INTISARI

Latar Belakang: Penyakit periodontal merupakan masalah kesehatan oral di Indonesia dengan jumlah kasus periodontitis sebesar 74,10% pada tahun 2018. Kehilangan gigi dapat disebabkan karena tingkat keparahan penyakit periodontal yang tinggi. Penyebab utama penyakit periodontal adalah faktor lokal yaitu bakteri plak dan kalkulus gigi. Akumulasi kalkulus gigi meningkat oleh adanya jumlah kalsium dan mineral dalam saliva seperti fluorida. Masyarakat Kalurahan Wukrisari sebagian besar masih menggunakan air sumur sebagai sumber air bersih. Air sumur tersebut mengandung mineral tinggi seperti fluorida, $CaCO_3$, serta derajat keasaman (pH). Kasus kalkulus gigi di Puskesmas I Imogiri tahun 2022-2023 ditemukan sebanyak 344.

Tujuan: Penelitian ini bertujuan untuk mengetahui, menganalisis, dan menjelaskan hubungan antara kadar Fluorida, $CaCO_3$, dan pH dalam air sumur yang dikonsumsi dengan *Calculus Index* masyarakat Kalurahan Wukirsari, Kecamatan Imogiri, Kabupaten Bantul, Daerah Istimewa Yogyakarta.

Metode: Jenis penelitian ini adalah analitik observasional dengan desain *cross sectional* pada 169 subjek usia 20-44 tahun yang mengonsumsi air sumur. Data primer diperoleh langsung dengan wawancara, pemeriksaan *Calculus Index,* dan uji parameter kimia air bersih. Data sekunder diperoleh dari Puskesmas Imogiri I dan data kependudukan. Analisis data dilakukan secara univariat, bivariat, dan multivariat menggunakan uji linier berganda dengan IBM Statistik.

Hasil: Rerata kadar fluorida didapatkan hasil 0,74 (sedang), kadar $CaCO_3$ 162,80 (sadah), pH 7,12 (basa), dan skor *Calculus Index* 1,91 (buruk). Hasil analisis bivariat menunjukkan terdapat hubungan yang signifikan antara kadar fluorida, $CaCO_3$, pH, usia, dan perilaku menyikat gigi dengan *Calculus Index* ($p < 0,05$). Variabel yang berhubungan signifikan pada analisis multivariat yaitu kadar fluorida ($p < 0,05$).

Kesimpulan: Kadar fluorida yang rendah, $CaCO_3$ yang tinggi, dan usia berhubungan secara signifikan dengan tingkat keparahan *Calculus Index*. Solusi potensial melibatkan peningkatan kadar fluorida dengan fluoridasi air minum dan pengurangan $CaCO_3$ melalui proses pemanasan air. Edukasi mengenai pentingnya kualitas air dan kebersihan gigi menjadi kunci utama untuk mengurangi prevalensi penyakit periodontal serta meningkatkan kesehatan masyarakat.

Kata Kunci: Air, Fluorida, $CaCO_3$, pH, *Calculus Index*

ABSTRACT

Background: Periodontal diseases are part of the oral health problems in Indonesia, with the number of periodontitis cases being 74.10% in 2018. Severe periodontal diseases may result in tooth loss. The main causes of periodontal diseases are local factors, such as dental plaque and dental calculus. The increasing accumulation of dental calculus is stimulated by the levels of calcium and mineral, such as fluoride, in the saliva. The majority of people in Wukirsari Ward still use well water as a source of clean water, which contains a high level of minerals, such as fluoride, $CaCO_3$, and pH. The number of dental calculus cases at Imogiri 1 Community Health Center from 2022 to 2023 was 344 cases.

Objectives: This study aims to determine, analyze, and explain the correlation between the levels of fluoride, $CaCO_3$, and pH in well water with the calculus index of the people of Wukirsari Ward, Imogiri Subdistrict, Bantul Regency, Special Region of Yogyakarta.

Methods: This is an analytical observational study with a cross-sectional design. This study involved 169 participants aged between 20 and 44 years who drank well water. Primary data were obtained directly from interviews, assessments of the calculus index, and measurements of the chemical parameters of water quality. Meanwhile, secondary data were obtained from Imogiri 1 Community Health Center and demographic data. Data were analyzed using univariate, bivariate, and multivariate analyses with multiple linear regression using IBM Statistics.

Results: The results showed that the average fluoride level was 0,74 (moderate), the average $CaCO_3$ was 162,80 (hard), and the average score of the calculus index was 1,91 (bad). Bivariate analysis showed that the levels of fluoride, $CaCO_3$, and pH, as well as age and tooth brushing habit, had a significant correlation with the calculus index ($p < 0,05$). Meanwhile, multivariate analysis showed that variables that were significantly correlated were fluoride level ($p < 0,05$).

Conclusion: A low level of fluoride, a high level of $CaCO_3$, and age significantly correlated with the severity of the calculus index. A potential solution includes increasing fluoride levels by drinking water fluoridation and reducing $CaCO_3$ levels by boiling water. Moreover, education about the importance of water quality and dental hygiene is a key to reducing the prevalence of periodontal diseases and improving public health.

Keywords: Water, Fluoride, $CaCO_3$, pH, Calculus Index