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Uptake, utilisation and spatial distribution of insecticide treated mosquito nets amongst pregnant women in Zimbabwe in 2015

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2021

https://hdl.handle.net/10539/33603

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Abstract

Background

Despite proven efficacious interventions to prevent malaria, over 90% of malaria cases still occur in sub-Saharan Africa. In 2016, Zimbabwe reported more than 300 000 cases with a death toll of 3 200. Malaria in pregnancy is a significant cause of both maternal and child morbidity and mortality. The World Health Organization recommends full insecticide mosquito net coverage to decrease the incidence of malaria. The aim of this study is to determine the uptake, utilisation, spatial distribution of insecticide treated nets (ITNs) and determine the predictors associated with ITN uptake and utilisation amongst Zimbabwean women of childbearing age in 2015. Uptake is the ownership of an ITN or living in a household with at least one ITN. Utilisation was when the respondent slept under an ITN the night before the interview.

Methods

We carried out secondary data analysis on cross-sectional data from the 2015 Zimbabwe Demographic Health Survey. There were 611 pregnant women who were matched with 1 833 non-pregnant women using propensity score matching, to make a total of 2 444 study participants. There were two outcomes, uptake and utilisation. Survey adjusted proportions were used to determine ITN uptake and utilisation rates. Survey adjusted t-test and Pearson's Chi Squared test were carried out to determine baseline characteristics against the two outcomes. Exploratory spatial analysis which included mapping the ITN uptake and utilisation prevalences and hotspot analysis were carried out. Multi-level logistic models with non-random and spatial random effects were produced using variables significant in the bivariate analysis for both outcomes. Conditional autoregressive (CAR) models were fitted with individual level data and simultaneous regressive (SAR) models were fitted with ecological

data at district level and maps were produced to determine the predictors of ITN uptake and use after adjusting for spatial random effects. An intrinsic Bayesian multivariate CAR model for mapping multiple outcomes was fit to determine the correlation between uptake and utilisation of ITNs.

Results

Out of 2 444, 1 136 participants (45.66%) reported uptake and 245 participants (8.13%) reported to have slept under an ITN the night before. Results from the multi-level logistic models showed that for every year increase in age, the odds of ITN uptake increased by 0.02 (95% CI 1.01; 1.04 p-value 0.03). When compared to respondents who made decisions about their own health, those whose partners made decisions on their behalf had an adjusted odds ratio of 0.59 of ITN uptake (95% CI 0.40; 0.88 p-value 0.009). With Harare as the reference, living in Mashonaland West and in Matabeleland North increased the odds of ITN uptake and utilisation of ITNs. The adjusted odds ratios of ITN uptake for Mashonaland West and Matabeleland North were 10.04 and 12.27 respectively (95% CIs 5.60; 18.03 and 6.93; 21.72 respectively). Both outcomes displayed significant spatial autocorrelation. Using individual level data, after adjusting for spatial random effects, age and person has final say on respondent's health remained significant predictors of ITN uptake, with age only being a predictor of ITN utilisation. The SAR model also showed that districts with higher employment levels had lower rates of ITN uptake. Spatial analysis using the intrinsic Bayesian CAR model showed that there was a positive correlation of 0.96 (95% BCI 0.80; 0.99) between uptake and utilisation of ITNs.

Conclusion

The ITN uptake and utilisation rates were suboptimal. Even though the spatial distribution of ITN uptake and use showed some relationship with the spatial heterogeneity of malaria transmission, there were still low levels of both ownership and use in malaria-endemic areas. We showed that women who have health autonomy and older women were more likely to own and use ITNs. There is a need to upscale ITN distribution and education campaigns in all parts of Zimbabwe to make sure that women from all age-groups and backgrounds are reached by these. Policies that empower women also have the potential to increase uptake of this efficacious intervention as well as increase uptake of other health interventions.

Key words: Malaria in pregnancy, ITN uptake/ownership, ITN utilisation/use