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SEROPREVALENCE AND ANTIMICROBIAL RESISTANCE OF NON-TYPHOIDAL *SALMONELLA* DISEASE AND ASSOCIATED FACTORS IN CHILDREN IN NAIROBI CITY COUNTY, KENYA

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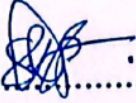
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DECLARATION

I hereby declare that this thesis is my original work and has not been presented for a degree or awards in any other University.

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SUPERVISORS

We confirm that the work reported in this thesis was carried out by the candidate under our supervision as supervisors.

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ABSTRACT

Salmonella enterica that causes human disease is divided into non-typhoidal *Salmonella* (NTS) and typhoidal serotypes. Non-typhoidal *Salmonella* infections are more common and remain an important public health challenge worldwide. In sub-Saharan Africa, invasive non-typhoidal *Salmonella* (iNTS) disease is commonly caused by *S. Enteritidis* and *S. Typhimurium* and is common among young children who are malnourished and adults who are infected with Human Immunodeficiency Virus (HIV). Invasive NTS disease is endemic in Kenya and is associated with sporadic fatal outbreaks in several regions of the country and particularly in the slum dwelling areas like Mukuru. The objective of the present study was to determine the seroprevalence and antimicrobial resistance of non-typhoidal *Salmonella* disease and associated factors in children in Mukuru settlement in Nairobi County, Kenya. Cross-sectional case-controlled study design was adopted in the study, where a total of 382 study subjects were recruited out of which 191 of the participants were iNTS symptomatic while 191 were asymptomatic. Participants recruited in the study provided blood samples for immunoglobulin (Ig) G and IgM quantification through Enzyme Linked Immunosorbent Assay (ELISA) and the symptomatic participants also provided stool samples for antimicrobial susceptibility testing of the recovered iNTS isolates from the stool and blood samples. Questionnaires were administered to the parents/guardians of the eligible study participants which helped collect data on host and environmental factors associated with iNTS exposure. Statistical data analysis was conducted using R-statistics. Descriptive analysis was performed to aid describe the study population. Chi-square statistic helped to determine which population between (symptomatic) and (asymptomatic) was more exposed to iNTS. The difference in the susceptibility patterns between the isolated iNTS was analyzed through Fisher's test. The association between iNTS exposure and possible host and environmental factors was determined using multivariate logistic regression analysis. The study results indicated iNTS exposure seroprevalence of 12.6% among the symptomatic and asymptomatic children. The seroprevalence of iNTS among the female was found not to be significantly different from that of male participants ($\chi^2 = 0.083333$; $p=0.7728$). Invasive NTS exposed participants indicated a peak at age 37-48 months and lower proportion was observed among children aged 25-36 months. The proportion of iNTS infection among the symptomatic and asymptomatic participants was not significantly different ($\chi^2 = 0.99649$; $p = 0.3182$). Both *S. Typhimurium* and *S. Enteritidis* isolates were resistant to gentamycin. *Salmonella Typhimurium* was found also to be resistant to tetracycline drug. The seroprevalence of iNTS was significantly associated with the participant's shortened mid arm length ($p= 0.041$), cooking water ($p= 0.0112$) and washing water ($p= 0.034$). Having received polio virus vaccine ($p= 0.009$) and treating water using boiling method or water guard ($p= 0.005$) were identified as being protective against infection with (*Salmonella Enteritidis*) and *S. Typhimurium*. From the study, it was concluded that iNTS is prevalent in Mukuru slums and that treating drinking water and having received polio virus vaccine were protective against *Salmonella* disease. Furthermore, public municipal tap water used for cooking and washing was associated with iNTS infections. The study recommends increased surveillance of iNTS from both symptomatic and asymptomatic people in order to provide data for policy on prevention and control of iNTS disease.