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FGF-23 Expression Unlocks New Perspectives on Anaemia in Chronic Kidney Disease

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Objectives : Chronic Kidney Disease (CKD), affecting 15.48% of Malaysia's population in 2018, is a major health concern associated with reduced kidney function and anaemia. Anaemia worsens CKD outcomes and increases mortality. Fibroblast Growth Factor 23 (FGF-23) regulates phosphate metabolism and suppresses erythropoietin (EPO) production, contributing to anaemia. This study aims to examine FGF-23 gene expression across CKD stages and its correlation with anaemia prevalence to support early detection and management strategies.

Methods : A cross-sectional study was conducted involving 200 blood samples collected from CKD patients undergoing haemodialysis at KPJ Selangor Specialist Hospital. Kidney function tests and haemoglobin concentration measurements were performed to classify patients according to CKD stages and determine anaemia status. RNA extraction was conducted from patient blood samples, followed by real-time polymerase chain reaction (RT-PCR) to evaluate FGF-23 gene expression. Quantitative PCR (qPCR) was employed to quantify FGF-23 expression levels, facilitating a correlation analysis between FGF-23 expression and anaemia prevalence in CKD patients.

Results : Elevated FGF-23 expression was identified in CKD patients with anaemia. Analysis of qPCR data revealed a two-fold increase in FGF-23 gene expression in anemic CKD patients compared to non-anaemic individuals within the CKD cohort. These findings were corroborated by RT-PCR analyses, which confirmed the upregulation of FGF-23 expression in patients with anaemia. Additionally, FGF-23 expression demonstrated a significant positive correlation with advanced CKD stages and lower haemoglobin levels, reinforcing its potential role in the pathophysiology of anaemia associated with CKD.

Conclusions : This study identifies a strong link between elevated FGF-23 expression and anaemia in CKD patients, positioning FGF-23 as a potential biomarker and therapeutic target. Findings highlight its role in erythropoiesis and phosphate metabolism, offering critical insights into CKD-related anaemia. Further validation could pave the way for novel strategies to enhance anaemia management in CKD.