



Use of technology for monitoring the development of nutritional status 1000 hpk in stunting prevention in Indonesia[☆]

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ABSTRACT

Objective: This study is reviewed about the use of technology to monitor the nutritional status of the first thousand days of life (1000 HPK), a program in Indonesia to prevent stunting.

Method: In this study, which is looking for journals used in the literature review, journals used in literature review obtained through the database of international journal providers such as Google scholar, PubMed, and Proquest. Researchers wrote the appropriate keywords, namely nutritional status of 1000 HPK, stunting, and application. The year limit used is ten years from 2010 to 2020.

Results: Nutritional status in the first thousand days of life (1000 HPK), which is 270 days during pregnancy and 730 days in the baby's first life, is critical because the consequences are permanent and irreparable. Pregnant women and toddlers who are less attentive about their food intake will impact nutritional problems or nutritional status that will then affect their development in the future. The level of optimal nutritional status will be achieved if nutritional needs are met, but on the contrary unbalanced nutrition can cause several diseases, including stunting. Monitoring the development of toddlers is very important to know the existence of growth disorders early on, by taking weight measurement as the best way to assess the nutritional status of pregnant women and toddlers every month so that the child's growth will be monitored. One tool for measuring nutritional status is to use applications, and technological advances have now undergone rapid development. Application is a multifunctional product with all its sophistication which can help humans in various ways.

Conclusion: From some journals can be concluded that the use of applications in monitoring the nutritional status of 1000 HPK facilitates parents, midwives, and other health workers in working to monitor the nutritional development of pregnant women and the growth of infants and toddlers for stunting prevention.

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Introduction

Nutritional status in the first thousand days of life (1000 HPK), which is 270 days during pregnancy and 730 days in the baby's first life, is a critical period because the consequences are permanent and irreparable. The period of 1000 HPK was so important that the World Bank (2009) referred to it as the "Window of Opportunity." That is, the opportunity ("opportunity") and "target" to improve the quality of human resources of future generations turned out to be narrow ("window"). The 1000 HPK is a food insecurity group including pregnant women, nursing mothers, and children under two years old. Thus the nutrition program policy is focused on this group of 1000 HPK. Since 2010 in the international world

known sun movement (Scaling Up Nutrition) and in Indonesia, this effort developed into a National Movement conscious nutrition to accelerate nutrition improvement in the first 1000 days of life (Movement 1000 HPK).¹ Specific indicators to assess the achievement of specific nutritional interventions include the protection of pregnant women against iron deficiency, folic acid, and chronic energy and protein deficiency (KEK), protection of protein adequacy in nursing mothers, protection of children under two years of breast milk containing enough protein and iron, and treatment of diarrhea.^{1,2}

Stunting is one of the nutritional problems faced in the world, especially in poor and developing countries.³ Stunting becomes a problem because it is associated with an increased risk of pain and death, suboptimal brain development so that motor development is late and mental growth is inhibited. Some studies show the risks associated with stunting include decreased academic achievement, increased risk of obesity, more susceptibility to non-communicable diseases, and increased risk of degenerative diseases. Over the past 20 years, the handling of stunting problems has been prolonged. Globally, the percentage of children stunted by growth has declined

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Table 1
Relevant studies.

No	Researcher Name/Year	Title	Purpose	Method	Result
1	Intan Gumilang, Pratiwi, Dian Aby Restanty/2018	Application of Android-Based Application “Nutritional Status of Toddlers To Maternal Knowledge In Monitoring Nutritional Status of Children Aged 12-24 Months”	It measures the skills of mothers in the application of android-based applications of the nutritional status of toddlers in monitoring the nutritional status of children aged 12-24 months.	Pseudo experiment with pre-post-test design approach—analysis used by Mann Whitney.	There is a significant influence of the android-based application “nutritional status of toddlers” on mothers’ knowledge in monitoring the nutritional status of children aged 12–24 months. From the results of this study, it is expected that there is a new method of technology used to improve maternal knowledge in monitoring the nutrition of toddlers. ¹⁰
2	Julia Dian Pratiwi, Nur Rokhman/2017	Development of Web-Based Maternal and Child Health Information System Input at RSKIA Bhakti Ibu Yogyakarta	Make input of maternal and child health information system based on the web at RSKIA Bhakti Ibu Yogyakarta.	Notepad++ has used the help of bootstrap Framework for Designing interfaces, Codeigniter framework for connections with databases, as well as MySQL for Creating databases.	The designer has made the input of the maternal and child health information system at RSKIA Bhakti Ibu Yogyakarta. ¹¹
3	Agustian, Nurhadi, Irawan/2015	Designing android-based mother and child health apps (KIA)	Create a mother and child health app (KIA) that can be run on android-based smartphones and help mothers or mothers-to-be get good and correct information.	this system is a model waterfall	The application can provide helpful information to application users, especially pregnant women, about the pregnancy cycle, child development, danger signs in pregnant women, and postpartum tips. ¹²
4	Dio Arisyahputra/2019	Android-based Child Growth Monitoring App Design	The design of this android-based child development monitoring application becomes very important to help parents know the condition of the baby’s growth and development and optimize it anytime and anywhere.	Developmental Preskrining Questionnaire	The purpose of this system is to: 1. Determine the status of children’s growth based on weight according to age, length or height according to age, weight according to length or height, and head circumference. 2. Diagnose results according to the answer from KPSP answered by the user (parent). 3. Save history of previous growth and development measurements. ¹³
5	Ardiawan Rivaldi, Bambang Hadi Kartiko, Gerson Feoh/2018	Design of Application for recording the development of children under five years old and android-based pregnant women in the puskesmas sumbersari parigi moutong district of central Sulawesi province	It is designing and implementing an android-based maternal and child health development recording app.	System Development Life Cycle (SDLC) with waterfall approach model	The app has the ability or features to record patient demographic data, results of maternal and child health development examinations, medications, and vaccines, as well as display graphs and tables of maternal and child health development periodically. This application is based on android, which can be used by midwives and cadres posyandu online. ¹⁴
6	Owen PL Mtambo, Victor Katoma, Lawrence NM Kazembe/2016	Analysis of Severe Child Stunting in Namibia	To assess the socio-demographic determinants and geographical variations of the prevalence of severe child stunting in Namibia using a quantile spatial regression model.	Bayesian structured quantitative regression models, data sources, and analytical procedures	The fixed effects of male head of household, rural housing, uneducated mothers, diarrhea, HIV + children, and lower household wealth have a significant negative relationship with the height of the child adjusted by age (i.e., a significant positive relationship with severe childhood stunting) while the more educated mother, vitamin A supplementation, adequate vaccination coverage, exclusive breastfeeding, improved source of drinking water, and highest household wealth had a significant positive relationship with adjusted childhood height for age (i.e. significant negative relationship with severe childhood stunting) in Namibia. ¹⁵

Table 1 (Continued)

No	Researcher Name/Year	Title	Purpose	Method	Result
7	Ibnu Zaki, Jejen Jaenudin dan Puspa Eosina/2018	PWS KIA Web-Based Reporting Information System	Build a web-based reporting information system that generates indicators from immunization recording results at Gunung Sindur Health Center"	Waterfall model consisting of analysis, design, implementation, and testing.	Reporting information system to make a report of PWS KIA results on immunization recording every month at the web-based Gunung Sindur Health Center, which manages immunization data, managing midwife data, managing village data, managing posyandu data, displaying charts showing indicators, uploading and downloading archives. Then, the results obtained from pabuaran village immunization data in 2016 that have been input indicators show that the cumulative results of immunization recording have passed the target determined by the Health Office. ¹⁶
8	Ika Kurnia Rahmawati, Herliyani Hasanah, Joni Maulindar	Application Monitoring The Nutritional Status of Toddlers with Z Score Method Based on Android	An application that can store toddler data so that when KMS book is lost or damaged, parents of toddlers do not have to worry because the toddler data can still be seen and stored in the application. Monitoring the nutritional status of the toddler's body with the Z Score method based on android.	Waterfall method. The app was developed using java and PHP programming languages using android studio software and notepad++.	Aplikasi yang dihasilkan dapat melihat data berat badan dan tinggi badan balita selama mengikuti kegiatan posyandu, dapat menghitung status gizi balita baik, lebih, kurang, sangat kurang, normal, kurus, sangat kurus maupun obesitas sesuai buku standar Anthropometri penilaian status gizi anak dengan ketentuan WHO 2005. ¹⁷

by just 0.6 percent annually since 1990. Who proposes a global target of reducing stunting incidence in children under the age of five by 40% by 2025, but predicted that only 15–36 countries would meet that target.

Prospective cohort research in Jamaica, conducted in the 9–24 month age group, followed by psychological development when 17 years old, found that adolescents who stunted growth had higher levels of anxiety, depressive symptoms, and lower self-esteem than adolescents who were not stunted by growth. Children who stunted their growth before the age of 2 had worse outcomes in their emotions and behaviors in late adolescence.⁴ Therefore stunting is a predictor of poor quality of human resources, affecting the nation's potential.³ Stunting is a form of growth faltering due to the accumulation of nutritional insufficiency that lasts a long time from pregnancy to the age of 24 months.^{5,6} This situation is exacerbated by the incomparable pursuit of adequate catch-up growth.^{5,7} Indicators used to identify stunting toddlers are based on the height by age index (TB/U) according to whom child growth standard with stunting criteria if the value of z score TB/U < -2 Standard Deviation (SD).⁸

Technological advances have now undergone such rapid development, and one example is application. This product is a multifunctional product with all its sophistication which can help people in various ways. The internet can help many human jobs to make people more productive and make human work more effective and efficient. The results of research conducted by Muhammad Azhar Hairuddin in 2017 showed that designing and creating an application to monitor the development of nutritional status and health of infants and toddlers using Android-based Anthropometry method to help reduce the percentage of malnutrition and malnutrition as well as the death rate of children under 5 years old in Indonesia.⁹ This is evidenced by the results of White Box and Black Box testing and as well as the dissemination of questionnaires to 20 target users, namely to mothers of infants and toddlers then 10 target users of health workers and medical personnel. White Box testing results show that various methods of coding can already run well following the theory. Black Box testing results show that functionally the functions, inputs, and outputs

of the software are following the required specifications, while based on the results of the questionnaire from 32 respondents from parents of infants and toddlers totaling 21 people stated that 90.6% stated that it had met the expectations of users, then from health/medical personnel from 11 respondents, a percentage of 86.7% assumed that the software was following the Method of Anthropology.

Methods

This study looked for journals used in the literature review, journals used in literature review obtained through the database of international journal providers such as Google scholar, PubMed, and Proquest. Researchers wrote the appropriate keywords, namely nutritional status of 1000 HPK, stunting, and application. The year limit used is ten years from 2010 to 2020.

Result

A total of 20 journals have been studied, and there are 8 research journals used in the literature review, namely the application to measure the growth, nutritional status, and health of mothers and toddlers. Overall this research article helps monitor parents and health workers in terms of services in the first 1000 days of life (Table 1).

Discussion

The results of the journal review obtained that the application of nutritional status monitoring using anthropometry standards, anthropometry itself is a standard of measurement of growth by calculating weight, length or height, and head circumference. Some have the ability or features to record patient demographic data, results of maternal and child health development examinations, vaccine drugs, immunizations, and display graphs/tables of maternal and child health development periodically. The designer and implementing of nutrition status monitoring applications and recording the health development of mothers and children help

midwives, posyandu cadres, mothers, or mothers-to-be obtain excellent and correct information because the application is easy.

From some of the results of this study, there is a significant influence between monitoring applications to improve nutritional status. It is expected that the application of nutrition status monitoring can run optimally and produce quality data/information to overcome related problems in 1000 HPK, especially stunting.

Conclusion

From some of the above journals can be concluded that the use of development monitoring application, nutritional status, and health of mothers and children in the service of 1000 HPK facilitates parents, midwives, and other health workers in working to monitor the development of pregnant women and the growth of infants and toddlers for stunting prevention.

Conflicts of interest

The authors declare no conflict of interest.

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