WhatsApp-Based AI Reminder and Guidance System for Child Growth and Development Monitoring in Remote Areas: A Case Study of Buru Regency, Maluku

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ABSTRACT

Monitoring child growth and development is essential to reduce stunting and improve the future quality of life. In Indonesia, most parents focus more on physical growth such as weight and height, while developmental aspects like motor, language, and cognitive skills are often neglected. These two aspects are closely related, and delays in development may increase the risk of stunting, reduce school readiness, and affect productivity later in life.

In Buru Regency, Maluku, this problem is quite serious. The 2024 SSGI survey reports a stunting prevalence of 25.4%, well above the national target of 14%. While 96.9% of children have a *Buku KIA* (Maternal and Child Health Book), only 3.6% of infants are exclusively breastfed for six months, and Posyandu attendance remains low at 68.8%. On the other hand, digital adoption is very high, with 90.9% of Indonesians using WhatsApp monthly. This situation shows a paradox. Health literacy is low, but digital access is very high.

Global studies emphasize the importance of early interventions to reduce stunting and enhance school readiness (Grantham-McGregor et al., 2017; WHO, 2022). In Indonesia, national programs such as the 1,000 Days of Life Initiative (*Gerakan 1000 HPK*) and Family-Based Healthy Indonesia Program (*PIS-PK*) have raised maternal and child health awareness, though implementation in remote areas remains limited (Bappenas, 2021).

Mobile health (mHealth) interventions have proven effective in various contexts, such as SMS reminders for antenatal visits (Pratama et al., 2019), yet challenges in local adaptation and sustainability persist. Combining the widely used WhatsApp platform with Artificial Intelligence (AI) offers potential to increase parental engagement and support comprehensive monitoring of child growth and development.

This study aims to design a WhatsApp-based system supported by AI that provides reminders and guidance for parents, especially mothers, to monitor both the growth and development of their children aged 0–24 months. The system is expected to improve family health literacy, increase parent involvement in early stimulation, and help reduce stunting in Buru regency.

The system works through a simple and accessible process. First, registration. Mothers send a first message to the service, and AI collects basic child information (name, date of birth, gender). Second, monthly reminders. AI sends personalized messages asking whether the child has been weighed and also simple questions about developmental milestones. Third, stimulation guidance. If the child shows delays, the system gives easy activities using household items. Fourth, integration with Posyandu. AI reminds parents of weighing schedules, helps interpret the child's growth chart, and suggests follow-up actions. Fifth, local nutrition advice. The system promotes local food for complementary feeding (e.g., sago, fish, sweet potatoes). Sixth, health worker contacts. Mothers can access contact details of midwives, nutrition staff, or lactation counselors.

Early stimulation and parental involvement are proven to protect children against stunting and developmental delays (WHO, 2022). Unlike conventional mHealth applications that often require downloading, regular updates, or high digital literacy, a WhatsApp-based AI system leverages a platform already familiar to most Indonesian families. By providing timely reminders, personalized guidance, and simple home-based activities directly through WhatsApp, the system shifts child

monitoring from health facilities to the family level, empowering parents as active participants rather than passive recipients. Its AI-driven personalization ensures that messages and recommendations are tailored to each child's age and developmental stage, while integration with health workers allows for immediate feedback and support. This approach not only strengthens parental engagement but also bridges gaps in health service delivery in remote areas, ensuring consistent monitoring and support during critical stages of growth and development.

A WhatsApp-based reminder and guidance system with AI support offers a low-cost, scalable innovation for monitoring child growth and development in remote areas. By improving family health literacy and strengthening collaboration with health workers, this initiative can contribute to reducing stunting and building stronger human capital for Indonesia's future.

Keywords: *Child growth and development, stunting, WhatsApp, AI, maternal-child health*

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