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Implementation of Decision-Making Systems To Help Early Detection of Android-Based Child Stunting

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Abstract

The development of child growth and development is very influential on the growth of children, delays in information on deviations in child growth and development cause delays in actions by Puskesmas officers and parents. Therefore, the government routinely conducts screening for Stimulation of Detection and Early Intervention of Growth and Development (SDIDTK) to find cases of deviations in the growth and development of children aged 3 to 72 months. Screening aims to detect growth disorders (stunting, thin, thin, fat, microcephaly, macrocephaly), developmental disorders (rough, smooth movement, speech and language, social personal), hearing and vision disorders, and emotional mental disorders. To overcome information delays and handlers and child growth and development handlers are made an online application to monitor the growth of children aged 0 to 72 months, namely the M-SDIDTK application. will have features including (1) Android-based SDIDTK form that can be downloaded for free by cadres or officers, (2) SDIDTK screening method guide, (3) dashboard of screening results that puskesmas officers can access. The dashboard can display a graph of the child's growth development according to the type of developmental disorder based on the book SDIDTK.

Keywords: SDIDTK, screening, stunting.

Abstrak

Penyimpangan tumbuh kembang anak sangat berpengaruh terhadap pertumbuhan anak, keterlambatan informasi penyimpangan tumbuh kembang anak menyebabkan keterlambatan tindakan oleh petugas Puskesmas maupun orang tua. Oleh karena itu pemerintah rutin melakukan skrining Stimulasi Deteksi dan Intervensi Dini Tumbuh Kembang (SDIDTK) untuk menemukan kasus penyimpangan tumbuh kembang anak usia 3 s.d 72 bulan. Skrining bertujuan mendeteksi adanya gangguan pertumbuhan (stunting, kurus, kurus sekali, gemuk, mikrosefal, makrosefal), gangguan perkembangan (gerak kasar, halus, bicara dan bahasa, personal sosial), gangguan pendengaran dan penglihatan, dan gangguan mental emosional. Untuk menanggulangi keterlambatan informasi dan penanganan tumbuh kembang anak dibuatlah aplikasi online untuk memonitoring pertumbuhan perkembangan anak usia 0 s.d 72 bulan yaitu aplikasi M-SDIDTK yang akan memiliki fitur- fitur antara lain (1) formulir SDIDTK berbasis Android yang dapat diunduh gratis oleh kader atau petugas, (2) panduan metode skrining SDIDTK, (3) dashboard hasil skrining yang dapat akses petugas Puskesmas. Dashboard dapat menampilkan grafik perkembangan pertumbuhan anak sesuai jenis gangguan perkembangan berdasarkan buku SDIDTK.

Kata Kunci : SDIDTK, skrining, stunting

Implementation of Decision-Making Systems To Help Early Detection of Android-Based Child Stunting

1. Introduction

Delays in information on growth and development irregularities cause delays in actions by Puskesmas officers and parents. Therefore, the government routinely conducts screening for Stimulation of Detection and Early Intervention of Growth and Development (SDIDTK) to find cases of deviations in the growth and development of children aged 3 to 72 months. Screening is done at least twice a year [1]. Screening aims to detect growth disorders (stunting, thin, thin, fat, microcephaly, macrocephaly), developmental disorders (rough, smooth movement, speech and language, social personal), hearing and vision disorders, and emotional mental disorders. Screening tools use manual (paper) SDIDTK forms. Screening forms and questions vary according to the age of the child.

West Purwokerto Health Center in Banyumas Regency is actively screening SDIDTK in 62 Posyandu in its work area. The results of SDIDTK in Karanglewas in 2017 identified stunting data as many as 223 children (9.78%) and 20 children of whom (0.74%) were very short. While the results of screening in 2018 obtained stunting data as many as 240 children (9.79%) and 22 children of whom (0.75%) are very short. At this time, the screening tool uses a manual (paper) SDIDTK form.

SDIDTK screening officer from West Purwokerto Health Center, Sri Endar S. AMd. Keb, explained several technical obstacles, namely: (1) limited West Purwokerto Health Center officers to conduct and fill out screening forms from 62 Posyandu, (2) slow recapitulation of screening results because they have to go through the data entry stage manually into the Ms Excel application first, (3) screening data is not stored integratedly in one system, causing data inconsistencies and difficulties in retrieval information. The solution to these engineering constraints is that puskesmas empower Posyandu cadres to help screening SDIDTK. The method has not been effective because of several obstacles, namely, the limited time of cadres and the ability of cadres in concluding screening results, the limited time of puskesmas officers to educate appropriate screening methods intensively to Posyandu cadres. Therefore, solutions are needed to overcome the time constraints of

cadres and officers. The use of information and communication technology (ICT) is the right solution considering that internet and smartphone users in Indonesia are very high. Smartphone users in 2018 reached 70.9% of the total population and 74% of them were aged 19 to 35 years. Internet media became the choice of 54.1% of respondents as a means of monitoring the growth and development of toddlers, especially information about breastfeeding and nutritional status [2]. The Android-based Pre-Development Screening Questionnaire (KPSP) application makes it easier for officers to detect early childhood development irregularities. More than 88% of respondents said the android-based KPSP application is very good and useful for parents in detecting child growth and development [3]. Android-based applications effectively motivate Midwives and Nutritionists to carry out SDIDTK screening [4].

Based on the background above, this study aims to make the M-SDIDTK application, which is an online application to monitor the growth of children aged 0 to 72 months. The M-SDIDTK application will have features including (1) Android-based SDIDTK forms that can be downloaded for free by cadres or officers, (2) SDIDTK screening method guides, (3) screening results dashboards that puskesmas officers can access. The dashboard can display a graph of the child's growth development according to the type of developmental disorder based on the book SDIDTK. The application will be tested in the field. As a sample of the trial were respondents from 5 Posyandu in the working area of the West Purwokerto Health Center banyumas regency.

2.   Method

The method used for the design of M-SDIDTK system applications is to use the "WaterFall" method where the creation of the system meets the following steps or stages. The Waterfall method is presented in Figure 1.
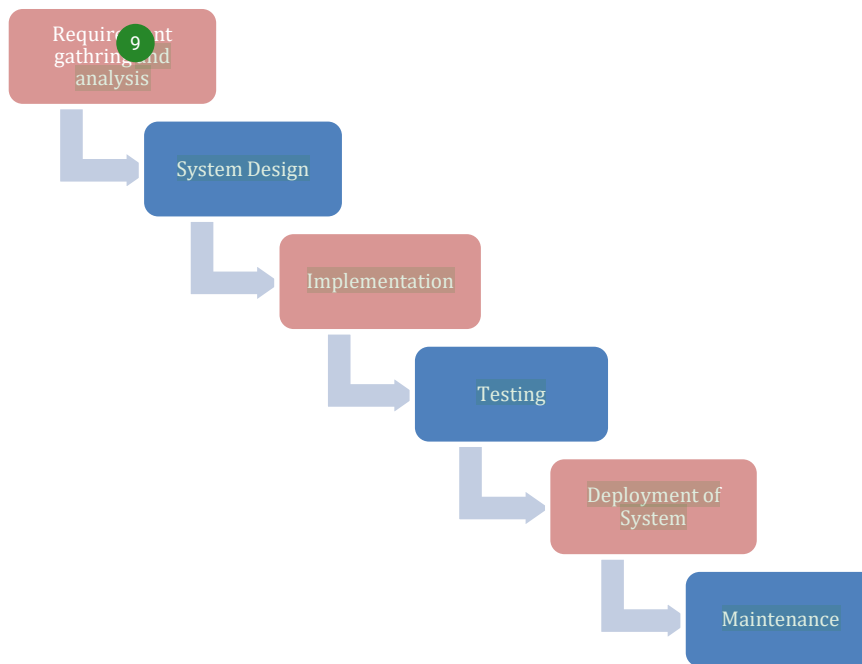
Waterfall Method

Figure 1. Waterfaall Method (W. Royce, Kristanto, 2004)

Here is an explanation of each stage of creating the M-SDIDTK application using the Waterfall method:

a. Requirement Gathring and Analysis include :

a.1. Field observation. Includes interviews or discussion group forums with SDIDTK officers at the West Purwokerto Health Center. The purpose of observation is to obtain a working picture of the SDIDTK screening system in the West Purwokerto Puskesmas work area.

a.2. Literature study related to the SDIDTK system. Literature studies in the form of study of research results related to child collapse disorders using SDIDTK tools, types of growth and development disorders, and reports on the results of SDIDTK screening at the West Purwokerto Health Center.

a.3. System analysis. This stage is done after obtaining the results of field observations and leteratur studies. Analysis includes analysis of input needs, process needs, and output needs.

b. System Design

The system is designed based on needs analysis. System design tools use UML (Unified Modeling Language) to describe the system to be built in general and in detail. The results of system design are UML diagrams, system architectures, database structure data.

c. Implementation

Implementation of system design into program code. Implementation is the stage of translating system design into program code. The system that has been designed will be implemented on the front end and back end. The front-end side is a mobile-based online SDIDTK form application in which there is also information on ways to screen SDIDTK. The front-end side is built using Android studio. While the back-end side is built using the PHP language. The back-end function is a means of managing form inputs and respondents by puskesmas officers. The back-end side has a dashboard view in the form of graphs of the results of the SDIDTK screening process.

d. Testing

M-SDIDTK trials in the laboratory and evaluation. Applications that are completed are then tested by the black box and white box methods. Black box aims to obtain logic errors in the implementation of program code. The black box result becomes feedback for application improvements so that no more program code logic errors are found. The white box test aims to get feedback from users (application users). The users who are sampled are students and lecturers. The intended feedback is the ease of application and the convenience of the application interface. The white box test tool consists of M-SDIDTK applications that are free from errors in program code logic and forms for user feedback. The results of the trial are then evaluated.

e. Deployment of System

M-SDIDTK trials in the field and evaluation of results. The field sample was five Posyandu in the working area of the West Purwokerto Health Center. The sample of each Posyandu is approximately 30 to 50 respondents. Field trials aim to get feedback on the use of applications from respondents (Posyandu cadres and toddler mothers / children). The results of the trial will be evaluated so that the conclusion of the study is obtained.

f.   Maintenance

Perform system maintenance and justify system errors or weaknesses that are not detected at the time of testing, making the system up to date improve the system's capabilities.

3.   Results and Discussion

Stunting application software serves as a paperless SDIDTK screening form and has a screening instruction feature for cadres. The complete features that will be applied to the application are analysis of the length, weight and body mass index, analysis of the condition of toddlers and advice on the type of food, recording of toddler data, immunization schedule, and development of toddlers. Thus Printscreen initial display stunting application.

3.1. Presenting research results

Here are the results of making software stunting M-SDIDTK. The first page of stunting software is the cover page, this page is presented in figure 2.

Figure 2. M-SDIDTK Application splash screen cover page

The main page of the stunting software is the login page, this login page is intended for screening member officers, the login page is presented in figure 2.
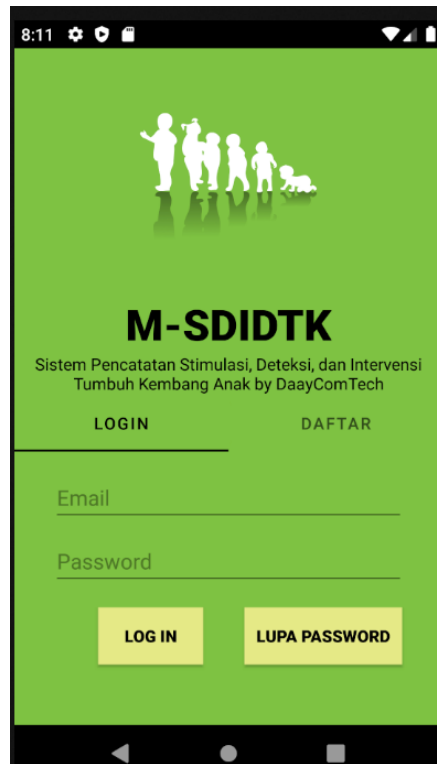
Figure 2. M-SDIDTK Application Home Page

The second page of the stunting software is the registration page of the screening officer, the registration page of the screening officer is presented in figure 3.
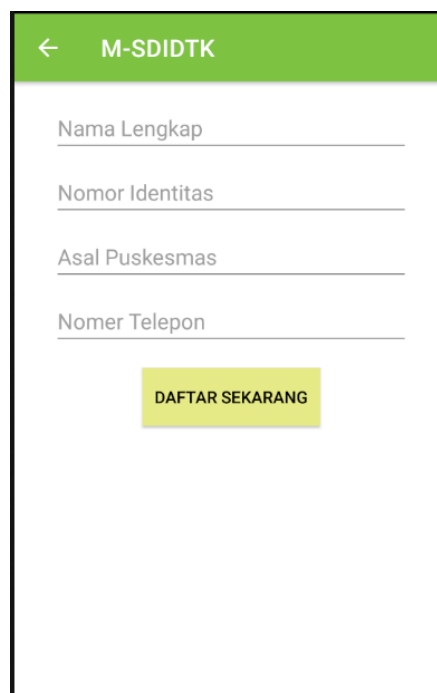
Figure 3. M-SDIDTK Member Registration Page

The password reset page is the page for resetting forgot password, password reset page presented in figure 4.
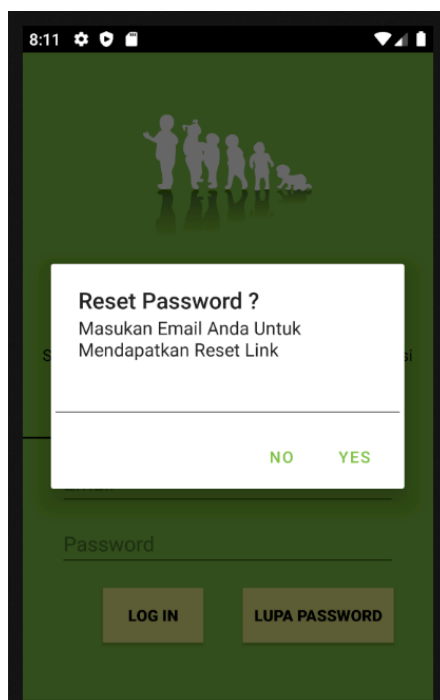
Figure 4. Reset Fitsword page

The menu page is the M-SDIDTK software facility page, the M-SDIDTK software menu page is presented in figure 5.
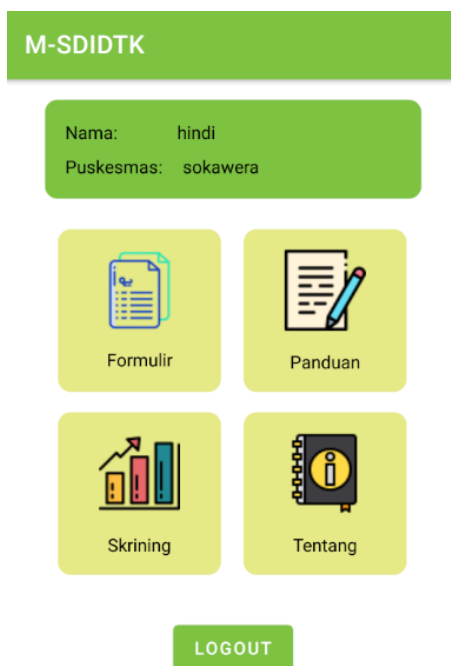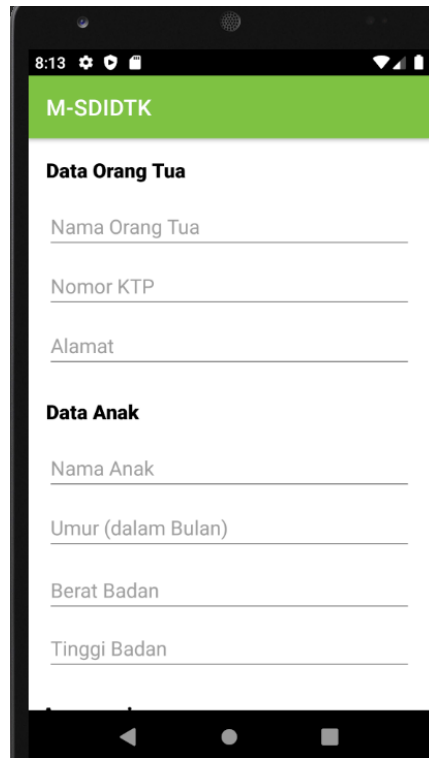
Figure 5. M-SDIDTK Menu Page
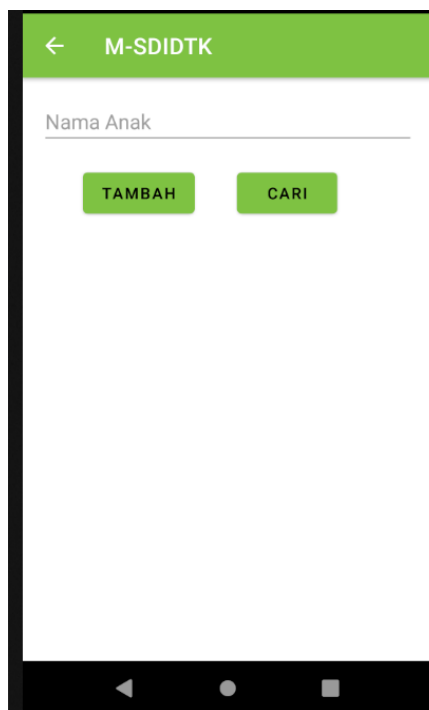
The next page is the page data input parent and child to record the child to be screened, this page is presented in figure 6.

Figure 6. Parent and Child Data Input Page On M-SDIDTK Application

The next page is the page add child data and searching child data that is screened, this page is presented in figure 7.

Figure 7. Add Child Data page and Searching Child Data

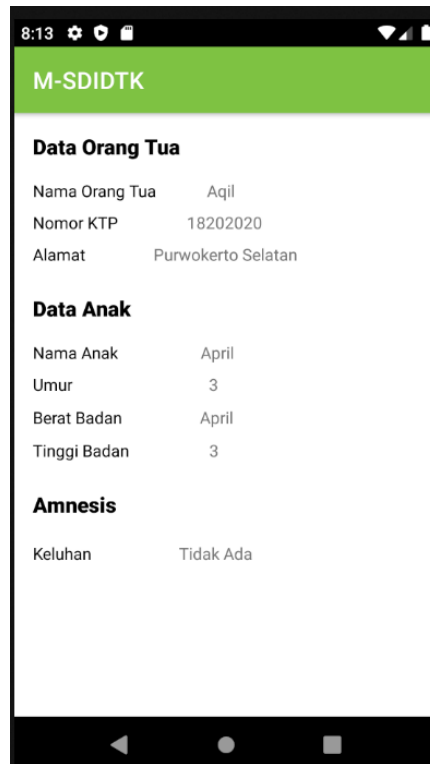The next page is parent and child data appear screening participants, this page is presented in figure 8.

Figure 8. Screening Participants' Parent and Child Data Display Page

The next page is page information on the condition of children per quarter, this page is presented in figure 9.
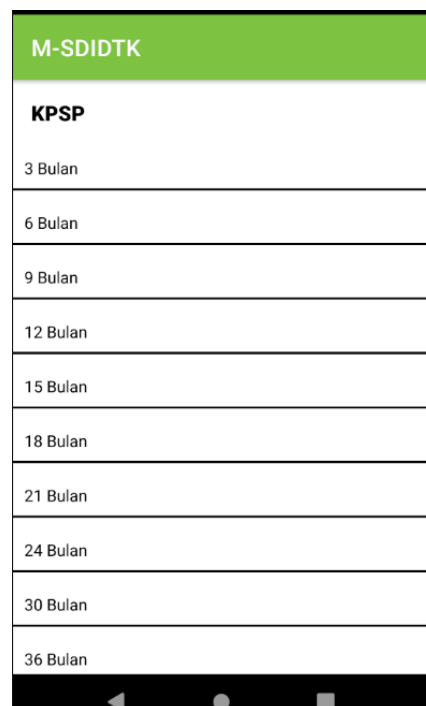

Figure 9. Child Screening Condition Information Page per quarter

The next page is information on the condition of the child per three months in the year, this page is presented in figure 10.
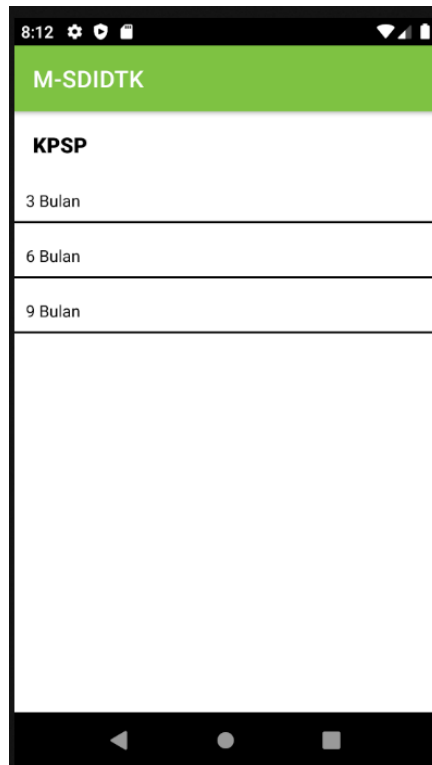

Figure 10. Child Condition Information Page per Three Months in the Early Year

The next page is information of child development 0-3 months, this page is presented in figure 11.
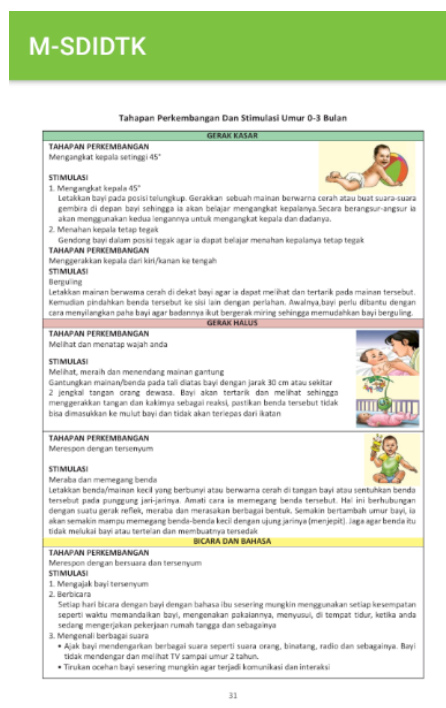
Figure 11. Child Development Information Page 0-3 Months

The last page is information page copyright, this page is presented in figure 12.

Figure 12. Copyright Page

Database on Fire Base M-SDIDTK application, the database presentation on Fire Base is presented in figure 13.
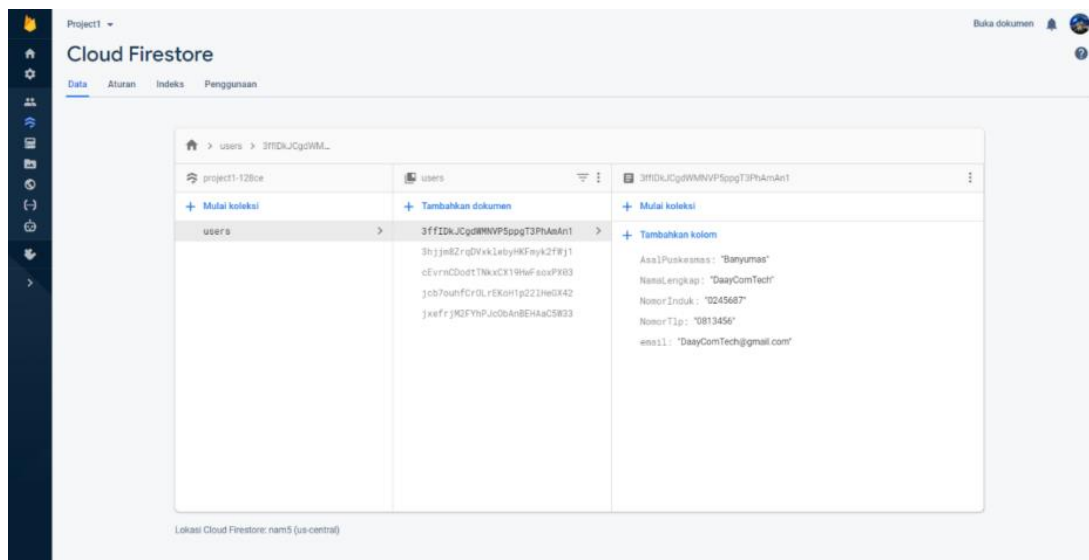

Figure 13. Database on Fire Base Application M-SDIDTK

3.2. Make a discussion

The application of information and communication technology (ICT) is proven to provide efficiency and effectiveness in various fields including the health sector. *Electronic Health (E-Health)* is one of the concerns of the Indonesian government in the field of health. One of *the E-Health* strategies in Candy number 46 is services and applications. The government through the ministry of health has developed several applications such as Generic SIKDA, SIMRS GOS, SIHA, SITT, SIM Surveillance, SI-PTM, SISMAL, and P-Care [5]. *E-Health* applications have also begun to be developed by industry, for example SIMPUS, SIMRS, SIM-Klinik). The development of these applications has the potential to accelerate the implementation of ICT in health services in Indonesia.

Especially in the field of maternal and child health (KIA) research related to the application of ICT has been widely done and continues to grow. Several studies have produced prototypes of toddler growth and development applications used by Posyandu cadres in rural areas [6][7]. This application is used to help counseling and has an advantage in terms of the rigidity of data stored in its system. There are several main functions in this application, namely recording toddler data, including height, weight, toddler length, vaccine records and vitamin records. *The output* of the system is the analysis of the length, weight and body mass index, the analysis of the condition of the toddler and the suggestion of the type of food. The Android-based POSYANDU application serves as a means of recording toddler data, immunization schedules, and toddler development [8][9]. The app uses the Android system and is installed on *a smartphone* device. The goal is to streamline administrative activities in Posyandu while encouraging mothers to use smartphones to monitor the growth and development of their respective toddlers[8][9]. Posyandu recording is manually converted into an automated system using the Posyandu information system (SIPosyandu).

The advantage is that this system can be integrated with Microsoft Excel for the reporting or presentation of KIA information [10]. In addition to the Posyandu application, a growth and development deviation detection application in the form of an Android-based Development Screening Form (KPSP) has been developed [3][11][12]. KPSP with multimedia usage guidance is able to increase user knowledge[11]. This application is equipped with an

expert system to help Puskesmas officers screen and monitor the growth and development of children [11][12]. Other application features are toddler data recording facilities, immunization schedules, and toddler development information. Administrative activities in Posyandu become more efficient and motivate parents to use *smartphones* to monitor the growth and development of their toddlers [11]. The M-SDIDTK application is equipped with a screening formular and stimulation advice if there are irregularities to the child's growth and development. This application is based on Android Mobile which makes it easier for users to access the application in real time and has features for puskesmas officers to input stunting data. There is a dashboard to monitor the condition of child growth and development that can be seen by Screening officers, Posyandu cadres and Toddler Mothers

4.   Conclusion

Screening aims to detect growth disorders (stunting, thin, thin, fat, microcephaly, macrocephaly), developmental disorders (rough, smooth movement, speech and language, social personal), hearing and vision disorders, and emotional mental disorders. The growth of a child should be monitored at all times and periodic recording is required. The M-SDIDTK application is very helpful in monitoring and inputting child development data that was previously done manually using the M-SDIDTK application to recap data and monitoring child development can be monitored in real time and overcome information delays so that the handling of deviant child growth and development can be handled immediately by health workers.

5.   Reference

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