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Toddler Nutrition Status Monitoring Dashboard as A Support for Stunting Reduction Acceleration Program in Temanggung Regency

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Abstract

Temanggung Regency is the district with the second-highest prevalence of stunting (28.9%) in Central Java. This result was still far from the national stunting prevalence target in 2024, which is 14%. Monitoring the nutritional status of toddlers regularly is very necessary as an effort to carry out early detection in preventing stunting. Stunting reduction activities specifically at the lower level are carried out by cadres. The role of the cadres includes measuring and recording the anthropometry of infants and toddlers. In the data collection process, several problems were found including writing and counting errors and delays in data distribution. To overcome this problem, a computerized system is needed that can be used as a means of collecting data on the nutritional status of toddlers quickly and in real-time. SI-GEMBUL dashboard is the final result of reporting from SI-GEMBUL application which is used by cadres to overcome problems with writing errors and calculating the nutritional status of toddlers. The system development method used in this study was the prototyping method. SI-GEMBUL dashboard display consists of a list of mothers, infants, and toddlers that can be displayed by Posyandu name, a real-time checklist that can be displayed by year, month, and name of the Posyandu, as well as educational media related to nutrition and stunting. This dashboard can help the Temanggung District Health Office to be able to minimize delays in the distribution of data that will be used for reporting to a higher level.

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Introduction

Presidential Regulation of the Republic of Indonesia No. 39 of 2019 concerning one national data, namely the government data management policy to facilitate access and sharing between Central and Regional Agencies through fulfilling Data Standards, Metadata, Data Interoperability, and using Reference Codes and Master Data (Pemerintah Republik Indonesia, 2019). This regulation encouraged many government agencies, one of them health agencies, to start developing a single health data system. This was in line with developments in information and communication technology which are expected to increase efficiency, effectiveness, transparency, and accountability. Quality information is obtained from good data collection, and becomes a reference in management, planning, and decision-making processes (Ketut et al., 2018)(Prihantoro, 2021). However, until now, the existing health information system has not been able to provide accurate and fast data and information.

Information about the health of infants and toddlers in a region is a very important source of information in the process of planning, monitoring, and evaluating activities or programs for developing infant and toddler health. This information describes the level of health, health resources, and health efforts as well as the achievement of health development indicators in an area. This information can be used as a tool to evaluate progress in the development of infant and toddler health in the area. Based on the results of the 2022 Indonesian Nutrition Status Survey (SSGI), Temanggung Regency is one of the districts in Central Java Province with a wasting prevalence of 6.1% and a stunting prevalence of 28.9%, which is still below the national target. This could happen possibly due to delays/errors in recording. In 2023, based on the Decree of the Regent of Temanggung Number 444/118 of 2023 concerning Villages/Subdistricts, Priority Locations for Stunting Prevention, Temanggung Regency, in 2024, 30 villages located in 17 health centers were designated as stunting locus areas. , which means the village must be able to meet the target of accelerating stunting reduction.

The process of mapping the distribution of infants and toddlers, especially those related to nutritional problems of infants and toddlers, is still carried out by health service employees collecting existing data at Posyandu through Puskesmas. With the data collection process carried out, various problems or obstacles were found, including the process of collecting data on babies and toddlers which was carried out by coming directly to the Posyandu recording it manually, and then handing it over to the Community Health Center which took a long time and quite a lot of employees were deployed. In the process of conveying data about the distribution of babies and toddlers, problems were also found, namely the process of recapitulating the data took a long time, and conveying information about the distribution of babies and toddlers, especially infant and toddler nutrition problems, only through information boards placed at health centers so that the delivery of information was felt to be less effective. To overcome this problem, a computerized system is needed that can be used as a means of collecting data on babies and toddlers quickly and up to date and can also be used to convey information about the distribution of babies and toddlers in real-time. This system is often called a dashboard information system.

Methods

The system development method used in this research is the prototyping method. The steps or stages contained in the prototyping method are as follows:

1. Gather and analyze needs.
   At this stage, the author made direct observations at the research site to analyze the system that was running and look for the main problems that were occurring.
2. Do fast planning.
3. At this stage, the system design that will be used is built as follows:
   a. The author designed a data dashboard application for mothers, babies, and toddlers, nutritional status checks, and educational media
   b. A system design was built with several auxiliary diagrams such as use case diagrams and their derivatives.
   c. Designing the interface of the system to be created.

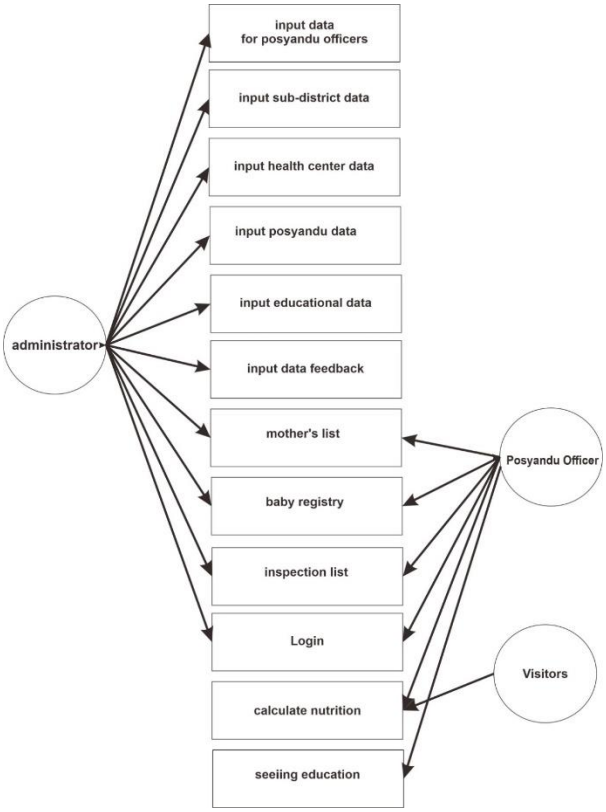

Figure 1. Use case diagram

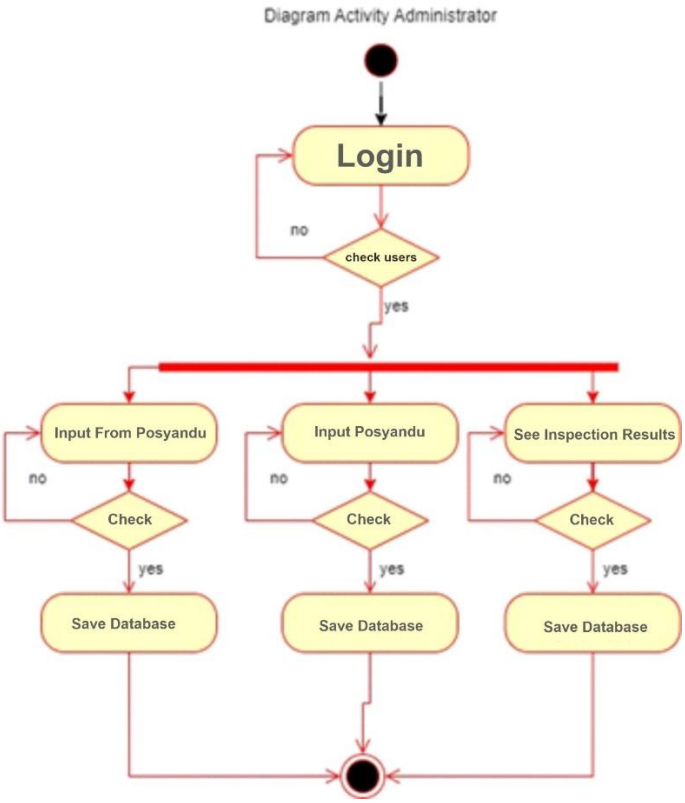

Figure 2. Administrator activity diagram

4. Build a prototype
   The author builds a system that has been designed with the help of an application. In this case, the author will use the PHP programming language and MySql database.

5. Evaluation is carried out by users on the prototype.
   Implementation of the system to users and consumers, in this case, the nutrition officers of the District Health Service Temanggung. Evaluation was carried out by distributing the UTAUT 2 questionnaire related to the data entry and available displays
6. Changes to design and prototype.
   Make system improvements based on evaluation results from users. If the user is disappointed with the prototype that has been built, repeat step 5, and if the customer is satisfied with the prototype that has been built, large-scale product development can begin.

Results

The results of the research, one of which is an application or program prototype, have been completed. The SI-GEMBUL dashboard display consists of a list of mothers and a list of babies which can be displayed based on the name of the Posyandu, a real-time inspection list that can be displayed based on year, month, and name of the Posyandu, as well as educational media related to nutrition and stunting.

1. Administrator login page
   The administrator login form can be seen in the following image:

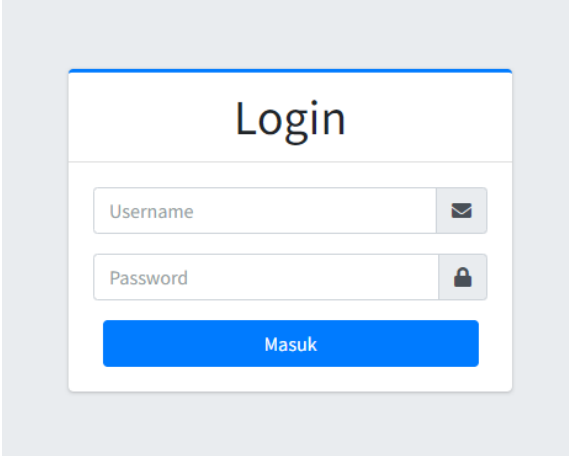

Figure 3. Administrator Login Form

The administrator login form is used to log in for administrators to enter the main application page. To log in to this admin, the user must enter a username and password so that they can be given access rights to the expert system.

2. Administrator main page
   The main page display can be seen in the following image:

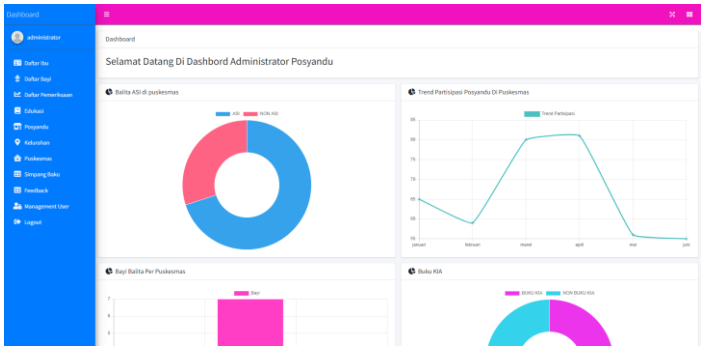

Figure 4. Administrator main page

The main administrator page is the main page in the administrator section for carrying out all activities in the system. On this main page, some menus can be accessed directly, such as the mother's list, baby's list, examination list, educational media, name of posyandu, name of the subdistrict, name of the health center, standard deviation, feedback, and user management as well as a data visualization in graphical form.

3. Mother's list page
   The display of the mother's list page can be seen in the following image:

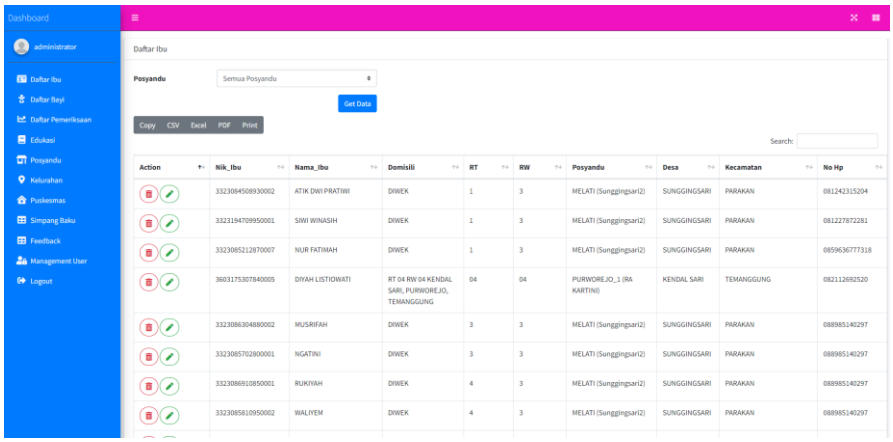

Figure 5. Mother's list page

This page is used to display maternal data that has been input into the SI-GEMBUL application. The data displayed on this menu is the mother's NIK, mother's name, domicile, RT, RW, Village, District, and No. MOBILE PHONE. Data can be displayed per Posyandu and can also be searched by entering keywords in the search column. Data in the dashboard can be downloaded in copy, CSV, Excel, PDF, and print form.

4. Baby registry page
   The appearance of the baby registration page can be seen in the following image:

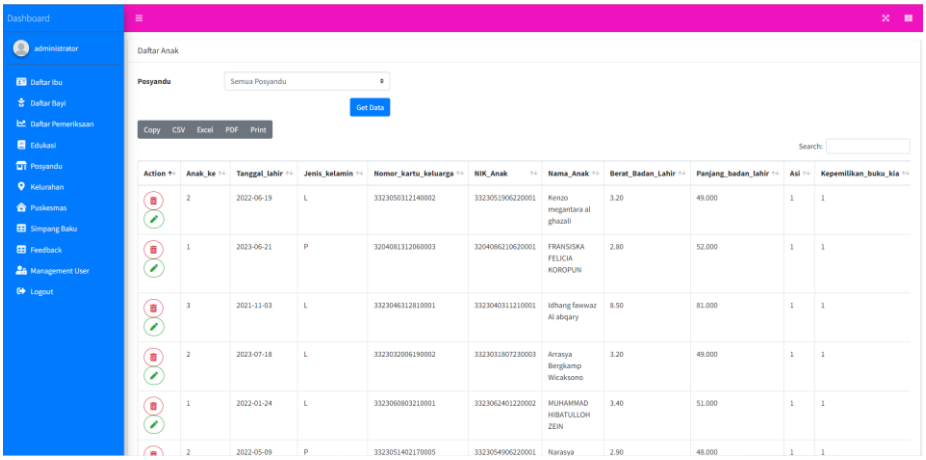

Figure 6. Baby registry page

This page is used to display maternal data that has been input into the SI-GEMBUL application. The data displayed on this menu is the child's birth date, gender, family card number, child's NIK, child's name, birth weight, and birth length. Data can be displayed per Posyandu and can also be searched by entering keywords in the search column. Data in the dashboard can be downloaded in copy, CSV, Excel, PDF, and print form.

5. Baby Checklist Page

The appearance of the baby checklist page can be seen in the following image:

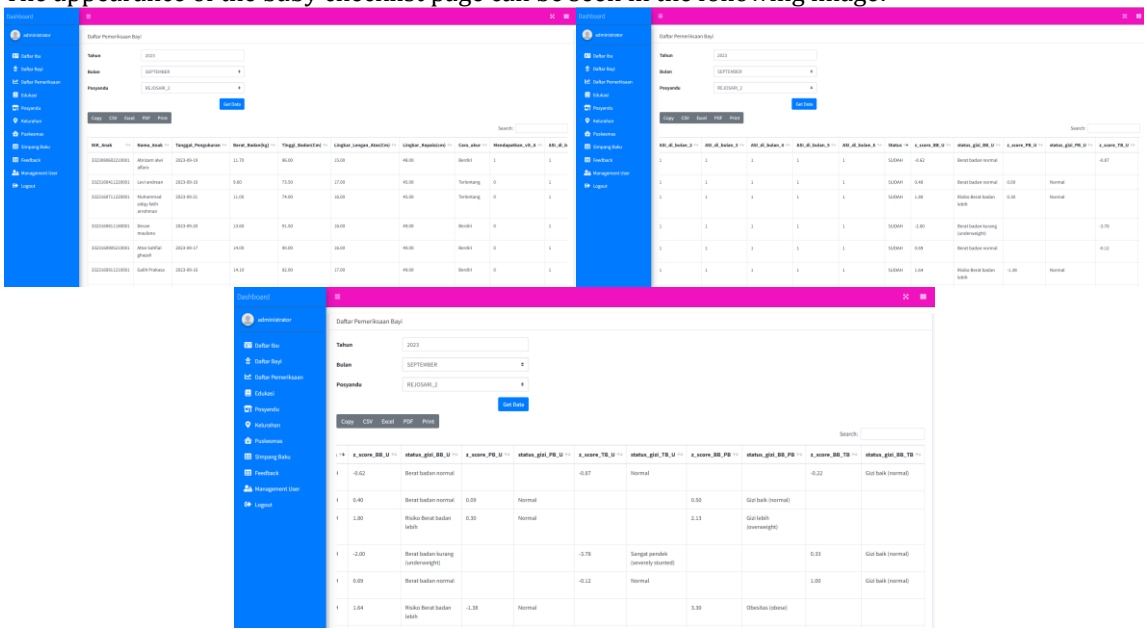

Figure 7. Baby Checklist Page

This page is used to display the results of examinations for babies and toddlers that have been input into the SI-GEMBUL application. Data that can be displayed in this menu are the child's NIK, child's name, date of measurement, weight, height, arm circumference, head circumference, how to measure height, getting vitamin A or not, exclusive breastfeeding or not, and results of measuring nutritional status. The appearance on the baby checklist page is displayed by year, month, and per posyandu and can be searched by entering keywords in the search column. Data in the dashboard can be downloaded in copy, CSV, Excel, PDF, and print form.

6. Education Page

The educational page display can be seen in the following image:

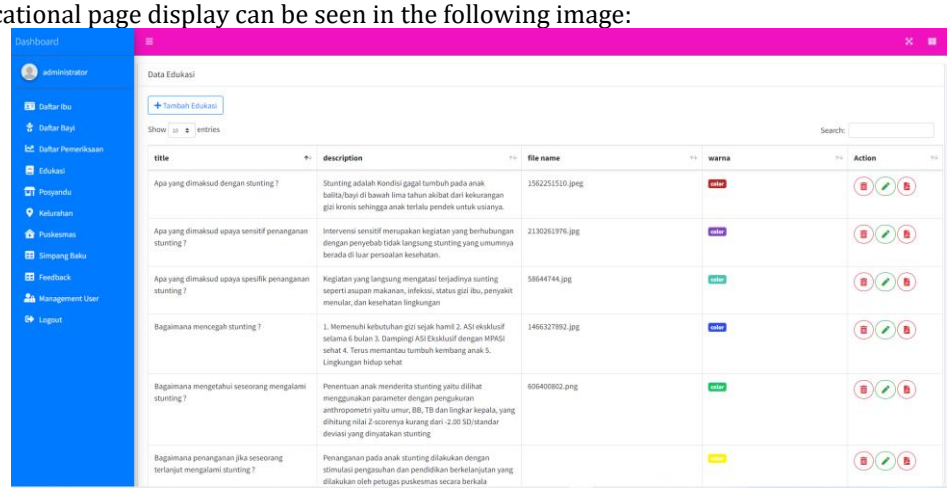

Figure 8. Education page

The educational page is used to display educational material that cadres can use to provide material related to the nutritional status of toddlers and stunting.

7. Posyandu page
The appearance of the Posyandu page can be seen in the following picture:

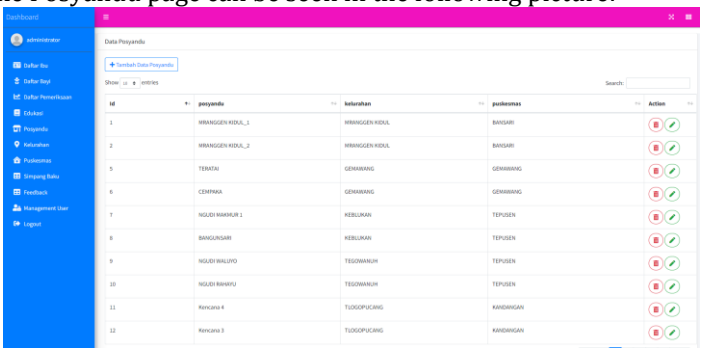

Figure 9. Posyandu page

The Posyandu page contains Posyandu data in Kab. Temanggung who inputs data into the system.

8. Village page
The Village page display can be seen in the following image:

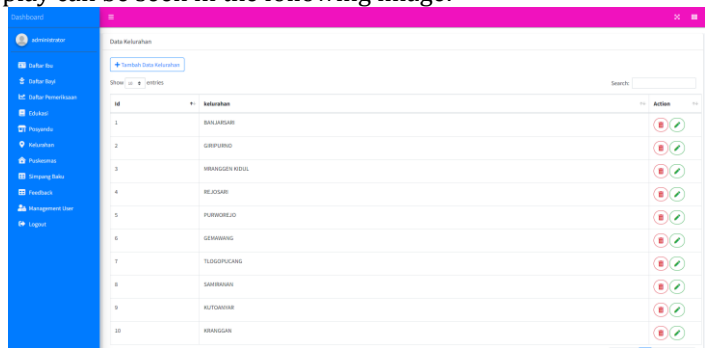

Figure 10. Village page

The sub-district page contains sub-district data in Kab. Temanggung who inputs data into the system.

9. Puskesmas page
The appearance of the Puskesmas page can be seen in the following image:

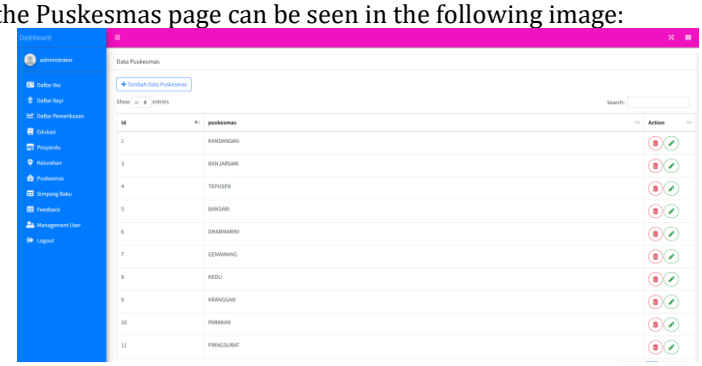

Figure 11. Puskesmas page

The Puskesmas page contains data on Puskesmas in the District. Temanggung who inputs data into the system.

10. Standard Deviation Page
The standard deviation page display can be seen in the following image:

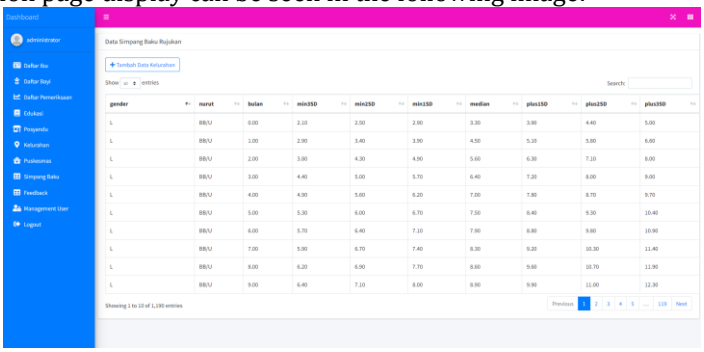

Figure 12. Standard Deviation Page

The standard deviation page contains standard deviation reference data for determining the nutritional status of infants and toddlers.

11. Feedback Page
The appearance of the feedback page can be seen in the following image:

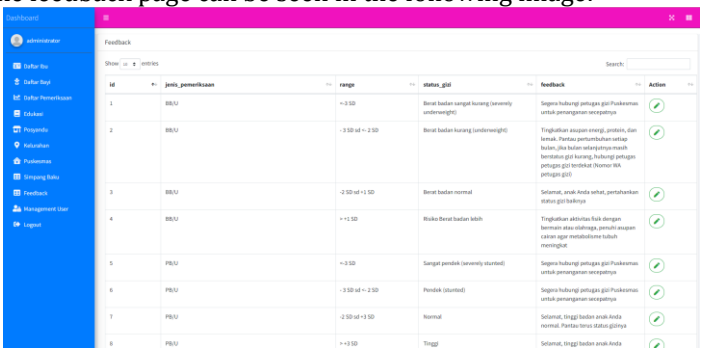

Figure 13. Feedback page

The feedback page contains feedback from the results of calculating the nutritional status of toddlers.

12. User Management Page
The user management page display can be seen in the following image:

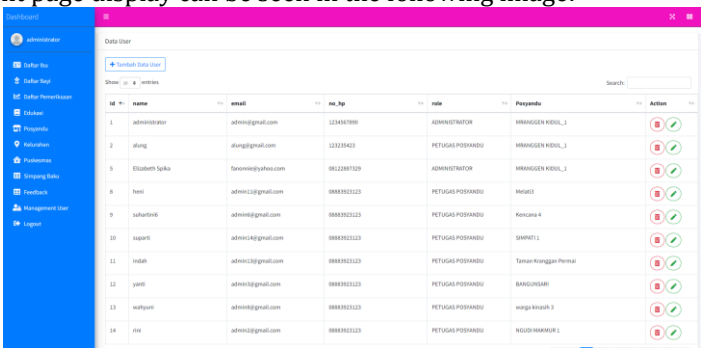

Figure 14. User Management page

The user management page contains data on who inputs into the system and their respective roles. User data contains name, email, and number. HP, role and origin of posyandu.

Discussion

Information technology serves as an important support for today's business strategies. Information technology system development is an activity to prepare a new system to replace the old system as a whole or improve an existing system (Kristiani et al., 2016). This research aims to use a dashboard to visualize and analyze data on the nutritional status of infants and toddlers obtained at Posyandu to make it easier for Puskesmas and Health Service officers to see the distribution of nutritional status and to make it easier for

officers to input data in EPPGBM (Community Based Electronic Recording and Reporting of Toddler Nutrition). There are many tools available that can be utilized for data visualization solutions.

Before creating a dashboard concept for reporting and visualization to facilitate monitoring data on the nutritional status of infants and toddlers at the Health Service, we first compiled a list of requirements according to the input, process, and output analysis of the implementation of EPPGBM (Community Based Electronic Recording and Reporting of Toddler Nutrition). Data collection is carried out by reviewing and analyzing data sources from recording in the application. Next, we create a dataset that will be used by adjusting what data is needed in the application.

To provide a better experience to users, researchers tried to summarize the data into ten main menus on the dashboard, which can be switched by clicking: mother's list, baby's list, examination list, education, Posyandu, Subdistrict, Puskesmas, Standart Deviation, Feedback, and User Management. Based on research results, Stefan Kraus et al said that an easy and simple dashboard display would be a powerful tool for expanding a more useful information system (Kraus et al., 2018). Simplifying the display is a relatively important step to display results so that users are more comfortable (Al-Hajj et al., 2013), and also can help improve the use of health data (Aung et al., 2019).

Needs analysis has shown that digital dashboards offer many benefits and simplify potential outcomes compared to manual recording. For example, dashboards can be linked to different systems through interfaces or interfaces. As a result, data can be automatically moved to the dashboard and displayed. In this way, the actuality of the information displayed can be ensured (Christen et al., 2020). With the recent interest in big data analysis, there has been much success in using dashboard tools to improve monitoring, make informed decisions, and improve healthcare processes (Franklin et al., 2017)(Dowding et al., 2015).

The primary focus of dashboards is to provide data for unit or program managers as a way to improve service delivery, but they also provide data intended to support decision-making (Daley et al., 2013). The implementation of the dashboard shows that it can monitor data efficiently and handle changes, providing significant benefits both in terms of time and flexibility.

The limitation of this research is that it only took 20 villages that were the locus for handling stunting, while the other 10 villages that were the locus were not taken. This data is not representative enough to describe the overall results considering that there are 289 sub-districts and villages in Temanggung Regency.

Conclusion

From the discussion above, it can be concluded that with this child and toddler nutrition dashboard application, the process of collecting child and toddler nutrition data no longer requires a long time to input child and toddler nutrition data into EPPGBM (Electronic Based on Toddler Nutrition Recording and Reporting). Community) because data from cadres can be directly obtained by Puskesmas and Health Service in real-time so that the delivery of information is more effective and efficient.

Author Contributions

Conceptualization, Vilda Ana Veria S.; Methodology, Agung Wardoyo; Writing original draft preparation, Muhammad Iqbal; writing review and editing, Ririn Nurmandhani; visualization, Firmansyah Kholiq Pradana P.H.; supervision, Eti Rimawati. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest:

The author declares no conflict of interest.

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