

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF A USER-CENTERED MOBILE
APPLICATION DESIGN FOR NUTRITION EDUCATION ON
VITAMIN D IN CHILDREN AGED 10 TO 12 YEARS OLD**

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ABSTRACT

The prevalence of vitamin D deficiency among children globally and in Malaysia is significantly high, with daily intake usually not met. Despite this, few digital interventions focus on vitamin D among children. This study aims to develop a mobile app for vitamin D nutrition education for children aged 10-12 years old. Employing a cross-sectional design in Phase 1 for needs assessment, the study involved 47 school-age children from three primary schools in Puncak Alam, Selangor. Data were collected through structured questionnaires distributed via Telegram following a detailed briefing about the research to assess general and nutritional knowledge, attitudes, and practices regarding vitamin D, analyzed using descriptive statistics. Results showed respondents had adequate knowledge, moderate positive attitudes, and moderate practices regarding vitamin D, with most liking the proposed app features. Phase 2 involved developing module content and designing the mobile app based on Phase 1 data. The "Riang Ria Vitamin D" mobile app, an Android application, incorporates features like personalized names, background colors, font sizes, pictures, menu buttons, responses, and clues. This app has the potential to contribute as a nutrition education tool tailored to primary school students' preferences, aiming to educate them on vitamin D and enhance their health outcomes. Future recommendations include evaluating the application with experts and target users, and further testing its acceptance and usability among children.

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CHAPTER 1: INTRODUCTION

Vitamin D which is also known as sunshine vitamin is essential for bone health, controlling the body's inflammatory response and immune system cells (Baciur et al., 2022; Tabassum et al., 2023). Moreover, vitamin D plays a crucial role in children's health by supporting biological processes, maintaining healthy bones, and regulating calcium and phosphate metabolism (Joshi and Suma Uday, 2023). This can be supported by a study by Chowdhary et al. (2023) which found a strong correlation between vitamin D insufficiency and stunting in children aged 5-15, with subclinical vitamin D insufficiency potentially contributing to stunting and poor growth. Vitamin D can be divided into two forms which are D2 and D3 also known as Ergocalciferol and Cholecalciferol respectively. This vitamin can be obtained from several sources such as endogenous synthesis in the skin by ultraviolet B radiation or consume dietary supplements and dietary sources, which include animal and plant-based foods as well as fortified products. Fortified foods may contain D3 or D2 forms, as well as the vitamin D metabolite 25-hydroxyvitamin D (Benedik, 2021).

Vitamin D insufficiency is linked to malnutrition, especially in children. This can be proven by findings from previous studies which stated that between 31% and 61% of malnourished children suffer from vitamin D insufficiency (Afroze Tisha et al., 2023; Dhulse et al., 2023) and 13.9 % of children between the ages of one and five in Malaysia were found to be undernourished (Lee et al., 2022). Vitamin D deficiency is a serious health issue, affecting individuals worldwide. Factors such as sun exposure, latitude changes, sunscreen use, and darker skin pigmentation contribute to this deficiency (Saki et al., 2015). Other factors that can cause vitamin D deficiency include malabsorption syndrome, elimination diets, long-term glucocorticosteroid use, AIDS medications, obesity, liver failure, chronic kidney disease, and kidney recipients Kubicska et al. (2023). Other than that, vitamin D deficiency can lead to various complications, including