Publication

Achieving high coverage of larval-stage mosquito surveillance: challenges for a community-based mosquito control programme in urban Dar es Salaam, Tanzania

ABSTRACT: BACKGROUND: Preventing malaria by controlling mosquitoes in their larval stages requires regular sensitive monitoring of vector populations and intervention coverage. The study assessed the effectiveness of operational, community-based larval habitat surveillance systems within the Urban Malaria Control Programme (UMCP) in urban Dar es Salaam, Tanzania. METHODS: Cross-sectional surveys were carried out to assess the ability of community-owned resource persons (CORPs) to detect mosquito breeding sites and larvae in areas with and without larviciding. Potential environmental and programmatic determinants of habitat detection coverage and detection sensitivity of mosquito larvae were recorded during guided walks with 64 different CORPs to assess the accuracy of data each had collected the previous day. RESULTS: CORPs reported the presence of 66.2% of all aquatic habitats (1,963/2,965), but only detected Anopheles larvae in 12.6% (29/230) of habitats that contained them. Detection sensitivity was particularly low for late-stage Anopheles (2.7%, 3/111), the most direct programmatic indicator of malaria vector productivity. Whether a CORP found a wet habitat or not was associated with his/her unfamiliarity with the area (Odds Ratio (OR) [95% confidence interval (CI)] = 0.16 [0.130, 0.203], P<0.001), the habitat type (P<0.001) or a fence around the compound (OR [95%CI] = 0.50 [0.386, 0.646], P<0.001). The majority of mosquito larvae (Anophelines 57.8 % (133/230) and Culicines 55.9% (461/825) were not reported because their habitats were not found. The only factor affecting detection of Anopheline larvae in habitats that were reported by CORPs was larviciding, which reduced sensitivity (OR [95%CI] = 0.37 [0.142, 0.965], P=0.042). CONCLUSIONS: Accessibility of habitats in urban settings presents a major challenge because the majority of compounds are fenced for security reasons. Furthermore, CORPs under-reported larvae especially where larvicides were applied. This UMCP system for larval surveillance in cities must be urgently revised to improve access to enclosed compounds and the sensitivity with which habitats are searched for larvae

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