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EDITORIAL

LIGHTING THE WAY: EVIDENCE INFORMED RESPONSE TO 2019 NOVEL CORONAVIRUS DISEASE (COVID-19)

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The 2019 novel coronavirus disease (COVID-19) pandemic has caught health systems unprepared-again- despite repeated calls for commitment to capacity strengthening following an increasingly frequent occurrence of global emergencies in recent decades (human immunodeficiency virus, Severe Acute Respiratory Syndrome virus, H1N1 Influenza virus, Ebola virus, Middle East respiratory syndrome coronavirus). As clearly witnessed, it has overwhelmed even those countries where pillar institutions of science and technology were traditionally strong.

Unprecedented speed, massive scale, clinical severity and huge health service disruption have characterized COVID-19. Physical distancing measures taken to control its transmission have profound negative impact on individuals and communities resulting in societal and economic difficulties. The indirect effect of COVID-19 on health service disruption (as seen in the dramatic decline in the number of women delivering in health institutions, cancellation of enormous numbers of surgical elective operations, of medical appointments, interruption of vaccination, suspension of mass drug administration campaigns, just to name a few) is being felt in rising morbidity and mortality from other illnesses (1,2). The progress made in the control of infectious diseases is likely to suffer serious setbacks not only in years of progress lost but also in prolonged delays even when services would resume.

Frontline health workers have suffered from high rates of infection with much loss of life. The risk of transmission in health facilities remains a concern because personal protective equipment is often in short supply or totally unavailable. Infection prevention and control measures are difficult to implement effectively when health facilities are increasingly overburdened, further underfunded and management is overwhelmed by crisis.

In the absence of a vaccine and curative treatment, the most effective response to COVID-19 so far has been physical distancing, testing, isolation, contact tracing and case management. Testing is unfortunately still technology intensive, costly and not widely available in health facilities of resource limited countries, adversely affecting the response to the pandemic (3,4). Individual level hand hygiene, respiratory etiquette and physical distancing are critical to limit transmission. Population level physical distancing measures including movement restriction have become essential despite the severe socioeconomic consequences that disproportionately affect the underprivileged. These measures are blunt in that they do not allow for context specific responses and their implementation needs to be tailored to local conditions to avoid the considerable social and economic costs that might result in higher morbidity and mortality as a consequence of these measures themselves.

In this period of overabundance of recommendations and conflicting information on COVID-19, there is a serious need for trustworthy communication that is tailored to the right audience at the right time. It is worthwhile to realize that the messages coming out from COVID-19 "authorities" are sometimes inconsistent and often moving targets. This is a time when local research data are of huge importance and relevance to guide the fight against COVID-19. The pandemic has shown significant differences in case fatality rate among different populations and communities. There is yet much to learn about the determinants of infection, clinical course, severity of disease and mortality in the African setting. To calibrate containment measures to local capacity and context, it is important to have at hand real time knowledge of the local epidemiology, the community and the health system performance. An adequate understanding of the community would require assessment of resilience, knowledge, behavior, perceptions and attitude towards response alternatives (5,6). Mobilization is best achieved when the solutions emanate from communities themselves and are managed through their leadership.

Ethiopia is facing a rising epidemic that is expected to spread into rural communities (7). The fight against COVID -19 is likely to be a protracted one until an effective vaccine is developed. What we do today will influence not

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only the evolution of COVID-19 but also the course of the other health problems we had been struggling with as our priorities until just a few months ago.

This is the time more than ever to document observations, conduct good quality investigations (8), do critical analysis and generate evidence for informed decision making to guide an effective response against COVID-19 tailored to the Ethiopian situation. It is a time for harmonized study protocols, collaborative investigations, data sharing and scientific dialogue. The dynamics of COVID-19 epidemic in Ethiopia is likely to vary between regions and subregions as it spreads depending on several factors including effectiveness of the measures taken to limit spread. The experiences of other countries in dealing with COVID-19 would suggest a number of alternatives and are useful to learn from but may not be trusted to serve as effective prescriptions for Ethiopia. The country will need to tailor its responses to its specific context based on scientific evidence. Much of the evidence needed does not require sophisticated equipment and can be generated by existing workforce if sufficient resources are mobilized for the purpose and scientific deliberations are scaled up (9). It is time for an organized multisectoral initiative involving various experts (health professionals, sociologists, anthropologists, economists, mathematicians, information technology experts, behavioral scientists, development specialists, etc.) and stakeholders (civil society, universities and research institutions, public services and government institutions) to rally forces in support of evidence generation, dissemination and uptake of research findings for a whole-of-society and whole-of-government response to COVID-19 in Ethiopia.

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ORIGINAL ARTICLE

POOR HYPERTENSION CONTROL AMONG PATIENTS ATTENDING THE KILI-MANJARO CHRISTIAN MEDICAL CENTRE, TANZANIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Introduction: *Poor hypertension control contributes significantly to the growing burden of Disability Adjusted Life Years. Despite the awareness and availability of interventions, only a small number of patients achieve the desired outcome, and the factors associated with poor control remain unclear.*

Objective*: The study aimed to determine the prevalence and factors associated with poor hypertension control.*

Methods: *We conducted a hospital-based cross-sectional study between June and August 2018. At the medical outpatient clinic, hypertensive patients 18 years and above who gave consent were eligible. An interview schedule was used to collect the general characteristics, followed by blood pressure recording. Poor hypertension control was defined as two consecutive high blood pressure readings of one month apart in patients using anti-hypertensive. Logistic regression was performed to determine factors associated with poor control.*

Results: *A total of 300 patients were enrolled in this study. More than half (52.0%) of the participants were female and living in rural areas (57.3%). The mean (±SD) age of participants was 64.1 (±12.02) years. More than three quarter (86.7%) of the participants had poor blood pressure control. Factors associated with poor control were; older age (cOR=1.05, 95% CI=1.02-1.08), being unemployed (cOR=3.46, 95% CI=1.30-9.14), and duration on anti-hypertensive (cOR=1.05, 95% CI=1.00-1.11).*

Conclusion: *Eight in every ten hypertensive patients had poor control. The poor control in this population was associated with unemployment, age and duration on anti-hypertensive. The results call for more concerted efforts to address hypertension control.*

Keywords*: Prevalence, Hypertension, Control, Factors, Tanzania.*

INTRODUCTION

Hypertension is a systolic blood pressure of ≥ 140mmHg and/or diastolic blood pressure of ≥ 90mmHg (1). Globally, an estimated 1.39 billion people are hypertensive (2), with the majority living in developing countries (3). The prevalence of hypertension varies widely within the region, a review in Africa reported a prevalence range between 9.3% and 48.1% (4). In Tanzania, a prevalence of 37% has been reported while that of Moshi district was far higher (69%) than the national average (5).

The condition is linked to a number of complications such as stroke, kidney failure, myocardial infarction, and heart failure. These complications are the top killers worldwide, whereby 51% and 45% of deaths are due to stroke and heart diseases respectively (6). Additionally, hypertension contributes significantly to the global disability-adjusted life years (DALYs), for example in 2015 alone systolic blood pressure of ≥140mmHg was linked to 143 million DALYs (7).

Despite efforts to reduce the burden of hypertension, there have been disparities in the achievements. Between 2000 and 2010, the prevalence of hypertension increased by 7.7% in low and middle -income countries compared to a 2.6% decline in high-income countries (8). A similar shift in the trends of high blood pressure form the high-income countries to low and middle-income countries was also observed in the period between 1975 and 2015 (9).

Despite being a common condition, only a small proportion achieve the desired blood pressure control. In high-income countries, only about a quarter (28.4) of those on antihypertensives have controlled blood pressure (8). For example, in England and the USA 34% and 50% of patients on anti-hypertensive attained hypertension control, respectively (10). Furthermore, in China, 22.1% of hypertensive patients had their blood pressure controlled (11).

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Considering the noticeable health system gaps in Africa, it is not surprising to find poor hypertension control in these countries. Across the resource-limited regions, previous estimates reported higher (92.3%) rates of poor blood pressure control (8).

Though the prevalence of uncontrolled blood pressure remains unacceptably high in this region, in the recent surveys a decline has been observed. In Ghana, Kenya and Ethiopia a 57.7%, 48.3% and 52.5%% poor blood pressure control has been reported, respectively (12). In Tanzania, only 0.9% of the population was adequately controlled (5,13,14).

The global poor blood pressure control is associated with many factors. The attributes are broad, both individual, disease pathophysiology and the health system. Previous studies have consistently reported personal factors like older age, male sex, high body mass index (BMI), active smoking, poor adherence to physical activity, and poor adherence to medications as predictors of the poor control (14,15). The duration of hypertension and the presence of co-morbid conditions like diabetes mellitus also contribute to poor control (16).

Despite the high prevalence of hypertension and the poor control elsewhere, in Tanzania as to many other low-income countries, the factors associated with the poor control has not been examined extensively. In the present research, we report factors associated with poor hypertension control among patients attending at Kilimanjaro Christian Medical Centre.

METHODS

Design and setting

We conducted a cross-sectional study between June and August 2018 at the Kilimanjaro Christian Medical Centre (KCMC). The hospital is among the four zonal referral hospitals in the country, serving an estimated 15 million people living in the five regions (Kilimanjaro, Tanga, Arusha, Singida, and Manyara) of Northern Tanzania. Since the facility is in the Kilimanjaro region, most patients are from Kilimanjaro, a region with 7 districts. The participants were enrolled at the medical outpatient clinic.

The clinic is scheduled for Monday and Friday of every week, where patients are followed on a monthly basis. Within a period of one month, each client is expected to make at least one visit to the clinic. Upon visiting the clinic, patients refill the drugs and check their blood pressure. In addition to adherence counselling, they are also counselled on the lifestyle modification.

Study population

Adults aged 18 years and above, previously diagnosed with hypertension and on anti-hypertensive drugs were considered eligible. The clients with the hypertensive crisis were excluded from participating in the study.

Sample size and sampling technique

The sample size was calculated based on a precision formula for a single population proportion. Assuming 88.6% prevalence of poor blood pressure control in a recent hospital-based survey in Ethiopia (17) and a 5% margin of error, the minimal required sample was estimated to be 155 hypertensive clients on treatment.

A total of 840 hypertensive patients attended the hypertensive clinic during the study period. Out of 411 clients were referred to the study team for screening. Following the screening, 305 were considered eligible for enrolment. However, 2 clients were not willing, and 3 absconded participation.

Procedures

At the outpatients' clinic, the triage nurse identified potential participants and referred them to the research team. Participants were briefed about the study topic, especially the objectives and procedures. Those willing and gave written consent were interview by the investigators. Interviews were conducted using the adapted WHO STEPS questionnaire (18). The tool was translated and used in the Swahili language.

Data abstraction: blood pressure a month preceding the current visit was extracted from the participant file. Additionally, the date of diagnosis, antihypertensive drugs, and comorbid diseases were also extracted from the patient file.

Measures

Blood pressure: The blood pressure was measured by a nurse using digital blood pressure device (Omron brand) following the American Heath Association recommendations (at the right arm, seated comfortably, appropriate calf size, legs uncrossed, upper arm bared, patient relax for 5 minutes before measurement) (19).

A cut-off point of ≥140/90mmHg was used to define high blood pressure (19), patients with two consecutive reading above or equal to 140/90mmHg of one month apart were classified to have poor control (20).

In addition to socio-demographic information (age, sex, level of education, place of residence, employment status and average monthly income), the following explanatory variables were also collected. Smoking status, participants were asked if they were smoking a cigarette or other tobacco products. Alcohol consumption including the type and amount used per day. Also, study participants were asked on physical activity, this reflected walking or riding a bicycle 10 minutes continuously to get to and from. Weight and height were measured using a portable weighing machine (Seca brand), with minimum clothing and barefooted. The BMI was calculated using a formula; BMI=weight/height^2 in kg/m2. Participants were classified using the obtained parameters, whereby, overweight was defined as BMI between 25 and 29.9kg/m^2 and obesity as a BMI of ≥ 30 kg/m^2.

Data analysis

The analysis was done using the Statistical Package for Social Sciences (SPSS) version 20. Hypertension control is the binary outcome, it was coded as Yes and No, whereby yes was for the one who have not attained hypertension control and no for those who have attained hypertension control. Logistic regression was used to determine factors associated with poor hypertension control, and factor with a p-value of <0.05 was considered statistically significant.

Ethical consideration

Permission to conduct this research was obtained from the Kilimanjaro Christian Medical University College Research and Ethics Committee (certificate number 2417). We also obtained the permission from the KCMC Hospital administration to carry out the study at the hospital. The risk and benefits of participating in the study were explained to potential participants then written consent was obtained from respondents before enrollment.

RESULTS

A total 300 of hypertensive patients were enrolled in this study. The mean (±SD) age of the participants was 64.1 (±12.02) years. More than half were females 156 (52.0%) and married 221 (73.7%). Only 105 (35.0%) had completed secondary education. Over three quarters 245 (81.7%) of patients had health insurance, and the median (IQR) income of the participants was 100,000 (50,000-300,000) TZS per month. Moreover, only four (1.3%) partici-

Table 1 : General characteristics of the study

Variables	n	%
Age		
Mean (±SD)	64.1(±12.02)	
Sex		
Male	144	48.0
Female	156	52.0
Place of residence		
Rural	172	57.3
Urban	128	42.7
Marital status		
Married	221	73.7
Not married	79	26.3
Education level		
No formal school and primary education	195	65.0
Secondary and above	105	35.0
Employment		
Employed	209	69.7
Not employed	91	30.3
Health insurance		
Yes	245	81.7
No	55	18.3
Income (TZS)		
<50,000	108	36.0
50,000-200,000	77	25.7
>200,000	115	38.3
Time on anti-hypertensive (yrs.)		
Median (IQR):	5(2-14)	
Current alcohol use (n=50)		
Yes	21	42.0
No	29	58.0
Currently smoking		
Yes	4	1.3
No	296	98.7
Physical activity		
Yes	80	26.7
No	220	73.3
Adding table salt.		
Yes	50	16.7
No	250	83.3
Herbal use.		
Yes	84	28.0
No	216	72.0
BMI		
Normal	79	26.3
Overweight	122	40.7
Obese	99	33.0

1USD=2200TZS

Out of 300 hypertensive patients enrolled in this study, more than a quarter (86.7%) had high blood pressure (uncontrolled blood pressure). In a bivariate analysis, three variables (age, unemployment and duration on anti-hypertensive) were significantly associated with poor hypertension control. To begin with is age, an increase in age by one year was associated with an increase of odds of poor control by 1.1 Unemployed patients had 3.5 higher odds of poor blood pressure control compared to employed (cOR=3.46, 95% CI=1.30-9.14). Lastly, a one-year increase in duration of using anti-hypertensive was associated with 1.1 increase in odds of poor control (cOR=1.05, 95% CI=1.00-1.11) (Table 2).

Table 2: Factors associated with poor hypertension control

Variable	Poor hypertension control n (%)	cOR(95%CI)	P-value
Age			
Mean (±SD)	64.1(±12.02)	1.05(1.02-1.08)	<0.01
Sex			
Male	144(48)	1	1
Female	156(52)	1.23(0.63-2.39)	0.541
Marital status			
Married	221(73.7)	1	1
Not married	79(26.3)	2.21(0.89-5.49)	0.087
Employment status			
Employed	209(69.7)	1	1
Not employed	91(30.3)	3.46(1.30-9.14)	0.012
Education level			
Secondary and above	105(35)	1	1
No formal school and primary education	195(65)	1.83(0.93-3.58)	0.078
Insurance			
Yes	245(81.7)	1	1
No	55(18.3)	0.88(0.38-2.03)	0.770
Current alcohol			
No	29(58)	1	1
Yes	21(42)	0.31(0.52-1.90)	0.209
Current smoke			
No	296(98.7)	1	1
Yes	4(1.3)	0.14(0.02-1.07)	0.059
Physical activity	220(73.3)		
No	80(26.7)	`1	1
Yes		0.72(0.35-1.47)	0.372
Adding table salt	250(83.3)		
No	50(16.7)	1	1
Yes		1.15(0.45-2.91)	0.761
Herbal medicine	216(72.0)		
No	84(28.0)	1	1
Yes		1.65(0.72-3.75)	0.230
BMI			
Normal	79(26.3)	1	1
Overweight	122(40.7)	1.13(0.52-2.47)	0.744
Obese	99(33.0)	1.97(0.79-4.88)	0.143
Time on anti-anti-hypertensive			
Median (IQR)	5(2-14)	1.05(1.00-1.11)	0.024
Income			
>200,000	115(38.3)	1	1
<50,000	108(36)	1.26(0.58-2.75)	0.541
50,000-200,000	77(25.7)	1.16(0.50-2.89)	0.720
Diabetic mellitus			
No	131(72.4)	1	1
Yes	50(27.6)	2.03(0.56-7.32)	0.282
Heart failure			
No	119(65.7)	1	1
Yes	62(34.3)	0.80(0.29-2.17)	0.660
Kidney failure			
No	172(95)	1	1
Yes	9(5)	0.87(0.10-7.44)	0.901

DISCUSSION

This cross-sectional study was designed to examine the factors associated with poor hypertension control among patients attending the KCMC hospital. In this population, more than three quarter (86.7%) of hypertensive patients had poor hypertension control. The poor hypertension control was associated with age, duration on antihypertensive and unemployment. Majority of the patients in this study had poor hypertension control. Similar to another cross-sectional survey conducted in Hai district (Tanzania). Among adults ≥70 years, reported 99.1% poor hypertension control. (4). Comparable to other regional prevalence of poor control, Kenya (97.7%) (21) and Uganda (73.3%) (22). However, higher than what was reported in Canada (35.6%) (23), and China (63.9%) (24). Although the findings agree with the previous studies, KCMC is a referral hospital and the majority of clients seen are referral from other facilities, probably with complications or with poor control. This might have contributed to the observed high prevalence of poor control.

Factor that was found to be significantly associated with poor hypertension control was age. Whereby older patients were less likely to have their blood pressure controlled. Similar results were reported in the study conducted in Tanzania, and Khartoum (5,25). Also, a study conducted in USA reported age to be significantly associated with poor hypertension control, whereby older patients were more likely not to control their blood pressure compare to young ones (26). However, a study done in China showed older people had higher control rates (27). A possible explanation might be that older people lack financial means to afford costly anti-hypertensive drugs since majority are retired. (28).

Furthermore, another factor was employment status, whereas, unemployed had more odds of poor blood pressure. Similar results were reported in a study conducted in Ghana, whereby employed were more likely to have their blood pressure controlled (28). However, another study reported no difference in hypertension control between employed and unemployed (29). This might be the result of financial limitations that unemployed faces which hinder them from affording prescribed medications (30). Thus, doctors may wish to consider affordability of medications as a clinical factor before prescribing. Duration on anti-hypertensive was another factor associated with poor hypertension control. In which patients who were on anti-hypertensive for longer duration of time were less likely to have their blood pressure controlled. This differs from another study conducted in Kenya, which reported no statistically significant on blood pressure control with duration on ant-hypertensive, since better control of blood pressure was observed regardless of time on medication (21).

However, similar results were reported in a study conducted in China (31). Not surprising that the duration was associated with poor control, as many families struggle to buy anti-hypertensives, sometimes they have to choose between buying food or anti-hypertensive medication (32). Consequently, missed appointment and poor adherence of anti-hypertension.

Though we used a validated tool (WHO STEP questionnaire) to collect data and measure non-communicable disease risk factors, there are limitations to be addressed. The prior blood pressure readings were extracted from files with limited information to verify how was measured. Also, a single measurement was taken per visit whereas guidelines recommend the average of two consecutive measurements (19). Moreover, since the study was hospital-based, social desirability bias is probable, this might have resulted in the underestimation of the obtained information on some behavioral factors for poor hypertension control, which are; alcohol use, smoking habit, physical activity and salt utilization.

Conclusion and recommendations

The prevalence of uncontrolled blood pressure control is unacceptably high in this population who are on treatment. Unemployed patients, older and those on treatment for longer duration had poor control. To ensure healthy lives and promote well-being for all at all ages (the United Nations sustainable development goal 3), more collaborative efforts are needed to combat poor control of blood pressure. Further studies are needed to examine the health system factors linked to poor control as these patients attend the clinic for monitoring but still have high blood pressure.

Availability of data material

The database analyzed during the current study are not publicly available. But can be freely available from the corresponding author on reasonable request.

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Conflicts of interest

There are no conflicts of interest

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ORIGINAL ARTICLE

DETERMINANTS OF OUTCOME OF INDUCTION OF LABOR IN FOUR TEACHING HOSPITALS IN ADDIS ABABA

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ABSTRACT

Introduction: *Induction of labor is an increasingly common intervention in obstetrics and known to decrease maternal and perinatal mortalities. Failed induction is one of the unwanted outcomes of induction of labor. Therefore, it is necessary to determine the safety and effectiveness of our institutions' labor induction process.*
Objective*: This study tried to address the obstetric outcomes and determinants of the outcomes of induction of labor.*
Method: *A cross sectional prospective quantitative study was done. Data was collected from a sample of 339 induction cases that were selected consecutively during the study period. Data was collected from medical records of cases using a structured questionnaire and analyzed using Statistical Package for Social Sciences. Descriptive analysis, Chi-square test, Student t-test and logistic regressions were used to analyze the data. A p-value of <0.05 was used to define statistical significance.*
Result: *The rates of failed induction and Cesarean section were 25.4% and 37.8% respectively. Failed induction contributed to 66.7% of indications for cesarean section. Direct oxytocin was used for induction in 39.2%, vaginal misoprostol in 27.7%, prostaglandin E2 in 23.6% and foley Catheter in 9.4%. There is significant association between failed induction and unfavorable Bishop Score, indication for induction, gestational age and nulliparity, all having a P<.01.*
Conclusion: *Failed induction and associated cesarean section rate is high in our setup compared with global rates. Therefore, reviewing our institutions' induction guideline in an attempt to increase the success of vaginal delivery is important.*
Keywords: *Induction of labor, Failed induction, Cesarean section*

INTRODUCTION

Induction of labor is one way of terminating a pregnancy. Its goal is to pre-empt the natural process of labor by initiating its onset artificially by ripening the cervix and stimulating uterine contractions before this occurs spontaneously. Induction of labor is beneficial both for the mother and the new born if it is undertaken for appropriate reasons and by appropriate methods (1,2).

The overall incidence of induction of labor worldwide has not been established but it is estimated to be 9-33%, but its incidence varies in different locations and institutions (1,2). The indications for induction of labor include post term pregnancy, hypertensive diseases of pregnancy and premature rupture of membrane. Their rates vary in different settings (1,3). Despite its impact in the improvement of maternal and perinatal outcome, it has its own risks. Increased risk of operative deliveries, maternal and fetal complications are the major risks associated with it.

(4-6). In a recent study made in 2010 in Tikur Anbessa Hospital (TAH), Ghandi Memorial Hospital (GMH) and St Paul's Hospital (SPH), the risk of Caesarian section (C/S) done for failed induction was 38%, which was higher than the studies done in 1996 and 2004 in the same settings 21.1% and 28.4% respectively (3,7). The progressive increment in failure rate of induction and hence rise in C/S rate needs further study. The Bishop score at onset of induction is found to be the primary determinant of success of induction in many settings (8). The parity of the woman, the indication for the induction and other factors also affect the success (9-12).

There are several methods of induction of labor, the common ones being oxytocin, misoprostol, dinoprostone(PGE2), and mechanical methods. During the study done in 2010 in Ethiopia, oxytocin was used in 85% of inductions and the cervical ripening agent used was prostaglandin E2 (PGE2) (3).

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In more recent years though, Misoprostol 25micrograms to be inserted 6 hours apart for a maximum of two doses and mechanical methods have been used in similar study areas, because PGE2 was not available in the market.

In recent years, several randomized controlled trials (RCT) and Meta analyses favored the use of low dose misoprostol over PGE2. The justification is that both have comparable effectiveness, maternal and fetal outcomes but PGE2 is much more expensive and its storage needs refrigeration. Hence PGE2 might not be a good choice in resource constraint countries like ours where cost and availability of infrastructures are still real challenges. Foley catheter, as a ripening agent, is another good option (13-15).

This study tried to see the outcomes and the determinants of the outcomes of induction of labor. It also addressed the current rate of failed induction of labor and agents used for induction of labor. It made an internal comparison between the different cervical ripening and induction agents in line with their effectiveness and complications. It will give a crucial information that might help in designing a solution to make the outcome in the acceptable range, if the factor contributing for the failure is found to be modifiable.

PATIENTS AND METHOD

The study was conducted in Addis Ababa, Ethiopia, at four teaching hospitals; TAH, GMH, ZMH and SPH. These hospitals' labor wards use a common management protocol for induction of labor. The four hospitals share the highest number of deliveries in the city. This is a facility based prospective cross-sectional study. It was approved by the Institutional Review Board of Addis Ababa University, College of Health Sciences and written consent was taken from each study participant. The study period was between May, 2016 –August, 2016.

The calculated sample size was 339. The prevalence (P) used in the calculation was 38% failed induction rate from the study done in the same setting in 2010. All pregnant women for whom induction of labor was done as per the protocol of the department of Gynecology and Obstetrics, SOM, A.A.U, 2004 were included. Gestational age (GA) less than 28 weeks, pregnancies with induction started outside the study hospitals, pregnancy which required serial induction and pregnancy with unknown GA and regarded clinically non-viable were excluded from the study.

Data was collected by interviewing each of the study subjects and revising their medical records. Data was cleaned, entered and analyzed using SPSS version 20.0 statistical software. Descriptive analysis, chi-square test, student t-test were used to analyze socio-demographic, obstetric outcomes, maternal and perinatal outcomes. Multiple logistic regression model was used for failure of induction of labor and confounding factors were controlled taking level of significance at $P<0.05$.

Operational definitions:

Induction of labor: is the process of artificially stimulating the uterus to start labor, usually performed by administering oxytocin, prostaglandins, mechanical methods or by rupturing the amniotic membranes.

Cervical ripening: is one of the methods used for induction of labor by using pharmacological agents or mechanical interventions to soften, efface or dilate the cervix to increase the likely hood of vaginal delivery.

Failed induction: is defined when there is no cervical change or decent of the presenting part after 6 -8 hours of start of oxytocin or when contractions of 3 in 10 minutes haven't been achieved in these hours.

Favorable cervical status: is defined as a Bishop score ≥9.

RESULTS

A total of 339 mothers who fulfill the eligibility criteria were included with a response rate of 100%. The mean (SD) age of the participants was 26 (±4.3) and nearly one-half, 157 (46.3%) fall in the age range of 25 – 29 years, and 309 (91%) of them were from Addis Ababa.

One-half, 170 (50.1%), of the participants, were nulliparous and almost all, 326 (96.2%) had at least one antenatal care (ANC) visit. The rate of preterm, term and post term pregnancies were 57 (16.8%), 221 (65.2%) and 61 (18%), respectively. Majority, 317 (93.6%), of the induced women had unfavorable Bishop Score before the start of induction. The pre-induction Bishop Scores were 0-4 and 5-8 in 228 (67.3%) and 89 (26.2%) of the participants respectively. Only 22 (6.5%) of the women had favorable Bishop score that is ≥9.

Preeclampsia was the leading indication for induction of labor accounting for 151 (44.5%).

The most commonly used method of induction in this study was oxytocin alone accounting for 137 (40.4%) (Table 1).

Table 1: Characteristics of induction of labor at four hospitals, Addis Ababa, May 2016 – August 2016.

Variables		No (%)
Indication for induction	Preeclampsia	151(44.5)
	Pre-mature rupture of memberanes	90(26.5)
	Post term	59(17.4)
	others	39(11.6)
Method	Oxytocin alone	137(40.4)
	PGE2 alone	13(3.8)
	PGE2+ Oxytocin	21(6.2)
	Misoprostol alone	14(4.1)
	Misoprostol + oxytocin	74(21.8)
	Foley + oxytocin	80(23.6)

Misoprostol (vaginal route in all the time) was used in 88 (26%) of participants and all had unfavorable Bishop Score before ripening. Single dose was used in eight (9.1%) of the mothers as labor was established with the first dose. Two, three and four doses of misoprostol were used in 73/ (83%), six (6.8%) and one (1.1%) of the cases, respectively. The Bishop Score was intermediate (5-8) and remained 0-4 at the time of oxytocin initiation after misoprostol use in 40 (45.5%) and 23 (26.1%) of cases, respectively. Overall, misoprostol use changed unfavorable Bishop score in to favorable in 28.4% of the cases.

PGE2 was used in 34 (10% of induction) patients. Overall, PGE2 changed unfavorable Bishop Score to favorable in 14)41.2%). Foley catheter was inserted for 80 (23.6%) of induced patients. Twenty percent of patients achieved favorable Bishop Score by the use of Foley catheter.

Vaginal delivery was achieved in 62.2% (211/339) of cases and the cesarean section delivery rate in this study was 37.8% (128/339). The rate of failed induction was 25.4% (86/339). Failed induction was the commonest indication for cesarean delivery followed by Non-reassuring fetal heart rate pattern (NRFHRP) accounting for 66.7 % (86/128) and 25.6 % (33/128) of cases respectively.

Unfavorable Bishop Score is the most significant risk factor for failed induction (AOR=424.3; 95%CI 4.352 -8.354). When linear regression was done, for every unit increase in Bishop score, the failure rate decreased by 68%.

Nulliparity has nearly threefold risk of failed induction (AOR=2.771; 95%CI: 1.415-5.426). Gestational age also has significant association with failed induction. Induction of labor done for post-term pregnancies and preeclampsia had higher failure rates compared with those induced for other indications. PGE2, misoprostol and Foley catheter have failure rates of 23.5%, 35.2% and 30%, respectively. But method of induction in general did not have any association with failed induction. (Table 2) Neonatal birth weight and maternal age do not have association with failed induction.

The mean induction to delivery time was 16.13 hours while the range was 4 – 40 hours. Majority, 207 (61%) delivered in 12-23 hours and 44 (13%) delivered in ≥24 hours. Among the ones who delivered vaginally (without assistance with instrument), 187 (91.7%) delivered in <24 hours and while 17 (8.3%) delivered in ≥24 hours. In this study, Foley catheter use was found to be less likely to prolong labor (AOR=0.025, 95% CI,0.003 -0.222). But when misoprostol was compared with PGE2, misoprostol use was associated with less failure to deliver within 24 hours (AOR=0.110, 95% CI, 0.019-0.623).

In 23 (6.8%), induction of labor was done for negative FHB from the outset. There were five (1.5%) intra-partum still births. Additional five (1.5%) immediate neonatal deaths were recorded based on the 5th minute Apgar score. Five neonates (1.5%) had 5th minute Apgar score 1-7 which signify a poor neonatal outcome.

Table 2: Association of different variables with failed induction of labor labor at four hospitals, Addis Ababa, May, 2016 –August, 2016.

Variable		Outcome: Not failed Number (%)	Outcome: Failed Number (%)	COR (95%CI)	AOR (95% CI)
Bishop Score	<5	28(38.4)	45(61.6)	122.50 (2.768-12.652) ***	424.30(4.352-8.354)***
	5-8	149(78.8)	40(21.2)	20.43(2.783-12.367)***	66.00(5.697-16.452)***
	≥9	76(98.7)	1(1.3)	1.00	1.00
Parity	Nulliparous	121(71.2)	49(28.8)	1.44(0.882-2.365)*	2.77(1.415-5.426)***
	Parous	132(78.1)	37(21.9)	1.00	1.00
Gest. Age	<37weeks	36(63.2)	21(36.8)	2.97(1.252-15.354)**	32.37(2.654-18.512)***
	37-41weeks	166(75.1)	155(24.9)	1.69(0.804-3.558)*	64.59(6.163-222.548)***
	≥42weeks	51(83.6)	10(16.4)	1.00	1.00
Indication for induction	preeclampsia	97(64.2)	54(35.8)	3.062(1.206-7.771)**	8.604(2.394-30.918)***
	Post- term	43(72.9)	16(27.1)	2.047(0.722-5.802)*	213.046(16.526-32.417)***
	PROM*	80(88.9)	10(11.1)	0.688(0.231-2.045)	0.588(0.149-2.328)
	Others	33(84.6)	6(15.4)	1.00	1.00

* Premature rupture of membranes

One fourth (25.6%) of the C/S 33 cases were done for NRFHRP. Both meconium staining and NRFHR pattern were not found to have association with method of induction. Forty-eight (15.5%) of the neonates were admitted to NICU, of which meconium aspiration syndrome is the leading cause of admission in 14 (28.6) of the time. Method of induction, gestational age, indication for induction and meconium staining do not have association with NICU admission when multivariate analysis was done. All admissions with a diagnosis of early onset neonatal sepsis (EONS) are delivered from mothers with PROM induced with oxytocin alone.

DISCUSSION

Preeclampsia has been found to be the leading cause of induction of labor accounting for 44.5% of inductions followed by PROM and post-term pregnancy. The above three contribute for 88.4% of indications for induction of labor. This result is similar with the report of the WHO global survey done in 2004- 2008 (16).

Induction with oxytocin alone was done in 39.2% of the time. Misoprostol was used in 27.7% of the cases. PGE2 and Foley catheter were used in 23.6% and 9.4% respectively.

This is different from the study done in 2010 where PGE2 was used in 34% of the cases (3) and there was no use of misoprostol or Foley catheter. During the study period, the availability of PGE2 was variable, therefore the main ripening and induction method in GMH, ZMH and BLH was Misoprostol. Almost all the Foley catheters were used in SPH. In this study, method of induction is not associated with failed induction. Both maternal and neonatal complications are also similar when Foley catheter was compared with other methods. This is also confirmed in RCT done in 12 hospitals in Netherlands with an intention to compare Foley catheter and vaginal PGE2 gel, C/S rates were the same between the two groups (23% vs. 20%), hyper stimulation was high with PGE2 and comparable neonatal infection (probably because of the increased vaginal examination in the prostaglandin group) (15).

C/S was done in this study in 128 (37.8%) of the cases) which is lower than the rate in 2010 study in the same setup (3). The decrement in failed induction might have contributed for this. It is a general fact that induction of labor is associated with high operative deliveries, greater maternal and perinatal complications when compared with spontaneous labor (4). The major indication for C/S is failed induction (66.7%) followed by NRFHRP (25.6%)

A study done in Latin America, which included 37,444 deliveries in women with low risk pregnancies, 4.9% were electively induced. Among the induced deliveries, 88.2% were vaginal (27). In another study made in 2009 in Pakistan, 18% of pregnant population who underwent induction failed to deliver vaginally (6). In most other studies also, they found higher vaginal delivery rate compared to our setting which is 211 (62.2%)**.** This might be due to the increased failed induction rate in our setting.

In almost all studies throughout the world, Bishop Score was found to be the best available tool for predicting the likelihood that induction will not fail and results in vaginal delivery (1). This is also consistent with both the previous and current studies done in our setting (3).

There were multiple cervical ripening and induction methods used during the study period unlike in the past study where either oxytocin alone or PGE2 with oxytocin were used. When unfavorable bishop was found, the ripening/inducing agent used was either misoprostol or PGE2. There was no PGE2 found in the market for some time during the study period of the current study therefore misoprostol was used in the majority of the cases based on the department's guideline where the two can be used interchangeably.

In all the ripening methods used, the rate of achievement of favorable Bishop Score (as defined by the score of ≥9) is very low compared with global experiences**.** This might be due to the frequency (doses) of the ripening agents used in our setup. In this study, a maximum of two doses of the prostaglandins was used even though favorable Bishop score was not achieved after their use. But the frequency of dosing used in multiple large trials was 4-6 (until favorability reached or established labor diagnosed). This is also similar in the Ethiopian guideline of 2004, where 4 doses can be used every 6 hours unless there is an ample reason that urges to terminate the pregnancy in a lesser time frame. Therefore, the practice in this regard during the study period is not in line with the large trials and even the Ethiopian guideline (5,13,26).

Failed induction rate in this study is 25.4% accounting for 66.7% of all C/S. This is almost comparable with the local study in 1996 (21%) and 2004 study (28.4%) but much lower than the rate found in 2010 (38%). The reason for the difference cannot be extrapolated clearly. Unfavorable Bishop score is the most significant risk factor for failed induction. When linear regression was done, for every unit increase in Bishop score, the failure rate decreased by 68%.

This is consistent with many global findings (12). Dr. Bishop once wrote that "induction in the nulliparous patient, there still remains the pertinent question why it should be done". This is because the failure rate in nulliparous lady is significantly high. Felghali, etal. reported that parity has the strongest correlation with attaining vaginal delivery (5,28). This is also true in this study where nulliparity has nearly threefold risk of failed induction.

All methods used for induction have almost similar rates of failed induction. Induction with oxytocin alone has failure rate of 16.8%. This low failure rate is most probably associated with the indication for induction, as most are PROM (which augments successful induction of labor) or have favorable Bishop from the outset.

When misoprostol was compared with PGE2, misoprostol use was associated with less failure to achieve vaginal delivery in <24 hours from the start of induction of labor (AOR=0.110, 95%CI: 0.019-0.623, P=0.013). This is one advantage of misoprostol over PGE2.This finding is consistent with many global studies. For instance, in a randomized and prospective study in Tunisia, comparing misoprostol and PGE2, misoprostol group showed a significant reduction in delivery time, an increase in birth rate in the first 24 hours after the first dose and a decrease use of oxytocin for augmentation (14). This also was true in the Cochrane review (13).

Induction of labor in general is associated with high maternal and perinatal complications compared with spontaneous labor. The fifth minute Apgar score is between 1 and 7 in 7.7% of the neonates. This low 5th minute APGAR was found both in the preterm and term group. These figures have shown significant improvement from the study done in 2010 in similar setup (3). This improvement could be attributed to an improvement in the close follow up of patients on induction.

Meconium staining was found in 15.9%. The only significantly associated factor with meconium staining is gestational age. In our study post-term pregnancy has a fourfold risk of meconium staining. This is consistent with the findings of Cochrane review in 2013(13). The incidence of NRFHRP in oxytocin alone, PGE2, misoprostol and Foley catheter groups were 32.5%, 26.7%, 19% and 25% respectively. There is no significant association between method of induction used and indication for induction with NRFHRP.

This is in line with the finding of other studies (1,13,20). Forty-eight neonates (15.5%) were admitted to NICU, Meconium aspiration syndrome (MAS) accounted for 28.6% of NICU admissions. All admissions with EONS (diagnosed from delivery attending group) are from patients with PROM induced with oxytocin. It is difficult to see the correlation of mechanical methods and EONS because it needs follow up in the NICU which is beyond the scope of this study.

Conclusion

Failed induction and therefore the rate of cesarean section done for failed induction is high in our setup compared to the global rates.

Complications previously thought to associate with misoprostol such as uterine hyper stimulation, meconium staining, FHR abnormalities and low fifth minute APGAR score have not been found in this study which is the same finding as global large trials. Therefore, their use is largely recommended in low resource setting where cost and storage mechanism of PGE2 are the challenges. The use of Foley catheter in SPH has shown a similar outcome with the other methods and hence its use should be encouraged in the other settings too.

The dose of the ripening agent we use is limited to a maximum of two. This might have an impact on the rate of failed induction. Hence considering the increment of the doses to 4-6 might help but this needs further study.

Limitation

Bishop scoring is subjective and there will be some amount of interpersonal differences, due to this the study may suffer some degree of inaccuracy.

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Competing interest:

The authors have declared that no competing interests exist.

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ORIGINAL ARTICLE

PRIMARY JUVENILE OPEN-ANGLE GLAUCOMA, CLINICAL FEATURES AT PRESENTATION TO TERTIARY EYE CENTER, MENELIK II HOSPITAL, ADDIS ABABA

Abeba T. Giorgis, MD, [1*] Almaz Kefy , MD[1]

ABSTRACT

Background: *Primary juvenile open-angle glaucoma is a rare form of glaucoma that affects young individuals below the age of 40 years. It is characterized by rapid progression of the disease with severely high intraocular pressure.*

Objective: *The purpose of this study was to describe the clinical features of patients with primary juvenile open-angle glaucoma at the time of presentation to tertiary eye center.*

Methods: *A retrospective cross-sectional medical record review of patients with the diagnosis of primary juvenile open-angle glaucoma at the Glaucoma unit of the Department of Ophthalmology, Menelik II tertiary referral hospital, Addis Ababa, Ethiopia. We reviewed charts of cases that were seen over a five year period. Central tendency, measures of dispersion, frequency and percentage were calculated using Statistical Package of Social Sciences version 21 statistical software.*

Results*: A total of 55 cases were included during the study period, 12 were affected unilaterally. The mean age was 27.0 ± 7.7, range: 5 to 35 years. Family history of glaucoma among parents and /or siblings was documented in 12 cases. Vision reduction was the commonest presenting complaint in 26 (47.3%) cases, followed by blurring of vision in 7 (12.7%). Seventeen (30.9%) were identified while presenting for other complaints. The mean intraocular pressure of 98 eyes with glaucoma and without medication was 37.20 ± 11.3 mm Hg, range, 15 - 69 mm Hg. Bilateral and unilateral blindness was identified in 9 (16.4%) and 27 (49.1%) cases, respectively. Glaucomatous optic nerve head damage was advanced in 68 (69.4%) of the eyes.*

Conclusion: *Ethiopians with primary juvenile open-angle glaucoma largely presented with vision loss related complaints and at advanced stage of the disease and with very high intraocular pressure. We recommend that eye care professionals should examine the optic nerve head and measure the intraocular pressure at any age, and to raise public awareness to detect this rare but blinding disease.*

Key words: *Juvenile open-angle glaucoma, intraocular pressure, glaucomatous optic nerve head*

INTRODUCTION

Glaucoma is a heterogeneous group of optic neuropathy and potentially blinding disease that can be divided into childhood, juvenile onset and adult onset categories according the age of onset, open angle and closed angle based on gonioscopy evaluation; and primary and secondary based on presence or absence of underlying cause (1).

Primary juvenile open-angle glaucoma (JOAG) is a rare form of glaucoma occurring 1: 50,000 in various ethnic origins (2) and it has various definitions. Some define it as a subset of primary childhood glaucoma (CHG) that occurs between age 3 and 40 years, while others define it as a subset of primary open-angle glaucoma (POAG) that occurs between age 5 and 35 years (3, 4).

The European Glaucoma Society defines JOAG as open angle-glaucoma with onset between the ages of 10 and 35 years (5).Primary juvenile open-angle glaucoma differs from childhood glaucoma by the absence of eyeball enlargement and corneal changes, and from that of POAG by the presence of very high intraocular pressure (IOP) and early age of onset (6-10). The diagnosis of primary JOAG is straight forward in the presence of markedly elevated intraocular pressure and glaucomatous optic nerve damage (3, 5). The disease is related to mutation of myocilin gene (MYOC/TIGR) and CYP1B1 and can be inherited as an autosomal dominant trait with high penetrance (2, 8, 11, 12). However, having MYOC mutation does not necessarily mean that a patient has or will develop JOAG (2).

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Most patients with primary JOAG present and/or are identified late with advanced form of the disease due to the symptomless nature and rare occurrence of the disease that leads to less attention by both the affected individuals and eye care professionals (3,5).

The purpose of this study was to describe the clinical features of Ethiopian patients with primary JOAG at time of presentation to a tertiary center. The outcome may help us to know how and when patients seek medical attention, the level of IOP and stage of glaucoma at presentation. The report of this study will alert eye care professionals to case detection at an earlier stage. And it will also be a contribution to the literature on the disease, which is particularly scarce from Africa.

PATIENTS AND METHODS

The study was a retrospective cross-sectional medical record review of patients with the diagnosis of primary JOAG over a five-year period (2013-2017). It was conducted at the Glaucoma unit of the Department of Ophthalmology, Menelik II tertiary referral Hospital, Addis Ababa, Ethiopia.

Glaucoma patients are referred to the Glaucoma unit from the different clinics of the eye department, eye centers in Addis Ababa and various areas of the country. Routine glaucoma evaluation for all new patients coming to the unit is done using evaluation format sheets that are attached to the patients' chart. Evaluation includes history taking, visual acuity including pinhole or with correction using Snellen chart on LCD display screen, intraocular pressure (IOP) measurement with I-care or Goldmann applanation tonometer, thorough eye evaluation under slit-lump microscope including gonioscopy, and optic nerve head and retina examination using 90D lens.

Staging of severity of glaucoma is made based on the extent of glaucomatous optic nerve head damage. Diagnosis of early, moderate or advanced glaucoma is made when the vertical cup: disc (VCD) ratio is 0.65 or less, 0.7 to 0.85 and 0.9 or greater, respectively according to the Canadian glaucoma strategy (13). Visual field is determined using Humphrey Frequency Doubling Technology (Welch Allyn, Carl Zeiss Meditech, Calif.) for those who have visual acuity better than 3/60.

The registration book of the Glaucoma unit was used to identify cases with the diagnosis of JOAG and to retrieve their charts. Those with the diagnosis of primary juvenile open-angle glaucoma who had completed evaluation format sheets were included in the study.

Relevant data was collected from the evaluation format sheets of each patient's chart into prepared data collection sheet. The data was entered to Epi-Data version 3.1 (The EpiData Association Company) and after being cleared, it was transferred to Statistical Package of Social Sciences (SPSS) version 21 statistical software. Descriptive statistics such as frequency, percentage and ratio were used for summarizing the data of categorical group. Mean and standard deviation was calculated for total numbers of variables of all eyes with glaucoma, and for the bilateral and unilateral cases. The mean difference between bilateral and unilateral cases was compared using independent t-test and statistical significance was declared if $P< 0.05$.

Operational classification and definition: Distance vision impairment for individual eye was classified based on the World Health Organization (WHO) classification (14). Visual acuity that was documented with either pin hole or correcting eyeglasses for those eyes with vision less than 6/6 was taken as the best visual acuity. Vision impairment was classified as mild, moderate, sever and blind when the visual acuity was less than 6/12, 6/18, 6/60 and 3/60, respectively. Visual field involving the central fixation or the central 10 degree among eyes with visual acuity better than 3/60 were considered as blind.

Ethical clearance: The study was approved by the research and publication ethics committee of the Department of Ophthalmology, School of Medicine, College of Health Science, Addis Ababa University. And patients' charts were handled confidentially.

RESULTS

A total of 62 cases with the diagnosis of primary JOAG were identified during the five-year period, and 55 with complete data were included in this study. Details of demographic characteristics are described in Table 1. The mean age of all study cases was 27.0 ± 7.7, ranging from 5 to 35 years. The mean age of those who had bilateral glaucoma was 27.2 ± 7.7, while for those presenting with one eye affected was 25.8 ± 8.8, (P-value: 0.53). Males were larger in number than females (34/21), making 1.6:1 ratio. The male:female ratio was even higher among the bilateral 43 cases, 2.3:1. On the other hand, among the unilateral 12 cases, females were twice as many as males, 2:1. Addis Ababa was the residential place for 26 (47. 3%) cases, while the rest were from other areas of the country. Family history of glaucoma among parents or siblings was documented in 12 cases. Eight had affected parents, while siblings were the affected in the others. Four of the unilateral cases with positive family history had affected siblings.

Table 1: Demographic Characteristics of Primary Juvenile Open Angle Glaucoma Patients, Menelik II Hospital, Addis Ababa, 2013-2017.

Characteristic	Frequency number	Percent
Age		
< 10	1	1.8
10 - 19	11	20.0
20 - 29	18	32.7
Above 30	25	45.5
Sex		
Male	34	61.8
Female	21	38.2
Address		
Addis Ababa	26	47.3
Others	29	52.7
Occupation		
Student	15	27.3
Farmer	7	12.7
Employed	23	41.8
Non-employed	10	18.2
Family history		
Yes	12	21.8
No	43	78.2

The initial presenting complaints of all the cases are listed in Table 2. Many of the cases, 26 (47.3%) came to the eye care service when they had either vision reduction or loss. The second vision related complaint that was documented in seven cases was blurring of vision.

These two complaints were the reasons for the 30 (69.8%) bilaterally affected cases for seeking attention, while 9 (75%) of the unilaterally affected cases were detected during evaluation for other complaints.

Table 2: Presenting complaints of Primary Juvenile Open-Angle Glaucoma patients, Menelik II Hospital, Addis Ababa 2013-2017.

Complaint	Total n=55 (%)	Bilateral n=43 (%)	Unilateral n=12(%)	P-value
Vision reduction/loss	26 (47.3)	24 (55.8)	2 (16.7)	< 0.05
Blurring of vision	7 (12.7)	6 (14.0)	1 (8.3)	> 0.05
Redness of eye	4 (7.3)	4 (9.3)	-	-
Eye pain	1 (1.8)	1 (2.3)	-	-
Evaluation for other complaints	17 (30.9)	8 (18.6)	9 (75.0)	< 0.001

The clinical characteristic of the eyes with glaucoma is depicted in Table 3. The mean intraocular pressure of all eyes with glaucoma was 37.2 $\pm$ 11.3 mm Hg, range 15 - 69 mm Hg.

The mean intraocular pressure was higher (42. 5 $\pm$ 10.9 mm Hg) among 75 eyes without medications than those on medications (30.28 $\pm$7.57 mm Hg), P-value < 0.001. The mean number of medications was 1.8 $\pm$ 0.66.

The visual acuity (VA) was severely impaired (VA < 6/60) in six eyes, while 31 eyes were blind (VA < 3/60). Bilateral blindness was identified in three cases. Among 14 eyes with visual field involving the central 10^0, two were that of a bilateral case and four were of those who had a second eye with visual acuity < 3/60, making the total number of bilateral blind cases 9 (16.4%). Twenty-seven cases (49.1%) were unilaterally blind by either visual acuity or visual field. Among the 12 unilateral cases, 5 (41.7%) were blind by visual acuity or visual field.

Mean vertical cup to disc ratio (VCD) was 0.88 $\pm$ 0.20. Severe or advanced glaucomatous optic nerve head damage (VCD $\geq$ 0.9) was documented in 68 (69.4%) eyes. The bilateral cases had advanced damage bilaterally in 24 eyes and unilaterally in 16 eyes. Half of the unilateral cases had advanced optic nerve head damage.

Gonioscopy, which was documented in all cases revealed the presence of iris processes with high insertion in 18 eyes, of which 15 were that of the bilateral cases.

Table 3: Clinical characteristics of eyes with Primary Juvenile Open-Angle Glaucoma, Menelik II Hospital, Addis Ababa, 2013-2017.

Variables	Frequency (n=98)	Percent
Intraocular pressure, mm Hg		
Below 21	3	3.1
21-30	25	25.5
31 – 40	29	29.6
Above 40	41	41.8
Visual Impairment		
Mild (< 6/12)	9	9.2
Moderate (< 6/18)	14	14.3
Severe (< 6/60)	6	6.1
Blind (< 3/60)	31	31.6
Glaucomatous optic disc damage		
Early	13	13.3
Moderate	17	17.3
Advanced	68	69.4
Visual field		
Central 10 degree involved	14	14.3
Central 10 degree not involved	84	85.7
Gonioscopy		
Normal appearing	80	81.7
Iris processes with high insertion	18	18.4

There was no statistically significant difference between the bilateral and unilateral cases when comparing the clinical characteristics including, mean age (P = 0.53), mean IOP with medication (P = 0.097) and without medication (P = 0.053), severity of visual loss (P = 0.466), tunnel visual field involving the central 10 degree (P = 0.562), and the mean of cup to disc ratio (P = 0.823). Table 4 shows the mean difference in intraocular pressure and vertical cup-disc ratio between the bilateral and unilateral affected eyes.

Table 4: Intraocular pressure and optic nerve head status of bilateral and unilateral eyes with primary juvenile open-angle glaucoma, Menelik II Hospital, Addis Ababa 2013-2017.

Character, Mean (SD)	All eyes n = 98	Bilateral n = 86	Unilateral n = 12	P-value
Intraocular pressure				
With and without medication	37.2 (11.30)	37.2(10.99)	37.2 (13.96)	0.986
With medication	30.3 (7.57)	31.2 (7.43)	25.0 (7.71)	0.097
Without medication	42.5 (10.94)	42.1 (10.9)	44.6 (11.56)	0.0533
Optic disc cup-disc ratio	0.88 (0.20)	0.88 (0.21)	0.89 (0.17)	0.823

DISCUSSION

This study demonstrates the presenting complaints, sex and age distribution, level of eye pressure, severity of glaucomatous optic nerve head damage and vision loss of Ethiopian patients with primary juvenile open angle-glaucoma, presenting at tertiary eye care level. The rare nature of the disease in young individuals is seen in the low number of cases over a five-year period, which is true elsewhere as well (4, 6, 8). The opportunity to get even this number was due to the referral of cases to the Glaucoma unit from various eye centers.

The beginning of the disease could be much earlier than the age at presentation (mean 27.0 $\pm$ 7.7) because at the time of presentation the majority (68, 69.4% eyes) had an advanced stage of the disease. Lower average ages of 18 and 18.5 years, at diagnosis have been reported in studies done by Johnson AT et al and Wiggs JL et al respectively (11, 8). In the literature, some stated that primary JOAG is a form of childhood glaucoma while others argued it is a subset of primary open-angle glaucoma (4, 5). Based on our findings, where 25 (45.5%) were older than 30 years and normal appearing gonioscopy that was seen in 80 (81.7%) of the affected eyes, we would support the view that it is a variant of POAG.

There were more males than females (34/21, 1.6:1) in this study, similar to the male predominance of 64% in a study from Korea (9). However, a report from the United State found both sexes to be affected equally (5). The majority of the cases 43 (78.2%) had bilaterally affected eyes, which is comparable to 79.2% in the medical record review study of 72 cases with JOAG in Korea (9). The bilateral nature of the disease is similar to that of primary childhood glaucoma and primary open-angle glaucoma and the relation of the disease to gene mutations.

The inheritance pattern of primary juvenile open angle glaucoma is autosomal dominance related to myocilin gene mutations (1,2,3,5). However, in this study, family history was obtained in only 12 cases (4 siblings and 8 parents), which could be actual fact or due to the absence of family screening and pedigree study.
Vision reduction (26, 47.3%) and blurring of vision (7,12.7%) were the common presenting complaints for seeking ophthalmic evaluation in 33 (60%) cases; and 17 (30.9%) presented with other complaints. In the study from Korea, 42 (58%) cases presented with complaints of symptoms associated with vision and pain; and one-third presented with no definitive symptoms (9). The results of the two studies may indicate that affected cases come to attention by the time the glaucoma is at an advanced stage and /or with severely elevated IOP causing vision loss, blurring of vision and pain.

Those who were identified on evaluation for other complaints indicates the importance of evaluation of the optic nerve head and measuring IOP in patients coming for other complaints regardless of patient's age to detect this blinding disease. The presentation of a larger number of the unilateral cases (9/12) with other complaints could be explained by the presence of good vision with the unaffected eye and unnoticed progressive vision reduction of the affected eye, which is true in the other forms of ocular diseases, in which vision loss in one eye is found during routine examination or during driving license or medical fitness check-ups.

The level of IOP was above 30 mm Hg in 78 (71.4%) of the affected eyes, which is similar to the study done in the United States that has reported average IOP of 38.5 mm Hg at time of diagnosis (8). It has also been shown in different studies that severely elevated intraocular pressure to be characteristic of primary JOAG (2, 5, 11). The magnitude of the blindness, that is bilateral in 9 (16.4%) and unilateral in 27 (49.1%) cases can be explained by the presence of advanced glaucomatous optic nerve head damage that was recoded in 68 (69.4%) eyes and the severely high IOP level, and symptomless nature of the disease that leads to late presentation with vision loss (3,5). The normal appearing gonioscopic angle drainage structures in 80 eyes of our cases is an indication of absence of overt angle anomaly, unlike the childhood glaucoma and similarity to that of POAG (5,10,11).

Comparing the level of IOP with and without medication, it is similarly high in both bilateral and unilateral cases without statistically significant difference. This is an indication of the high level of pressure in these cases whether they are bilaterally or unilaterally affected. Even if there was reduction with medication, the pressure remained high because the disease is less responsive to medical treatment (3). The severity of optic nerve head damage was similar in both bilateral and unilateral cases, which can obviously be explained by the presence of high IOP irrespective of laterality.
Limitations of the study: Although this study shows the presenting clinical features of cases with primary JOAG, the fact that it was a retrospective study has limited the variety of data and further details that could have been collected; and cases with incomplete data were excluded.

***Conclusion*:** Ethiopians with primary Juvenile open -angle glaucoma largely presented with vision loss related complaints at an advanced stage of the disease and with very high intraocular pressure. We recommend eye care professionals to examine the optic nerve head and measure the intraocular pressure at any age, and to raise public awareness to detect this rare but blinding disease.

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Conflict of interest

The authors have declared that no competing interests exist.

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ORIGINAL ARTICLE

NEEDLE STICK AND SHARP INJURIES AMONG RESIDENTS PRACTICING SURGICAL INTERVENTION IN A TERTIARY HOSPITAL, ADDIS ABABA

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ABSTRACT

Introduction: *Needle stick and sharp object injury is a common occupational hazard to healthcare workers.*
Objective: *The study aims to assess the occurrence and circumstances surrounding needle stick & sharp injuries and behavior associated with the reporting of injuries among residents practicing surgical intervention.*
Methods: *A cross sectional study was employed among residents in training at the St. Paul's hospital millennium medical college and who practice surgical intervention on patients. Data was collected using pretested and structured questionnaire from all participants and who are at different post graduate year of their specialty training from February 1st, 2018 till March 30th, 2018.*
Result*: A total of 122 residents participated on the study, of which 32.8% are general surgery residents. Of the respondents, 84 (68.9%) residents sustained needle stick and sharp object injury at least once over the study period, among which 14.8% are involved in high risk patients. Of the 84 injuries, 67 (54.9%) were self-induced and occurred in the operation room. 37(44%) of the residents attributed rushing as the cause of the injury. only 12 (14.3%) reported their recent injury to incidence office or antiretroviral treatment clinic. The most frequent reason for not reporting is the consideration of residents that source patients are not high risk 39 (49.4%). Highest level of injury is seen among residents from departments of orthopedics & traumatology and maxillofacial whereas the least injury seen from department of ophthalmology.*
Conclusion: *Incidence of Needle stick and sharp object injury among residents practicing surgery is high. Most injuries are self-inflicted. Adopting or designing prevention methods and providing training for residents on safety issues is mandatory to decrease Needle stick and sharp object injury .*
Key words*: Needle Stick, sharp injury, Occupational hazard*

INTRODUCTION

Health care providers are always at risk to be exposed to harmful contaminants. Most commonly encountered are biological hazards (blood, body fluids or tissue specimens), chemical hazards (detergents, disinfectants or powder placed into the surgical gloves which can cause allergies), physical hazards (intra operative radiation exposure while using fluoroscope or laser based instruments), ergonomic hazards (back pain & musculoskeletal pain because of standing for long hours), psychological hazards (work induced weak family relations, burnout due to overtime work) and fire explosion & electrical hazards (while using oxygen and alcohol). (1)
Needle stick and sharp injuries (NSSIs) are one of the common biological occupational hazards. Health care workers are prone to acquire acute and chronic infections caused by HBV, HCV, & HIV/AIDS and different forms of psychological consequences after sustaining NSSI.

Residents practicing surgical procedures are susceptible to sustaining needle stick and sharp injuries due to their frequent use. Although NSSIs are one of the common occupational hazards that they face, the magnitude of the problem is not well understood (9).

The risk of acquiring HBV from a single needle sticking ranges from 6%-30% while it is lower for HIV/AIDS, an average rate of 0.3% per injury. Average incidence of acquiring HCV is 1.8% per injury (10). Estimated number of 16,000 HCV, 66,000HBV and 1000 HIV infections has been acquired among HCW throughout the world in the year 2000 (11).

An estimated 600,000-800,000 needle stick & other percutaneous injuries reported annually among HCWs in United States (13). The Botswana public health sector reported the lifelong prevalence of needle stick injuries to be 48.9% (14).

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In Ethiopia, different studies showed that there is high prevalence of NSSI among health care workers. A study done in 4 hospitals of bale zone showed that the prevalence of life time NSSIs among HCW was 37.1% to 42.5%. And the figure in this study is lower than earlier studies in Ethiopia where the life time risk was 66.6% in TASH and 59% in Bahir-dar hospital (15-17).

Timely reporting is essential to ensure appropriate counseling, prophylaxis or early treatment and in some countries the data is used to establish legal prerequisites for worker compensations (18,20). Underreporting of sharp injuries by employees is common according to different literatures. It is higher among surgeons and surgical residents. One study has showed that 74% of surgeons never reported or reported only some of the injuries and the main reasons they mentioned were considering most patients as low risk (22.5%) and lack of concern (30%) (22). A study done among surgical residents at TASH, Addis Ababa University, Ethiopia, showed that most frequently cited reasons for not reporting were lack of awareness about the existence and functionality of incidence office in the hospital (22.2%) and considering that the process takes a long time (38.8%) (23). Underreporting results in significant underestimation of the magnitude of the problem and impedes interventions that could benefit the injured ones.

The study aims to assess the occurrence and circumstances surrounding needle stick & sharp injuries and behavior associated with the reporting of injuries among residents practicing surgical intervention.

METHODS

This is a cross-sectional study conducted from March 1 - 30, 2018 on all residents practicing surgical intervention and training at the St. Paul's Hospital Millennium Medical College (SPHMMC) at different postgraduate level of their specialty program. These include all residents who are in General surgery from 2nd to 4th year residency, Gynecology & Obstetric residents from 2nd to 4th year residency, Orthopedics & Traumatology residents from 2nd to 3rd year, Ophthalmology residents from 2nd to 3rd year, maxillofacial surgery from 2nd to 3rd year, ENT residents from 2nd to 3rd year and Emergency medicine residents on their 2nd year.

All 1st year surgical residents were excluded for they started their residency program only 2 months prior to data collection period. Residents who were not willing to participate in the study were excluded.

Study participants who fulfill the inclusion criteria were selected by simple random sampling technique using the list and proportionate allocation to size was made for each year of residency in each specialty to share the total sample size. Data was collected using pre-tested self-administered structured questionnaire which contains questions about socio demographic data, current level of training, and the number of NSSIs during the immediate past one academic year (Sep1st 2016 – Aug 31st 2017), NSSIs involving a high risk patient (patients with confirmed HIV, HBV & HCV infections) and a set of detailed questions about the recent (the last) NSSI the resident remembers sustaining over the past one year.

The collected data were checked for completeness and consistency and entered into Statistical Package for Social Sciences (SPSS) version 20.0. Descriptive analysis was performed; Tabulation of the dependent with the independent variables done and data were analyzed using chi-square test with a significance level of 0.05. Kruskal-Wallis a non-parametric test was used to compare frequency of needle stick injuries per resident according to surgical specialty type.

RESULT

A total of 122 residents practicing surgical intervention participated in the study (response rate = 86.5%). Of 122 respondents, 40 (32.8%) were general surgery residents and 15 (12.3%) residents were from orthopedics & traumatology surgery (Table 1).

These residents were in their different level of residency training i.e.; 44.3% (54) in 2nd year, 50% (61) 3rd year and 5.7% (7) in 4th year. 99 (81.1%) were male and 23 (18.9%) were female.

Of the 122 respondents, 84(68.9%) had sustained at least one NSSI over the past one academic year of their residency program. (Range 1-10, mean=1.6). Of the 84 injuries, 18 (14.8%) of them occur while they are involved in management of high-risk patients. (Figure 1).

Table 1: Sampling stratification of participants in needle and sharp object injury study, St. Paul's Hospital Millennium Medical College, Addis Ababa, March 1 - 30, 2018

Total number of surgical residents fulfilling the inclusion criteria, 172						
General Surgery	**OBGYN**	**Orthopedic**	**Ophthalmology**	**Maxillofacial**	**ENT**	**Emergency medicine**
49	**67**	**18**	**11**	**8**	**10**	**9**
RII=8 RIII=33 RIV=8	RII=26 RIII=30 RIV=11	RII=12 RIII=6	RII=6 RIII=5	RII=4 RIII=4	RII=4 RIII=6	RII=9
The total sample size is 141						
General Surgery	**OBGYN**	**Orthopedic**	**Ophthalmology**	**Maxillofacial**	**ENT**	**Emergency medicine**
40	**55**	**15**	**9**	**7**	**8**	**7**
RII=7 RIII=26 RIV=7	RII=21 RIII=25 RIV=9	RII=10 RIII=5	RII=4 RIII=5	RII=3 RIII=4	RII=3 RIII=5	RII=7

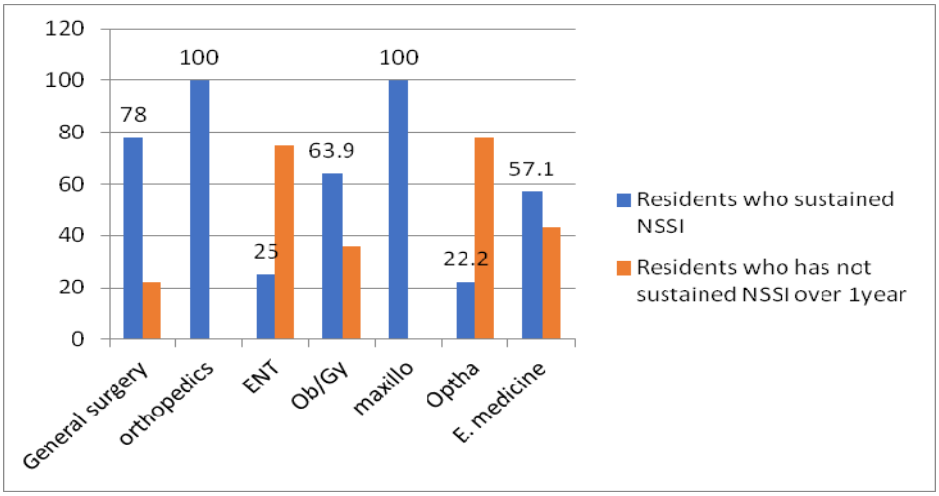

Figure 1: Comparison of needle and sharp object injured and non-injured residents, St. Paul's Hospital Millennium Medical College, Addis Ababa, March 1 - 30, 2018

The highest rate of injury (100%) was found among orthopedics and maxillofacial surgery residents (15/15 and 7/7, respectively), followed by General surgery residents 31/40 (77.5%) ObGyn residents, 23/36 (63.9%), and emergency medicine residents 4/7 (57.1%) (Table 2). The differences are statistically significant (p=0.000). The frequency of NSSIs per a resident per year was analyzed within each surgical specialty with the use of Kruskal-Wallis test and results showed that the mean ranks of NSSI per a resident are significantly different among the different surgical specialty. (X^2=27.150, 6 d.f., p=0.000). The highest was found among orthopedics and maxillofacial surgery residents with a mean number of injuries over one year is 3 and 2.71 respectively. Thirty-eight (45.2%) out of the 84 NSSIs were among residents in their 1st year of residency, 41 (48.8%) injuries to residents on their 2nd year, and five (6%) injuries to residents on their 3rd year of training program. No significant association was found between occurrence of NSSI and level of residency (p=0.925) (Table 2).

Table 2: Patterns needle and sharp object injury (NSSI) by surgical specialty type, St. Paul's Hospital Millennium Medical College, Addis Ababa, March 1 - 30, 2018

Surgical Specialty	No. of Residents	Residents with NSSI	Mean No. of NSSI per resident
All surgical Specialty	122	84	1.62
General Surgery	40	31	1.85
Orthopedics and Traumatology	15	15	3
Ear, Nose and Throat	8	2	0.63
Obstetrics and Gynecology	36	23	1.33
Maxillofacial	7	7	2.71
Ophthalmology	9	2	0.63
Emergency medicine	7	4	0.57

Of the 84 injuries, 67 (79.7%) were self-inflicted. Highest number of injuries occurred in the operating theatre-69 (82.1%), followed by emergency room - 11(13.1%), 2 (2.4%) at the bedside (wards & ICU) and 2 (2.4%) in the out-patient department. There is association between place where the injury happened and occurrence of NSSI (p=0.000). Procedures related with high risk of injury were suturing - 59 (70.2%) and manipulating a needle or sharps - 9 (10.7%) (see table 3) The result were found statistically significant (p=0.000).

Solid needle accounted for 65 (77.4%), sharp instruments for 12 (14.3%) and hollow bore needle for 7 (8.3%) of the NSSIs. 37 (44%) of the residents involved in the study attributed rushing as the cause of the injury. Other reasons mentioned are use of inappropriate equipment in 21 (25%), fatigue/hungry while performing procedures n 10 (11.9%), negligence in following the principle of prevention method six (7.1%), lack of assistance in nine (10.7%) and lack of skill in 1 (1.2%) (Table 3).

Out of 84 residents who sustained, only 12 (14.3%) reported their recent injury to incidence office or ART clinic. In addition, among the 18 recent injuries which involved in high risk patients, only 11 (61.1%) were reported. The most frequent reason for not reporting was the feeling of residents that source patients are not high risk 39 (49.4%).

Other reasons included lack of awareness about existence of the incidence office in the hospital in 10 (12.7%), 9 (11.4%) thought that the process takes too much time, five (6.3%) did not want to take prophylaxis due to its side effects, 5(6.3%) because of negligence and one (1.3%) believed reporting has no significant use (Table 4).

Table 3: Circumstances under which the recent NSSI occurred

		Frequency	Percentage
Source of the injury			
	Self-induced	69	82.1%
	By someone else	15	17.9%
Place where injury occurred			
	In the OR	69	82.1%
	In the ER	11	13.1%
	At the bedside (Wards, ICU)	2	2.4%
	OPD	2	2.4%
Tasks performed during injury			
	suturing	59	70.2%
	Manipulating a needle or sharp in a patient	9	10.7%
	Cutting	5	6%
	Exchanging instruments	3	3.6%
	Recapping a needle	2	2.4%
	Cleaning up	2	2.4%
	others	4	4.8%
Type of equipment used			
	Solid needle	65	77.4%
	Sharp instruments	12	14.3%
	Hollow bore needle	7	8.3%
Perceived cause of injury			
	Feeling of being rushed	37	44%
	Not using appropriate equipment	21	25%
	Fatigued/hungry	10	11.9%
	Lack of assistance	9	10.7%
	Negligence in following the principles of prevention method	6	7.1%
	Lack of skill required	1	1.2%

Table 4: Reason for not reporting NSSI

Reason for not reporting the most recent NSSI	Frequency	Percentage
Number of residents who did not report their most recent NSSI	72	100%
The source patient was not of high risk	39	54.2%
I don't know if the unit exists	10	13.9%
The process takes too much time	9	12.5%
I don't want to take prophylactic drug	5	6.9%
Negligence	5	6.9%
It has no significant use	1	1.4%
Other	1	1.4%
Missing	5	6.9%

DISCUSSION

NSSI among residents is a very serious occupational safety issue. Even though seroconversion following a single needle stick injury is rare, the lifetime risk of contracting an infection is noteworthy. This study revealed that NSSI among residents practicing surgery is common. More than two-thirds of residents, (68.9%), have sustained NSSIs within the study time. This result is almost comparable to other studies conducted in a university hospital in Saudi Arabia (58.9%) and Mulago Hospital, Uganda (60.7%) (2,5,24,25). The level of residency is not a determining factor for NSSI from our study. This is comparable to a study done in southern California. (26) But in most of the literature, the likely hood of injury increased as residents practice more. (2,5,7,8,8,26) This could be a result of engagement in more emergency procedures, long working hours, and sleep deprivation.(4,5,12,16,25,26)

The higher number of NSSI among orthopedics and maxillofacial residents from our study is comparable to surveillance done in Nigeria. This unique risk of percutaneous injuries during surgical procedures could be related to the usage of a wide array of sharp instrumenta-tion and routine handling of sharp bony edges by orthopedic and Maxillofacial trainees.(5,13,14,28) The high frequency of solid needle injury seen in the OR related to suturing is also similar to other works of literature (2,5,10,13,21).

The most important reasons are; rushing, use of inappropriate equipment, fatigue/hungry, negligence in following the principle of prevention method, lack of assistance, and lack of skill. Almost all reasons are seen in most of the literature including one done in black lion hospital, Ethiopia. (5,7,11,23). As we can see from above most of the mechanisms of injuries are preventable by adherence to standardized sharps-handling guidelines (e.g creating a neutral zone to avoid hand-to-hand passing), providing continuous education and training, applying newer technologies like using adhesives for skin closure. Especially as rushing is the most important reason, an increasing number of residents and OR tables during emergency hours may help a lot by reducing the workload and fatigue. (1,5,13,23)

Underreporting is significant, only 12 (14.3%) reported their recent injury to incidence office or ART clinic. Which is similar to most of the literature (e.g in Saudi Arabia, 9% reported).(2,5,8,9,19,23,25,26,28) (Also, among the 18 recent injuries involved in high-risk patients, only 11 (61.1%) were reported. The most frequent reasons for not reporting are; the feeling of residents that source patients are not high risk, lack awareness about the existence of the incidence office in the hospital, thinking the process takes too much time, negligence, and others.

From above it seems the factor that has a great impact on the attitude of doctors toward injuries is the belief that the patient is a low risk. In some of the literature, it is shown, if the incidence reporting unit is nearby and accessible also during night shifts, reporting is improved. (1,13,15) So continuous awareness creating sessions in each level of residency that emphasizes, If surgeons do not consistently report their sharps injuries, they may be more likely to incur such injuries which, in turn, poses a greater risk to themselves and their patients, could help a lot. (5, 22,28)

In conclusion, the incidence of NSSI among residents practicing surgery is high. Most injuries are self-inflicting. The reporting habit and rate is inadequate, which can have a serious consequence even for those who considered their injury is related to a low-risk patient as some of them can be in the window period. Adopting universal precautions which are the gold standard in the prevention of blood-borne pathogens is the key.

This includes using protective barriers such as gowns, gloves and masks, protective eye-wear, and taking precautions when handling sharp instruments such as scalpels and needles. This involvement of the teaching university management team is crucial in making sure training is being given timely, practiced accordingly, and most importantly showing these kinds of results to policymakers so that newer technologies will be available.

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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

TRENDS IN THE OCCURRENCE OF UROLITHIASIS IN ETHIOPIA: A 13-YEAR RETROSPECTIVE ANALYSIS OF CASES AT ST. PAUL'S REFERRAL HOSPITAL

Tilahun Alelign, MSc[1,2]*, Asfaw Debella, PhD[3], Beyene Petros, PhD[1]

ABSTRACT

Introduction*: Recent studies have reported an increasing occurrence of urolithiasis worldwide. However, studies that evaluate the occurrence of stone diseases in Ethiopia are scarce.*

Objective*: This study was intended to determine trends in the occurrence of urolithiasis at the St. Paul's Referral Hospital during the last 13 years, and its associated comorbidities.*

Methods: *A total of 32,370 patients who underwent surgical treatment was included in the study. Thirteen years retrospective data were retrieved from medical records (registry books and electronic databases) at St. Paul's Tertiary Referral Hospital from September 2005 to 2017. Cases with open surgical treatments related to urolithiasis were identified through a review of patient medical records. Data were analyzed using descriptive statistics, and using Graph Pad Prism 6 Software.*

Results: *Among 32,370 surgically treated patients referred from all over the country, 2.3%(757) urolithiasis cases were determined in the last 13 years. The mean (SD) age at which the stones treated was 42.5(±23.7) years. The occurrence of stone diseases was found to be higher in males (68.2%) than females (31.8%). Nearly one quarter (22.2%) of the cases with urolithiasis occurred in the age group 30 and 39 years. Urolithiasis increased in men and declined in women as age increased. In nearly one-half (46.5%) of the patients the stones were located in the kidneys, with a higher proportion in the left kidney. Stone surgeries in recurrent stone formers constituted 1.32%. The most common co-morbidity associated with urolithiasis was benign prostatic hyperplasia, and reduced urinary output complications.*

Conclusion: *The occurrence of cases with urolithiasis increased over the 13- year period at the referral hospital in this study. This finding will raise awareness of physicians, researchers and policy makers for appropriate actions.*

Keywords*: Ethiopia, Prevalence, Occurrence, Retrospective, Trend, Urolithiasis*

INTRODUCTION

Urolithiasis is a public health problem, the prevalence of which has been increasing worldwide (1,2). Urolithiasis refers to the formation of stone(s) in the urinary tracts (3). This includes nephrolithiasis (renal calculi, or kidney stones), ureterolithiasis (ureter calculi), and cystolithiasis (bladder calculi) (4,5). Urolithiasis is mostly lodged in the kidneys (6), and is the third common disease of the urinary tract (7). Nephrolithiasis is a systemic disorder and has been associated with chronic kidney disease (CKD), the end-stage renal failure (8-10), cardiovascular diseases (11), *Itus*, hypertension and obesity (12,13). The clinical manifestations of nephrolithiasis include renal colic, blockage of urine flow, kidney swelling, bloody urine and secondary bacterial infection (14).

The cause for kidney stones is multi-factorial including epidemiological, biochemical, and genetic factors (15-17). The pathogenesis of kidney stone formation is a complex biochemical process and remains incompletely understood (18).

A kidney stone is formed as the result of an imbalance between promoters and inhibitors in the urine and the kidneys (17). The types of kidney stones are calcium stones, struvite or magnesium ammonium phosphate stones, uric acid stones or urate, cystine or ammonium acid citrate stones and drug-induced stones (19). Calcium stones comprise about 80% of the urinary tract stones (20). After the first episode of a stone, the 10-year recurrence rate is more than 50% (21, 22).

Globally, the prevalence of kidney stones is between 2% and 20% (23, 24) including infants (25). In the United States, a National Health Survey report for kidney stone prevalence was 5.2% (from 1988 to 1994) (1), and it affects approximately 1 in 11 people in the United States (26). In Germany, the prevalence of stone disease was 4.7% (2). This prevalence may be influenced by variations in sex, age, race, and changes in dietary practices and global warming (3).

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Similarly, variations in stone disease prevalence among the different studies may be linked to differences in the study design, duration of the study, and geographical locations.

Sun exposure enhances vitamin D production which leads to an increase in 25-hydroxy vitamin D (27) and the classic effect of vitamin D is to facilitate the intestinal absorption of calcium by mediating active calcium transport across the intestinal mucosa (28). It was reported that most kidney stones are frequently formed in men than in women between 20 and 49 years old (15). In addition, Ahuja et al. (29) reported higher stone occurrences in men than in women between the ages of 30 and 39.

The urinary stones cause not only pain and distress in patients, but also impose a significant economic burden due to loss of working days and associated health care costs. The analysis of stone chemical compositions may influence the choice of intervention (30). Currently, less invasive surgical therapies such as extracorporeal shock-wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), or ureteroscopy (URS) have revolutionized acute and complex stone management. However, these often result in incomplete stone clearance. In Ethiopia, reports on the prevalence of urolithiasis is scarce. Therefore, the present study was intended to estimate trends in the occurrence of urolithiasis among patients that attended St. Paul's Hospital, Millennium Medical College (SPHMC), Ethiopia, over a period of 13 years (2005 - 2017).

PATIENTS AND METHODS

Thirteen years retrospective data were extracted from medical records (surgical theatre registry books and electronic databases) between September 2005 and September 2017 from SPHMC, Addis Ababa, Ethiopia. Electronic medical records were available only for the last 2 years (2015-2017).

The study population was patients who had been admitted to the SPHMC during the study period. Among all patients who underwent open surgery, those identified as stone cases were enrolled in the study. The data retrieved include the age, sex, anatomical positions of stones in the urinary system, co-morbidities or conditions associated with stones, and the history of stone recurrence. Patient records with incomplete information and did not appear readable were excluded from the study. Data in the clinical records were entered into Microsoft Excel and analyzed using descriptive statistics and Graph Pad Prism Version 6 software.

The research protocol was approved by the College of Natural Sciences Institutional Review Board (CNS-IRB) (Approval Minute No. IRB/021/2016), Addis Ababa University. Furthermore, permission was also obtained from the SPHMC Institutional Review Board (Ref. No. PM23/285/2016). Patients' names were assigned code identifiers, and data were used only for the intended study.

RESULTS

Among 32,370 patients who underwent surgical treatment, 757(2.3%) of patients had stone diseases (open stone removal). The patients' theatre registry information, which were completely filled and readable was included in the study. In terms of gender, urolithiasis was more prevalent among males accounting for 68.2% (516), as compared to 31.8% (241) in females. During the 13 year retrospective study period, the prevalence of urolithiasis showed an increasing trend from 2012 to 2017 in spite of the decreasing number of surgeries in stone disease surgery performed each year (Figure 1; Figure 2**)**.

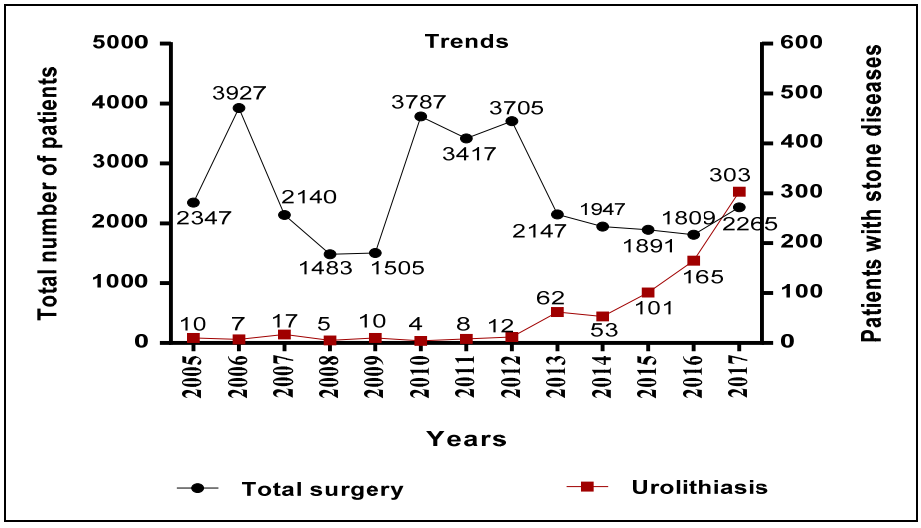

Figure 1: Trends in urolithiasis prevalence from September 2005 to 2017 at St. Paul's Hospital, Millennium Medical College.

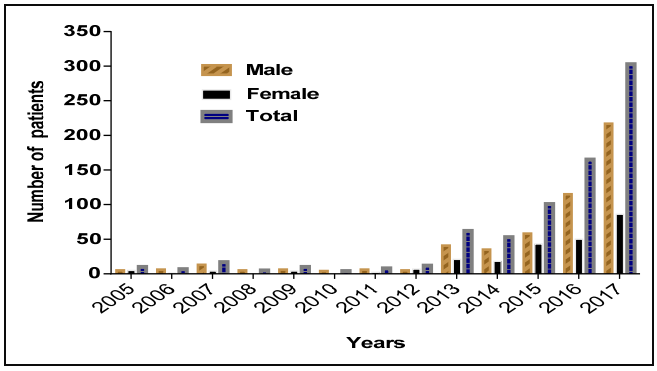

Figure 2: Proportions in stone surgery as it relates to gender at the St. Paul's Hospital, Millennium Medical College, September 2005 - 2017.

The age of the study population ranged between three and 84 years and the mean (SD) age was 42.5 (±23.7) years. The majority of stone patients (22.2%) were in the age group 30-39 years. In this group, the hospital prevalence of urolithiasis was 20.5% among males and 25.7% among females.

In general, most cases with urolithiasis were between 20 and 49 years of age (Figure 3). As age increased, urolithiasis raised in men and declined in women (Figure 4).

Figure 3: Age related frequency of urolithiasis among 757 patients at the St. Paul's Hospital, Millennium Medical College, September 2005 - 2017.

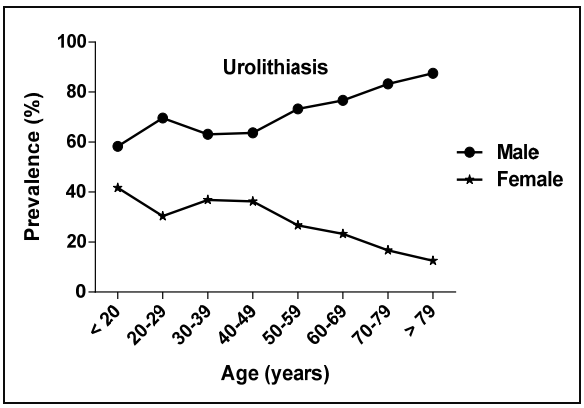

Figure 4: Percentage of patients with urolithiasis as it relates to gender and age among 757 cases at St. Paul's Hospital Millennium Medical College, September 2005 - 2017.

In 46.5% of the cases, the stones were located in the kidneys. The location of stones was more on the left kidney (47.7%) than the right kidney (37.5%). There were some patients whose stone locations not defined or recorded in the registry books (**Table 1**).

Table 1: The frequency of urolithiasis anatomical locations among 757 cases at St. Paul's Hospital Millennium Medical College, September 2005 - 2017.

Urolithiasis locations	Number of cases (%)
Urolithiasis (n=757)	
Kidneys	352 (46.5)
Ureter	314 (41.5)
Bladder	89 (11.7)
Urethra	2(0.3)
Kidney stones (n=352)	
Right	132(37.5)
Left	168(47.7)
Not defined	52(14.8)
Ureteric stones (n=314)	
Right	153(48.7)
Left	126(40.1)
Not defined	35(11.2)

Among 757 stone patients, 13.61% (103) of the urinary stones were associated with comorbidities or complications. The major comorbidity was benign prostatic hyperplasia (BPH), and major complications include decreased urinary output (UOP) and hydronephrosis. Stone surgeries due to recurrent stone formation constituted 1.32% (Table 2).

Table 2: Common co-morbidities and complications associated with urolithiasis among 757 cases at St. Paul's Hospital, Millennium Medical College, September 2005-2017.

No.	Co-morbidities/ Complications	Urinary stones Number of Patients(%)
1	Benign prostatic hypertrophy	24(3.17)
2	Reduced UOP	58(7.66)
3	Hydronephrosis	6(0.79)
4	Kidney failure	4(0.53)
5	Diabetes mellitus (Type 2)	1(0.13)
6	Recurrent	10(1.32)
7	Null	654 (86.39)

DISCUSSION

Urolithiasis is a public health problem caused by an imbalance between stone promoters and inhibitors in the kidneys. The SPHMC is one of the tertiary hospitals in Ethiopia, in receiving patients referred from all over the country. The increasing trend in stone disease prevalence through the years in Ethiopia may be a reflection of the changes in the life- style of the population such as diet and reduced daily activities. There are indications that the increase in prevalence of stone diseases may be associated with increasing consumption of animal proteins and salts, decrease in calcium-rich products, and climate change as reviewed by Alelign and Petros (17). The analysis results of trends in urolithiasis prevalence were low and similar across the years 2005 to 2012, but started to rise thereafter until 2017.This might be due to improvements in diagnosis of the disease and availability of surgical services at the hospital.

Similar increasing trends in stone disease prevalence were reported from USA by Raheem *et al*. (32). In Japan, the prevalence of renal stones rose from 4 to 5.4% within 10years (1975–1985)(33). It was also shown that, recurrent urinary tract infections (urease-producing microorganisms) enhanced the prevalence of urolithiasis (7,34). The findings that most stones were located in the kidneys is similar to previous reports from Tunisia and Saudi Arabia (35,36). The retrospective prevalence of urolithiasis (2.3%) was substantially higher than the prevalence (0.24%) from the USA (37), and in Iran (5.7%) (38). The majority of stones were located in the left kidney, probably due to its larger size, which would increase the chance of crystal depositions.

Patients with ureteric stones (41.5%) had surgical interventions, although the non-invasive treatment options such as ESWL were available, though there are problems with their functionality. Therefore, open surgery remains the mainstay of urinary stone treatment.

The finding that the prevalence of kidney stone in men was higher than women, may be explained by the fact that the female sex hormone (estrogen) inhibits calcium oxalate stone formation (39), whereas male hormones, testosterone (40) and androgen (42) promote. Similar studies from other countries had indicated that urolithiasis was more frequent among men than women (1,26,38,43,48) indicating study from the USA also showed that males have a three times higher urinary stone incidence compared to females and provided an explanation that urolithiasis mainly occurred in the third and fourth decades of life when the level of serum testosterone is the highest (41).

However, as Lieske *et al.* (45) reported from Rochester, Minnesota, USA there is a decreasing trend during the past 30 years in the male-to-female ratio in kidney stone disease, in the developed countries. In the present study, the life expectancy in the country is in the sixties and a small number of patients in the 70's may come to the hospital for support. Moreover, one of the possible reasons for gender variation might be due to gender equity, in which females may not have equal opportunity to go to health setup.

The mean age of 42.5 (±23.7) at the time of stone treatment was similar to that reported from USA, 45 years in men and 41 years in women (45), but was different from what was reported from Iceland (30 to 79 years) (23). However, there is also another study that showed younger age groups not to be fully free from developing kidney stones(31). Thus, age does not appear to be a risk factor for stone disease formation in the kidneys. Also, although *Diabetes mellitus* and hypertension have been significantly associated with stone diseases, affecting children as young as 5 years old (47), these were not associated with urolithiasis in the current study.

The limitation of the study is that the retrospective study sample falls short of being a fair representative of the general Ethiopian population since it is based on patients that came to the hospitals seeking treatment, as a result of which it may overestimate the prevalence of stone diseases. Furthermore, patients clinical records were taken only from surgically operated patients in one referral hospital. Also, it is possible that some erroneous and incomplete coding of patients' medical information could have limited the effort to capture all stone disease hospital admitted cases. In addition, since the ESWL treatment performed on outpatients, was not included under surgical treatment records, this will also lead to under reporting of stone diseases.

Conclusions

The findings showed that urinary stone prevalence was increasing and the disease remains a public health problem in Ethiopia. The overall prevalence of stone disease in the past 13-years (2005 to 2017) among patients admitted to the St. Paul's referral Hospital was 2.3%. This provides baseline information for researchers and would guide policy makers to institute preventative measures to minimize stone diseases in the population.

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Conflict of Interest

The authors declare that they have no competing interests.

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Kurabachew Mengistu, Dereje Geleta. *Ethiop Med J, 2020, Vol. 58, No. 3*

ORIGINAL ARTICLE

OCCURRENCE AND FACTORS ASSOCIATED WITH DIABETIC KETOACIDOSIS AMONG CHILDREN SEEN AT HAWASSA UNIVERSITY, COMPREHENSIVE PECIALIZED HOSPITAL: A CROSS-SECTIONAL STUDY

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ABSTRACT

Introduction: *Diabetic ketoacidosis is a medical emergency that requires prompt hospital admission and treatment. It contributes significantly to morbidity and mortality in children with type 1 diabetes mellitus. Diabetic Ketoacidosis is a result of an absolute or relative shortage of insulin deficiency, resulted in hyperglycemia, ketonemia, acidemia, and systemic inflammation.*

Objective: *To study the prevalence of diabetic ketoacidosis and associated factors among the pediatric diabetic age group in Hawassa University teaching hospital from September 2014 to August 2019.*

Methods: *The research area is in a pediatric clinic, Hawassa University teaching hospital. This study is a retrospective cross-sectional study of 150 cases who had diabetes mellitus. Data were collected from patient records by trained data collectors. Data intended for our study that consists of the patient's history, physical examination, progress notes, treatment results, and a summary of deaths from September 2014 to August 2019.*

Results: *Of the 150 patients, 108 (72%) had diabetes ketoacidosis. The condition was common (28.7%) among patients in the age group 10 to 14 years. The majority (98.7%) had type 1 diabetes mellitus. Of patients with diabetes ketoacidosis, 50 (46.2%) were on drug treatment for diabetes, of which 48 (96%) used insulin and two (4%) were on oral hypoglycemic agents.*

Conclusion: *Diabetic ketoacidosis was common among patients with Type diabetes mellitus. Most patients with diabetes ketoacidosis presented with symptoms of polyphagia, polydipsia, and polyuria. Early recognition of warning symptoms of ketosis such as weakness, abdominal pain, vomiting and drowsiness are required to make diagnosis early and provide treatment.*

Keywords: *Diabetic ketoacidosis, Hyperglycemia, Cerebral oedema, Ketonemia, Ethiopia*

INTRODUCTION

Diabetic ketoacidosis (DKA) occurs most commonly in patients with type-1diabetes mellitus (DM), but also may occur in patients with type 2 diabetes, and is most often triggered by omission of treatment, occurrence of infection, or alcohol abuse (1). The diagnostic criteria of DKA issued by the International Society for Pediatric and Adolescent Diabetes consists of blood glucose > 11 mmol/L, blood pH<7.3, serum bicarbonate <15 mmol/L, ketonemia and ketonuria, and a high anion gap (2,3).

Differential diagnosis of DKA consists of alcoholic ketoacidosis, starvation ketosis, and conditions causing metabolic acidosis such as lactic acidosis, chronic renal failure and ingestion of drugs such as salicylate, methanol, ethylene glycol, and paraldehyde (4).

The risk of DKA in young patients with established Type-1 diabetes mellitus (TIDM) is 1% - 10% per patient per year (5).

Clinical decision must be taken to decide optimal treatment for the individual patient, and appropriate adjustments to treatment must be made based on meticulous clinical and biochemical monitoring of the patient's response (6). The true incidence of DKA in tropical Africa is unknown, but has been estimated at 24% (International Diabetes Federation 2011), suggesting that many cases are underreported or misdiagnosed (7).

The incidence of DKA at the onset of DM may be due to parents' unawareness of symptoms of hyperglycaemia. Having a first degree relative with DM is associated with a decreased risk of DKA. However, the degree of awareness of DM symptoms among medical care providers seems to be crucial in DKA prevention (8). Incidence rates of DKA vary and are influenced by demographic, socio-economic, and clinical and laboratory service settings in each area (9).The prevalence of DKA among newly diagnosed patients remains unacceptably high, even among the nations with a highly developed system of medical care (10).

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Therefore, our aim of the study was to identify the occurrence and associated risk factors of DKA in children at Hawassa University Teaching Hospital (HUTH) in Southern Ethiopia.

PATIENTS AND METHODS

Study area

This was study conducted at HUTH located in Hawassa town, southern Ethiopia. It is located 273 km south of Addis Ababa. The hospital has more than 68 units and serves more than 18 million people in Southern Nations and Nationalities People's Regional State of Ethiopia and neighboring regions such as of Oromia and Somali..

The hospital has 528 beds and provides the public with service in various specialized area, including dental, dermatology, laboratory, pathology, clinical psychiatry, ear, nose and through (ENT), physiotherapy, surgery (general surgery, neurosurgery, and orthopedic, urological and plastic surgery), and subspecialty (cardiology, neurology, ophthalmology, radiology, anesthesia, oncology, gynecology and obstetric, and pediatric services.

Of the total number of beds, 78 were for pediatric department, 40 for newborns. Currently, there are a total of 58 senior physicians, 34 residents and 19 general practitioners; among these eight senior physicians, 18 residents and four general practitioners working in the department of pediatrics. The average monthly delivery in the hospital is 380 per month. The number of patients admitted to the hospital pediatrics' ward is 147 per month, of which 75 are neonates covering 51% of pediatric admissions.

Study design

This was a cross-sectional study with data collected retrospectively at Hawassa University Comprehensive Specialized Hospital (HUCSH) from September 2014 until August 2019. All pediatric patients treated at the hospital for a specified period. All pediatric diabetic patients treated at the hospital during the study period were included

Inclusion and exclusion criteria

All pediatric diabetic patients who were being treated at HUCSH with complete records were included. Pediatric patients with DM and treated at the hospital during the study period, but had incomplete (unknown age and type of diabetes treatment and treatment outcome) records in the study period were excluded.

Sampling size

We identified a total of 173 records of patients treated for DKA. Of these, 150 medical records with complete information were included in the study.

Data collection and analysis

Checklist prepared by reviewing the different literature and previous studies conducted to review the patient's records. The checklist consists of the data in question from the history, physical examination, progress notes, and the results of treatment, and a summary of death.

Data were collected included patient's age, gender, treatment adherence, education level of parents, family history, type of medication, precipitating factors, other chronic diseases, drug withdrawal, body mass index, whether previously known or newly diagnosed DM, type of DM, presenting signs and symptoms, place of residence, treatment given and outcome of treatment. The contents of the checklist was pre-tested before the actual data collection process in 5% of the patient records. Based on the result of pretest the necessary changes were made to improve the quality of the tool. the collected data for on each participant was checked for completeness and a code provided prior to data entry. The data were cleaned and entered onto SPSS version 20 and cleaned before data analysis. Frequency distribution, proportion and descriptive summaries were used to describe the study variables.

Ethical Considerations

Ethical clearance was obtained from Hawassa University, College of Medicine and Health Sciences Internal Review Board, and Hawassa Teaching Hospital. Consent from patients was not obtained since the study involved retrospective data in patietn records.

RESULTS

One hundred and fifty patients who had 148 types 1 and type 2 DM studied at HUCSH during the five-year study period from September 2014 to August 2019. One hundred and eight patients (72%) had DKA. The demographic data of the 150 patients are shown in Table 1. There were 56 (51.9%) males and 52 (48%) females, with a male-to-female ratio of 1: 1.1. A majority 31 (28.7%) of the patients were in the age group 10-14 years. Of the total patients who had DKA 73 (67.6%) were underweight and 35 (32.4%) were within the normal range.

Patients from urban residence accounted for 61 (56.48%), while those from rural area accounted for 47 (43.52%).

Table 1: Sociodemographic data of patients with type 1 and type 2 diabetes mellitus Hawassa University, Teaching Hospital, September 2014 to August 2019.

Variables		Frequency	Percent
Age	<1 year	2	1.3
	1-4 yrs.	32	21.3
	5-9 yrs.	38	25.3
	10-14 yrs.	46	30.7
	15-18 yrs.	32	21.3
Gender	Male	81	54
	Female	69	46
BMI	Underweight	93	62
	Normal	56	37.3
	Overweight	1	0.7
Residence	Urban	88	58.7
	Rural	62	41.3
Type of DM	Type-1	148	98.7
	Type-2	2	1.3

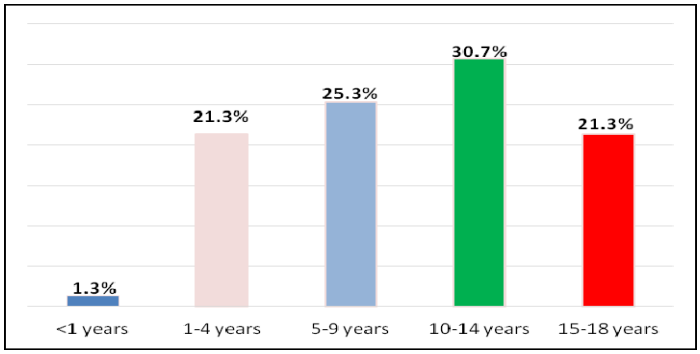

Figure 2: Distribution of Diabetic ketoacidosis among pediatric patients in HUTH from September 2014-August 2019.

In our study, 148 (98%) of the patients were type 1 DM, and 2 (1.3%) of the were type 2 DM. Eighty (53.3%) of the patients were newly diagnosed DM and 70 (46.7%) were known cases of DM. Of the known diabetic patients, 68 (97.1%) had type-1 DM and two (2.9%) had type 2 DM. From a total of 148 patients with type 1 DM, 106 (71.6%) presented with DKA. Among them, 58 (54.7%) were newly diagnosed with type 1 DM.

Of the known diabetic patients, 50 (45.7%) developed DKA, of which 48 (96%) were type 1 and two (4%) type 2 DM patients. Among patients who developed DKA, 30 (27.8%) had a family history and 21 (19.4%) did not have a family history of diabetes and the remaining 57 (52.8%) had no known family history DM.

Among the 108 children who presented with DKA, 27 (25%) had a history of DKA, and 29% of the patients with DKA were between 10 to 15 years of age. Of the 108 DKA patients, 52 (48.1%) had mild, 37(34.3%) had moderate and the remaining 19 (17.6%) had severe DKA of whom 11 (57.9%) had urinary ketone level +3. Sixty-five percent of DKA patients had random blood sugar (RBS) between 250mg/dl and 500mg/dl and t22% had over 500mg/dl.

Of the 108 patients with filed outcomes, 105 (97.22%) improved after treatment, whereas three (2.8%) died in hospital. The cause of death was severe DKA in two patients and moderate DKA in one patient. (Table-2)

Table 2: Clinical Characteristics of diabetic ketoacidosis in children in Hawassa University Teaching Hospital, September 2014 -August 2019.

Variable		Percent of DKA		Total
		Yes	No	
Age at Diagnosis of DM	less than 5 year	30	10	40
	5 to 10 year	38	10	48
	10 to 15 year	36	19	55
	15 to 18 year	4	3	7
Previous history of DKA	Yes	27	0	27
	No	81	42	123
Age at first DKA diagnosis	less than 5 year	26	1	27
	5 to 10 year	24	0	24
	10 to 15 year	31	0	31
	15 to 18 year	12	1	13
Current grade of DKA	Mild	52	1	53
	Moderate	37	0	37
	Severe	18	0	18
The current blood glucose level	RBS less than 250mg\dl	16	26	42
	RBS 250mg\dl to 500 mg\dl	70	15	85
	greater than 500mg\dl	22	1	23
Onset of DM	Known DM patient	50	20	70
	Newly diagnosed	58	22	80
Family history of DM	Yes	30	8	38
	No	21	13	34
	Unknown	57	21	78

Of the 108 DKA patients, 56 (51.8%) had precipitating factors, either preceding infections (n=55), of which 24 (41.3%) had respiratory tract infections (RTI), 18 (31%) urinary track infection (UTI), three (0.1%) gastroenteritis, and 13 (22.4%) infections of other organ systems.

Regarding their treatment regimen of 50 (46.2%) of patients with DKA, 48 (96%) were on insulin, two (4%) were taking oral hypoglycemic agents and, of these 21 (42%) discontinued medication for unknown reasons. Twenty (23.1%) of the patients were not taking their meals regularly (Table-3).

Table 3: Characteristics of factors associated with Diabetes ketoacidosis in children, Hawassa University Teaching Hospital, September 2014 -August 2019.

Variables		Presence of DKA		Total
		Yes	No	
Pre-Medication history	Yes	50	20	70
	No	58	22	80
	Total	108	42	150
Type of Medication	Insulin	48	19	67
	Oral hypoglycemic agent	2	0	2
	Total	50	19	69
Medication Discontinuation	Yes	21	3	24
	No	29	17	46
	Total	50	20	70
Patients who take their meal properly	Yes	83	35	118
	NO	25	7	32
	Total	108	42	150
Chronic illness other than DM	Yes	7	1	8
	No	101	41	142
	Total	108	42	150
Precipitating factor	Yes	56	3	59
	No	52	39	91
	Total	108	42	150
Presence of infection	Yes	55	4	59
	No	53	38	91
	Total	108	42	150

In this study, the frequently reported presenting symptoms of DKA were poly symptoms (polyphagia. Polydipsia, polyuria) 84 (77.8%), and nausea and vomiting 66 (61%), tachypnea and easy fatigability 57 (52.8%), abdominal pain 51 (47.2%), and loss of consciousness 15 (13.9%) (Table 4).

Table 4: Clinical Presentations of children with diabetic ketoacidosis, Hawassa university Teaching Hospital, September 2014 - August 2019.

Variables		Presence of DKA Yes	No	Total
Nausea and vomiting	Yes	66	8	74
	No	42	34	76
Abdominal pain	Yes	51	2	53
	No	57	40	97
Loss of consciousness	Yes	15	3	18
	No	93	39	132
Poly symptoms	Yes	84	36	120
	No	24	6	30
Other symptoms	Yes	57	15	72
	No	51	27	78

There was a significant association between DKA and preceding infections X^2 =21.7 ($p<0.0001$), medication discontinuation X^2=4.622 ($p=0.05$) and BMI X-=7.024 ($p=0.03$). Patient's sex, parental education status, family history of diabetes, the onset of diabetes, type of diabetes, not taking food well, and other chronic diseases besides diabetes do not have a significant relationship with the occurrence of DKA.

DISCUSSION

Ketoacidosis is an acute complication of DM, especially type 1 DM, demonstrating a severe insulin deficiency (11). DKA results from both absolute or relative insulin deficiency, and elevated counter-regulatory hormones (glucagon, catecholamine, cortisol and growth hormone (12,13). DKA in children with recognized T1DM can be the result of non-compliance with insulin therapy, insulin pump failure, or intercurrent illness (14).

In our study, the prevalence of DKA among pediatric age group was 72%, which is comparable with the study conducted at Tigray region hospitals and the overall prevalence Ethiopia is 80% (15). A study in the Sudan reported the prevalence of 81.2% newly diagnosed DM patients with DKA (16). Research done in a different countries have reported relatively similar figures with our study, which have shown a high facility prevalence of DKA among the pediatric age group worldwide (15). In contrast, low occurrences have been reported from Finland (22%), Iran (24%), Sweden (14%) (16).

In our series, we found a significant association between DKA and preceding infection, discontinuation of medication, and patient's BMI. This is similar to a study conducted by Smith JA, et.al., which indicated a strong effect of preceding infection on the development of DKA. Similar observations have also been reported from Mekele Teaching Hospital and by research done in Addis Ababa Hospitals (16-18). Another study (19), has also shown that the combination of inadequate insulin administration, the presence of infection, and other clinical conditions such as myocardial infarction, cerebrovascular accidents, pulmonary embolism, pancreatitis, illegal drug use, and alcohol abuse predispose patients with DM to DKA.

There was a family history of DM in 27.8% of our patients, which was slightly higher than the 23.3% reported from Mekele Teaching Hospital (17). Family history is an important risk factor for the development of T1DM (18). This was also been demonstrated in our study, where family history of DM is in the order of 27.8% and 28.7% of DKA occurred in the age group 10 to 14 years higher than the age group 0-14 years, an observation also corroborated by other studies (20).

The commonest presenting symptoms in our study were poly symptoms (61%), which is also common presenting symptoms (98%) at the Tikur Anbesaa Hospital (16) in Addis Ababa. There were three deaths, which accounted for a 2.8% case fatality rate, and of two among the deaths presented with severe DKA.

Our study showed 52 (42%) of the children presented with mild DKA followed by moderate which was seen in 37 (34%) of them and severe 19 (17.6%). This finding is comparable to the reports of studies done in a tertiary care hospital (22). Weight loss before a diagnosis is a usual sign of metabolic imbalance, with a greater risk of developing DKA, and which has also been affirmed by a report form Nepal (23). In industrialized countries, the death associated with DKA in children is in the order of 0.2% to 0.3% (24), whereas in our study the corresponding figure much higher (2.8%).

In sub-Saharan Africa, in particular, there are many challenges regarding patients with DM, because of the lack of effective management systems, including timely awareness of its complications and prevention of DM (25). Improving awareness among parents and clinicians about the early symptoms of DM through diabetes education programmes - such as community intervention in Italy, which reduced the prevalence of DKA at diagnosis from 78% to 12.5% (26).

Conclusion

DKA is the most common complication of type 1 DM and cause of morbidity in the pediatric age group with DM. It commonly occur in newly diagnosed type 1 DM patients. Most patients with DKA present with poly symptoms.

In most patients, a precipitating factor is preceding infections (like UTI, URTI and acute gastroenteritis), although drug discontinuation is one of the precipitating factors. As most of the risk factors associated with DKA among children from developing countries are pretreatment factors, the primary goal of future programmes should be focused on the prevention of DKA in children. Early awareness and prompt commencement of treatment with reevaluations and adjustments of care plans are so important to decrease complications and death.

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Conflict of interest

The authors have declared that no competing interests exist.

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ORIGINAL ARTICLE

THE OCCURRENCE AND SEVERITY OF DIABETIC RETINOPATHY IN NEWLY DIAGNOSED TYPE 2 DIABETES PATIENTS AT MENILIK II HOSPITAL IN ADDIS ABABA

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ABSTRACT

Introduction*: Diabetic Retinopathy, one of the chronic micro vascular complications, is a major global cause of total blindness. As the global prevalence of diabetes mellitus increases, so will the number of people with diabetic retinopathy.*

Objective: *This study aimed to determine the occurrence and severity of diabetic retinopathy in newly diagnosed type 2 diabetes patients.*

Method*: Institution based cross-section study was conducted with prospective data collection on newly diagnosed type 2 diabetes mellitus patients. Data were analyzed using the statistical package for social science (SPSS) 20 version software.*

Result*: A total of 111 patients with newly diagnosed type II diabetes mellitus participated in the study. The prevalence of diabetic retinopathy among patients with type II diabetes mellitus was 21.6% at the time of diagnosis. The mean (standard deviation) age of the study participants was 50.5 (±10.6) years with a range of 30-70 years. Almost half of the participants (47.7%) completed their secondary school education. The mean (standard deviation) body mass index of the participants was 25 (±3.6) kg/m^2. Diabetic retinopathy was detected in 24 (21.6%) of the patients, of which seven (29.2%) had mild proliferative diabetic retinopathy, eight (33.3%) had moderate non-proliferative, and five (20.8%) had severe non-proliferative, and four (16.7%) had proliferative diabetic retinopathy.*

Conclusion*: The high number of undiagnosed diabetic retinopathy among diabetic patients in our series is a call for an early and regular screening for this complication and more aggressive management of modifiable risk factors could reduce the numbers of people who develop vision-threatening retinopathy.*

Keywords: *Prevalence, Type II Diabetes, Retinopathy, Ethiopia*

INTRODUCTION

Diabetes mellitus (DM) is one of the most serious metabolic disorders that is alarmingly going up in its incidence and prevalence worldwide. The number of adults with DM in the world will rise from 135 million in 1995 to 300 million in the year 2025 (1). The prevalence of type 2 DM increases in developing countries and it mainly affects the younger age group (2). Ethiopia is at risk of having an increased DM incidence (3). According to the WHO, the diabetic population in the country will rise to about 1.8 million by 2030 from a baseline 796,000 in 2000 (4).

The incidence and prevalence of DM are unknown among the Ethiopian population. As a result, the national estimate is based on neighboring countries with similar socio-economic situation. Accordingly, 2%-3% of the population is estimated to live with DM in Ethiopia (3).

Chronic complications of DM affect multiple organ systems and are responsible for the majority of morbidity and mortality associated with the disease. Since type 2 DM often has a long asymptomatic period of hyperglycemia, many individuals with type 2 DM may have complications at the time of diagnosis (5).

Diabetic retinopathy, one of the chronic micro vascular complications, is a major global cause of total blindness. According to the global update on visual impairment in 2002, its prevalence was estimated to be as high as 4.8% of the total blindness (6). As the global prevalence of DM increases, so does the number of people with diabetic retinopathy. Therefore, the aim of the study was to determine the occurrence and severity of diabetic retinopathy in newly diagnosed type 2 DM patients. The findings of this study would provide baseline information for further studies.

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PATIENTS AND METHOD

Institution based cross-sectional study with prospective data collection in newly diagnosed type 2 DM patients at Menelik II Hospital was conducted from May 2014- September 2016. Menelik II Hospital is one of the regional referral hospitals under the auspices of Addis Ababa City Administration Health Bureau. Its diabetic clinic is one of the follow-up clinics, which give service to patients with DM two days per week for an average of 30 patients per day. It is run by two internists and four nurses. A total of 1,000 diabetic patients were enrolled in the follow-up.

During the study period, all newly diagnosed patient seen within the previous six months diagnosed to have had type II DM were included. The patients were referred to the retinal clinic for complete eye examination. Patients who were less than 30 years of age, had type II DM and were in care, had media opacity, and retinopathy other than diabetic retinopathy (diseases requiring steroid treatment, retinal vein occlusion, retinal vasculitis) were excluded in the study. Grading of the degree of retinopathy was determined before the launch of the study by two retina specialists who were investigators using a standardized method.

At the retinal clinic, data on patients' age, sex, educational status, marital status, personal report of fasting blood sugar (FBS) at diagnosis (mild <200mg/dl), moderate 200-250mg/dl and severe (>250mg/dl) (5), history of hypertension and personal habits (physical exercise, smoking and alcohol intake) were documented. Physical exercise was graded as sedentary if the patient rarely participates in physical activity, active if the patient walks or rides a bicycle for at least 30 minutes a day and fit if the patient does regular and vigorous activity at least three times per week.

Smoking was categorized as non-smoker and current smoker and alcohol intake as none, occasional and regular drinking (7), blood pressure was measured in the sitting position and in right hand at using sphygmomanometer. Patients were labeled as hypertensive based on WHO definition of systolic pressure of >140mmHg, diastolic >90mmHg or if the patients were already taking antihypertensive drugs (8). BMI was calculated using the formula (weight/Height^2) after measuring the weight in Kg and height in meters. According to WHO a BMI of 18.5 – 25 kg/m2 was considered normal, 25-29.9kg/m2 overweight and >30kg/m2 obese (9).

Best corrected visual acuity (BCVA) was determined using Snellen chart and pin hole. Intraocular pressure was measured using Schiotz tonometer before dilating the pupils. Slit lamp examination was performed to document any abnormality in the anterior segment of the eye. Tropicamide 1% was used to dilate the pupil .Two retina specialists did fundus examination with 90 diopter lens. Retinopathy and diabetic macular edema (DME) were graded using international council of ophthalmology (ICO) guidelines for diabetic eye care (10), and final diagnosis was determined by the grading of worse eye. Patients were then enrolled to regular retina clinic for follow-up and management.

Study in investigators competed and compiled the data by using a structured questionnaire. The data was entered onto and analyzed using the statistical package for social science (SPSS) version 20. Frequency distribution, mean (±SD), range and ratio were used to summarize data on independent variables. Bivariate analysis using Chi square test was computed to identify predictor for the outcome variable. $P<0.05$ was taken as threshold of statistically significance. Ethical clearance for the study was obtained from the Research and Publication Committee of the Department of Ophthalmology, Medical Faculty Addis Ababa University. Verbal consent was obtained from each participant, who was informed of his or her right to withdraw from the study at any time.

RESULTS

Socio-demographic characteristics

The study population consisted of 111 patients whose age ranged from 30-70 years, with a mean (SD) age of 50.5 (±10.6) years. Of the total participants, 72 (64.9%) were males and (47.7%) completed secondary school. The average BMI and FBS were 25.0 ±(3.6) kg/m^2. and 265.3 (0±99.4) mg/dl, respectively (Table-1).

Table 1: Demographic characteristics of newly diagnosed type 2 DM patients in Menilik II Hospital, 2016.

Variables	Diabetes mellitus with retinopathy n=24 (52.8 ±9.7)	Diabetes mellitus without retinopathy (n=87) 49.8 ± 10.7
Age		
30 – 39	2	17
40 – 49	5	21
50 – 59	10	32
60 – 70	7	17
Sex		
Male	17	55
Female	7	32
Marital status		
Single	7	16
Married	17	64
Divorced	-	1
Widowed	-	3
Separated	-	3
Educational Level		
Illiterate	5	15
Primary	3	17
Secondary	7	26
Diploma	5	16
Degree	3	9
Masters	1	2
Postgraduate	0	2

Prevalence of Diabetic Retinopathy

Diabetic retinopathy was detected in 24 (21.6%) of the patients with mean (SD) age of 52.8 (±9.7); 23.6 % (17/72) in men compared with 17.9 % (7/39) in women. The mean (SD) FBS of patients with retinopathy was 256.1 (±109.6) mg/dl. Of the patients with diabetic retinopathy, 37.5% had hypertension. Mean SBP and DBP in patients with diabetic retinopathy were 132.1 (±11.7) mmHg and 130 (±8.9) mmHg, respectively.

Among the retinopathy patients, mean (SD) BMI was 24 (± 3.1) kg/$m^{2.}$ Six (25%) of the patients were overweight and one (4.2%) was obese. Visual acuity was between 6/6 - 6/12 in 20 (83.3%) and between 6/18 - 6/60 in four (16.7%) of patients with diabetic retinopathy (Table-2).

Among patients with diabetic retinopathy, five (20.8%) were unable to read and write, three (12.5%) attended primary school, seven (29.2%) secondary school, 5 (20.8%) had diploma, 3(12.5%) were degree holders and 1(4.2%) had masters.

Four (16.7%) of diabetic retinopathy patients were smokers and 15 (62.5%) consumed alcohol (Table 1).

Out of the 24 patients with diabetic retinopathy, seven (29.2%), had mild non-proliferative diabetic neuropathy (NPDR) 8 (33.3%) had moderate NPDR 5(20.8%) had severe NPDR and 4 (16.7%) had proliferative diabetic retinopathy (PDR). Among the PDR patients, 12.5% were males and 4.2% were females. Mild diabetic macular edema was detected in 5 (20.8%) cases but didn't cause significant reduction in visual acuity.

Variables Association with Diabetic Retinopathy

In this study, only regular alcohol consumption has shown statistically significantly associated with diabetic neuropathy (p=0.003). No statistically significant association was observed between age (p=0.53), gender (p=0.49), FBS (p=0.68), hypertension (p=0.15), being overweight (p=0.16), obesity (p=0.15), smoking (p 0.10) and diabetic retinopathy(Table 3).

Table 2: Clinical characteristics of newly diagnosed type 2 DM patients in Menilik II Hospital, 2016.

Variables		Diabetes mellitus with retinopathy (n=24)	Diabetes mellitus without retinopathy (n=87)
Alcohol	None	9	61
	Occasional	15	26
Smoking	Never	17	75
	X-smoker	3	8
	Current	4	4
FBS at diagnosis		256.1 (±109.6) mg/dl	267.8 (±96.9) mg/dl
	< 200mg/dl	7	23
	200 -250mg/dl	7	18
	>250mg/dl	10	46
Hypertension	Yes	9	18
	No	15	69
Blood pressure	Systolic	132.08 ± 11.7mmHg	130.9 (± 8.9) mmHg
(mmHg)	Diastolic	132.08 ± 11.7mmHg	81.2 (±6.8_mmHg
BMI	Male		
	<18.5	0	3
	18.5-24.99	12	31
	25-29	5	19
	>30	0	2
	Female		
	<18.5	0	0
	18.5-24.99	5	12
	25-29	1	12
	>30	1	8

Table 3: Variable associated with diabetic retinopathy at Menelik II referral Hospital 2016.

Variables	DR present (n=24)	DR absent (n= 87)	P value
Age >50	14 (58.3%)	41 (47.1%)	0.57
Sex Male	17 (70.8%)	55 (63.1%)	0.48
Female	7 (29.2%)	32 (36.8%)	
FBS> 250mg/dl	10 (41.7%)	46 (52.9%)	0.83
Hypertension	9 (37.5%)	18 (20.7%)	0.08
overweight	6 (25%)	31(35.6%)	0.59
Obesity	1 (4.2%)	10 (11.5%)	0.17
Smokers	4 (16.6%)	4 (4.6%)	0.10
Alcohol consump-tion	15 (62.5%)	26 (29.9%)	0.003

DISCUSSION

The result of this study showed that the prevalence of diabetic retinopathy in newly diagnosed type II DM patients was 21.6%. Multiple studies done worldwide showed varied prevalence rates. Diabetic retinopathy in this study showed almost the same result as the study done in Jordan 22.6% (16). However, diabetic neuropathy in this study had been higher than the studies done in other countries such as in Iran 7.3% (11), Pakistan7.6% (12) and 9% (13), Urban India 5.1% (14), Kuwait 6.2% (15) and 7.6% in Kuwait (17).

This variation might be explained with higher blood glucose level of our study population than other studies at time of diagnosis which is a major known risk factor for development of diabetic retinopathy among diabetes patients. Additional there was a difference in methods used, specifically differences in sample size and sampling of the study population among these studies.

Most studies done worldwide on newly diagnosed patients showed that majority of diabetic retinopathy diagnosed at presentation was NPDR. A study done in Tehran (11) showed 48.4% of NPDR and 45.4% of PDR cases. Another study from Pakistan (13) reported background retinopathy in 12%, pre-proliferative in 4% and proliferative in 1%. Rema M et.al. (14) in their study in urban India identified mild and moderate NPDR in 5.1% of newly diagnosed patients and a study done by Ereifej Iet.al in Jordan found 77.2% NPDR and 22.8% PDR cases. (16)

Our study also found non-PDR cases to be the presentation (83.3%) which was comparable to the Jordan study. Most studies showed high rate of diabetic retinopathy among type II DM at time of diagnosis This was explained by long time undiagnosed diabetes as a result of asymptomatic nature of the diseases. Most of the time types II DM patients diagnosed while they are seeking medical advice for other illness. Additionally, lack of screening programs to diagnose and treat type II DM in time might be a reason to have a lot of retinopathy at the time of diagnosis.

Although this study found that only alcohol consumption had statistically significant association with diabetic retinopathy (P=0.003), different studies showed that older age, high FBS, high hemoglobin (Hg)A1c, high BMI, serum cholesterol, smoking and alcohol consumption are associated with diabetic retinopathy (7-13).

Our findings did not concur with those findings of studies, which reported association between risk factors and development of diabetic retinopathy. Most of our cases were not smokers and obese. However, other important parameters like lipid profile and HgA1c were not done because of limited access to this diagnostic modality.

There was also a difference in the methods, including study population sampling. Additionally, there was difference in lifestyle between our study population and those in other studies. This could be a reason for most of the risk factors which did not have strong association resulting in the development of diabetic retinopathy in this study. Large and multicenter study is recommended to see association between potential risk factor and development of diabetic retinopathy.

Conclusion

Diabetic retinopathy among newly diagnosed type 2 diabetic patients at the time of diagnosis was a common occurrence in our setting. Therefore, early screening for diabetic retinopathy among type II diabetic patients could help early identification of the condition, thereby reducing the number of people who develop vision-threatening retinopathy.

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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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Tibebe Bayou Admike, Rahel Demissew Gebreyohannes, Solomon Kumbi Hawas. *Ethiop Med J, 2020, Vol. 58, No. 3*

ORIGINAL ARTICLE

THE PREVALENCE OF PREMENSTRUAL SYNDROME AND ITS EFFECT ON ACADEMIC AND SOCIAL PERFORMANCE OF FEMALE MEDICAL STUDENTS, ADDIS ABABA UNIVERSITY: A CROSS-SECTIONAL STUDY

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ABSTRACT

Introduction: *Premenstrual syndrome (PMS), a common cyclic disorder of young and middle-aged women, is characterized by emotional and physical symptoms that consistently occur during the luteal phase of the menstrual cycle.*

Objective; *The primary objective of the study was to determine the prevalence of premenstrual syndrome and its effect on academic and social performance among medical students of the College of Health Sciences, Addis Ababa University.*

Methods: *A cross-sectional descriptive study was done among systematically selected female medical students of the College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia in March 2019. A self-administered semi-structured questionnaire was used to collect data from 226 Students during the study period and data was analyzed using SPSS 25.0.*

Results: *Among the respondents, 129(57%) students fulfilled the Diagnostic and Statistical Manual of Mental Disorders V (DSM V) criteria for premenstrual syndrome. Hundred and four (53%) of the participants reported academic performance impairment in their learning activities. Among those who reported performance impairment due to PMS, 67(29.6%) reported missing class lectures, seminars, bed sides or rounds, 11(4.8%) missed examination and 3(1.3%) of them reported withdrawal from their study. Hundred and two (52.9%) participants reported impairment in their social life activities. Body Mass Index of <18.5 kg/m2 with AOR =3.01, 95% CI (1.71-6.3), p=0.02 and age of menarche between 13 and 15 years with AOR=6.12, 95% CI (1.99-19.8), p=0.01 showed statistically significant association with premenstrual syndrome.*

Conclusion: *Our study revealed a high prevalence and negative impact of PMS on academic performance and social life activities of female medical students of Addis Ababa University. Strategies to reduce PMS related wastage need to be considered by training institutions. An in-depth look in to the problem from different perspectives across diverse dimensions is recommended.*

Keyword: *Premenstrual syndrome, Female Medical students, Addis Ababa university*

INTRODUCTION

Premenstrual syndrome (PMS), also called late luteal phase dysphoric disorder in previous versions of the Diagnostic and Statistical Manual (DSM) is the severe variant of premenstrual dysphoric disorder (PMDD). It is characterized by the presence of physical and/or behavioral symptoms that occur repetitively in the second half of the menstrual cycle and often the first few days of menses (1). These include somatic symptoms (breast tenderness, abdominal bloating, swelling, and headache) and affective symptoms (depression, irritability, anxiety, confusion, and social withdrawal), which increase in severity during the last part of the luteal phase (2, 3). Nearly 300 different symptoms have been reported and typically include both psychological/emotional and physical complaints (4).

Nearly 80% of menstruating women report one or more symptoms characteristic of PMS (5, 6). It is difficult to determine the true prevalence because of self-treatment, difference in availability and access to medical care, definition & diagnostic criteria and cultural practices. Severity of PMS strongly correlates with impairment of social and occupational/school performance (10). Stress has been found to be one factor to increase the prevalence and severity of PMS. This is justified in many studies as it is found more in high-level educated people and it is more severe compared with those women who were not educated. The prevalence of PMS is not known in Ethiopia because it is not taken as public health problem(11). Currently, neither PMS nor PMDD are reflected as official diagnoses by DSM-IV.

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PMDD appears as a "depressive disorder not otherwise specified". According to the American Psychiatric Association, the new proposed changes would actually recognize PMDD as a disorder. The pathophysiology of PMS has never been fully known but it can be multifactorial. It may include the effect of progesterone on neurotransmitters such as serotonin, opioids, catecholamine and Gamma amino butyric acid (GABA), increased prolactin level or increased sensitivity to the effect of prolactin, insulin resistance, sensitivity to endogenous hormones, abnormal hypothalamic-pituitary-adrenal axis function, nutritional deficiencies, alteration of glucose metabolism, and fluid and electrolyte imbalance (12,13-15).

There are only few studies in Ethiopia that investigated the prevalence and impacts of PMS on female university students and they used DSM IV diagnostic criteria; unlike this study, where the recent DSM-V criteria are used. In addition, there are only few reports that included data on premenstrual work/school or social impairment. This study generated data on the prevalence and impact of PMS on female medical students that can serve as baseline for further in-depth studies in higher educational institutions to help them design strategies and interventions to address the problem. It also gives information on the magnitude of the problem in the institution which helps the management body, instructors and parents to give adequate attention and support to female medical students.

This was conducted to determine the prevalence of premenstrual syndrome and its effect on academic and social performance of female medical students at Addis Ababa University, College of Health Sciences. It specifically aimed to determine the prevalence of premenstrual syndrome among female medical university students of Addis Ababa University, identify socio-demographic and educational factors associated with the severity of the symptoms, and define the academic and social performance of female medical students with Premenstrual Syndrome

PATIENTS AND METHODS

The study was done in the College of Health Sciences (CHS), Addis Ababa University (AAU), in Ethiopia. The study was conducted in March, 2019. A cross-sectional descriptive analysis was carried out on data obtained from systematically selected female medical students of College of Health Sciences, Addis Ababa University, Ethiopia. Each participant was given information on the study and written consent was taken from those willing to participate. The sample size was determined by using single proportion formula taking the prevalence of PMS of 83.2% from a study done at Mekelle University in 2014 and assuming 95% CI, 5% precision and 15 % non-response rate to be 247. The total number of female medical students was 401. Therefore, when the proportion of the total female students to the sample size was calculated, it was nearly 2. Therefore, through systematic sampling, data was collected from every second female student after randomly choosing a female student to begin the sampling.

Medical students who had a regular menstrual period in at least the previous three consecutive months and who were enrolled in undergraduate medical studies were included in the study. Students who were pregnant during the study period, those with history of known chronic illnesses such as diabetes, high blood pressure, heart disease or current depression, anxiety and any other psychiatric disorders, those students currently using hormonal methods of contraception were excluded from the study.
Ethical clearance was obtained from the institutional review board (IRB) of CHS, AAU. In order to keep confidentiality of any information provided by study subjects, the data collection procedure was made anonymous.

Data was collected by using semi-structured questionnaire in English. A questionnaire was designed with the help of DSM V definition of PMDD and Premenstrual symptom screening tool (PSST) for clinicians. The questionnaire was pretested and modifications were made. Data was entered in to SPSS version 25 statistical package. Coding of individual questionnaires was checked before data entry in to the software. Further data cleaning was performed to check for outliers, missed values and any inconsistencies before the data was analyzed using the software. Chi-square and independent t-test were used to see the association between dependent and independent variables. A confidence limit of 95% and *P*- value less than 0.05 was used as a cut-off point for statistical significance.

To control the effect of confounding variables, a stepwise multiple logistic regression analysis was done and adjusted odds ratio (AOR) was used to explore the real association.

RESULTS

A total of 226 female medical students of the College of Health Sciences, Addis Ababa University responded to the questionnaire. The distribution of the students that responded to the questionnaire is 22.1%, 17.2%, 18.6%, 21.7% and 20.4% for 1st, 2nd, 3rd, 4th, and 5th year students respectively.

The response rate was 91.5%. There was relatively similar distribution of number of medical students in each class year. The ages of the study participants ranged from 18 to 26 years, with mean age of 21.0 (SD 1.7) years. Majority (71%) were between the ages of 20 to 23 years followed by under the age of 20 years (23.4%). The mean height and weight of the study participants was 1.60 (SD 0.07) meters and 54.1(SD 8.1) kilograms respectively. One hundred and fifty (66.4%) had a normal BMI, 22.1% were underweight and the rest were overweight. There was no participant who was obese, that is BMI over 30 kg/m^2.

Menarche was between 13 and 15 years in 58.4% of the participants and less than 13 years of age in 35% of them. The usual menstrual cycle was ≥28 days (85.4%) and menstrual flow was not more than 7 study participants' parents were from Addis Ababa. The majority (85.4%) of the study participants' parents were married. Among the participants, 123 (54.4%) lived with their parents while 103(46.4%) lived in dormitories.

Among the participants, 191(84.5%) had at least one PMS symptom with their menstrual cycle. Participants having one of the physical symptoms (breast tenderness, headaches, muscle/joint pain, bloating, weight gain) with PMS were 155(68.6%). Psycho-behavioral symptoms experienced by the participants were fatigue/lack of energy 155(81.2%) followed by anger/irritability in 130(68.1%), decreased interest in home/dorm activities in 125 (65.4%), decreased interest in social activities in 122(63.9%) and difficulty of concentrating in 119 (62.3%). (Table 1)

Table 1: Premenstrual syndrome Symptoms among Female Medical Students, College of Health Sciences, Addis Ababa University, March 2019 (n=226).

Psycho-behavioral and physical symptoms	Mild No (%)	Moderate No (%)	Severe No (%)	Total No (%)
Anger/irritability	71(37.2)	47(24.6)	12(6.6)	130(68.1)
Anxiety/tension	68(35.6)	29(15.2)	9(4.7)	106(55.5)
Tear full/increased sensitivity to rejection	58(30.4)	23(12.0)	14(7.3)	95(49.7)
Depressed mood/hopelessness	65(34.0)	33(17.3)	13(6.8)	111(58.1)
Decreased interest in class activities	61(31.9)	38(19.9)	19(9.9)	118(61.8)
Decreased interest in home/dorm activities	73(38.2)	32(16.8)	20(10.5)	125(65.4)
Decreased activity in social activities	63(33.0)	42(22.0)	17(8.9)	122(63.9)
Difficulty concentrating	55(28.8)	47(24.6)	17(8.9)	119(62.3)
Fatigue/lack of energy	57(29.8)	64(33.5)	34(17.8)	155(81.2)
Overeating/food cravings	37(19.4)	35(18.3)	14(7.3)	86(45.0)
Insomnia	43(22.5)	12(6.3)	4(2.1)	59(30.9)
Hypersomnia (needing more sleep)	52(27.2)	34(17.8)	18(9.4)	104(54.5)
Feeling overwhelmed or out of control	52(27.2)	25(13.1)	13(6.8)	90(47.1)
Physical symptoms, breast tenderness, headaches muscle/joint pain, bloating, weight gain	45(23.6)	71(37.2)	39(20.4)	155(81.2)

One hundred and four (53.0%) of the participants reported academic performance impairment in their learning activities while the remaining reported that they did not have problem in that regard. Among those who reported performance impairment due to PMS, 67(29.6%) reported missing class lectures, seminars, bed sides or rounds, 11(4.8%) missed examination and 3(1.3%) of them reported withdrawal from their study.

A hundred and two (52.9%) participants reported impairment in their social life activities.

According to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition, text revision diagnostic criteria for PMS/premenstrual dysphoric disorder (DSM V-TR), 129(57.1%) students fulfilled the diagnostic criteria for PMS (Table 2).

Table 2: Negative effects of premenstrual syndrome on academic and social performance of female medical students, college of health sciences, Addis Ababa University, March, 2019 (n=226).

Academic and social performance	Mild Number (%)	Moderate Number (%)	Severe Number (%)	Total Number (%)
Study and learning activities	51(26.3)	39(20.1)	14(7.2)	104(53.6)
Relationship with friends and classmates	58(29.9)	26(13.4)	4(2.1)	88(45.4)
Relationship with family	50(25.8)	22(11.3)	10(5.2)	82(42.3)
Social life activities	62(32.0)	29(14.9)	11(5.7)	102(52.6)
Home responsibilities	63(32.5)	32(16.5)	18(9.3)	113(58.3)

Under Pearson Chi-square test, the age of participants, the class year, the BMI and the age at menarche were significantly associated with the presence of PMS.

Multiple logistic regression analysis revealed that participants with BMI<18.5 kg/m^2 were three times more likely to develop PMS compared with healthy weight students with AOR =3.01, 95% CI (1.71-6.3) and p<0.05. Respondents whose ages at menarche were between 13 and 15 years were more likely to develop PMS compared with those 16-18 years with AOR =6.12, 95% CI (1.99-19.8) and *p*<0.05(Table 3).

Table 3: Association of demographic and gynecologic factors with premenstrual syndrome in female medical students, college health sciences, Addis Ababa University, March, 2019 (n=226)

Demographic and gynecologic characteristics	Symptoms		COR (95% CI)	AOR (95% CI)	P-value
	Yes (%)	No (%)			
Class year					
1st	37(74.0)	13(26.0)	1.00	1.00	
2nd	36(92.3)	3(7.7)	0.24(0.06-0.9)	0.29(0.7-1.2)	0.09
3rd	32(76.2)	10(23.8)	0.88(0.34-2.3)	1.12(0.4-3.1)	0.82
4th	46(93.9)	3(6.1)	0.19(0.05-0.7)	0.21(0.06-0.8)	0.26
5th	40(87.0)	6(13.0)	0.43(0.15-1.2)	0.47(0.15-1.4)	0.19
BMI(kg/m2)					
<18.5 (Underweight)	36(72.0)	14(28.0)	3.04(1.27-7.3)	3.01(1.71-6.3)*	0.02*
18.5 and 24.9 (Healthy	133(88.7)	17(11.3)	1.00	1.00	
weight)	22(84.6)	4(15.4)	1.42(0.37-5.10)	1.12(0.11-3.10)	0.55
25 to 30 (Overweight)					
Age at menarche (years)					
<13	68(86.1)	11(13.9)	5.41(1.41-21.2)	6.21(1.10-20.2)	0.40
13-15	115(87.1)	17(12.9)	5.92(1.66-21.8)	6.12(1.99-19.8)*	0.01*
16-18	8(53.3)	7(46.7)	1.00	1.00	
Interval between menstrual cycle	29(72.5)	11(27.5)	1.46(0.49-4.3)	1.84(0.56-5.9)	0.31
<28 days	135(88.8)	17(11.2)	0.48(0.18-1.3)	0.73(0.25-2.1)	0.55
28days	27(79.4)	7(20.6)	1.00	1.00	
>28 days					

*=p<0.05

DISCUSSION

This survey involved medical students aged 18–26 years, similar to previous studies in 2002 (28) and 2014 in Ethiopia (11), except that this study included only medical students. The prevalence of PMS in our study, based on DSM-V criteria, was 57.1%. This figure is markedly higher than previous two studies done in Mekelle University (11) and Jimma University (28), which reported prevalence of PMS based on DSM-IV to be 27% and 37% (but 83.2% when they defined PMS based on ACOG 2000 criteria for diagnosis of PMS) respectively, although the study done in Jimma University included both social and health sciences students and the study in Mekelle university included all health science students while this study recruited only medical students who are all the time in academic stress leading to the high prevalence of PMS.

Comparability between our study and those studies will be difficult because of the differences in the criteria used to diagnose PMS and the type of students they included in the studies (11,28). Neither PMS nor PMDD are reflected as official diagnoses by DSM-IV. PMDD appears as a "depressive disorder not otherwise specified" in the DSM-IV. The new DSM V changes would actually recognize PMDD as a disorder. Since almost all previous studies used the older version, DSM IV, comparisons were made with these studies.

The prevalence of PMS in our study is comparable with a research done on university students in Izmir, Turkey which reported the prevalence of PMS to be 58.1% (31). This study is also in agreement with the study done among female medical students of a medical college in Chennai, India showing prevalence of dysmenorrhea to be 51% and pre-menstrual syndrome of 67% (35).

The most commonly reported psycho- behavioral symptom experienced by the participants was fatigue/ lack of energy and around two-thirds of the students have at least one of the physical symptoms such as breast tenderness, headache, muscle/joint pain, bloating and/or weight gain. In the study done in Jimma University, decreased interest in the usual activities was the dominant psycho-behavioral symptom and easy fatigability being the commonest of the physical symptoms (28). In the study done in Mekelle University, the most commonly reported physical symptom with PMS was abdominal bloating and the commonly reported psycho- behavioral symptom experienced by the participants was loss of interest in doing things (11).

This highlights that physical or psycho-behavioral symptoms can be different among students but the extent to which students can be affected by these symptoms is significant.

In this study, nearly one-third of female medical students had performance impairment interfering with the daily school activities of the participants such as missing classes, seminars, bed-side teachings and rounds. This is almost similar with the study done in Mekelle university, Saudi Arabia and India (11, 28, 29). This shows the extent to which female students are affected by PMS even requiring them to miss the most important activities of the teaching-learning process as medical students. One should not also ignore the fact that there were even drop outs from medical school for the mere reason of having a severe PMS.

As multiple logistic regression analysis revealed, underweight participants were three times more likely to develop PMS than those with normal BMI (AOR =3.01, 95% CI (1.71-6.3) and $p<0.05$. This result agrees with the research done among Nigerian university students but there are studies which showed more PMS in obese participants (37, 38). Our study group does not have obese participants, making comparisons difficult. Students whose age at menarche was between 13 and 15 years were six times more likely to develop PMS compared to those whose menarche was at 16-18 years of age. This goes in line with the finding among Nigerian university students which showed significant association between PMS and young age at menarche (37).

There are multiple reasons that can be mentioned to justify the disparity of results on PMS among several studies. These reasons could range from differences in sample size and data collection techniques to the criteria used to define PMS.

Strength and limitations of the study:
This study used the most recent criteria (DSM-V) to diagnose PMS which makes it up to date with regard to methodology and interpretation of information on prevalence and characteristics of PMS. The sample size is adequate and the proportion of study participants is well distributed among the class years, which gives a better understanding of the possible differences between participants in each class year and their impact on PMS.

However, retrospective logging of symptoms is not the best way to collect data as it is prone to recall bias.

Although the topic is sensitive to Ethiopian culture, the fact that the participants were medical students and the questionnaire was self- administered makes it less liable to bias in this regard.

Conclusion and recommendations:

The prevalence of PMS, based on DSM-V criteria, is high among medical students of Addis Ababa University. Severe symptoms affected the social and academic performance of the students causing them to frequently miss classes and exams and in some cases to the level of withdrawal from their studies. Age at menarche and BMI affected the development of PMS among these students. Psycho-behavioral symptoms were more common than physical symptoms among AAU medical students.

This study showed PMS is an important deterrent to the performance of female medical students in College. Strategies to reduce PMS related wastage need to be considered by higher education institutes in Ethiopia.

A follow up in-depth look in to the problem from diverse perspectives and across different dimensions is highly recommended.

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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

ECONOMIC BURDEN OF DIABETES MELLITUS TO DIABETIC PATIENTS AND THEIR FAMILIES ATTENDING HEALTH FACILITIES IN ADDIS ABABA

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ABSTRACT

Introduction: *Diabetes imposes large economic burden on individuals and their families, and on the national health care system and the economy at large. In developing countries, the problem is increasing rapidly because of limited attention toward non-communicable diseases prevention, including diabetes mellitus. International Diabetes Federation estimated average cost 1,437 United States dollars per person with diabetes was spent globally in treating and managing the disease in 2013.*

Objective: *The aim of this study was to assess the economic burden of diabetic mellitus on patients and their families.*

Method: *Institution based cross-sectional study design was conducted in patients with patient with diabetes mellitus selected from health facilities in Addis Ababa during April 1 - May 4, 2015. A structured questionnaire was used to collect the data, and the data was entered and analyzed using SPSS version 20. A Correlation between the dependent and independent variables was determined using the Spearman's rho correlation coefficient.*

Result: *This study involved 404 patients with diabetic mellitus. The median direct cost of caring for a diabetic patient was 21.8 United States dollars per month. The median of total indirect cost was 6 days (mean 17.3) for the patient and their caregiver in the last six months. Direct cost was significantly higher in those who had higher education level, higher monthly income, monthly family income, patients who had frequently laboratory test, patients source of medication cost from exempted to family/relative cost covered in correlation degree of (0.1 to 0.6 or -0.1 to -0.6) at p- value < 0.05.*

Conclusion: *Medical costs were the major contributor to the direct cost of patients with diabetes mellitus and caregivers. It is suggested that efforts need to increase to improve access to medical services at low cost to diabetic patients.*

Key words: *diabetes mellitus, economic burden, patients, families, Ethiopia*

INTRODUCTION

Diabetes mellitus (DM) is a disease that occurs when the body cannot produce enough insulin or cannot use the produced insulin effectively. In 2013, about 382 million people or 8.3% of adults were estimated to have diabetes and one-half of all adults with DM were between the ages of 40 and 59 years. About 80% of the cases live in low- and middle-income countries. If these trends continue, by 2035, 592 million people will have DM.

The highest increases will take place in developing countries due to poor community awareness and week national health care system. In Ethiopia, an estimated prevalence of DM was 4.4% and DM-related deaths were in the order of 34 thousand (1, 2).

In 2010, over 12 million people in sub-Saharan Africa (SSA) had DM and some 330 thousand people died from DM-related conditions (2). DM is among the main non-communicable diseases (NCD) in developed and developing countries. The millennium development goals (MD has not considered NCDs as one of the public health problems. However, in 2005, the World Health Organization (WHO) report drew attention to the neglect of chronic diseases and in 2011 non-communicable diseases started to get focus by United Nations (3).

The global economic burden of NCD is increasing, estimated United States (US) $6.3 trillion in 2010 and increased to $13 trillion in 2030. Increase in 10% of NCDs leads to 0.5% decrease in the gross domestic product of a country (4).

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Also, DM is as one of the NCDs, which imposes large economic burden to the individual, their families and the nation at large. The main costs it incurs are direct, indirect and intangible costs (5,6). In developing countries, like Ethiopia, the health-care costs have been covered by the patient. The cost for DM management and care imposes significant strain/load to households' expenditures particularly among the lower-income families (7-10).

Global economic development had been hindered due to DM and NCD burden (9-12). In sub-Saharan Africa the problem of diabetes was once considered a rare condition. Due to rapid urbanization, increasingly sedentary life, and poor prevention, early detection and treatment, and aging of the population, the prevalence of DM is increasing rapidly (2,13-15). Estimating the economic burden of DM in Ethiopia has been extremely difficult because of lack of data (2,14-16). Studies on the economic burden of DM, particularly studies examining direct and indirect costs of DM at the individual and at household level, are scarce in Ethiopia (15). The purpose of this study is to identify costs and factors influencing the costs of DMs at individual and household levels to help policy and program mangers make informed decision on resource allocation.

PATIENTS AND METHODS

Study Design

Institution-based cross-sectional analytical study was conducted in Addis Ababa during April 1 - May 4, 2015. Diabetes-induced medical and non-medical (direct) costs and lose of days (indirect costs) to the patient and their families were identified. Costs in cash expensed and in production day's loss were calculated. A micro-costing or bottom-up approach was used to calculate direct coasted and a loosely human capital approach used to calculate indirect costs. Indirect costs included earnings, present and future, and loss to individuals as a result of the illness. Each person's expenses were considered as equal to his market earnings at that time. Direct and indirect costs of DM patient/clients and their families were the dependent variables and socio-demographic variables (age, sex, marital status, occupation, monthly income, educational status, family number, number of visits, distances from the health facility) constituted the independent variables.

Study Area and population

Addis Ababa is the capital city of Ethiopia located at the central part of the country. It's total population 3,061,404 by the Central Statistics Agency (CSA) in 2012.

The city has five public hospitals and 86 public health centres, and a few private facilities providing DM management services. Only one diabetic centre, located at Tikur Anbessa hospital, provides specialized DM services. Patients seen at Tikur Anbessa and Zewditu hospitals and Kazanchis and Nifas Silik LaftoWorda 3 health center, Senaye private higher clinic were included in the study.

Operational definitions

Direct costs: The cost or expenditures in USD spent by patients and their families in the diagnosis and treatment of DM per prescription of physicians
Indirect costs: the lost productive days by patients and their families that is associated with DM care and treatment.

Inclusion and Exclusion criteria

Type 1 and type 2 diabetic patients/clients who lived in Addis Ababa and had follow-up at the health facilities for the preceding 12 months and patients greater than 14 and visited the facility with caregivers and comfortable to take part of the study. Mothers with gestational diabetes, patients severely ill, and children less than 14 years were excluded from the study.

Sample Size

Study sample size was determined by using a single population proportion formula. Due to the lack of similar studies in the country the proportion 50%, marginal error (d) of 5% and a confidence interval of 95% were used. The sample size (n) was calculated using the formulas:
$n = (Z\ 1-\alpha/2)^2 p\ (1-p)/\ d^2 = 1.96^2 * 0.5 * 0.5/0.05^2 \approx 384$. Making adjustment for a 10%non-response rate, the sample size for the study was estimated at 422.

Sampling Procedures

The health facilities in the city were identified based on availability of study participants and capacity in provision of DM services. The health facilities were stratified into three categories- public hospitals, public health centres and private health facilities. The facilities were selected purposively based on long service years and number DM patient in care. Study participants were selected proportionate to number of patient in each category and by employing simple random sampling using patient registers as the sampling frame.

Data Collection Procedures

A structured questionnaire designed after reviewing relevant literature was used to collect data. Face-to-face interviews were conducted with DM patients and with selected family members.

For children under 18 years of age and for very old patients data was collected from caregivers or those accompanying the patients. The interviews were administered by trained data collectors after consent was obtained from each patient.

Data Analysis Procedures

The data analysis was done by using SPSS version 20 statistical software. Frequency distributions and proportions were to summarize discrete variables - socioeconomic, demographic variables, and clinical variables, and direct and indirect medical costs. Mean with standard deviation (SD) or median were calculated as appropriate to summarize data on continuous variables. Medical costs of people with waiver privileged were considered as the cost for analysis by taking the estimated cost of expenditure from the pharmacy and laboratory. Pearson correlation coefficient and Manny Whitney U test were used to assess associations between quantitative and normally distributed variables. Association between rank orders for the variables with values non-normal distribution or had categories of independent variables with continuous dependent variables was tested the Kendall's tau-b or Spearman and Manny Whitney U test.

Data Quality Management

The data collection tool was translated to local language Amharic and translated back to English to check consistency. The questionnaires were pre-tested in 10% of participants and the necessary adjustments made. Data was collected by nurses with Bachelor of Science (BSc) degree and drawn from non-study facilities. They received three-day training on data collection tool and procedures. The principal investigator and supervisor checked the data for completeness and accuracy on daily basis.

Ethical Consideration

This study was approved by the School of Public Health Research and Ethics Committee of Addis Ababa University, the Internal Medicine Department and Addis Ababa City Health Bureau ethical committees. Administrative clearance was obtained from study health facilities. Written and oral informed consent were obtained from the study participates.

RESULTS

Demographic and Socioeconomic Characteristics

The study included 404 (95.7%) participants of the estimated sample, 148 (36.6%) of them were in the age group of 46 – 60 years, about one-quarter,99 (24.5%) and 97 (24%), attended primary and secondary education, respectively. Some127 (31.4%) were unemployed and 186 (46%) had a role as mothers in the family and 294 (72.7%) had their own income with a median of USD 27 (Table 1).

Table 1: Socio demographic characteristics of patients with diabetic mellitus followed up in health facilities, Addis Ababa, April 2015.

Variable	Number	Percent
Sex(n=404)		
male	175	43.3
Female	229	56.7
Age (n=404))		
14 – 30	69	17.1
31 – 45	103	25.5
46 – 60	148	36.6
61 and above	84	20.8
Education (n=404)		
Illiterate	39	9.7
Read and write	38	9.4
Primary	99	24.5
Secondary	97	24.0
Diploma	63	15.6
Degree and above	68	16.9
Occupations (n=404)		
Unemployed	127	31.4
Employed	198	49
Retired	62	15.3
Student	17	4.2
Employee type (n=198)		
Government	58	29.3
Private	100	50.5
NGO	40	20.2
Patients role in household (n=404)		
Father	148	36.6
Mother	186	46.0
Child	56	13.9
Other family member	14	3.5
Average household size	4.5	
Average employed family members	2.1	
Median income of the respondents (n=294)	1,600	
Median income of family (n=404)	3,500	

Clinical characteristics and burden of illness

Only 55 (13.6%) of the patients knew their diabetic status and 94 (23.4%) had Type 1 DM. The mean duration (SD) of follow up of participants was 8.4 (±6.75) years.

The range of follow-up period for Type 1 DM patients was one to six months with a mean (SD) duration 3.2 months and one to nine months with a mean of 2.9 for type 2 DM patients (Table 2).

Table 2: Clinical characteristics and burden on patient with diabetic Mellitus at Health Facilities, Addis Ababa, April 2015.

Variables	Number	Percent
Ways of diabetes identified at first		
Having exam for diabetes mellitus (n=404)	55	13.6
Other diseases examination (n=404)	349	86.3
Type of diabetes mellitus (n=404)		
Type 1	94	23.4
Type 2	308	76.6
Average duration year (n=404)	8.4	Range (1-35)
Average T1 frequency of visit (n=92)	3.2	Range (1-6)
Average T2 frequency of visit (n=312)	2.9	Range (1 -9)
Average wait at reception in hours (n=404)	3.2	Range (0.3 to 9)

Some 286 (70.8%) of the participants had worries related to diabetes and 88.5% were had concerns due to the illness **(**Table 3).

Table 3: Intangible burdens of disease to patients with diabetes mellitus and their family members, Addis Ababa, April 2015.

Variables	Number	Percent
Degree of worries related to DMs (N=286)		
very strong	68	23.8
Strong	73	25.5
Medium	112	39.2
Fair	23	8.0
Rarely	10	3.5
Mainly household caregiver (N=404)		
Female Sex, mother, wife, sister, daughter	200	49.5
Male sex, father, husband, brother, son	80	19.8
All family member and others	124	30.7

Of the direct cost, the medical cost in USD was 58.9% with a median of 11.5 and mean of 17.7. The median non-medical cost was 8.6 and mean 12.3. The median (IQR) of the overall monthly direct cost was 38.3 and the mean (SD) was 30 USD per patient per months. In 96 (32.6%) of the participants, direct cost expenditure for treatment of DM each month was more than 40% of their income (Table 4).

Indirect cost was a time devoted to diabetic patients and their caregiver in seeking treatment during the six months recall period. It was expressed by loss of days, directly by patients during follow up visits, days in inpatient treatment, days in emergency visits and emergency managements, a totally 4,460 days with a median of 6 days were used. Indirectly 2,507 days by 212 caregivers with a median (IQR) of 8 days were used in six months for the care of patients.

Total days used by patients and their caregiver were 6,987 days with a median of 6 days in 6 months. About 74 (18.3%) individuals used more than 30 days in six months for the care of diabetes by patients and their families. About one-fourth.108 (26.7%), of the study participants used more than 20 days (Table 5).

Table 5: Loss of days by patients and their caregiver who had follow-up in health facilities, Addis Ababa, April 2015.

Variables	n	Mean	Median	Std. Deviation
Total Days Used By patient in 6 Month	404	11.1	6.0	14.84
Number Day used Visit in 6 months	404	3.9	3.0	2.35
Stopped School days	17	7.9	6.0	5.73
Stopped Work days	72	12.4	10.0	10.01
Days in Care in Household for unemployed	140	9.9	7.0	8.17
Days used in inpatient services	53	6.5	5.0	5.65
Days Used During Emergency	69	4.2	3.0	3.62
Total Days Used by Caregiver in 6 Month	212	11.7	8.0	12.52
Days with Caregiver in follow up	144	3.4	3.0	2.62
Days with Caregiver in patient case	52	6.6	5.0	5.67
Days Used by Caregiver in Emergency	65	3.8	3.0	3.23
Days giving Care in Household	140	9.9	7.0	8.17
Total Days used by patients and their caregiver in six Months	404	17.3	6.0	25.05
Patients and their families used ≥ 20 days in 6 months	108 (26.7%)			
Patients and their families used ≥ 30 days in 6 months	74 (18.3)			

Correlates of costs of for independent Variables

The variables such as educational status, individual income, family income, laboratory test frequency and financial sources were moderately correlated with direct costs, Spearman Correlation Coefficient 0.3 to 0.6 or -0.3 to -0.6, whereas family size, employed family number, year of follow up, and distance from health facilities were weakly correlated, Spearman Correlation Coefficient0.1 to 0.29 or -0.1 to -0.29.

The association between sex of participants and DM type tested using Mann-Whitney U test showed a significant difference at Z= -2.05 and P=0.04, but sex of participants had no significant difference in direct costs. The number of visits had moderate correlation with indirect costs but weak correlated with family income and duration of follow up (Table 6).

Table 6: Correlation of direct and indirect costs with independent variables in patients with diabetes mellitus and their families, Addis Ababa, April 2015.

	Spearman's rho correlation coefficient			
Variables	Monthly Medical cost	Monthly Non-medical cost	Direct cost	Indirect cost
Visit number in six months	-.056/.260	.163/.001**	.050/.321	.470/.00**
Education	.287/.00**	.338/.00**	.354/.00**	-.022/.66
Occupation	.042/.405	.121/.015*	.076/.128	-.061/.219
Family size	.101/.042*	.046/.353	.101/.042*	.060/.226
Employed family number	.209/.00**	.275/.00**	.282/.00**	.061/.239
Income	.393/.00**	.498/.00**	.492/.00**	.014/.812
Family income	.435/.00**	.560/.00**	.545/.00**	.102/.041*
Follow up year	.177/.00**	.086/.086	.148/.003**	-.123/013*
Laboratory frequency	-.398/.00**	-.330/.00**	-.415/.00**	-.068/.174
Distance from home	.227/.00**	.161/.001**	.240/.00**	-.085/.089
Medication finance source	.295/.00**	.268/.00**	.319/.00**	.020/.689
Mann–Whitney test of independent variable sex and DMs type with direct and indirect cost				
Sex Mann-Whitney U=19731.0, Z= -264, P=0.79				
DM type Mann-Whitney U=12451.5, Z= -2.05, P=0.04				
Sex Mann-Whitney U=17902731.5, Z= -1.85, P=0.064				
DM typeMann-Whitney U=13451.5, Z= -1.048, P=0.295				

DISCUSSION

The median direct cost of study participants was USD 21.9 (25.2) per patient per month of which medical cost covered 58.9%. This finding was consistent with reports from Brazil, Indian, and Nigeria (27, 28, 31, and 32). The find of a study conducted in Thailand was contrary with our study finding this might be (health care service difference and health insurance type) the hospitals in Thailand provide medications and drugs in cheap cost options. Another reason might be non-medical expenditure were expensive and take the higher percentage than medical costs as it was a percentile comparison, medical costs may be subsidized. Moreover, there might be aware of patient and advice of the medical professional to use cheap cost drugs from options (32).

The median per person per month medical cost in our study (USD 11.4) was similar to the finding in studies in Indian and Thailand, but lower than that in Brazil (23, 27, 28, 29, and 32). This could be due to the direct cost calculations, which varied in the studies and differences in health care system. In Thailand USD 5.9 or 45% of the direct cost was used for pharmacy services, in Nigeria USD 37.3 or 51.1% for insulin per person per month (29,31). The difference might be due to differences in health care system and some assumption in the study methods.

The total direct cost of diabetes in our study (USD 21.86 per month) was higher than that of reports from Pakistan, India, the Sudan and Thailand, while it was less than that of Nigeria and Brazil (22,25-29,31,33,34). Type of diabetes had a significant correlation while occupation had a weak correlation with direct non-medical costs. A study in Pakistan showed significant cost difference with duration of follow up and participant's sex. But had no significant marginal difference with age and higher socioeconomic status like education and income (22).

The finding from our study was similar with a study conducted in India, showing that none of the socio-demographic measures except education had significant correlations with direct costs and indirect costs (27). This might because educated people are more aware of their health status and earn more money than the non-educated. This was consistent with reports from India but contrasts that from Pakistan and this might be due to socio-economic and cultural differences (22,27). Overall, cost differences might be explained by variations in costs of commodities, the health care policy, and the quality of services provided across these countries.

In our study, indirect cost was correlated with number of visits, household role, family income and year of the follow-up, whereas, a study in Pakistan showed cost correlations with sex, family income, but no correlation with follow up duration (22). The finding from both studies were similar in terms of socio-economic status, loss of indirect costs among female participants, and need for frequent visits and services. In our study, though not statistically significant, 50% of female versus 20% male participate provided care for patients with DM. This is a similar trend with reports by other which showed that children and elderly patients were accompanied with a female caregivers (31), suggesting that the burden of diabetes mellitus was more on the females.

The indirect costs or lost days by patients over 180 days (six months) in our series were, on the average, 11.1 days, and the median outpatient visit used over the six months was three days. A report from Sweden showed inconsistent finding with this study (25). The Swede patients had medical follow up, on the average, of 10 days in the outpatient department and 4.8 at the inpatient nursing care over 12 months. The total number of days used as a result of diabetes mellitus in our study more than that is reported by the Swede series and this could largely be due to differences in socioeconomic status and the health care system.

Limitation of the Study

Study participants with age less than 14 years were excluded in our study and participants were no analyzed by type and level of complications. Aspects of economic burdens such as social burden and intangible costs were not evaluated. Indirect cost calculation was not expressed in terms of price.

Conclusion

Diabetes mellitus was a complex illness to treat and manage in individuals who had low income. Medical costs were the major contributors to direct cost of care for patients with diabetes mellitus. Need to be exerted to provide medical services at lower cost and cost reduction activities should be advocated for and supported.

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Competing interest:

The authors have declared that no competing interests exist.

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CRITICAL REVIEW

PATIENT CENTERED COMMUNICATION: A SYNOPTIC REVIEW OF THE STATE OF THE ART

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"*The good physician treats the disease; the great physician treats the patient who has the disease"*
William Osler (1849-1919)

ABSTRACT

With rising awareness of the importance of effective communication in health care and the need for patient-centeredness, a transition is taking place from a clinician-centered biomedical to a humanistic biosychosocial approach that centers much of the medical communication on the patient. The transition has led to significant evidence validating numerous patient reported outcomes that include better adherence to therapy and illness self-management. This narrative review synthesizes the evidence base on patient centered communication, its distinguishing characteristics, and key strategies, chief among which are the modalities of the Patient Interview, Shared Decision Making and Patient Decision Aids as well as the Six-Step Protocol for Delivering Bad News. On the basis of the relevant gaps identified in medical training, a case is made for the inclusion of communication competency in the Ethiopian medical curriculum that underpins key physician communication skills based on international models and the best practices evidence base.
Key words: Communication, patient-centred, interview, measurement, competency, ethics

Conceptual, definitional and substantive landscape

The adoption of the biopsychosocial model in health care has had multiple ramifications (1,2) placing the patient at the center of a galaxy of actors and parameters that impact the wellbeing of the individual pointing to the import of a whole person approach (3). The patient centered approach acknowledges patient voice as central to the healing experience and wellness states. Patient empowerment through self-care means overturning the biomedical model that puts the disease and the provider in the center to one that locates the patient in the center of the medical encounter. The shift in perspective and review of older models means there is now a more negotiated interactional space with the controlling and hierarchical bent giving way to more horizontal, less scripted conversation. The patient comes to have more self-knowledge, self-direction and autonomy over outcomes and prognosis. Rightly patient-centered medicine stipulates that patients need to be active, responsible participants in their healthcare and clinical decisions and choices. Incrementally collaborative exchanges lead to patient development and sensitivity requiring less direction and more autonomy.

The Institute of Medicine (IOM) defines patient-centered care as: "Health care that establishes a partnership among practitioners, patients, and their families (when appropriate) to ensure that decisions respect patients' wants, needs, and preferences and that patients have the education and support they need to make decisions and participate in their own care" (4). From a more impersonal perspective defined as "as right care in the right way at the right time" quality of care has been reconceptualized as "providing care that the patient needs in the manner the patient desires at the time the patient desires"(5).

Quality of care is at the center of what is now considered patient centered healthcare. According to the Institute of Medicine's definition of the dimensions, patient-centered care encompasses:

- Compassion, empathy and responsiveness to needs, values and expressed preferences
- Co-ordination and integration Information, communication and education
- Physical comfort
- Emotional support, relieving fear and anxiety
- Involvement of family and friends (6)

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Clearly, the dimensions of the construct of patient centered care are in the main relationship and communication issues. Compassion is about emphatic communication that a patient in distress needs. Compassionate communication may be exemplified by information that can empower or sooth the patient as yet another ingredient of the construct to which one may add affective support that relieves the patient of anxieties arising from a medical event or related concerns. The family and friends dimension also contributes towards the agenda of putting the patient in the center and using communication and relationship strategies towards assisting patients as they pass through a difficult psychosomatic period.

However, it is impliedly important to note that it may be necessary to ponder over what is communication especially as it relates to healthcare settings. Reducing it to information transfer or interchange would seriously undermine the considerable semantic load carried by the construct –which may be broken down, albeit at the cost of reductionism, to information communication and relationship communication using appropriate verbal and nonverbal codes. All codes radiate toward the patient as the center who is the subject of the extraordinarily important curative function.

Indeed the popular construct of patient centered communication (PCC) is at the center of modern health care that values the humanity of the patient beyond and above other considerations. Yet definitional imprecision and lack of theoretical clarity have characterized the catchphrase. Thus it has been synonymously described as patient-centeredness, or patient-centered care highlighting the absence of a definitive semantic settlement. However patient-centeredness does imply communicative focus on and relational closeness to the patient. The elements of patient-centeredness manifest themselves in considerations of the patients' receptive and expressive needs, perspectives of their illness experience, and their inputs into the doctor-patient partnership. The partnership while dyadic in the main, nonetheless, involves or subsumes other modalities that are functional and relational. The whole communication complex includes interprofessional communication (inclusive of nursing and other staff), family members and the patient (7). Core definitional elements of patient-Centered Communication subsume "(1) eliciting and understanding patient perspectives (2) understanding the patient within his or her unique psychosocial and cultural contexts, and (3) reaching a shared understanding of patient problems and the treatments that are concordant with patient values" (8).

The evidence base supporting patient centered communication

The patient-centered communicative system aids in health outcomes including survival, recovery, affective wellness, pain reduction, as well as better functioning owing to the vital psychosocial power associated with therapeutic communication. More specifically, six outcomes pertain to communication, namely uncertainty management, management of emotions, information interchange, decision-making, patient empowerment for self-management, and cultivation of curative relationships (20).

A large body of scholarship has found PCC to be an asset in medical practice (21). While it may be axiomatic that good communication that is dialogical in character may have desired yields, more specific benefits have been borne out by audits of medical communication. First among these is that the patient feels an encounter with an amicable physician was fruitful because s/he was partners in a valuable communication with a knowledgeable figure. Patients report general satisfaction as well as more specific information/communication satisfaction because of the symmetry in the communication and their centrality in the process (22). Patient adherence and compliance have also been linked to patient-centered communication (23).

A sense of inclusion and ownership leads patients to take the driver's seat when it comes to managing their own health course. Efficiency has also been an outcome suggesting that when communication is patient-centered and as a result of information richness, patients' request for expensive tests decreases as word of mouth explanatory detail helps them make correct choices. Better health outcomes, lower relapse and readmission rates have also been reported in settings practicing patient centered communication (24). Patient-focused communication is also related to lower litigation and legal costs to medical establishments as the probability of patients suing them for lack of correct and adequate information about procedures and dispensary becomes less (25). Further a communicative- curative alliance can be considered an epitome of good patient-centered communication and the beneficial outcomes extend to family relief and ease of anxiety.

Barriers to patient centered communication

A number of factors adversely impact the implementation of patient-centered communication. All too often physicians seem to believe the practice is unproductively time-taking (9). Indeed time may be spent trying to describe, explain, clarify and predict. While the conversational time does add value to both the patient and physician, many physicians seem to perceive it as inefficient. But studies seem to show that patients take no more than 3 minutes to air their narrative. If time spent conversing with a patient is unduly short, the therapeutic role of the communication may be lost as patients are able to take home with them the barest essential information which consequently compromises their self-management. Conversational interruption is also common costing the patient much as it disrupts the evidence communication the doctor needs (10). Further the self-disclosure that is so much important is ignored owing to standard focus on biomedical data.

The standardization of medical practice could mean that the individuality and uniqueness of every patient is sidelined. Whilst different patients respond differently to the same course, standard instructions about standard symptoms, regimen and prognosis rule out the need for individualized patient-centered communication. As is typical with many in the helping professions physicians may have burnout levels that deny them the needed fuel for human communication leading them to treat patients in a formal, aloof and impersonal or even cold style.

There may also be factors that relate to patient health literacy levels that can impact a physician's approach to patient-centered communication. The literacy levels can make conversation drag on for longer than is normal in an attempt to send a message across through simplification of medical linguistics and health education. Patient-physician congruence is also a factor that may shorten or help to make optimum the conversational duration. Factors in this category may include personality match, age, gender and other demographic details including disability such as hearing dysfunction. There may also be a caseload that frustrates patient-centered communication and in especially private practice this may be an important factor discouraging communication satisfaction from an optimal interchange.

However, considered against the litigation and patient dissatisfaction that can be damaging, the time taken in patient-centered discourse would be worth making a normal practice and a standard policy. The evidence that patients may fail to remember or incorrectly recall more than half of critical medical information makes patient-centered communication even more important as outcomes are dependent on effective communication which involves retention (11).

Evidence based communication strategies:

Four Habits Model

Medicine uses as a data line the best conversational technology called the medical interview. The four habits model is one of several models with graded and sequenced communication events that unfold in a standard medical encounter. Consistent with the principle of patient-centered communication, the model addresses the psychology of communication by first helping establish a relational foundation of trust vital for a mutually satisfying communication experience.

The Four Habits are: Invest in the Beginning, Elicit the Patient's Perspective, Demonstrate Empathy, and Invest in the End. In Habit 1: Invest in the Beginning; the interview establishes much needed rapport for a productive communication. This stage is followed by Elicit the patient's perspective i.e. finding out from the patient their take on their experience, and their medical situation expressed in their own ways. Then comes demonstration of sympathy i.e. understanding the patient's state and emotionally sharing their situation. Invest in the end subsumes providing medical-diagnostic information, educating, involving the patient and rounding up the visit (12).

The Calgary-Cambridge guide

Another model of patient-centered communication is the widely used Calgary-Cambridge guide taught as a crucial component of medical communication across universities (13) and structured in the following sequence

- Initiating the session
- Gathering information
- Providing structure
- Building relationship

- Explanation and planning
- Closing the session
- Options in explanation and planning

Built around 71 communication skills and behaviors (14.) the guide is more meticulous than the four habits model but shares much in terms of the desiderata of good communication in modern medicine that places the patient in the center. For instance at stage one, the rapport stage, the physician welcomes the patient and conveys a nonverbal message that he is there to listen and help.

While PCC is an important innovation, it appears to lack qualities suitable to women's situations. It seems that women are less likely recipients of PCC –suggesting they may also be communicationally or informationally less satisfied in view of the evidence that women's communication styles and preferences are different from men's (15). Back in 1995, the United Nations Fourth World Conference on Women made recommendations that there is an unmet need to tailor services to women's conditions- a point further strengthened by the WHO in later years in Women and Health (16). Calls for a woman-centered approach and women-relevant innovations such as Humanised Midwifery Health Services have implicit implications for patient-centered communication relevant to women (17).

Another important model is the management of communication in difficult medical circumstances that are uncomfortable to both physician and patient but more so to the patient. This emotionally distressing and demanding communication may relate to how bad news is communicated in a patient centered communication context. Subject to cultural norms and context the SPIKES model has been in use across a wide range of health services and settings. The model sequences six communication tasks (18) that culminate in the revelation of bad news to a patient that recognizes and respects the humanity of the patient. Defined as "any information which adversely and seriously affects an individual's view of his or her future" (19) it is able to come as a complete and devastating shock while its reception may differ interpersonally.

SPIKES - The Six-Step Protocol for Delivering Bad News-is structured as follows:

STEP 1: SETTING UP the Interview
STEP 2: Assessing the Patient's PERCEPTION
STEP 3: Obtaining the Patient's INVITATION
STEP 4: Giving KNOWLEDGE and Information to the Patient
STEP 5: Addressing the Patient's EMOTIONS with empathic responses
STEP 6: Strategy and Summary

Shared Decision Making and Patient Decision Aids

In regard to communication for optimal patient outcomes, evidence may come from scientific literature, clinical practice, informed patients, and clinical experience. These together serve to guide a clinical decision on offer. These nonetheless are patient decision aids serving as important inputs. Called patient decision aids, they help patients participate in decisions made regarding their healthcare needs. Their importance lies in their informative power in regard to patients who are made aware of clinical options available to address their medical/surgical needs. The set includes clarification of values and preferences in relation to options available.

The totality of the communication as pertains shared decision making (SDM) 1) includes choice discourse which addresses imperatives of decision making and weighing patient options 2) option discourse (extended discussion involving reference to decision aids as outlined). This category of discourse includes delineation of patient-relevant risk-benefit analysis followed by a relevant discussion of values and preferences vis-à-vis options available.

The deliberation phase follows, which takes a more diagnostic evaluation of the totality of the medical options, which is followed by a final decision phase of the shared decision making encounter as a patient centered communication phase (26).

The effectiveness of the model has been extensively demonstrated (27).

- Gains in patient medical understanding

- Enhanced patient-physician communication
- More participatory experience of patient in decision-making of important clinical issues
- Raising patient communication and service satisfaction
- Enhancing patient decision satisfaction by reducing decision ambiguity
- Raising figure of patients who make decisions

International Patient Aids Standards (28) highlight and recommend additional merits of aids which include.

- Information adequacy made available to patient in regard to options
- Detailing of options that includes the option of taking no action
- Provision of both positive (eg cost) and negative features (eg. risks) of options objectively
- Discussion of statistical chances of options and associated adverse events

Overall, ISDAs help in clarifying and encouraging that a decision needs to be reached, in informing patients about existing options, in helping them make a decision based on what matters to them most and experiencing higher satisfaction levels.

Patient centered communication ethics

Grounded in the ethics of care, patient centred communication ethics puts the patient in the center of the health care system, shares decision making ("nothing about me, without me") and unconditionally shows respect for persons (29)

The evidence base for outcomes and correlates of patient-centered communication

Measurement of Patient centered communication

Lack of complete consensus on what constitutes patient centered communication continues to plague the conceptual literature. However researchers have identified six constructs forming patient centered communication that included exchanging information, fostering healing relationships, recognizing and responding to emotions, managing uncertainty, making decisions, and enabling patient self-management representing an attempt to facilitate operationalization and measurement (30).

Other measures of patient centered communication include the Euro-communication scale (31), Measure of patient-centered communication (32), Roter interaction analysis system patient centeredness subscale (33), Consultation care measure (34), Patient perceived involvement in care scale(PICS) (35), Patient-perceived patient-centeredness scale (PPP) (36), and Measure of Patient-Centered Communication in Health Promotion Clinic Visits with Youth (37). There are other ways of conceiving patient centered communication or aspects thereof as in medical interviewing. These suggest the measurement literature needs to move toward and result in refinement and further development as extant tools are limited.

The further operationalization and refinement of PCC has far reaching implications for programs in communication programs in medical schools, as well as independent certification programs and institutions engaged in communication certifying (38). There is also the need to take advantage of psychometric advances in instrument validation which seem to have been paid little attention in the area of patient centered communication. It is also important that mixed methods can be employed that capture the full gamut of patient data in regard to perceiving medical communication which can then be used for further scale development and validation.

Implications for communication education

Evidence regarding communication skills interventions

Communication is complex and the complexity requires knowledge of its characteristics and the desiderata of effective communication especially in health care settings. In medical settings communication occurs as a central element of interpersonal, inter-professional and small group processes. There are also cross-gender, cross-cultural and intergenerational communications that warrant attention. Because medical care is a communication intensive practice an understanding of the nuances and techniques of communication is vital for optimal health outcomes.

The intricate character of communication suggests it is necessary that medical education include a communication competency component. Because the biomedical component is insufficient training has to include human and medical communication.

Studies have addressed the place of communication in the medical curriculum in several academic settings and the training offered in others. In some studies, communication training led to beneficial outcomes that included the competency to handle emotional issues among patients (39,40) interviewing skills (41**)** with a focus on the Four Habits identified as important clinical communication skills (42). Another evidence comes from a five day communication course intervention that had a significant effect on doctor-patient communication satisfaction (43). Training does appear to make a difference in communication competence and performance in medical settings (44). Communication training also led to more focused competencies clarification of patient concerns, discussing treatment options , rapport communication, and favorable patient impression of health care provider (45).

Statistically significant improvement was reported in a two-day communication training offered to medical doctors as demonstrated by higher patient satisfaction. With a specialized communication training in breaking bad news a tailored training led to significant self-perceived communication competence gains (40) Further evidence showed communication training of physicians led to significant rise in patient satisfaction (46). Empirical evidence also points to the value of communication training as demonstrated in improved patient outcomes, functioning, life quality, psychological adjustment, and clinical outcomes (47). On the whole the communication training surveyed had general and more specific features that improved physicians' quality of interaction with their patients as well as their own satisfaction (48).

In the Ethiopian medical school setting, students do not take training in specialized medical communication. In consequence both physicians and patients may not reap the benefits of a productive and mutually satisfying communication encounter. Since training does often make a difference, it is necessary that Ethiopian medical education include a professional communication component that many medical universities have put in place for quite long. Learning their relevant best practices would take the Ethiopian healthcare system to even greater heights. Given the lower levels of general education and the attendant health literacy standards in Ethiopia, medical communication training has to offer even more benefits than in contexts of more advanced countries where doctor-patient communication may be a lot easier.

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CASE REPORT

A ROCKING CHILD: INFANTILE MASTURBATION IN A FIVE-YEAR-OLD GIRL

Shiferaw Negash, MD[1*] , Yonas Bahiretibeb, MD[2]

ABSTRACT

Summary: *Gratification behavior considered taboo and highly stigmatizing as it is rarely discussed openly in Ethiopia, a highly conservative society. This response is especially encountered when it occurs in a very young girl and may thus call for a visit to the religious healers for 'spiritual intervention' and prompt female genital cutting/mutilation to reduce the child's libido and the presumed risk of sexual promiscuity as she gets older. Because of its rarity and peculiar presentation in children without manual genital stimulation, it is often misdiagnosed. A Medline search showed sparse information on gratification disorder and none from Ethiopia.*
Key words: *Rocking child, Infantile masturbation.*

INTRODUCTION

Gratification disorder or "infantile masturbation" is also sometimes known as "benign idiopathic infantile dyskinesia" and is a form of masturbatory behavior that is often mistaken for epilepsy, abdominal pain, paroxysmal dystonia, or dyskinesia (1, 2). Though often called a 'disorder', masturbation is a normal behavioral variant seen in early childhood (2). There is a great variation at the age of onset of symptoms, age at first clinical diagnosis, and the frequency of occurrence of the behavior.

The age of onset ranges from 2 months to 5 years with a second peak incidence at about the adolescent age, the age at first diagnosis ranges from 5 months to 8 years, with the frequency of the event once per week to 12/ day (1). Its exact mechanism is poorly understood, but has been associated with the relief of self-tension, sexual pleasure, boredom, excitement, genital infection, and lack of stimulation, especially in adolescents' boredom has been strongly associated with masturbation (2).

Gratification behavior or self-stimulation of the genitalia in children is quite common, and reported in 90-94% of males and 50-55% of females (3). Whereas, gratification behavior not involving the self- stimulation of the genitalia has variable clinical presentations in early childhood and failure to recognize these behaviors may result in unnecessary investigations and treatment and moreover stigmatization (2,4,5, 6,7).

Despite ample evidences of self-genital stimulation in children in the western literature, there is paucity of literature depicting its exact physical characteristics in the Ethiopian context. This may in part be due to few or no parental complaints of these problems, partly because, genital stimulation considered religiously and culturally as a sin and taboo and rarely discussed openly in the Ethiopian society.

We therefore present a case of gratification disorder in a 5 years old girl diagnosed initially to have epilepsy.

CASE SUMMARY

This 5 year old female child was referred from pediatric neurology clinic to psychiatry clinic in Tikur Anbassa Specialized Hospital after 2 years of close observation and follow up, because the mother reported the child has been exhibiting inappropriate sexual behaviors. From her birth, the mother described her as an irritable infant for which the mother used to sooth her by holding her over her back. The mother noticed the child rubbing herself against her mother's back at about the age of 6months.

As the child grew, the mother witnessed additional behavior, like crossing and rubbing her thighs/legs together by supporting herself against the wall. She used to do this irregularly and every time she did it her mother used to scold her, after which she would become irritable and cry for a long time.

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As time passed, the behavior escalated and began to be seen while the child was on her mother's lap, sitting on chair, or in bed and when quiet, with more frequency, 5-6 times per day. The family thought their daughter was posed by evil spirit for which they took her to different spiritual healers and holy water but with no improvement. When she was 2 years old, the mother decided to visit a nearby health center where the doctor suspected abnormal body movement, described as seizure disorder, and started her on two antiepileptic medications.

Despite the treatment for more than a year, as described by her mother, episodically the child would lean forward and rock continuously on a hard surface such as a chair or an adult's lap. The child exhibited rocking accompanied with lip smacking, eye rolling, shaking, watching of television in the air, "eidetic imagery", spasm, and feeling of fatigue, and resumption of the motions unless she was distracted. Typically, the movements stopped by gentle restraints, are not present during sleep, and not associated with loss of consciousness. The family after consulting church clergy decided to stop the medication and took the child to different holy waters but to no avail.

The parents used to punish her sometimes with no noticeable improvement in behavior. Older female relatives and traditional birth attendants suggested female genital cutting or circumcision, but her father resisted strongly. For reasons unknown to the mother, her daughter is lonely at school and in the village. Village kids do not want to play with her and associate themselves with her, they use nickname "Tewezawazua Lije" means the "Rocking Child" to tease the child. For four months, the mother decided not to send her daughter to school and allow her to play with other kids.

At the age of 3 years, the mother brought the child to Tikur Anbessa Specialized Hospital, pediatric neurology clinic, and with the suspicion of seizure disorder, investigated with CBC, serum electrolytes, ultrasound, electroencephalogram, all investigations were normal. Since no definite diagnosis was made, no specific treatment was obtainable at the neurology clinic except close observation and follow up. As no noticeable changes seen at the neurology clinic after two years of follow up, and the mother continued to report abnormal sexual behavior, she was referred for psychiatric and gynecologic evaluation. Otherwise, the child did not exhibit abnormal vaginal discharge, urinary or gastrointestinal symptoms or symptoms of itching and the mother denied history of sexual abuse, nor similar illness history in the family.

The evaluation at the gynecology clinic revealed normal female breast and external genitalia development appropriate for her age. Trans-abdominal ultrasound shows normal female internal pelvic organs. Six months after being transferred to the psychiatry clinic, a detailed history was taken from the mother regarding the behaviors the child exhibited at home. A cellphone recording by her mother, that showed typical features of gratification behavior, was instrumental in making the diagnosis. Childhood gratification disorder was diagnosed and all medications stopped. The mother was given psycho-education with a special focus on avoiding corporal punishment, reassured that the behavior is self - limiting and go away slowly, and advised to distract the child with interactive play during the episodes. She has a follow up currently at the psychiatry clinic and has shown slight improvement.

DISCUSSION

Gratification disorder observed in our patient, who is 5 years, is similar to the report by other authors. It is commonly seen between 2 months and 8 years (1, 3). It has never been reported in infants less than 2 months, though the existence of the disorder even in the fetus in utero has been reported (9). Infants and young girls with the gratification disorder, as has been revealed in our index case, first misdiagnosed to have epilepsy or movement disorders, underwent many investigations and took antiepileptic for 2 years (3, 5). This is because, unlike in adolescents, it does not usually involve self-genital manipulation and the clinical presentations are variable. Therefore, infants and children with this disorder wrongly labeled to have epilepsy, non-epileptic paroxysmal movement disorder, or even gastrointestinal disorder like gastro-esophageal reflux disease (1).

Nechay et al in their review of 31 cases of masturbatory behavior in children found that majority of the patients were initially misdiagnosed with seizure disorder (1), while other authors in their case series, reported abdominal pain and movement disorder as the commonest initially diagnosis (2,10). The unhappy expression observed in our patient during the event is similar to earlier reports, where, diagnosis of infantile masturbation is more difficult when the infant or young child seems unhappy during the rhythmic movements. When there are repeated jerky spasms, there may be confusion with epileptic infantile spasms (10). It is for these reasons that gratification behavior often leads to over-investigation, and unnecessary treatments, including antiepileptic drugs (2, 5-7).

A detailed interview of the mother was a key to considering gratification behavior in our index case. This is consistent with the previous reports, where, careful interview of parents, caregivers, and the child, appears to be one of the hubs to accurate diagnosis (9). One of the most important features of the behaviors is that the child may be stopped during gratification if distracted but responds with anger and annoyance, which was demonstrated in our case (6). The diagnosis made possible only after the video clip obtained by the mother's cellphone was seen in our patient. This finding is consistent with the case reports and series by the earlier authors, where, video recording of events has been documented to be of significant help in understanding the nature of the episodes (2, 6, 11).

Because of illiteracy, culture, sexual taboo, and tradition parents may use descriptive terminology and language that is difficult to understand for some of these movement and postural features, moving the working diagnosis to a culture bound syndrome, like possession, or to a medical disorder such as seizure disorder, movement disorder, or gastrointestinal disorder. Moreover, female relatives, elders and traditional birth attendants recommended female genital cutting, though resisted by the father is in accordance with African reports of female genital cutting considered as means of reducing the future risk of sexual promiscuity (12). In this case report, patterns of help seeking vary according to a range of factors, including the evaluation of symptoms, patient and family explanatory model of the illness and prior experiences of illness and treatment. Helman suggested that the decision to seek medical aid is influenced by social, cultural, and emotional factors, rather than the severity of the illness (13).

In our case report, the child, because of her masturbation behaviors, was isolated, bullied and not able to attend school. This shows that stigma often leads to discrimination, in our case, the child was unable to attend school and play with other children – vital resources in the healthily development of a child.

In our context, using cellphone videotaping of these episodic events is invaluable in the diagnosis of gratification behavior.

As this is the first case reported in an Ethiopian child, health professionals who are engaged in the treatment of children with abnormal body movement need to consider gratification disorder in the differential diagnosis. Though it is a benign condition and self-limiting, failing to appreciate the condition may impose unnecessary resource utilization for diagnosis and treatment, unnecessary punishment and stigmatization of the child and inflict undue anxiety and stress on the parents/guardians.

Conclusion

Infantile masturbation rarely diagnosed in Ethiopia, probably due to a low index of suspicion and mothers are afraid of stigma and alienation. We suggest health professionals to consider gratification behavior in the differential diagnosis of strange movement mimicking epilepsy in infants and young children. Once diagnosed, parents should be reassured, advised against female genital cutting, physical punishment and segregation. Video recording of the events by parents using cellphone is strongly encouraged for better understanding of the episodes and make the correct diagnosis.

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We would like to thank the parents of the child for allowing us to publish this case for educational purpose.

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

ATAXIA TELANGIECTASIA IN AN ETHIOPIAN CHILD

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ABSTRACT

Ataxia telangiectasia is a rare, progressive, multisystem, autosomal recessive disorder that has a large number of complex and diverse manifestations, which vary with age. It is characterized by progressive cerebellar ataxia, oculocutaneous telangiectasia, and recurrent respiratory and sinus infections. Diagnosis of Ataxia telangiectasia is often made on clinical evaluation, exclusion of similar conditions, and supportive laboratory tests. The management of Ataxia telangiectasia is multidisciplinary, requiring neurologist, physiotherapist and nutrition program. Treatment is symptomatic and supportive including counseling of parents or caretakers. We report a 10 year old Ethiopian girl who presented with progressively increasing gait difficulties, scoliosis, ocular manifestations and bilateral chronic suppurative otitis media.

Key words: *Ataxia telangiectasia; Immunodeficiency; Cerebellar atrophy; Ethiopia*

INTRODUCTION

Ataxia Telangiectasia (AT) or Louis Bar syndrome is a rare (1:40,000-1:300,000 live births per year (1, 2), multisystem, autosomal recessive disease characterized by neurological impairment (progressive cerebellar ataxia, axonal peripheral neuropathy, oculomotor apraxia, and movement disorders such as dystonia, choreoathetosis, myoclonus, tremor, Parkinsonism), telangiectasias, recurrent sinopulmonary infections, susceptibility to cancer, increased alpha-fetoprotein, decreased IgA levels and radio hypersensitivity (3).

AT is caused by biallelic mutations in ATM gene, which plays a pivotal role in the control of cell cycle and in the response to DNA double strand break damage and Chromatin changes. Elevated AFP occurs due to immature liver. Males and females are equally affected. No racial or regional preferences are found. It usually begins around the age of 5 years old (4). The mean age of diagnosis is around 3 years of age (5) but it may occur to the age of 10 years (6).

Diagnosis is usually achieved clinically by examination and identification of ataxia in early childhood and ocular or skin telangiectasia usually after the age of 3-4 years. Neuroimaging, genetic tests and other laboratory tests are also important. The management of AT is multidisciplinary, requiring pediatrician, infectious disease specialist, child neurologist, hemato-oncologist, physiotherapist, occupational therapist, speech therapist, social worker etc.

The course of AT can be variable. Many patients are confined to a wheelchair in their teens. So far, to the knowledge of the authors, there is no case report on AT in Ethiopian children. We report the case of a 10 years old Ethiopian girl with classic manifestations of AT.

CASE SUMMARY

A 10 year old Ethiopian child, born of a non-consanguineous marriage, is the eldest in a family of two. Her younger brother is healthy. There is no history of similar illness in her family up to three generations (Figure 1). She was in good health until the age of 2 years, when she had bilateral chronic suppurative otitis media, which was treated with oral antibiotics and eardrops with poor response. Since the age of six years, she started to have progressively increasing difficulty in walking, keeping balance, coordinating hand movements and slurring of speech. She has also red eyes and frequent attack of respiratory tract infections.

Clinical examination revealed cerebellar ataxia, scoliosis, dysarthria and oculocutaneous telangiectasias on bulbar conjunctivae, nose and ear lobes (Figure 2). Otoscopic examination revealed sub totally perforated tympanic membrane on both sides.

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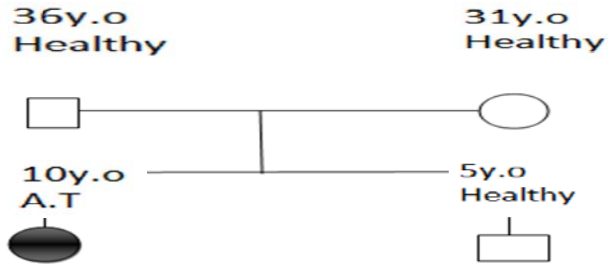
Magnetic resonance images (MRI) showed diffuse cerebellar atrophy (Figure 3) and opacified middle ear and mastoid air cells. Alpha- fetoprotein (AFP) was elevated but serum IgA level was not determined.

She was given antibiotics for recurrent infections and multivitamins. Parents were counseled.

Figure 1: Family Tree



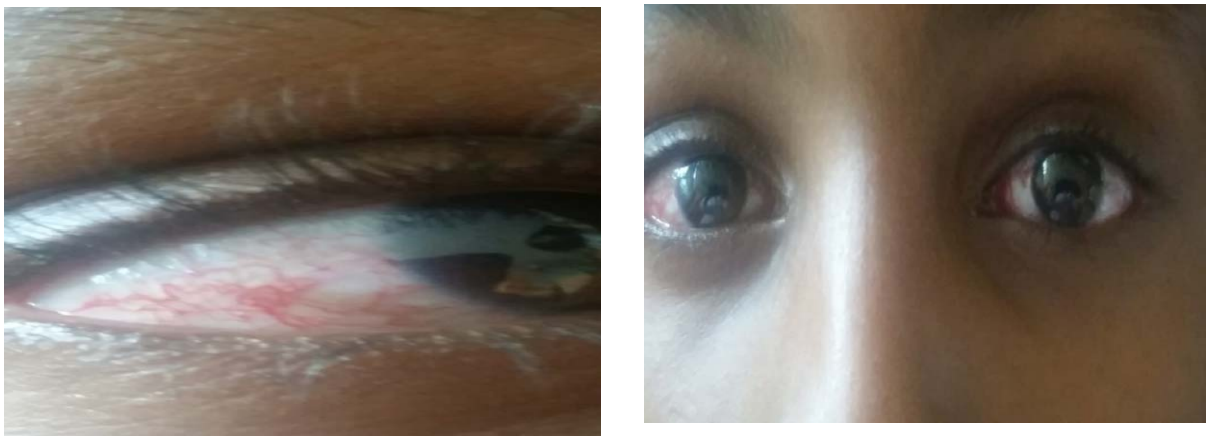


Figure 2: Conjunctival telangiectasias present in both eyes

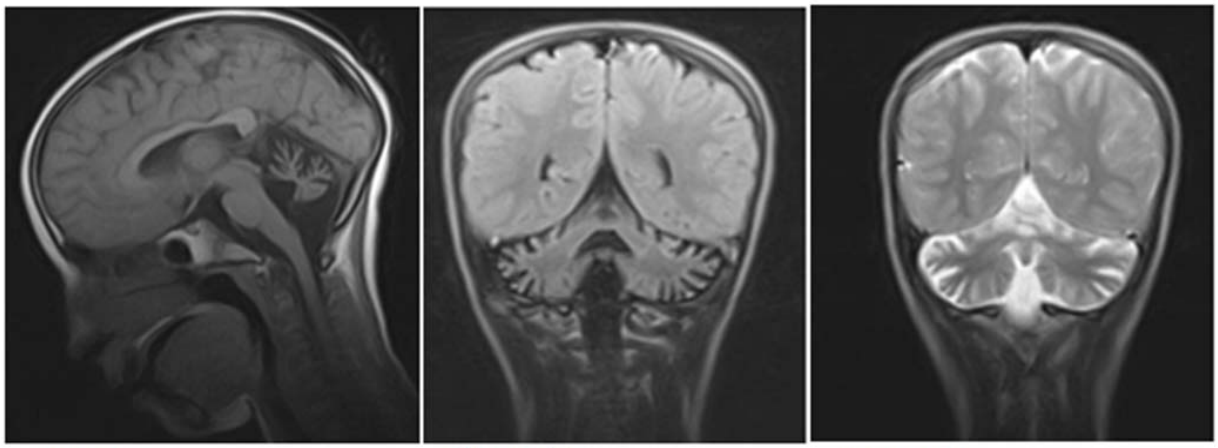


Figure 3a **Figure 3b** **Figure 3c**

Figure 3 : Sag SE T1 (a), Cor FLAIR (b) and Cor FSE T2 showed diffuse cerebellar atrophy involving vermis and both cerebellar hemispheres.

Figure 3: MRI brain showing cerebellar atrophy

DISCUSSION

Ataxia-telangiectasia (AT) or Louis Bar syndrome is a rare neurodegenerative inherited disorder that affects many parts of the body and leads to severe disability (7). The disease is inherited in an autosomal recessive fashion and is due to mutations in the ATM gene located on chromosome 11q22-23 (8). ATM gene is important in DNA repair. The prevalence is estimated to be between 1 out of 40,000 and 1 out of 300,000 persons worldwide (1, 2).

Ataxia telangiectasia has multisystem manifestations including progressive neurological manifestations, like tremor, chorea, athetosis, dystonia, ataxia, dysarthria, oculomotor apraxia and dysphagia which worsen through childhood into adult life (9). Oculocutaneous telangiectasias usually appear at about 3 or 4 years of age (9). Telangiectasias are occasionally found in the bladder or other internal organs.

Patients will also have recurrent infections usually affecting the chest, ears and sinuses that can lead to chronic lung disease and chronic otitis media with hearing impairment (9). A wide range of immunological abnormalities, including deficiencies of immunoglobulin (particularly classes A and E), poor responsiveness to pneumococcal polysaccharide vaccine, reduced lymphocyte numbers particularly affecting T and B cells and thymic hypoplasia, slurred speech, drooling, and dysphagia leading to low body weight are common.

Less common clinical manifestations include vomiting and choking, particularly in the morning, non-infective granulomatous skin disease, deformities of the feet and lower limbs, scoliosis, incontinence of bladder and bowel, diabetes mellitus, which tends to develop during adolescence or adulthood in about 25% of patients (9).

AT occurs in three forms. The first form is pure AT where patients present with all/most of the diagnostic symptoms. The second form is attenuated AT or type II where a patient lacks some of the typical findings but shows radio-sensitivity. The last form is carrier AT where individuals with a single ATM mutation may have an increased risk of cancer.

Immunodeficiency affects over half of all patients with AT and when present can contribute significantly to morbidity and mortality**,** which is the case of our patient, who presented with respiratory infections and chronic suppurative otitis media since childhood, highly suggestive of immunodeficiency.

This deficit is often mixed, progressively worsening in cellular immunity (CD4 and CD8) but also in humoral immunity mainly immunoglobulin A and in addition, subclasses of Immunoglobulin G (5). The IgM levels are normal or sometimes high. This immune deficiency is responsible for respiratory disorders that are common and may precede the onset of neurological signs. It is often repeated bronchial infections, sinusitis, diffuse lung dis eases, bronchiectasis, and rarely interstitial lung disease. Patients with AT also have increased sensitivity to ionizing radiation, most notably γ and X. Thus, radiologic examination should be limited to the maximum in these patients (10). A high chance of development of cancer has been reported in homozygous patients (100 times greater than in the normal population) (11).

This predisposition is partly due to the increased radio sensitivity but especially acquired chromosomal abnormalities. For homozygous individuals, it is essentially lymphoma (50%), lymphoid leukemia (30%), and carcinomas (20%especially in adults (12,13). Among females heterozygous for the gene mutation, breast cancers are more often seen than in the general population (5).

Diagnosis is usually achieved clinically by identification of both ataxia and ocular telangiectasia or skin telangiectasia. Laboratory tests often show elevated serum AFP level, low lymphocyte count and other immunological abnormalities. MRI and computed tomography (CT) scans may show cerebellar atrophy. MRI is the preferred method, as any exposure to ionizing radiation should be avoided. Cytogenetic and molecular testing will confirm the diagnosis of AT.

When a clinical diagnosis of AT has been made or there is a reasonable clinical suspicion of AT, genetic confirmation should be obtained by identifying the ATM mutations present. The management of AT is multidisciplinary, requiring neurologist, physiotherapist and nutrition program (5). Treatment is symptomatic and supportive. Physical and occupational therapy may help maintain mobility. Speech therapy may also be needed. Regular use of intravenous immunoglobulin may help to improve immune function and reduce the frequency of infections. Aggressive antibiotic therapy is required for bacterial infection, avoidance of radiological exposure and screening for cancer is an imperative part of the follow up. Counseling of parents/caretakers on disease course and prognosis is crucial.

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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

AN EXTREME CASE OF LIFE THREATENING METABOLIC ACIDOSIS AND DIABETIC KETOACIDOSIS

Dawit Kebede[1*], MD, Munib Khalid, MD[1], Joseph Huang, MD[2], Charles B. Sherman, MD[3]

ABSTRACT

Metabolic acidosis is one of the common manifestations of diabetic ketoacidosis (DKA). Concurrent hypokalemia often complicates management and mandates correction before administration of insulin. We report a unique case of a young woman with extreme life-threatening metabolic acidosis (pH 6.57) and hypokalemia due to DKA who survived without any sequelae.

Key words: *Severe metabolic acidosis, diabetic ketoacidosis, hypokalemia*

INTRODUCTION

Diabetic ketoacidosis (DKA) is a potentially life threatening complication of diabetes (DM) and is commonly associated with significant morbidity and mortality. Infections and drug discontinuation/under dosing are the most common precipitating factors. A triad of uncontrolled hyperglycemia, metabolic acidosis, and ketosis is the hallmark of DKA (1). Treatment relies on fluid and insulin administration, and correction of resulting metabolic acidosis and electrolyte abnormalities.

We report a case of a young woman with severe metabolic acidosis due to DKA who survived with no neurological sequelae. To our knowledge, such life threatening metabolic acidosis associated with DKA and

CASE SUMMARY

A 16-year-old female patient with known Type 1 DM on NPH insulin (60 IU AM and 50IU PM) for 8 years presented with complaints of worsening of fatigability, vomiting, watery diarrhea and abdominal pain of 02 days duration. Her physical examination was evident for a semi-comatose patient with Glasgow Coma Score (GCS) of 6/15, dehydration, and deep sighing respirations. Her vital signs included a respiratory rate of 34 breaths/min, pulse rate of 110 beats/min, axillary temperature of 36.7^{o}C and blood pressure of 130/70mmHg.

Initial laboratory values are shown in Table 1. These confirmed severe DKA with severe meta-

Table 1: Results initial Laboratory Investigations

Random Blood Sugar	>600mg/dl
Sodium	157 mmol/L (135-145
Potassium	2.6 mmol/L (3.5-5.1)
Chloride	135 mmol/L (97-111)
Calcium (Ionized)	4.6 mg/dl (4.2-4.9)
Urea	25 mg/dl (10 - 50)
Creatinine	1.5 mg/dl (0.5-1.3)
Phosphorus	5 mg/dl (2.5-5.0)
Urinalysis	Glucose 3+
	Protein 1+
	Ketone 3+
White blood cell count	7800/ul (4,000-11,000)
% Polys	64%
Hempglobin	12 gm/dl (12.0-15.5)
Platelets	158,000/ul (150,000-450,000)

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Concomitantly, her condition was complicated with multiple electrolyte abnormalities (hypokalemia and hyperchloremia) and pre-renal azotemia. The patient was initially treated in the Emergency Department (ED) with 5 liters of normal saline over 16 hours. Insulin was not started as the serum potassium level was below 3.3mmol/L, the cut-off level where insulin administration is contraindicated until potassium correction has occurred (1, 2, 3). She was transferred to the medical intensive care unit and treatment continued. However, there was again a delay in starting insulin due to the ongoing degree of hypokalemia and the unavailability of potassium chloride (KCL) for replacement.

Unfortunately, her mental status further deteriorated (GCS 3/15) and she was intubated and mechanically ventilated. The team then decided to start intravenous regular insulin infusion despite the hypokalemia; eventually potassium replacement was started once KCL was obtained. Ringer's lactate and later a D5W infusion were also given. Hypernatremia developed during the course of her treatment and was appropriately managed. Her metabolic derangements normalized within 36 h (Table 2), after which the patient was extubated and transferred to the general ward. She was discharged three days later with no sequelae, and normalization of all her chemistries.

Table 2: Changes in Laboratory Investigations from Admission to Time of Extubation

	Admission	**Time of Extubation**
RBS	>600mg/dl	278mg/dl
Na+	157mmol/L	162mmol/L (135 – 145)
K+	2.6mmol/L	2.9mmol/L (3.5 - 5.1)
Cl-	135mmol/L	130mmol/L (97 – 111)
HCO3-	1.9 meq/L	15.5 meq/L (21.0 – 28.0)
Ca+ (Ionized)	4.6 mg/dl	4.8 mg/dl (4.2-4.9)
pH	6.57	7.30
PCO2	15.8 mmHg	29.8 mm Hg
PO2	140 mmHg on 3 -5L/ min supplemental oxygen	89.5 mmHg on FiO2 0.4
Lactate	0.66 mmole/L	0.92 mmol/L (0.56 – 1.39)

DISCUSSION

To date, severe metabolic acidosis to this degree associated with a favourable outcome has not been reported. In fact it is quite unusual that our patient survived as it is known that severe acidemia at presentation (arterial blood pH <7.0) and development of coma are important predictors of mortality (4). There has been only one other similar case in the literature, a patient with an initial pH of 6.74 who survived without complications. This patient was reported to have type 1 diabetes with severe hyperglycemia, sepsis, vasoplegia, acute kidney injury, coma, and metabolic and respiratory acidosis from DKA (5). On the other hand there were a few case reports of severe metabolic acidosis, not as severe as the case reported here who recovered, from other causes who had favourable neurologic recovery (6, 7).In general, DKA results from a decrease in the net effective action of circulating insulin with an increase in glucagon, epinephrine, cortisol, and stress hormone.

This results in increased production of nonesterified fatty acids (NEFA) and glycerol from the breakdown of triglycerides. Glycerol is a substrate for gluconeogenesis and the greater amounts of NEFA results in the production of ketone bodies. Clearance of ketone bodies is impaired by low insulin concentrations, increased glucocorticoids, and decreased peripheral glucose utilization. Metabolic acidosis then develops due to the limited buffer capacity of bicarbonate (1, 4, 8).

In addition, there is often a concurrent respiratory acidosis as was seen in our patient. There are several possible explanations for this finding. The first is simultaneous failure of tissue perfusion resulting in CO_2 retention. Another explanation is the development of circulatory overload and hydrostatic pulmonary edema due to the acute shift of fluid from the intracellular into the extracellular compartment.

The third plausible mechanism is nonhydrostatic pulmonary edema resulting directly from DKA. And finally, diabetes mellitus can alter the structure and function of the lungs. Reduced lung volumes, reduced pulmonary elastic recoil, and reduced capillary lung capacity are well known functional changes that can occur. These underlying abnormalities may cause clinical lung dysfunction under stressful conditions such as DKA (4, 5, 9, 10).

Our patient had severe hypokalemia at presentation, which persisted beyond correction of her acidemia. Liberal and early insulin administration was hindered by her hypokalemia and contributed to the severity of her acidosis and clinical deterioration. The possible reasons for her ongoing hypokalemia included gastrointestinal loss, and fluid and insulin administration (5). Despite the general teaching to hold insulin if the potassium of <3.3mmol/l, we decided to administer insulin early on as her DKA was so severe (coma, pH < 7mmol/l, bicarbonate < 10mmol/l, glucose >250mg/dl, AG >12, urine ketone positive) (6).

Conclusion

To our knowledge, this is the first case report of a patient presenting with such severe metabolic acidosis (pH 6.57) due to DKA who ultimately survived without any long-term sequelae. We believe that the initial lack of resources in diagnostics and treatment (i.e., lack of ABG's in the ED and limited availability of KCL) worsened her condition, but ultimately did not affect her outcome.

Furthermore, management protocols adopted from resource-rich countries need to be modified to address the clinical reality of resource-poor nations. There should be a less stringent and an individualized treatment approach in DKA patients as restrictive criterion like delaying insulin administration in the presence of a potassium level below 3.3mmol/L could result in more extreme complications in those settings.

Competing Interests: The authors whose names are listed above certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript. This case was previously presented at the American Thoracic Society International Conference in San Diego, May 2018 (American Journal of Respiratory and Critical Care Medicine 2018;197:A3375).

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PERSPECTIVE

CORONAVIRUS DISEASE-2019 (COVID-19) PANDEMIC: AN EERIE CHALLENGE TO THE GLOBAL COMMUNITY

Sileshi Lulseged, MD, MSc[1], Zenebe Melaku, MD[2]

Named after the crown-like spikes on their surfaces, it is established that coronaviruses (CoVs) constitute a large group of viruses, most of which circulate among animals such as pigs, camels, bats and cats (1). The history of human coronaviruses began in 1965, and we know that new coronaviruses appear to emerge periodically in humans, primarily due to the high prevalence and wide distribution of these viruses, the large genetic diversity and frequent recombination of their genomes, and the increase of human-animal interface activities (2). It is fascinating to see that ongoing research using serologic techniques has resulted in a considerable amount of information regarding the epidemiology of the human coronaviruses. We recognize that the enormous infusion of energy and activity around the expanding field of veterinary virology has deepened our knowledge about the virology and pathogenesis of coronaviruses (3).

It is perplexing and, in a way, also daunting, that at least five new human coronaviruses have been identified over the last two decades alone, including a very new severe acute respiratory distress syndrome coronavirus (SARS-CoV), which emerged in 2002–2003 causing significant morbidity and mortality in 29 countries in North and South America, Europe and Asia (4). Then, we had the middle east respiratory syndrome corona virus (MERS-CoV), starting in 2013, which, by 2020, claimed many lives globally (5). We now have severe acute respiratory distress syndrome coronavirus-2 (SARS-CoV-2), which despite all the signals over the last two decades, has unfortunately caught us of guard, causing coronavirus disease 2019 (COVID-19), and turning into a public health emergency of international concern (6).

It is well recognized that the magnitude and impact of an epidemic depends on the number of persons infected, the infection's transmissibility and the spectrum of clinical severity (7). We know that the full spectrum of COVID-19 severity ranges from asymptomatic, to symptomatic-but-mild, to severe, to requiring hospitalization, to fatal (8). The disease has spread to many countries within weeks to become a pandemic, which has swept the globe, and to date (as June 29) stands at over 10 million vases and has caused over 500,000 deaths, as well as massive socio-economic disruption. Governments and health authorities across the continent, like others across the globe, are striving to limit widespread infections. Response however looks frantic and uncoordinated, each country grappling with a herculean challenge largely on its own.

Africa has so far been largely spared the kind of impact COVID-19 has thrown the United States, and Europe into chaos (9), but is pandemic is steeply rising, particularly in some of the countries in the continent. Overall, in the African continent, as of June 29, 2020, a total of over 382,190 confirmed cases and over 9,500 deaths have been reported (10), which constitutes a small proportion. In a Continent with a population of over 1.2 billion the spread of COVID-19 could have devastating health and socio-economic consequences. Efforts to control the disease will themselves come with an enormous economic and social price. The weak health system plagued with inadequate surveillance and laboratory capacity will contribute to loss of lives. Population displacement, which is rampant in the continent, coupled with substantial disruptions to humanitarian operations, will compound the challenge posed by the pandemic across the continent.

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The pandemic has created unprecedented disruption for the global health and development and is complicated by unprecedented challenges of access, safety, supply chain logistics, and financial stress (11). Health workers, who are at the front line in response to the pandemic, are highly exposed to hazards associated with COVID-19, including pathogen exposure, long working hours, psychological distress, fatigue, occupational burnout, stigma, and physical and psychological violence. There is an utter need for implementation of occupational safety and health management systems to identify risks to health and safety, institution of infection prevention and control measures, and zero-tolerance policies towards workplace violence and harassment.

The short-term implications of this global challenge are evident everywhere. The long-term consequences of the COVID-19 pandemic, how it will reshape health and development institutions, occupations, and priorities, are still difficult to imagine (12). This global crisis, if not managed by coordinated global response and in a substantial way, will inevitably increase and deepen the divide between North and South, challenging the multilateral system and global solidarity on a large scale. Anecdotal observations suggest that each country has realized its fragility and reflected on its dependence on the rest of the world. Countries have experienced isolation and loneliness to a various level, when attempting to respond single handedly to such a major exogenous shock. The COVID-19 pandemic will surely test the resilience of nations, businesses, and communities. It has become evident that no single county, agency or organization can respond to such the pandemic on its own. Response to the pandemic calls for a comprehensive approach and must take a whole-of-society and whole-of-government approach. We need to draw on our experience with other major outbreaks such as Ebola, HIV, SARS, Tuberculosis (TB) and malaria. There is a dire need to urgently and effectively respond to COVID-19 pandemic (13) and translate knowledge into action that can guide efforts in developing context-specific national and regional operational plans.

The uphill battle against the COVID-19 pandemic is anticipated to go a long way. We may draw much lesson and inspiration from the HIV pandemic for the response to COVID-19 pandemic. No vaccine is available for either and there are no licensed pharmaceuticals for COVID-19 when the outbreak started, just as there was no drug for HIV infection in the early years of the epidemic. Population behavior will determine the pandemic trajectory of COVID-19 just as it did for HIV. A severe COVID-19 epidemic in low-income and middle-income countries (LMICs) with weak health systems has a sobering prospect. As humanity it is a serious mistake to go the same path that led us pay 32 million lives from the HIV pandemic. HIV transmission accelerated among mobile, well-connected networks, but the burden shifted to poorer people and countries, young women, and marginalized groups (14). We have witnessed with HIV that new advances often rapidly benefit the better off, increasing inequalities. Fast, decisive political leadership is crucial and is imperative to avoid falling in the same trap.

Observations to date show that displaced populations, including refugees, have been stigmatized, scapegoated and neglected in the emergency response to COVID-19 pandemic. Affected populations often experience substandard living conditions, overcrowding, limited access to safe water and sanitation, and poor health and nutrition, thus substantially increasing their risk of infection (15). In addition, they may face greater difficulties than the general population in accessing health services and may disproportionately bear the burden of pandemic-control measures, including restrictions on movement and border closures. In humanitarian contexts, conflict, political instability, resource limitations, and poor governance, further constrain the ability to detect and respond effectively to outbreaks.

We believe, though it is mind boggling and somewhat arguable, we have learnt enough from SARS that started in China in 2002-2003, then from the 2012 MERS epidemic which started in Saudi Arabia and Jordan. We might have also learnt form epidemics caused by other virus species - swine flu (H1N1) in 2009, bird flu (H7N9) in 2013 and 2017 as well as other pathogens such as Zika and Ebola (still active in Africa). For decades, experts from the science community have warned about the need to prepare for another pandemic like the 1918 Spanish flu (“the Great Influenza”), which killed at least 50 million people worldwide. However, never has a virus stopped the entire

world's gears quite like SARS-CoV-2, which has led to a situation where over one-third of humanity is under lock-down.

Stigmatization of people infected with SARS-CoV-2 will inevitably have a negative impact on others. We may count here on innovative approaches we employed in our HIV response, including structured community mobilization, targeted social protection, and differentiated health-care delivery (16). As countries take different approaches to control the pandemic, they must be aware of this and be alerted to averting unintended effects. The COVID-19 pandemic is a wake-up call to global citizens and their authorities, particularly that the pandemic viciously affects humans without any prejudice as to their education, socioeconomic status, race and ethnicity, religion, gender, age, abilities or disabilities, national origin, and other factors (17). That is why solidarity across the world is an absolute necessity in the battle against this unprecedented pandemic.

As part of the prospects for an exit strategy, lifting of restrictions to curtail the impact of coronavirus is beginning to emerge, but may be premature when we have not even yet settled on a long-term control strategy. On the positive side, we might get a useful serological test within the next months, and we will be able to gradually get better at treating people who have acute illness. Relaxing distancing measures will have to be done, not because it is the best way to conquer COVID-19, but because the costs, in terms of human health and welfare, will eventually outweigh the benefits. But even then, the process of relaxation will probably take many months or years. Assuming we will eventually succeed in developing a reliable antibody test, it might be possible that people who have significant antibodies to COVID-19 will be able to circulate more freely than people who do not. Currently, more than hundred vaccines are under trial. Only if a useful vaccine is developed will there be a possibility for most people to be immunized and return to the kind of normal mobility (18).

Looking forward, it is paramount to have a detailed understanding of how an animal virus jumps species boundaries to infect humans so successfully in order to design and effectively implement prevention of future zoonotic events. Irrespective of the exact mechanisms by which SARS-CoV-2 originated, the ongoing surveillance of pneumonia in humans and other animals is clearly of utmost importance. In this early period of COVID-19 pandemic, high-quality research is needed to provide valid and reliable ways to manage this kind of public health emergency in both the short- and long-term. Currently, the most viable option is enforcing strict preventive and control measures that minimize the risk of possible disease transmission. Efforts on repurposing broadly acting antiviral drugs may be encouraged. It cannot be overstated, as has also been emphasized by others (19), that in the wake of the pandemic basic health services viz. maternal and child health, Tuberculosis (TB), HIV and non-communicable diseases, are sidelined causing increases in mortality and morbidity form other major public health problems.

The COVID-19 pandemic has provided us, once more, with an opportunity to re-think why the economic models which have dominated for the past 50 years have done so little to care for each other. The rapid global spread of a novel coronaviruses must have taught us that we are all interconnected in terms of our health and well-being. In the age of COVID-19, protecting the most vulnerable among us is not just a moral imperative but an urgent public health objective: the health of one is the health of all. The COVID-19 pandemic will be controlled eventually through prevention measures and the technology of medications and vaccines and shockwave from the pandemic will end at one point. Meanwhile, we need to seriously re-think about the interconnected global economy. As has been expressed cogently by others (20), there could be a silver lining to the collapse of the current economic systems and the phoenix that emerges could be much better for future generations even if the cost right now is high. We cannot let this opportunity pass.

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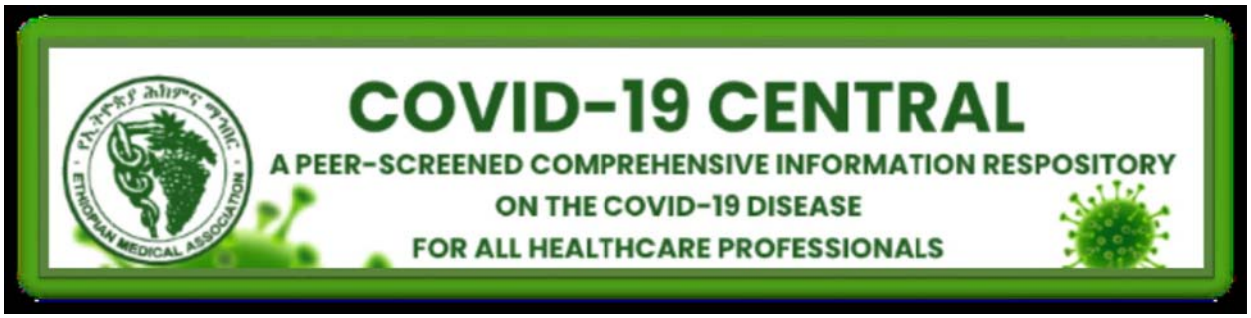
NEWS/UPDATE



Ethiopian Health Professionals Advisory Council on the COVID-19 Pandemic in Ethiopia
in collaboration with the
Ethiopian Diaspora High-Level Advisory Council on the COVID-19 Pandemic in Ethiopia

ESTABLISHMENT OF A COVID-19 CENTRAL INFORMATION REPOSITORY FOR HEALTH CARE PROFESSIONALS

https://www.ethiopianmedicalass.org

INTRODUCTION

The Ethiopian Diaspora High-Level Advisory Council on COVID-19 was initiated at the request of H.E. Fitsum Arega, Ambassador of Ethiopia to the United States. The independent Advisory Council is composed of Ethiopian medical and other professionals and has the primary objective of supporting the efforts to combat the COVID-19 pandemic in Ethiopia. It provides policy and technical recommendations based on currently available scientific evidence and experiences learned from around the world. The Ethiopian Health Professionals Advisory Council was initiated by the Federal Ministry of Health of Ethiopia and subsequently the Ethiopian Medical Association (EMA) along with other health professional associations established the local Advisory Council with the same objective as above.

SITUATION

Within a very short period, the COVID-19 pandemic has become a worldwide crisis. As a novel coronavirus, the medical community had minimal experience with this particular infection. This dearth of knowledge has spurred a flurry of research activities leading to publications in a never before seen numbers and speed. For the very first time publications are being circulated in early formats before any formal online or print process to accelerate the sharing of new scientific information. Furthermore, most of the journals have made COVID-19 publications freely downloadable. In addition to the scientific publications' epidemiological reports from multitude of sources are appearing in real-time. Guidelines and recommendations regarding COVID-19 are generated by institutions as well as local, regional, state, federal and international agencies at a high rate and frequently revised.

BACKGROUND

The volume of information on COVID-19 on the internet is staggering. The word "COVID 19" generated in Google 5.8 billion entries on 17th of June 2020. As a comparison the word "Ebola" garnered only 43 million entries. On the same day, the top central resource for scientific medical publications, PubMed, showed 23,464 publications on COVID-19 since January 2020 i.e. within less than 6 months. To the contrary, over the past 43 years there are only 43,926 publications on Ebola listed in PubMed. These numbers do clearly demonstrate that it can be very daunting to navigate through the myriad of scientific and non-scientific information on COVID-19.

ASSESSMENT

Until now in Ethiopia there was no authoritative local resource of comprehensive information on COVID-19 specifically designed to support health care professionals. As medical knowledge on this new pandemic is rapidly evolving and cannot be gained from existing textbooks it is imperative to provide a central, well-organized, easily accessible source of information with peer-selected clinical, research and educational materials that will support the Ethiopian health care professionals in their various tasks in combatting the COVID-19 pandemic. In light of the abundance of COVID-19 information out there, it was planned to develop a targeted and well organized comprehensive medical information source for the health care professionals. There is also an increased need for management protocols contextualized for the Ethiopian use. To that effect, both the Ethiopian and the Diaspora COVID-19 Advisory Councils are collaborating and developing specific protocols addressing local issues.

RECOMMENDATION

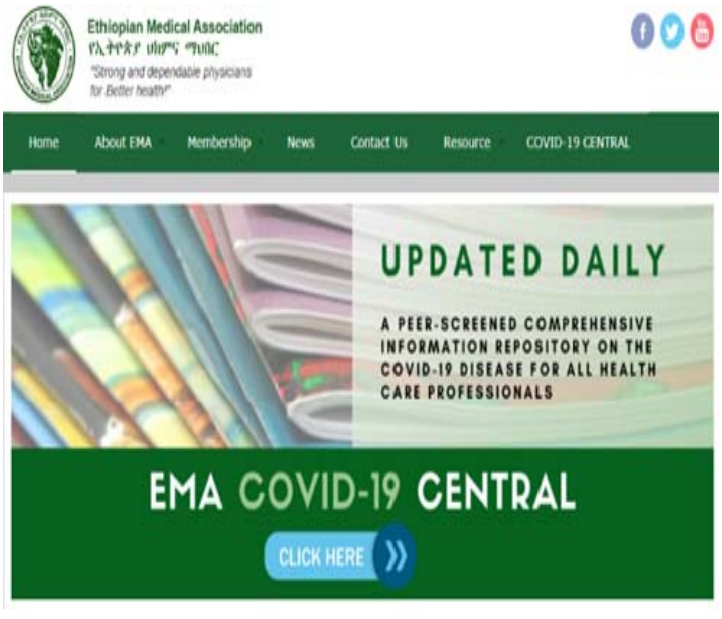
Following the above considerations the recommendation was to establish a local and centralized resource center as a repository for [1] comprehensive and peer-screened information source on COVID-19 as well as [2] COVID-19 oriented diagnostic and treatment protocols contextualized for the local use for health care professionals and [3] the Ethiopian Medical Association (EMA) to host these content on its website. Other professional societies and agencies, including those of all ancillary health services, can establish links on their websites with the EMA one.

ACTION

The two Advisory Councils went on to establish in collaboration with the EMA the dedicated webpage on their website at **https://www.ethiopianmedicalass.org** with the following points in consideration:

- **A.** **The resource to be named "COVID-19 CENTRAL** – A PEER-SCREENED COMPREHENSIVE IN FOR MATION REPOSITORY ON THE COVID-19 DISEASE FOR ALL HELATH CARE PROFES SIONALS"
- **B.** **Continuously provide** peer screened online connections, literatures and other information material for the "COVID CENTRAL".
- **C.** **Continuously upload** newly developed Ethiopia specific diagnostic and treatment protocols to "COVID CENTRAL".
- **D.** **Ensure awareness** of the existence of "COVID CENTRAL" by health care professionals and other stakeholders through different means.
- **E.** **Track the traffic** through the "COVID CENTRAL" repository and accordingly fine tune the process and content.
- F. **Prepare a pathway for complete takeover** of "COVID CENTRAL" by local stakeholders in due course.

INAUGURATION



The webpage on the EMA website was officially launched with a webinar on 19th June 2020. The launching webinar program can be found at the end. The repository is solely focused on COVID-19 with documents relevant for clinical and public health practice in Ethiopia. The resources are organized in 7 categories and 24 sub-categories relevant for COVID-19. Most importantly, the pdfs are directly available and downloading is easy and fast. A search function is also present. Those who screen the documents for uploading, so called "peer-screeners", constitute of 49 health care professionals, 28 from the Ethiopian and 21 from the Diaspora Advisory Councils. The project received financial funding from the People to People (P2P) organization.

PROGRAM OF THE WEBINAR FOR OFFICIAL LAUNCH OF THE EMA COVID-19 CENTRAL

Introduction Project objective & program outline **Description** The how why and How	**Kassa Darge, MD, PhD, FSAR** *Project Lead, COVID-19 Central* *Member, Ethiopian Diaspora High-Level Advisory Council on CV-19* Radiologist-in-Chief & Chair Children's Hospital of Philadelphia Professor of Radiology & Surgery University of Pennsylvania Philadelphia, USA and *Hon. Professor of Radiology,* *Addis Ababa University*	
Opening EMA	**Tegbar Yigzaw, MD, MPH, PhD,** F AIMER Fellow *President, Ethiopian Medical Association* *Member, Ethiopian Health Professionals Advisory Council on CV-19* Chief of Party, USAID Health Workforce Improvement Program	
Keynote The need for a reliable local information resource	**H. E. Dr. Lia Tadesse, MD, MPA** *Minister of Health*	
Sponsorship/Support	**Dr. Enawgaw Mehari, MD** President and Founder, People to People [P2P] Chairman, Ethiopian Diaspora High-Level Advisory Council on CV-19 Medical Director-Stroke TriStar Horizon Medical Center Dickson/Nashville Adjunct Clinical Professor of Neurology University of Pikeville Pikeville, USA	
Highlights	**Tigist Hailu, MPH** Coordinator, COVID-19 Central Clinical Research Program Manager Coordinator, Radiology Global Outreach Children's Hospital of Philadelphia, MPH Teaching Faculty, University of Pennsylvania, Philadelphia, USA	
Live demonstration	**Bekure Ledet, BSc** IT, Ethiopian Medical Association	
Closing remarks	**H.E. Fitsum Arega, MA, MBA, PGD** Ambassador of Ethiopia to the United States Patron, Ethiopian Diaspora High-Level Advisory Council on CV-19	

EDITORIAL POLICYOF THE ETHIOPIAN MEDICLAL JOURNAL

Overview

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.

Reviewing procedure

Peer reviewers

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.

Peer review process

Manuscripts are sent for review only if they pass the initial evaluation (pre-review by the Editorial Board) regarding their style, methodological accuracy, ethical review documentation and thematic scope. A special care is taken that the initial (pre-review) evaluation is done in 3-5 days.

The Journal policy is to minimize time from submission to publication without reducing peer review quality. Currently the total period from the submission of a manuscript until its publication takes an average of six months. Peer reviewers are requested to respond within four weeks. During the review process, the Editor-in-Chief may require authors to provide additional information (including raw data) if they are necessary for the evaluation of the manuscript. These materials shall be kept confidential and must not be used for any other purposes.

The entire review process takes place under the supervision of the Editor-in-Chief in an online environment, with the assistance of the Journal Secretariat. The online system also allows authors to track the manuscript review progress.

Resolving inconsistencies

In case that the authors have serious and reasonable objections to the reviews, the Editorial Board assesses whether a review is objective and whether it meets academic standards. If there is a doubt about the objectivity or quality of review, the Editor-in-Chief will assign additional reviewer(s).

Additional reviewers may also be assigned when reviewers' decisions (accept or reject) are contrary to each other or otherwise substantially incompatible. The final decision on the acceptance of the manuscript for publication rests solely with the Editor-in-Chief.

Responsibilities

Authors' responsibilities

This is provided in the '*Guidelines to Authors'* which appear in each issue of the Journal. Authors must guarantee that their manuscripts are their original work, that they have not been published before, and are not under consideration for publication elsewhere. Parallel submission of the same paper to another journal constitutes misconduct and eliminates the manuscript from further consideration. Work that has already been published elsewhere cannot be reprinted in the Ethiopian Medical Journal

Authors are exclusively responsible for the contents of their submissions and must make sure that the authors listed in the manuscript include all and only those authors who have significantly contributed to the submitted manuscript. If persons other than authors were involved in important aspects of the research project and the preparation of the manuscript, their contribution should be acknowledged in the Acknowledgments section.

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.

Authors are required to properly cite sources that have significantly influenced their research and their manuscript. Parts of the manuscript, including text, equations, pictures, tables and graphs that are taken verbatim from other works must be clearly marked, e.g. by quotation marks accompanied by their location in the original document (page number), or, if more extensive, given in a separate paragraph.

Full references of each quotation (in-text citation) must be listed in the separate reference section in a uniform manner, according to the citation style used by the journal. References section should list only quoted/cited, and not all sources used for the preparation of a manuscript.

When authors discover a significant error or inaccuracy in their own published work, it is their obligation to promptly notify the Editor-in-Chief and cooperate with him/her to retract or correct the paper.

Authors should disclose in their manuscript any financial or other substantive conflict of interest that might have influenced the presented results or their interpretation.

By submitting a manuscript, the authors agree to abide by the Editorial Policies of the Ethiopian Medical Journal

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Editorial responsibilities

The Editor-in-Chief is responsible for deciding which articles submitted to the journal will be published. The decisions are made based exclusively on the manuscript's merit. They must be free from any racial, gender, sexual, religious, ethnic, or political bias. When making decisions the Editor-in-Chief is also guided by the editorial policy and legal provisions relating to defamation, copyright infringement and plagiarism.

Members of the Editorial Board including the Editor-in-Chief must hold no conflict of interest about the articles they consider for publication. Members who feel they might be perceived as being involved in such a conflict do not participate in the decision process for a manuscript.

The information and ideas presented in submitted manuscripts shall be kept confidential.

Editors and the editorial staff shall take all reasonable measures to ensure that the authors/reviewers remain anonymous during and after the evaluation process in accordance with the type of reviewing in use.

The Editorial Board is obliged to assist reviewers with additional information on the manuscript, including the results of checking manuscript for plagiarism.

Reviewers' responsibilities

Reviewers are required to provide the qualified and timely assessment of the scholarly merits of the manuscript. The reviewer takes special care of the real contribution and originality of the manuscript. The review must be fully objective, and the judgment of the reviewers must be clear and substantiated by arguments.

The reviewers assess manuscript for the compliance with the profile of the journal, the relevance of the investigated topic and applied methods, the scientific relevance of information presented in the manuscript, and the pres-

entation style. The review has a standard format. It is submitted through the online journal management system where it is stored permanently.

The reviewer must not be in a conflict of interest with the authors or funders of research. If such a conflict exists, the reviewer is obliged to promptly notify the Editor-in-Chief. The reviewer shall not accept for reviewing papers beyond the field of his/her full competence.

Reviewers should alert the Editor-in-Chief to any well-founded suspicions or the knowledge of possible violations of ethical standards by the authors. Reviewers should recognize relevant published works that have not been considered in the manuscript. They may recommend specific references for citation but shall not require citing papers published in the Ethiopian Medical Journal, or their own papers, unless it is justified.

The reviewers are expected to improve the quality of the manuscript through their suggestions. If they recommend correction of the manuscript prior to publication, they are obliged to specify the way this can be achieved. Any manuscript received for review must be treated as confidential document.

Ethical Considerations

Dealing with unethical behavior

Anyone may inform the Editor-in-Chief at any time of suspected unethical behavior or any type of misconduct by giving the necessary credible information/evidence to start an investigation.

- Editor-in-Chief makes the decision regarding the initiation of an investigation.
- During an investigation, any evidence should be treated as confidential and only made available to those strictly involved in the process.
- 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.

Minor misconduct (with no influence on the integrity of the paper and the journal, for example, when it comes to misunderstanding or wrong application of publishing standards) will be dealt with directly with authors and reviewers without involving any other parties. Outcomes include:

- Sending a warning letter to authors and/or reviewers.
- Publishing correction of a paper, e.g. when sources properly quoted in the text are omitted from the reference list.

Publishing an erratum, e.g. if the error was made by editorial staff.

In the case of major misconduct, the Editor-in-Chief may adopt different measures:

- Publication of a formal announcement or editorial describing the misconduct.
- Informing officially the author's/reviewer's affiliating institution.

The formal, announced retraction of publications from the journal in accordance with the Retraction Policy.

- A ban on submissions from an individual for a defined period.

Referring a case to a professional organization or legal authority for further investigation and action.

The above actions may be taken separately or jointly. If necessary, in the process of resolving the case relevant expert organizations, bodies, or individuals may be consulted.

When dealing with unethical behavior, the Editorial Board will rely on the guidelines and recommendations provided by the Committee on Publication Ethics (COPE).

Plagiarism prevention

The Ethiopian Medical Journal does not publish plagiarized papers. The Editorial Board has adopted the stance that plagiarism, where someone assumes another's ideas, words, or other creative expression as one's own, is a clear violation of scientific ethics. Plagiarism may also involve a violation of copyright law, punishable by legal action.

Plagiarism includes the following:

- Self-plagiarism, which is using one's own previous work in another context without citing that it was used previously
- Verbatim (word for word), or almost verbatim copying, or purposely paraphrasing portions of another author's work without clearly indicating the source or marking the copied fragment (for example, using quotation marks) in a way described under Authors' responsibilities;
- Copying equations, figures or tables from someone else's paper without properly citing the source and/or without permission from the original author or the copyright holder.

Any manuscript which shows obvious signs of plagiarism will be automatically rejected. In case plagiarism is discovered in a paper that has already been published by the journal, it will be retracted in accordance with the procedure described under Retraction policy, including blacklisting the author(s) .

To prevent plagiarism, the manuscripts are submitted to a plagiarism detection process. The results obtained are verified by the Editorial Board in accordance with the guidelines and recommendations of the Committee on Publication Ethics (COPE).

Retraction policy

Legal limitations of the publisher, copyright holder or author(s), infringements of professional ethical codes, such as multiple submissions, bogus claims of authorship, plagiarism, fraudulent use of data or any major misconduct require retraction of an article.

Occasionally, a retraction can be used to correct numerous serious errors, which cannot be covered by publishing corrections. A retraction may be published by the Editor-in-Chief, the author(s), or both parties consensually.

The retraction takes the form of a separate item listed in the contents and labeled as "Retraction".
The original article is retained unchanged, except for a watermark on the PDF indicating on each page that it is "retracted".

Open access

Open access policy

The Ethiopian Medical Journal is published under an Open Access license. All its content is available free of charge. Users can read, download, copy, distribute, print, search the full text of articles, as well as to establish HTML links to them, without having to seek the consent of the author or publisher.

The right to use content without consent does not release the users from the obligation to give the credit to the journal and its content in a manner described under Licensing.

Article processing charge

The Ethiopian Medical Journal does not charge authors or any third party for publication in its regular quarterly Issues. Both manuscript submission and processing services, and article publishing services are free of charge.
There are no hidden costs whatsoever.

GUIDELINES FOR AUTHORS

The *Ethiopian Medical Journal (EMJ)* is the official Journal of the Ethiopian Medical Association (EMA) devoted to the advancement and dissemination of knowledge pertaining to the broad field of medicine in Ethiopia and other developing countries. Prospective contributors to the Journal should take note of the instructions of Manuscript preparation and submission to EMJ as outlined below.

Article types acceptable by EMJ

Original Articles (*vide infra*) on experimental and observational studies with clinical relevance
Brief Communications
Case Series
Case Reports
Editorials, Review or Teaching Articles: by invitation of the Editorial Board.
Correspondences/Letters to the Editor
Monographs or set of articles on specific themes appearing in a Special Issues of the Journal
Book reviews
Perspectives,
Viewpoints
Hypothesis or discussion of an issue important to medical practice
Letter to the Editor
Commentaries
Advertisements
Obituaries

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.

b) Introduction : Should provide a short background and context of the study and provide the rationale for doing the study. It should not be a detailed review of the subject and should not include conclusions from the paper.

c) **Patients or (Materials) and Methods:** should contain details to enable reproducibility of the study by others. This section must include a clear statement specifying that a free and informed consent of the subjects or their legal guardians was obtained. Corresponding author should submit a copy of institution review Board (IRB) clearance or letter of permission from the hospital or department (if IRB exempt) with the manuscript. For manuscripts on clinical trials, a copy of ethical approval letter from the concerned body should be submitted with the Manuscript. If confidential data is being used for publication (such as student grades, medical board data, or federal ethics board data), then appropriate support/ agreement letter should be included. Photos of patients should disguise the identity or must have obtained their written consent. Reference number for ethical approval given by ethics committee should be stated. In general, the section should include only information that was available at the time the plan or protocol for the study was being written; all information obtained during the study belongs in the Results section.

d) **Results:** This section should present the experimental or observational data in text, tables or figures. The data in Tables and Figures should not be described extensively in the text.

e) **Discussion:** The first paragraph should provide a summary of key finding that will then be discussed one by one in the paragraphs to follow. The discussion should focus on the interpretation and significance of the results of the study with comments that compare and describe their relation to the work of others (with references) to the topic. Do not repeat information of Results in this section. Make sure the limitations of the study are clearly stated.

f) **Tables and Figures:** These should not be more than six. Tables should be typed in triplicate on separate sheets and given serial Arabic numbers. Titles should be clearly place underneath Tables and above Figures. Unnecessary and lengthy tables and figures are discouraged. Same results should not be presented in more than one form (choose either figure or table). Units should appear in parentheses in captions but not in the body of the table. Statistical procedures, if not in common use, should be detailed in the METHODS section or supported by references. Legends for figures should be typed on separate sheets, not stapled to the figures. Three dimensional histograms are discouraged. Recognizable photographs of patients should be disguised. Authors should submit editable soft versions of the tables and figures.

g) **Acknowledgement:** Appropriate recognition of contributors to the research, not included under Authors should be mentioned here; also add a note about source of the financial support or research funding, when applicable.

h) **References**:

- 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 re-submitting it to the Journal, and to ensure that the spelling and numerals in the text and tables are accurate.
- Authors should submit their work through the Ethiopian Medical Journal website; ema.emj@telecom.net.et.

Conflict of interest

Authors should disclose at the time of submission of manuscripts any conflict of interest, which refers to situations in which financial or other personal considerations may compromise, or have the appearance of compromising their professional judgment in conducting or reporting the research results They should declare that there is no conflict of interest to declare if there is none,

Manuscripts review procedures

The procedures for manuscripts review include:

- 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.
- Once accepted for external review, the Editorial Board identifies one (for brief communication, case reports, and teaching articles) or two (for original articles) reviewers with appropriate expertise. The reviewers will be asked to review and return manuscripts with their comments online within two weeks of their receipt. Reviewers have four options; accept, accept with major revision, accept with minor revision, or reject.
- A Manuscript accepted subject revision as suggested by reviewers will be returned to the corresponding author. Author(s) will be given four weeks to respond to reviewers' comments, make necessary changes, and return the manuscript to the Editorial Board. A Manuscript not returned within the specified time will be considered withdrawn by the author(s).
- Manuscripts with minor revisions will be cleared by the Editorial Board and accepted for publication. Those with major revisions will be returned to external reviewers and follow the procedures as outlined for the initial review.

General information

The Editorial Board reserves the right for final acceptance, rejection or editorial correction of papers submitted. However, authors are encouraged to write an appeal to the Editor-in-Chief for reconsideration of rejected manuscripts or any other complaints they might have.

Accepted papers are subject to Editorial revision as required and become the copy-right of the EMA Twenty-five reprints of published articles are supplied free to the first/corresponding author.

The Editorial Board welcomes comments on the guidelines from Journal readers.

Privacy statement

The names and email addresses entered in this journal site will be used exclusively for the stated purposes of this journal and will not be made available for any other purpose or to any other party.

Acknowledgment
We gratefully acknowledge the financial support of the U.S. Centers for Disease Control and Prevention (CDC) obtained through the CDC-EMA Cooperative Agreement No. 5U2GPS000834. We also warmly thank those who generously give donations to meet the Journal's cost.

THE ETHIOPIAN MEDICAL JOURNAL

The *Ethiopian Medical Journal*, founded in 1962, appears four times a year and is available from the Secretary, EMA House, Addis Ababa, or by mail P. O. Box 3472, Addis Ababa, Ethiopia. Request for previous issues is welcomed. For this and any other information, please contact us through:

e-mail: emjeditor2018@gmail.com **Tel**. 251-1-158174 or 251-1-533742; **Fax**: 251-1-533742

The Journal contains original articles and research of special relevance to the broad issue of medicine in Ethiopia and in other developing countries. It is listed in the *Index Medicus* and *Current Contents*. Its ISSN number is ISSN 0014–1755.

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