

EVALUATION OF POSYANDU INFORMATION SYSTEMS USING THE HEALTH METRIC NETWORK MODEL

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ABSTRACT

Introduction: Posyandu has an important role in disseminating health information and monitoring the growth and development of infants and toddlers. The information generated serves as a material for consideration of decision-making. In order for the decision-making to be right on target, it is necessary to evaluate the Posyandu recording and reporting system. The purpose of this study is to assess the implementation of the Putra Bangsa Posyandu recording and reporting system in Bojonegoro which is more commonly referred as Posyandu Information System (PIS). **Methods:** used in this study is a qualitative approach that is presented descriptively using in-depth interviews and observation methods without making any intervention on the target. The Posyandu Information System Assessment uses Health Metrics Network components which are grouped into 3 parts, namely input, process, and output. **Result:** of the evaluation of the implementation of the Posyandu Information System at Putra Posyandu show that in terms of input the implementation of the Posyandu Information System is not in accordance with the guidelines for implementing the Posyandu Information System. From the aspect of the process it was found that data collection had been carried out routinely, but there was one format that was not yet routine. In terms of output it shows that the data generated are quite complete but not timely. **Conclusion:** Human Resources (HR) is one of the most dominant factors causing Posyandu Information Systems not to run optimally. The results of this study can help Health Information Management in improving the Posyandu Information System.

Keywords: Posyandu, Health Metric Network, Record, Report

INTRODUCTION

Posyandu as a form of Community-Based Health Efforts (UKBM) makes Posyandu as the main frontline for maternal, infant and toddler health services in the community. In addition, Posyandu also has an important role in disseminating health information and monitoring the growth and development of infants and toddlers. Optimizing the role of Posyandu is not only the responsibility of the government and health workers, but elements in society including cadres also play an important role. One of the roles of cadres after the opening of Posyandu is to learn Posyandu Information System (PIS) (Kementerian Kesehatan RI, 2017).

Posyandu Information System (PIS) is a set of data preparation tools to produce health information about Posyandu activities, conditions, and developments

that occur in each Posyandu. The benefits of this PIS are as a reference for cadres to understand existing problems and facilitate the operation of Posyandu activities such as posyandu basic data, Posyandu service activities, posyandu user data and posyandu officers (Mubarak et al., 2017). Through this PIS, it is expected that Posyandu can develop the right type of activity and in accordance with the target's needs. The ability of cadres in understanding PIS becomes very important because it will affect the quality of information produced. This is in accordance with the theory of Garbage In, Garbage Out which states that if the data obtained are of poor quality then processing as well as anything else will produce bad information (Kim, Huang, & Emery, 2016).

Posyandu Information System has three main components of the system, namely, input, process, and output. Input

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here is defined as a collection of raw data obtained from internal and external organizations to be processed in a system. The process is a series of activities that include moving, manipulating, and analyzing data into useful information, while output is the distribution of information that has been processed up to the utilization of information generated (Wiratna Sujarweni, 2015).

The Posyandu Information System is still far from the standards set by the Government. Some challenges that are still faced in the implementation of the Posyandu Information System such as the process of managing data into information that has not been effective and efficient in an integrated and coordinated mechanism, there is overlap in the collection and processing of health data, and there is still data collection that is repeated by the units different units so that there is a risk of data and activities being recorded more than once.

Health information is a collection of data relating to health that have been processed into information that has value and meaning that is useful for increasing knowledge in supporting development and development in the health sector. These data and information then become a reference in the management, decision-making, planning, and accountability processes. But until now the available health information system has not been sufficient to present data and information that is valid and timely.

The need for quality data and information can be obtained through the implementation of the Health Information System (SIK) by collecting data, processing data, analyzing data, and presenting information. At present the data quality assessment methods are still fragmented and have not been able to provide quality information. In connection with this, it is necessary to develop data quality assessment methods that are able to produce accurate, complete, timely, actual, and consistent information (Indonesian

Ministry of Health Center for Data and Information, 2015).

Therefore, recording and reporting on the Posyandu Information System (PIS) are very important to be done by Posyandu cadres because it will determine the information produced as a material for decision-making. In order for the decision-making to be on target, an evaluation of the Posyandu Information System (PIS) is needed. An assessment of the quality of data produced by the Posyandu Information System can be carried out using a Health Metrics Network (H MN) framework developed by the World Health Organization (WHO) in 2008 (Tristantia, 2018). The HMN framework aims to make improvements and developments in a health information system and assist in the implementation of sustainable monitoring and evaluation.

The Health Metrics Network (HMN) framework is useful in providing information about all health data and information systematically. This framework is universally standardized as a guide in the collection, reporting and use of health information. In addition to the benefits above, the Health Metrics Network (HMN) Framework also helps identify important gaps and issues that can be seen from the perspective of stakeholders involved in health information systems (Mbondji et al., 2014).

According to Permenkes No. 97 of 2015 concerning the Health Information System Road Map states that the results of the Health Information System (SIK) evaluation using the Health Metric Network (HMN) model conducted in 2012 showed that the six components of the health information system implementation did not yet adequately meet data quality standards, especially for the data management component. However, when compared to 2007 as a whole, there was an increase, especially in the resource component.

The Health Metrics Network has six main components namely health information system resources, health

indicators, data sources, data management, information products, and dissemination and use of health information. The six components are further divided into input, process, and output (Jakti et al., 2016).

Inputs in this case include policy, human resources, and communication technology support as a prerequisite needed to ensure health information is functioning optimally. Process in this case is the basis of health information planning and strategy which includes data collection and data processing activities. While the output in this case is the quality of information produced based on the timeliness and completeness of the data criteria (Listyorini et al., 2017).

The Posyandu that is the location of this research is one of the Posyandus in Ngujo Village, Bojonegoro, which has been Purnama standardized. According to interviews with health workers who work at the Polindes, one of the problems is the Posyandu Information System (PIS) which has not been running optimally.

This study aims to assess the implementation of the Posyandu Information System (PIS) in Posyandu Putra Bangsa, Bojonegoro. The results of this study can be used as input in improving the management of the Posyandu Information System (PIS) better.

METHOD

The research method used in this study is a qualitative approach that is presented descriptively using in-depth interviews and observation methods without making any intervention on the target. Informants in this study included the Ngujo Village midwife, and two Posyandu cadres who filled out the Posyandu Information System (PIS) book. The Posyandu that is the place of research is the Putra Bangsa Posyandu based on the recommendation of Ngujo Village health workers because this research is useful if conducted at the Posyandu Putra Bangsa that will prepare for an increase in the

Posyandu strata from Purnama level to Mandiri.

Variables in this study use components of the Health Metrics Network (HMN) evaluation model that have been grouped into inputs, processes, and outputs. Variables in the input group consist of policies, human resources, and technology which are the main prerequisites for the formation of information systems. Process variables consist of data collection and data processing which are two important activities in processing data into quality information. While in the output group there are two variables analyzed to see the resulting picture of information, namely, timeliness and completeness of the data.

Primary data collection is done through two techniques, namely direct observation and in-depth interviews. Observation was carried out to directly observe the Posyandu recording and reporting process carried out by the cadres. In-depth interviews were conducted with semi-structured questions to find out the obstacles experienced by cadres and important information that supports the results of observation. Meanwhile, secondary data were obtained from a review of the Posyandu Information System (PIS) report document.

The assessment conducted in this study uses two categories, namely appropriate and not appropriate. Recording and reporting are said to be appropriate if they are carried out in accordance with the standards established by the implementation manual of the Posyandu Information System (PIS). In addition to the PIS handbook, the assessment is also seen from the Health Metrics Network theory.

After the data collection has been completed, the data are analyzed using content analysis methods based on Health Metrics Network components that have been grouped into inputs, processes, and outputs. The recording and reporting documents that are in PIS will be analyzed for their suitability by comparing the recording and reporting of PIS that has been

carried out by Posyandu cadres with the guidelines for implementing the Posyandu Information System (PIS). Presentation of the data used in the study is descriptive narrative that is equipped with tables. This research has received ethical approval by Komisi Etik Penelitian Kesehatan – Fakultas Keperawatan Universitas Airlangga (1769-KEPK/2019).

RESULT

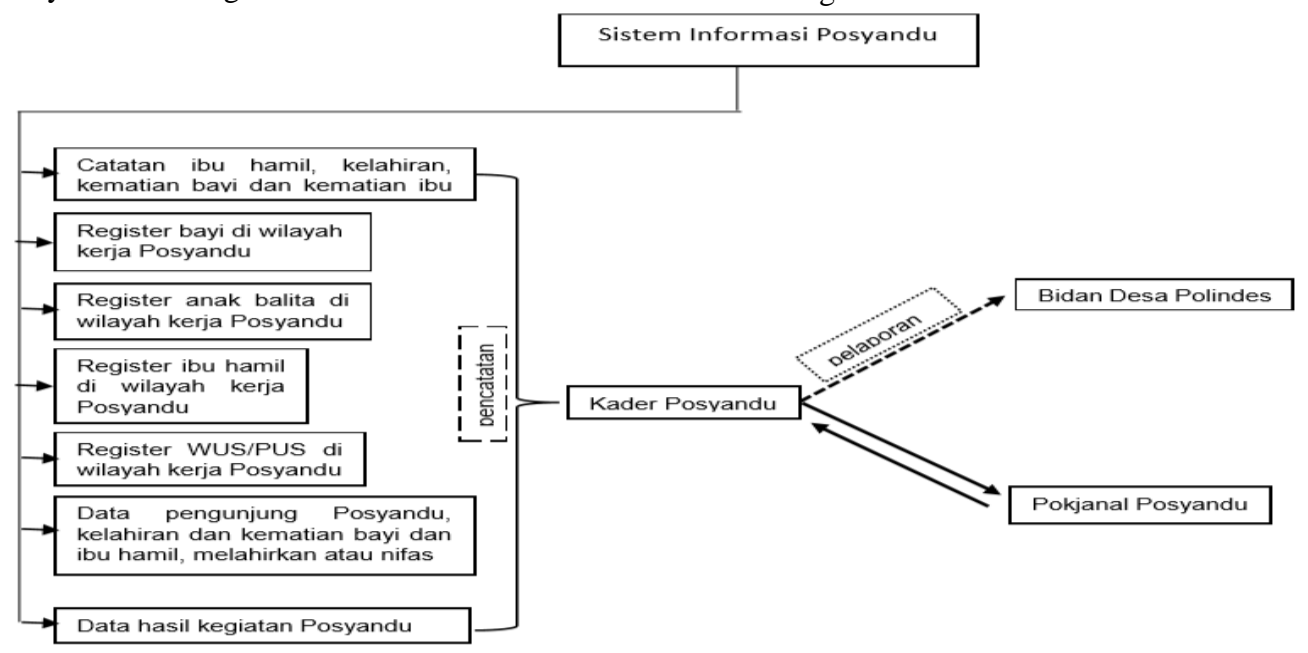
Overview of Posyandu Information System Format

Posyandu Information System has seven formats consisting of (1) records of pregnant women, births, infant deaths and maternal deaths, (2) registers of babies in Posyandu working areas (3) registers of under-fives in Posyandu working areas (4) registers of pregnant women in the Posyandu working area.

In addition to the four formats, there are still three other supporting formats consisting of (5) WUS / PUS registers in Posyandu working areas, (6) Posyandu visitors data, births and deaths of babies and pregnant women, childbirth or childbirth, and (7) Data results of Posyandu activities.

The seven formats must be filled in regularly by Posyandu cadres in accordance with the Posyandu Information System guidebook. The handbook is held by the midwife, then the midwife will convey the recording mechanism to the Posyandu cadres.

The process of recording to reporting not only involves Posyandu cadre leaders but all cadre members and Posyandu coordinating midwives are also involved. Pokjanal Posyandu is also involved in cross-checking data.



Source : Polindes Desa Ngujo 2015

Figure 1. Flow Chart of Posyandu Information System

The Posyandu Information System chart in Ngujo village is actually not available in the form of pictures. The chart in Figure 1 is obtained from the conversion results of the interview with the midwife in Polindes. Midwives confirmed that the Posyandu Information System that is

already running has seven formats which must be filled out by Posyandu cadres after every Posyandu activity is completed.

The results of the recording are then kept by Posyandu cadres. If there is a request for data by the midwife, the cadre will submit them to the village midwife. In

addition, cadres also distribute data with Pokjandal Posyandu in the context of cross-checking data with the aim of ensuring that the data recorded are complete and correct.

Input Assessment of Poyandu Information System

The evaluation of the Posyandu Information System (PIS) in terms of input in this study includes three variables, namely policy, human resources, and technology support as a prerequisite needed to ensure the Posyandu Putra Bangsa Information System functions optimally. The recapitulation of the results of the Posyandu Information System (PIS) assessment in terms of input is explained in Table 1.

Based on observations and document review by comparing the Posyandu Information System format sheet and the

Posyandu Information System Guidelines issued by the Ministry of Health in 2017 it was found that the Posyandu Information System (PIS) format sheet given to cadres was not in accordance with the latest Posyandu Information System Guidelines (PIS). The discrepancy is due to there being one sheet of PIS format which is different from the 2017 PIS Guide.

The discrepancy lies in format 5, namely the WUS / PUS register in the Posyandu working area. The format used is still using independent recording through cadre notebooks. This was considered more practical by the cadres and the format was rarely checked by the Posyandu Putra Bangsa supervisor midwives.

Table 1. Recapitulation of Input Assessment of Posyandu Information System

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
Policy	The existence of a Posyandu Information System guidebook published by the Indonesian Ministry of Health, 2017.	Not in accordance with the guidelines. The discrepancy lies in format 5, that is, the WUS / PUS register which is recorded only in the notebook does not match the format.	Cadres feel that data about WUS / PUS are rarely requested so that the recording is not done according to format.
Human Resource	The cadre leader was given training by the Village midwife on recording and reporting on the Posyandu Information System (PIS) format.	In accordance with the guidelines that the cadre leader or the representative is entitled to receive training on Posyandu Information Systems.	The difficulty of determining the meeting time between midwives and cadres.
Technology	Already available	Not in accordance with	The availability

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
	software in the form of Ms. Excel but there is no hardware in the form of computers or laptops that can be used by cadres. Therefore, recording and reporting is still done conventionally in the book.	the Health Metrics Network theory that there should be a need for a complete technology component so that information technology can function optimally.	of hardware (hardware) is inadequate.

Process Assessment of Poyandu Information System

The Posyandu Information System (PIS) assessment is carried out based on two process variables consisting of data processing and data collection. The recapitulation of the Posyandu Information System (PIS) assessment results in terms of process is shown in Table 2.

Posyandu Information System data collection is done through recording all PIS format sheets that are carried out by Posyandu cadres. Data collection time varies for each format. For formats 1 to 5, recording is done every month in one year openly. While for formats 6 and 7, every Posyandu is completed.

However, there is one format that is not in accordance with procedures, namely

the format of 5 WUS and PUS registers in the Posyandu working area. The discrepancy lies in the time of data collection which should be done once a month but in reality it is only done once a year or tentatively in accordance with the request of the Posyandu supervisor midwife.

"... if the data register of WUS and PUS is not done every month, if asked by the midwife alone." (main informant, 35 years).

The availability of timely health data and information is very much needed. This will affect the speed and accuracy in decision-making.

Table 2. Recapitulation of Output Assessment of Posyandu Information System

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
Data Collecting	The Posyandu Information System data collection is done through the recording	Of the seven formats, only one format is not in accordance with the PIS guidelines, namely	WUS and PUS register data collection is still adjusted by

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
	of seven sheets of PIS format conducted by Posyandu cadres.	the fifth format of WUS and PUS registers.	midwife requests.
Data Processing	Data processing is carried out by the midwife using the Ms. Excel program. Excel provided by the Bojonegoro Health Office.	It is in accordance with HMN theory that the use of technology used can support data processing.	Not fully computerized.

Output Assessment of Poyandu Information System

The Posyandu Information System (PIS) assessment is based on two output variables consisting of data completeness and timeliness. The recapitulation of the Posyandu Information System (PIS) assessment results in terms of output is shown in Table 3.

Based on observations and analysis of PIS documents, it can be concluded that the available data are quite complete. The cadre has filled out the format given in

accordance with the instructions submitted by the midwife.

There are still some data that are not yet available. Incomplete data include data on Fe tablets, data on the number of PUS / WUS, attendance list of cadres and health workers.

The completeness of the data will affect the quality of information that will be generated. So that incomplete data cannot be used as a reference for making decisions.

Table 3. Recapitulation of Output Assessment of Posyandu Information System

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
Data Completeness	The completeness of data on Posyandu Information System (PIS) can be seen from aspects that must be completed in 7 PIS formats.	The recording and reporting of Posyandu activities are quite complete but the attendance list of cadres and data regarding the number of PUS / WUS and Fe tablet data are not recorded.	Lack of awareness of the importance of completeness of data.
Punctuality	The recording is done in accordance with the	Not in accordance with the PIS Handbook	Cadres have responsibilities on

Evaluation Aspect Based on Health Metrics Network	Implementation	Conformity To Theory	Obstacles
	free time that the cadres have after carrying out Posyandu activities.	which states that the recording should be done once a month or after every Posyandu activity is completed.	other work and must adjust Posyandu schedules to take notes.

"If the official registration data is never recorded, only visitor registration is recorded. So far, I have never checked with Puskesmas or midwives and Pokjantal for visitor registration data."
(Main informant, 32 years).

The results of observations and study of recording documents in the PIS format found double data so it was inefficient. This is in the fifth and sixth formats. Cadres must record the number of WUS and PUS in the Posyandu working area in both formats. The recording should be in the WUS and PUS registers or in the fifth format so that it is more efficient and does not overlap data.

In terms of timeliness, cadres have filled in routinely in one year. However, if viewed from the guidelines, it should be done every month and after every Posyandu activity has been carried out. Based on interviews with cadres it can be concluded that some of the obstacles experienced were cadres having to adjust Posyandu schedules that could change at any time.

Timeliness is one important component in data collection. Especially in the health sector, the data needed must be updated immediately and available when needed. This can have an effect on making decisions that are fast and right. Therefore certainty in the data collection schedule must be ensured and more clearly regulated.

DISCUSSION

Format of Posyandu Information System Evaluation

Based on the Posyandu Information System handbook available at the Ngujo Village Polindes, it can be concluded that the recording should be done every month. Each format has a different note. Therefore, cadres must pay close attention to the guidelines so that each format can be filled correctly.

In an information system and database, the format can be in the form of a screen that contains a lot of space or fields that have been categorized to enter data in accordance with the categories that have been made. Good format and neatly arranged will facilitate the recording in entering data. The Posyandu Information System used in the Putra Bangsa Posyandu has seven formats. The seven formats are fairly neat but have a concise and small layout. So that the manual recording process is quite difficult for Posyandu cadres to adjust handwriting to the available layouts.

Provisions and ways to fill in are available in the Posyandu Information System (PIS) manual. Format 1 contains basic notes on Posyandu targets. Format 2 contains the results of weighing the baby, administering iron pills, vitamin A, ORS, date of immunization and infant meningial. Format 3 is used to record the results of weighing children under five, giving iron pills, vitamin A and OR in

children under five. Format 4 is data about pregnant women, gestational age, administration of blood-added pills and iodine capsules, immunization, pregnancy examination, risk of pregnancy, date and birth attendants, data on live and dead infants, and data on maternal deaths. Format 5 is a list of women and husband and wife who are likely to have children (pregnant). Format 6 is a record of the number of Posyandu visitors and the number of attendees. Format 7 contains reports on the results of Posyandu activities that have been held. Explanation of the Posyandu Information System flowchart is simply illustrated through Figure 1 regarding the Ngujo Village Posyandu Information System flowchart.

The many formats that must be filled in by Posyandu cadres will add to the workload of Posyandu cadres. Based on interviews with Posyandu cadres, information was obtained that some of the Posyandu cadres also doubled as Posbindu cadres so that the workload increased. The absence of specific regulations governing Posyandu Information Systems is also a factor in the weak development and improvement of existing systems.

"Many of them are concurrently being managers of Posyandu toddlers as well as Posbindu or Posyandu elderly. Work becomes more and more, must take care of the household with other work." (Informant Utaman, 35 years old)

Analysis of Posyandu Information System (PIS) in Input

The register format for Fertile Age Women (WUS) and Fertile Age Pairs (PUS) is still made manually by Posyandu cadres. So the recording done by cadres is not based on the Posyandu Information System guidelines. The format of the register of Fertile Age Women (WUS) and Fertile Age Pairs (PUS) is very important because it can estimate basic immunization

needs by looking at the list of women and husband and wife who are likely to have children (pregnant).

"Data collection on women of fertile age (WUS) and couples of fertile age (PUS) is carried out in cross-program with Family Data Collection (PK) so that the format used is slightly different to facilitate data collection." (Supporting Informant, 49 years old)

The Posyandu Putra Bangsa has achieved full stratification (green), which means that this Posyandu already has an innovative program with Posyandu activities often carried out annually. Posyandu cadres in charge of 5 people but in addition to the leader of the cadres, there are still four other cadres who do not understand the recording and reporting system for each sheet format in accordance with the Posyandu Information System (PIS). This shows that only cadre leaders can complete all the formats in the Posyandu Information System. While other cadres only assist in copying from manuals to formats with the guidance of the cadre leader. That is because the training on recording and reporting of Information Systems is indeed not comprehensive and only cadre representatives get the information

The results of the Posyandu Information System (PIS) assessment on the technology aspect are in line with research (Rohman & Try Nur Aminna, 2018) that the Posyandu Information System will be implemented effectively and efficiently through the assistance of the latest technology. However, not everyone is capable and ready to take advantage of the existence of such technology so the results are not necessarily as expected. As is the case in the Putra Bangsa Posyandu, there is no device that can and is ready to be used by cadres to do computerized recording. So

that all data are still input manually using handwriting.

The Posyandu Putra Bangsa work area already has internet access but the internet network is not yet stable and strong enough. In addition, the change in the recording model from manual to computerized with the help of technology certainly requires readiness from several sectors. Therefore the Health Office needs to review the matter to support the operation of a more effective and efficient Posyandu Information System.

Analysis of Posyandu Information System (PIS) in Process

The Posyandu Information System (PIS) assessment is carried out based on two process variables consisting of processing and collecting data. If seen based on observations in the data collection process, there is still one format that is not yet suitable, namely the fifth format regarding the register of Fertile Age Women and Fertile Age Pairs.

The format of the register of Fertile Women (WUS) and Fertile Age Pairs (PUS) is very important because it can estimate basic immunization needs by looking at the list of women who have the potential to have children (pregnant). Therefore, it is better from the midwife and the health department to inform further about the recording of WUS and PUS. Data on WUS and PUS have actually been recorded by the village and also the PKK. Data collected by several parties and not yet integrated results in data duplication. There are no specific provisions regarding which parties should be obliged to collect data about Fertile Age Women and Fertile Age Pairs.

Data processing was carried out by the midwife at Polindes using the assistance of Ms. program. Excel provided by the Bojonegoro Health Office. The program has been developed in 2019 with a more comprehensive and systematic formula. When compared with the previous year, the program made now is very helpful in

making decisions quickly. That is because there is a hyperlink feature that is used.

In its application, midwives do not experience significant difficulties. The existence of training of health workers organized by the Health Office is very helpful for health workers to operate the program. Training is conducted at least once a year.

"For data processing, it is already using the program in Ms. Excel is the latest one in 2019. It installs people from the DHO section of the health information system. There used to be but not as complex as this formula. Before being implemented, each health worker representing the village was given training by the Health Office. At that time I was also assisted by other health workers." (Main Informant, 49 years old)

Although data processing has used a computer but this is not enough to say computerized. Research conducted by Arges Cilla Mondey and Asparizal (2018) states that to be described as a computerized system is not just doing data deception using a computer but includes the process of recording data, distributing data to printing reports involving computers. Based on these findings, it can be concluded that the application of PIS in Posyandu Putra Bangsa has not been fully computerized because at the stage of recording and distributing data it is still done manually without involving programs on the computer.

This condition is caused by cadres not being able to operate computers so that recording at Posyandu is still done manually. Processes that use computers are only carried out by midwives at the data processing and decision-making stages. Another drawback is the condition of regions that have internet networks that are less stable and less robust so that the data distribution stage is still done manually.

Analysis of Posyandu Information System (PIS) in Output

The assessed component of output consists of data completeness and timeliness. This is consistent with the results of research conducted by Tristantia (2018) who revealed that the indicators that determine the quality of a data can be seen through completeness and timeliness.

The completeness of the data means that the information generated from the data processing can represent any amount needed and the actual conditions. The data in the Posyandu Information System are complete, but there are some data that are not recorded. One of them occurred when the cadres did not fill out data regarding the administration of Fe tablets. The recording should be done in the 7th PIS format.

The recording of the number of officers present was also not routinely filled out by the cadres assuming that the data were not used to make decisions. The data should still be filled in regularly to see the activeness of the cadres who attend the Posyandu.

Lack of information about the use of cadre and health staff attendance registration data is one of the contributing factors. Until now, cadres feel that the attendance list of cadres and health workers is not very important because it has never been checked and is rarely asked by the midwife for Posyandu supervisors. Cadres should have been informed that the activity of the officers present was very influential on the success of the Posyandu. One of them is monitoring active and inactive cadres. Without the presence of cadres, Posyandu will find it difficult to run optimally.

During checking the PIS format held by cadres, double data were found to be inefficient. This can be found in format 5 regarding the Register of Fertile Age Women (WUS) & Fertile Age Couples (PUS) and the 6th format regarding Posyandu visitors. In both formats it must record the number of WUS and PUS in the

Posyandu working area. The recording should be in the WUS and PUS registers so that it is more efficient and does not overlap data. In terms of timeliness, cadres have filled in routinely in one year. However, if viewed from the guidelines, it should be routinely done every month and after every Posyandu activity has been completed. Based on interviews with cadres it can be concluded that some of the obstacles experienced were cadres having to adjust Posyandu schedules that could change at any time. Therefore recording is often not exactly one month and can be more than the time it should be.

Timeliness is an important component in data collection. Especially in the health sector, the data needed must be updated immediately. Therefore the certainty of the data collection schedule must be ensured. Because this will affect the decision-making. If the resulting data are available on time and in full, then decision-making can be done more quickly as well.

CONCLUSION

Posyandu Putra Bangsa has implemented Posyandu Information System. However, in practice there are still several formats that are not filled in accordance with the PIS Guidelines. Through this research, it is expected to help Health Information Management in improving some components that are not yet suitable.

Human resource capabilities also need to be planned because, based on an assessment of all aspects, it shows that Human Resources (HR) plays a very important role as implementing Posyandu Information Systems. In addition to improving the quality of human resources, the prerequisites for the formation of other information systems such as supporting policies and technology need to be considered so that the Posyandu Information System (PIS) can run optimally.

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