

Tsegaye Melaku Kebede

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Tsegaye Melaku is a pharmacist by training and working as an academic and research staff at Jimma University in Ethiopia. Tsegaye is a young clinical pharmacist with research experience in the field of pharmaceutical sciences, infectious diseases, and antimicrobial use optimization focusing on antimicrobial drug resistance. He has attended different national and international training courses in the area in different countries like Belgium, The Netherlands, and the United Kingdom (UK), the Wellcome Sanger Institute (hosted by The Gambia Medical Research Council). He has been involved in different international and national collaborative research projects supported by Jimma University (JU), the Research Council of Norway (RCN), the World Health Organization (WHO), and the Danish International Development Agency (DANIDA) as principal investigator or investigator.

Tsegaye has authored and co-authored more than 50 research articles and published in reputable journals. He was also a member national antimicrobial stewardship guideline development task force and co-director of the antimicrobial stewardship committee at Jimma Medical Center in Ethiopia. For his contribution to academic and research works, he won awards of the “outstanding teacher and outstanding researcher of the year” from Jimma University in 2021, and also “Researcher of the Month” from Norwegian BI Business School (Norway) in 2022. Currently, he is appointed as a local antimicrobial stewardship (AMS) expert at the Global Antimicrobial Stewardship Accreditation Scheme (GAMSAS), UK. His current research project focuses on the impact of maternal vaginal dysbiosis during pregnancy and adverse pregnancy outcomes such as neonatal sepsis focusing on antibiotic resistance and molecular characterization of multidrug resistance (MDR) microorganisms.

In his project, Tsegaye will conduct screening and whole genome sequencing of selected MDR micro-organisms focusing on the Group B streptococcus (GBS) to understand its molecular diversity and resistance gene profiles from neonatal and maternal biological samples.

Project

Maternal vaginal dysbiosis and associated adverse pregnancy outcomes in Ethiopia: Epidemiological and microbiological aspects

Neonatal mortality is extremely high in sub-Saharan Africa. Newborn mortality remains an urgent concern and is an important indicator of child health, development, and well-being. The most common causes are neonatal sepsis (NS) and preterm birth (PTB), both of which are common adverse pregnancy outcomes with significant neonatal morbidity. The composition and structure of the pregnancy vaginal microbiome may influence susceptibility to adverse pregnancy outcomes. However, studies on the pregnancy vaginal microbiome have largely been limited in low resource settings including Ethiopia. Therefore, the current project aimed to evaluate vaginal colonization of women in labor with potentially pathogenic bacteria to the mothers and newborns. Additionally, it will assess the influence of vaginal dysbiosis in causing adverse pregnancy outcomes such as NS and PTB at a tertiary teaching hospital in Ethiopia. The

following are the major research questions to be addressed: (1) what are the bacteriologic profiles of maternal genito urinary and newborn colonization? (2) Do maternal factors, such as colonization by potentially pathogenic microorganisms predispose to adverse birth outcomes in newborns? (3) How do identified bacterial pathogens respond to commonly used antibiotics in the setting? The prospective cohort study that includes mother-infant dyads will be employed and follow them during the hospital stay up to 7 days during the postpartum period for the endpoints. Consenting pregnant women coming to maternity ward of JMC for delivery services will be included. To evaluate the impact of maternal colonization on newborn infections, we will perform microbiological and/or molecular analysis from the recto-vaginal swabs and surface body swabs collected from mother and neonate, respectively, as per the recommended protocol and stepwise standard operation procedures. Within the cohort of mother-infant pairings, the possibility for organism transmission from mother to newborn will be evaluated for colonization of the same bacterial species with the same antibiogram. This will be demonstrated by using pairwise sequence alignment-based methods of dendrogram construction. A minimum inhibitory concentration test, disk diffusion methods or MALDI coupled to time-of-flight mass spectrometry (MALDI-TOF MS) will be used for antibiotic susceptibility test, and with possibility of molecular characterization of the isolates. The International Council on Harmonization Guidelines for Good Clinical Practice and the principles of the Declaration of Helsinki shall be followed in conducting the study.