THE PREVALENCE OF *Vibrio cholerae* AND OTHER *Vibrio* spp. IN SURFACE WATER OF RURAL COMMUNITIES IN THE LIMPOPO PROVINCE OF SOUTH AFRICA

by

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ABSTRACT

Introduction: *Vibrio cholerae* is a waterborne pathogen that has caused several outbreaks in developing parts of the world due to a lack of access to clean water.

Objectives: The aim of the study was to investigate the prevalence of *Vibrio cholerae* and other *Vibrio* species in surface waters used by rural communities in the Limpopo province of South Africa.

Materials and method: A total of 120 water samples were collected over a period of three months from 13 rivers in the rural communities of the Vhembe district. The study area encompassed 3 of the 4 Vhembe municipalities namely Thulamela, Mutale, Makhado municipalities. The water samples were collected from three points on each river (upstream, middle stream and downstream). Physico-chemical parameters (pH, Temperature, Total dissolved solids (TDS), electric conductivity (EC)) were measured for each sample. Isolation of *Vibrio* spp. was done using membrane filtration technique, followed by pre-enrichment of the bacteria in Alkaline Peptone Water after which the bacteria was cultured onto Thiosulfate Citrate Bile Salts (TCBS) selective agar. Presumptive *Vibrio* isolates where identified using a series of biochemical identification techniques which included: Gram staining, Oxidase test and API 20 E Identification strips. DNA was extracted from all samples which were identified as *Vibrio* spp by the API 20 E strips. Two optimized multiplex conventional PCR assays were used to identify the pathogenic strain of the presumptive *Vibrio* isolates. The first PCR assay targeted 16S rRNA *(Vibrio* species*), ctxA* (cholera toxin) and *sodB* (Multiplex 1) genes and the second PCR assay targeted 16S rRNA *V. cholerae* O1 *rfb* and *V.p flae* (Multiplex 2) genes.

Results and discussion: *Vibrio cholerae* non O1 was the only prevalent strain identified over the study period. Most physico-chemical parameters of the rivers (pH, Temperature, TDS and electric conductivity were within the (DWAF 1998), (WRC 1998) and (WHO 2011) standard guideline limits.