis were between 31 to 40 years. The age of LAM and Bysinosis patients was in the range of 51-60 years. Patients with Hypersensitivity Pneumonitis and PLCH were between 41-50 years of age. The age of the patient with Silicosis was between 31-40 years while the one with Sarcoidosis was between 20-30 years.

Among the patients presented with ILD, three cases were smokers. Of these, 2 had IPF type and 1 had PLCH type. About 29 patients (58%) reported previous history of tuberculosis. Of these, 41.4% were presented with NSIP and 31% with IPF. History of pneumonia was seen among 43 (86%) ILD patients where most of them were NSIP (41.9%) followed by IPF (34.9%).

Farmers and House wives have equal frequency in having ILD each accounting 22 patients (44%). (Table 2) From those who have NSIP, 10 patients (45.5%) were house wives and 9 patients (40.9%) were farmers while 2 (9.1%) were students and 1 (4.5%) was driver. Among patients who had IPF, 10 patients (66.7%) were farmers and 4 patients were house wives while one patient (6.7%) was working in Mill. Two of the RA associated ILD patients (66.7%) were House wives and one patient (33.3%) was a farmer.

One of the LIP patients (50%) was house wife and the other one was secretary. Patients diagnosed with LAM, COP, Bysinosis, PLCH and one of the Hypersensitivity pneumonitis patients were house wives. The other Hypersensitivity Pneumonitis patient and a patient with Sarcoidosis are farmers. The patient diagnosed with Silicosis works in deep rock excavation.

Table 1: Sociodemographic characteristics among ILD patients: chest clinic, Ayder Comprehensive Specialized Hospital, Mekelle. December 2016 to November 2019

		Total number	Percent
Age (Years)	21-30	4	8.0%
	31-40	7	14.0%
	41-50	10	20.0%
	51-60	12	24.0%
	61-70	7	14.0%
	>=71	10	20.0%
Gender	Male	24	48.0%
	Female	26	52.0%
Retroviral infection Status	Non-reactive	46	92.0%
	Reactive	4	8.0%
History of Tuberculosis Treatment	No	21	42.0%
	Yes	29	58.0%
History of Pneumonia Treatment	No	7	14.0%
	Yes	43	86.0%
Place of residence	Urban	17	34.0%
	Rural	33	66.0%

Table 2: Distribution of occupation among ILD patients: chest clinic, Ayder Comprehensive Specialized Hospital, Mekelle. December 2016 to November 2019

OCCUPATION	Total number	Percent (%)
Farmer	22	44.0%
House wife	22	44.0%
Driver	1	2.0%
Student	2	4.0%
Secretary	1	2.0%
Mill	1	2.0%
Deep Rock Excavation	1	2.0%

DISCUSSION

Totally there were 11 types of ILDs diagnosed in the clinic. The predominant types were IIPs, the most common type being NSIP followed by IPF. The mean age of ILD patients was 55 years. Female patients were predominant. The prevalence of ILD was 8.4%.

The commonest types were IIPs accounting up to 80% (NSIP (44%), IPF (30%), LIP (4%) and COP (2%) followed by CTD related ILD (RA-associated ILD (6%). NSIP is predominant from IIPs which is different from studies done in India, Paris and Italy where IPF was Predominant(6, 16).

The difference could be due to age variation of the study population or difference in genetics and geographical distribution of diseases. Sarcoidosis is a least cause of ILD in this study unlike the European studies where it was the commonest diagnosis (16-21). It may be associated with the difference in race of the study populations (22,23).

In our study RA associated ILD is one of the predominant types next to IIPs which is in line with French, Saudi Arabia, New Mexico and recent Spanish studies (16,24,25). It might be even under diagnosed because some patients may have subclinical ILD that is masked by the co-existent peripheral symptoms, and are not necessarily referred to a pulmonologist. Regard to this, an international guideline on IIPs have raised awareness of the need to search carefully for connective tissue disease signs and perform autoimmune serologies in patients with ILDs (26).

The mean age of our patients found to be 55 years which was between the findings from Greece study (mean age 58.6 years) and Indian study done in tertiary center (mean age 50.6 years) (17,18). This can be explained by the effect of commonest diagnoses in the studies because there is expected age variation in distribution of ILDs. It could also be due to the difference in the nature of the studies because most of them were population-based studies. Two third our ILD patients (64%) are beyond 40 years old. This is similar with the finding on a study done in India (6). Two third of IPF patients were above 60 years old which is in line with findings from Paris done on 2012 (16).

Female predominance was seen in our study which is consistent with studies from India, Turkey and Greece while in contrary to studies from United States of America and Spain (17,18,20,24,25). This difference in predominance of different gender could be due to the difference in predominant diseases, where male predominance was seen in studies with IPF as a predominant ILD. In our study Females are predominant (59.1%) in NSIP patients but male patients predominate in IPF accounting 73.3%. Since we found more NSIP patients than IPF, this could affect the general female predominance.

The prevalence of ILD is found to be 8.4%. It was only preceded by Asthma and post Tuberculosis bronchiectasis. We couldn't compare with other studies because the epidemiological studies done to find the prevalence of ILD were population-based studies and we couldn't get similar studies from African countries.

This study provides baseline information for further researches on respiratory diseases in the nation and other African nations. One of the limitations of the study is the nature of the study being a retrospective chart review. The other limitation is being a tertiary care referral hospital based retrospective cross-sectional study which may not be representative of the general population.

Conclusion

Interstitial Lung Disease is the third diagnoses following asthma and post tuberculosis complications. IIPs are the commonest types of ILDs, from which NSIP is the leading type. This is an alarm to give due attention to the prevention, diagnosis and management of ILD.

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Competing Interest:

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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ORIGINAL ARTICLE

THE PATTERN AND OUTCOME OF UPPER GI BLEEDING AT ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA

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ABSTRACT

Introduction*: Upper gastrointestinal bleeding (UGIB) is a common medical emergency associated with significant morbidity and mortality. The presentation of bleeding depends on the amount and location of hemorrhage and the endoscopic profile varies according to different etiology. Despite advancements in medical intervention, UGIB still carries considerable morbidity, mortality and economic burden on health care system. At present, there is limited epidemiological data on GIB and associated mortality in Ethiopia.*

Objective*: To assess the pattern, clinical and endoscopic profile; management and outcome of GIB patients admitted to St. Paul's Hospital Millennium Medical College*

Methods: *A cross-sectional retrospective study was done from January 2018 to May 2018. Of 208 patients who presented to Saint Paul's Hospital Millennium Medical College (SPHMMC) with gastrointestinal bleeding (GIB) in one-year period, 128 patients fulfill the inclusion criteria. A structured questionnaire was used to assess the demographic data, endoscopic diagnosis and outcome of GI bleeding patients. Data was analyzed by using SPSS version 23 and Statistical analysis was performed by using chi-square test and P-value less than 5% is considered as significant.*

Result: *The mean (SD) age of patients was 35 (±14.37). Majority (83.6%) of them were males with a male to female ratio of 5:1. Varices is the most common cause of UGIB seen in 46.1% (59), followed by peptic ulcer disease 24.2% (31), esophagitis 3.9% (5), gastritis 6.3% (8), Duodenitis 3.1% (4) and malignancy 4.7% (6). Ten patients (7.8%) had both varices and ulcer. The proportion of death in this study was 17.2%.*

Conclusions: *In the present study, variceal bleed was the most common cause of UGIB, followed by peptic ulcer bleed. Overall mortality was 17.2% of cases.*

INTRODUCTION

Gastrointestinal bleeding (GIB) is a potentially fatal, time-critical presenting complaint in the emergency department (ED). It's classified as upper GI bleeding (UGIB)and lower GI bleeding (LGI). it's called upper GI bleeding (UGIB) when the bleeding is due to lesions located above the ligament of Tre-itz such as from the esophagus, stomach and duodenum. If the lesions are located beyond ligament of Treitiz that's called lower GI bleeding (LGIB). Hematemesis, melena or both and hematochezia are the presenting symptoms (1). The annual incidence of hospitalization for acute GIB is >500,000 discharges in the United States (2) .

GIB is more frequent in men than women and increases with age(2,3). Bleeding from the upper gastrointestinal tract (GIT) is about four times as common as bleeding from the lower GIT (2). The etiology of acute UGIB can be divided into variceal and non-variceal causes, as the two have different treatment algorithms and prognosis.

The main sources of non-variceal bleeding are peptic ulcers, esophagitis, drug-induced mucosal damage, vascular anoma-lies, traumatic and post-operative lesions, and tumors. Variceal UGIB is caused by the sequelae of portal hypertension such as varices of the esophagus, stomach, duodenum, and portal hypertensive gastropathy.

Globally, the overall mortality of acute UGIB is around 5% to 10%, and oc-curs more in variceal than non-variceal etiologies (4,5). The primary diagnostic test for evaluation of UGIB is endoscopy. Early endoscopy and endoscopic appearance of certain lesions helps to guide care and thereby reduce the costs and duration of hospitalization (6).

Epidemiological data are important for gaining an insight into the etiology, outcome, and management and to recommend preventive healthcare measures for GIB. However, no epidemi-ological surveys have been performed with regards to GIB in Ethiopia.

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This study is intended to assess the magnitude, causes, and outcomes of GIB in one of the major endoscopy centers in Ethiopia at Saint Paul's Hospital Millennium Medical College (SPHMMC).

PATIENTS AND METHODS

A retrospective cross-sectional study is carried out at one of the tertiary hospitals in Ethiopia, St. Paul's Hospital Millennium Medical College. SPHMMC is the 2nd largest hospital in the capital city. Gastroenterology and Hepatology unit is one of the units in the Department of Internal Medicine. The unit is training fellows, doing diagnostic and therapeutic endoscopy. The Endoscopy unit is WEO and ESGE accredited center for endoscopy training. For more information visit (www.sphmmc.edu.et). Data collection was conducted from January 2018 to May, 2018.

From 208 patients who were admitted to the internal medicine ward and/or coming for endoscopy from January 2017 to December 2017 with Hematemesis, melena, hematochezia or combination of these 128 patients were recruited in the study. Patient of whom charts lost, which lack the necessary information and patients didn't come back to the hospital within one-month period after bleeding and not reachable via phone call were excluded from the study.

By using structured questionnaire information regarding demographic data, clinical presentation, presence of co morbidity, hemodynamic status, transfusion requirement, timing of endoscopy, endoscopic finding, their management and length of hospital stay were gathered from patient's chart. Outcome at one month is also assessed from patient's chart if they came back within one-month period, if not their condition was followed via phone call after verbal consent.

statistical analyses

Data analysis was performed using the statistical package for social sciences (SPSS) version 23. The mean ± standard deviation (SD), median and ranges were calculated for continuous variables, whereas proportions and frequency tables were used to summarize categorical variables. Ethical clearance was obtained from the college institution review board (IRB) and verbal consent was taken from patient or guardian during phone call.

RESULTS

From the total of 128 patients, 107 (83.6%) were males and 21 (16.4%) were females. The mean age of patients with GIB was 35 ± 14. Most patients with -- GIB presented with Hematemesis (48%), both Hematemesis and melena in 41%, melena only in 9% and hematochezia in 2%.

Table 1: Baseline characteristic of patients with gastrointestinal bleeding.

Baseline characteristics	Frequency	Percentage
Gender : male	107	83.6
Female	21	16.4
Age:		
< 20	17	13.3
21-30	42	32.8
31-40	36	28.1
41-50	16	12.5
51-60	8	6.3
>60	9	7.0
Address		
In Addis Ababa	39	30.5
Out of Addis Ababa	89	69.5
Presenting symptom		
Hematemesis	61	47.7
Melena	11	8.6
Hematemesis and melena	53	41.4
hematochezia	3	2.3
Hemodynamic status		
Stable	96	75
Unstable	32	25
Comorbidity		
Liver disease	74	57.8
Diabetes mellitus	4	3.1
Malignancy other than HCC	3	2.3
Other	12	12.4
No comorbidity	35	27.3

* hemodynamic instability is defined as: systolic blood pressure less than 90 mmHg or pulse rate of greater than 100 bpm. *

Ninety-three patients (72.6%) had co-morbidity. Liver disease is the most common co-morbidity found in 74 patients (57.8%). From liver disease chronic viral hepatitis is the most common cause found in 27 patients (36.5%) followed by hepatosplenic schistosomiasis evidenced by periportal fibrosis on ultrasound 19 (25.6%), chronic liver disease of unknown cause 17 (22.9%) and alcoholic liver disease found in 11 (14.8%) patients.

Table 2: Causes of upper gastrointestinal bleeding.

Cause of bleeding	Frequency	Percentage
Varices	49	38.3
Varices and ulcer	10	7.8
Peptic ulcer disease		
Duodenal ulcer	18	14.1
Gastric ulcer	3	2.3
Erosive mucosal disease		
Esophagitis	5	3.9
Gastritis	8	6.3
Duodenitis	4	3.1
Mallori-Weiss tear	2	1.6
Malignancy	6	4.7
Normal	9	7.0
Endoscopy not done	14	10.9
Total	128	100.0

For 114 (89%) of the patients had upper GI endoscopy within a mean (SD) of 5.5 (± 6.4) days of the initial bleeding. For the rest 14 patients (10.9%) endoscopy was not done because 10 patients died before endoscopy and 4 patients discharged after medical management and appointed for outpatient endoscopy. *Helicobacter pylori* test was positive in 12 patients (57.1%) with PUD.

Patient management and outcome

Sixty-one patients (47.6%) were transfused with one or more units of blood and blood components. Ninety -five (74.2%) of the patients were managed medically and thirty-three (25.8%) were managed both endoscopically and medically. Band ligation was done for thirty-two patients (28.1%). Adrenaline injection for two patients, histoacryl injection for one patient and hemoclip applied for one patient.

One-month mortality rate in this study was 17.2% (22). Ten patients (45.5%) died of sepsis with or without organ failure, four patients (18.2%) died because of uncontrolled bleeding, three patients (13.6%) died because of hepatic encephalopathy and cause of bleeding for five patients (22.7%) cause of death was not known. Mortality rate was higher in patients with variceal cause of bleeding, hemodynamically unstable and those who required blood transfusion.

DISCUSSION

Upper GI bleeding is one of the common reasons for patients to visit our hospital and need gastroenterologist consultation.

In our study, 83.6% of upper GI bleeding patients were males which give male to female ratio of 5:1. Similar male predominance of UGIB patients was also reported in an Egyptian and Sudanese studies (7,8). This is well explained by higher prevalence of viral hepatitis and schistosomiasis in males because of gender specific behavioral patter and occupational activities may expose males more often to viral hepatitis and schistosomiasis(9,10) .

Majority of the patients with upper GI bleeding in our study were in age range between 21-41 years, with a mean age of 35± 14. This is consistent with other studies in Africa and other developing countries (8,9). However, it is lower than the age reported in the developed world and could just reflect generally higher life expectancy in the west and difference in etiology of UGIB (5).

72.7% of upper gastrointestinal bleeding patients in our study have co-morbidities. Liver disease was the most common co-morbidity identified, seen in 57.8% of patients. Similar co-morbidity rates of co-morbidity was reported in patients hospitalized with UGIB in UK and mortality was higher in patients with co-morbid illnesses(11). Co-morbidity is one of the important criteria for risk assessment after acute upper GI hemorrhage in Rockall score. A study done in India also showed higher mortality rate in UGIB patients with co-morbid illnesses (1).

In this study, varices were the common cause of UGIB which was seen in 59 patients (46.1%) followed by peptic ulcer disease seen in 16.4% of patients with UGIB. This is consistent with other studies in developing countries(1,7) but in contrary to the findings of most western studies where peptic ulcer disease is identified as a commonest cause of GIB (11,12) . This discrepancy may be because of the high prevalence of chronic liver disease as a result of the endemic nature of hepatitis B infection and schistosomiasis in Ethiopia and other African countries(9,10).

A systematic review done on the initiation of proton pump inhibitor (PPI) prior to endoscopy in UGIB patients revealed PPI therapy significantly reduced stigmata's of recent hemorrhage and endoscopic therapy at index endoscopy(13). In our study all patients presented to the hospital with upper GI bleeding got medical management such as PPI plus or minus antibiotics. Guidelines recommend doing early endoscopy (within 24 hours) for most patients with UGIB (6) and in 76% of Canadian cohort and 50% of UK study the first endoscopy was done within 24 hours(5,11).

In our study endoscopy was done within 5.5 (± 6.4) days of the initial bleeding which is later than guidelines recommendation. This can be because, most of our patients came from outside of Addis Ababa after long distance travel and delay in referral. In the Canadian registry, endoscopic therapy was performed for 37% of upper GI bleeding patients(5) which is higher than our study which is 25.8%. this can be well explained by the universal use of PPI and delay in the first endoscopy in our study, both can decrease stigmata's of recent hemorrhage and need for endoscopic therapy.

The proportion upper GI bleeding patients who died within one month in our study was 17.2% which is lower than studies from centers with no therapeutic endoscopy and higher than studies in developed world where early endoscopy can be done for every bleeding patient and advanced endoscopic interventions are available (5,11). Sepsis, uncontrolled bleeding and hepatic encephalopathy are most common causes of death and mortality rate was higher in patients with variceal cause of bleeding, hemodynamically unstable and those who required blood transfusion.

It is known that early intensive resuscitation in patients with upper GI bleeding to correct hemodynamic instability, hematocrit and coagulopathy decreased mortality (14). In our study only 47.6% of patients got blood and blood component transfusion. This and the higher prevalence of co-morbid illnesses may explain the higher mortality in other studies (1).

Conclusion and recommendation

In this study, varices (46.1%) were the most common cause of GIB followed by peptic ulcer-related bleed (16.4%) and overall mortality was 17.2%.

Aggressive Resuscitation, intensive care unit admission, early endoscopy and management of sepsis and hepatic encephalopathy should be given emphasis in managing patients with UGIB. We recommend having a large scale multicenter national study to understand the burden of GI bleeding and policy makers should give priority for GI bleeding, expand endoscopic service and scale up of treatment centers.

Strength

As to the investigator's knowledge, this is the first study done on GI bleeding in Ethiopia. It's done at the endoscopy training center accredited by WEO and ESGE

Limitation

Since this is retrospective cross-sectional study and many patients are excluded from the study because of poor documentation it may be difficult for generalizability.

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Competing Interest:

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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ORIGINAL ARTICLE

OXYGEN SATURATION AMONG UNDER-FIVE CHILDREN LIVING AT MODERATE ALTITUDE, ADDIS ABABA, ETHIOPIA

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ABSTRACT

Introduction: *Acute lower respiratory infections (ALRI) is a major cause of deaths in children worldwide. In ALRI hypoxemia is the most common fatal complication. The WHO definition of hypoxemia does not take altitude into account.*

Objective: *The objective of this study is to determine the oxygen saturation value in apparently healthy under-five children who permanently reside at moderate altitude, Addis Ababa, Ethiopia using pulse oximetry.*

Methods: *The study was a cross sectional design. The location of the study was at 2 health facilities in Addis Ababa. The SpO_2 was measured among apparently healthy under-five year children using Nellcor N-10 self-calibrating pulse oximetry between May and July 2017. A structured questionnaire was used to collect socio-demographic and clinical data. Data were entered and analyzed using SPSS version 20 statistical software.*

Results: *The mean SpO_2 was 93.59% (95% CI 93.06%, 94.11%) with a median of 94.67%. The 2.5^{th} centile threshold of SpO_2 for hypoxemia is 82%. Using suggested formula for hypoxemia threshold for the altitude of Addis Ababa is 90%. A significant difference was observed in SpO_2 between infants and older children, although the difference was not demonstrable when sleeping subjects were excluded. Activities affect SpO_2 whereby sleep and bottle or breast feeding had a lowering effect on SpO_2.*

Conclusions: *This study provided a reference range of SpO_2 values for healthy children under-five years of age. To determine the threshold for hypoxemia needs further clinically relevant cutoff.*

Key words*: Moderate altitude, oxygen saturation, children, under-five-year*

INTRODUCTION

In 2016 acute lower respiratory infections (ALRI) caused over 600,000 deaths among children under five years of age globally (1). Hypoxemia is common among children admitted to a hospital with 11.7% in acute lower respiratory tract infections, 16.5% among neonates (2). In addition studies (3,4) reported association between hypoxemia and death. Ensuring a reliable and efficient system for detecting hypoxemia and supplying oxygen and having clear and simple guidelines for its use are vital to good quality pediatric care. This is particularly so in developing countries given the magnitude of the burden of pneumonia. Such systems are often of poor quality or non-existent where they are most needed, where oxygen administration is often dictated more by availability than by need.

Where pulse oximetry is available, oxygen should be given to all children who have an SpO_2<90%. It was recognized that this threshold may need to be adjusted in settings where oxygen supplies are limited and at higher altitudes where normal values for SpO_2 are lower than at sea-level (5)

In Ethiopia most of the population lives at altitudes between 2400 meter and 3700 meter above sea level. Addis Ababa is located in the foothills of the Entoto Mountains and standing at 2,355 meters above sea level, it is one of highest capitals in the world. Its lowest point is around Bole international airport, at 2326 meters above sea level in southern periphery. However, normal pediatric SpO_2 have not yet been established for different altitudes.

The objective of this study is to determine the reference value and activities that affect the oxygen saturation in apparently healthy under five children who permanently reside in moderate altitude, Addis Ababa, Ethiopia (2326-3000 meters) using pulse oximetry.

METHODS

The location of the study was at 2 sites. One was at Tekle Haymanot health center (THC) in Addis Ababa involving children who come for regular vaccination program. The second was at Zenebework Memorial Hospital (ZMH) in Addis Ababa among children who came for dermatologic disorders.

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Study design
The study employed cross-sectional facility-based design. The study was conducted from May to July 2017

Participants
All children who come for vaccination to THC and to ZMH for dermatological disorders were taken as source population. The study included all children under the age of five years. Enrollment was stratified into five age groups: 0–5, 6–11, 12–23, 24–35, and 36 –60 months. The study included children who are permanently residing in the Addis Ababa and had no travels out of the city for at least the last one month, absence of bronchospasm or upper respiratory illness during physical exam, no cardiac or pulmonary disease detected during medical evaluation or by clinical history, not having been hospitalized in the last month, no history of blood transfusion within the last six months, no signs and symptoms of anemia or severe acute malnutrition.

Sample size is computed based on the formula: $N = 1+2C\ (s/d)^2$ where C is dependent on the values chosen for significance level (α) and power (1-β). Taking α at 0.05 and 1-β at 0.8 as 7.85.For the same altitude the mean and standard deviation is 2 up to 5 and we took S as 4 and error 1.

$n=1+2(7.85)\ (4/1)^2$
$n=1+ (15.7)\ (16) =243$

Data collection
A self-administered questionnaire was used to collect data from the participants. Respiratory rate, heart rate and three oximetry readings were obtained for each child using a Nellcor N-10 self-calibrating pulse oximetry and appropriate sized adhesive transducer placed on the index finger, thumb or large toe of each subject. The average of the three readings, which was measured 10 minutes apart, was taken as the final reading. Measurements were discarded if not consistent with the other readings. Bright lights and excessive motion were avoided during transducer application to minimize artifacts. For the saturation of oxygen to register, the oximeter had to track the peripheral pulse for at least 10 seconds.

The measurements were conducted by trained physician and/or qualified medical interns and sociodemographic data was entered into a study forms. The principal investigator monitored the data collection and did a quality check by counterchecking collected data against information in the charts in randomly selected number of cases.

Statistical Analysis
The data was entered and cleaned using Epi Info version 3.5 and analyzed using Statistical package for social science (SPSS) version 20 statistical software. Central tendencies were calculated and P -value of < 0.05 is taken as significant.

Ethical consideration
The study was approved by the Department of Pediatrics and Child Health Research and publication committee, College of Health Sciences, Addis Ababa University. Caretaker informed verbal consent was obtained prior to the inclusion of infants and children in the study and were told that they have full right of noninvolvement. Names or any personal identifiers were held anonymous. Letters of cooperation were written from the Department of Pediatrics and Child Health to the study health facilities for permission to conduct the study.

RESULTS

A total of 243 children were screened and of this 236 were included in the study seven were excluded because they had conjunctival pallor. Enrollment was stratified into five age groups: 0–5, 6 –11, 12–23, 24–35, and 36–60 months. The mean (SD) age was 14.3 (±15.2) months. There were 122 (51.7%) males and 114 (48.3%) were females. Regarding the activities of the subjects 190 children (80.1%) were calm or quiet, 44 (18.6%) were asleep and the remaining two (0.8 %) were breast or bottle feeding (table 1).

All of the children included in the study were born and were residents of Addis Ababa. Most of them were from around Teklehaimanot sub-city in Addis Ababa.

The 2.5th centile of SpO_2 in this study is 82%, 5th centile is 84.7%, 10th centile is 89.6%. However, when we apply the suggested formula by Subhi (6) for the altitude of 2355 meters the threshold for hypoxemia is about 90%. When we use 90% it will be on 14th centile.

Table 1: Frequency distributions of socio-demographic characteristics.

Characteristics	Frequency	Percent
Age group		
1-5 months	80	33.9
6-11 months	55	23.3
12-23 months	53	22.5
24-35 months	19	8.1
36-59 months	29	12.3
Sex		
Male	122	51.7
Female	114	48.3
General activity		
Calm/quiet	190	80.1
Asleep	44	18.6
Breast or bottle feeding	2	0.8

Table 2 shows that the mean(SD) respiratory rate was 43.4 (±8.0) and the mean (SD) pulse rate was 130 (±15.5) for all the subjects. With regard to these vital signs increasing age was significantly associated with a decrease in mean heart rate and mean respiratory rate for each group ($p<0.01$).

Age (in months)	Age Mean/+ SD	Pulse rate Mean/+ SD	Respiratory rate Mean/+ SD
1-5	2.3/0.8	140.8/14.3	47.9/7.4
6-11	7.6/1.5	131.5/13.2	44.7/7.4
12-23	16.2/3.6	123.8/9.1	40.4/5.3
24-35	26.5/3.7	118.2/8.5	39.9/7.4
36-60	48.3/9.2	116.3/14.0	35.4/6.1
Total	8.9/1.2	130/15.5	43.4/8

Table 2 : Vital signs and anthropometry for different age groups

As shown in table 3 the mean SaO_2 for all subjects was 93.59% (95% CI 93.06 - 94.11) with a median value of 94.7%. No significant difference in SaO_2 was observed by the Kruskal-Wallis test (P=0.098), among age stratified groups.

Although, as a group, children less than one year old had a lower mean SaO_2 93.2% (95% CI 92.3- 93.9); in contrast to the mean SaO_2 of older children was 93.6%; (95% CI 93.5%, 94.7%) (p = 0.05), the difference was not significant when sleeping children were excluded

Table 3: Oxygen saturation and respiratory rate for different age groups.

Age group in months	Number	Oxygen saturation Mean/SD (95% CI)	Oxygen saturation Median	Respiratory rate Mean (95% CI)
s				
1-5	80	92.7/5.4 (91.5-93.9)	94.0	47.9 (46.3-49.6)
6-11	55	93.8/3.3 (92.9-94.6)	94.7	44.7 (42.5-46.6)
12-23	53	94.4 /3.2 (93.5-95.2)	95.0	40.4 (38.8-41.9)
24-35	19	94.1/3.7 (92.4-95.7)	94.0	39.9 (36.4-43.4)
36-60	29	93.7/ 2.6 (92.7-94.6)	94.3	35.4 (32.9-37.6)

Table 4: Oxygen saturation and respiratory rate for age groups excluding sleeping children.

Age group in months	Number	Oxygen saturation Mean/SD (95% CI)	Median	Respiratory rate Mean (95% CI)
1-5	46	93.0/5.1 (91.5-94.4)	94.0	47.9 (45.5-50.1)
6-11	49	93.9/3.5 (92.9-94.9)	94.7	44.7 (42.4-46.9)
12-23	49	94.4/3.2 (93.5-95.3)	95.0	40.7 (39.0-42.4)
24-35	19	94.1/3.7 (92.7-95.6)	94.0	47.9 (45.5-50.1)
36-60	29	93.7/2.6 (92.8-94.6)	94.3	44.7 (42.4-46.9)

P =0.47

Physiological states with corresponding mean values for oxygen saturation, respiratory rate, and heart rate are shown in Table 5. Relatively lower mean values for oxygen saturation were observed in children who were either breast or bottle feeding or asleep, compared with children who were awake and quiet. These differences in SaO_2 were significant (P=0.01).

Table 5: Oxygen saturation and respiratory rate by state of activity.

State of activity	Number	Oxygen saturation Mean/SD (95% CI)	Median	Respiratory rate Mean (95% CI)
Calm/ quite	190	93.9/3.7 (93.3-94.4)	94.7	42.7 (41.5-43.8)
Asleep	44	92.5/5.2 (90.9-94.1)	94.0	46.3 (43.9-48.6)
Breast or bottle feeding	2	87.7/5.2 (84.0-91.3)	87.7	44.0 (40.0-48.0)

P=0.01

Comparisons of the sleep state were made with other physiological states only in group (0–5 months old) because it was the only subgroup in which there were adequate numbers of infants sleeping. Sleeping infants tended to have lower SpO_2 mean and median values (Table 6), but this difference did not achieve statistical significance (Mann- Whitney, P=0.58).

Table 6: Oxygen saturation and respiratory rate for sleeping children (age <6 months) compared with other activity states.

State of activity	Number	Oxygen saturation mean/SD (95% CI)	Median	Respiratory rate mean (95% CI)
Asleep	34	92.4/5.8 (90.2-94.2)	94.0	47.8 (45.3-50.4)
Other state	46	93.0/5.1 (91.4-94.4)	94.0	47.9 (45.7-50.4)

P-value = 0.58

DISCUSSIONS

This study has shown the normal value of oxygen saturation in children under five years of age at a moderate altitude of 2355 meters above sea level. In a systematic review by Subhi [6] showed that the threshold for hypoxemia decreases with increase in altitude. Subhi (6) found hypoxaemia threshold at an altitude of approximately 2500 m above sea level, the 2.5th centile of the distribution of SpO2 in normal, healthy children is 90%. This decreases to 85% at approximately 3200 m above sea level. Taking the mean SpO_2 of our study subjects they are all above the threshold level for the estimated altitude of Addis Ababa.

In adaptation to high altitude hypoxia it has been demonstrated that higher hemoglobin concentration and percent of oxygen saturation of hemoglobin among Ethiopian highlanders do not differ from sea-level in these two traits (7). It has been shown that genetic adaptations may permit adequate oxygenation [8]. However, earlier studies have shown mean lower oxygen saturations in children living at high altitudes (6,9-11). The study also observed a difference in the SpO_2 of children based on their state of activity. Those who were awake and quiet had mean saturation of 93.9% (95% CI 93.3-94.4) which are higher than the SpO_2 of children who were asleep 92.5% (95 % CI 90.9-94.1). The mean SpO_2 for the breast or bottle Others also have shown similar trends of SpO2 at different activities (8,9,12,13). Sleeping children had lower saturation due to the hypoxic state that we expect and we speculate that because recumbency occurs with sleep, it is usually associated with mildly decreased functional residual capacity, owing to pulmonary atelectasis, which results in the child taking more frequent and shallower breaths. Thus, the activity state of the child should be considered when measuring SpO_2.

In addition, we found a significant difference in oxygen saturation between infants and older children living at moderate altitudes. The mean saturation for <12 months was 93.2 (95% CI 92.3-93.9) and for >12 months was 93.6 (95 % CI 93.5-94.7) with a P-value of 0.05. The trend is similar to an observation by Reuland *et al.* (10] that, in general, younger children have lower mean SpO_2 values—a relation seen only at altitudes above 3000 m. Though in previous study there was no clinically important differences in the oxygen saturation of haemoglobin in the range of ages included (9). We expect infants to have a lower mean SpO_2 than older children because during infancy many of the physiological compensations stimulated by low oxygen tension may not yet be developed; infants have comparatively less functional residual capacity than older children; and their smaller airways generate a higher airway resistance.

Other similar researches support the finding of this study. A research conducted by Lozano *et al* in Bogota, Columbia provided reference values for children 5 days to 24 months of age at an altitude of 2640 m found mean (SD) value of 93.3(2.05)% with 95 % CI of 93.0-93.6% (9).

In line with results of this study, we found low mean and median saturation levels at high attitude. In Bolivia, which is situated above 4018m above sea level, has a mean saturation of 86.9 (95% CI 85.4%-88.4%) and median of 87.0% (12). Our study has higher saturation mean 93.59% (95% confidence intervals (CI) 93.06%, 94.11%) with a median value of 94.67% may be due to low elevation of Addis Ababa compared to Bolivia.

Conclusions

This study provides normal SpO_2 in healthy under-five year children living at high altitude (2300-3000m). Younger children have lower mean SpO_2 than older children living at high altitude. Sleep had a lowering effect on SpO_2, the clinical importance of this effect remains undetermined.

In addition this research could be used as a reference value for places with similar altitude to use for oxygen administration.

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Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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ORIGINAL ARTICLE

ANATOMICAL PROFILE OF MUSCULOSKELETAL AND NEUROLOGICAL DISORDERS AMONG PATIENTS ATTENDING PHYSIOTHERAPY UNIT AT TIKUR ANBESSA SPECALIZED HOSPITAL

Biruk L.Wamisho, MD, FCS[2*], Sisay Abiy, MSc[1], Alpha Seifu, MD[2], Girma Seyoum, PhD[1]

ABSTRACT

Introduction*: Musculoskeletal and neurological disorders can affect different body parts and anatomical structures. Physiotherapy (physical therapy) is one branch of rehabilitative medicine that deals in rehabilitating patients with musculoskeletal and neurological disorders.*
Objective*: To assess the anatomical profile of neurological and musculoskeletal disorders among patients attending services given by the hospital.*
Methods*: Institution based cross sectional study was carried out at Tikur Anbessa Specialized Hospital (TASH). The sample size was 355 and the data were obtained from charts of patients who presented to physiotherapy unit. The study participants were neurological and musculoskeletal patients visiting physiotherapy unit of TASH. The data were analyzed using SPSS 21 and statically significant association was declared at p-values <0.05.*
Result*: There were 342 participants and among them, 192 (56.1 %) were male and 150 (43.9 %) were female. Most 84 (24.6%) were between 45 and 59 years of age. The prevalence of neurological disorders and musculoskeletal disorders were 55.3% and 38.6%, respectively. Lower limb, 109 (31.9%), the back, 67 (19.6%), and upper limb, 59 (17.3 %) were the most affected anatomical regions. Inter-vertebral disc (IVD), 88 (27.9%), the bone 66 (19.3 %), and the joint 55 (17.5%) were the most affected structures. Among traumatic causes of disorders, road traffic accident (RTA) (45%) was the leading cause, followed by falling (19%).*
Conclusion*: Lower limb, the back, upper limb and central nervous system (CNS) were the most affected anatomical regions. IVD and the bone were the most affected anatomical structures. RTA and accidental fall were among the common traumatic causes of musculoskeletal and neurologic disorders.*
Keywords*: Musculoskeletal, Neurological disorder, TASH, physiotherapy, CLBP, back pain, DDD, RTI*

INTRODUCTION

Physiotherapy is a health profession that focuses on the science of movement and helps people to restore, maintain and maximize movement, functional ability and overall well-being by addressing the underlying physical issues. Physiotherapists offer treatments related to Cardiopulmonary conditions Cancer, Women's health and Incontinence, Musculoskeletal, Neurological, Pediatric problems, sport related injuries ,pre and post-operative care ,palliative care, vestibular rehabilitation, integumentary conditions ,geriatric problems and Pain disorders (1).

Neurological disorders are diseases of the central and peripheral nervous system. Now a day's hundreds of millions of people worldwide are affected by neurological disorder (2). Musculoskeletal disorders are disease conditions that affect: joints, bones, the spine, and muscles (3). Neurological and musculoskeletal disorders are among the leading cause of disability worldwide.

According to the Global Burden of Disease study of the 2018-2020 musculoskeletal conditions were the second highest contributor to global disability, and lower back pain remained the single leading cause of disability (4). In Iran, multiple traumas were observed in about 25% of the victims among this leg (tibia and fibula) (37.6%) and forearm (radius and ulna) (19.3%) had the most frequent fractures (5).

According to a population-based neuro epidemiological survey of 102,557 individuals in India; 3,206 individuals were diagnosed with neurological disorders (6). A Community based cross sectional study done in Uganda over 3000 study subjects also reported a total of 98 (7.2 %) neurological cases were observed (7). In Saudi Arabia spinal cord disorder was common disorder among this the most commonly affected were lumbar spine (53.1%) and cervical spine (27.1) (8).

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In case of Ethiopia road traffic collisions were the main cause of spine (36.4%) and spinal cord (32.9%) injuries. Most often the cervical spine was involved (33%) and 103 (26.7%) patients had paraplegia (9). In order to give attention and design preventive mechanism of these disorders, identifying the anatomical profile of these disorders is help full for training professionals, qualifying instrument and proper organization of physiotherapy centers. However, there are no studies conducted that identifies the anatomical profile of this disorder. The data obtained from this study, could help to develop counter measures that could reduce the number and severity of these disorders. In addition the study may provide baseline information to carry out further research on related topics.

PATIENTS AND METHODS

A hospital-based cross-sectional study was conducted involving retrospective collection of data during May 1-June 30, 2018. The data was collected form clinical records of neurological and musculoskeletal patients who visited both adult and pediatric physiotherapy units of TASH from January 1 - December 31, 2017.

The total sample size required for the study was 355 and it was calculated by using a single population proportion formula. Systematic random sampling technique was employed to select the sample by using medical record numbers in the health management information system (HMIS) of physiotherapy record room as a sampling frame. Anatomical profile of neurological and musculoskeletal disorders was the outcome measure and the independent variables included age, sex ,address, affected anatomical region, affected anatomical structure and causes of the disorders.

Operational definitions

Anatomical profile*:* description of the anatomical characteristics of disease condition by anatomical region or structure.

Musculoskeletal disorder: disease condition which affects the musculoskeletal system.

Neurological disorder: disease condition which affects the nervous system.

Data was collected using structured checklist which was adapted from previous literatures. The selected sample MRN's chart was searched by card room staffs and data was recorded by data collectors. To maintain data quality, training was given for data collectors and for supervisors for two days.

The data was entered into EPI-Data version 4.2 and analyzed using SPSS version 21. For categorical data, descriptive statistics like frequency and percentage were computed and presented in tables, bar graphs and pie chart. Continuous variables were summarized using mean (±standard deviation), median, and the mode. Chi-square ($\chi 2$) test was applied to assess the association between the different categorical variables. A statically significant association was declared at p-value<.05.

Ethical clearance was obtained from the Departments of Orthopedics and Anatomy Research and Ethics Review Committee (DRERC) of School of medicine, Addis Ababa University.

RESULT

Data obtained from 342 charts were analyzed. Of these, 192 (56.1%) were male and 150 (43.9 %) were female, a male to female ratio of 1.3:1. Their age ranged from two months to 85 years with a mean (SD) age of 34.7 (±21. 2) years. The median age and mode of the participant's were 35 and 50 years, respectively. Eighty (24.6%) of the patients were between 45 and 59 years. Most, 249 (72.8%), of the patients were from Addis Ababa and 65 (19%) were from Oromia region (Table 1).

Table 1: Socio-demographic characteristics of neurological and musculoskeletal patients, physiotherapy unit, TASH, January 1 - December 31, 2017.

Variable		Frequency	Percentage
Sex	Male	192	56.10%
	Female	150	43.90%
Age	0-14	78	22.80%
	15-29	55	16.10%
	30-44	81	23.70%
	45-59	84	24.60%
	60-74	35	10.20%
	≥ 75	9	2.60%
Address	Addis Ababa	249	72.80%
	Oromia	65	19.00%
	Amhara	13	3.80%
	SNNP	10	2.90%
	Dire Dawa	2	0.60%
	Harari	3	0.90%

In this study, the prevalence of neurologic disorders were 55.3% and among these 61% were males and 39% were female patients and musculoskeletal disorders were the second most prevalent, accounting for 38.6% of total patients. Among these, 51% were male and 49.2% were female and the rest of disorders were Growth and developmental delay.

Affected anatomical regions and structure

Regarding the affected anatomical region in the present study, among studied anatomical regions, the most affected region was lower limb 109 (31.9%), out of which 55 (28.6%) were male and 56 (37.3%) were female. And the second most affected was back 67 (19.6%) out of which 26.0% were male and 19.3% were female.

The third commonly affected body part was the upper limb 59 (17.3%) and neck, pelvis and perineum 5 (1.5%) and Head 1 (0.3 %) were among the least affected body regions (Table 2).

Central nervous system was the commonly affected anatomical region in all age groups; However, The CNS was, specially, the most affected region in 0-14 years age group 28%. The lower limb was another commonly affected region and it was most common in the 30-44 years age group (51%). Back problem was more in older age groups.

Table 2: The magnitude affected anatomical region of neurological and Musculoskeletal patients who visited Physiotherapy unit of TASH

variables	Frequency	Percent
head	1	0.3
neck	5	1.5
upper limb	59	17.3
lower limb	109	31.9
Pelvis and perineum	5	1.5
CNS	55	16.1
back	67	19.6
PNS	14	4.1
mixed	27	7.9
Total	342	100

IVD (commonly Lumbo-Sacral region DDD) was commonly affected anatomical structure among most of the age group, especially; it was the most commonly affected anatomical structures among the age group of 60-74 (47%).

Table 3: Magnitude of the affected structure of neurological and musculoskeletal patients who Visited Physiotherapy unit of TASH

Structures affected	**Frequency**	**Percent**
Bone	65	20.6
Joint	55	17.5
Nerve	47	14.9
Brain	41	13
IVD	88	27.9
Spinal cord	15	4.8
Muscle	4	1.3
Total	315	100

Table 4: The magnitude of the affected bone of musculoskeletal and neurological patients who visited Physiotherapy unit of TASH.

Affected bone	Frequency	Percent
Clavicle	1	1.50%
Humerus	3	4.50%
Radius	8	12.10%
Ulna	3	4.50%
Metacarpal	5	7.60%
Hand phalanges	2	3.00%
Femur	13	19.70%
Patella	5	7.60%
Tibia	16	24.20%
Fibula	6	9.10%
Tarsal	1	1.50%
Metatarsal	1	1.50%
Sacrum	1	1.50%
Vertebrae	1	1.50%
Total	66	100.00%

Among the affected joint studied in this study the knee joint (50.9%) was the mainly affected joint; while elbow joint and shoulder joint (18.2%) each were the second most affected and ankle joint (5.5%) was the least affected (Figure 1).

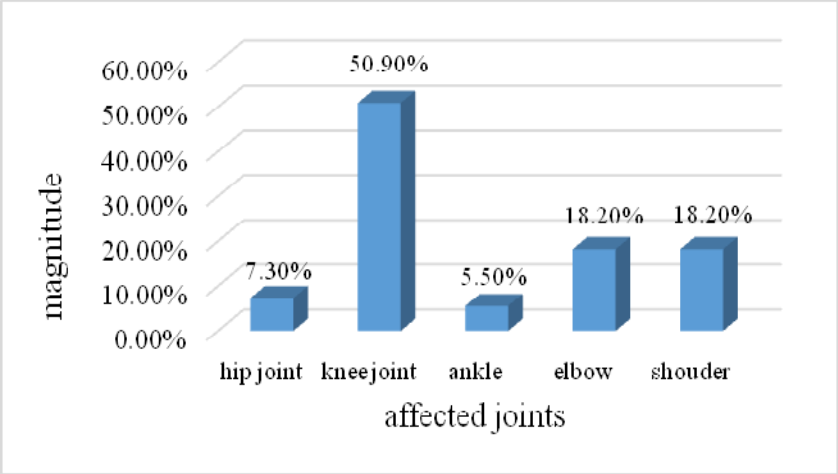

Figure 1: The magnitude the affected joint of neurological and musculoskeletal patients who visited Physiotherapy unit of TASH.

Table 5: The distribution of clinicaly affected nerve of neurological patients who visited Physiotherapy unit of TASH

Affected nerve	Frequency	Percent
Facial(cranial)	11	24.40%
Radial	3	6.70%
Sciatic	4	8.90%
Femoral	1	2.20%
Tibial	2	4.40%
Fibular	4	8.90%
Brachial plexus	8	17.80%
Multiple Peripheral nerves	12	26.70%
Total	45	100.00%

Regarding the causes of neurological and musculoskeletal disorders 85 (24.9%) of disorders were caused by trauma and 257 (75.1%) of the disorders were non traumatic cause. Most of musculoskeletal disorders were caused by 85.9% traumatic and most 77.0% of neurologic disorders were caused by non-traumatic causes.

Among traumatic cause of disorder RTA (45%) was the leading cause and falling (19%) was the second most common traumatic cause, penetrating injury (10%) and stick injury 18.1. While bullet injury (4%) and sport related (2%) activities were the least causes (Figure 2).

Causes of neurological and musculoskeletal disorder

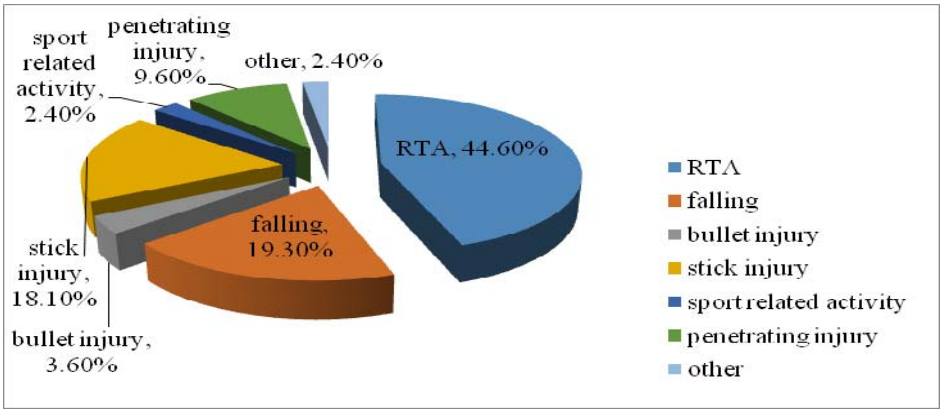

Figure 2: The distribution of traumatic causes of the disorders among neurological and musculoskeletal patients who visited Physiotherapy unit of TASH

Regarding non-traumatic causes of neurologic and musculoskeletal disorders Degenerative Disc Disease (DDD) 93 Osteoarthritis (OA) 31 and stroke 15 were the three most common non traumatic cause's disorders in a physiotherapy unit of TASH.

And Growth and Developmental Delay (GDD) 25 GBS 11 and CP 8 were the first three most common non traumatic causes of disorders among pediatric patients. Joint stiffness, frozen shoulder and cord compression were among the least common causes in both age categories (Table 6).

Table 6: The distribution of non-traumatic cause of the disorders among neurological and musculoskeletal patients who visited Physiotherapy unit of TASH

	Age group		Total
None traumatic cause	**0-21**	**>21**	
Stroke	6	15	21
GBS	11	1	12
PD	0	1	1
MS	2	0	2
OA	1	31	32
GDD	25	2	27
DDD	1	93	94
Frozen shoulder	1	3	4
Neuropathy	5*	7	12
Joint stiffness	3	3	6
Joint contracture	0	3	3
CP	8	0	8
Myelopathy	2	3	5
Nerve palsy	3	7	10
Movement d/o	0	5	5
Cord compression	1	1	2
Infection	3	3	6
Total	72	178	250

*Note: * Symbol represents brachial plexopathy for pediatrics.*

As shown in the Table 7 there was a statistically significant difference between the causes of disorders and age group and affected body part with p-value of 0.045 and <0.001 respectively, and some anatomical structures like bone, joint, brain and IVD with p value of <0.001, 0.019, <0.001 and <0.001 respectively.

Table 7: Association (X^2) of selected variable of neurological and musculoskeletal patients who visited Physiotherapy unit of TASH

Variables		Causes of disorder		Total	p-value
		Trauma	Non trauma		
Sex	Male	44 (22.9%)	148 (77.1%)	192(100%)	0.348
	Female	41(27.3%)	109 (72.1%)	150(100%)	
Age group	≤21	16(17.2%)	77(82.8%)	93(100%)	0.045
	>21	69(27.7%)	180(72.3%)	249(100%)	
body part	Extremity	79(47%)	89(53%)	168(100%)	0.000
	Non-extremity	6(3.4%)	168(96.6%)	174(100%)	
Affected anatomical structure					
Bone	Yes	64 (97%)	2 (3%)	66 (100%)	0.000
	No	21 (7.6%)	255(92.4%)	276(100%)	
Joint	Yes	7(12.5%)	49(87.5)	56(100%)	0.019
	No	78(27.3%)	208(72.7%)	286(100%)	
Nerve	Yes	10(20.8%)	38(79.2%)	48(100%)	0.487
	No	75(25.5%)	219(74.5%)	294(100%)	
Muscle	Yes	1(25%)	3(75%)	4(100%)	0.995
	No	84(24.9%)	254(75.1%)	338(100%)	
Brain	Yes	1(2.5%)	40(97.5%)	41(100%)	0.000
	No	84(30.6%)	190(69.3%)	274(100%)	
IVD	Yes	1(1.1%)	87(98.9%)	89(100%)	0.000
	No	84(33.1%)	170(66.9%)	254(100%)	

Note: Extremity –upper and lower limb
Non extremity - body parts other than upper and lower limb

DISCUSSION

Among the affected anatomical regions in this study, the most affected anatomical region was lower limb (31.9 %) while the second and the third were back (19.6 %) and upper limb 17.3% respectively. This finding is in line with the study conducted in Nigeria, which reported that, lower extremity injury was most commonly affected, with the femur being the most fractured bone accounting for (22.69%) followed by the tibia/fibula (17.13%) (10).

The possible justification for this similarity may be due to the similarity in study design which is cross sectional retrospective and RTI was the leading cause of injury for the study conducted in Nigeria and also for the Present study. In addition, both studies were conducted in the general population. However the finding of this study contradicts with the findings of the study conducted in the UK and India, which reported that, back was the most affected anatomical region (11,12).

The possible explanation for this inconsistency may be the large sample size included in their study compared to the present study.

Among anatomical structure affected by musculoskeletal and neurologic disorder the present study identify that, the most affected structure was IVD 27.9% it was also the commonest cause of back pain. This was followed by Bone 19.3 % and joint 17.5% which were the second and the third respectively. This finding is in agreement with a retrospective study conducted King Fahd Hospital of the University, Dammam, Saudi Arabia, which stated that (28.1%) of patients (5,929) had spinal disorders (8). The possible reason for the similarity may be since both of the studies were conducted retrospectively and were institution-based study based study.

In the present study, among the studied affected bones the first three commonly affected were tibia (24.2 %), femur (19.7 %) and radius (12.1 %). Clavicle, tarsal, metatarsal, sacrum and vertebral bone were among the least affected (1.5%). This finding is in line with the finding of A retrospective descriptive hospital- based study in Iran, which indicate Tibial fracture was most common (37.6%) (6); the possible reason for this similarity may be, since both studies were hospital based and were conducted in the general population.

On the other hand the finding of the present study is inconsistent with the finding of retrospective study conducted in Nigeria, which showed that, femur is the most affected bone with a magnitude of 22.69%(13). The possible explanation for this difference may be, due to the study in Nigeria include only fracture cases compared to our study which include non-fracture cases. In the present study out of the patients with joint disorder, the knee joint was the most affected (50.9%) and osteoarthritis was common cause of disorder while elbow joint and shoulder joint (18.2%) each were next to the knee joint. In addition to this ankle joint (5.5%) was the least affected joint.

The finding of the current study is in agreement with Cross sectional study conducted on 858 people in the West of Scotland whose report indicate that knee joint was the most affected joint (14). The possible justification for this similarity may be due to the similarity in the study design. Among the spinal nerve injuries assessed in this study brachial plexus (17.8 %) was the most affected and brachial plexopathy was the common cause. The sciatic nerve and its division fibular nerve (8.9 %) each were also commonly affected next to it. Radial nerve (6.7 %), Tibial nerve (4.4 %) and femoral nerve (2.2 %) were among the least affected nerve.

The findings of this study contradict with the study conducted in Massachusetts, which reported that Radial and ulnar nerve1.03% were the most affected nerves (15). The possible explanation for this contradiction may be due to inclusion of pediatric patients in the present study. Out of all causes of musculoskeletal and neurologic disorder, the findings of this study identified that RTI (45%) was the leading cause among traumatic causes of disorder followed by falling (19%), penetrating injury (10%) and stick injury.

This finding is in agreement with the findings of retrospective study conducted in Nigeria, which reported that RTI was the leading cause of injury (13). The possible justification for this similarity may be due to the similarity in study design which is cross sectional retrospective and RTI was the leading cause of injury for the study conducted in Nigeria and also for the present study.

Concerning the non-traumatic cause of neurologic and musculoskeletal disorder the current study identified that degenerative disc disease (DDD) 93(37.6 %) Osteoarthritis 31(12.8 %) and stroke 15 were the three most common non traumatic causes adult patient disorders in physiotherapy unit of TASH.

This finding is against to the finding of Community based cross sectional study conducted in Uganda which reported that peripheral neuropathy was the most common cause (7). It also contradicts with the finding of Cross sectional study conducted in the UK whose finding indicate that diabetic poly neuropathy was the common cause these disorders (16). The possible reason for this contradiction may be due to the difference in socioeconomic status and environmental factors in the present study and in the study done in the UK and Uganda.

Conclusion

The findings of this study showed that neurological and musculoskeletal disorders were common among patients attending physiotherapy unit (adult & Pediatric) of TASH. Among the affected anatomical regions, lower limb and back were the most affected. Inter vertebral discs and bones were the most affected anatomical structures. Road traffic injuries and fall injury were also among the common traumatic causes of musculoskeletal disorders. On the other hand, Degenerative disc disorders, Osteoarthritis and stroke from hypertension were top among the non-traumatic causes.

Stroke and degenerative conditions need due attention as many patients are presenting at the unit. As the both wings of the unit (Adult and Pediatric) are handling many patients with diverse conditions, strengthening the unit in terms of equipment, trainings and further professional advancement.

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Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDES, AND PRACTICES TOWARDS CORONAVIRUS DISEASE -19 AMONG HEALTH PROFESSIONALS IN ADDIS ABABA

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ABSTRACT

Introdution: *COVID-19 is an acute respiratory illness caused by a novel human coronavirus (SARS-CoV-2, called COVID-19 virus), which causes higher mortality in people aged ≥60 years and in people with underlying medical conditions. It is also announced as global concern of pandemic disease (WHO).*

Objective: *To describe the Knowledge, attitudes, and practices towards COVID-19 among health professionals in four selected hospitals, Addis Ababa, Ethiopia.*

Methods*: A cross-sectional survey was conducted on 526 health professionals aged from 20-50^{+} years old from April to May 2020. A standardized, well-structured questionnaire was used for randomly selected health professionals in four government hospitals in Addis Ababa. Data were analyzed using Statistical Package for Social Sciences software (SPSS) (version 23.0). Descriptive statistics were used to summarize the study and outcome variables. Chi-square test was used to test the differences and odds ratios were used for observing and quantifying the association between categorical outcomes. The 95% confidence intervals were calculated for odds ratio. The p value ≤ 0.05 was considered significant.*

Results: *A total of 526 health professionals participated in the study. 227(43.2 %) from Tikur Anbesa Hospital, 110 (20.9 %) from Yekatit 12 Hospital, 87 (16.5 %), and 102 (19.4 %) from Ghandi and Zewditu Memorial Hospitals respectively. 283 (53.8 %) were females, 311 (59.8%) age 20 - 30, the mean age was 32.5 with Standard deviation (8.9). 204 (38.8 %) physicians and 82 (15.6 %) were nurses. Age groups > 50 years were more knowledgeable than the reference age group 20-30 years AOR= 8.76 with 95% CI (2.47-30.99).*

Conclusion*: The study identified that there was a huge knowledge gap on the asymptomatic transmission of the disease and the need of child protection.*

Key words*: Knowledge, Attitude, practice, health professionals and COVID-19.*

INTRODUCTION

Coronavirus - 2019 (abbreviated as "COVID- 19") is a Public Health Emergency of International Concern (1). Initially, most cases were reported in Wuhan City, Hubei Province, China. It is an acute respiratory illness caused by a novel human coronavirus (SARS-CoV-2, called COVID-19 virus), which causes higher mortality in people aged ≥60 years and in people with underlying medical conditions (2,3). Its main clinical symptoms include fever, dry cough, fatigue, myalgia, and Dyspnea, and develop to the severe stage, which is characterized by acute respiratory distress syndrome, septic shock, difficult-to-tackle metabolic acidosis, and bleeding and coagulation dysfunctions (4-7).

In Ethiopia the first coronavirus case was reported on 13 March 2020. 74 total cases, 14 recovers from the virus and 3 deaths were reported Since 13 April 2020 (8,9).

Different measures were taken by the Government of Ethiopia to reduce the spread of the virus such as suspending schools, sporting events, public gatherings, suspending flights, closing of night clubs and closing all land borders (10 -14).

These also applied by the regional governments. The disease has very great impact on world's economy. It is estimated that COVID-19 will shave 2.9 percentage points off this fiscal year's economic growth in Ethiopia. Therefore, collaborative efforts of all countries to prevent the rapid spread is mandatory (15-17). knowledge and attitudes towards infectious diseases are associated with level of anxiety among health professionals and the public at all hence complicate prevention.

Thus, adherence to the practice of control measures are indispensable (18,19). Study showed a positive attitude among physicians, pharmacist, nurses and technicians was great but with average practices. The level of concern and precaution are significantly associated with knowledge.

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Factors such as age and profession were associated with inadequate knowledge and poor perception of COVID-19 (20).
Understanding the health professionals' perceptions towards COVID-19 is an imperative requisite. Therefore, study is intended to identify the knowledge, attitude and practice gaps between the health professionals and provide recommendation for the government and ministry of health and other responsible bodies.

MATERIALS AND METHODS

A cross-sectional survey was conducted on 526 health professionals aged from twenty to above fifty years old in period from April to May 2020. Sample size was calculated with 95% confidence interval, 0.04 margin of error and 72% the proportion of targeted population who expected fair knowledge according to the study done in Saudi Arabia (21) and 10% non-respondent rate was added, the sample size was 532(6 professionals declined from interview due to lack of willingness).

A standardized, well-structured questionnaire was used for randomly selected health professionals in four government hospitals in Addis Ababa. Only health professionals working in the selected hospitals were included in the study. The questionnaire was designed in English and then translated to Amharic and reviewed for consistency. The questionnaire included socio-demographic characteristics of the participants, questions related to knowledge about Coronavirus, and followed by questions related to attitude and practice toward COVID-19.

The recorded data were analyzed using Statistical Package for Social Sciences software (SPSS) version 23.0. Descriptive statistics frequency with percentage and cross tab were used to summarize the study and outcome variables. Pearson's Chi-square test was used to test the differences and odds ratios were used for observing and quantifying the association between categorical outcomes. 95% confidence intervals were calculated for odds ratios. P -value < 0.05 was considered significant.

Operational Definitions

The knowledge part consists of 12 questions and the score 1 for the correct answer, 0 for No and for I don't know. The highest score was 12 and the lowest was 0. The cut off point for the 'good knowledge' was the mean scores and above and 'poor knowledge' was below the mean score which was 10.5.

Attitudes towards COVID-19 was measured by 2 questions about the agreement on the final control of COVID-19 and the confidence in winning the battle against COVID-19. The assessment of respondents' practices was composed of 3 behaviors of Frequent hand washing, going to a crowded place and wearing a mask when going out in recent days.

RESULTS

A total of 526 health professionals participated in the study with 98.8 response rate. 227(43.2 %) from Tikur Anbesa Hospital, 110 (20.9 %) from Yekatit 12 Hospital 87 (16.5 %), and 102 (19.4 %) from Ghandi and Zewditu Memorial Hospitals respectively. Among these, 283 (53.8 %) were females, 311 (59.8%) with age group between 20 - 30, the mean age was 32.5 with Standard deviation (8.9). 204 (38.8 %) were physicians and 82 (15.6 %) were nurses.

Most of the knowledge questions towards covid-19 was scored above 87.1%.where as questions about asymptomatic transmission and the need of prevention of child from covid-19 scores 59.7 and 56.5 respectively. 523 (99.4%) of the respondents Knew the main clinical symptoms of covid-19 (Figure- 1).

Figure 1: Knowledge of health professionals about COVID-19.

Great majority of the respondents had good attitude that covid-19 will be successfully controlled 394 (74.9 %) but only 233 (44.3 %) of the respondents believed that Ethiopia can win the fight against covid-19 (Table - 2).

There are three questions to evaluate the practice of covid-19 prevention, 309 (58.7 %) had gone to crowded place in the recent days, 376 (71.5 %) worn mask when leaving home, 334 (63.5 %) practice proper hand washing technique and use hand sanitizer (Figure- 2).

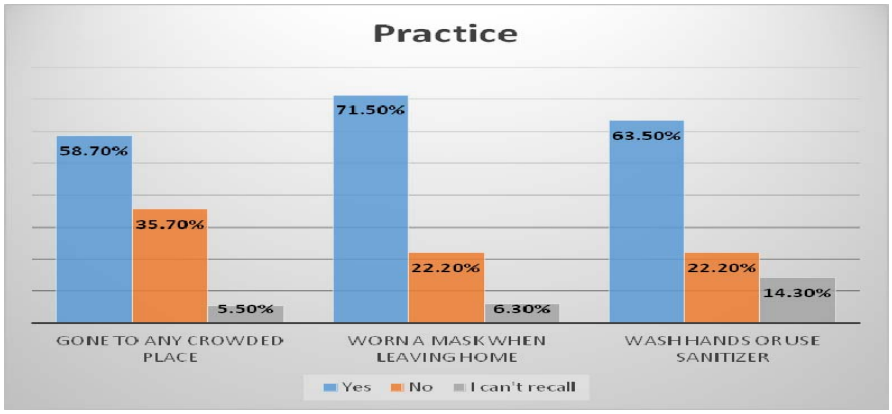

Figure 2: Practice of health professionals to prevent COVID-19.

Table 1: Association betweenCOVID-19 prevention practice and level of profession and age.

		Gone to any crowded place		Worn a mask when leaving home		Wash hands or use sanitizer	
		Yes	No	Yes	No	Yes	No
Nurses	N	42	40	59	23	65	17
	%	51.2	48.8	72.0	28.0	79.3	20.7
Medical Students	N	64	40	92	12	76	28
	%	61.5	38.5	88.5	11.5	73.1%	26.9
Physician	N	111	93	150	54	130	74
	%	54.4	45.6	73.5	26.5	63.7%	36.3%
Pharmacist	N	43	23	25	41	16	50
	%	65.2	34.8	37.9	62.1	24.2%	75.8
Laboratory Technician	N	49	21	50	20	47	23
	%	70.0	30.0	71.4	28.6	67.1%	32.9
P-value		0.071		0.000		0.000	
20-30	N	189	122	260	51	243	68
	%	60.8	39.2	83.6	16.4	78.1	21.9
31-40	N	64	48	70	42	69	43
	%	57.1	42.9	62.5	37.5	61.6	38.4
41-50	N	38	33	32	39	15	56
	%	53.5	46.5	45.1	54.9	21.1	78.9
>51	N	18	14	14	18	7	25
	%	56.2	43.8	43.8	56.2	21.9	78.1
P-value		0.676		0.000		0.000	

Nearly half of the respondents, had gone to crowded place, 92 (88.5 %) of medical students(interns),150 (73.5 %) physicians worn mask when leaving home and majority of nurses, 65 (79.3 %) and only 16 (24.2%) pharmacists perform proper hand washing techniques or use hand sanitizer.

Mask was worn by 260 (83.6%) of health professionals with the age group between 20-30 and 14 (43.8 %) of age >50 years, P-value <0.001. Wearing mask while leaving home significantly associated with age, 260 (83.6%), 20-30yeras, and 14 (43.8 %) >50 years, P-value <0.001 (Table- 1).

The practice of wearing mask while leaving home was significantly associated with level of profession, age groups and place of work with p-value <0.001 but there was no association with gender (P-value 1.000). The practices of hand washing or using sanitizer were significantly associated with level of profession and age groups with P-value <0.001, with gender and place of work with P-value 0.016 and 0.010 respectively. However, the practice of going to crowded place was not associated with p-value >0.05 (Table – 1&2).

The attitude of controlling COVID-19 associated with the level of profession with P-value 0.042 but no association with age of the health workers with P -value 0.052. the confidence of health workers in winning the fight against COVID-19 was significantly associated with level of profession (P-value 0.019) and age groups of the health workers P-value 0.005.(Table- 3).

Table 2: Association between Practice of covid-19 prevention, gender and work place

		Gone to any crowded place		Worn a mask when leaving home		Wash hands or use sanitizer	
		Yes	No	Yes	No	Yes	No
Male	N	166	117	202	81	166	117
	%	58.7	41.3	71.4	28.6	58.7	41.3
Female	N	143	100	174	69	168	75
	%	58.8	41.2	71.6	28.4	69.1	30.9
Value		1.000		1.000		0.016	
OR		1.008 (0.712-1.428)		1.011 (00.692- 1.478)		1.579 (1.101 - 2.264)	
Tikur	N	120	107	137	90	130	97
Anbesa	%	52.9	47.1	60.4	39.6	57.3	42.7
Yekatit 12	N	66	44	87	23	71	39
	%	60.0	40.0	79.1	20.9	64.5	35.5
Ghandi	N	59	28	69	18	55	32
	%	67.8	32.2	79.3	20.7	63.2	36.8
Zewditu	N	64	38	83	19	78	24
	%	62.7	37.3	81.4	18.6	76.5	23.5
P-value		0.074		0.000		0.010	

Table 3: Association between the attitudes of health workers towards COVID- 19 with socio-demographic characteristics.

	COVID-19 will be successfully controlled N (%)		Win the fight against the COVID-19 virus N (%)	
	Yes	No	Yes	No
Nurses	54 (65.9)	28 (34.1)	46 (56.1)	36 (43.9)
Medical Students	71 (68.3)	33 (31.7)	42 (40.4)	62 (59.6)
Physician	160 (78.4)	44 (21.6)	81(39.7)	123 (60.3)
Pharmacist	55 (83.3)	11 (16.7)	25 (37.9)	41 (62.1)
Laboratory Technician	54 (77.1)	16 (22.9)	39 (55.7)	31 (44.3)
P-value	0.042		0.019	
20-30	223 (71.7)	88 (28.3)	143 (46.0)	168 (54.0)
31-40	88 (78.6)	24 (21.4)	58 (51.8)	54 (48.2)
41-50	61 (85.9)	10 (14.1)	26 (36.6)	45 (63.4)
>51	22 (68.8)	10 (31.2)	6 (18.8)	26 (81.2)
P-value	0.052		0.005	
Male	223 (78.8)	60 (21.2)	126 (44.5)	157 (55.5)
Female	171 (70.4)	72 (29.6)	107 (44.0)	136 (56.0)
P-value	0.034		0.910	
Tikur Anbesa	177 (78.0)	50 (22.0)	98 (43.2)	129 (56.8)
Yekatit 12	81 (73.6)	29 (26.4)	52 (47.3)	58 (52.7)
Ghandi	68 (78.2)	19 (21.8)	44 (50.6)	43 (49.4)
Zewditu	68 (66.7)	34 (33.3)	39 (38.2)	63 (61.8)
P-value	0.144		0.331	

Variables in bivariate analysis with P-value <0.2 were computed with multivariate analysis to exclude confounding factors. Gender, going to crowded place and the attitude about disease control were excluded P-value >0.2. Elder age groups > 50 years were more knowledgeable than the reference age group 20-30 years AOR= 8.76 with 95% CI (2.47-30.99). Being Pharmacist and laboratory technicians had a good knowledge than the reference group nurses with AOR =2.72 (1.25-5.94) and =1.98 (1.00-3.94) 95% CI respectively.

Health workers who were not confident in winning the fight against COVID-19 were more knowledgeable than those who were confident with AOR= 1.64 (1.14-2.37) 95% CI. After adjusting variables for confounding factors work place, wearing mask while leaving home and washing hands or using sanitizer were not associated with knowledge (Table- 4).

Table 4: Multivariate analysis of level of knowledge of health workers with attitude, practice and socio demographic characteristics.

Characteristics		Knowledge N (%)		P-value	COR (95 % CI)	AOR (95 % CI)
		Poor	Good			
Age in year	20-30	159 (51.1)	152 (48.9)	0.000	1	1
	31-40	53 (47.3)	59 (52.7)		1.164 (0.756-1.795)	1.103 (0.677-1.796)
	41-50	24 (33.8)	47 (66.2)		2.049 (1.194-3.514)	1.464 (0.757-2.832)
	>50	3 (9.4)	29 (90.6)		10.112 (3.017-33.886)	8.760 (2.476-30.995)
Profession	Nurses	48 (58.5)	34 (41.5)	0.007	1	1
	Medical students	49 (47.1)	55 (52.9)		1.585 (0.884-2.842)	1.808 (0.948-3.449)
	Physicians	91 (44.6)	113 (55.4)		1.753 (1.043-2.945)	1.384 (0.796-2.406)
	Pharmacist	18 (27.3)	48 (72.7)		3.765 (1.874-7.562)	2.729 (1.252-5.946)
	Lab.Tech.	33 (47.1)	37 (52.9)		1.583 (0.832-3.010)	1.989 (1.004-3.941)
Work place	Tikur Anbesa	89 (39.2)	138 (60.8)	0.075	1.613 (1.007-2.582)	1.563 (0.932-2.620)
	Yekatit 12	52 (47.3)	58 (52.7)		1.160 (0.676-1.989)	1.258 (0.700-2.261)
	Ghandi	46 (52.9)	41 (47.1)		0.927 (0.523-1.643)	0.780 (0.419-1.451)
	Zewditu	52 (51.0)	50 (49.0)		1	1
Worn a mask when leaving home	No	54 (36.0)	96 (64.0)	0.006	1.722 (1.166-2.543)	1.107 (0.698-1.755)
	Yes	185 (49.2)	191 (50.8)		1	1
Wash hands or use sanitizer	No	69 (35.9)	123 (64.1)	0.001	1.848 (1.283-2.661)	1.134 (0.732-1.756)
	Yes	170 (50.9)	164 (49.1)		1	1
Win the fight against COVID-19 virus	Disagree	113 (38.6)	180 (61.4)	0.001	1.876 (1.323-2.659)	1.646 (1.140-2.379)
	Agree	126 (54.1)	107 (45.9)		1	1

DISCUSSION

Most of the respondents had good knowledge on symptoms of COVID-19 which scores above 87.1%, but the study identified that there was a gap of knowledge on asymptomatic transmission and the need of prevention of child from COVID-19 which scores 59.7% and 56.5% respectively.

The study result was relatively correlated with another study done in Saudi (61%) of HCWs had poor knowledge of its transmission (22). 523 (99.4%) of the respondents Knew the main clinical symptoms of covid-19. This is equivalent to the study in China the correct rate of the knowledge questionnaire was 90%. (3).

Different countries use their maximum efforts to control the spread of disease forexample, (98.0%) of Chinese people worn masks while leaving home (2). Study found that the practice of prevention methods was not satisfactory in contrast to others experience, 309 (58.7 %) had gone to crowded place in the recent days, only 376 (71.5 %) worn mask when leaving home and 334 (63.5 %) practice proper hand washing technique and use hand sanitizer. However, utilization of mask was relatively better than the experience of Saudi Arabia to prevent MERS face mask was used by (24.2%) in crowded place (23).

The practice of wearing mask while leaving home was significantly associated with level of profession, age groups and place of work with p-value <0.001 but there was no association with gender P-value 1.000. The practice of hand washing or using sanitizer were significantly associated with level of profession and age groups with P-value <0.001, with gender and place of work with P-value 0.016 and 0.010 respectively. However, the practice of going to crowded place according to this study was not associated with p-value >0.05. the result is so different with other study which showed that (male vs. female, OR: 1.37, P=0.019), occupation of "students" (vs. mental labor, OR: 1.54, P=0.007), and COVID-19 knowledge score (OR: 0.90, P<0.001) were significantly associated with going to any crowded place (2).

Study in Saudi Arabia about Middle East Respiratory Syndrome (MERS): showed a positive attitude among physicians (96.3%), pharmacist (94.4%), nurses (94.6%) and technicians (90.1%) with no statistically significant (p=0.273) (23). Another study showed (97.1%) had confidence that China can win the fight against COVID-19 (3). But in this study, the attitude of health workers was very poor only, 233 (44.3 %) of the health workers believed that Ethiopia can win the fight against covid-19, while 394 (74.9 %) of the respondents believed that covid-19 will be successfully controlled. This poor attitude may also relate to the countries health system capacity and this also requires further investigation.

In this study, the attitude of controlling COVID-19 associated with the level of profession with P-value 0.042 but no association with age of the health workers with P-value 0.052. the confidence of health workers in winning the fight against COVID-19 was significantly associated with level of profession P-value 0.019 and age groups of the health workers P-value 0.005. This result somehow resembles study among Chinese residents the attitude towards the final success in controlling COVID-19 significantly differed across genders, education levels, occupation categories, and residence places P<0.05.

Elder age groups > 50years were more knowledgeable than the reference age group 20-30 years AOR= 8.76 with 95% CI (2.47-30.99). Factors, such as age and profession were associated with inadequate knowledge and poor perception of COVID-19 (22). Being Pharmacist and laboratory technicians had a good knowledge than the reference group nurses with AOR= 2.72 (1.25-5.94) and =1.98 (1.00-3.94) 95% CI respectively.

Health workers who were confident in winning the fight against COVID-19 were more knowledgeable than those who were not confident with AOR= 1.64 (1.14-2.37) 95% CI. In multiple logistic regression analyses, the COVID-19 knowledge score (OR: 0.75-0.90, P<0.001) was significantly associated with a lower likelihood of negative attitudes and preventive practices towards COVID-2019 (3). Work place, wearing mask while leaving home and washing hands or using sanitizer were not associated with knowledge.

Conclusion

The study identified there was a huge knowledge gap on the asymptomatic transmission of the disease and the need of child protection which needs seminars or short term trainings for the health professionals to fill the knowledge gap. But the rest of the knowledge questions had got satisfactory answers. The attitude towards the control of the disease and successfully winning the fight **a**gainst the disease is still very poor. This needs improvement by building the capacity of the government health system which helps the health professionals to be more confident. Avoiding going to crowded place, wearing mask and proper hand washing or using sanitizer were not adequate. All prevention methods should be performed perfectly to protect themselves and others.

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Competing Interest

The authors declare that this manuscript was approved by all authors in its current form.

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ORIGINAL ARTICLE

IMPACT OF COVID-19 PANDEMIC ON RADIOLOGY RESIDENCY TRAINING IN ETHIOPIA

Tesfaye Kebede, MD[1*], Mohammed Hamid, MD[2]

ABSTRACT

Introduction: *Radiology practices are facing unprecedented challenges during COVID-19 pandemic not only in how they are providing care to patients, but also in how to continue to educate the next generation of radiologists. Education is one of the areas challenged markedly by the pandemic. This study mainly analyzed the impact of COVID 19 on radiology residency in Ethiopia and look into alternative, innovative options that radiology departments were using in order to maintain the training program.*

Methods*: This is a survey done during the month of May and June 2020. A questionnaire was prepared using a google forms application and link was sent to all radiology residents using a telegram messenger group. Questionnaire contains learning and teaching activities before and after COVID 19 pandemic.*

Result: *Of the total 211 radiology residents who were in training in the radiology residency in Ethiopia 119 residents fulfilled the inclusion criteria, of which 93 (78.2%) were males and 26 (21.8%) are females. Nearly one-half, 52 (43.3%). of residents were in their third year while 45 (37.5%) and 21(17.5%) in their second and first year of residency training respectively. Seminar and daily image viewing sessions were the most common ways of radiology teaching activities, accounting for 93.3% and 91.6%, respectively. More than half (50.4%) of respondents stated that the activities were compromised as some activities had to be replaced by alternative models. Use of open source video conferencing (74.4%) was the most commonly used alternative method.*

Conclusion: *The COVID-19 pandemic disrupts radiology residency training as the traditional models of teaching and learning, which mainly employs face-to-face encounters and discussions will no more be effectively implemented. The use of alternative methods helps in overcoming the challenges and is an opportunity to explore online teaching models which other parts of the world were implementing even before the pandemic.*

Key words: *COVID-19, pandemic, radiology, residency training, Ethiopia*

INTRODUCTION

An unprecedented outbreak of pneumonia of unknown etiology in Wuhan City, Hubei province in China emerged in December of 2019. Coronavirus was found as the causative agent and the World Health Organization (WHO) named it COVID-19 on 11 February 2020 (1). The coronavirus disease 2019 (COVID-19) outbreak rapidly expanded to Europe, America, and the African continent and progressed to a worldwide pandemic.

This development caused serious implications for public health institutions and raises particular questions for medical schools (1). The effect can be devastating in the case of Africa as there are already complex challenges in the continent such as rapid population growth and increased movement of people, high burden of endemic diseases, and an increasing incidence of non-communicable diseases (2).

Ethiopia is one of the countries with a very low health care workforce density of about 0.96 per 1000 population. There are inadequate number of hospitals, shortages in transportation facilities, and lack of personal protective equipment for health care providers. These constitute the major driving factors making Ethiopia one of developing countries heavily challenged by the unprecedented COVID-19 pandemic (3).

Education is one of the heavily impacted social sectors by the COVID 19 pandemic in Ethiopia. Schools have been closed following the declaration of the disease as a pandemic by the World Health Organization on 12 March 2020. As a result, around 25 million pre-primary, primary, secondary, and tertiary-level students are staying at home. One of the changes introduced includes canceling of in-person medical classes and replacing them with recorded lectures or live-video conferencing.

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This may eventually result in loss of collaborative experiences that could negatively affect education, but the actual impact needs to be studied (5).

Many schools and faculties have canceled clinical clerkships for different reasons. One such reason is that this measure will decrease the risk of exposure of medical students to the COVID 19, which is an understandable concern, although many students are willing to put themselves at risk and as such can be frustrated by these decisions. The COVID-19 pandemic has also affected medical education as a result of cancellation of medical conferences. The conferences involve presentations by medical students, which contribute to students' credentials supporting their residency applications.

As for the other residency programs, the radiology program has also been affected by the pandemic. Radiology practices have encountered unprecedented challenges not only in how they are providing care to patients, but also in how to continue to educate the next generation of radiologists (4). Even though many teaching and learning activities like seminars, interdepartmental joint sessions, and daily image viewing sessions have severely compromised, the true impact of the pandemic on radiology residents is not known.

The impact of COVID-19 on tertiary education in general and medical education in particular is largely unknown. Already, faculty, medical students, and residents are impacted by the pandemic and are forced to change and reschedule their regular working activities. This study is primarily aimed to analyze the impact of COVID 19 on Ethiopian Radiology residency programs and also describe alternative innovative options the program is using to maintain the teaching-learning activities during the pandemic.

PARTICIPANTS AND METHODS

The study was conducted in Ethiopian institutions of higher education which are currently running radiology residency program - Addis Ababa University (AAU), Saint Paul Hospital Milleneum medical College (SPMMC), Gondar University, Bahirdar University, and Mekelle University). An online survey using a google forms application was prepared, then the form link was sent to all radiology residents using a telegram messenger group. The form contains variables on demographic characteristic, year of residency, learning and teaching activities before and after COVID 19 pandemic, access to internet service at home, and infection prevention methods they practice in their departments.

The responses were collected in a google spread sheet which was then uploaded on SPSS version 25 and data cleaned. Descriptive statistics was used to analyze the data and the results were summarized using tables and figures.

Ethical review to conduct the study was obtained from the ethical review committees of the Department of Radiology, Tikur Anbessa Specialized Hsopital (TASH) of AAU. There were no personal information identifiers in the questionnaire and all pieces of information were kept confidential. Informed consent was obtained from each study participant before they fill the questionnaire

RESULTS

Of total 211 radiology residents who were in training during the study period. 63 were in SPMMC, 58 in Addis Ababa University, 34 in Mekelle, 30 in Gondor and 26 in Bahirdar. All were invited to the online survey and 131of the 211 (60%) of residents in training participated in the survey. Twelve (9.1%) of the response were excluded from the study due incomplete data they provided and 119 residents fulfilled the inclusion criteria for the study. Of the 119 residents, 93 (78.2%) were male and 26 (21.8%) are female residents. A majority (42.5%) of responpondants were from AAU, while the rest were from SPMMC (18.3%), Bahirdar University (16.7%), Mekelle University (11.7%), and Gondar University (10%). Nearly one-half 52 (43.3%) of respondents were in their third year, while 45 (37.5%) were in their second year and the rest 21(17.5%) in their first year of residency training.

According to the response, seminar and daily image viewing sessions were the most common ways of radiology teaching activities at their respective institutions, each accounting for 93.3% and 91.6%, respectively. Others teaching activities included small group discussion (71.4%) interdepartmental joint session (67.2%) and case review which is practiced in 63.9% of the time. Journal club is the least way of teaching activity which only practiced in 2.5% of the time. One-half of the respondents stated that the activities are compromised with some activities replaced by alternative models,l while 35.3% of the respondents said the activities were completely interrupted (Figure 1). Some 53.4% (N=103) of the residents had internet access outside their institutions and most were the institutions Addis Ababa, while 70.5% of the residents outside Addis Ababa responded as having no internet access outside their institutions.

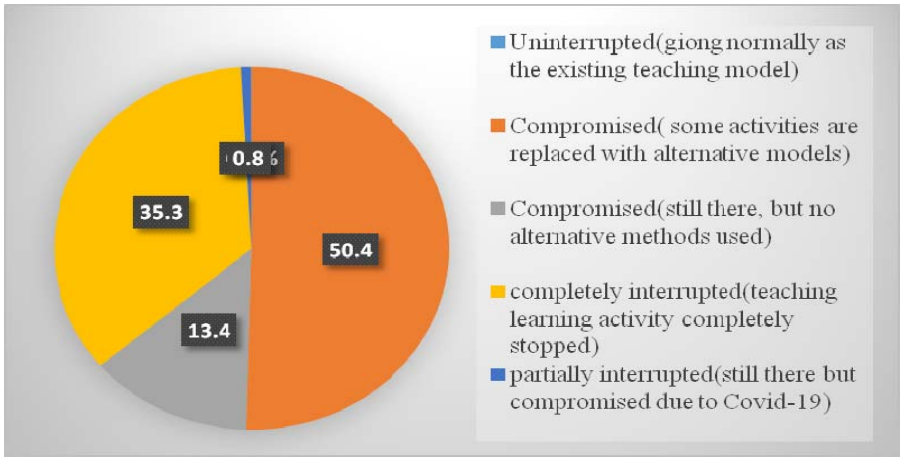

Figure 1: Responses for the current radiology residency teaching-learning activities in institution of higher education, Ethiopia, 2020

When we see alternative methods that were being used to maintain the teaching-learning activity, 79 residents responded and who indicated that using open source video conferencing is the most commonly used (74.4%) alternative method followed by use of social media groups for case discussion (57%) Continuing activities in small groups and providing residents with online teaching materials were the third common alternative methods (44%).

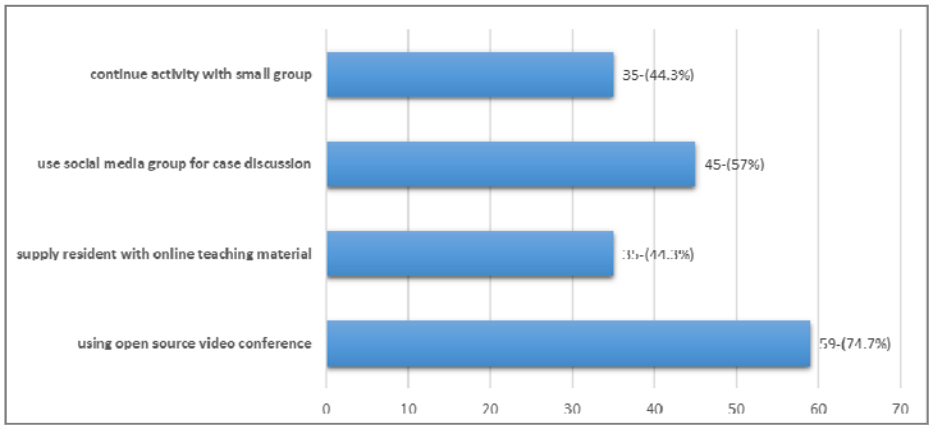

Figure 2: Bar graph showing alternative models being used to continue teaching-learning activities

When we compare the number of radiological examinations that were undertaken and interpreted by radiology residents, there is a significant difference before and after the COVID-19 pandemic. Before COVID-19, the mean (SD) number of x-rays interpreted/performed or observed in a week by 91 (75.8%) of respondent residents was 156 (±150), ranging from 0 to 700. The number of x-rays interpreted and or observed after COVID-19 pandemic Similarly, the number of ultrasound performed/observed reduced from 72.8 (±52) 28.7 (±29.3), after COVID-19 (Figure 3).

When we compare the number of computerized tomography (CT) scan interpreted/performed or observed, the mean 9SD) is 22 (±20), ranging from 0 to 80 cases in 90 (75.6%) of resident responses before COVID-19 and mean (SD) of 9.5 (±11.5)

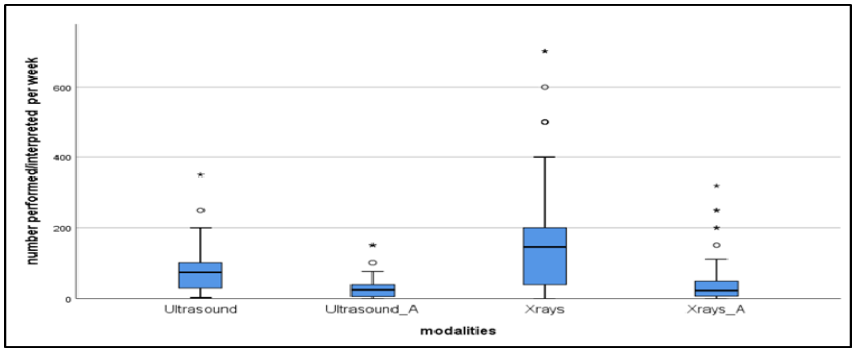

Figure 3: Boxplot comparing the number of ultrasound performed before and after COVID-19 pandemic per week. Ultrasound (ultrasound before covid-19, Ultrasound_A (ultrasound after COVID -19), X-ray (X-ray before covid19), Xray_A(X-ray after covid-19).
*= Extreme outliner numbers.
=Outliners.

Before COVID-19, the mean (SD) magenric resonance imaging (MRI) interpreted/ performed/observed is 8 (±18) cases, ranging; from 0 to 80 cases among 67 residents who responded, while the mean (SD) after COVID-19 is 5.4 (±8.5) cases, range inging from 0 to 40 cases among 48 respondant residents (Figure 4). the mean fluoroscopy interpreted/performed/observed before COVID-19, the mean (SD) is 4 (±5.5) cases, ranging from 0 to 15 cases among 70 (58.8%) residents who responded. After the COVID-19 pandemic, the mean (sd) is 0.6 (±1.7) cases., ranging from 0 to 10 cases among 53 (44.5%) of the residents who responded (Figure 4). Image-guided procedures performed/observed before COVID-19, the mean (SD) is 3.5 (±4.2) cases, ranging 0 to 15 cases in 64 residents who responsd and, after COVID-19, the mean (SD) is 0.7 (±1.5) cases, ranging from 0 to 8 cases among 44 residents who responded.

Regarding infection prevention activities that are being practiced in the radiology department after COVID-19 pandemic, 111 residents responded and 95 (85.6%) of them had sanitizer available, 83 (74.8%) residents had gloves available, and 79 (71.2%) residents had facemask available. As an infection prevention method, nearly one-half, 49 (44.1%), and 48 (43.2%) of residents practice Re-appointment of non-emergency imaging and remote teaching using video conferences respectively. Training on infection prevention and control, imaging equipment disinfecting facility available, and personal protective (PP)-gowns available if needed are among the least available infection prevention methods that are only available/ practiced by 15 (13.5%), 8 (7.2%) and 2 (1.8%) radiology residents, respectively (Figure 5).

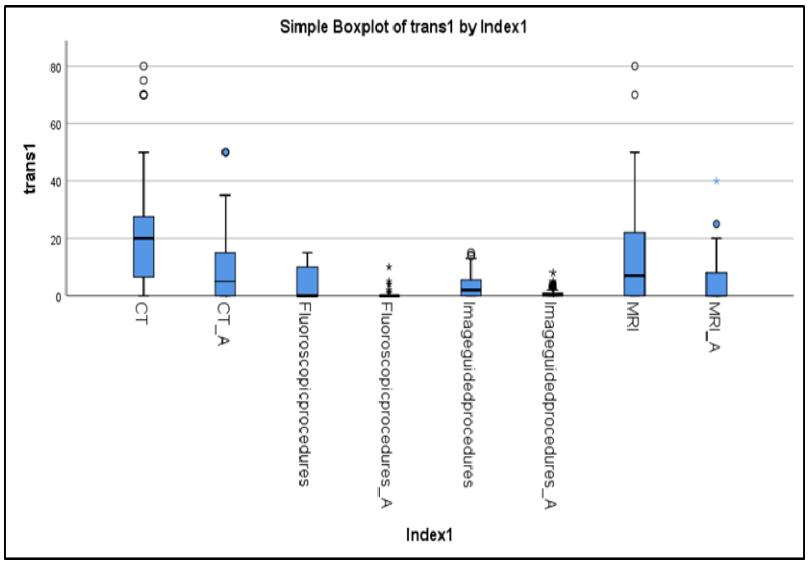

Figure 4: Boxplot comparing the number of CT, MRI, fluoroscopy, and procedures performed before and after covid-19 pandemic per week. CT(CT before covid-19), CT_A(CT after COVID-19), Fluoroscopies(Fluoroscopies before covid-19), Fluoroscopy_A (Fluoroscopy after covid-19), Image-guided procedures(Image-guided procedures before covid-19), Image-guided procedures_A (Image-guided procedures after covid-19), MRI (MRI before covid-19), MRI_A (MRI after covid-19). *= Extreme outliner numbers. =Outliners.

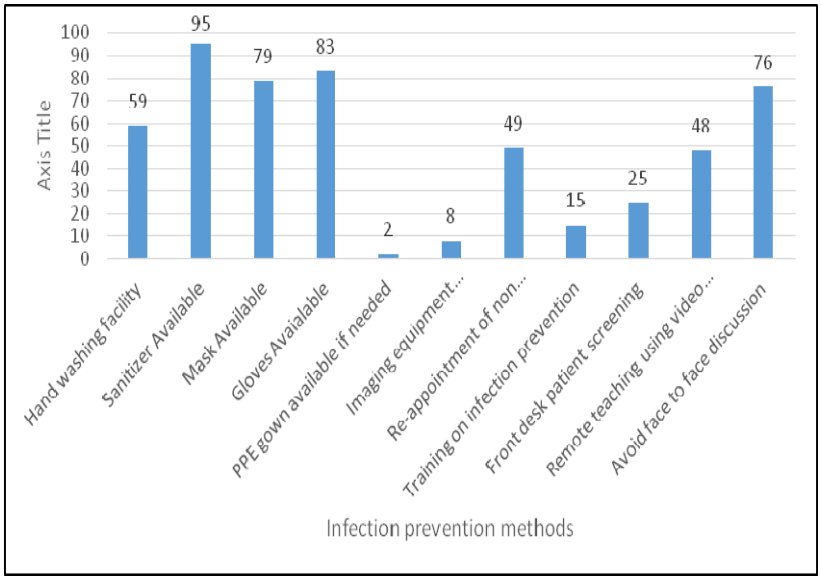

Figure 5: Column showing infection prevention methods being used in radiology departments

Among 112 residents who responded regarding the continuation of resident teaching-learning activities around 83.3% voted to continue with alternative models (Figure 6). If teaching-learning activity is completely interrupted, more than half (53.6%) of residents answered that reason is due to covid-19 and its impact.

Another 26.8% of residents states that it is due to poor motivation from the department while rest (19.5%) said it is due to the inability to use alternative models due to lack of internet access outside institutions.

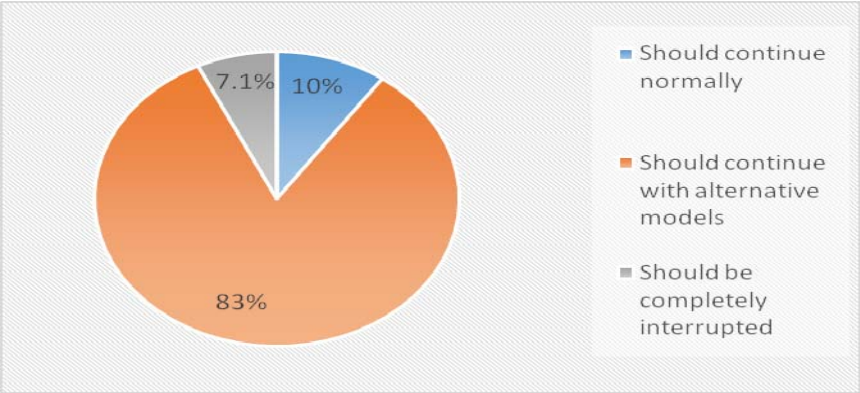

Figure 6: Pie chart showing resident's opinion regarding the continuation of resident teaching-learning activities.

DISCUSSION

The COVID-19 pandemic is evolving rapidly and widely all over the world disrupting personal and professional life, including that of medical students and radiology trainees. Even if some postgraduate programs have continued, primary and secondary schools as well as higher education institutes including universities have been closed due to the COVID-19 pandemic in Ethiopia. This study revealed that radiology teaching-learning activities are compromised in all teaching schools in the country. It has also shown that radiology departments are employing alternative teaching methods replacing the face-to-face teaching models, which were uniformly used in all schools.

This study showed that more than half (57.3%) of radiology trainees are in the capital city of Ethiopia Addis Ababa training in AAU and SPMMC. This is likely due to the comprehensive and specialized nature of these institutes with multiple subspecialty services they provide. Besides, AAU is one of the pioneer universities in Ethiopia with an experience of more than a century.

As we clearly see from this study, almost all major models of teachings were similar across the whole radiology teaching institutions, which included; daily image viewing sessions, interdepartmental joint sessions, seminars, small group discussions and case reviews. Based on the response in the study, daily image viewing sessions and seminars were the most common ways of radiology teaching activities, each accounting for 91.6% and 93.3%, respectively.

The introduction of COVID-19 infection prevention strategies, particularly physical distancing and avoiding of face-to-face activities significantly affected most teaching-learning activities.

Moreover, marked reduction in case load in relation to the pandemic together with appointing of non-emergent imaging have a significant impact in individual exposure during their training period. Such strategies of reducing patient crowed was also practiced in other radiology institutions and also endorsed by the American College of radiology (ACR)(6).

Due to the nature of the traditional teaching models, which need gathering of residents and staffs in conference rooms and face-to-face discussions, as well as the need of physical contact during teaching of procedural skills, using alternative methods of teaching is mandatory. This is essential if we need to maintain the teaching models, which were practiced in only 50% of our institutions. Almost all of the institutions which have already made a shift from the traditional teaching model to alternative methods during this study period were in the capital city, Addis Ababa, partly due to better access to the Internet. All institutions which are currently running radiology training programs have Internet access, but only 53.4% of respondents had Internet access outside the campus. Even if videoconferencing is shown to be cost effective in residents' teaching and learning process (7), it incurs the residents more cost to travel all the way to the campus to get access to the Internet.

Tele-radiology and videoconferencing are practiced worldwide in most continents and is being used for remote service delivery before the pandemic (8-11), it is also known that it is used to improve training in radiology including in isolated regions. The use of videoconferencing enables successful completion of an educational program dealing with non-interpretative competencies for radiology trainees located considerable distances away from a main teaching institution (8). Despite the availability of alternative methods of teaching, some activities should continue with traditional models. For institutions which have never practiced this alternative model of teaching, this is encouraging and strategies should be designed to fully maintain such alternative methods.

Even though face mask, gloves and sanitizers are available to majority of residents, the absence of adequate, PP-gowns and equipment disinfecting facility in radiology departments especially in areas where there is direct contact with patients, like ultrasound examinations and image guided procedures, will impose additional mental stress to residents which may have an impact on the teaching learning.

In the author's opinion, COVID-19 is not only be a treat to the radiology training but is also an opportunity to introduce online teaching methods, which were practiced and shown to be effective even before the pandemic.

with due consideration of infection prevention and physical distancing, avoidance of staff and resident crowding, and other patient safety considerations.

Conclusion

The COVID-19 pandemic has widely disrupted professional life, and medical students, including radiology training. In spite of this disruption, the pandemic should also be taken as an opportunity to explore alternative methods of teaching like implementing teleradiology to continue with radiology teaching. Institutions should look for alternate solutions for residents to have access to the Internet on their living compounds. In addition, optimal infection prevention strategies should be implemented in the radiology departments to boost resident's confidence and avoid stress during practice and learning.

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Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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ORIGINAL ARTICLE

HEALTH WORKER'S COMPETENCE AND PREDICTORS TO LEAD AND MANAGE AND GOVERN HEALTH DELIVERY SYSTEM IN NORTHWEST ETHIOPIA

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ABSTRACT

Introduction: *Observing over-led and under-managed, over-managed and under-governed, and over-governed and under-led health delivery systems remain a common phenomenon. A considerable number of countries have launched integrated health system leadership, management, and governance capacity-building programs. However, there has been a dearth of attempts to measure the workforce's competence to lead and manage and govern the health delivery system, particularly in Ethiopia.*

Objective: *The purpose of this study was to determine competence and predictors to lead and manage and govern the health delivery system among the health workforce in Northwest Ethiopia.*

Methods: *A cross-sectional study was carried out. Eight hundred thirteen workforce had participated in the study. Competence to lead and manage and govern the health delivery system was computed from 20 items. Ordinal logistic regression analysis was conducted to identify predictors. Probability value and odds ratio with 95% confidence interval were used to determine statistical significance and strength of association, respectively.*

Results: *Eight hundred thirteen participants were addressed. Of these, 396 (48.7%) were females. The estimates for low, moderate, high, and very high levels of competence to lead and manage and govern the health delivery system were 41.3%; 42.7%; 13.5%, and 2.5%, respectively. Sex and responsibility were identified as main predictors at a probability value of less than 0.05. Being a male workforce was 50.2% (AOR: 1.502 (1.038, 2.173) higher to lead and manage and govern the health delivery system at a very high level of competence compared with those of females. Being head of the office was more than 2 times (AOR: 2.382 (1.155, 4.914) higher to lead and manage and govern the health delivery system at a very high level of competence compared with those of service owners.*

Conclusions: *The competence to lead and manage and govern the health delivery system among the health workforce in Northwest Ethiopia is leveled into four categories: very high, high, moderate and low. Of which, the low and moderate levels accounted for 84% that is inadequate. Policymakers, program planners and implementers need to strengthen investments in integrated health system leadership, management and governance. In reinforcing it, they could give due attention to females and service owners. Future research could be conducted considering hierarchical variables.*

Keywords: *Health system, Workforce, Competence, Lead and Manage and Govern, Predictors*

INTRODUCTION

Observing over-led and under-managed, over-managed and under-governed, and over-governed and under-led health systems remain a common phenomenon (1, 2). This puzzle has been palpated in dealing with the successes, glitches, and trends of health initiatives to ensure universal health coverage.

In driving the Millennium Development Goals, diverse experiences were recorded from countries around the globe (3). Evidences show that many countries had made incredible achievements; some others made optimal improvements and few with little progress. These trends doubted the reachability of the goals at a considerable number of countries. This doubt unduly pressured the globe to sit for a strategy. Consequently, leadership and governance is identified as one of the health system building blocks (4). Yet, implementing and measuring leadership and governance has remained challenging (5, 6). To overcome such the challenges, integrated Leadership, Management, and Governance (LMG) capacity-building program was developed (5, 7).

This program has been launched in a considerable number of countries (8, 9). The program aims to build the competence of the workforce in influencing people, improving performance, and ensuring societal health and well-being (6). Although integrated LMG has caught the attention of the workforce, particularly in low and middle-income countries' health systems; yet, there has been a dearth of attempts to measure the workforce's competence to lead and manage and govern the health delivery system (8).

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This can be characterized by the inadequate literature that have been conducted to determine the health workforce's competence and its predictors to lead and manage and govern the health delivery system. However, limited studies, though they lacked quantitative results, indicate that the workforces who are competent to lead and manage and govern improve the health service outcomes (1, 9, 10).

Thus, the results of this study would support policymakers, program planners, implementers, and researchers to scheme scientifically reliable and empirically scalable integrated LMG capacity building programs.

PATIENTS AND METHODS

Study design and participants

A cross-sectional study was carried out in December 2018. Eight-hundred thirteen health facility workforce were selected, randomly from 32 health facilities located in Amhara Regional State in Northwest Ethiopia.

Data collection and measurements

Data were collected using a structured multi-item questionnaire. The data collected included the participants' basic characteristics and items that potentially measured competence to lead and manage and govern the health delivery system (dependent variable).

The measuring items were adapted from the Ethiopian hospital leadership, management, and governance implementation checklist; management and organizational sustainability tool; pact organizational capacity assessment tool, and the WHO health governance assessment tool.

The test stimuli (psychometric properties) of the questionnaire was refined through rigorous debriefing sessions, focused on instrument clarity and validity. In this process, five specialists of health service management, of whom three were from civil service and two from the academic spheres were involved.

All of the measuring items were rated with a five-point Likert scale, ranging from 1 = very low to 5 = very high. The data related to measuring items were checked for inter-correlation of 0.3 and greater, intra-item consistency of 0.7 and greater (11), communality of 0.5 and greater (12, 13), and complex structure that is whether any factor had resided on more than one item with factor loadings of 0.4 and greater (14) using factor analysis. In this process, six items were removed from the original dataset.

Of which, two items: looking for best practices and match deeds to words were removed due to violating the rule of communality, and the other four items: set annual and strategic plan, allocate adequate resources, provide accountability and authority, and provide appropriate feedback were removed due to violating the rule of complex structure. It indicated that the dataset was reduced to a 20-item dataset. Yet, the six measuring items trimmed from the original dataset due to violating the rules of communality or complex structure were taken as predictors. This process was discussed elsewhere (15).

Data analysis

Data were entered using epi-demographic information version 7 and analyzed using statistical package for social science version 20. Texts, tables and figures were used to report results. The dependent variable was computed from the 20-item dataset. The computed variable was leveled into four ordinal categories: low, moderate, high and very high that represented scores of <60, 60-79.99, 80-94.99, and ≥95 respectively. These scales were taken from the Amhara Regional State health workforce performance appraisal guideline, unpublished work.

Ordinal logistic regression analysis with logit link function was used to model the relationship between the dependent variable and its predictors. Model fitting information tested by (-2Log Likelihood) was significant at a probability value (p) <0.001. The consistency of the observed data tested with Pearson chi-square goodness-of-fit remained marvelous with p = 1. The explained variance of the dependent variable from the predictors was tested by pseudo-r-squared value (Nagelkerke's R^2 =0.765), which indicated a strong association.

The test of parallel lines or testing proportional odds assumption that is testing whether the location parameters (slope coefficients) of predictors were the same across outcome variable categories was tested by (-2Log Likelihood) and became non-significant with p = 0.487. This showed that the slope coefficients were the same across response categories, which justified that there had no evidence to reject the parallelism hypothesis.

The odds ratios together with the corresponding 95% Confidence Intervals (CI) were given as appropriate to better understand the contribution of each predictor.

Ethical approval

Ethical clearance with a protocol record 090/18-04 was secured from the institutional review board of Bahir Dar University. Each participant provided written consent. The process was strictly anonymous and questionnaires completed were stored in a locked cabinet. Note that this work is an extension of a preprint manuscript (16).

RESULTS

Basic characteristics of participants

Table 1 presents the participants' basic characteristics. Overall, eight hundred thirteen participants were addressed. Regarding sex, 396(48.7%) were females. Concerning responsibility, 582 (71.6%) were service owners.

The central tendency of the measuring items

Table 2 indicates the means and standard deviations of measuring items. This was included to show simply the overall trend of the data set, how the data were spread around it. Other ways it did not provide evidence for a nuanced decision. Accordingly, the highest and lowest mean scores were recorded for the items: determine key priorities for action (3.38±1.097), and describe the outcomes related to the allocated resources (2.76±1.231).

Table 1: Basic characteristics of participants (n = 813)

Variable	Category	Frequency	Percent
Sex	Male	417	51.3
	Female	396	48.7
Age	<= 24 years	124	15.3
	25-29 years	334	41.1
	30-34 years	256	31.5
	>34 years	99	12.2
Educational level	Diploma and less	363	44.6
	First degree	411	50.6
	Second degree and above	39	4.8
Responsibility	Head of office	61	7.5
	Process owner	35	4.3
	Unit coordinator	135	16.6
	Service owners	582	71.6
Year of service	<2 years	209	25.7
	2-4 years	222	27.3
	5-8 years	283	34.8
	>8 years	99	12.2

Table 2: Means and standard deviations of measuring items (n = 813)

	Item	Mean	Standard deviation
1	Identify client and stakeholder needs and priorities	3.35	1.103
2	Recognize trends, opportunities, and risks	3.36	1.076
3	Look for best practices	3.11	1.168
4	Articulate the organization's mission, strategy, and vision	3.33	1.103
5	Determine key priorities for action	3.38	1.097
6	Enlist the stakeholders to commit resources	2.86	1.197
7	Unite mobilized resources to reach organizational vision	2.97	1.214
8	Match deeds to words	3.25	1.161
9	Show trust and confidence and acknowledge contributions	3.04	1.197
10	Model of creativity, innovation, and learning	3.00	1.160
11	Set annual and strategic plan	3.32	1.165
12	Allocate adequate resources	3.04	1.172
13	Provide accountability and authority	3.06	1.111
14	Considers the organizational lines of authority for delegation	3.24	1.126
15	Integrate work structures and workflow	3.16	1.091
16	Coordinate practices with other workforce's programs	3.22	1.097
17	Monitor their achievements against the plan, and take lessons	3.20	1.136
18	Provide appropriate feedback	3.19	1.125
19	Uphold ethical and moral integrity to serve the public interest	3.24	1.230
20	Establish a consultation mechanism to heard public voice	2.95	1.171
21	Ensure the participation of key stakeholders	2.86	1.160
22	Establish alliances for joint action at all levels	2.96	1.162
23	Oversee a shared direction to achieve organizational mission	3.10	1.240
24	Advocate organizational mission and vision to stakeholders	2.97	1.223
25	Use resources in a way that maximizes the public well-being	3.07	1.284
26	Describe the outcomes related to the allocated resources	2.76	1.231

Competence to lead and manage and govern the health delivery system

Figure 1 indicates the health workforce's competence to lead and manage and govern the health delivery

About 41% and 43% of the health workforce had low and moderate levels of competence, respectively. On the other hand, only 2.5% of the work-

Table 3: Estimates of predictors fitted to ordinal logistic regression analysis (n = 813)

Variable					95% CI			95% CI	
			Estimate	Sig.	Lower Bound	Upper Bound	EXP	Lower bound	Upper bound
Location	Sex	Male	.407	.031	.037	.776	1.502	1.038	2.173
		Female	0	.	.	.	1	-	-
	Age in years	≤24	.359	.353	-.398	1.115	1.432	.672	3.050
		25-29	-.391	.236	-1.037	.256	.676	.355	1.292
		30-34	-.526	.110	-1.171	.119	.591	.310	1.126
		>34	0	.	.	.	1	-	-
	Educational level	Diploma & below	.731	.103	-.147	1.609	2.077	.863	4.998
		First degree	.625	.152	-.230	1.479	1.868	.795	4.389
		Masters & above	0	.	.	.	1	-	-
	Responsibility	Head of office	.868	.019	.144	1.592	2.382	1.155	4.914
		Process owner	-.022	.965	-1.030	.985	.978	.357	2.678
		Unit coordinator	.445	.083	-.058	.948	1.560	.944	2.581
		Service owner	0	.	.	.	1	-	-
	Service in years	<2	.577	.114	-.138	1.292	1.781	.871	3.640
		2-4	.548	.119	-.142	1.238	1.730	.868	3.449
		5-8	.392	.245	-.269	1.053	1.480	.764	2.866
		>8	0	.	.	.	1		
	Look for best practices	Very low	-3.531	.000	-4.541	-2.521	.029	.011	.080
		Low	-2.579	.000	-3.356	-1.802	.076	.035	.165
		Moderate	-1.602	.000	-2.249	-.954	.201	.106	.385
		High	-1.278	.000	-1.890	-.667	.279	.151	.513
		Very high	0	.	.	.	1	-	-
	Match deeds to words	Very low	-2.030	.000	-2.963	-1.097	.131	.052	.334
		Low	-3.551	.000	-4.415	-2.688	.029	.012	.068
		Moderate	-1.657	.000	-2.270	-1.044	.191	.103	.352
		High	-.559	.049	-1.116	-.002	.572	.328	.998
		Very high	0	.	.	.	1	-	-
	Set anual and strategic plan	Very low	-1.208	.033	-2.319	-.097	.299	.098	.908
		Low	-1.387	.001	-2.179	-.595	.250	.113	.552
		Moderate	-1.266	.000	-1.891	-.641	.282	.151	.527
		High	-.391	.153	-.928	.145	.676	.395	1.156
		Very high	0	.	.	.	1	-	-
	Allocate adequate resources	Very low	-.469	.365	-1.485	.546	.626	.227	1.726
		Low	-1.227	.002	-2.010	-.444	.293	.134	.641
		Moderate	-.584	.104	-1.289	.120	.558	.276	1.127
		High	-.919	.006	-1.575	-.262	.399	.207	.770
		Very high	0	.	.	.	1	-	-
	Provide accountability and authority	Very low	-2.877	.000	-4.085	-1.669	.056	.017	.188
		Low	-2.415	.000	-3.279	-1.552	.089	.038	.212
		Moderate	-1.791	.000	-2.522	-1.059	.167	.080	.347
		High	-.921	.007	-1.591	-.252	.398	.204	.777
		Very high	0	.	.	.	1	-	-
	Provide appropriate feedback	Very low	-4.490	.000	-5.947	-3.033	.011	.003	.048
		Low	-4.069	.000	-4.960	-3.177	.017	.007	.042
		Moderate	-2.383	.000	-3.078	-1.687	.092	.046	.185
		High	-1.381	.000	-2.001	-.761	.251	.135	.467
		Very high	0	.	.	.	1	-	-

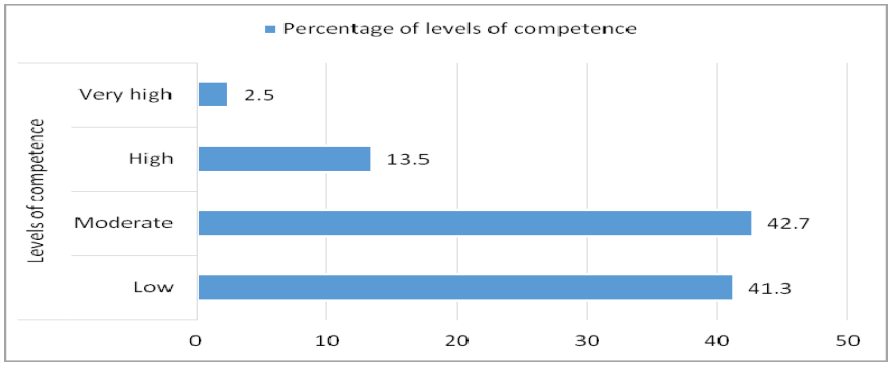

Figure 1: Competence to lead and manage and govern the health delivery system

Predictors of competence to lead and manage and govern the health delivery system

Table 3 displays the estimated coefficients of the ordinal logistic regression model. The estimates labeled "location" were the coefficients (odds) of the predictors. To interpret the impact of individual predictors in a better way, proportional odds ratio with 95% CI was calculated by coefficient exponentiation, which was indicated in the exponential (EXP) column of the table.

From the observed significance levels: sex and responsibility (working position) were significantly related (P<0.05) to the competence to lead and manage and govern. The odds ratio of the male health workforce was 1.502 (95% CI, 1.038 to 2.173). This showed that being male workforce was 50.2% higher to lead and manage and govern the health delivery system at a very high level of competence compared with those of females (p = 0.031).

The odds ratio of the head of the office was 2.382 (95% CI, 1.155 to 4.914). This indicates that being the head of the office was more than 2 times higher to lead and manage and govern the health delivery system at a very high level of competence compared with those of service owners (p = 0.019).

Note that all the six items that were trimmed from the measurement model (15) and treated as predictors were also significantly related to this competence (p<0.05). For instance, the odds ratio of the health workforce who had a very low rate of 'look for best practices' was 0.029 (95% CI, 0.011 to 0.080). This revealed that the very low rate of 'look for best practices' reduced the workforce's higher level of competence to lead and manage and govern the health delivery system by 97.1% compared with the very high rate of it (P < 0.001).

DISCUSSION

The health workforce's competence to lead and manage and govern the health delivery system in the current study is leveled into four categories: very high, high, moderate and low. Of which, the low and moderate levels accounted for 84%. As the best of the investigators' knowledge, no previous study attempted to determine it, however, most of them reported that a competent workforce in this regard improves the health service outcomes (1, 9, 10, 17-19). The potential reason might be the presence of significant duplication and overlap between the practices of the three paths (6, 18). Hence, the current study measures the health workforce's competence to lead and manage and govern the health delivery system (2) after developing a four-factor measurement model (detailed elsewhere) using a theoretically reasonable analysis technique, that is, factor analysis that overcomes the issue of duplication and overlap (20).

Alongside determining such a competence, identifying its predictors using a scientifically reliable and empirically scalable model is also helpful. Particularly, it is valuable when one wishes to design a characteristic-based integrated LMG capacity-building program. In the current study, sex and responsibility are identified as the main statistically significant predictors (p<.05).

Regarding sex, being a male workforce has a higher competence to lead and manage and govern the health delivery system. This deviation could be due to the limited number of females that are authorized to lead and manage and govern the health delivery system. In Ethiopia, this has a historical trend, in which breaking it and bringing adequate number of females to the stage is a troublesome investment. However, almost half of the participants in this study are females, which indicates that a considerable number of workforces in the health delivery system are females. Thus, whatever reasons people have, without empowering half of the segment of the workforce, getting organizations to the intended stage would be rather difficult.

Concerning responsibility (working position), being the head of the office has more than two-fold higher competence compared with the service owners. The reason behind could be that the service owners may not have training or have limited training in the field that makes them incompetent of leading. This point that there is huge need to invest on integrated LMG to service owners who account for almost three-fourth of the workforce. The other significantly associated predictors (p<.05) are the six measuring items trimmed from the original dataset (15) due to violating the rules of communality or complex structure (14) and taken as predictors. These include: (i) Looking for best practices, (ii) Match deeds to words, (iii) Set an annual and strategic plan, (iv) Allocate adequate resources, (v) Provide accountability and authority, and (vi) Provide appropriate feedback.

Yet, their relationship with competence to lead and manage and govern the health delivery system implies that while scheming capacity-building policies and strategies, as well as, designing further research; considering them as measuring items would be more meaningful than taking them as predictors.
Away from all the implications, interpreting results with caution is important due to there might have been some information bias. The limitation of excluding the health workforce that took integrated LMG capacity building training so far might also deviate the results.

Conclusions

The competence to lead and manage and govern the health delivery system among the health workforce in Northwest Ethiopia is leveled into four categories: very high, high, moderate and low. Of which, the low and moderate levels accounted for 84%. This shows the inadequacy of the health workforce competence in this regard. Sex and responsibility are identified as the main statistically significant predictors.

The policymakers, program planners and implementers need to strengthen the investments on integrated health system leadership, management and governance. In reinforcing it, they could give due attention to females and service owners.

Results can be also considered in similar settings. Feature research could be conducted considering hierarchical variables.

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Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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CASE REPORT

DICAVITORY TWIN PREGNANCY IN UNDIAGNOSED UTERUS DIDELPHYS DELIVERED BY CAESAREAN SECTION

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ABSTRACT

Uterus didelphys represents a uterine malformation where the uterus is present as paired organ. There is presence of double uterine bodies with two separate cervices and often a double or septate vagina. Women with congenital malformations of uterus usually have higher incidence of complications during pregnancy and delivery. We report the case in our institute of a dicavitory twin pregnancy in the both sided body of undiagnosed didelphys uterus delivered by caesarean section.

Keywords: *Uterine didelphys, Caesarean delivery, Mullerian duct, Ethiopia*

INTRODUCTION

Simultaneous pregnancy in each uterine cavity of a double uterus is unusual but was reported by Davies and Cellan-Jones in 1927 (1) and recently by Yang et al. in 2015 (2). The incidence of this anomaly is one in 3000 (3). It remains a challenge to the obstetricians especially when it is undiagnosed before onset of labor. Patients are usually asymptomatic, but the anomaly may be associated with dysmenorrhoea, dyspareunia, infertility, recurrent abortion, preterm labor, fetal malpresentation, intrauterine-growth restriction, premature rupture of membranes (PROM), renal agenesis, recurrent still births and cesarean delivery (1-6). Diagnosis is usually initiated by the findings of a longitudinal vaginal septum and two vaginal openings during vaginal examination. A 3-D-transvaginal sonography is an excellent non-invasive method of investigation (6).

Other methods of investigations include sonohysterography, hysterosalpingography, hysterolaparoscopy and pelvic magnetic resonant imaging. The incidence of cesarean delivery in uterus Didelphys in pregnancy may be as high as 82% (2). However, several good pregnancy outcomes have, been reported, including vaginal deliveries, and twin and triplet pregnancies (7-11).

The aim of this case report is to make clinicians to have high index of suspicion of uterine anomaly when investigating cases of recurrent still birth, infertility, spontaneous-abortion, preterm-labor, fetal-malpresentation, intrauterine growth-restriction, PROM and renal agenesis. Early diagnosis, meticulous follow up can avert most of these complications.

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We present a case of an undiagnosed simultaneous pregnancy in each uterine cavity of a uterus didelphys in term pregnancy that was complicated with prolonged PROM, breech presentation, cord prolapse and an emergency caesarean delivery to buttress the need for early diagnosis, close monitoring in pregnancy and labor to avert adverse outcomes.

CASE SUMMARY

Pre-operative examination

A 21 Years gravida five para four (all stillbirth) married for five year presented to our institution. She did not remember her last normal menstrual date but claimed nine months of amenorrhea. She presented to our labour room with complaint of labour pains and passage of liquor since nine hour. She had three times antenatal check-ups in a private clinic for her current pregnancy and was diagnosed to be having twin, a non- vertex and was advised to undergo caesarean section in view of first twin non vertex. She had four consecutive pregnancy losses at six, seven and eight months of amenorrhea. All were vaginal delivery and this was her first visit to our institute. On pre-operative physical examination her pulse rate was 78 beats/minutes, her BP 110/80mm/Hg in left arm, supine position, she was not anemic. Cardiovascular and respiratory systems were normal appearing. Per-abdominal examination her uterus was 38 weeks of gestational age, multiple fetal parts with two fetal polls palpable, fetal heart rate for twin-A 140 bpm and for twin-B 144 bpm, uterus contractions were three in 10 min, each contraction lasting for 10-15 seconds.

On vaginal examination her cervix was 80% effaced, three cm dilated. Pulsatile loop of cord was felt in the vaginal canal with thick non communicative vaginal septum.

Intra-operative findings

Under spinal anesthesia, abdomen opened by pfannensteil incision. Lower uterine segment caesarean section was done on right uterus. Baby twin-A presented as flexed breech with loop of cord was delivered by breech extraction. It was an alive male baby of weight 2.5 kg with Apgar score of eight and ten. After delivery of the placenta, when right uterus was exteriorized, another gravid uterus was found on left side. It was diagnosed to be a case of uterus didelphous. Twin -B fetus weighting 1.9 kg female delivered with Apgar score of 7 & 9 from the left uterus. Each uterus had one fallopian tube and ovary (Figure 1).

Figure 1: Intra operative images of uterine didelphys each having their own tube and ovaries.

Both ovaries and tubes appeared to be healthy looking. Both uteri had separate cervices opening into separate vagina. Bilateral kidneys were palpated and were normal. Estimated blood loss was 500ml. Incision to delivery interval was 30 minutes.

Post-operative condition

The mother's postoperative recovery was uneventful. After written consent has been collected and preserved, post-operative sonography was repeated (Figure 2) and vaginal speculum examination done (Figure 3).

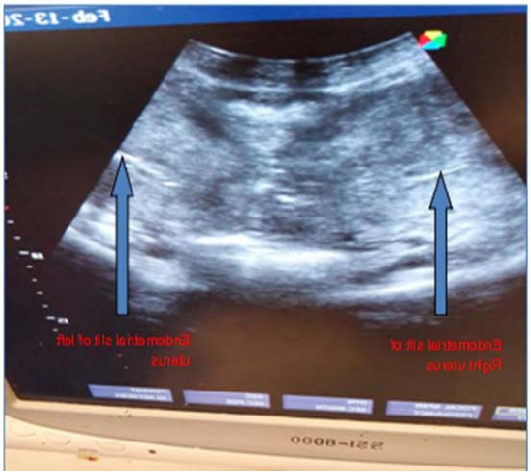

Figure 2: postoperative sonographic image of didelphys showing two endometrial slit.

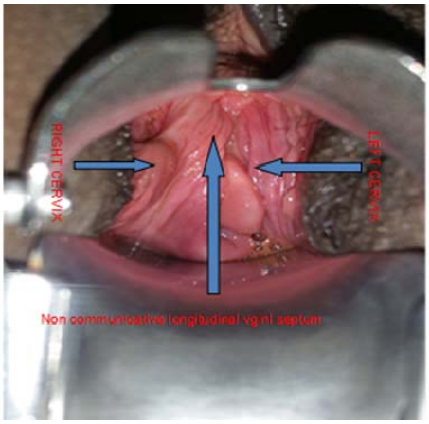

Figure 3: Image of non-communicative vaginal septum.

Dressing was removed on 3rd post-operative day and she was discharged on 4th post-operative day after advising her on family planning and future mode of delivery to be by repeated cesarean section.

DISCUSSION

A double or didelphys uterus as reported in the literatures is still uncommon even in Africa. It will even be more unpopular because of poor care-seeking behavior and lack of diagnostic equipment. This is especially true in large rural population of Ethiopia where poverty and different phases of obstetrics delay are rife. It also means that women needing care do not get access to quality care like in our case where her poor care seeking behavior ended up with four consecutive still births and poor quality of prenatal care ending with undiagnosed uterus didelphys.

While infections are very important and should always be considered as causes of preterm labour. A high index of suspicion will help to diagnose a uterine anomaly; it often leads to more precise clinical examination and studies in cases of recurrent stillbirth and preterm birth, where other causes such as infection and cervical incompetence have been ruled out (13,14).

Uterus didelphys is rare and sometimes not even diagnosed. It occurs in 0.1% -0.5% of healthy fertile population (12). Heinonen PK (3) evaluated the long-term clinical consequences, and reproductive performances of 49 women with uterus didelphys that were followed up to 6.3 years. He found five (13%) had primary infertility. Thirty four out of 36 (94%) of the women who wanted to conceive became pregnant, 21% had miscarriage, while 2% had ectopic pregnancy. The fetal survival rate was 75%, prematurity 24%, fetal growth retardation 11%, perinatal mortality 5.3%, and caesarean delivery rate 84%. Pregnancy was located in the right uterus in 76% cases.

Our patient experienced most of these complications associated with uterus didelphous including four consecutive still-birth, preterm labour and cesarean delivery for the current pregnancy. Her current pregnancy was in both - uterus (twin), and remained uneventful until she had prolonged term PROM with cord prolapse and an emergency caesarean delivery. Her uterus Didelphys was undiagnosed for her previous four consecutive stillbirths until she was operated for the current pregnancy and incidentally diagnosed intra operatively as a case of uterus didelphys. She missed the meticulous prenatal care that was advocated by Heine on PK (3) in her previous pregnancies that would have prevented the adverse outcomes that were associated with this anomaly.

Early diagnosis and prompt operative delivery would have prevented the stillbirths. Previous studies including this study were mostly case reports, and the results cannot be generalized on the general population. Only Heinonen PK (3) was able to follow 49 cases up to 6.3 years. Recent advances in diagnostic techniques, and availability of meticulous medical services and treatments for the associated complications that favor good outcomes depict the international clinical relevance of early diagnosis of the subject. None availability of such modern diagnostic technique in most developing countries like Ethiopia may be the cause of the delay in establishing diagnosis, and thus delayed prompt interventions that could have averted the adverse fetal outcomes.

The directions for further studies should include universal availability of diagnostic techniques like 3-D ultrasound with vaginal probes so that population studies can be undertaken, uterine anomalies identified, and protocol for the management such anomalies established.

Conclusion

Double uterus is an important cause of recurrent preterm births and still-birth like in our case. Thorough pelvic examination should be conducted for women of reproductive age groups when they present for gynecological consultation to rule out double uterus. In the absence of this, pregnant women should have at least one ultrasound study to check their babies and their uterus for rare conditions in order to avoid the obstetrics catastrophe which was reported in our practice.

Most importantly, health education should be intensified through different media on the reality of double uterus and its attendant complications as a means to boost antenatal care booking and attendance for early diagnosis and appropriate management of this congenital anomaly.

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Competing Interest:

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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Tesfaye Kebede, Abebe Habtamu, Abrehet Zeray, Hana Getachew *Ethiop Med J, 2020, Vol. 58, No. 4*

CASE REPORT

WANDERING SPLEEN WITH TORSION: A RARE CAUSE ACUTE ABDOMEN IN CHILDREN

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ABSTRACT

Torsion of wandering spleen is a major complication and also a potentially fatal surgical emergency case, and its correct and early identification continues to represent a challenge especially in children. Because of nonspecific symptoms, clinical diagnosis can be difficult; hence, imaging plays an important role on the initial diagnosis of the condition. We present a case of torsion of wandering spleen in a 10 years old male child. Preoperative diagnosis was made on the basis of ultrasonography and computed tomography, which was later confirmed on surgery.

INTRODUCTION

A wandering spleen, also known as "ectopic", "proptotic", "floating", "displaced" and "aberrant" spleen is defined as a spleen which is hypermobile resulting from maldevelopment of its ligament supports and also due to laxity of the supporting ligaments too. The acquired variant is more common in females after the age of 10 years, and it has been suggested that pregnancy contributes to the laxity of supporting ligaments by the direct effect of estrogen.

Patients with wandering spleen are usually asymptomatic but may present with a mobile abdominal mass due to mobility of the spleen which may be located outside the LUQ. Unless it is complicated with torsion, clinical diagnosis of wandering spleen is difficult. Due to the rarity of the condition, torsion of wondering spleen would not be included in the clinical differentials of patients with acute abdomen, so imaging plays an important role in the diagnosis of asymptomatic cases and those complicated with torsion.

CASE REPORT

A 10-years-old boy who was admitted to pediatric ward with a 2 weeks history of acute abdominal symptoms. He was having abdominal swelling around the mid abdomen for the previous one and half year with progressive increase in size and discomfort especially with movement. Other than repeated malarial attack, there was no significant past medical or surgical history. On general examination, the abdomen was asymmetric with a large mass over the umbilical area measuring 17X12 cm, mildly tender, firm, non-pulsatile,

Table 1: hematologic and serologic test results of a 10year old child with torsion wandering.

Hematology		
	HCT	31.3%
	Hbg	11.2g/dl
	Mcv	78.9fl
	Mch	22.3pg
	WBC	9.13 x 103 (N=50.2 & L = 29.2)
	Platelet	776 x 103
Serology	PICT	Non-reactive
	LFT	Normal
	RFT	Normal
	SERUM ELECTROLYTES	Normal
	SERUM LDH	939u/l

Abdominal ultrasonography revealed absent spleen in the LUQ except small accessary spleen. There was a midline oval abdominal mass measured 17cm in length extending to the pelvis having a homogeneous echo pattern with internal areas of patchy hypo echogenicity.

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Color and spectral Doppler showed complete absence of flow in the mass (Figure 1). Radiological diagnosis of splenic infarct secondary to torsion of wandering spleen was made. The patient was kept in emergency for another ten days because refereeing physicians were not convinced with the radiological diagnosis, since torsed wandering spleen being a rare cause of acute abdomen.

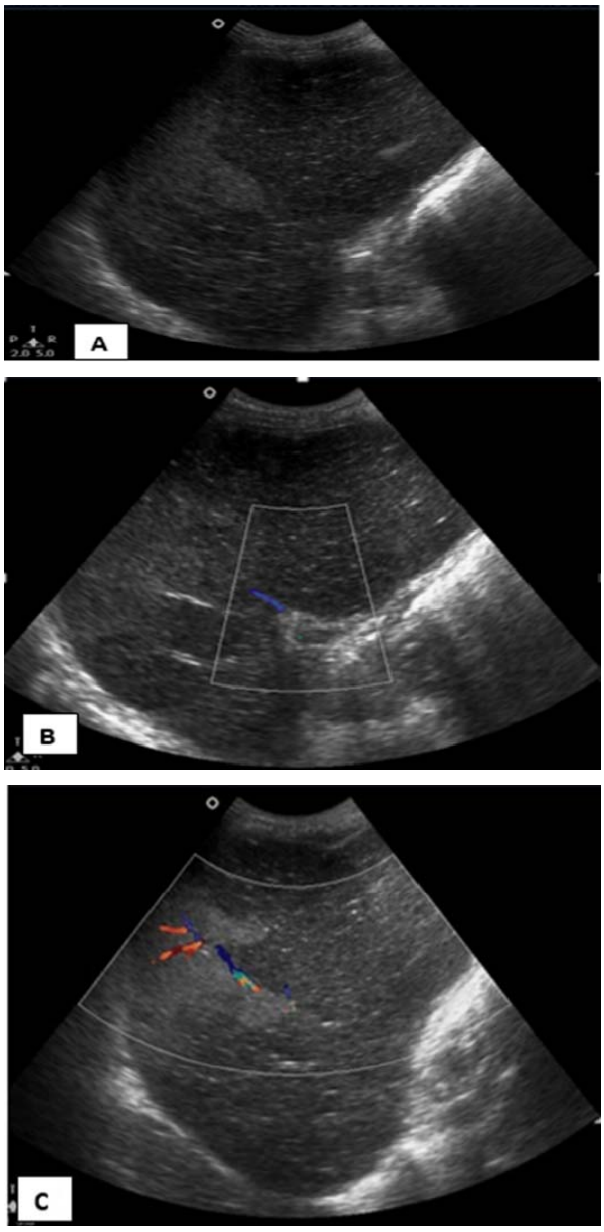

Figure 1: transabdominal ultrasound of a patient with acute abdomen showing heterogeneous predominantly hypoaechoic spleen in the mid abdomen (a) with no parenchymal flow on color Doppler interogatiioon (b & c).

Abdominal CT was then requested and done which also revealed absence of the normal spleen in the left upper quadrant with the spleen markedly enlarged and occupying the mid abdomen measuring 17cm in length with internal areas of non-enhancement confirming the diagnosis of wandering spleen with torsion and splenic infarction (Figure 2).

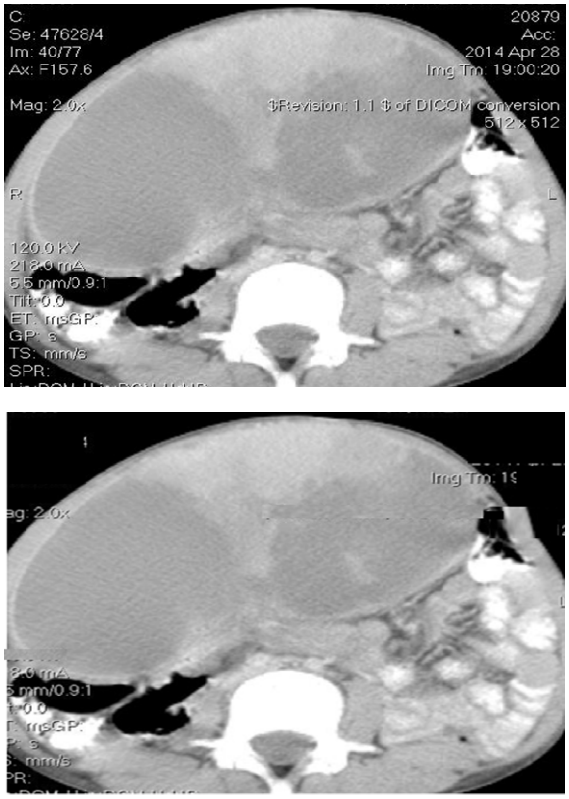

Figure 2: heterogeneously and predominantly peripheral enhancing midline abdominal mass and absent spleen in the LUQ confirming infarcted wondering spleen.

Finally decision was made to surgically intervene which revealed infracted spleen with long and twisted pedicle. There is strong adhesion between the spleen, liver, omentum, large and small bowel loops. Because of the infarction, splenectomy was performed. The postoperative period was uneventful so the patient was discharged.

DISCUSSION

We presented a rare cause of acute abdomen, torsioned wandering spleen, which was initially diagnosed with imaging and managed with splenec-

Due to the rarity of the condition, clinical suspicion is difficult and either imaging or surgery will establish the diagnosis in most cases.

Even if it may sometimes be an incidental finding or asymptomatic, most patients with wondering spleen present with intermittent abdominal pain and mass. (1). Due to excessive mobility of the spleen, either due to congenital absence of the supporting ligaments or due to acquired laxity, spleen may go out of its fossa in the LUQ into the rest of the abdomen and pelvis which can present as an abdominal mass. The acquired form that occurs in conditions that weaken the supporting ligaments like in pregnancy

The age distribution for wandering spleens is variable. There appears that in the first year of life there is a male predominance but after the first year there is female predominance. Which can be explained by the laxity of ligaments due to female hormonal effects of pregnancy (2).

Wandering may also be symptomatic. The most common presenting complaint at all age groups is recurrent abdominal pain, more common in adults. In those under the age of one year, abdominal mass is the predominant findings. (2). It may present as mass anywhere in the abdomen including the pelvis (3, 4). The most common complication encountered in wandering spleen is torsion as in our case, which may result in splenic infarction and necrosis. Most patients with torsion of a wandering spleen present with acute abdomen. When present with acute abdomen, it may sometimes mimic other causes of acute abdomen clinically like appendicitis (5). The mobile torsed spleen may also compress other abdominal structures like bowel and ureters with presentation mimicking bowel obstruction and / or hydronephrosis (2).

Due to lack of accurate clinical diagnosis, imaging is an important non-invasive tool which establishes the diagnosis in most cases. Most patients undergo abdominal ultrasound as the initial mode of evaluation which most of the time suggests the diagnosis, which is true also for our case. Doppler ultrasound may also show the torsed splenic vessels and may also confirm the diagnosis of infarction. Surgical intervention can be done without the need for additional imaging (6). Due to the rarity of the condition, the finding of abdominal mass both clinically and sonographycally may be subjected to other unnecessary invasive diagnostic means like fine needle aspiration cytology (FNAC).

Sometimes patients may also be misdiagnosed as having lymphoma even after ultrasound evaluation which mistakenly consider the abnormally located spleen as a an abdominal mass. This may also lead to initiation of unnecessary medical treatments(7).

Ultrasound alone with the use of Doppler interrogation may establish the diagnosis of splenic torsion; which in such cases rapid intervention can be done without the need for other imaging evaluation. When ultrasound cannot give a specific diagnosis or if there is a need to confirm the diagnosis, both CT and MRI can be employed which may show absence of spleen in its fossa and spleen located in an abnormal position (4, 8). Other CT findings include enlarged low attenuating spleen which show absent or minimal heterogeneous contrast enhancement and enhanced splenic capsule compared with the parenchyma as well as whirling of the splenic vessels (9). Stranding of the fat at the splenic hilum near the whirling of the splenic vessels is also seen which possibly represents congestion.

The current management wandering spleen is surgical with either splenopexy or splenectomy. When there is complication like torsion and infarction, immediate surgical intervention and splenectomy is the standard of treatment (1)

Conclusion

Confident diagnosis of wandering spleen with torsion can be made with ultrasound and radiologists should keep in mind the possibility in pediatric patients presented with acute abdomen where ultrasound revealed the spleen outside the left upper quadrant of the abdomen.

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Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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Seid Mohammed, Richard O.E. *Ethiop Med J, 2020, Vol. 58, No. 4*

CASE REPORT

GOLLOP-WOLFGANG COMPLEX IN AN 18 YEARS OLD FEMALE

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ABSTRACT

Skeletal dysplasias are disorders associated with a generalized abnormality in the skeleton. The Gollop-Wolfgang complex is a limb deficiency disorder and an unusual limb malformation with highly variable manifestations. Here, I report a rare case of an 18-year old female patient with Gollop-Wolfgang Complex showing bifurcation of the left femur, bilateral hemimelia and ectrodactyly of the ipsilateral foot. The etiology of Gollop-Wolfgang complex in this patient could be a familial genetic condition, since she had a younger brother with tibial hemimelia and bilateral cleft hands. The clinical and radiographic findings are presented in detail.

INTRODUCTION

Skeletal displasias represent generalized disorders of cartilage and bone (1). Skeletal dysplasia, affecting around 4 million people worldwide is a heterogeneous group of more than 200 disorders, characterized by abnormalities of cartilage and bone growth - resulting in abnormal shape and size of the skeleton and disproportion of the bones. A cumulative international incidence of at least 1:5000 newborns has been estimated (2).

Gollop-Wolfgang Complex (GWC) is a rare congenital limb anomaly characterized by tibial aplasia, ipsilateral bifurcation of the thighbone and ectrodactyly (3). Very often, the anomalies of limbs, heart, digestive and urinary tracts and the lumbosacral vertebrae are also affected (4).

Ectrodactyly involves the deficiency or absence of one or more central digits of the hand or foot and is also known as split hand/split foot malformation (SHFM) (5). The term ectrodactyly has been applied to a variety of malformations of the fingers or toes. But it is probably best reserved for transverse terminal aphalangia (absence of the last bone in the finger or toe, adactylia (total absence of a finger or toes), or acheiria (total absence of one or both hands) (6).

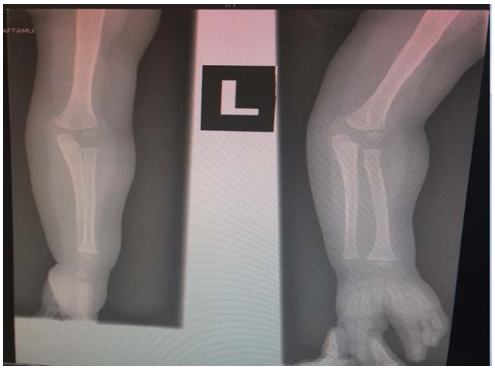
In 1980, Gollop, *et al.* described a case of two brothers with ectrodactyly and unilateral bifurcation of the femur, absence of both tibiae and monodactyly of the feet. In 1984, Wolfgang reported a case of right femoral bifurcation and absence of tibia and bilateral central defects of the hand. Endo, *et al.* found a total of 12 reported cases and added the case of a Japanese girl with a unique form of this malformation complex.

CASE PRESENTATION

An 18 years old female, 9th grade student from Ethiopia, born to a 46-year-old lady, at full term by SVD, presented with limb deformities which included two prominences at her left knee and a short, deformed ipsilateral leg. She also has deformities in the contra lateral leg for which she can't walk on her legs but uses her hands to lift her body and move around. She performs well at school and has better than average scores.

There was no history of exposure to radiation, prenatal teratogenic medications or infections during pregnancy. The mother did not smoke or drink during pregnancy. The child was breast-fed with good appetite for one year.

She has a younger brother with bilateral cleft hands and right leg tibial hemimelia. No other family members are affected. Figures 1,2 and 3 are radiographic images of her affected brother's both upper



extremities and right leg.

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Figure 2: Cleft hand of the right upper extremity (younger brother).

Figure 3: Tibial hemimelia of the right lower extremity (brother).

Coming back to our patient, her physical examination revealed deformed **left** thigh, knee, leg and foot (Figures 4 and 5):

- Deformed left femur with two prominences at the knee
- Short, inverted and hypoplastic foot with absent two central digits
- Patella couldn't be localized
- Fixed flexion deformity of the knee at full flexion (both active and passive)
- Absent quadriceps function
- Distally, she has good capillary filling and sensations are intact

Right foot is flat, internally rotated, and is with rigid equinovarus deformities (Figures 4 and 6).

Figure 4: A picture of the lower extremities of our patient.

She has normal upper extremities and normal trunk and pelvis. No cardiac or spinal anomalies was identified. Radiographic images showed bifid **left** femur with ipsilateral tibial agenesis (Figure 5); intact fibula; absent left patella and absence of left foot's 1st and 2nd central digits along with their corresponding metatarsals; there is fusion of 3rd and 4th metatarso phalangeal joints and a single phalanx emerging out of this fusion. Radiographic images of the **right** lower extremity showed distal tibio fibular

diastasis.

Figure 5: Radiographic image of the left lower extremity of our patient.

Figure 6: Radiographic image of the right leg and foot of our patient.

DISCUSSION

Our patient has all components of Gollop Wolfgang Complex, which includes tibial aplasia, ipsilateral bifurcation of the thighbone and ectrodactyly.

The etiology of GWC is most likely an error in the complex genetic control of limb development but the exact cause is still unclear. GWC is listed as a "rare disease" by the United States Office of Rare Diseases (ORD) of the National Institute of Health (NIH) (8,9). The fact that our patient has a younger brother with features of skeletal dysplasia signifies familial nature of her condition denoting a possible genetic component as an etiology.

The best treatment option for patients with Gollop-Wolfgang syndrome is early knee disarticulation and resection of the protruded bifurcated femur, followed by fitting of a modern prosthesis. For patients with partial tibial hemimelia, foot centralization, with tibiofibular fusion can be done. But for those with complete tibial hemimelia, even though the required post operative rehabilitation is quite intensive and yet the outcome is uncertain, the possible reconstructive option is fibular transfer (Brown's procedure) and callus distraction lengthening. (5,10,11).

In summary, our patient has: Bifurcated left distal femur + absent left patella + fixed flexion deformity of the left knee + ipsilateral Jones' Ia tibial hemimelia + ipsilatral absent central digits of the foot + contralateral Jones' type 4 tibial hemimelia + deformed right ankle and flat foot + bilateral rigid equino varus deformity of the feet. She has a family member (younger brother) with right side tibial hemimelia and bilateral cleft hands. No other family members are affected. There were no additional associated abnormalities like cleft lip/palate, tibial agenesis, visceral or cardiac anomalies seen in this patient.

Conclusion

This case with the above combination of typical GWC (Gollop Wolfgang Complex) and additional features of bilateralism of leg deformities and the presence of a limb anomaly in a close family member calls for further researches in this rare anomaly especially with regard to its possible familial nature.

Competing Interest

The authors declare that this manuscript was approved by all authors in its current form and that no competing interest exists.

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Ephrem Abathun, Yoseph Mamo, Eleanor Reid. *Ethiop Med J, 2020, Vol. 58, No. 4*

PERSPECTIVE

DIGNIFIED COMMUNICATION IN A TIME OF CRISIS: COVID-19 AND THE ROLE OF PALLIATIVE CARE IN ETHIOPIA

Ephrem Abathun, MPH [1] , Yoseph Mamo, MD[1], Eleanor Reid, MD, MSc[2]

As the COVID-19 pandemic continues, it is recklessly, indiscriminatingly, highlighting the need for an often neglected yet vital component of any health system: palliative care. As we write this, recorded global infections have passed 23 million with 800,000 recorded deaths (1)**.** At the height of the crisis in New York City, Emergency Departments were in chaos, with refrigerated trucks serving as mobile morgues set up outside hospitals to accommodate morgue overflow. In Ethiopia, the alert by the World Health Organization was taken very seriously and we have seen major evidence of political commitment to mitigate the pandemic. The covid-19 pandemic has, however, brought forth unprecedented social challenges, with Ethiopians being traditionally communal in worship and daily transactions. Mass activities like funeral processions, church and mosque attendances, mass open markets, an overwhelmed public transportation system and the daily subsistence income of the majority of our population has made lockdown unthinkable. Life is now defined by social distancing, hand sanitization and mask wearing.

Currently over 600,000 Ethiopians have been tested. Of these 32,722 were positive with 572 deaths (2)**.** Initially testing was for those at high risk due to the expense associated with the PCR method , which is resource intensive, but most recently a house to house survey is being carried out which should help to better assess total population prevalence.

End of life preferences are both a highly personal and global, human phenomenon. Whether you live in New York City or Addis Ababa, most of us want the same things at the end: to be with family, to be at peace, at home; in short 'a good death (2). Yet more and more of us are dying apart from families, in hospitals. This is especially true now, in the midst of the covid-19 pandemic. In Ethiopia, having advance directives, or instructions that ensure a doctor acts in a way that honours your wishes, is extremely rare, for a number of important reasons.

Palliative care is a poorly understood, indeed often misunderstood, treatment modality for when curative options are exhausted or not available. It is an often neglected yet vital component of any health system. Palliative care, and its terminus, end-of-life care, aims to decrease suffering and promote dignity and a "good" death, *whatever that means to you*. This last point is critically important. COVID-19 is especially lethal for older adults, and those with underlying health conditions, there are no proven treatments, it is indiscriminate and advances quickly. It is so important right now, that all of us and especially the most vulnerable among us think about and verbalize what we would want, if we were suddenly, critically ill.

COVID-19 has highlighted the need for increased awareness and access to palliative care. Globally, over 19 million people are in need of palliative care, yet just 14% will receive it, largely in high income settings. In Ethiopia, palliative care is in its infancy. The hospice and palliative care movement in Ethiopia started as a response to the health system's inadequacy to respond to the HIV/AIDS epidemic. The first case appeared in 1984 and infection spread rapidly with hospitals and clinics quickly filling up and overflowing bed capacity. Home based hospice-care were, hence, the only alternatives in the absence of anti-retroviral therapy (ART). Community members and minimally trained home care workers filled the void by providing basic services.

More organized initiatives in HCBC were introduced in the year 2000, when care and support services began to be delivered by Organization for Social Services for AIDS (OSSA), and others through Idirs (community self-help associations), and Kebeles (smallest unit of Urban dwellers self-help public associations). The establishment of the Addis-based non-profit organization Hospice Ethiopia in 2003 has further boosted the advocacy for home based palliative care services. The Ethiopian Ministry of Health is also working to improve access to palliative care in Ethiopia.

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In the best of times, and again no matter where you live, it is hard to talk about death. The COVID-19 pandemic is fast-moving, dynamic and has magnified the need for these difficult conversations. Communication of bad news and empathy are a well-organized, cultural practice in Ethiopia 'packaged as *merdo*'. Yet despite this traditional skill, bad news communication is commonly shunned duty by Ethiopian health providers and still much abhorred by the community. Culturally, the collective will of community prevails over the personal autonomy of patients. Individual autonomy is further undermined by critical illness at end of life. A healthcare worker is often instructed by family not to communicate bad news to the patient for fear of inability to cope or even widespread belief in acceleration of death after such a disclosure. Healthcare professionals must learn how to communicate bad news within our accepted cultural context. Assessing what the patient already knows and how much he/she would like to know is a good starting point. As healthcare providers, this is our responsibility, always, but especially now, during this time of crisis. For tips on how to incorporate palliative care into your practice, please visit https://ethiopianpalliativecare.com/, where under the "Resources" tab, you will find links to guides for healthcare providers.

The cloak of palliation, a crucial yet often non-existent component of fragile health care systems and humanitarian response efforts, is a critical adjunct which both reduces suffering and spares resources. There are no second chances in decisions surrounding end of life care, whether we make them for ourselves, a loved one, a patient or whether the decision is made for us. It is time to start having the difficult conversations. We owe this to ourselves, to our families and at challenging time, to our country as well.

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3. Centers for Disease Control. Advanced Care Planning; Ensuring your wishes are known honored if you are unable to speak for yourself. Available at: https://www.cdc.gov/aging/pdf/advanced-care-planning-critical-issue-brief.pdf

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PERSEPECTIVE

NON-HUMAN PRIMATE BITES IN AFRICA: RECOMMENDATIONS ON EVALUATION AND TREATMENT

Tinsae Alemayehu, MD

ABSTRACT

Non-human primates are one of the closest living animals to humans, often mingling in households and street life. Due to their proximity in many societies globally, bites and subsequently consultations for infectious risks are commonly seen in infectious diseases' clinical practice. An approach to the evaluation and treatment of similar non

INTRODUCTION

A nine year old boy presented 12 hours after a monkey bite to his left calf. The incident happened upon a visit to a holiday resort 120 km south of Addis Ababa whose premises are frequented by baboons who feed on left-over food from visitors. The area is also inhabited by stray dogs and cats as well as different wildlife. On examination, he had a solitary bite wound with puncture sites and superficial laceration. His vaccine records were up to date for his age. He was treated with wound cleansing, antibiotic prophylaxis against super-infection, a series of four Rabies vaccines (Verorab) and Tetanus anti-toxin vaccine. An approach to the evaluation and treatment of similar non-human primate bites is summarized.

Potentially infectious non-human primates

There are more than 500 species of non-human primates (NHPs) in the world. These primates are one of Species like Macaque and Langur monkeys are common features of urban life in South Asia. Primates can also be devoured as bush-meat, compounding the routes of exposure to infectious pathogens harbored by these animals (1,2). The epidemiology of the major species of NHPs associated with infectious risks to humans in Africa is mapped below (Figure 1).

Bites from NHPs are one of the commonest routes of dissemination of infectious agents – both when the NHP is the initial host of infection and also when the NHP was secondarily infected from biting another human being. Monkey bites are the second most common form of animal bites in India – next to dog bites (3). Potential hazards range from the mostly asymptomatic ones like foamy virus infections to the life-threatening disorders caused by simian herpes B viruses and Ebola viruses (4).

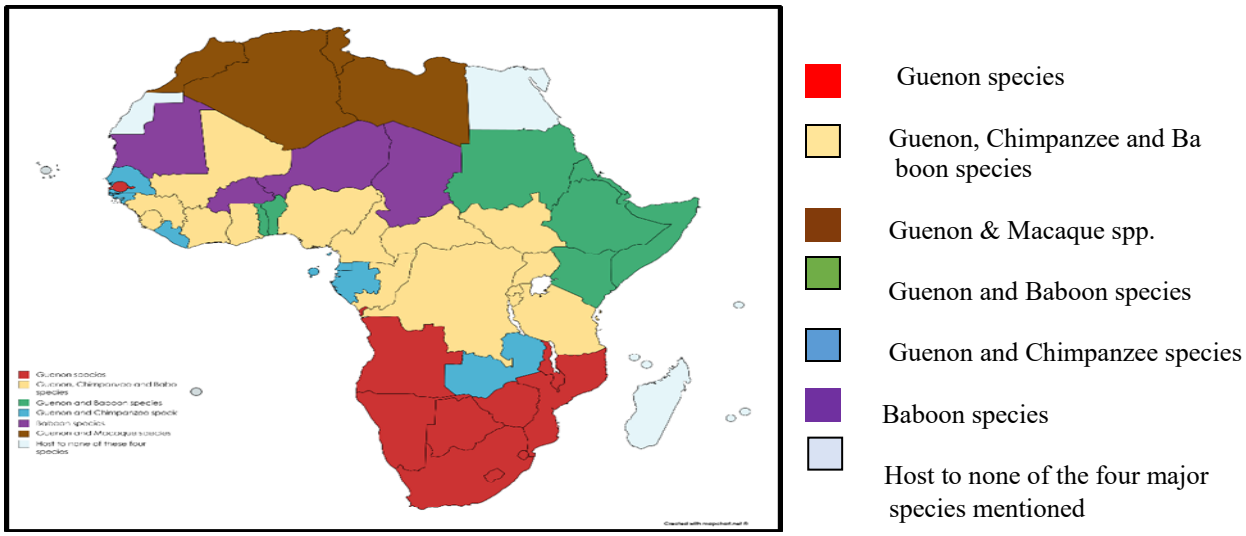

Figure 1: Distributions of major non-human primate species in African countries which are potentially infectious

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Syndromes resulting from non-human primate bites

There are multiple human viral and bacterial infections which can follow NHP bites (Table 1). B viruses or *Cercopithecine herpes* viruses 1 can cause fatal encephalitis in bitten humans while they remain asymptomatic in most of the culprit primates. The main monkeys associated with this infection are Macaque species (Figure 2A). Infections occur after about one month of incubation. Proximity of bite to the central nervous system and the degree of inoculum (mucosal splash, loss of skin integrity, depth of bite) are major determinants of disease (5,6).

Symptoms can be myriad as B virus encephalitis can affect any part of the nervous system. Reports exist of ataxia, sensory and behavioral abnormalities, ascending flaccid paralysis or diplopia being presenting signs. Even if caught, the clinical appearance of the macaque monkey is not helpful in decisions for prophylaxis or treatment (5,7).

Table 1: Notable infectious hazards from bites from major species of NHPs found in Africa

Guenons	Pox viruses, Ebola Aerobes and anaerobes including Neisseria, Streptococci, Staphylococci, Hemophilus parainfluenzae, Moraxhella, Eikenella, Bacteroides, Fusobacterium, Clostridium tetani and Pasteurella multocida
Baboons	Pox viruses Aerobes and anaerobes including Neisseria, Streptococci, Staphylococci, Hemophilus parainfluenzae, Moraxhella, Eikenella, Bacteroides, Fusobacterium, Clostridium tetani and Pasteurella multocida
Macaques	B virus, Pox viruses, Ebola Aerobes and anaerobes (Burkholderia pseudomallei, Staphylococci, Neisseria, Moraxhella,Streptococci, Hemophilus parainfluenzae, Eikenella, Bacteroides, Fusobacterium, Clostridium tetani, Pasteurella multocida etc)
Chimpanzees	Molluscum contagiosum, Pox viruses, Ebola Aerobes and anaerobes (Burkholderia pseudomallei, Staphylococci, Neisseria, Moraxhella,Streptococci, Hemophilus parainfluenzae, Eikenella, Bacteroides, Fusobacterium, Clostridium tetani, Pasteurella multocida etc)

Key: SIV – Simian immunodeficiency virus

(Table modified from National Research Council (US) Committee on Occupational Health and Safety in the Care and Use of Nonhuman Primates. National Academies Press (US); 2003) (4)

Bites and other forms of exposure (droplet, contact) from different species of NHPs including Guenons, Chimpanzees and Macaques (Figures 2 A – C) have been reported to be sources of Ebola and Marburg infections in humans (4,8,9). Marburg infections present after a 1 – 2 weeks incubation while symptoms may appear as late as three weeks after exposure in Ebola viral hemorrhagic disease.

Patients may present with fever, headache, myalgia and abdominal pain which may then be followed by vomiting, diarrhea, petechial rash over face and trunk and conjunctivitis. Children may develop cough or fast breathing too.

Molluscum contagiosum, a disorder thought to be exclusive to humans, has been documented in chimpanzees and can be transmitted via close contact (4).

Monkey pox is a related infection which presents with similar skin lesions but uniquely having hemorrhagic necrosis at bite sites. Symptoms are preceded by a prodrome of fever, headache, and sweats and involving prominent lymphadenopathy (10).

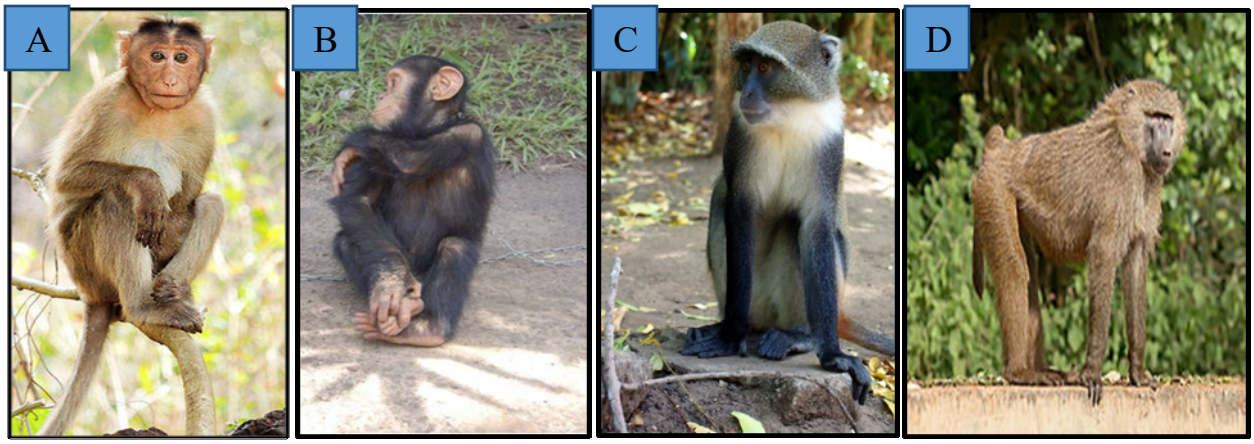

Figure 2A: Macaque monkey

Figure 2B: Chimpanzee

Figure 2C: Sykes' monkey – a type of Guenon monkey (Genus: *Cercopithecus*)

Figure 2D: Olive baboon

Rabies following NHP bites is rarely reported with only 25 cases reported over a period of five decades (1960 – 2013) (11). But Monkeys have been demonstrated to carry the virus in Rabies-endemic countries (figure 3) (12,13).

Evaluation and management

The assessment of a victim of a non-human primate bite includes:

- Reviewing past medical history to assess need for immunoprophylaxis against Tetanus (age of patient, vaccination history etc) (11).
- Assessing need for immunoprophylaxis against Rabies (reviewing the distribution of domestic and wild animals around the area of the incident, understanding whether the bite was provoked or not etc) (figure 3) (12).
- Showing pictures of common primates of infectious risk to humans may help identify species of particular risk – Example: Macaques in relation to simian herpes risk.

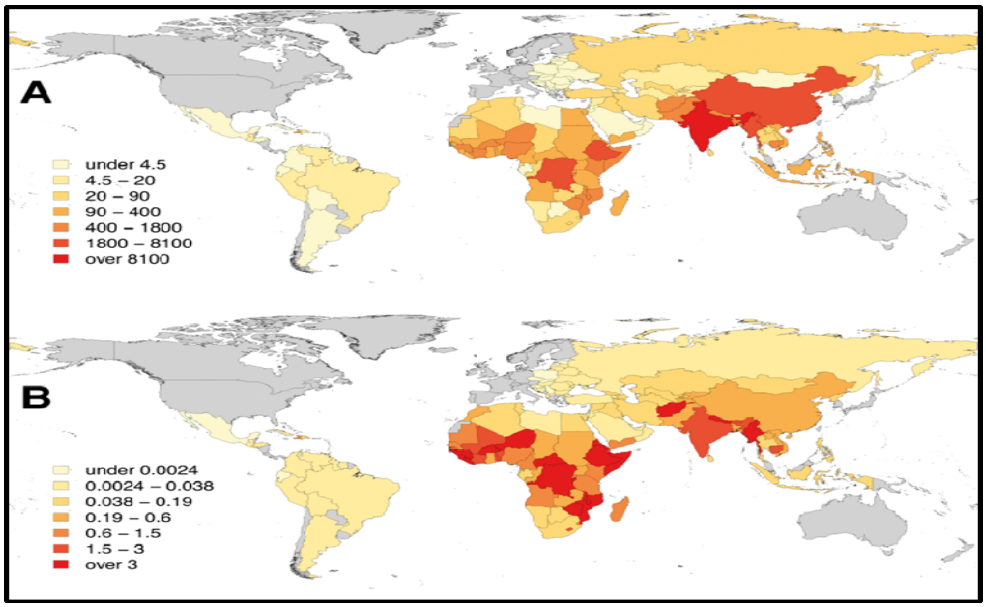

Figure 3: Global burden of dog-transmitted human rabies (14) A) Human rabies deaths and B)

Cultures for both aerobic and anaerobic bacteria should be taken followed by copious irrigation of wound with soap or detergent (skin) or with saline or water (mucosa) for 15 minutes or more.

Antibiotic prophylaxis is recommended for NHP bites which are contaminated, puncture wounds and involving the hands. Amoxicillin-Clavulanate for 3 – 5 days is the preferred option. In Penicillin allergic patients, a combination of Cotrimoxazole and Clindamycin or a 3rd generation Cephalosporin with Clindamycin can be used (4,11,12).

Antiviral treatment against B viruses (risky encounters reported from a few countries in the north of Africa so far, though more cases reported from south Asia) is successful if started before neurologic symptoms appear. Intravenous Acyclovir (when neurologic symptoms are absent) or Ganciclovir (when neurologic symptoms are present) both till symptoms resolve are appropriate therapeutic options. Without therapy, mortality rates in humans exceed 70%. Post-exposure prophylaxis can be given by oral Acyclovir five times per day for 14 days (7).

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As in all previous years, the Ethiopian Medical Journal (EMJ) was fortunate enough to have enlisted the dedicated support of highly professional reviewers. The Board of Editors of EMJ takes the opportunity in this Issue (last in the series of Volume 58, 2020) to acknowledge their invaluable contributions to the Journal and, thereof, to the dissemination of research outputs in Ethiopian physicians and other countries, particularly in developing settings. All colleagues listed below deserve special thanks for graciously accepting our request and for doing the painstaking work of reviewing the manuscripts published in Volume 58 of the EMJ.

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Ethiopia's oldest medical journal, *The Ethiopian Medical Journal (EMJ)* is the official organ of the Ethiopian Medical Association (EMA). The EMJ is devoted to the advancement and dissemination of knowledge pertaining to the broad field of medicine in Ethiopia and other developing countries. The journal first appeared in July 1962 and has been published quarterly (January, April, July, October) without fail since then. It has been published in both online (www.emjema.org) and hard copy (ISSN0014-1755) versions.

The EMJ continues to play an important role in documenting and disseminating the progress of scientific medicine, and in providing evidence base for health policy and clinical practice in Ethiopia and Africa at large.

Our online journal is open access. The hard copies are distributed to members of the Ethiopian Medical Association. Hard copies of the Journal are distributed to institutions and organizations (internal and external) based on subscription.

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The Ethiopian Medical Journal uses a double-blind review system for all manuscripts. Each manuscript is reviewed by at least two reviewers. The reviewers act independently, and they are not aware of each other's identities. The reviewers are selected solely based on their relevant expertise for evaluating a manuscript. They must not be from the same institution as the author(s) of the manuscript, nor be their co-authors in the recent past. The purpose of peer review is to assist the author in improving papers and the Editorial Board in making decision on whether to accept or reject a manuscript. Reviewers are requested to decline if they have a conflict of interest or if the work does not fall within their expertise.

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It is the responsibility of the authors to specify the title and code label of the research project within which the work was created, as well as the full title of the funding institution. In case a submitted manuscript has been presented at a conference in the form of an oral presentation (under the same or similar title), detailed information about what was published in proceedings of the conference shall be provided to the Editor-in-Chief upon submission.

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- The accused will always be given the chance to respond to any charges made against them.

If it is judged at the end of the investigation that misconduct has occurred, then it will be classified as either minor or serious.

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Article types acceptable by EMJ

Original Articles (*vide infra*) on experimental and observational studies with clinical relevance
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Case Series
Case Reports
Editorials, Review or Teaching Articles: by invitation of the Editorial Board.
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Monographs or set of articles on specific themes appearing in a Special Issues of the Journal
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N.B. Articles are not acceptable if previously published or submitted elsewhere in print or electronic format, except in the form of abstracts in proceedings of conferences.

Content and format of articles:

Title: The title should be on a separate page. It should not have acronyms or abbreviations. The title should be descriptive and should `not exceed 20 words or 120 characters including space. The title page should include the name(s) and qualification of the author(s); the department or Institution to which the study/research is attributed and address of the corresponding Author. If the author has multiple affiliations only use the most preferred one.

1. Original Articles

2,500 words, excluding Abstracts, References, Figures and Tables. The manuscript of the Article, should appear under the following headings:

a) Abstract: The abstract of the Article is prepared on a separate paper, a maximum of 250 words; it should be structured under the titles: a) Background; b) Methods; c) Results; d) Conclusions. Briefly summarize the essential features of the article under above headings, respectively. Mention the problem being addressed in the study; how the study was conducted; the results and what the author(s) concluded from the results. Statistical method used can appear under Methods paragraph of the Abstract, but do not insert abbreviations or references in the Abstract section.

Keywords: Provide three to six key words, or short phrases at the end of abstract page. Use terms from medical subject heading of Index Medicus to assist in cross indexing the Article.

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- The titles of journals should be abbreviated according to the style used for MEDLINE (www.ncbi.nlm.nih.gov/nlmcatalog/journals).
- References should be numbered consecutively in the order in which they are first mentioned in the text and identify references in text, tables, and legends by Arabic numerals in parentheses.
- Type the References on a separate sheet, double spaced and keyed to the text.
- Personal communications should be placed NOT in the list of references but in the text in parentheses, giving name, date and place where the information was gathered or the work carried out (e.g. personal communication, Alasebu Berhanu, MD, 1984, Gondar College of Medical Sciences). Unpublished data should also be referred to in the text.
- References with six or less authors should all be listed. If more than six names, list the first three, followed by et al.
- Listing of a reference to a journal should be according to the guidelines of the International Committee of Medical Journal Editors ("Vancouver Style') and should include authors' name(s) and initial(s) separated by commas, full title of the article, correctly abbreviated name of the journal, year, volume number and first and last page numbers.
- Reference to a book should contain author's or authors' name(s) and initials, title of chapter, names of editors, title or book, city and name of publisher, year, first and last page numbers.

The following examples demonstrate the acceptable reference styles.

Articles:

- Gilbert C, Foster A. Childhood blindness in the context of Vision 2020: the right to sight. *Bull World Health Org 2001;79:227-32*
- Teklu B. Disease patterns amongst civil servants in Addis Ababa: an analysis of outpatient visits to a Bank employee's clinic. *Ethiop Med J 1980;18:1-6*
- Tsega E, Mengesha B, Nordenfelt E, Hansen B-G; Lindberg J. Serological survey of human immuno-deficiency virus infection in Ethiopia. *Ethiop Med J 1988; 26(4): 179-84*
- Laird M, Deen M, Brooks S, et al. Telemedicine diagnosis of diabetic retinopathy and glaucoma by direct ophthalmoscopy (Abstract). *Invest Ophthalmol Vis Sci 1996; 37:104-5*

Books and chapters from books:

- Henderson JW. Orbital Tumors, 3rd ed. Raven Press New York, 1994. Pp 125-136.
- Clipard JP. Dry Eye disorders. In Albert DM, Jakobiec FA (Eds). Principles and Practice of Ophthal-mology. W.B Saunders: Philadelphia, PA 1994 pp257-76.

Website:

- David K Lynch; laser History: Masers and lasers. http://home.achilles.net/jtalbot/history/massers.htmAccessed 19/04/2001

2. **Brief Communication**

Short versions of Research and Applications articles, often describing focused approaches to solve a health problem, or prelnary evaluation of a novel system or methodology

- Word count: up to 2000 words
- Abstract up to 200 words; excluding: Abstract, Title, Tables/Figures and References
- Tables and Figures up to 5
- References (vide supra – Original Article)

3. **Case Series**

Minimum of three and maximum of 20 cases

- Up to 1,000 words; excluding: Abstract, Title, Tables/Figures and References
- Abstract of up to 200 words; structured; (vide supra)
- Statistical statements here are expressed as 5/8 (62.5%)
- Tables and Figures: no more than three
- References: maximum of 20

4. **Case Report**

Report on a rare case or uncommon manifestation of a disease of academic or practical significance

- Up to 750 words; excluding: Abstract, Title, Tables/Figures and References
- Abstract of up to 100 words; unstructured;
- Tables and Figures: no more than three
- References: maximum of 10

5. **Systematic review**

Review of the literature on topics of broad scientific interest and relevant to EMJ readers

- Abstract structured with headings as for an Original Article (*vide supra*)
- Text should follow the same format as what is required of an Original Article
- Word count: up to 8,000 words, excluding abstract, tables/Figures and references
- Structured abstract up to 250 words
- Tables and Figures up to 8

6. **Teaching Article**

A comprehensive treatise of a specific topic/subject, considered as relevant to clinical medicine and public health targeting EMJ readers

- By invitation of the Editorial Board; but an outline of proposal can be submitted
- Word limit of 8,000; excluding abstract, tables/Figures and references
- Unstructured Abstract up to 250 words

7. Editorial

- By invitation of the Editorial Board, but an editorial topic can be proposed and submitted
- Word limit of 1,000 words: excluding references and title; no Abstract
- References up to 15.

8. Perspectives

- By invitation of the Editorial board, but a topic can be proposed and submitted
- Word limit of 1,500
- References up to six

9. Obituaries

- By invitation of the Editorial board, but readers are welcome to suggest individuals (members of the EMA) to be featured.

Preparation of manuscripts

- Manuscripts must be prepared in English, the official language of the Journal.
- On a single separate sheet, there must be the title of the paper, with key words for indexing if required, and each author's full name and professional degrees, department where work was done, present address of any author if different from that where work was done, the name and full mailing address of the corresponding author, including email, and word count of the manuscript (excluding title page, abstract, references, figures and tables). Each table/figures/boxes or other illustrations, complete with title and footnotes, should be on a separate page.
- All pages should be numbered consecutively in the following order: Title page; Abstract and keywords page; main manuscript text pages; References pages; acknowledgment page; Figure-legends and Tables
- The Metric system of weights and measures must be used; temperature is indicated in degrees Centigrade.
- Generic names should be used for drugs, followed by propriety brand name; the manufacturer name in parenthesis, e.g. diazepam (Valium, Roche UK)
- Statistical estimates e.g. mean, median proportions and percentages should be given to one decimal place; standard deviations, odds ratios or relative risks and confidence intervals to two decimal places.
- Acronyms/Abbreviations should be used sparingly and must be given in full, at first mention in the text and at the head of Tables/foot of Figure, if used in tables/figures.eg. Blood Urea Nitrogen (BUN). Interstitial lung disease (ILD).
- Use the binomial nomenclature, reference to a bacterium must be given in full and underlined - underlining in typescript becomes italics in print (e.g. *Hemophilus influenzae)*, and later reference may show a capitalised initial for the genus (e.g. *H. influenzae)*
- In the text of an article, the first reference to any medical phrase must be given in full, with the initials following in parentheses, e.g., blood urea nitrogen (BUN); in later references, the initials may be used.
- Manuscripts for submission should be prepared in Microsoft Word document file format

Submission of manuscripts

- As part of the submission process, authors are required to check off their submission's compliance with journals requirements

- All manuscripts must be submitted to the Editor-in-Chief of the Journal with a statement signed by each author that the paper has not been published elsewhere in whole or in part and is not submitted elsewhere while offered to the *Ethiopian Medical Journal*. This does not refer to abstracts of oral communications at conferences/symposia or other proceedings.
- It is the author's responsibility to proof-read the typescript or off-print before submitting or resubmitting it to the Journal, and to ensure that the spelling and numerals in the text and tables are accurate.
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- Within one week of receipt of a manuscript, the Editorial Board will review it in reference to (i) conformity with the Journal's "guidelines to authors (revised version available in all issues starting January 2020)", (ii) relevance of the article to the objectives of the *EMJ*, (iii) clarity of presentation, and (iv) plagiarism by using appropriate software
- The Editorial Board has three options: accept manuscripts for external review, return it to author for revision, or reject it. A manuscript not accepted by a board member is blindly reviewed by another board member. If not accepted by both, the manuscript is rejected by the Editorial Board. Decision will be made by the suggestion of a third Editorial Board member if the decisions of first two do not concur.
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