Original Research Article

ANALYSIS OF INFORMATION SYSTEM NEED DESIGN FOR RECORDING AND REPORTING INTEGRATED HEALTHCARE CENTER TODDLERS IN KASIN VILLAGE, WORKING AREA OF BARENG COMMUNITY HEALTH CENTER, MALANG CITY

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Abstract

Background: Integrated Healthcare Center is a form of Community Based Health Efforts (UKBM) that has an active role through health cadres in realizing the Community Health Efforts (UKM) to strengthen basic health services (Primary Health Care). Now, it starts to implement a health management information system (Health Management Information System) that is a form of e-health implementation as an effort to accelerate the digital transformation of health in Indonesia according to Regulation of The Minister of Health of The Republic of Indonesia Number 46 of 2017. The recording and reporting system of the integrated Healthcare Center in Kasin Village is still manual and performs the data input using microsoft excel and spreadsheet.

Objectives: This research purpose is providing information system based on website for recording and repoting needed by Integrated Healthcare Center Toddlers in Kasin Village, working area of Bareng Community Health Center, Malang City.

Methods: This research is descriptive qualitative to analyze user needs, system requirements, design system and interface design required for the information system for recording and reporting activities of the Integrated Healthcare Center.

Results: User needs in the recording and reporting of the Integrated Healthcare Center Information System can be identified as the needs of health cadres users and the need of Community Health Center Officers. The design of the information system design for recording and reporting of the Integrated Healthcare Center for toddlers had been compiled using Unified Modeling Language (UML) diagrams using simple and easy to operate features and menus to meet the data needs of the Integrated Healthcare Center and Community Health Center.

Conclusion: The design of the information system that facilities the performance of health cadres and reduce the chance of data errors.

Keywords: Health Information System, Healthcare Centre, Toddlers

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INTRODUCTION

Integrated Healthcare Center as a form of Community Based Health Efforts (UKBM) has an active role to realize Community Health Efforts (UKM) as a form of strengthening basic health services (Primary Health Care) that starts to implement management information system. This system is a form of implementing e-health as an effort to accelerate the digital transformation of health in Indonesia (Kemenkes RI, 2021). Health information system provides the basis for decision making and have four main functions: data generation, data compilation, data analysis and synthesis, and data communication and use (Herawati & Purnomo, 2016).

Integrated Healthcare Center data recording and reporting carried out according to Integrated Healthcare Center Information System (SIP) that provides convenience for Integrated Healthcare Center cadres in processing data and monitoring the health development of Integrated Healthcare Center participants.

The Integrated Healthcare Center information system results more accurate data, minimizing data loss due to computerized storage system. The Integrated Healthcare Center information system can assist the health development (weight) for infants/toddlers without the KMS need and can present reports on the weight development of infants/toddlers in graphic form. The Integrated Healthcare Center information system minimizes the risks that can arise from data recording and reporting Integrated Healthcare Centers that are carried out manually at risk of causing several possible invalid data, delays in data processing and report generation and low utilization of reports on the results of Integrated Healthcare Center activities, either by the Integrated Healthcare Center or related agencies such as Community Health Centers, sub-district offices and to the stakeholders above it (Sugiarti et al., 2018).

METHODS

Study Design

The study design was cross sectional study with descriptive approach.

Setting

This research was conducted in Kasin Village, the working area of The Bareng Health Center in Malang City.

Research Subject

The interview was conducted with 16 heads of health cadres and Community Health Center officers who are responsible for building the Integrated Healthcare Center.

Instruments

Data were obtained through structured interviews using a questionnaire about the data of each Integrated Healthcare Center, the need for an Integrated Healthcare Center information system and the willingness of health cadres and Community Health Center officers to have an information system in recording fund reporting activities for Integrated Healthcare Center data.

Data Analysis

The design of the Integrated Healthcare Center information system used the classic life cycle method approach or waterfall method. This model includes the identification phase including the identification of user needs and the identification of problems that exist in the Integrated Healthcare Center related to recording and reporting systems. The analysis stage was carried out through analysis of system requirements, system components and the relationship between objects. The design phase was carried out through system design and integrated Healthcare Center information system interface design.

The collected data was analyzed then was created the modeling using Unified Modeling Language (UML) diagrams to ease system design. This section provides an overview of the database design, programming flow and information system activities.

Ethical Consideration

Research ethics is carried out trough research licensing prosedures, which is letter of permission submitted to the Malang City Health Office and Malang City Health Center.

RESULTS

The Integrated Health Center (Posyandu) of toddler in Kasin Village is one of the posyandu located in the Working area of the Bareng Health Center, Malang City. One of the 4 (four) working areas in the Bareng Health Center, namely Bareng Village, Kasin Village, Gading Kasri Village and Sukoharjo Village. Today, there are 16 posyandus in Kasin Village. Each posyandu uses the identity of the name of the posyandu by the name of the flower. The names of the toddler posyandu are Mawar, Melati 1, Melati 2, Gardena 1, Gardena 2, Dahlia, Katelya, Aster 1, Aster 2, Nusa Indah 1, Nusa Indah 2, Nusa Indah 3, Carnation, Lely, Seruni and Bougenville. The total number of toddlers the Posyandu in Kasin Village was 517 children under five (data for June 2022) as seen in Table 1 below:

Table 1. Frequency Distribution of Number of Toddlers in Healthcare Center Toddlers in Kasin Village, Working Area of Bareng Community Health Center Malang City on July 2022

Total Toddler	Frequency (Toddler)	%
Mawar	50	9,7
Melati 1	48	9,3
Melati 2	42	8,1
Gardena 1	39	7,5
Gardena 2	24	4,6
Dahlia	33	6,4
Katelya	17	3,3
Aster 1	21	4,1
Aster 2	24	4,6
Nusa Indah 1	49	9,5
Nusa Indah 2	24	4,6
Nusa Indah 3	38	7,4
Anyelir	24	4,6
Lely	17	3,3
Seruni	38	7,4
Bougenville	29	5,6
Total	517	100

The recording and reporting of toddler data is still manual using a register book and for further reporting using Microsoft Excel and spreadsheets. The identification results showed that in recording and reporting the data there had not been synchronized so that officers had to input the same data for each toddler data and reporting data for weighing toddlers. The recordings carried out by health cadres include the identity of toddlers, cohorts of toddlers, monitoring of toddlers' growth, nutritional status of toddlers, the administration of vitamin A and exclusive breastfeeding. In detail, the data requirements can be seen in Table 2 below:

Table 2. Toddler Reporting Data Category in Kasin Village, Working Area of Bareng Community Health Center Malang City on July 2022

Data Category	Element Data

Toddler Identity	1. Family card number
	2. Identity Card Number
	3. Child number-
	4. Name
	5. Birth of date
	6. Sex
	7. Address
	   a) Ward
	   b) Posyandu
	   c) Street
	   d) Neighborhood association (RT)
	   e) Citizens association (RW)
	8. Birth body weight
	9. Birth body length
	10. IMD
	11. Parents name
	12. Parents identity card
	13. Parents phone number

Toddler Cohort	1. Identity Card Number 2. Child name 3. Birth of date 4. Sex 5. Parents name 6. Address 7. Phone number 8. Body weight in January-December 9. Body height in January-December
Toddler Growth Monitoring	1. Ward 2. Posyandu 3. Total toddler (K) 4. Total weighted toddler (D) 5. The increase of body weight (N) 6. No increase in body weight (T) 7. Imbalance (O) 8. New (B) 9. BBLR

Data Category	Element Data
Toddler Nutritional Status	1. List a) Child name b) Birth of date c) Sex d) Birth body weight e) Birth body length f) Parents name g) Address (RT, RW, ward) h) Posyandu i) Measurement date j) Measurement age k) BB, TB, LILA, LIKA l) Measurement way (terlentang/berdiri) m) Z-score + Description (BB/U. TB/U, BB/TB) n) The status of BB increase (N, T, O, B) 2. Recap a) Ward b) Posyandu c) Body weight /U (sangat kurang, kurang, normal, lebih) d) Body height /U (sangat pendek, pendek, normal, tinggi) e) Body /TB (buruk, kurang, normal, resiko lebih, lebih, obesitas)
The Administration of Vitamin A	1. List a) Identity Card Number b) Name c) Sex d) Birth of date e) Parents name f) Ward g) Posyandu h) Address i) The administration date 2. Recap a) Ward b) Posyandu c) 6-11 months (male, female) d) 12-59 months (male, female)

The following is the distribution of the number of health cadres and a statement of the need for information systems at the Posyandu, Kasin Village, Working Area of the Bareng Health Center, Malang City in July 2022 as seen in Table 3 below:

Table 3. Frequency Distribution Characteristics of Number of Health Cadres and Statement of Information System Need in Kasin Village, Working Area of Bareng Community Health Center Malang City on July 2022

Demography Characteristics	Frequency (Respondent)	%
Total Posyandu Cadre		
Mawar	8	7,0
Melati 1	9	7,8
Melati 2	9	7,8
Gardena 1	6	5,2
Gardena 2	5	4,3
Dahlia	10	8,7
Katelya	6	5,2
Aster 1	7	6,1
Aster 2	7	6,1
Nusa Indah 1	7	6.1
Nusa Indah 2	6	5,2
Nusa Indah 3	5	4,3
Anyelir	9	7,8
Lely	7	6,1
Seruni	9	7,8
Bougenville	5	4,3
Total	97	100
Internet-based information system		
Agree	16	100
Doubtful	0	0
Disagree	0	0
Total	16	100
Expected features of an internet-based information system		
Report Data	10	62,5
Google	1	6,3
Excell	2	12,5
Graphic	3	18,8
Total	16	100

1. Analysis of user needs

Based on the reporting process and categories of Integrated Healthcare Center data for toddlers. The data were 2 (two) user needs in reporting the data for the toddler Integrated Healthcare Center including: 1) the needs of health cadres include: (a) inputting toddler identity data, (b) managing toddler cohort data, (c) managing data on monitoring of the toddler growth, (d). managing data on nutritional status

of toddler, (e) managing data on vitamin A administration, (f) managing data on exclusive breastfeeding, (g) viewing reports on Integrated Healthcare Center data for toddlers, (h) printing reports on Integrated Healthcare Center data for toddlers; 2) the needs of Community Health Center officers include: (a) looking at the identity data of toddlers, (b) looking at the data on the toddler cohort, (c) looking at the growth monitoring data for toddlers, (d) looking at the nutritional status data for toddlers, (e) looking at the vitamin A administration data (f) viewing data on exclusive breastfeeding, (g) viewing data reporting on Integrated Healthcare Centers for toddlers, (h) printing data report on Integrated Healthcare Centers for toddlers.

2. Analysis of system need

There are 2 types of system requirements that can be identified among others: 1) system requirements for health cadres, including: (a) to be able to input data and manage Integrated Healthcare Center data on the website created, health cadres for each Integrated Healthcare Center must log in by entering a username (name of cadre_Name of Integrated Healthcare Center) and a validated password, (b) health cadres can access identity data for toddlers, toddler cohort data, toddler growth monitoring data, toddler nutritional status data, vitamin A administration data, vitamin A administration data, (c) health cadres can access the data reporting on Integrated Healthcare Center toddler , (d). health cadres can print reports on Integrated Healthcare Center data for toddlers, (e) health cadres can log out after accessing the website; 2) system requirements for Community Health Center officers, including: (a) to be able to view Integrated Healthcare Center data on the website created, Community Health Center officers must log in by entering their username (Officer Name_Community Health Center Name) and password set and validated, (b) Community Health Center officers can access toddler identity data, toddler cohort data, toddler growth monitoring data, toddler nutritional status data, vitamin A administration data, vitamin A administration data, (c) Community Health Center officers can access reporting data Toddler Integrated Healthcare Center, (d). Community Health Center officers can print reports on Integrated Healthcare Center data for toddlers, (e) Community Health Center officers can log out after accessing the website.

3. Analysis of the information system design

The analysis of the information system design used in the Integrated Healthcare Center was Unified Modeling Language (UML) diagram with a health cadre use case diagram as follows:
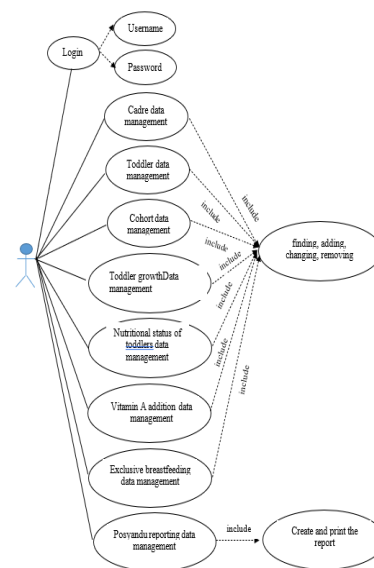

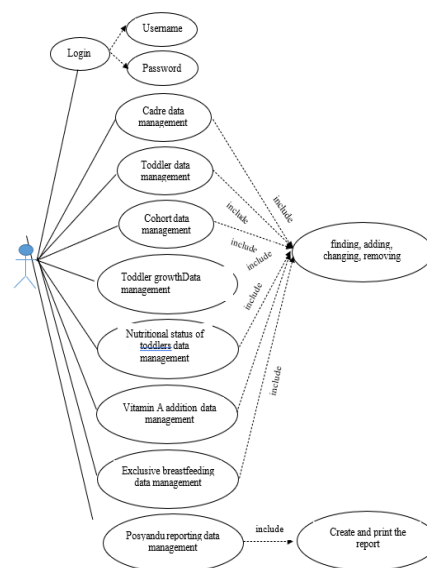Figure 1. *Use Case* of Health Cadre Diagram

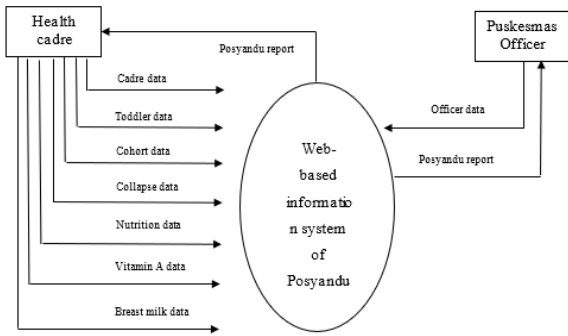Figure 2. Use Case of Health Officer Diagram

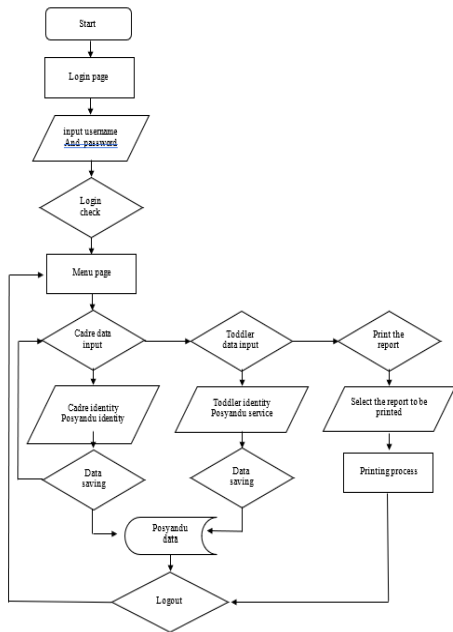Figure 3. Diagram of Information System Context
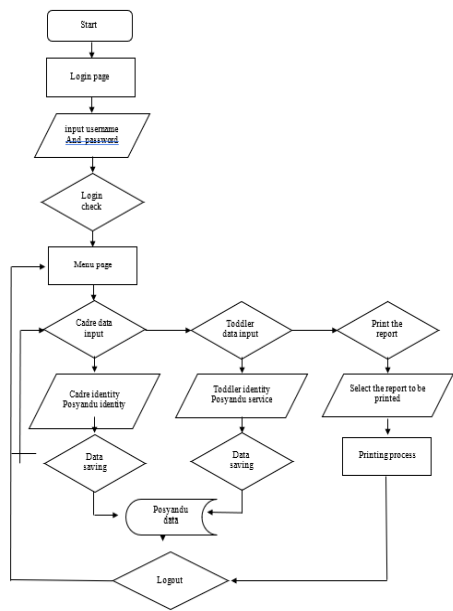

Figure 4. Flow Chart of Administrator (Health Cadre)

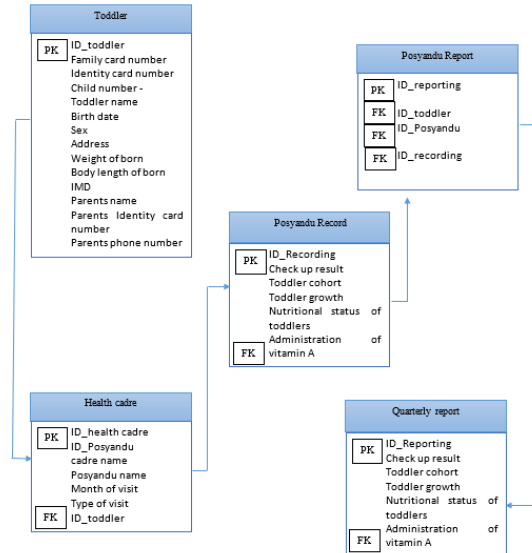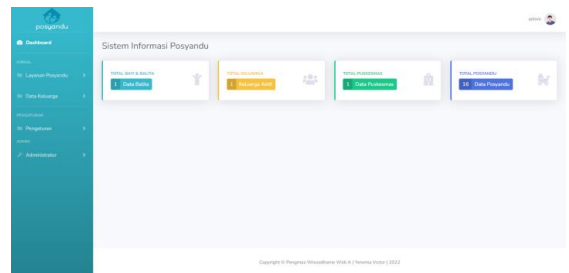Figure 5. Flow Chart User (Community Health Center Officer)

Figure 6. *Entity Relationship* Diagram

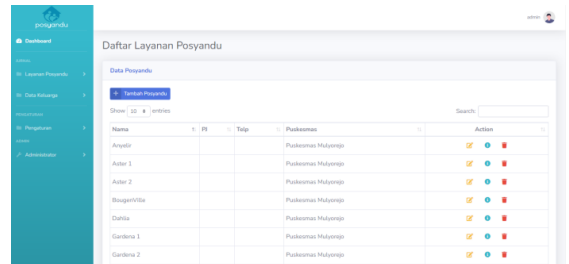4. Information system interface analysis

Information System Login Display

Information System Registration Display

Information System Dashboard Display

Display all Community Health Center data and provides options to edit, view details and delete Community Health Center data.

DISCUSSION

1. User need

Identifying user needs is the first step in developing an information system model. In the information system users are Integrated Healthcare Center cadres and Community Health Center officers. Identifying user requirements appropriately provides information for system requirements design. According to Amrin et al (2020), research on the development of value processing information systems that the user needs in designing the value processing information system are the needs of the admin, the needs of the homeroom teacher and the needs of the student's parents (Amrin et al., 2020).

Identification of user needs is the requirements definition stage that is the stage of collecting what is needed completely and then analyzed to define the needs that must be met by the program to be built. This stage must be done completely to produce a complete design (Fridayanthie & Mahdiati, 2016).

2. System need

Identifying system requirement is the second stage after obtaining the requirements data. Based on user needs data, we can obtain a series of data access processes in the information system for each user according to the needs of each user. The system requirements that we can arrange at this stage are the system requirements for Integrated Healthcare. Center cadres as administrators and system requirements for Community Health Center officers as users. System requirements are needed for information system design implementation that is an advanced stage of the user data collection stage. The next stage after collecting user data is to analyze the data collected in order to determine the boundaries of the system before entering the further stage to design the system (Hermawaty & Supiandi, 2020).

3. Design system

System design is one of the elements or stages of the overall development of a computerized system. The design of the Integrated Healthcare Center information system design used Unified Modeling Language (UML) diagrams. At this stage, the use case diagrams and flow charts are also compiled from health cadres as administrators and Community Health Center officers as users referring to the application of the Unified Modeling Language as a method of choice in building information systems. The proposed system is an explanation of the stages of health cadres filling in master data which consists of cadre data and toddler data then inputting Integrated Healthcare Center service data and finally reporting data on the results of Integrated Healthcare Center activities carried out.

Unified Modeling Language (UML) is a collection of diagrams with the standards for building object-based software. Unified Modeling Language (UML) is a tool to support the development of systems that use standard specification languages to document, specify and build software. In the Unified Modeling Language (UML), the use case diagrams are first compiled in the object-oriented software modeling. Flow charts are arranged to explain the flow of system processes that occur based on administrators and users in a system. Entity relationship diagrams are structured as a description of the relationships between entities in the information (Ayu & Sholeha, 2019; Rohman & Agnia, 2019). The system design process will translate the requirements into a software design that is estimated before coding, this process focuses on data structures, software architecture, interface representations and procedural algorithm details. The use of the Unified Modelling language (UML) as a tool for developing object-oriented systems is very reliable in the world (Fridayanthie & Mahdiati, 2016).

4. Interface design

Interface design is the final stage in the design of information systems. At this stage, the features are arranged according to the data needs inputted by health cadres and the features for data access by Community Health Center officers. The interface design for the information system has been simple designed and can meet the data needs of the toddler in Integrated Healthcare Center recording and reporting. Each interface design element consists of a login, authentication and dashboard system to access the reporting system. The interface design is then equipped with general information system settings, each

system has been equipped with a menu to change data, view system details, delete data, view toddler data, view family data. The interface design for administrators (health cadres) has also been equipped with menus for changing passwords, options, changing data and viewing user details (Community Health Center officers).

The interface design display is the final part of the information system design that can be accessed online via a computer or mobile phone using internet. The interface design may ease the users, allows access rights to be maintained and is able to display Integrated Healthcare Center activity report data in graphical form. The provision of a computer-based information system can provide an opportunity to backup data to minimize the occurrence of program errors (Rohman & Agnia, 2019).

CONCLUSION

The user needs for recording and reporting Integrated Healthcare Center information systems that can be identified as the needs of users of health cadres and the needs of users of Community Health Center officers. The system requirements for recording and reporting Integrated Healthcare Center information systems can be identified as system requirements for Integrated Healthcare Center cadres as administrators and system requirements for Community Health Center officers as users. The design of the information system for recording and reporting the Integrated Healthcare Center for toddlers uses Unified Modeling Language (UML) diagrams and has been compiled to interpret the data need of Integrated Healthcare Center services for toddlers. The interface design for recording fund for reporting the information system for Integrated Healthcare Center toddlers has been prepared using easy to operate simple features and menus to meet the data requirement of Integrated Healthcare Center and Community Health Center.

SUGGESTIONS

This study will give benefit to community healthcare center toddlers in Kasin Bareng village to organized and valid health information that can provide the safety of client data.

DECLARATION OF CONFLICTING INTEREST

There is no conflict of interest with the research I am carrying out.

AUTHOR CONTRIBUTION
Author 1:
Conducting research, coordinating socialization and permitting proposals, coordinating with health cadre in collecting and analyzing research data, coordinating data processing and analysis, coordinating the preparation of reports, coordinating the publication of research results, seminars, and publications.
Author 2:
Website designing for information system recording and reporting integrated healthcare center toddlers, coordinating the publication of research results, seminars, and publications.
Author 3:
Coordinating the implementation of seminars and publications.

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REFERENCES

Amrin, Larasati, M. D., & Satriadi, I. (2020). Model Waterfall Untuk Pengembangan Sistem Informasi Pengolahan Nilai Pada SMP Kartika XI-3 Jakarta Timur. *Jurnal Teknik Komputer AMIK BSI*, *6*(1), 135–140. https://doi.org/10.31294/jtk.v4i2

Ayu, F., & Sholeha, W. (2019). Rancang Bangun Sistem Informasi Penjadwalan Mata Pelajaran Berbasis Web Pada Smart Center Pekanbaru. *Intra-Tech*, *3*(1), 38–48.

Fridayanthie, E. W., & Mahdiati, T. (2016). Rancang Bangun Sistem Informasi Permintaan ATK Berbasis Intranet (Studi Kasus: Kejaksaan Negeri Rangkasbitung). *Jurnal Khatulistiwa Informatika*, *4*(2), 2016.

Herawati, S., & Purnomo, M. A. (2016). Rancang Bangun Sistem Informasi Pencatatan Dan Pelaporan Terpadu Puskesmas. *Multitek Indonesia*, *10*(1), 39.

Hermawaty, R., & Supiandi, I. (2020). Sistem Informasi Untuk Pelayanan Posyandu Berbasis Web dan Menggunakan Fitur SMS Gateway. *Prosiding Industrial Research Workshop and National Seminar*, *11*(1), 409–414.

Kemenkes RI. (2021). *Situasi dan tantangan kesehatan digital Indonesia Cetak biru Strategi transformasi digital kesehatan 2024*. 78.

Rohman, H., & Agnia, E. (2019). Pelaporan Posyandu Lansia Puskesmas Banguntapan III: Perancangan Sistem Informasi Berbasis Web Hendra Rohman, Elmy Agnia. *Health Information Management Journal ISSN*, *7*(2), 2655–9129.

Sugiarti, I., Tarmansyah, A., & Junaedi, F. A. (2018). Pengembangan Sistem Informasi Posyandu Terintegrasi (Sipter) Di Wilayah Puskesmas Tawang Kecamatan Tawang Kota Tasikmalaya. *Seminar Nasional Dan Diseminasi Hasil Pengabdian Kepada Masyarakat Berbasis Riset Politeknik Kesehatan Kemenkes Tasikmalaya*, *April*, 118–123.