Outcomes of newborns with surgical conditions at moi teaching and referral hospital: the context of a structured standard operating procedure for newborn transport

ABSTRACT

World over, neonatal mortality contributes significantly to the under-five mortality rate, and 10% of neonatal deaths in L/MICs are due to surgical conditions. In Kenya, newborn surgical care is only provided in two tertiary-level hospitals, one each in Eldoret and Nairobi. As the majority of the newborns with surgical conditions are born or seek initial care in the lower-level health facilities, appropriate referral and transport of these newborns to the tertiary-level hospitals often underlie their survival. This study was conducted to evaluate the outcomes of newborns with surgical conditions at the Moi Teaching and Referral Hospital (MTRH), in the context of a structured Standard Operating Procedure (SOP) for newborn transport. A Cluster Randomized Controlled Trial that was based on Post-Test – Only ControlGroup design, was conducted. Ten clusters (county hospitals that refer neonates with surgical conditions to the MTRH) were randomly selected and randomized into two groups (Intervention Group-A and Control Group-B) of 5 hospitals each. A structured SOP for transport of newborns, that was based on the WHO guidelines on transfer and referral of sick neonates (WHO, 2003), was introduced in the Newborn Units/Labour Wards of the referring county hospitals in the intervention group (Group A) via an education module. Thereafter, a blinded research assistant enrolled a total of 126 newborns referred and transported from the selected county hospitals upon their admission at the MTRH (63 from the hospitals in Group A, and 63 from the hospitals in Group B). Data was collected on their socio-demographic, referral and transport characteristics; clinical diagnosis; and clinical status at admission. The newborns were then followed up until discharge or death. The outcomes of the newborns in the two groups were compared to assess the effect of the structured SOP. The statistical tests that were applied to the data included chi-square and Fisher's exact tests for the categorical variables and Wilcoxon rank sum test for the continuous variables, and p values < .05 were considered statistically significant. Predictors of neonatal mortality were determined by regression analysis using Cox Proportional-Hazards Model. One-hundred and twenty-six (126) newborns were enrolled into the study between February 2018 and January 2019. The median age at admission was 4.1 days (99 [IQR=77, 128] hours) for the newborns referred from the county hospitals in the intervention group (Group A), and 4.6 days (112 [IQR=75, 137] hours) for those referred from the county hospitals in the control group (Group B). Only 14 (22.2%) mothers in Group A and 12 (19.0%) mothers in Group B had optimal antenatal care during pregnancy. The top 4 surgical conditions in both groups were gastroschisis (27.0% in Group A, 19.1% in Group B), hydrocephalus (14.3% in Group A, 22.2% in Group B), Hirschsprung's disease (7.9% in Group A, 20.6% in Group B), and ano-rectal malformations (ARM) (17.5% in Group A, 11.1% in Group B). The majority of the newborns referred from the county hospitals in Group A were accorded pre-transport clinical stabilization and care during transport, as compared to those referred from the county hospitals in Group B. There was a statistically significant difference (P<.05) in all parameters that measured the clinical status of the newborns at admission, between those referred from the county hospitals in Group A, and those referred from the county hospitals in group B. The all-cause in-hospital mortality rate was 3.2% in Group A, and 28.6% in Group B (P<.001). The median duration of hospital stay was 11 (IQR=8, 17) days in Group A, and 18 (IQR=9, 28) days in Group B. Statistically significant predictors of neonatal mortality were weight at admission (< 2500g) (Hazard Ratio: 0.118; 95%CI: 0.016- 0.888; P<.05), and Respiratory Rate (> 60 breaths/minute) (Hazard Ratio: 3.221; 95%CI: 1.078-9.626; P<.05). Overall, the structured SOP significantly improved the outcomes of newborn with surgical conditions, referred and transported to MTRH. However, the newborns had delay in accessing neonatal surgical care; and the majority of their mothers had sub-optimal antenatal care during pregnancy despite the apparent high health-facility delivery.