BOOK OF ABSTRACT OF TIGRAY HEALTH RESEARCH INSTITUTE

THRI

PREPARE BY PUBLICATION CASE TEAM 2015/2023

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Introduction

Tigray Health Research Institute (THRI) a public health research institute which was established by the proclamation No.265/2007 and inaugurated on July, 2008 E.C. Tigray Regional Laboratory was established in 1985 E.C to strengthen the laboratory services in Tigray region. Later on with the opening of additional departments, the regional laboratory evolved in to Tigray Health Research Institute with the blessing of Tigray regional government. As THRI is primarily a research institute, it has **Level A Institutional Review Board** (IRB) approved by Ministry of Science and Higher Education (IRB 002/2019). In addition, the IRB is also registered at U.S. department of Health and Human Services /HHS/.

Mission

Performing research, public health emergency management, capacity development of health professionals and providing diagnostic services which collectively address public health challenges.

Vision

To be a leading health research and diagnostics center by 2025.

Duties and Responsibilities of Tigray Health Research Institute includes:

- ✓ Conduct research gap analysis and do researches on prioritized research areas and disseminate the findings to stakeholders.
- ✓ Surveillance of communicable diseases, do outbreak investigations and provide early warning to relevant stakeholders.
- ✓ Produce necessary protocols to conduct researches.
- ✓ Systematically synthesize evidences and avail to Tigray Health Bureau for decision making.
- ✓ Engage in national and international scientific plat forms and adapt experiences in to Tigray context
- ✓ Improve quality of health service provision through short and long term training.
- ✓ Ensure the quality of laboratory services in health facilities and provide advanced laboratory diagnostics.

Laboratory Services available at Tigray Health Research Institute

- ✓ HIV diagnosis in HIV exposed early infant diagnosis,
- ✓ CD4 count, Viral Load,
- ✓ Hepatitis B Viral Load,
- ✓ Diagnosis of Rabies,
- ✓ Diagnosis of MDR TB,
- ✓ Bacteriological culture and DST ,
- ✓ Bacteriological Water analysis,
- ✓ Quality Assessment of Laboratories in Tigray.

Organizational Structure

Directorates and Offices

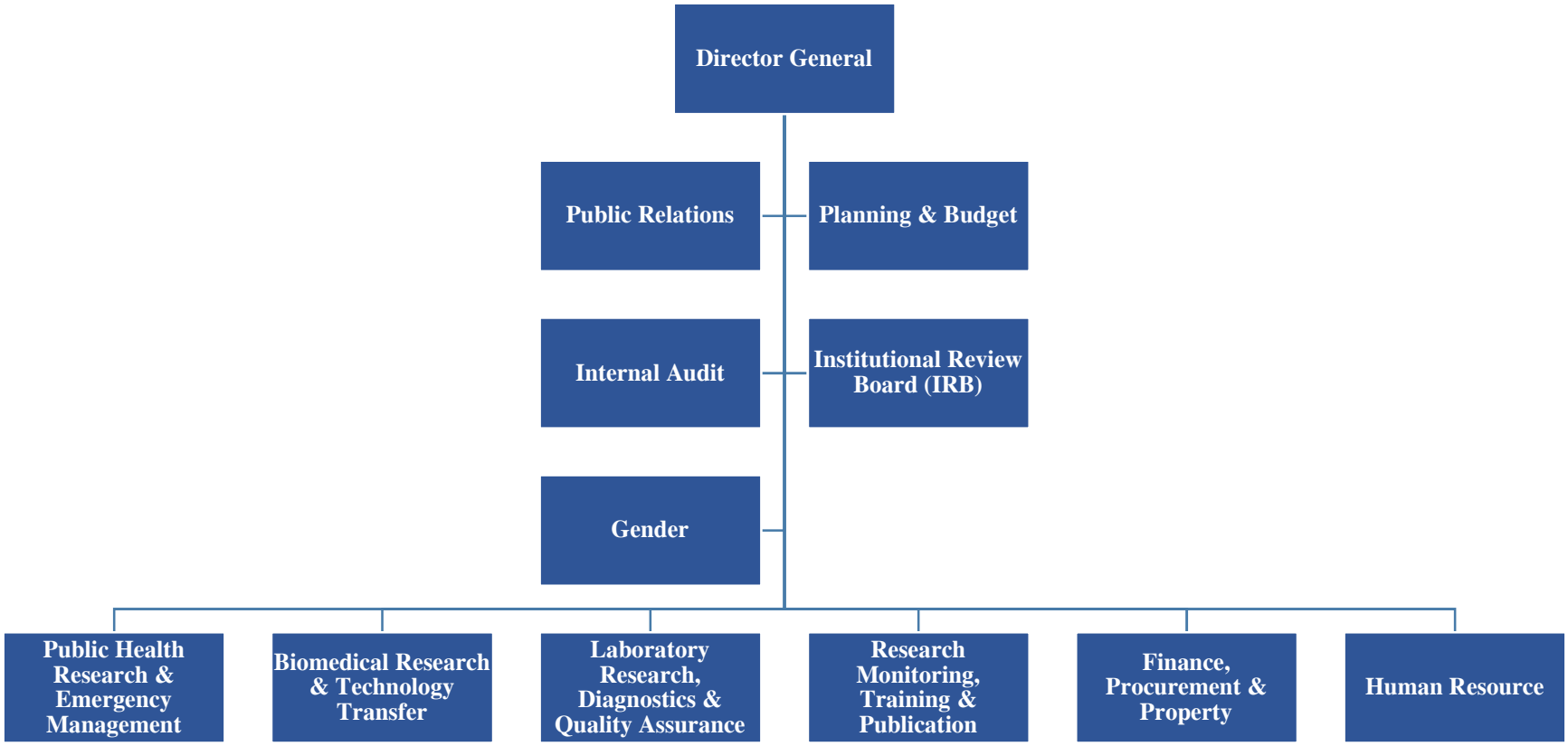
The institute is organized in seven directorates and four offices. Under each directorates, there are case teams tasked to execute specific duties. The directorates and offices of the institute are listed as follows:

1. Public Health Research and Emergency Management Directorate
    - ✓ Public Health Case Team
    - ✓ Nutrition Case Team
    - ✓ Environmental & Occupational Health Case Team
    - ✓ Public Health Emergency Management (PHEM) Case Team
2. Laboratory Research, Diagnostics and Quality Assurance Directorate
    - ✓ Medical Microbiology Case Team
    - ✓ Entomology Case Team
    - ✓ Biochemistry Case Team
    - ✓ Parasitology Case Team
    - ✓ Immunohematology and Pathology Case Team
    - ✓ Quality Assurance Case Team
3. Research Monitoring, Training and Publication Directorate
    - ✓ Research Monitoring Case Team
    - ✓ Capacity Building Case Team
    - ✓ Publication, Knowledge Translation (KT) and Dissemination Case Team
4. Biomedical Research and Technology Transfer Directorate
    - ✓ Molecular Biology Case Team

- ✓ Traditional and Modern Medicine Case Team
- ✓ Biotechnology Case Team

5. Human Resource Directorate
6. Finance, Procurement and Property Directorate
7. Planning, Budget, Monitoring and Evaluation Directorate
8. Public Relations Office
9. Gender Office
10. Internal Audit Office

Organogram


Director General
Public Relations
Planning & Budget
Internal Audit
Institutional Review Board (IRB)
Gender
Public Health Research & Emergency Management
Biomedical Research & Technology Transfer
Laboratory Research, Diagnostics & Quality Assurance
Research Monitoring, Training & Publication
Finance, Procurement & Property
Human Resource

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Mekelle, Tigray, Ethiopia

A thematic area: Communicable disease

1. Implementation status of household contact tuberculosis screening by health extension workers: assessment findings from programme implementation in Tigray region, northern Ethiopia

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   Background: In the Tigray region of Ethiopia, Health Extension Workers (HEWs) conduct Tuberculosis (TB) screening for all household (HH) contacts. However, there is limited evidence on implementation status of HH contact TB screening by HEWs. The aim of this program assessment was to describe the implementation status and associated factors of HH contact TB screening by HEWs.

   Methods: This programme assessment was conducted in three randomly selected districts from March to April 2018. Data was collected by using pre-tested structured questionnaire. Descriptive statistics was carried out using frequency tables. Logistic regression analysis was done to identify factors associated with HH contacts screening by HEWs.

   Results: In this programme assessment a total of HHs of 411 index TB cases were included. One-fifth (21.7%) of index TB cases had at least one HH contact screened for TB by HEWs. Having TB treatment supporter (TTS) during intensive phase of index TB case (AOR = 2.55, 95% CI: 1.06-6.01), health education on TB to HH contacts by HEWs (AOR = 4.28, 95% CI: 2.04-9.00), HH visit by HEWs within 6 months prior to the programme assessment (AOR = 5.84, 95% CI: 2.81-12.17) and discussions about TB activities by HEWs with Women Development Army (WDA) leaders (AOR = 9.51, 95% CI: 1.49-60.75) were significantly associated with household contact TB screening by HEWs.

   Conclusions: Our finding revealed that the proportion of HH contact TB screened by HEWs was low. Therefore, HEWs should routinely visit HHs of index TB cases and provide regular health education to improve contact screening practice. In addition, it is highly recommended to strengthen HEWs regular discussion about TB activities with WDA leaders and TB TTS.

   Keywords: Ethiopia; Health extension worker; Tigray; Tuberculosis; Tuberculosis screening.

2. Prediction of CD4 T-Lymphocyte Count Using WHO Clinical Staging among ART-Naïve HIV-Infected Adolescents and Adults in Northern Ethiopia: A Retrospective Study

Abraham Desta Aregay, Kibriti Mehari Kidane, Asfawosen Berhe Aregay, Kiros Ajemu Fenta, Ataklti Gebretsadik Woldegebriel, Hagos Godefay, Tewolde Wubayehu Woldearegay(AIDS Res Treat).

Background: WHO clinical staging has long been used to assess the immunological status of HIV-infected patients at initiation of antiretroviral therapy and during treatment follow-up. In setups where CD4 count determination is not readily available, WHO clinical staging is a viable option. However, correlation between CD4 count and WHO clinical staging is not known in an Ethiopian setting, and hence, the main aim of this study was to assess predictability of CD4 T-lymphocyte count using WHO clinical staging among ART-naïve HIV-infected adolescents and adults in northern Ethiopia.

Methods: A retrospective cross-sectional study was done in the Tigray Region, Ethiopia, from April 2015 to January 2019 from a secondary database of 19525 HIV-infected patients on antiretroviral treatment. Analysis was done using STATA-14.0 to estimate the frequencies, mean, and median of CD4 T-cell count in each WHO stages. Sensitivity, specificity, positive predictive value, negative predictive value, kappa test, and correlations were calculated to show the relationships between WHO stages and CD T-cell count.

Results: The sensitivity of WHO clinical staging to predict CD4 T-cell counts of <200 cells/μl was 94.17% with a specificity of 3.62%. The PPV was 49.03%, and the NPV was 3.62%. The sensitivity of WHO clinical staging to predict CD4 T-cell counts of <350 cells/μl was 94.75% with a specificity of 3.00%. The PPV was 75.81%, and the NPV was 15.09%. Similarly, the sensitivity of WHO clinical staging to predict CD4 T-cell counts of <500 cells/μl was 95.03% with a specificity of 2.73% and the PPV and NPV were 88.32% and 6.62%, respectively. The kappa agreement of WHO clinical stages was also insignificant when compared with the disaggregated CD4 counts in different categories. The correlation of WHO clinical staging was inversely associated with the CD4 count, and the magnitude of the correlation was 5.22%.

Conclusions: The WHO clinical staging had high sensitivity but low specificity in predicting patients with CD4 count <200 cells/μl, <350 cells/μl, and <500 cells/μl. There was poor correlation and agreement between CD4 T-lymphocyte count and WHO clinical staging. Therefore, WHO clinical staging alone may not provide accurate information on the immunological status of patients, and hence, it is better to use the CDC definition rather than the WHO clinical definition.

3. Hepatitis B and C viral co-infections and their association with HIV viral load suppression among HIV-1 infected patients on ART at Mekelle hospital, northern Ethiopia

Gebrecherkos Teame , Araya Gebreyesus , Ephrem Tsegay , Mulu Gebretsadik, Kelemework Adane (AIDS Res Ther).

Background: Although Ethiopia is endemic to viral hepatitis and HIV, data that could guide population-specific interventions are limited. In this study, we determined the seroprevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) and assessed their associations with HIV-1 viral load suppression among HIV-1 infected patients on antiretroviral therapy (ART) at Mekelle hospital in northern Ethiopia.

Methods: Between February and April 2020, blood samples were collected from 439 participants. Samples were screened for HBsAg and anti-HCV on the immunochromatographic test and confirmed using the Enzyme-Linked Immuno-sorbent assay (Beijing Wantai Co. China). HIV-1 viral load was quantified using reverse transcription-polymerase chain reaction (RT-PCR) on the Abbott platform. Binary and multivariable logistic regression was performed to identify potential predictors.

Results: Overall, 10% (44/439) and 3.6% (16/439) of the participants were coinfected with HBV and HCV, respectively. In a multivariate analysis, being illiterate (AOR = 6.57; 95% CI 1.04-41.6), and having a history of sexually transmitted infections (AOR = 4.44; 95% CI 1.31-15.0) and multiple sexual partners (AOR = 29.9; 95% CI 7.82-114.8) were associated with HBV infection. On the other hand, participants with a history of chronic non-communicable diseases (AOR = 10.6, 95% CI 1.61-70.1), and those reporting a history of sexually transmitted infections (AOR = 5.21, 95% CI 1.39-19.5) were more likely to be infected with HCV. In further analysis, HCV infection status was significantly associated with decreased viral load suppression rate (AOR = 7.14; 95% CI 2.18-23.3) whereas no significant association was observed with the HBV infection.

Conclusions: The HBV coinfection rate in our study is high and, as per WHO's standard, corresponds to a hyperendemic level. The HCV coinfection rate is also substantially high and urges attention given its influence on the viral load suppression of HIV patients on ART at our study site. Our findings suggest the need to adopt universal screening and vaccination of people with HIV against HBV and screening for HCV at our study site and in Ethiopia at large, which contributes to Ethiopia's progress towards the 2030 global target of reducing the HBV infection.

Keywords: Antiretroviral therapy; HBV; HCV; HIV; Viral load suppression.

4. Impacts of COVID-19 on essential health services in Tigray, Northern Ethiopia: A pre-post study

Abraham Aregay Desta, Tewolde Wubayehu Woldearegay, Estifanos Gebremeskel, Mussie Alemayehu, Theodros Getachew, Gebremedhin Gebregzabiher, Kiros Demoz Ghebremedhin , Degnesh Negash Zgita , Abera Berhe Aregawi, Getachew Redae(PLoS One).

Background: COVID-19 has proved to have an indirect impact on essential health services in several parts of the world which could lead to increased morbidity and mortality and loss of the gains made in the past decades. There were no synthesized scientific evidences which could show the impact of COVID-19 epidemics/pandemic on essential health services in Tigray, Northern Ethiopia. Therefore, this study aimed to assess the impacts of COVID-19 epidemics/pandemic on essential health services provision in Tigray, Northern Ethiopia.

Methods: A pre-post study design was used to assess the impacts of COVID-19 on essential health services delivery in Tigray, Northern Ethiopia in the second quarter of 2020 (Post COVID-19) compared to similar quarter in 2019 (Pre COVID-19). The study focuses on five categories; namely; maternal, neonatal and child health care; communicable diseases with a focus on HIV and TB-HIV co-infection; prevention of mother to child transmission of HIV; basic emergency, outpatient, inpatient and blood bank services, non-communicable diseases and road traffic accidents (RTAs). Analysis was done using Stata version 14.0 software package. The effects of COVID-19 epidemics/pandemic were calculated taking the differences between post COVID -19 and pre COVID-19 periods and the levels of service disruptions presented using proportions. Wilcoxon sign rank test was done and a significance level of ≤ 0.05 was considered as having significant difference among the two quarters. Results There were significant increase in institutional delivery, delivery by Caesarian Section (CS), still birth, postnatal care within 7 days of delivery, the number of children who received all vaccine doses before 1 st birthday, the number of under 5 children screened and had moderate acute malnutrition, the number of under 5 children screened and had severe acute malnutrition and children with SAM admitted for management. However, there were significant decrease in HIV testing and detection along with enrolment to antiretroviral therapy (ART) care, number of patients with cardiovascular disease (CVD) risk $\geq$ 30% received treatment, RTAs, total units of blood received from national blood transfusion service (NBTS) and regional blood banks, total number of units of blood transfused and emergency referral. There were no significant changes in outpatient visits and admissions.

Conclusion: Despite commendable achievements in maintaining several of the essential health services, COVID-19 has led to an increase in under nutrition in under five children, decline in HIV detection and care, CVD, cervical cancer screening and blood bank services. Therefore,

governments, local and international agencies need to introduce innovative ways to rapidly expand and deliver services in the context of COVID-19. Moreover, lower income countries have to customize comprehensive and coordinated community-based health care approaches, including outreach and campaigns. In addition, countries should ensure that NCDs are incorporated in their national COVID-19 response plans to provide essential health care services to people living with NCDs and HIV or HIV-TB co-infection during the COVID-19 pandemic period.

5. Epidemiology and Challenges of HBV/HIV Co-Infection amongst HIV-Infected Patients in Endemic Areas: Review

Letebrhan Weldemhret (HIV AIDS)

Background: With the introduction of highly active antiretroviral treatment, HIV-related morbidity and mortality have declined. But underlying hepatitis B virus infection remains the major cause of AIDS-defined illness and liver-related disease progression mainly in endemic settings. Moreover, HBV-HIV co-infection is the leading cause of cirrhosis, hepatocellular carcinoma, and liver-related death. This review paper emphasizes reviewing the burden and impact of HBV-HIV co-infection in liver-related disease progression, immune recovery, and therapeutic management of HIV-infected individuals on ART regimen.

Keywords: HBV; HBV–HIV; HIV; co-infection; endemic; epidemiology; patient.

6. Sero-prevalence of HBV and associated risk factors among HIV positive individuals attending ART clinic at Mekelle hospital, Tigray, Northern Ethiopia

Letebrhan Weldemhret, Tsehaye Asmelash, Rashmi Belodu,Dawit Gebreegziabiher(AIDS Res Ther).

Background: Because of the shared mean of transmission, hepatitis B virus (HBV) is one of an important cause of co-morbidity and mortality in peoples living with HIV/AIDS. Hence, the aim of this study was to determine the sero-prevalence of HBV infection and associated risk factors in HIV/AIDS positive individuals attending ART clinic at Mekelle hospital, Mekelle, Northern Ethiopia.

Methods: A cross sectional study was conducted from August to October 2014 in HIV/AIDS positive adult individuals. Socio-demographic data and other explanatory variables were collected from 508 study participants using pre-tested and structured questionnaire-based interviews. Serum hepatitis B surface antigen (HBsAg) was detected using commercially available rapid test and third generation enzyme-linked immunosorbent assay (ELISA). Bivariate and multivariate analysis, using SPSS V.20.0, were performed to assess the variables associated with HBV infection and P value less than 0.05 was considered as statistically significant.

Results: A total of 508 study participants, 305 females and 203 males were included in this study with the mean (+SD) age of 37.8 + 9.6. The sero-prevalence of HBsAg was 5.9 %. Male gender (AOR = 2.6, 95 % CI 1.2–5.7), multiple sexual partners (AOR = 4.2, 95 % CI 1.3–13.1) and CD4 count <200 cells/μl (AOR = 3.5, 95 % CI 1.1–11.2) were significantly associated with HBsAg positivity.

Conclusion: The prevalence of HBsAg was similar to the general population. However, HIV/AIDS positive individuals with reduced CD4 count, <200 cells/μl, showed a significant association with HBsAg seropositivity. Therefore, we recommended, all HIV/AIDS positive individuals should be screened for HBsAg during their follow for better treatment outcome and minimize risks of HBV transmission.

7. HIV virological non-suppression and factors associated with non-suppression among adolescents and adults on antiretroviral therapy in northern Ethiopia: a retrospective study

Abraham Aregay Desta, Tewolde Wubayehu Woldearegay, Nesredin Futwi, Gebrecherkos Teame Gebrehiwot, Goyitom Gebremedhn Gebru, Asfawosen Aregay Berhe, Hagos Godefay (BMC Infect Dis).

Background: Despite the benefits of Antiretroviral Therapy (ART), there is a growing concern of treatment failure. This study aimed to assess viral non suppression rate and factors associated with HIV viral non suppression among adolescents and adults on ART in Northern Ethiopia.

Methods: A retrospective cross sectional study was done on 19,525 study subjects. All the data in the database of Tigray Health Research Institute was exported to Microsoft excel 2010 and then data verification and filtration were done before exporting to STATA 14.0 for analysis. Generalized Estimating Equation (GEE) logistic regression was used for statistical modeling of viral non suppression.

Results: A total of 5153 (26.39%; 95%CI (25.77%, 27.02)) patients had no viral suppression despite being on ART. Being male (AOR = 1.27, 95% CI: 1.18, 1.37), 15–19 years of age (AOR = 4.86, 95%CI: 3.86, 6.12), patients from primary hospital (AOR = 1.26, 95%CI: 1.05, 1.52), WHO staging II (AOR = 1.31, 95%CI: 1.10, 1.54), poor ART adherence level (AOR = 2.56, 95%CI: 1.97, 3.33), fair ART adherence level (AOR = 1.61, 95%CI: 1.36, 1.90), baseline CD-4 count of < 200 cells/micro liter (AOR = 1.33, 95%CI: 1.14, 1.54), recent CD-4 count of < 200 cells/micro liter (AOR = 3.78, 95%CI: 3.34, 4.27), regimen types: 1c (AZT-3TC-NVP) (AOR = 1.32, 95%CI: 1.22, 1.44), 2 h (TDF-3TC-ATV/R) (AOR = 1.79, 95%CI: 1.27, 2.52) and declined immunological responses after ART initiation (AOR = 1.45, 95%CI: 1.30, 1.61) were significantly associated with viral non-suppression.

Conclusions: The virological non suppression was high which makes it less likely to achieve the third 90 UNAIDS target. Being male, patients with WHO staging II and poor ART adherence level were significantly associated with viral non suppression. Therefore, intensive adherence support and counseling should be provided. It is also a high time to determine the antiretroviral drugs resistance pattern given the fact that a large number of patients had virological non suppression.

8. Level of Adherence and Associated Factors among HIV-Infected Patients on Antiretroviral Therapy in Northern Ethiopia: Retrospective Analysis

Abraham Aregay Desta, Kibriti Mehari Kidane, Ataklti Gebretsadik Woldegebriel, Kiros Fenta Ajemu, Asfawosen Aregay Berhe,Degnesh Negash Zgita, Letebrhan Weldemhret Teweldemedhn, Lemlem Legesse Woldegebriel, Nega Mamo Bezabih, Tewolde Wubayehu Woldearegay(Dove press).

Background: Poor adherence to ART increases viremia, which leads to disease progression and transmission of drug-resistant HIV strains. This study aimed to assess the level of ART adherence and associated factors among adolescents and adult patients enrolled in ART care in Northern Ethiopia.

Methods: A retrospective analysis was conducted among 19,525 patients from April 2015 to March 2019. Data verification and filtration were done in Excel 2013 before exporting to STATA 14.0. Ordinal logistic regression was used to analyze the data.

Results: About 94.84%, 95% CI (94.52%, 95.14%) of the study subjects were in good adherence. However, about 1.46%, 95% CI (1.30%, 1.64%) and 3.70%, 95% CI (3.44%, 3.97%) of them had poor and fair adherence respectively. In the adjusted analysis, being male (AOR = 0.75; 95% CI: 0.0.65, 0.87), patients from general hospitals (AOR = 0.52; 95% CI: 0.39, 0.69), WHO staging IV (AOR = 0.57; 95% CI: 0.41, 0.81) and non-suppressed viral load (VL) status (AOR = 0.54; 95% CI: 0.47, 0.63) were negatively associated with good adherence. Whereas, age of 50+ years old (AOR = 1.68; 95% CI: 1.13, 2.50), recent CD4 count of 200– 499 (AOR = 1.45; 95% CI: 1.21, 1.74) and recent CD4 count of 500 and above (AOR = 1.84; 95% CI: 1.47, 2.32) were positively associated with good ART drug adherence.

Conclusion: There was a higher level of adherence compared to the previous studies conducted in Ethiopia. Being male, patients from general hospitals, WHO staging II, II and IV and non-suppressed VL status were negatively associated with good adherence. Whereas, older ages, recent CD4 count of 200– 499 and ≥ 500 CD4 count were positively associated with good ART drug adherence. The health system should recognize a higher need of younger age groups and males to design targeted counseling and support to encourage consistently high levels of adherence for a better ART treatment outcome.

Keywords: adherence and compliance, antiretroviral therapy, retreatment

9. Determinants of immunological recovery following HAART among severely immunosuppressed patients at enrolment to care in Northern Ethiopia: a retrospective study

Abraham Aregay Desta, Kibriti Mehari Kidane, Yemane Weldu Bahta, Kiros Fenta Ajemu, Ataklti Gebretsadik Woldegebriel, Asfawosen Aregay Berhe, Nega Mamo Bezabih , Awtachew Berhe Woldu, Tewolde Wubayehu Woldearegay (BMJ Open).

Background: Determinants of immunological recovery following HAART among severely immunosuppressed patients at enrolment to care in Northern Ethiopia: a retrospective study.

Objective: This study aimed to identify determinants of immunological recovery following highly active antiretroviral therapy (HAART) among severely immunosuppressed patients at enrolment to care in Northern Ethiopia.

Methods: retrospective study.The study was done in Tigray Region, Northern Ethiopia.The study was done among severely immunosuppressed (<200 CD4 cells/mm^3) individuals at initial enrolment to care and whose samples were sent for viral load determination from April 2015 to March 2019 in Tigray Health Research Institute.The main outcome variable was immunological recovery, modelled using binary logistic regression.

Results: Among the 9687 patients with severe immunosuppression at enrolment, 2746 (28.35%, 95% CI 27.45% to 29.26%) had immunological recovery following HAART for at least 6 months. Male gender (adjusted OR (AOR)=0.50, p<0.001), age 20-34 years old (AOR=0.33, p<0.001), age ≥50 years old (AOR=0.26, p<0.001), WHO clinical stage III (OR=0.68, p=0.036) and viral non-suppression (AOR=0.38, p<0.001) were strong predictors of immunological failure.

Conclusions: Immunological recovery following HAART was low among severely immunosuppressed individuals at enrolment to care. Gender, age, WHO stage III and viral non-suppression were determinants of immunological recovery. Male patients, adolescents and virally non-suppressed patients should be identified as groups at higher risk for immunological failure. Therefore, greater support and intensive counselling should be prioritised among adolescents, men and virally non-suppressed patients for better immunological recovery.

10. Longitudinal profile of antibody response to SARS-CoV-2 in patients with COVID-19 in a setting from Sub-Saharan Africa: A prospective longitudinal study

Teklay Gebrecherkos ,Yazezew Kebede Kiros ,Feyissa Challa,Saro Abdella,Atsbeha Gebreegzabher,Dereje Leta,Abraham Desta,Ataklti Hailu,Geremew Tasew,Mahmud Abdulkader,Masresha Tessema,Getachew Tollera,Tsigereda Kifle (PLoS One).

Background: Serological testing for SARS-CoV-2 plays an important role for epidemiological studies, in aiding the diagnosis of COVID-19, and assess vaccine responses. Little is known on dynamics of SARS-CoV-2 serology in African settings. Here, we aimed to characterize the longitudinal antibody response profile to SARS-CoV-2 in Ethiopia.

Methods: In this prospective study, a total of 102 PCR-confirmed COVID-19 patients were enrolled. We obtained 802 plasma samples collected serially. SARS-CoV-2 antibodies were determined using four lateral flow immune-assays (LFIAs), and an electrochemiluminescent immunoassay. We determined longitudinal antibody response to SARS-CoV-2 as well as seroconversion dynamics.

Results: Serological positivity rate ranged between 12%-91%, depending on timing after symptom onset. There was no difference in positivity rate between severe and non-severe COVID-19 cases. The specificity ranged between 90%-97%. Agreement between different assays ranged between 84%-92%. The estimated positive predictive value (PPV) for IgM or IgG in a scenario with seroprevalence at 5% varies from 33% to 58%. Nonetheless, when the population seroprevalence increases to 25% and 50%, there is a corresponding increases in the estimated PPVs. The estimated negative-predictive value (NPV) in a low seroprevalence scenario (5%) is high (>99%). However, the estimated NPV in a high seroprevalence scenario (50%) for IgM or IgG is reduced significantly to 80% to 85%. Overall, 28/102 (27.5%) seroconverted by one or more assays tested, within a median time of 11 (IQR: 9-15) days post symptom onset. The median seroconversion time among symptomatic cases tended to be shorter when compared to asymptomatic patients [9 (IQR: 6-11) vs. 15 (IQR: 13-21) days; $p = 0.002$]. Overall, seroconversion reached 100% 5.5 weeks after the onset of symptoms. Notably, of the remaining 74 COVID-19 patients included in the cohort, 64 (62.8%) were positive for antibody at the time of enrollment, and 10 (9.8%) patients failed to mount a detectable antibody response by any of the assays tested during follow-up.

Conclusions: Longitudinal assessment of antibody response in African COVID-19 patients revealed heterogeneous responses. This underscores the need for a comprehensive evaluation of seroassays before implementation. Factors associated with failure to seroconvert needs further research.

11. Incidence and factors associated with treatment failure among HIV infected adolescent and adult patients on second-line antiretroviral therapy in public hospitals of Northern Ethiopia: Multicenter retrospective study

Adisu Zenebe Haftu,Abraham Aregay Desta ,Nega Mamo Bezabih,Alemayehu Bayray Kahsay,Kibriti Mehari Kidane,Yodit Zewdie,Tewolde Wubayehu Woldearegay (PLoS One).

Background: This study aimed to determine the incidence and factors associated with treatment failure among HIV infected adolescent and adult patients on second-line antiretroviral therapy (ART) in public hospitals of Northern Ethiopia.

Methods: A retrospective study was conducted from September 1, 2007 to July 30, 2017 on 227 patients. The data were extracted using a retrieval checklist from the patient's charts. The incidence rate of treatment failure was calculated using Kaplan-Meier methods and Cox proportional hazard model was used to assess factors associated with treatment failure.

Result: The study subjects were followed for a total observation of 788.58 person-years with a median follow-up period of 35 (IQR: 17-60) months after switching to second-line ART. About 57 (25.11%) patients developed treatment failure, out of which, 32 (56.14%) occurred during the first two years. The overall incidence of second-line treatment failure was 72.3 per 1000 person years (95%CI: 55.75-93.71) of observation. The Kaplan-Meier estimates of cumulative treatment failure after 1, 2, and around 10 years of follow-up were 12.31% (95%CI: 8.60-17.45%), 14.99% (95%CI: 10.82%-20.57%), and 48.67% (95%CI: 32.45-67.81%) respectively. Age >45 years AHR = 3.33, 95%CI = 1.33-8.31), WHO stage IV (AHR = 3.63, 95%CI = 1.72-7.67), CD4 count <100 cells/mm3 (AHR = 3.79, 95%CI = 1.61-8.91), TB co-morbidity (AHR = 3.39 95%CI = 1.91-6.01) and poor adherence level (AHR = 3.63, 95% CI = 1.89-6.96) at the start of second line ART were significantly associated with second-line ART failure.

Conclusion: Incidence of second-line ART treatment failure in the first 2 years of follow-up was high. The rate of second-line ART failure was higher in patients who started second-line ART with poor drug adherence, CD4 count <100 cells/mm3, TB co-morbidity, age >45 years, and being in WHO stage IV. Therefore, intensive counseling and adherence support should be given along with strong TB screening. Moreover, the government of Ethiopia should consider endorsing third-line ART drugs after careful cost-benefit analysis.

12. Effect of co-infection with intestinal parasites on COVID-19 severity: A Prospective observational cohort study

Dawit Wolday, Teklay Gebrecherkos, Zekarias Gessesse Arefaine, Yazezew Kebede Kiros, Atsbeha Gebreegzabher, Geremew Tasew, Mahmud Abdulkader, Hiluf Ebuy Abraha, Abraham Aregay Desta, Ataklti Hailu (ClinicalMedicine).

Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection results in a spectrum of clinical presentations. Evidence from Africa indicates that significantly less COVID-19 patients suffer from serious symptoms than in the industrialized world. We and others previously postulated a partial explanation for this phenomenon, being a different, more activated immune system due to parasite infections. Here, we aimed to test this hypothesis by investigating a potential correlation of co-infection with parasites with COVID-19 severity in an endemic area in Africa.

Methods: Ethiopian COVID-19 patients were enrolled and screened for intestinal parasites, between July 2020 and March 2021. The primary outcome was the proportion of patients with severe COVID-19. Ordinal logistic regression models were used to estimate the association between parasite infection, and COVID-19 severity. Models were adjusted for sex, age, residence, education level, occupation, body mass index, and comorbidities.

Result: 751 SARS-CoV-2 infected patients were enrolled, of whom 284 (37.8%) had intestinal parasitic infection. Only 27/255 (10.6%) severe COVID-19 patients were co-infected with intestinal parasites, while 257/496 (51.8%) non-severe COVID-19 patients were parasite positive ($p<0.0001$). Patients co-infected with parasites had lower odds of developing severe COVID-19, with an adjusted odds ratio (aOR) of 0.23 (95% CI 0.17_0.30; $p<0.0001$) for all parasites, aOR 0.37 ([95% CI 0.26_0.51]; $p<0.0001$) for protozoa, and aOR 0.26 ([95% CI 0.19_0.35]; $p<0.0001$) for helminths. When stratified by species, co-infection with Entamoeba spp., Hymenolopis nana, Schistosoma mansoni, and Trichuris trichiura implied lower probability of developing severe COVID-19. There were 11 deaths (1.5%), and all were among patients without parasites ($p = 0.009$).

Interpretation: Parasite co-infection is associated with a reduced risk of severe COVID-19 in African patients. Parasite- driven immunomodulatory responses may mute hyper-inflammation associated with severe COVID-19.

13. Prognostic Value of C- reactive protein in SARS-CoV-2 Infection: A Simplified Biomarker of COVID-19 Severity in Northern Ethiopia

Teklay Gebrecherkos, Feyissa Challa, Geremew Tasew, Zekarias Gessesse, Yazezew Kiros, Atsbeha Gebreegziabxier, Mahmud Abdulkader, Abraham Aregay Desta, Ataklti Hailu Atsbaha (Infect Drug Resist).

Objective: To evaluate the role of C-reactive protein (CRP) in predicting severe COVID-19 patients.

Methods: A prospective observational cohort study was conducted from July 15 to October 28, 2020, at Kuyha COVID-19 isolation and treatment center hospital, Mekelle City, Northern Ethiopia. A total of 670 blood samples were collected serially. SARS-CoV-2 infection was confirmed by RT-PCR from nasopharyngeal swabs and CRP concentration was determined using Cobas Integra 400 Plus(Roche). Data were analyzed using STATA version 14. P-value <0.05 was considered statistically significant.

Results: Overall, COVID-19 patients had significantly elevated CRP at baseline when compared to PCR-negative controls [median 11.1 (IQR: 2.0–127.8)mg/L vs 0.9 (IQR: 0.5–1.9) mg/L; p=0.0004)]. Those with severe COVID-19 clinical presentation had significantly higher median CRP levels compared to those with non-severe cases [166.1 (IQR: 48.6–332.5) mg/L vs 2.4 (IQR: 1.2–7.6) mg/L; p<0.00001)]. Moreover, COVID-19 patients exhibited higher median CRP levels at baseline [58 (IQR: 2.0–127.8) mg/L] that decreased significantly to 2.4 (IQR: 1.4–3.9) mg/L after 40 days after symptom onset (p<0.0001). Performance of CRP levels determined using ROC analysis distinguished severe from non-severe COVID-19 patients, with an AUC value of 0.83 (95% CI: 0.73–0.91; p=0.001; 77.4% sensitivity and 89.4% specificity). In multivariable analysis, CRP levels above 30 mg/L were significantly associated with an increased risk of developing severe COVID-19 for those who have higher ages and comorbidities (ARR 3.99, 95% CI: 1.35–11.82; p=0.013).

Conclusion: CRP was found to be an independent determinant factor for severe COVID-19 patients. Therefore, CRP levels in COVID-19 patients in African settings may provide a simple, prompt, and inexpensive assessment of the severity status at baseline and monitoring of treatment outcomes.

Keywords: CRP, COVID-19, SARS-CoV-2, biomarker.

14. Bacterial profile of ocular infections: a systematic review

Mebrahtu Teweldemedhin, Hailay Gebreyesus, Ataklti Hailu Atsbaha, Solomon Weldegebreal Asgedom & Muthupandian Saravanan (Free PMC article).

Background: Bacteria are the major contributor of ocular infections worldwide. Ocular infections, if left untreated, can damage the structures of the eye with possible blindness and visual impairments. This work was aimed to review the bacterial profile of ocular infections.

Methods: Literature search was made in different electronic databases; the review was systematically made to getconcrete findings.

Results: As far as this review, Staphylococcus aureus, Coagulase negative Staphylococci, Streptococcus pneumoniae and Pseudomonas aeruginosa are the leading isolates in ocular infections. Frequent pathogens of the respective clinical diagnose include Staphylococci, Streptococcus pyogenes and Pseudomonas aeruginosa in blepharitis; Staphylococci, Streptococus pneumoniae, Pseudomonas aeruginosa, Klebsiella pneumoniae and Escherichia coli in Conjunctivitis; Staphylococci, P. aeruginosa and E. coli in dacryocystitis; Coagulase negative Staphylococci, Pseudomonas aeruginosa and Staphylococcus aureus in keratitis; Streptococcus viridians, Streptococcus pneumoniae and Coagulase negative Staphylococci in endophthalmitis diagnoses. Endogenous endophthalmitis is associated with Klebsiella pneumoniae whereas Coagulase negative Staphylococci and Bacillus spp. are common causes of post-operative and post-traumatic endophthalmitis. However, the predominant pathogens may not be exactly same in all areas of the world, in the United States for instance, Staphylococcus aureus, Streptococcus pneumoniae and Haemophilus influenzae are the major causes of conjunctivitis.

Conclusion: Gram positive bacteria are the major contributor of bacterial ocular infections. The distribution and proportion of bacterial isolates among clinical diagnoses varied but without exclusive anatomical restriction. To mitigate the burden of bacterial ocular infections, physicians should regard on risk reduction and comply with etiologic approach of diagnosis.

Keywords: Ocular infection, Bacterial profile, Review

15. Sero-prevalence and associated risk factors for hepatitis C virus infection among voluntary counseling testing and antiretroviral treatment clinic attendants in Adwa hospital, northern Ethiopia

Ataklti Hailu Atsbaha, Tsehaye Asmelash Dejen, Rashmi Belodu, Konjit Getachew, Muthupandian Saravanan, Araya Gebreyesus Wasihun (BMC Res Notes).

Background: Hepatitis C virus (HCV) is a major health concern where about 3 % of the world's population is infected globally. In Ethiopia the prevalence ranges from 0.9 to 1.3 % in the general populations. Human immune deficiency virus (HIV) patients due to their weak immune response are heavily affected by the virus. There is no data on magnitude and associated risk factors for HCV infection among voluntary counseling, testing center and anti retroviraltreatment clinic Attendants in the study area. Therefore, the aim of this study was to determine the sero-prevalence and associated risk factors for HCV infection among voluntary counseling testing and anti retroviral treatment clinic attendants Adwa general hospital.

Methods: Cross sectional study was carried out among 302 participants (151 HIV-negative from VCT and 151 HIVpositive from ART follow up) clinics of Adwa hospital from September to December, 2014. About 5 ml of venous blood samples were collected from study participants for anti HCV antibody tests. Univariate analyses were used to identify associated variables with anti HCV positivity. Variables having $p < 0.05$ were considered as statistically significant association.

Results: Out of the total 302 participants, 52.6 % of them were females and 47.4 % males. The mean age of the participants was 34.1 year (SD ± 10.5). The overall sero-prevalence of HCV in this study was 4.3 %. The prevalence HCV (6.6 %) was higher among the ART clinic attendants than the VCT (2 %) clinic attendants. History of hospitalization ($p = 0.001$), tooth extraction ($p = 0.018$) and blood transfusion ($p = 0.041$) showed statistically significant association with anti-HCV antibody.

Conclusion: HCV sero-prevalence in this study was high. The prevalence was three fold higher among HIV positive patients than their counter parts. Thus, screening of HCV should be done among HIV patients for close monitoring and better management in HIV patients.

Keywords: HCV, Sero-prevalence, Risk factors, VCT clinic, ART clinic, Adwa hospital.

16. Time to Sputum Culture Conversion and Its Predictors among Multidrug Resistant Tuberculosis Patients in Tigray, Northern Ethiopia: Retrospective Cohort Study

Letebrhan Weldemhret , Ataklti Hailu Atsbaha , Hadish Bekuretsion , Abraham Desta , Lemlem Legesse , Atsebaha Gebrekidan Kahsay , Dawit Hagos. (Infection and Drug Resistance).

Background: Sputum culture conversion status is a cardinal index of treatment response and patient outcome for MDR TB patients on longer anti-TB drugs. But, there is limited information on time to sputum culture conversion of MDR TB patients on a longer antiTB treatment regimen. Therefore, this study aimed to evaluate time to sputum culture conversion and its predictors among MDR TB patients in Tigray, Northern Ethiopia.

Methods: A retrospective cohort study was conducted from January 2017 through September 2020 among MDR TB patients in Tigray, Northern Ethiopia. Demographic and clinical characteristics including bacteriological data were extracted from the TB registration book and electronic database in Tigray Health Research Institute. Statistical analysis was performed using SPSS version 25. The time to initial sputum culture conversion was analyzed using the Kaplan–Meier method. Bivariate and multivariate Cox proportional hazards regression analyses were used to identify predictors for culture conversions. P <0.05 was considered statistically significant.

Results: A total of 294 eligible study participants with a median age of 30 years (IQR: 22.75–40) were included. The participants were followed for a total of 1066.7 person months. Sputum culture conversion was achieved in 269 (91%) of the study participants. The median time of sputum culture conversion was 64 days (IQR: 49–86). In our multivariate model, HIV-positive (aHR=1.529, 95% CI: 1.096–2.132, P=0.012), patients new to anti-TB treatment (aHR=2.093, 95% CI: 1.100–3.982, P=0.024) and baseline AFB smear grading of +1 (aHR=1.982, 95% CI: 1.428–2.750, P=0.001) significantly affected time to initial sputum culture conversion. Conclusion: The median time of culture conversion was 64 days. Moreover, the majority of the study participants achieved culture conversion within the first six months of treatment commencement, which supports predefined standard treatment durations. Keywords: sputum, smear, culture, conversion, tuberculosis, multi-drug resistance, Ethiopia

17. Burden of pulmonary tuberculosis and challenges related to tuberculosis detection in Ethiopia

Letebrhan Weldemhret (J Infect Dev Ctries).

Early and rapid diagnosis of Mycobacterium tuberculosis in clinical specimen is important for the treatment of patients and control of disease transmission to the community. The disease is largely preventable and curable, but without rapid, and correct diagnostic tools for tuberculosis (TB) infection and drug resistance, it is unlikely that we can meet the national TB elimination program in Ethiopia by 2035. Moreover, drug resistant TB is becoming more common and is a great challenge for the successful control and eradication of TB. The need for rapid, accurate and affordable methods for TB management should be considered by policy makers to improve TB detection rate and reduction of TB related deaths in line with the stop TB strategy by 2030 in Ethiopia.

Keywords: Ethiopia; detection; infection burden; pulmonary; tuberculosis.

18. Knowledge, Attitudes, and Practices about Trachoma in Rural Communities of Tigray Region, Northern Ethiopia: Implications for Prevention and Control

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Background. Trachoma is a neglected tropical disease which is the leading infectious cause of blindness in the world. Trachoma is one of the major health problems in Tigray Region, Northern Ethiopia. However, knowledge, attitudes, and practices about trachoma are not yet studied in depth. The objective of the study was to assess knowledge, attitudes, and practices on trachoma and its associated factors among rural communities in two districts of Tigay Region, Northern Ethiopia. Methods. A cross-sectional study was conducted in two districts of Tigray Region, Northern Ethiopia, from May 7–24, 2017. Data were collected on paper based, were entered into Epi Info version 3.5.1, and then exported to SPSS version 21 for analysis. Logistic regression analysis was done to identify factors associated with knowledge, attitudes, and practices. Results. In this study, a total of 194 respondents were included. The overall level of good knowledge, attitudes, and practices on trachoma was 51%, 49.5%, and 35.6%, respectively. Having ever received health education was significantly associated with good knowledge (adjusted odds ratio (AOR) = 4.10; 95% confidence interval (CI): 1.91–8.79) and attitudes (AOR = 2.10; 95% CI: 1.02–4.25). Moreover, good knowledge was associated with good practices on trachoma prevention and control (AOR = 2.86; 95% CI: 1.46–5.62). Conclusion. Our study implies that areas with high burden of trachoma need to improve communities' knowledge, attitudes, and practices towards trachoma prevention and control in order to eliminate trachoma as a public health problem. Therefore, health education focused on SAFE strategy should be provided to increase knowledge and changing attitudes that contribute for good practices towards trachoma prevention and control among communities.

19. Plasmodium falciparum and Schistosoma mansoni coinfection and the side benefit of artemether-lumefantrine in malaria patients

Solomon M Abay , Mulugeta Tilahun, Nigus Fikrie, Abiy Habtewold(J Infect Dev Ctries).

Introduction: The distribution of both malaria and schistosomiasis exhibits a large geographical overlap in tropical environments, particularly in sub-Saharan Africa. This part of the world currently harbours more than 85% of the estimated global burden of these diseases. Studies showed that artemisinin derivatives used for the treatment of malaria also have an antischistosomal effect. This study aimed to investigate the extent of malaria-schistosomiasis co-infection and the antischistosomal effect of artemether-lumefantrine when administered to treat falciparum malaria in Kemise, Northeast Ethiopia.

Methodology: Stool samples were collected from 152 microscopically confirmed malaria patients and diagnosed for schistosomiasis using the Kato-Katz technique before treatment. The schistosomiasis cure rate and egg reduction were determined in co-infected patients, who were treated with artemether-lumefantrine,.

Results: Twenty-eight out of 152 malaria patients were co-infected (18.4%, n = 152) with schistosomiasis. All 28 co-infected patients were found stool-negative for Schistosoma mansoni eggs four weeks after treatment. The extent of co-infection was associated with age, sex and educational level. Cure rate and egg reduction rate following the treatment of artemether-lumefantrine were 100%.

Conclusion: The co-infection rate was associated with patient characteristics. Artemether-lumefantrine was effective against S. mansoni in co-infected patient. Multicenter and randomized trials, however, are needed for a better understanding of the efficacy of artemether-lumefantrine against schistosome infection with ranges of intensity.

20. Health extension workers contribution on tuberculosis case notification in Tigray region, Northern Ethiopia: A concurrent mixed method study

Hailay Gebretnsae , Tsegay Hadgu, Brhane Gebrekidan Ayele, Alemnesh Abraha , Equbay Gebre-Egziabher, Mulugeta Woldu , Tsegay Wellay , Gebregziabher Berihu Gebrekidan , Measho Gebreslassie Gebregziabher(plos one).

Background: Despite the emphasis placed on Community Based Tuberculosis Care (CBTC) implementation by Health Extension Workers (HEWs) within the National Tuberculosis Program (NTP) in Ethiopia, there is little evidence on contribution of HEWs on TB case notification. Therefore, this study aimed to describe the contribution of HEWs on TB case notification and its associated factors in Tigray region, Northern Ethiopia.

Methods: A concurrent mixed method (quantitative and qualitative) cross-sectional study design was conducted in three randomly selected districts in Tigray region, Northern Ethiopia. Quantitative data were collected using a pre-tested semi-structured questionnaire. Qualitative data were collected using Focused Group Discussions (FGDs) and Key Informant Interviews (KIIs) to further describe the community participation and presumptive TB identification and referral system. For the quantitative data, binary logistic regression analysis was done and all variables with P-value of < 0.25 in bivariate analysis were included in the multi-variable model to see predictors of HEWs contribution to TB notification. The qualitative data were thematically analyzed using Atlas.ti version 7.

Results: In this study, a total of 68 HEWs were included. From March 1, 2017 to February 28, 2018, a total of 427 TB cases notified in the study areas and one-third (34%) of them were notified by the HEWs referral. Provision of Community Based-Directly Observed Treatment Short course (CB-DOTS) (Adjusted Odds Ratio (AOR) = 3.63, 95% Confidence Interval (CI) = 1.18-11.19) and involvement of community volunteers on CBTC (AOR = 3.31, 95% CI = 1.10-10.09) were significantly associated with the contribution of HEWs on TB case notification. The qualitative findings indicated that high workload of HEWs, inaccessibility of TB diagnostic services at nearby health facilities, and transportation and investigation costs were identified as factors affecting for presumptive TB referral by HEWs.

Conclusions: Provision of CB-DOTS and involvement of community volunteers in CBTC activities should be strengthened to improve the HEWs contribution on TB case notification. Additionally, HEWs should be empowered and further interventions of TB diagnostic services at diagnostic health facilities are needed to improve presumptive TB referral by HEWs.

21.Isolation and anti-microbial susceptibility pattern of group B Streptococcus among pregnant women attending antenatal clinics in Ayder Referral Hospital and Mekelle Health Center, Mekelle, Northern Ethiopia

Gebreselassie Alemseged, Selam Niguse, Haftamu Hailekiros , Mehamud Abdulkadir , Muthupandian Saravanan and Tsehaye Asmelash(BMC Res Notes).

Background: Vaginal colonization with group B Streptococcus (GBS) is the predominant risk factor for the development of invasive neonatal GBS diseases and puts newborns at increased risk for morbidity and mortality. This study is aimed to determine the colonization rate and antimicrobial susceptibility pattern of group B Streptococcus among pregnant women.

Methods: Hospital based cross-sectional study was conducted from August to December 2014 at selected health facilities. A total of 139 antenatal clinics attendees, proportionally allocated, were recruited consecutively. Sociodemographic and clinical factors were collected using a structured questionnaire. Vaginal swabs were collected and cultured on Todd Hewitt broth and in 5 % sheep blood agar. Antimicrobial susceptibility test was done using KirbyBauer disk diffusion test. Statistical analysis was performed using Pearson's Chi square test.

Results: Among the 139, 19 (13.7 %) were positive for GBS. All the GBS isolates were susceptible (100 %) to penicillin G, vancomycin, ampicillin, erythromycin and gentamicin. Two of the GBS isolates showed multidrug resistance against norfloxacin and ciprofloxacin. No statistically significant difference was observed for GBS colonization with any independent variables.

Conclusion: Vaginal colonization of GBS for the present study put emphasis on further investigation and accomplishment of routine GBS screening practices. The recovery of resistant strains to antimicrobial agents recommended in cases of penicillin allergic mothers indicates the importance of susceptibility test.

Keywords: Pregnant women, Antenatal clinic, Vaginal swab, Group B Streptococcus, Antimicrobial susceptibility,Antibiotic resistance

B. THEMATIC AREA: NUTRITION

1. Effectiveness of Anthropometric Measurements for Identifying Diabetes and Prediabetes among Civil Servants in a Regional City of Northern Ethiopia: A Cross-Sectional Study

Ataklti Gebertsadik Woldegebriel,Kiros Ajemu Fenta,Asfawosen Berhe Aregay,Abraham Desta Aregay,Nega Bezabih Mamo,Tewolde Woldearegay Wubayehu,Alemayehu Bayray,and Afework Mulugeta (J Nutr Metab).

Background: Diabetes mellitus is an emerging noncommunicable disease in Ethiopia. Overlooking an appropriate tool for identifying diabetes and prediabetes would have significant impact for future diabetes and prediabetes projections and its management. Therefore, the study aims to examine the effectiveness of anthropometric measurements for identifying prediabetes and diabetes in Mekelle city, Tigray, Northern Ethiopia.

Methods: The study involved a cross-sectional survey carried out from October 2015 to February 2016 among 1504 subjects aged from 18 to 75 years of age. Receiver operating characteristic (ROC) was used to select the most effective anthropometric cut-off point among waist circumference, waist-to-hip ratio, waist-to-height ratio, and BMI for identifying prediabetic and diabetes. Statistical significance was declared at p value of ≤ 0.05.

Results: Waist circumference was found better for identifying diabetes (AUC = 0.69) and prediabetes (AUC = 0.63) in women, respectively. Waist-to-hip ratio was better identifying diabetes (AUC = 0.67) while waist circumference-to-height ratio was better identifying prediabetes (AUC = 0.63) in men compared to body mass index. The optimal cut-off point with maximum sensitivity and specificity of waist circumference for identifying diabetes and prediabetes was 83.5 cm and 82.9 cm in women, respectively. The optimal ut-off point with maximum sensitivity and specificity of waist-to-hip ratio for identifying diabetes and prediabetes was 0.97 and 0.82 in men, respectively.

Conclusion: Waist circumference and waist-to-hip ratio exhibited better discriminate performance than BMI for identifying prediabetes and diabetes in women and men, respectively.

2. Determinants of Anemia in Pregnancy: Findings from the Ethiopian Health and Demographic Survey.

Ataklti Gebretsadik Woldegebriel , Gebremedhin Gebregziabiher Gebrehiwot , Abraham Aregay Desta , Kiros Fenta Ajemu , Asfawosen Aregay Berhe , Tewolde Wubayehu Woldearegay , Nega Mamo Bezabih(National labirary of medicine).

Background: In Ethiopia, anemia during pregnancy is a major public health problem and affects both the mothers and their child's health. There is a scarcity of community-based evidence on determinants of anemia among pregnant women in the country. Therefore, this study aimed to assess the determinants of anemia among pregnant women in Ethiopia.

Method: This study was based on the 2016 Ethiopian Demographic Health Survey (EDHS) that used a two-stage stratified cluster sampling technique. A cross-sectional study was conducted among 3080 pregnant women. Data analysis was done using STATA v.14. Variables with P value <0.05 in the bivariate analysis were candidates for the multivariable analysis to identify independent determinants of anemia among pregnant mothers. Odds ratios (OR) were calculated at 95% confidence interval (CI).

Results: The overall prevalence of anemia among pregnant women was 41% of which 20% were moderately anemic, 18%, mildly anemic, and 3%, severely anemic. The following were significantly associated with anemia during pregnancy: an age of 30-39 years, receiving no education (AOR = 2.19; 95% CI 1.45, 2.49), belonging to the poorest wealth quintile (AOR = 1.29; 95% CI 1.22, 1.60), being a Muslim (AOR = 1.59; 95% CI 1.69, 2.65), number of house members being 4-6 (AOR = 1.44; 95% CI 1.05, 1.97), number of under-five children being two (AOR = 1.47; 95% CI 1.10, 1.97), head of the household being a female (AOR = 2.02; 95% CI 1.61, 2.54), current pregnancy wanted later (AOR = 1.75; 95% CI 1.23, 1.63), no terminated pregnancy (AOR = 1.49; 95% CI 1.15, 1.93), and an age of 13-17 years at the first sexual intercourse (AOR = 1.97; 95% CI 1.291, 3.00).

Conclusions: The study revealed that more than one-third of the pregnant women in Ethiopia were found anemic. Its prevalence varied among regions in which the highest (62.7%) and the lowest (11.9%) were from Somali and Addis Ababa, respectively. Hence, efforts should be made by concerned bodies to intervene in terms of the identified risk factors.

3. Dietary Diversity and Associated Factors among Children Aged 6-59 Months in Ethiopia: Analysis of Ethiopian Demographic and Health Survey 2016 (EDHS 2016)

Ataklti Gebretsadik Woldegebriel,Abraham Aregay Desta,Gebremedhin Gebreegziabiher,Asfawosen Aregay Berhe,Kiros Fenta Ajemu,and Tewolde Wubayehu Woldearegay(Int J Pediatr).

Background: Dietary diversity is one of the key elements of diet quality. Even though different measures were taken to increase dietary diversity feeding practice in Ethiopia, the problem still remains high. Therefore, this study was done to identify determinants of inadequate minimum dietary practice among children aged 6-59 months in Ethiopia.

Method: Secondary analysis of the data from the 2016 Ethiopian Demographic and Health Survey was done on a weighted sample of 5161 children aged 6-59 months. Data analysis was done using STATA v.14. Variables with P value < 0.05 in the bivariable analysis were candidates for the multivariable analysis to identify independent determinants of dietary diversity. Odds ratios (OR) were calculated at 95% confidence interval (CI).

Results: A total of 5161 children aged 6 to 59 months were enrolled in the study. Only 8.5% of the children had the recommended minimum dietary diversity. Mother's education (adjusted odds ratio (AOR) = 2.51 (1.65, 3.83)), mothers currently working (adjusted odds ratio (AOR) = 1.83 (1.47, 2.29)), mother's wealth index (adjusted odds ratio (AOR) = 4.75 (3.31, 6.81)), age of a child (adjusted odds ratio (AOR) = 1.72 (1.24, 2.39)), and number of under-five children (adjusted odds ratio (AOR) = 1.49 (1.12, 2.00)) were significantly associated with the minimum dietary diversity.

Conclusion: The minimum dietary diversity was not achieved by most children 6-59 months of age in Ethiopia. Ensuring large-scale interventions that focus on the identified factors should be considered by concerned bodies to improve the dietary diversity practice.

4. Identification of Factors Influencing Anemia among Children Aged 6–59 Months in Ethiopia Using Ethiopia Demographic and Health Survey 2016 Data

   Ataklti Gebretsadik Woldegebriel,Gebremedhin Gebreegziabiher Gebrehiwot,Abraham Aregay Desta,Kiros Fenta Ajemu,Asfawosen Aregay Berhe,Tewolde Wubayehu Woldearegayand Nega Mamo Bezabih(Pediatric Health Med Ther).

   Background: Anemia is the most common nutritional problem and a widespread micronutrient-deficiency disorder on a global scale. In Ethiopia, childhood anemia is highly prevalent and a major public health concern. This study aimed to identify factors associated with anemia among children aged 6–59 months in Ethiopia.

   Methods: Data were extracted from the 2016 Ethiopia Demographic and Health Survey (EDHS). We found records for 8,603 children aged 6–59 months in the data set. After 448 had been excluded due to incomplete records, 8,155 children were included in the final analysis. Pearson's $\chi 2$ was used to assess associations between each factor and categorical outcome variables. Multivariate logistic regression analyses were done to determine factors associated with anemia, and significant associations were declared at $p \leq 0.05$ for the final model.

   Results: More than half (51.5%) the children were male and the overall mean age was 31.85±15.66 months. Mean hemoglobin concentration was 10.37±17.55 g/dL. The overall prevalence of anemia was 56.6%: 3.7%, 30.4%, and 22.5% severe, moderate, and mild anemia, respectively. Increased child age, decreased maternal age, lowest rung on wealth index, mother living alone, mother engaged in outside work, increased birth order, decreased birth interval, one antenatal care visit, severe stunting, and severe underweight were significantly associated with anemia.

   Conclusion: The prevalence of anemia in this study was the highest of all EDHS reports. It had increased since the preceding report (EDHS 2011), and remains the main public health concern in Ethiopia. Comprehensive intervention strategies should be put in place and tailored to different levels of government (national, regional, and district) including household- and individual-level interventions for combating childhood anemia by focusing on the identified risk factors.

   Keywords: anemia, associated, children, EDHS 2016, Ethiopia

5. Magnitude, components and predictors of metabolic syndrome in Northern Ethiopia: Evidences from regional NCDs STEPS survey, 2016

Kiros Fenta Ajemu, Abraham Aregay Desta, Asfawosen Aregay Berhe, Ataklti Gebretsadik Woldegebriel, Nega Mamo Bezabih , Degnesh Negash , Alem Desta Wuneh, Tewolde Wubayehu Woldearegay (PLoS One).

Background: Individuals with metabolic syndrome are five times more susceptible to chronic diseases. Assessment of its magnitude, components, and risk factors is essentials to deploy visible interventions needed to avoid further complications. The study aimed to assess magnitude, components, and predictors of metabolic syndrome in Tigray region northern Ethiopia, 2016.

Methods: Data were reviewed from Tigray region NCDs STEPs survey data base between May to June 2016. A total of 1476 adults aged 18-64 years were enrolled for the study. Multi-variable regression analysis was performed to estimate the net effect of size to risk factors associated with metabolic syndrome. Statistical significance was declared at p-value of ≤0.05 at 95% confidence interval (CI) for an adjusted odds ratio (AOR).

Results: The study revealed that unadjusted and adjusted prevalence rate of Metabolic Syndrome (MetS) were (CPR = 33.79%; 95%CI: 31.29%-36.36%) and (APR = 34.2%; 95% CI: 30.31%-38.06%) respectively. The most prevalent MetS component was low HDL concentration (CPR = 70.91%; 95%CI: 68.47%-73.27%) and (APR = 70.61; 95%CI; 67.17-74.05). While; high fasting blood glucose (CPR = 20.01% (95%CI: 18.03-22.12) and (APR = 21.72; 95%CI; 18.41-25.03) was the least ones. Eating vegetables four days a week, (AOR = 3.69, 95%CI; 1.33-10.22), a salt sauce added in the food some times (AOR = 5.06, 95%CI; 2.07-12.34), overweight (AOR = 24.28, 95%CI; 10.08-58.47] and obesity (AOR = 38.81; 12.20-111.04) had strong association with MetS.

Conclusion: The magnitude of metabolic syndrome was found to be close to the national estimate. Community awareness on life style modification based on identified MetS components and risk factors is needed to avoid further complications.

6.Iodine level concentration, coverage of adequately iodized salt consumption and factors affecting proper iodized salt utilization among households in North Ethiopia: a community based cross sectional study

Abraham Aregay Desta, Usha Kulkarni, Kidan Abraha, Solomon Worku , Berhe Woldearegay Sahle (BMC Nutr).

Background: Adequate iodine fortified salt is the most common and effective method of preventing iodine deficiency. Studies showed households using iodized salt (15 Parts Per Million (PPM) to 80 PPM) of iodine at household level were low in Tigray region and other regions of Ethiopia. Limited studies have conducted on utilization of iodized salt at the household level and none of them did not addressed on factors affecting to proper iodized salt utilization. The aim of this study was to determine the iodine concentration in the collected salt samples, adequately iodized salt consumption coverage and identify factors affecting to proper iodized salt utilization amongst the households of Northern Ethiopia.

Methods: Community based cross-sectional designs on selected 318 household food caterers were interviewed and salt samples were accordingly collected. Data was analyzed by the SAS-9.2 statistical software package. The iodine concentrations of the salt samples were determined by using the golden standard iodometric titration technique. Logistic Generalized Estimating Equation (GEE) statistical analysis method was used to assess factors affecting proper iodized salt utilization at household level.

Results: Adequately iodized salt coverage among the households was only 51 (17.5%). About 42 (14.38%) had 15 ppm (ppm) – 80 ppm, 9 (3.08%) had > 80 ppm, 188 (64.4%) had 1.1 ppm to 14.9 ppm and 53 (18.2%) had no iodine in the salt (0 ppm). Only 26 (8.9%) of the households had used iodized salt properly. Family size with Adjusted Odds Ratio (AOR) (0.82) and 95%CI [0.67, 0.92], residency of the household with AOR (2.83) and 95%CI [1.48, 5.40], the availability of iodized salt with AOR (3.90) and 95% CI [1.74, 8.7] and affordability to iodized salt with AOR (3.33) and 95% CI [1.41, 7.34] was strong predictors to proper iodized salt utilization.

Conclusions: Coverage of adequately iodized salt was low. Family size, residency, availability and affordability of iodized salt were the predictors of proper iodized salt utilization. To enhance USI utilization effective inspection and regulatory measures should be taken to prevent the production and distribution of under/ over iodized salt in the market. Keywords: Iodine, Iodized salt, Proper utilization, Iodine deficiency, Ahferom District, Tigray, Ethiopia.

7.Overweight and obesity among children under five in Ethiopia: further analysis of 2016 national demographic health survey: a case control study

Haftom Gebrehiwot Weldearegay, Tesfay Gebregzabher Gebrehiwot , Mulugeta Woldu Abrha , Afework Mulugeta(BMC Res Notes).

Objective: The objective of this study was to assess the determinants of overweight and obesity among children under 5 years in Ethiopia.

Results: Data from a total of 672 (224 cases and 448 controls) under 5 years of age children were included in the study. Urban residence (AOR = 2.63, 95% CI 1.29, 5.34), boys (AOR = 1.56, 95% CI 1.10, 2.22) and age of the child less than 6 months (AOR = 3.40, 95% CI 2.05, 5.64) were the determinants for being childhood overweight and obesity.

Keywords: Case–control study; EDHS; Ethiopia; Overweight and obesity.

8. Identification of Factors Influencing Anemia among Children Aged 6–59 Months in Ethiopia Using Ethiopia Demographic and Health Survey 2016 Data

Ataklti Gebretsadik Woldegebriel, Gebremedhin Gebreegziabiher Gebrehiwot , Abraham Aregay Desta , Kiros Fenta Ajemu, Asfawosen Aregay Berhe, Tewolde Wubayehu Woldearegay, Nega Mamo Bezabih (Pediatric Health Med Ther).

Background: Anemia is the most common nutritional problem and a widespread micronutrient-deficiency disorder on a global scale. In Ethiopia, childhood anemia is highly prevalent and a major public health concern. This study aimed to identify factors associated with anemia among children aged 6–59 months in Ethiopia. Methods: Data weres extracted from the 2016 Ethiopia Demographic and Health Survey (EDHS). We found records for 8,603 children aged 6–59 months in the data set. After 448 had been excluded due to incomplete records, 8,155 children were included in the final analysis. Pearson's χ 2 was used to assess associations between each factor and categorical outcome variables. Multivariate logistic regression analyses were done to determine factors associated with anemia, and significant associations were declared at $p \leq 0.05$ for the final model. Results: More than half (51.5%) the children were male and the overall mean age was 31.85 ±15.66 months. Mean hemoglobin concentration was 10.37±17.55 g/dL. The overall prevalence of anemia was 56.6%: 3.7%, 30.4%, and 22.5% severe, moderate, and mild anemia, respectively. Increased child age, decreased maternal age, lowest rung on wealth index, mother living alone, mother engaged in outside work, increased birth order, decreased birth interval, one antenatal care visit, severe stunting, and severe underweight were significantly associated with anemia. Conclusion: The prevalence of anemia in this study was the highest of all EDHS reports. It had increased since the preceding report (EDHS 2011), and remains the main public health concern in Ethiopia. Comprehensive intervention strategies should be put in place and tailored to different levels of government (national, regional, and district) including household- and individual-level interventions for combating childhood anemia by focusing on the identified risk factors. Keywords: anemia, associated, children, EDHS 2016, Ethiopia

C.THEMATIC AREA: ENVARNMENTAL HEALTH

1. Latrine Ownership and Its Determinants in Rural Villages of Tigray, Northern Ethiopia: Community-Based Cross-Sectional Study

Latrine Ownership and Its Determinants in Rural Villages of Tigray, Northern Ethiopia: Community-Based Cross-Sectional Study (J Environ Public Health).

Background: Open defecation was largely a rural phenomenon most widely attributed to poor latrine ownership at community level. We aimed at examining latrine ownership and its determinants in rural villages of the Tigray region, Northern Ethiopia.

Methods: Community-based cross-sectional study was conducted from June to July 2018. A total of 756 randomly selected households were involved in the study. The multistage cluster sampling technique was used to select study households. Data were checked, coded, and entered into Epi-Info version 7. Besides, it was exported to SPSS version 20 for data analysis. Multivariable logistic regression analysis was involved to estimate the net effect size of factors associated with latrine ownership.

Results: The proportion of households owning latrine was 35.7%. The majority (84.4%) of constructed latrines were utilized by household families. Households advocated latrine IEC by Health Extension Workers (HEWs) (AOR = 1.902, 95% CI: 1.269-2.852), living in their private house (AOR = 3.13, 95% CI: 1.528-6.401), and the occupation status of government employees (AOR = 3.54, 95% CI: 0.586-21.397) are more likely to lead to the construction of latrines. The availability of latrine made on slab floor (AOR = 1.790, 95% CI: 0.297-3.102), having a latrine constructed inside the household compound (AOR = 4.463, 95% CI: 1.021-19.516), and delivery of latrine IEC by Women Development Armies (WDAs) (AOR = 2.425, 95% CI: 0.728-8.083) may lead to better latrine utilization at the household level.

Conclusion: Households owning latrine at the community level were low. The desired level of latrine ownership will be realized if all sanitation and hygiene components are kept on eye side by side in line with identified predictor factors.

2. Knowledge, Attitude, and Practices on Water, Sanitation, and Hygiene among Rural Residents in Tigray Region, Northern Ethiopia

Knowledge, Attitude, and Practices on Water, Sanitation, and Hygiene among Rural Residents in Tigray Region, Northern Ethiopia (J Environ Public Health).

Background: Poor hygienic practices, inadequate water supply, and poor sanitary conditions play a major role in the spread of infectious diseases. Lack of knowledge, attitude, and practices (KAP) on WASH is one of the most imperative causes for transmission of infectious diseases. Therefore, the aim of this study was to assess knowledge, attitude, and practice of rural residents on water, sanitation, and hygiene in Tigray, Ethiopia.

Methods: A community-based cross-sectional study was conducted from June to July 2018. Multistage cluster sampling technique was used to collect data from 759 households in Tigray region, Northern Ethiopia. A standardized questionnaire was used to collect data on knowledge, attitude, and practice on water, sanitation, and hygiene (WASH). Descriptive data analysis was done to present the study findings.

Results: The response rate was 99.6%, and 574 (75.9%) of the respondents were females. Good knowledge, favorable attitude, and good practice on WASH were observed in 42.2% (95% CI: 38.7%, 45.7%), 48.5% (95% CI: 44.9%, 52.0%), and 49.2% (95% CI: 45.6%, 52.7%) of the respondents, respectively.

Conclusions: Poor knowledge, unfavorable attitude, and poor practice on WASH were common amongst the residents in rural Tigray, Northern Ethiopia. Therefore, the health extension programs at primary health care should be revitalized in a way that can enhance the interventional measures to improve knowledge, attitude, and practice on WASH.

3. Magnitude and determinants of road traffic accidents in Northern Ethiopia: a cross-sectional study

Awtachew Berhe Woldu, Abraham Aregay Desta, Tewolde Wubayehu Woldearegay(BMJ Open).

Objective: This study aimed to assess the magnitude and determinants of road traffic accidents (RTAs) in Mekelle city, Northern Ethiopia.

Methods: A cross-sectional study was done using a simple random sampling technique.

Setting: The study was done in Mekelle city from February to June 2015.

Participants: The study was done among drivers settled in Mekelle city.

Main outcome measures: The main outcome measure was occurrence of RTA within 2 years. A binary logistic regression was used to identify factors associated with RTA.

Results: The magnitude of RTA was found to be 23.17%. According to the drivers' perceived cause of the accident, 22 (38.60%) of the accident was due to violation of traffic rules and regulations. The majority of the victims were pedestrians, 19 (33.33%). Drivers who were driving a governmental vehicle were 4.16 (adjusted OR (AOR) 4.16; 95% CI 1.48 to 11.70) times more likely to have RTA compared with those who drive private vehicles. Drivers who used alcohol were 2.29 (AOR 2.29; 95% CI 1.08 to 4.85) times more likely to have RTA compared with those drivers who did not consume alcohol.

Conclusion: Magnitude of reported road traffic accident was high. Violation of traffic laws, lack of vehicle maintenance and lack of general safety awareness on pedestrians were the dominant reported causes of RTAs. Driving a governmental vehicle and alcohol consumption were the factors associated with RTA. Monitoring blood alcohol level of drivers and regular awareness to the drivers should be in place. Holistic study should be done to identify the causes of RTAs.

Keywords: Ethiopia; Mekelle city; drivers; road traffic accident; tigray.

4. Latrine Availability and Associated Factors among Religious Institutions in Northern Ethiopia, 2018

Mulugeta Woldu Abrha,Kiros Demoz Ghebremedhin,and Tesfay Teklemariam Weldeslasie(Journal of Environmental and Public Health).

Background: Religious institutions found in the community not only uphold belief and cultural values but can also act as a force for positive change and development. Improved sanitation and hygiene are crucial in these institutions to decrease preventable infections due to unsanitary conditions. However, there are no studies among religious institutions on availability of latrines. Therefore, this study was conducted to assess latrine availability and associated factors among religious institutions in the Tigray Region, Ethiopia.

Method: An institution-based cross-sectional study design was conducted in the Tigray Region, Northern Ethiopia. Multistage sampling was used to sample 385 religious institutions. Data were collected using a pretested, structured questionnaire and observation checklist. Logistic regression was fitted, and an odds ratio with 95% confidence interval (CI) with p value less than 0.05 was used to determine the predictors of latrine availability. Analysis was carried out using the SPSS 20TM software package.

Results: In this study, latrine availability was 32.8%. It was significantly affected by currently saved money towards having a latrine (adjusted odds ratio (AOR): 0.32, 95% confidence interval (CI) [0.25, 0.42]), any messages seen, heard, or received on sanitation and hygiene (AOR: 0.43, 95% CI [0.38, 0.51]), and the place where messages were seen, heard, or received (AOR: 2.95, 95% CI [1.11, 5.55]).

Conclusion: Latrine availability was very low when compared to the national target of 100% among religious institutions and was affected by the currently saved money towards having a latrine, any messages seen, heard, or received on sanitation and hygiene, and the place where the messages were received. Information regarding latrine availability should be provided to the community visiting religious institutions through available channels and promotion of practical models.

D.THEMATIC AREA: NON COMMUNICABLE DISEASE

1. Impact of Breast Cancer in Tigray, Northern Ethiopia: Retrospective e-HMIS Data Base Review and Analysis

Kiros Fenta Ajemu, Abraham Aregay Desta and Nega Mamo Bezabih(J Cancer Sci Ther).

Background: Breast cancer is an emerging non-communicable disease in Ethiopia. The aim of the study was to assess the impact of breast cancer in Tigray, Northern Ethiopia.

Methods: Retrospective secondary data were scanned from health management information system data base (e-HMIS) at Tigray Regional Health Bureau from 2011-2017. Data abstraction and analysis were conducted from June to July 2018. Scanned data were filtered in Excel- sheet and exported to SPSS version 21 for further statistical analysis. Finally, descriptive statistics were used to display finding of impact of breast cancer in terms of its morbidity and mortality rate using table and line graph.

Results: A total of 4630 cancer cases were registered during the study period. Of which, 1250 (26.9%) were new cases of breast cancer. high proportion of breast cancer morbidity and mortality was observed in age category of 15 years of age and above in both men and women. Over all breast cancer mortality was 2.3% during the study period. The trend of breast cancer morbidity was picked by nearly half and its mortality rate by 12.7% in year 2017 when compared with base line data in 2011.

Conclusion: The study finding revealed that high breast cancer morbidity and mortality trend were observed. This high impact might result additional burden causing maternal illness and death in addition to communicable disease. Therefore, other systematic studies needed to identify its indigenous predictors for initiating appropriate interventions efficiently.

2. Factors associated with obstetric fistula among reproductive age women in Ethiopia: a community based case control study

Ataklti Gebretsadik Woldegebriel, Gebremedhin Gebreegziabiher Gebrehiwot , Abraham Aregay Desta, Kiros Fenta Ajemu, Asfawosen Aregay Berhe, Tewolde Wubayehu Woldearegay, Kiros Demoz Ghebremedhin, Nega Mamo Bezabih (Reprod Health).

Background: Obstetric fistula is a major public health concerns in Ethiopia. It is the most devastating cause of all maternal morbidities.

Method: Data from the 2016 Ethiopian Demographic Health Survey (EDHS) was analyzed. A community-based unmatched case control study was conducted. Seventy cases and 210 non cases were selected using random number table. Data were analyzed by using STATA statistical software version 14. Multivariable logistic regression model was applied to determine the factors associated with fistula.

Results: The majority of fistula cases were from rural residences. The multivariable statistical model showed that rural residence (Adjusted OR (AOR) = 5, 95% CI 4.26, 7.52), age at first marriage (AOR = 3.3, 95% CI 2.83, 4.60), poorest wealth index (AOR = 3.3, 95% CI 2.24, 5.01) and decision making for contraceptive use by husband alone (AOR = 1.3, 95% CI 1.124, 1.67) were factors significantly associated with obstetric fistula.

Conclusion: Age at first marriage, rural residence, poorest wealth index and decision making for contraceptive use by husband alone were significantly associated factors for obstetric fistula. Intervening on these factors will reduce the magnitude of obstetrics fistula. In this context there is in-need to improve on avoiding early marriage through awareness creation to the community and developing legal framework by the policymakers. Furthermore, information about the joint decision making to use contraceptives should be disseminated though mass-media and interpersonal channels.

3. Mass Psychogenic Illness in Haraza Elementary School, Erop District, Tigray, Northern Ethiopia: Investigation to the Nature of an Episode

Kiros Fenta Ajemu, Tewolde Wubayehu Weldearegay, Nega Mamo Bezabih, Yrgalem Meles , Goytom Mehari, Abraham Aregay Desta, Asfawosen Aregay Berhe, Micheale Jorjo, Ataklti Gebretsadik Weldegebriel , Tesfay Subagadis Gebru, Abenezer Tesfadingle (Psychiatry).

Background: Mass psychogenic illness has been documented for more than 600 years in a variety of cultural, ethnic, and religious settings. We aimed to assess the nature and characteristics of mass psychogenic illness and to evaluate community awareness and perception about the treatment they practiced in Haraza Elementary School, Erop district, Tigray, Northern Ethiopia.

Methods: A school-based cross-sectional study was conducted in Haraza Elementary School from January to February, 2020. Students who were victims of an episode were subjects of the study. A total of twelve students were investigated using a semistructured questionnaire for a quantitative study. Seven key informant interviews were conducted using a guiding questionnaire. Quantitative data was analyzed using XL sheet while qualitative data were analyzed manually.

Results: The mean age of study participants was 14 years (SD ± 1.3). The majority (87%) were teenage female students. The incident was an unspecified disease with psychiatric disorder, migraine, and syncope with no plausible organic causes. An important feature of migraine and syncope was their comorbidity with mass psychogenic illness. The community perceived that evil devil force and blaming the being as an evil eye were common causes of the occurrence of an episode.

Conclusion: Lack of empirical knowledge and awareness about its management and prevention among community members and health professionals resulted exaggerated rumor that would perceive as newly emerging disease that affected school activities. Integrating MPI in PHEM package at health facility level, advocacy workshops for media, and other relevant stakeholders will minimize its impact for the future.

4. Utilization Rate and Factors Associated with Non-Utilization of Non-Pneumatic Anti-Shock Garment in the Management of Obstetric Hemorrhage in Public Health Care Facilities of Northern Ethiopia: A Cross-Sectional Study

Abraham Aregay Desta, Mentsegeba Berhane, Tewolde Wubayehu Woldearegay (Int J Womens Health).

Background: Obstetric hemorrhage (OH) causes more than 25% of the maternal deaths across the world annually. A significant number of these deaths can essentially be prevented with a skilled birth attendant and having all-inclusive emergency obstetric care technologies. One of these promising technologies is to utilize non-pneumatic anti-shock garment (NASG). Despite this fact, there are limited studies on the utilization of NASG in Ethiopia.

Objective: The aim of this study was to assess the utilization rate and factors associated with non-utilization of NASG in the management of obstetric hemorrhage in public healthcare facilities of Northern Ethiopia.

Methods: An institution-based cross-sectional study was conducted from December 2017 to February 2018 involving 338 randomly selected healthcare providers working in the maternity healthcare facilities. Data were collected using pre-tested and self-administered questionnaires. Data were entered and analyzed using STATA version 14.0 statistical software package. The result was displayed using descriptive, bivariate, and multivariable logistic regression analysis to identify independent predictors of non-utilization of NASG at a P-value≤0.05.

Results: About 121 (35.80%; 95% CI=30.68-41.16%) of the health workers did not utilize NASG, and 217 (64.20%; 95% CI=58.84-69.32%) utilized NASG. Being females, with adjusted odds ratio (AOR)=2.21 (95% CI=1.06-4.63), use of NASG in previous works to manage OH, with AOR=0.1 (95% CI=0.02-0.48), having perceived skill to use the garment in the facility, with AOR=0.10 (95% CI=0.01-0.79), were significantly associated with the non-utilization of NASG.

Conclusion: There was a lower rate of NASG utilization among the healthcare providers for the management of obstetric hemorrhage. Being a male care provider, having no experience of using NASG to manage PPH, and having perceived skill to use the garment in the healthcare facility were significantly associated factors for the non-utilization of the NASG. Due emphasis should be given to the utilization of NASG to manage obstetric hemorrhage by addressing the identified modifiable factors for non-utilization of NASG by healthcare workers.

Keywords: Ethiopia; maternal and child health; non-pneumatic anti-shock garment.

E.THEMATIC AREA: HEALTH SYSTEM

1. Health Service Utilization among Out-of-Pocket Payers and Fee-Wavier Users in Saesie Tsaeda-Emba District, Tigray Region, Northern Ethiopia: A Comparative Cross-Sectional Study

   Ataklti Gessesse , Mezgebu Yitayal , Mihiretu Kebede , Getasew Amare (Risk Manag Healthc Policy).

   Background: Health service utilization among out-of-pocket payers and fee-wavier users and factors associated with it in Saesie Tsaeda-Emba District, Tigray Region, Northern Ethiopia.

   Methods: A comparative community-based cross-sectional study was conducted in Northern Ethiopia. Households with at least one person who experienced illness during the last six months were included in the study. Data were collected using a structured and interviewer-administered questionnaire. Bivariable and multivariable logistic regression analyses were used to identify factors associated with the HSU.

   Results: In this study, 652 individuals (489 OOP payers and 163 fee waiver users) participated with overall response rate of 98%. The overall HSU among the participants was 44.3% (41.9 for OOP users and 51.5% for fee waiver users). The study revealed that educational status (AOR = 0.35; 95% CI: 0.21, 0.59), family size (AOR = 0.60; 95% CI: 0.37, 0.97) and income level (AOR = 2.09; 95% CI: 1.12, 3.90, and AOR = 4.12; 95% CI: 2.41, 7.53) were factors significantly associated with the HSU among OOP payers. The study also revealed that educational status (AOR = 0.65; 95% CI: 0.21, 0.59), family size (AOR = 0.4; 95% CI: 0.37, 0.97), income level (AOR = 1.12; 95% CI: 1.21, 4.87), and payment mechanism (AOR = 2.21; 95% CI = 1.34, 4.67 were significantly associated with the HSU among all study participants.

   Conclusion: This study shows that the level of the HSU is low. Educational status, family size, economic status, and payment mechanism were significantly associated with the HSU. Therefore, improving the community's educational level, promoting family planning, devising income-generating strategies, and strengthening the fee waiver mechanism may enhance the HSU.

   Keywords: Northern Ethiopia; fee-waiver; health service utilization; out-of-pocket payment.

2. Level and Predicators of quality of Integrated Disease Surveillance and Response for Infectious Disease in Tigray, Northern Ethiopia: Cross-Sectional Study

   Kiros Fenta Ajemu , Abraham Aregay Desta ,Nega Mamo Bezabih ,Alemnesh Abraha Araya ,Essayas Haregot Hilawi (research square).

   Background: The health impacts of recent global infectious disease outbreaks have demonstrated the importance of strengthening public health systems. The aim of the study was to assess the level of quality of integrated disease surveillance and response for infectious disease in public health facilities of Tigray, Northern Ethiopia.

   Methods: the study was facility based cross-sectional. It was conducted from June- July 2018 in 46 health facilities. It has involved mixed method approach both quantitative and qualitative data collection methods. Donabedian input-process-output quality assessment model was used to evaluate the service. The magnitude of the association was considered at p-value of ≤0.05 in multivariable logistic regression analysis using adjusted odds ratio (AOR) at 95% confidence interval (CI). Concurrently, facility surveillance officers were subjected to an in-depth interview autonomously to explore factors for good and bad service quality. Quantitative data were analyzed using SPSS version 21. Use of manual thematic approach was used for qualitative data analysis.

   Result: The level of the overall quality of IDSR service provision has rendered as good in 6 out of 46(13%) studied health facilities. Two third of studied health facilities were rated as good for input service quality but 34.7% for process service quality. The output service quality was two times better than the overall service quality. Being enrollment of HIT to rapid response team (AOR=7, 95% CI: 1.092- 37.857) and accessing technical guideline to the health facility (AOR=3, 95% CI: 0.399-22.567) were predictor factors for facilitating overall service quality.

3. Knowledge of vaccine handlers and status of cold chain and vaccine management in primary health care facilities of Tigray region, Northern Ethiopia: Institutional based cross-sectional study

   Hailay Gebretnsae, Tsegay Hadgu, Brhane Ayele, Equbay Gebre-Egziabher, Mulugeta Woldu, Mulugeta Tilahun, Alemnesh Abraha, Tewolde Wubayehu, Araya Abrha Medhanyie (PLoS One).

   Background: Ethiopia federal ministry of health has been working on increasing access to immunization service by deploying solar refrigerators to primary health care facilities. However, there is limited evidence on cold chain and vaccine management status. Therefore, the objective of this study was to assess knowledge of vaccine handlers and status of cold chain and vaccine management and their associated factors in primary health care facilities of Tigray region Northern Ethiopia.

   Methods: Institutional based cross-sectional study was conducted in four randomly selected districts of Tigray region, Northern Ethiopia. In each selected district, all primary health care facilities with functional vaccine refrigerators were included in the study. Data were collected using a pre-tested semi-structured questionnaire. The collected data were entered into Epi-data version 3.1 and then exported to Statistical Package for Social Sciences (SPSS) version 21 for analysis. All variables with p-value of < 0.25 in bivariate logistic regression analysis were included in multi-variable model to identify predictors of the dependent variables.

   Results: In this study, fifty Primary Health Care Facilities (PHCFs) were included with a response rate of 94.4%. The overall level of good knowledge of vaccine handlers and good status of cold chain and vaccine management were 48% (95% CI; 30.7%-62%) and 46% (95%CI; 26.1%-61.3%) respectively. Receiving training on cold chain and vaccine management (AOR = 5.18; 95%CI: 1.48-18.18) was significantly associated with knowledge of vaccine handlers. Furthermore, receiving supportive supervision (AOR = 4.58; 95%CI: 1.04-20.17) and good knowledge of vaccine handlers (AOR = 10.97; 95%CI: 2.67-45.07) were significant associated with cold chain and vaccine management.

   Conclusions: This study showed that knowledge of vaccine handlers on cold chain and vaccine management was poor. Similarly, the cold chain and vaccine management status was also poor. Therefore, on-site training should be provided to vaccine handlers to increase their knowledge, so as to improve their practices on cold chain and vaccine management. In addition, Programme based supportive supervision is needed to improve cold chain and vaccine management.

4. Assessment of Emergency Care Quality in Public Hospitals of Tigrai, Ethiopia, 2019

   Abera Berhe, Ataklti Gessesse , Fana Gebreslasie , Tesfay Teklemariam and Kiros Fenta(Health Science Journal).

   Background: The emergency department is the most critical area of any hospital. The time taken for each patient for triaging, consultation and referral can have an effect on the disease outcome of the patient.The study was undertaken to determine the average waiting time of patients, assessing availability of basic equipment, drug and supplies, Ambulance utilization, service readiness and quality of emergency service in the of public hospitals.

   Methods: Facility based cross sectional study was employed to assess emergency quality health care provision in public hospitals of Tigray, Northern Ethiopia. The study was conducted from April-June, 2019.

   Results: The study revealed that, 10(71%), 4(29%) and 9(64%) were accessible with computer, internet and Telephone. The emergency department in the study hospitals enrolled 29 % pharmacists and (43%) laboratory technologist. However, training on basic emergency care was provided below 50% in both general and referral hospitals. Similarly, Basic medical equipments for emergency care was available in 50% in both general and referral hospitals. With respect to service utilization, 6(43%), 3(21%), and 9(64%) of the general hospitals were providing 24 hour service at laboratory, radiology and pharmacy units respectively based on predetermined specifications in the national guide line . Client exit interview indicated that patient satisfied with standalone service were 60% in general and 66% in referral hospitals. The average waiting time from arrival to receiving clinical care was 10.8 and 12.5 munities' in general and referral hospitals respectively. About 4(29%) experience written information during discharge. Utilization of Pediatric triage protocol (36%) and obstetric triage protocols (71%) were achieved in general hospitals but this was by far low when compare with the regional target (100%).

   Conclusion: Quality of Emergency care with respect components of health service quality such as availability and accessibility was not adequately implemented when compared with the national and regional predetermined targets. Therefore, regular monitoring and addressing the identified gaps needed by program implementers, funders and other relevant stakeholders.

5. Health extension workers contribution on tuberculosis case notification in Tigray region, Northern Ethiopia: A concurrent mixed method study

   Hailay Gebretnsae, Tsegay Hadgu, Brhane Gebrekidan Ayele, Alemnesh Abraha, Equbay Gebre-Egziabher , Mulugeta Woldu, Tsegay Wellay, Gebregziabher Berihu Gebrekidan, Measho Gebreslassie Gebregziabher (PLoS One).

   Background: Despite the emphasis placed on Community Based Tuberculosis Care (CBTC) implementation by Health Extension Workers (HEWs) within the National Tuberculosis Program (NTP) in Ethiopia, there is little evidence on contribution of HEWs on TB case notification. Therefore, this study aimed to describe the contribution of HEWs on TB case notification and its associated factors in Tigray region, Northern Ethiopia.

   Methods: A concurrent mixed method (quantitative and qualitative) cross-sectional study design was conducted in three randomly selected districts in Tigray region, Northern Ethiopia. Quantitative data were collected using a pre-tested semi-structured questionnaire. Qualitative data were collected using Focused Group Discussions (FGDs) and Key Informant Interviews (KIIs) to further describe the community participation and presumptive TB identification and referral system. For the quantitative data, binary logistic regression analysis was done and all variables with P-value of < 0.25 in bivariate analysis were included in the multi-variable model to see predictors of HEWs contribution to TB notification. The qualitative data were thematically analyzed using Atlas.ti version 7.

   Results: In this study, a total of 68 HEWs were included. From March 1, 2017 to February 28, 2018, a total of 427 TB cases notified in the study areas and one-third (34%) of them were notified by the HEWs referral. Provision of Community Based-Directly Observed Treatment Short course (CB-DOTS) (Adjusted Odds Ratio (AOR) = 3.63, 95% Confidence Interval (CI) = 1.18-11.19) and involvement of community volunteers on CBTC (AOR = 3.31, 95% CI = 1.10-10.09) were significantly associated with the contribution of HEWs on TB case notification. The qualitative findings indicated that high workload of HEWs, inaccessibility of TB diagnostic services at nearby health facilities, and transportation and investigation costs were identified as factors affecting for presumptive TB referral by HEWs.

   Conclusions: Provision of CB-DOTS and involvement of community volunteers in CBTC activities should be strengthened to improve the HEWs contribution on TB case notification.

   Additionally, HEWs should be empowered and further interventions of TB diagnostic services at diagnostic health facilities are needed to improve presumptive TB referral by HEWs.

6.Demand for health care service and associated factors among patients in the community of Tsegedie District, Northern Ethiopia

Tsegay Wellay, Measho Gebreslassie, Molla Mesele , Hailay Gebretinsae , Brhane Ayele , Alemtsehay Tewelde , Yodit Zewedie (BMC Health Serv Res)

Background: Demand-side barriers are as important as supply factors in deterring patients from obtaining treatment. Developing countries including Ethiopia have been focusing on promoting health care utilization as an important policy to improve health outcomes and to meet international obligations to make health services broadly accessible. However, many policy and research initiatives focused on improving physical access rather than focusing on the pattern of health care service utilization related to demand side. Understanding of determinants of demand for health care services would enable to introduce and implement appropriate incentive schemes to encourage better utilization of health care services in the community of Tsegedie district, Northern Ethiopia.

Methods: A community based cross sectional study design was conducted from March1-30/2016 in Northern Ethiopia. Systematic random sampling technique was used to select 423 participants from 2189 patients of the one-month census. A pretested and standardized semi-structured interviewer administered questionnaire was used to collect the data. The data were entered using Epi-info version 7 and analysed by STATA version 11. Multinomial logistic regression model was used to identify the determinants of demand for health care service.

Results: A total of 423 (with a response rate of 98.3%) study participants were included in the study. The finding indicates that 72.5% (95%CI = 61.6, 81.1) of the participants demanded modern health care services. The multinomial logistic regression econometric model revealed that perceived severity of illness (β = 1.27; 95% CI = 0.74, 1.82), being educated household head (β = 0.079; 95% CI = 0.96, 1.74), quality of treatment (β = 0.99; 95% CI = 0.47, 1.5), distance to health facility β = 1.96; 95%CI = 0.11, 0.27), cost of treatment (β = - 1.99; 95% CI = 0.85, 3,13) were significantly and statistically associated with demand for health care service.

Conclusion: This study revealed that in Tsegedie district, majorities (72.5%) of the patients demanded modern health care service. Distance to health care facility, user-fees, educational status of household, quality of service, and severity of illness were found to be significantly associated with demand for health care service. Out of pocket, payments should be changed by prepayment schemes like community-based insurance than to depend on user fees and appropriate health information dissemination activities should strengthen to create awareness about modern care.

Keywords: Demand of health care; Modern health care service; Multinomial logit model; Tsegedie District.

7.Health care professionals' adherence to partograph use in Ethiopia: analysis of 2016 national emergency obstetric and newborn care survey

Solomon Weldemariam Gebrehiwot, Mulugeta Woldu Abrha, Haftom Gebrehiwot Weldearegay(BMC Pregnancy Childbirth).

Background: The period around childbirth and the first 24 hours postpartum remains a perilous time for both mother and newborn. Health care providers' compliance to the World Health Organization modified partogram across the active first stage of labor is a graphic representation of a mother's condition that is used as a guide in providing quality obstetrics care. However, little evidence is documented on the health providers' adherence to the use of the partograph in Ethiopia, which limits health care providers' ability to improve quality care services. Therefore, this study assessed the adherence of partograph use and associated factors in Ethiopia.

Methods: Data from the Ethiopian 2016 National Emergency Obstetric and Newborn Care survey of 3,804 health facilities that provided maternity services were used. We extracted 2611 partograph charts over a 12 months period prior to the survey to review the proper recording of each component. Data analyses were performed using SPSS version 22.0 software. A logistic regression analyses was used to identify the association of explanatory variables with the outcome variable. A p-value of <0.05 was considered as cut off point to declare the significance association in the multivariable analysis.

Results: Of the total 2611 partographs reviewed, 561(21.5%) of them were fully recorded as per the WHO guideline. Particularly, molding in 50%, color of liquor in 70.5%, fetal heart beat in 93.3%, cervical dilation in 89.6%, descent in 63.2%, uterine contraction in 94.5%, blood pressure in 80.5%, pulse rate in 70.5%, and temperature in 53% were accurately recorded. The odds of adherence to partograph use were 1.4 in rural health facilities when compared to their counterparts (AOR=1.44; 95% CI: 1.15, 1.80, P- 0.002).

Conclusion: This study revealed a poor level of adherence in partograph use in Ethiopia. Molding, maternal temperature and decent were the least recorded parameters of the partograph. The odds of completion of partograph were high in rural facilities. Strong supporting supervision and mentoring the health workers to better record and use of partograph are needed mainly in urban health facilities. Moreover in the future, interventional research should be conducted to improve the current rate of adherence.

Keywords: Adherence; Emergency obstetrics care; Ethiopia; Health care providers; Partograph.

8.Factors associated with willingness to pay for social health insuranceamong government employees in Tigrisregion, Northern Ethiopia

ATAKLTI T. GESSESSE, ABERA A. BERHE, MULUGETA G. TILAHUN, TESFAY W. TEKLEMARIAM(East African Journal of applied health monitoring and evaluation).

Background: Developing countries seldom use social health insurance (SHI), and their healthcare finances mostly rely on general revenues and direct out-of-pocket payments. This study investigated the level and factors associated with willingness to pay for SHI among government employees in Tigrai region, North Ethiopia.

METHODS:An institution-based quantitative cross-sectional study was carried out from June to July 2018 among government employees in Tigrai, Ethiopia. Sample size was determined using single population proportion formula, and multi-stage cluster sampling was used to select the study participants. Data collected using an interviewer-administered questionnaire was analyzed using SPSS

Version 20.

RESULTS: There were 544 (64.5%) respondents who were not willing to pay for SHI. Respondents age older than 39 years were 2.2 times more likely to be willing to pay for SHI, as were those who disagreed with the binding rule of referral system (1.4 times), and with exclusion of periodic medical checkup from the SHI (1.4 times), those who didn't consider health service quality to be poor (1.6 times), and those who disagreed with the presence of financial insecurity in health institutions (1.7 times).

CONCLUSION: This study revealed that government employees' willingness to pay for SHI was low. SHI agencies should publicize the proclamation for SHI and induce employees with SHI referral system, services excluded, and health facilities' readiness and service quality to increase willingness to pay. In addition, the government should reconsider the implementation of the proclamation for SHI accordingly.

Key words: employee, willingness to pay, social health insurance

9. Blinded rechecking of sputum smear microscopy performance in public health facilities in Tigray region, Northern Ethiopia: Retrospective cross sectional study

Letebrhan Weldemhret, Ataklti Hailu, Goyitom Gebremedhn, Hadish Bekuretsion, Gebreselassie Alemseged 1, Gebremicheal Gebreegziabher, Gebrhiwot Tesfahuney, Tesfaye Berhe, Lemlem Legesse, Kelali Kalayu, Mesfin Tesfay, Kibrti Mehari (PLoS One).

Background: Tuberculosis disease is the leading cause of death worldwide along with HIV/AIDS. Sputum smear microscopy plays an essential role for initial TB diagnosis and treatment follow up. But, misdiagnosis of sputum smear microscopy revealed a high economical crisis and missing of active TB cases. This study was aimed to determine blinded rechecking of sputum smear microscopy performance in public health facilities in Tigray region, Northern Ethiopia.

methods: A cross sectional retrospective study was conducted from January, 2017 to December, 2018 year. Data was collected retrospectively using electronic and paper based in Tigray health research institute. The data was analyzed using the SPSS version 25 software. The sensitivity, specificity, positive predictive value, and negative predictive value of the smear readings were calculated using 2X2 contingency table. The reading agreement between the microscopic center and reference center was determined using kappa statistics.

Results: A total of 23,456 blinded rechecked smear results were reviewed. In average, the performances of sputum smear quality were 61%, 68%, 64%, 66%, 62% and 75% for specimen quality, staining quality, smear size, smear thickness, smear evenness and smear cleanliness respectively. Of the total error (0.48%) reported, 0.25%, 0.19% and 0.085% were false positive, false negative and quantification errors respectively. The concordance rate of health facilities for smear reading was increased to 90% by the end of 2018. Overall, the sensitivity, specificity, PPV, and NPV of the smear readings were 95%, 99.7%, 93% and 99.8% respectively. Likewise, the smear reading agreement was also perfect with kappa value, 0.87.

Conclusion: The overall performance of public health facilities for blinded rechecking of smear microscopy was satisfactory. But, the high false positive and false negative errors found calls for continuous evaluation and monitoring of the health facilities by reference center.

10. Community based reference interval of selected clinical chemistry parameters among apparently healthy Adolescents in Mekelle City, Tigrai, Northern Ethiopia

Getachew Belay, Gebreyohanes Teklehaymanot, Gebreslassie Gebremariam, Kelali Kaleaye, Hagos Haileslasie, Gebremedhin Gebremichail, Brhane Tesfanchal, Getachew Kahsu, Brhane Berhe, Kebede Tesfay, Lemlem Legesse, Ataklti Gebretsadik, Mistire Wolde, Aster Tsegaye (PLoS One).

Background: Locally established clinical laboratory reference intervals (RIs) are required to interpret laboratory test results for screening, diagnosis and prognosis. The objective of this study was establishing reference interval of clinical chemistry parameters among apparently healthy adolescents aged between 12 and 17 years in Mekelle, Tigrai, northern part of Ethiopia.

Methods: Community based cross sectional study was employed from December 2018 to March 2019 in Mekelle city among 172 males and 172 females based on Multi stage sampling technique. Blood samples were tested for Fasting blood sugar (FBS), alanine aminino transferase (ALT), aspartate amino transferase (AST), alkaline phosphatase (ALP), Creatinine, urea, total protein, albumin (ALB), direct and indirect bilirubin (BIL.D and BIL.T) using 25 Bio system clinical chemistry analyzer. Results were analyzed using SPSS version 23 software and based on the Clinical Laboratory Standard Institute (CLSI)/ International Federation of Clinical Chemistry (IFCC) C 28-A3 Guideline which defines the reference interval as the 95% central range of 2.5th and 97.5th percentiles. Mann Whitney U test, descriptive statistics and box and whisker were statistical tools used for analysis.

Results: This study observed statistically significant differences between males and females in ALP, ALT, AST, Urea and Creatinine Reference intervals. The established reference intervals for males and females, respectively, were: ALP (U/L) 79.48-492.12 versus 63.56-253.34, ALT (U/L) 4.54-23.69 versus 5.1-20.03, AST 15.7-39.1 versus 13.3-28.5, Urea (mg/dL) 9.33-24.99 versus 7.43-23.11, and Creatinine (mg/dL) 0.393-0.957 versus 0.301-0.846. The combined RIs for Total Protein (g/dL) was 6.08-7.85, ALB (g/dL) 4.42-5.46, FBS(mg/dL) 65-110, BIL.D (mg/dL) 0.033-0.532, and BIL.T (mg/dL) 0.106-0.812.

Conclusions: The result showed marked difference among sex and with the company derived values for selected clinical chemistry parameters. Thus, use of age and sex specific locally established reference intervals for clinical chemistry parameters is recommended.

G.THEMATIC AREA: MATERNALAND CHILD HEALTH

1. Quality of neonatal resuscitation in Ethiopia: implications for the survival of neonates

   Haftom Gebrehiwot Weldearegay, Mulugeta Woldu Abrha, Esayas Haregot Hilawe, Brhane Ayele Gebrekidan, Araya Abrha Medhanyie (BMC Pediatr).

   Background: Birth asphyxia accounts for one-quarter newborn deaths. Providing quality care service of neonatal resuscitation reduces neonatal mortality. However, challenges to providing quality neonatal resuscitation are not well investigated in Ethiopia. Hence, this study is conducted to assess the quality provision of neonatal resuscitation in Ethiopia.

   Method: We used data from the Ethiopian 2016 Emergency Obstetric Newborn Care survey, conducted in 3804 health facilities providing maternal and newborn health services. We described the quality of neonatal resuscitation services according to the structure, process and outcome triad of quality dimension. Data from registers and birth records for the last 12 months prior to the survey were extracted. In each facility, the three last eligible charts of resuscitated neonates were reviewed and the highest frequency of chart of resuscitated baby was considered to the analysis. Thus, a total of 555 charts were assessed. Logistic regression model was used to assess the relationship between the neonatal resuscitation processes, provider, facility and newborn characteristics with neonatal outcome at the time of discharge.

   Results: The finding suggested that, around two-third, 364(65.6%) of the asphyxiated babies resuscitated by bag and mask type of neonatal resuscitation. Of the babies who had got neonatal resuscitation 463 (83.4%) survived. Resuscitated neonates with a gestational age of greater than 37 weeks and above (Adjusted Odds Ratio (AOR) =1.82; 95% Confidence Interval (CI) (1.09-3.04)), availability of priority equipment in health facilities for neonatal resuscitation (AOR = 1.24, 95% CI (1.09, 1.54)) and women who had 12 h and less duration of labor (AOR = 1.76; 95% CI (1.23, 3.13)) were the independent factors of survival of the neonate.

   Conclusion: Only half of the health facilities were ready for neonatal resuscitation (NR) in terms of priority equipment's. However, eight out of ten babies survived after NR in Ethiopia. Gestational age, priority equipment for NR and duration of labor were determinants of survival of resuscitated neonates in Ethiopia. Therefore, the availability of priority equipment and attentive care and follow-up for premature neonates and those face prolonged labor need to be improved in Ethiopia.

   Keywords: Birth asphyxia and Ethiopia; Emergency obstetrics and newborn care; Neonatal resuscitation; Quality of care.

2. Does short inter-pregnancy interval predicts the risk of preterm birth in Northern Ethiopia?

   Merhawi Brhane, Brhane Hagos, Mulugeta Woldu Abrha, Haftom Gebrehiwot Weldearegay (BMC Res Notes).

   Objective: The study aimed to assess the effect of inter pregnancy interval on preterm birth in Northern Ethiopia: prospective cohort study.

   Result: This study showed that, total incidence of premature birth was 10.4%. Among mothers with short inter pregnancy interval the incidence of preterm birth was 39 (25.9%).Whereas, among mothers who had recommended inter pregnancy interval was 9 (2.9%). Short inter-pregnancy interval [adjusted hazard ratio (AHR): 6.85, 95% confidence interval (CI) 3.07-15.31], antenatal care (ANC) visit 1-3 times (AHR: 2.24, 95% CI 1.04-4.85), complication during pregnancy (AHR: 3.16, 95% CI 1.58-6.33) and birth defect (AHR: 8.01, 95% CI 2.56-25.07) were predictors of premature birth.

   Keywords: Cohort study; Incidence; Inter pregnancy interval; Northern Ethiopia; Preterm birth.

3. Quality of Kangaroo Mother Care services in Ethiopia: Implications for policy and practice

Haftom Gebrehiwot Weldearegay, Araya Abrha Medhanyie, Mulugeta Woldu Abrha, Lisanu Tadesse , Ephrem Tekle, Bereket Yakob, Tsinuel Girma, Catherine Arsenault (PLoS One).

Background: Providing high-quality kangaroo mother care (KMC) is a strategy proven to improve outcomes in premature babies. However, whether KMC is consistently and appropriately provided in Ethiopia is unclear. This study assesses the quality of KMC services in Ethiopia and the factors associated with its appropriate initiation among low birth weight neonates.

Methods: We used data from the 2016 national Emergency Obstetric and Newborn Care (EmONC) assessment which contains data on all health facilities providing delivery care services in Ethiopia (N = 3,804). We described the quality of KMC services provided to low-birth weight (LBW) babies in terms of infrastructure, processes and outcomes (survival status at discharge). We also explored the factors associated with appropriate KMC initiation using multivariable logistic regression models.

Results: The quality of KMC services in Ethiopia was poor. The facilities included scored only 59.0% on average on a basic index of service readiness. KMC was initiated for only 46.4% of all LBW babies included in the sample. Among those who received KMC, 66.7% survived, 13.3% died and 20.4% had no data on survival status at discharge. LBW babies born in health centers were twice more likely to receive KMC compared to those born in hospitals (AOR = 2.0, 95% CI: 1.3-3.0). Public facilities, those with a staff rotation policy in place for newborn care, and those with separate newborn corners were also more likely to initiate KMC for LBW babies.

Conclusions: We found low levels of appropriate KMC initiation, inadequate infrastructure and staffing, and poor survival among LBW babies in Ethiopia. Efforts must be made to improve the adoption of this life saving technique, particularly in hospitals and in the private sector where KMC remains underutilized. Facilities should also dedicate specific spaces for newborn care that enables mothers to provide KMC. In addition, improving record keeping and data quality for routine health data is a priority.

4.Healthcare Professionals' Knowledge of Neonatal Resuscitation in Ethiopia: Analysis from 2016 National Emergency Obstetric and Newborn Care Survey

Mulugeta Woldu Abrha, Tsrity Tadese Asresu, Alemnesh Abraha Araya, Haftom Gebrehiwot Weldearegay (Int J Pediatr).

Background: Birth asphyxia, which accounts for 31.6% of all neonatal deaths, is one of the principal causes of neonatal mortality in Ethiopia. Adequate knowledge of newborn resuscitative procedures plays an important role in early diagnoses and suitable management. However, there are limited data on healthcare professionals' knowledge about neonatal resuscitation. Thus, this study aimed to determine the knowledge of healthcare professionals about neonatal resuscitation and factors affecting it.

Methods: Data from the Ethiopian 2016 national Emergency Obstetric and Newborn Care survey of 3,804 health facilities that provided maternal and newborn health services were analyzed. We have included 3804 healthcare providers, who attended the largest number of deliveries in the last month prior to the survey, and assessed their knowledge of neonatal resuscitation. It was also determined whether certain factors were associated with healthcare providers' knowledge through linear regression method.

Result: The overall knowledge score of the healthcare providers about neonatal resuscitation ranged from 12 to 24 out of 37 items (with mean score of 18.4 (±5.47) and mean score percentage of 49%). The findings showed that providers trained on neonatal resuscitation (β=2.65, 95% CI: 0.65, 4.62; p <0.00), facilities that had guideline of neonatal resuscitation (β=2.50, 95% CI: 0.60, 3.52; p =0.01), and availability of essential equipment (β=0.95, 95% CI: 0.44, 1.45; p =0.02) were significantly associated with sufficient knowledge of neonatal resuscitation in Ethiopia.

Conclusion: Overall knowledge of neonatal resuscitation was insufficient. Trained healthcare providers, having guideline on neonatal resuscitation, and availability of essential equipment were significantly associated with knowledge of neonatal resuscitation. Competency and simulation-based in-service training and refresher training complemented by supportive supervision and mentorship are helpful ways to put up providers capability to perform neonatal resuscitation.

5. Exploring Factors Influencing Practice of Neonatal Resuscitation with Bag and Mask in Ethiopia: Analysis from 2016 National Emergency Obstetric and Newborn Care Survey

Mulugeta Woldu Abrha, Equbay Gebreegziabher Gebru, Solomon Weldemariam, Haftom Gebrehiwot Weldearegay (J Multidiscip Health).

Background: Globally, more than 7 million children die under the age of five and the highest proportion of death is during the first 28 days of life. For babies who do not breathe at birth, neonatal resuscitation is critical in reducing intra-partum related neonatal deaths by 30%. Yet, there is a dearth of studies on the provision of neonatal resuscitation in Ethiopia. So, this study aimed to assess health facilities provision of neonatal resuscitation with bag and mask and its factors among asphyxiated newborns.

Materials and methods: Data used were from the Ethiopian 2016 Emergency Obstetric Newborn Care survey, conducted in 3,804 health facilities providing maternal and newborn health services. The analysis included neonatal resuscitation with bag and mask in the previous 3 months before the survey. Descriptive statistics, simple and multivariable regression analyses were performed using SPSS-21 version.

Results: The analysis findings show that 72.2% of the health facilities were providing neonatal resuscitation with bag and mask. The result showed that hospitals (adjusted odds ratio (AOR): 3.90; 95% confidence interval (CI) [2.05, 7.49]), health-care providers not trained in neonatal resuscitation (AOR: 0.64; 95% CI [0.42, 0.99]) and availability of essential equipment (AOR: 1.32; 95% CI [1.15, 1.51]) were more likely to practice neonatal resuscitation.

Conclusion: Overall practice of health facilities on neonatal resuscitation with bag and mask was at 72.2%. Type of facility, providers trained in neonatal resuscitation and availability of essential equipments were independently affecting the practice of neonatal resuscitation. Incorporating competency-based training, refresher training, and clinical mentorship will improve the practice.

Keywords: Ethiopia; birth asphyxia; emergency obstetric care; newborn resuscitation; practice.

6. Level of Quality of Option B+PMTCT Service Provision in Public Health Facilities in Mekelle Zone, Northern Ethiopia: Cross-sectional study

Kiros Fenta Ajemu 1, Alem Desta (BMC Health Serv Res).

Background: Substantial improvements have been observed in coverage and access to maternal health services in Ethiopia. However, quality of care has been lagging behind. Therefore, the aim of the study was to assess quality of OptionB + in Mekelle Zone, Northern Ethiopia.

Methods: Facility based cross-sectional study involving both quantitative and qualitative methods was conducted from December 2016- January 2017. The quality of service delivery was assessed in 11 public health facilities in Mekelle. Data collection was conducted using facility audit, observation, and client exit interview check list to assess (Input-Process–Output) quality components. Similarly in-depth interview guide was used to gather qualitative data. Data were analyzed using SPSS version 21 software. Descriptive statistics were computed to summarize the study findings and triangulation was made with qualitative findings.

Results: Overall, 2 (16.7%) of study health facilities full filled all the three quality components but none in 3(25%). The input quality component was better than the others in which 4(33.3%) facilities were rated as good. The process and output quality components were judged as good in 3(25%) study health facilities.

Conclusion: Only 16.7% of facilities studied were achieved good quality with respect to the three predetermined quality components. Since, assessed items in each quality component were potentially easy to intervene; strengthening program monitoring needed by program managers at each level of the health facilities.

7.Alarm Clock-Based Reminder for Improving Low Adherence on Option B Plus Antiretroviral Therapy Among HIV Positive Pregnant and Lactating Mothers in Northern Ethiopia

Gebremedhin Gebreegziabher Gebretsadik 1, Hailay Gebretnsae 2, Mulu Ftwi 1, Afewerki Tesfahunegn(HIV AIDS).

Background: Option B plus antiretroviral therapy (ART) is an approach used to eliminate new Human Immune Deficiency Virus (HIV) infections among infants. Considering the high adherence on Option B plus ART in HIV positive mothers is a crucial part in preventing mother-to-child transmission HIV. Therefore, this study was performed to assess the status of adherence and factors related to Option B plus ART.

Methods: A cross-sectional study design was conducted in Eastern zone of Tigrai Region from January to February 2017. Data were collected by using pre-tested structured interviewer-administered questionnaire from 350 participants selected using simple random sampling. Descriptive and binary logistic regression was done during analysis.

Results: The overall good adherence status of Option B plus ART among pregnant and lactating mothers was 67.3% [62.3-72.3%]. Attending formal education (AOR=2.78, 95% CI 1.52-5.07), traveling for <1 hour to reach health facility (AOR=2.03, 95% CI 1.19-3.44), (CD4) count <350 cells/mm3 (AOR=2.3, 95% CI 1.33-3.95), starting their Option B plus during pregnancy (AOR= 2.08, 95% CI 1.08-3.97), taking one pill per day (AOR=2.12, 95% CI 1.25-3.58), using a clock as a reminder (AOR=2.51, 95% CI 1.3-4.86), and having good male involvement (AOR=2.91, 95% CI 1.64-5.16) were associated with good level of adherence for Option B plus ART treatment.

Conclusion: Our study revealed that the level of good adherence is low compared with the national target. Therefore, addressing the low adherence of Option B plus ART requires a policy response, such as efforts to enhance male partner involvement and better service accessibility in Prevention of Mother-to-Child Transmission (PMTCT) program. Moreover, health care providers and policymakers need to maximaze their efforts on HIV positive pregnant and lactating mothers using a clock as a reminder.

Keywords: Ethiopia; Option B plus ART; Prevention of Mother-to-Child Transmission program; PMTCT; adherence.

8.Determinants of defaulting from completion of child immunization in Laelay Adiabo District, Tigray Region, Northern Ethiopia: A case-control study

Hailay Gebretnsae Aregawi , Tesfay Gebregzabher Gebrehiwot , Yamane Gebremariam Abebe , Kidanu Gebremariam Meles , Alem Desta Wuneh (PLoS One).

Background: Globally 2.5 million children under five years of age die every year due to vaccine preventable diseases. In Tigray Region in Northern Ethiopia, full vaccination coverage in children is low. However, the determinants of defaulting from completion of immunization have not been studied in depth. This study aimed to identify the determinants of defaulting from child immunization completion among children aged 9-23 months in the Laelay Adiabo District, North Ethiopia.

Methods: An unmatched community based case-control study design was conducted among children aged 9-23 months in the Laelay Adiabo District from February-March 2015. A survey was conducted to identify the existence of cases and controls. Two hundred and seventy children aged 9-23 months (90 cases and 180 controls) were recruited from 11 kebeles (the smallest administrative units) by a simple random sampling technique using computer based Open Epi software. Cases were children aged 9-23 months who missed at least one dose of the recommended vaccine. Controls were children aged 9-23 months who had received all recommended vaccines. Data were collected from mothers/care givers using structured pretested questionnaire. The data were entered into Epi Info version 3.5.1 and analyzed using Statistical Package for Social Sciences (SPSS) version 21. Bivariate and Multiple logistic regression analysis were used to identify the predictors of the outcome variable. The degree of association was assessed by using odds ratio with 95% Confidence Interval (CI).

Result: This study shows that mothers who take >30 minutes to reach the vaccination site (Adjusted Odds Ratio (AOR) = 3.56,95%CI:1.58-8.01); households not visited by health extension workers at least monthly (AOR = 2.68,95%CI:1.30-5.51); poor participation in women's developmental groups (AOR = 3.3,95%CI 1.54-7.08); no postnatal care follow-up (AOR = 5.2,95%CI:2.36-11.46); and poor knowledge of child immunization (AOR = 3.3,95%CI:1.87-7.43) were predictors of defaulting from completion of child immunization.

Conclusion: Postnatal care follow-up, household visits by health extension workers and maternal participation in women's development groups are important mediums for disseminating information and increasing knowledge to mothers about child immunization. To reduce the rate of defaulters, health providers should motivate and counsel mothers to attend postnatal care. Health extension

workers should visit households at least once per month and strengthen mothers' participation in the women's development groups.

10.Maternal and perinatal death surveillance and response in Ethiopia: Achievements, challenges and prospects

Brhane Ayele 1, Hailay Gebretnsae 1, Tsegay Hadgu 1, Degnesh Negash 1, Fana G/Silassie 1, Tesfu Alemu 2, Esayas Haregot 1, Tewolde Wubayehu 1, Hagos Godefay(plos one).

Background: Maternal and Perinatal Death Surveillance and Response (MPDSR) was a pilot program introduced in Tigray, Ethiopia to monitor maternal and perinatal death. However; its implementation and operation is not evaluated yet. Therefore, this study aimed to assess the implementation and operational status and determinants of MPDSR using a programmatic data and stakeholders involved in the program.

Methods: Institutional based cross-sectional study was applied in public health facilities (75 health posts, 50 health centers and 16 hospitals) using both qualitative and quantitative methods. Data were entered in to Epi-info and then transferred to SPSS version 21 for analysis. All variables with a p-value of ≤ 0.25 in the bivariate analysis were included in to multivariable logistic regression model to identify the independent predictors. For the qualitative part, manual thematic content analysis was done following data familiarization (reading and re-reading of the transcripts).

Results: In this study, only 34 (45.3%) of health posts were practicing early identification and notification of maternal/perinatal death. Furthermore, only 36 (54.5%) and 35(53%) of health facilities were practiced good quality of death review and took proper action respectively following maternal/perinatal deaths. Availability of three to four number of Health Extension Workers (HEWs) (Adjusted Odds Ratio (AOR) = 6.09, 95%CI (Confidence Interval): 1.51-24.49), availability of timely Public Health Emergency Management (PHEM) reports (AOR = 4.39, 95%CI: 1.08-17.80) and participation of steering committee's in death response (AOR = 9.19, 95%CI: 1.31-64.34) were the predictors of early identification and notification of maternal and perinatal death among health posts. Availability of trained nurse (AOR = 3.75, 95%CI: 1.08-12.99) and health facility's head work experience (AOR = 3.70, 95%CI: 1.04-13.22) were also the predictors of quality of death review among health facilities. Furthermore; availability of at least one cluster review meeting (AOR = 4.87, 95%CI: 1.30-18.26) and uninterrupted pregnant mothers registration (AOR = 6.85, 95%CI: 1.22-38.54) were associated with proper response implementation to maternal and perinatal death. Qualitative findings highlighted that perinatal death report was so neglected. Community participation and intersectoral collaboration were among

the facilitators for MPDSR implementation while limited human work force capacity and lack of maternity waiting homes were identified as some of the challenges for proper response implementation.

Conclusion: This study showed that the magnitude of: early death identification and notification, review and response implementation were low. Strengthening active surveillance with active community participation alongside with strengthening capacity building and recruitment of additional HEWs with special focus to improve the quality of health service could enhance the implementation of MPDSR in the region.

11. Magnitude and determinants for place of postnatal care utilization among mothers who delivered at home in Ethiopia: a multinomial analysis from the 2016 Ethiopian demographic health survey

Brhane Gebrekidan Ayele , Mulugeta Abrha Woldu , Haftom Weldearegay Gebrehiwot , Equbay Gebru Gebre-Egziabher, Hailay Gebretnsae , Tsegay Hadgu, Alemnesh Araya Abrha , Araya Abrha Medhanyie (Reprod Health).

Introduction: Above half of mothers in Ethiopia give birth at home. Home based care within the first week after birth as a complementary strategy to facility-based postnatal care service is critical to increase the survival of both mothers and newborns. However, evidence on utilization of postnatal care and location of service among mothers who delivered at home in Ethiopia is insufficiently documented. Therefore, this study assessed the magnitude and determinants for place of postnatal care service utilization among mothers who delivered at home in Ethiopia.

Methods: We used the 2016 Ethiopian Demographic and Health Survey, and extracted data from 4491 mothers who delivered at home during 5 years preceding the survey. A multinomial logistic regression model was applied to examine the determinants of both facility and home -based postnatal care service utilization. Likelihood ratio test was used to see the model fitness and p-value of < 0.05 was used to determine statistical significance at 95% confidence interval.

Results: From the total 4491 mothers who delivered at home, only 130(2.9%) and 236(5.3%) of them utilized postnatal service at home and at a health facility respectively. Being from an urban region (AOR = 0.378, 95%CI: 0.193-0.740), ever using the calendar method to delay pregnancy (AOR = 0.528, 95%CI: 0.337-0.826), receiving four and above antenatal care visits (AOR = 0.245, 95%CI: 0.145-0.413) and having a bank account (AOR = 0.479, 95%CI: 0.243-0.943) were the factors associated with utilizing home- based postnatal care. Similarly being a follower of the orthodox religion (AOR = 1.698, 95%CI: 1.137-2.536), being in the rich wealth index (AOR = 0.608, 95%CI: 0.424-0.873), ever using the calendar method to delay pregnancy (AOR = 0.694, 95%CI: 0.499-0.966), wantedness of the pregnancy (AOR = 0.264, 95%CI: 0.352-0.953), receiving four and above antenatal care visits (AOR = 0.264, 95%CI: 0.184-0.380) and listening to radio at least once a week (AOR = 0.652, 95%CI: 0.432-0.984) were the determinants of facility-based postnatal care utilization.

Conclusion: The coverage of postnatal care service utilization among mothers who delivered at home was very low. Living in urban region, following the Orthodox religion, having higher wealth

index, having a bank account, ever using calendar method to delay pregnancy, wantedness of the pregnancy, receiving four and above antenatal care visit and listening to radio at least weakly were associated with postnatal care service utilization. Therefore, targeted measures to improve socio-economic status, strengthen the continuum of care, and increase health literacy communication are critically important to increase postnatal care service utilization among women who deliver at home in Ethiopia.

Keywords: Ethiopia; Home delivery; Maternal service utilization; Place for PNC; Postnatal care.

12.Do mothers who delivered at health facilities return to health facilities for postnatal care follow-up? A multilevel analysis of the 2016 Ethiopian Demographic and Health Survey

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Background: Returning to health facility for postnatal care (PNC) use after giving birth at health facility could reflect the health seeking behavior of mothers. However, such studies are rare though they are critically important to develop vigorous strategies to improve PNC service utilization. Therefore, this study aimed to determine the magnitude and factors associated with returning to health facilities for PNC among mothers who delivered in Ethiopian health facilities after they were discharged.

Methods: This cross-sectional study used 2016 Ethiopian Demographic and Health Survey data. A total of 2405mothers who gave birth in a health facility were included in this study. Multilevel mixed-effect logistic regression model was fitted to estimate both independent (fixed) effects of the explanatory variables and community-level (random) effects on return for PNC utilization. Variable with p-value of ≤ 0.25 from unadjusted multilevel logistic regression were selected to develop three models and p-value of ≤0.05 was used to declare significance of the explanatory variables on the outcome variable in the final (adjusted) model. Analysis was done using IBM SPSS statistics version 21.

Result: In this analysis, from the total 2405 participants, 14.3% ((95%CI: 12.1-16.8), (n = 344)) of them returned to health facilities for PNC use after they gave birth at a health facility. From the multilevel logistic regression analysis, being employed (AOR = 1.51, 95%CI: 1.04-2.19), receiving eight and above antenatal care visits (AOR = 2.90, 95%CI: 1.05-8.00), caesarean section delivery (AOR = 2.53, 95%CI: 1.40-4.58) and rural residence (AOR = 0.56, 95%CI: 0.36-0.88) were found significantly associated with return to health facilities for PNC use among women who gave birth at health facility.

Conclusion: Facility-based PNC utilization among mothers who delivered at health facilities is low in Ethiopia. Both individual and community level variables were determined women to return to health facilities for PNC use. Thus, adopting context-specific strategies/policies could improve PNC utilization and should be paid a due focus.