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GROUNDWATER QUALITY AND ANTIBIOTIC RESISTANCE OF BACTERIA IN WILGAMUWA, AN AREA OF CHRONIC KIDNEY DISEASE OF UNKNOWN ETIOLOGY (CKDu) IN SRI LANKA

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Wilgamuwa region is identified as a hotspot of Chronic Kidney Disease with unknown etiology (CKDu). In this region, groundwater is the main source of drinking water. Since there are no records as yet of coliform bacteria in drinking water and their influence on the etiology of CKDu in these areas, an investigation was carried out to assess the presence of coliform bacteria in drinking water samples and ascertain their antibiotic resistance. The results were compared with drinking water samples from Minipe, an area considered as a non-prevalent region. Twenty-six and 25 groundwater samples, from Wilgamuwa and Minipe respectively, were collected during January-October 2019. Membrane filtration technique was performed to obtain total and fecal coliforms, followed by biochemical tests on randomly selected typical coliform colonies for further identification. Antibiotic Sensitivity Testing (ABST) was carried out using 12 antibiotics, to assess the antibiotic resistance of bacterial strains isolated from both regions. In groundwater from Wilgamuwa and Minipe regions, the average total coliform (TC) counts were 19.26 and 16.72 CFU/100 mL, respectively, while the average fecal coliform (FC) counts were 5.2 and 5.0 CFU/100 mL, respectively. These values exceeded the permitted values stipulated by WHO guidelines (0 CFU/100 mL for both TC and FC) and SLS standards (< 4 and 0 CFU/100 mL, for TC and FC, respectively) for coliforms in drinking water. Out of a total of 120 isolates, *Escherichia coli*, *Klebsiella* sp. and *Yersinia* sp. were identified in both areas, while *Enterobacter* sp. was identified only in Wilgamuwa. A higher prevelance of antibiotic resistance was observed in the isolates from Wilgamuwa region compared to those from Minipe, which was significant at $p < 0.05$. In conclusion, the high coliform counts and the high antibiotic resistance observed in bacterial isolates in the CKDu areas may give a lead to the treatment regime of secondary infections of CKDu patients. Further investigations have to be carried out including all CKDu hotspots, and comparisons with non-endemic regions in Sri Lanka are necessary to confirm these findings, using the current study as a baseline.

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