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Improvement of management information system to facilitate recording and reporting for Integrated Health Service cadres

Putu Ika Farmani[1], Putu Ayu Laksmini[1], I Kadek Arya Sugianta[2]

[1]Department of Health Information Management, Faculty of Health Sciences, [2]Department of Informatics Faculty of Business, Social, and Humanities, Universitas Bali Internasional
Jl. Seroja Gang Jeruk No. 9A, Denpasar-Bali, 80239, Indonesia

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ABSTRACT

In the Penatih Dangin Puri Village area, the Integrated Health Service (*posyandu*) activities data recording by cadres is still carried out manually using forms which are then recorded again in the SIP book. This data recording system is considered to still have many shortcomings, so this community service aims to provide an integrated recording system and provide training to facilitate *posyandu* data recording and reporting activities. Carried out in the form of training and implementation related to data entry and making reports for toddler *posyandu* based on the *posyandu* Information System (SIPOS). SIPOS training activities with Human Development Cadre partners in Penatih Dangin Puri Village began on September 27 2023. Attended by 65 cadres from 13 Banjars. Latter evaluation has been carried out and shows that the average accuracy of using SIPOS after training is 80 percent and increased to 94 percent after implementation. With the level of accuracy in filling out the data entry and report extract features, most of them have a percentage of >80 percent, but there is an accuracy level of <80 percent, namely in the date of birth entry feature (55 percent) and entering the date of visit (51 percent). Community service activities succeeded in improving cadres' skills in recording and reporting information system-based *posyandu* data.

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1. INTRODUCTION

Community empowerment can be implemented in the form of Village Community Institutions and Village Traditional Institutions which require a participatory learning process for the community to be able to recognize the health problems they face as well as the potential they have and plan to resolve these health problems independently (Kementerian Dalam Negeri Republik Indonesia, 2018; Kementerian Kesehatan Republik Indonesia, 2019b). Institutionally, Integrated Health Service (*posyandu*) is an LKD and is one of the village-scale local authorities developed by the community in an effort to prevent stunting, especially Integrated Service Post (*Posyandu*) activities for toddlers. *Posyandu* are one of the primary healthcare institutions located closest to the community and easily accessible (Sari et al., 2023). In Penatih Dangin Puri Village there are KPM (Human Development Cadre) staff who are tasked

✉ Corresponding Author: **Putu Ika Farmani**: Tel. +62 361-4747770 | E-mail: ikafarmani@iikmpbali.ac.id

with coordinating *posyandu* activities in the Penatih Dangin Puri Village area, including the Toddler *posyandu*. *Posyandu* is a form of community-based health effort that is managed from, by, for and with the community, to empower the community and make it easier for the community to obtain health services for mothers, babies and toddlers (Kementerian Kesehatan Republik Indonesia, 2012). In Penatih Dangin Puri Village, *posyandu* activities for toddlers are carried out by *posyandu* cadres appointed by the village with assistance from local health center officers *Posyandu* cadres for toddlers are tasked with carrying out measurement activities (weight and height of toddlers), administering vitamin A, checking the nutritional status of toddlers on Healthy towards Card (KMS), as well as recording and reporting *posyandu* data. Penatih Dangin Puri Village has 13 toddlers *posyandu* with a total cadre of 65 people. The thirteen *posyandu* are spread across the citizens association (that called "Banjar" in Bali) and housing levels, consisting of Banjar Laplap Sengguan, Banjar Laplap Arya, Banjar Laplap Tengah, Banjar Laplap Kauh, Banjar Gunung, Banjar Buaji, Banjar Bekul, Banjar Palagiri, Banjar Kertapala, Banjar Taman, Banjar Poh Manis, BTN Nuansa Penatih, and BTN Mertasari. All *posyandu* have intermediate status. Those involved in organizing the *posyandu* for toddlers are cadres, local community leaders, village officers, and assisted area officers.

Data obtained from *posyandu* activities is recorded by cadres using a form provided by the *posyandu* Support Officer from the Public Health Centre (PHC). The concept of toddler *posyandu* activities in Penatih Dangin Puri Village applies the 5 table concept as regulated in the guidelines for organizing *posyandu* activities where each cadre has a pre-agreed division of tasks and the recording of *posyandu* activities is carried out using the *posyandu* Information System (Kementerian Kesehatan Republik Indonesia, 2019b; Khoiri, 2008). Cadres record manually using the SIP (*Posyandu* Information System) book which contains a cohort of toddlers from age zero months to age 59 months. The SIP is filled in routinely every month according to the frequency of *posyandu* activities which are then reported to Penatih Dangin Puri Village and also reported to the Nutrition Program Officer at UPTD Puskesmas II, East Denpasar District Health Service.

The current system for recording toddler *posyandu* activities by cadres is still manual, where cadres use a register book known as SIP and fill in the results of weight and height measurements in the toddler KIA/KMS book. Meanwhile, to report *posyandu* activities to the community health center, cadres must fill out a form given by the community health center officer which contains the toddler's name, date of birth, gender, parents' names, parents' telephone numbers, measurement results (weight and height), and information by recapitulating data from the SIP book every month and recapitulating the results of *posyandu* weighing into variables for monitoring toddler growth according to SKDN blocks. Next, community health center officers analyze the monitoring of toddler growth by analyzing nutritional surveillance indicators consisting of D/S percentage, K/S percentage, N/D' percentage, 2T/D' percentage, and nutritional status (based on Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2020 concerning Anthropometric Standards for Children under five based on the Minister of Health of the Republic of Indonesia Regulation Number 14 of 2019 (Kementerian Kesehatan Republik Indonesia, 2019a; Kementerian Kesehatan Republik Indonesia, 2020) .

Weaknesses of the current system include: (1) Toddler data is still stored manually by cadres so they often experience data loss and it is difficult to search for data; (2) Cadres write down the same data repeatedly for recording in the SIP Book and monthly reports to community health center officers; (3) The filling out of report forms by cadres to community health center officers is not uniform; (4) Not all cadres have the same level of completeness and timeliness of recording and reporting; (5) Limited access to data by community health center officers as supervisors of *posyandu* activities from community health centers so they have to wait for manual reports by cadres to be collected first and then recapitulate them into reports monitoring the growth of toddlers per village.

If the problems above are not addressed, it is feared that it will have an impact on reducing the quality of data on toddler *posyandu* considering that the important role of toddler *posyandu* today is as the front door to catch cases of malnutrition under five and even stunting which is a concern of nutritional problems in the present. The problems faced by the Penatih Dangin Puri Village *posyandu* need to be resolved in order to improve the quality of service, recording, data collection and reporting in the health sector by toddler *posyandu* cadres.

The Team's efforts that have been carried out include research related to designing information systems for toddler *posyandu*. The research results of the proposing team, namely Designing a *posyandu* Information System as an Effort to Digitalize *posyandu* Data at PHC of II, East Denpasar District Health Service (Farmani et al., 2021). The design of the toddler *posyandu* information system in the UPTD PHC II work area of the East Denpasar Health Service was made using the waterfall method based on needs analysis. The information system design developed is web-based where there are 3 main activities, namely input, process and output. If we look at the flow of the toddler *posyandu* information system before the *posyandu* information system was developed, there would be a flow of changes in the recording and reporting of *posyandu* data. If the previous system required cadres to record the same data three times for each *posyandu* activity, then with this *posyandu* information system, cadres only enter data once into the system. The potency contribution of SIPOS to HIS of The Ministry of Health is providing toddler data for the e-PPGBM application. Several previous studies on community service have provided solutions for improving the *posyandu* data recording and reporting system by applying technology and information (Andriyat et al., 2022; Anggraini et al., 2023; Arista et al., 2020; Egeten et al., 2019; Fauzi & Amrozi, 2019; Kusumadewi et al., 2019; Mulyana et al., 2022; Putra, 2021; Zaidiah et al., 2019). The information system also helps cadres to obtain monthly cohort records of toddler visits and helps recapitulate the nutritional status of toddlers. Apart from the benefits for cadres, the *posyandu* information system is designed to make it easier for Nutrition Program Holders to access monitoring data on toddler growth based on SKDN blocks.

Community service activities in the form of Beginner Community Empowerment (PMP) aim to improve the skills of *posyandu* cadres in managing activities (data entry and reporting) of *posyandu* data for toddlers through the implementation of the *Posyandu* Information System (SIPOS) for toddlers.

2. METHODS

Location

Community service is carried out in 13 banjars in Penatih Dangin Puri Village, East Denpasar District, consisting of Banjar Buaji, Banjar Bekul, Banjar Palagiri, Banjar Pohmanis, Banjar Gunung, Banjar Mertasari, Banjar Nuansa Penatih, Banjar Kertapala, Banjar Taman, Banjar Laplap Sengguan, Banjar Laplap Kauh, Banjar Laplap Tengah, and Banjar Laplap Arya. Each banjar has 5 toddler *posyandu* cadres. The location of Penatih Dangin Puri Village is 4.5 km from Bali International University with a travel time of around 10 minutes.

The method of implementing community service activities is carried out in the form of socialization, training and implementation related to data entry and making SIPOS-based toddler *posyandu* reports, and observation. Implementation of activities is carried out using 3 stages, namely the preparation stage, implementation stage and evaluation stage.

Preparation Phase

The preparation stage begins with a situation analysis related to partner needs. Discussion about problem solving and what goals to achieve (Table 1).

Figure 1. Location map of Penatih Dangin Puri Village

Table 1. Preparation phase

Description	- The team analyzes partner situations and solves problems relevant to partner needs - Setting up a *Posyandu* Information System (SIPOS) as a tool for solving partner problems - Providing supporting tools such as tablets, *LAN to type C adapters*, *flash disks*, and SIPOS manuals - Determine the training schedule, monitoring and evaluation of SIPOS implementation - Prepare the place and facilities for SIPOS training
Executor	Team and Human Development Cadres of Penatih Dangin Puri Village
Time	2nd and 3th on September 2023

Implementation Stage

At the implementation stage, the community service team conveys the planning and stages of activities to be implemented, including the expected outcomes. Partners in this case contribute to providing training places and facilities such as LCDs, internet networks, and microphones. Meanwhile, the community service team prepared materials, guidebooks, resource persons, and event performers. The methods used are material presentation, discussion, and practice. The material was delivered by a resource person who conveyed information system-based *posyandu* data management consisting of data entry and reporting with SIPOS. During the training participants are accompanied by the implementing team.

Table 2. Implementation phase

Description	Opening and outreach programs - Opening of community service program - Socialization of offline activities about data entry and *posyandu* report by SIPOS - Discussion about problems in data entry and *Posyandu* report by SIPOS SIPOS Training and Assistance - Trial data entry by real data from *posyandu* - Trial *posyandu* report by real data from *posyandu*
Executor	Team and Cadres
Time	September 27, 2023 Duration: 3 hours

Evaluation Stage

Evaluation of activities is carried out on the results of SIPOS implementation.

Table 3. Evaluation phase

Description	Evaluation is carried out by observing incoming data and extracting reports in two stages: - After SIPOS training, we direct observed the general accuracy of using all SIPOS's items in each team when the cadres use SIPOS. Such as procedure of login SIPOS, select parent menu, add parent data, add toddler data, add visit data, select report menu, and extract report. SIPOS training success indicator if the average of acuracy using SIPOS is >80 percent. - After SIPOS implementation, we direct observed the general accuracy of using all SIPOS's items when the cadres use SIPOS at *posyandu* events in October 2023 and the accuracy of each SIPOS items. Evaluation using a checklist that contains accurate data entry (family number, parent's identity number, parent's name, cellphone number, address, toddler's identity number, toddler's name, date of birth, weight of newborn, newborn length, sex, KIA book, initiate early breastfeeding, date of visit, height toddler at visit, weight toddler at visit, vitamin, anthelmintic) and extract report (recapitulation of toddler visits, toddler development cohort, and toddler growth monitoring). SIPOS implementation success indicator if the average acuracy using SIPOS is >80 percent.
Executor	Team and Cadres
Time	After SIPOS Training: 27 September 2023 Duration: 2 hours After SIPOS Implementation: 6-19 October 2023 Duration: 2 weeks

SIPOS Description

SIPOS which is applied to community service is the result of research carried out in 2021 based on the problems and needs of toddler *posyandu* in the field. SIPOS can be accessed on https://www.snow.co.id/*posyandu*/index.php. The use case diagram model and system output can be seen in Figure 2.

Use Case Diagram and Narrative

An explanation of each functional function of the *posyandu* information system can be described in the use case diagram in Figure 2.

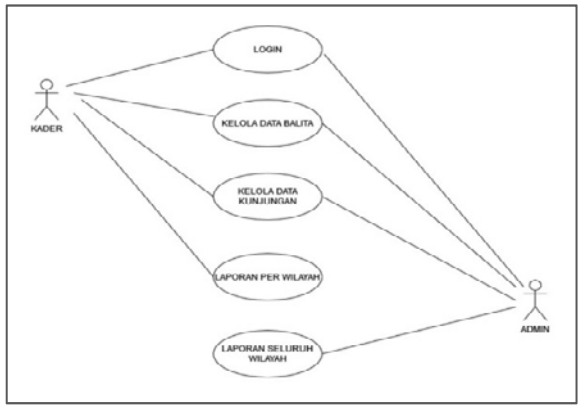
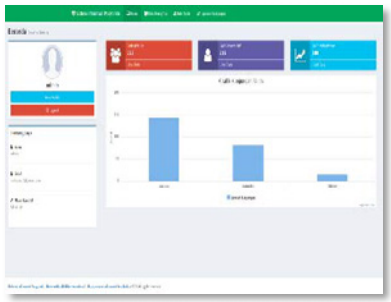
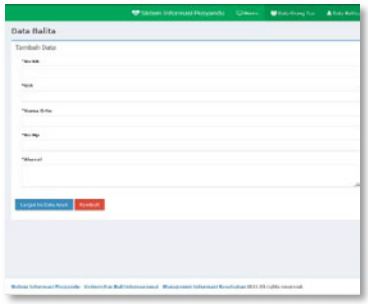
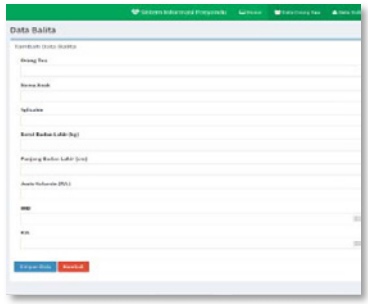


Figure 2. Use case diagram of SIPOS

Input Display







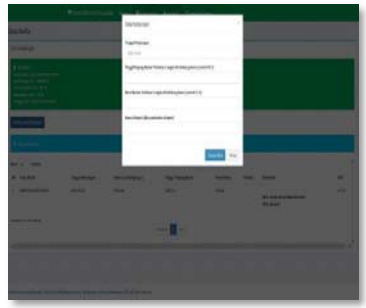
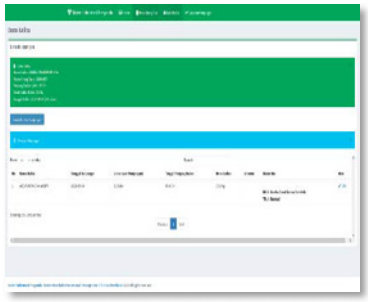
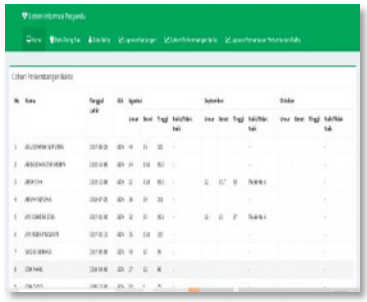


Figure 3. Home display and login
Figure 4. Parents and toddlers' data entry
Figure 5. Toddler visit page view

Output Display





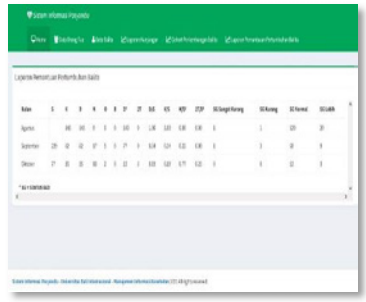


Figure 6. Recapitulation of toddler visits
Figure 7. Toddler development cohort
Figure 8. Toddler growth monitoring

3. RESULTS AND DISCUSSION

Results

Preparations begin by coordinating with KPM (Human Development Cadre) regarding the schedule for community service, activity facilities, and places for training activities. The Team and Human Development Cadres discussed the *posyandu* activity schedule in October so that monitoring

and evaluation activities could be carried out. Human development cadres prepared a list of names of 13 banjars along with the names of toddler cadres.

Posyandu Information System (SIPOS) training activities with Human Development Cadre (KPM) partners started on September 27 2023 in the Penatih Dangin Puri Village Office Hall, East Denpasar District, Denpasar City. The advantages of SIPOS program is 1) the cadres not write same *posyandu* data repeatedly, 2) cadres could evaluate the status of toddler nutrition realtime by indicator the weight, height, and age, 3) cadres have digital *posyandu* data that could direct reported to Nutrition Staff for e-PPGBM (penguatan pencatatan pelaporan gizi berbasis masyarakat) system. Material training could be acess on link: https://shorturl.at/R8EzN. Activities are divided into 2 major stages, namely training in the use of SIPOS and implementation of use by cadres. Because training on the information system-based *posyandu* recording system was being carried out for the first time, an evaluation of the accuracy of using the features in SIPOS was carried out at the end of the training session and the end of the implementation session. Efforts to increase cadre skills in recording and reporting information system-based data. The training activity was attended by 65 toddler *posyandu* cadres from Penatih Dangin Puri Village spread across 13 banjars, namely Banjar Buaji, Banjar Bekul, Banjar Palagiri, Banjar Pohmanis, Banjar Gunung, Banjar Mertasari, Banjar Nuansa Penatih, Banjar Kertapala, Banjar Taman, Banjar Laplap Sengguan, Banjar Laplap Kauh, Banjar Laplap Tengah, and Banjar Laplap Arya. The characteristic of cadres are all cadres are female (100 percent), mostly housewifes (78 percent), and e"40 years old (62 percent).

Figure 9. Coordination for preparation with Humah Development Cadre
Figure 10. Training of SIPOS in Penatih Dangin Puri Village

The evaluation of the implementation of SIPOS by direct observation by the team when *posyandu* activity in October using checklist evaluation. Some documentation is shown in Figure 11. During the post-implementation evaluation process, the number of cadres who took part was 51 people. Some cadres are absent when the *posyandu* activity in October for some reason such as religious activity, sickness, or work.

Figure 11. Evaluation of SIPOS implementation

The results of the activity evaluation are in Table 4.

Table 4. Evaluation results of the accuracy of using SIPOS post-training and post-implementation

Banjar Names	Accuracy of Using SIPOS Post-Training (%)	Accuracy of Using SIPOS Post Implementation (%)
Buaji	78	92
Bekul	79	94
Palagiri	76	93
Pohmanis	80	93
Mountain	77	90
Mertasari	80	97
Coaching Nuances	77	90
Kertapala	80	94
Park	79	91
Laplap Sengguan	79	93
Laplap Kauh	80	95
Middle Laplap	81	97
Laplap Arya	91	95
Average Accuracy	80	94

The analysis of the level of accuracy in using items in SIPOS is in Table 5.

Table 5. Level of Accuracy in Using Items in SIPOS

Items	Post-Implementation Accuracy (%)
Add Parental Data	
Click the parent and child data button	96
Entry number KK	94
VIN entry	96
Parent's Name Entry	98
Cellphone number entry	98
Address entry	98
Click continue to child data	96
Add Toddler Data	
Child's NIK entry	98
Child name entry	100
Date of Birth Entry	55
Birth Weight Entry	100
Birth Length Entry	100
Gender Entry (P/L)	98
The entry has a KIA book	100
IMD status entry (early initiation of breastfeeding)	100
Add Visit Data	
Visit date entry	80
TB/PB entry 1 digit after the comma	100
BB entry write 2 numbers after the comma	98
Vitamin name entry (if necessary)	94

Items	Post-Implementation Accuracy (%)
Entry of worm medicine given (if necessary)	98
AVERAGE DATA ENTRY ACCURACY	**95**
Extract Visit Report	
Enter the date of visit	51
Click the search data button	100
Click download excel	100
Toddler Development Cohort Extract	
Enter the date of visit	80
Click the search data button	100
Click download excel	100
Toddler Growth Monitoring Extract	
Enter the date of visit	80
Click the search data button	100
Click download excel	100
Average Accuracy of Report Extract	**90**

The level of accuracy in using the features in SIPOS shows mixed results. Filling in dates is a feature that has an accuracy rate of less than 90 percent, such as entering the child's date of birth (55 percent) and entering the visit date in the visit report extract (51 percent), entering the visit date in the child development cohort extract (80 percent), and entering the number of visits to the toddler growth monitoring extract (80 percent). The example of data on SIPOS such as Figure 12.

Discussion

Health service facilities are one of the organizers of the Health Information System based on Law number 17 of 2023 concerning health. The regulation of this Health Information System also aims to empower community participation, including professional organizations in the implementation of the Health Information System. In this case, *posyandu* cadres are one form of community empowerment. To reduce stunting, the government must collaborate with various stakeholders, including *posyandu* health cadres, to ensure that health education reaches village level (Qodir et al., 2024). The community service team aims to support government programs by applying strategies through the second pillar—campaigns and change of behavior (Muharyani et al., 2023). Improving the quality of recording and reporting toddler *posyandu* activities is one of these efforts. Community service activities in the form of SIPOS training for toddler cadres in Penatih Dangin Puri Village received a good response from the village considering that previously there had never been an information system-based recording and reporting of data on toddler *posyandu* activities based on an information system. Moreover, SIPOS itself was developed based on research results with a case study of the toddler *posyandu* at Puskesmas II East Denpasar, one of which has working areas in Penatih Dangin Puri Village. This is very relevant for implementing SIPOS training with KPM partners in Penatih Dangin Puri Village in the form of community service.

The level of acceptance of SIPOS training activities by toddler *posyandu* cadres was quite good with 65 people (100 percent) willing to take part in the training even though several obstacles were encountered in the field. This obstacle is the difficulty in determining the training schedule because

the toddler *posyandu* cadres are native residents of the local village and in September there are many traditional and religious activities scheduled in the Penatih Dangin Puri Village area. Acceptance of community service activities in the form of information systems training at this *posyandu* is also in line with the results of community service carried out in Bimomartani Village, at *Posyandu* Peruri, in Kuningan Regency, and Anyelir *Posyandu*, Burangrang Village, Lengkong District, Bandung City (Andriyat et al., 2022; Kusumadewi et al., 2019; Mulyana et al., 2022). Meanwhile, in implementation activities, only 51 people (78 percent) of toddler *posyandu* cadres were willing to participate in recording and reporting data on *posyandu* activities using SIPOS. The reasons for refusing to participate in the implementation were difficulty reading the system display on the tablet, difficulty typing *posyandu* activity data into SIPOS, and reasons for having other activities outside of measuring and weighing toddlers. The reason for this refusal is different from that found in research activities in Sukoharjo Village which showed that the reason for cadres' refusal to carry out reporting using an information system was due to the need for equipment such as cellphones, internet access, and training (Anggraini et al., 2023).

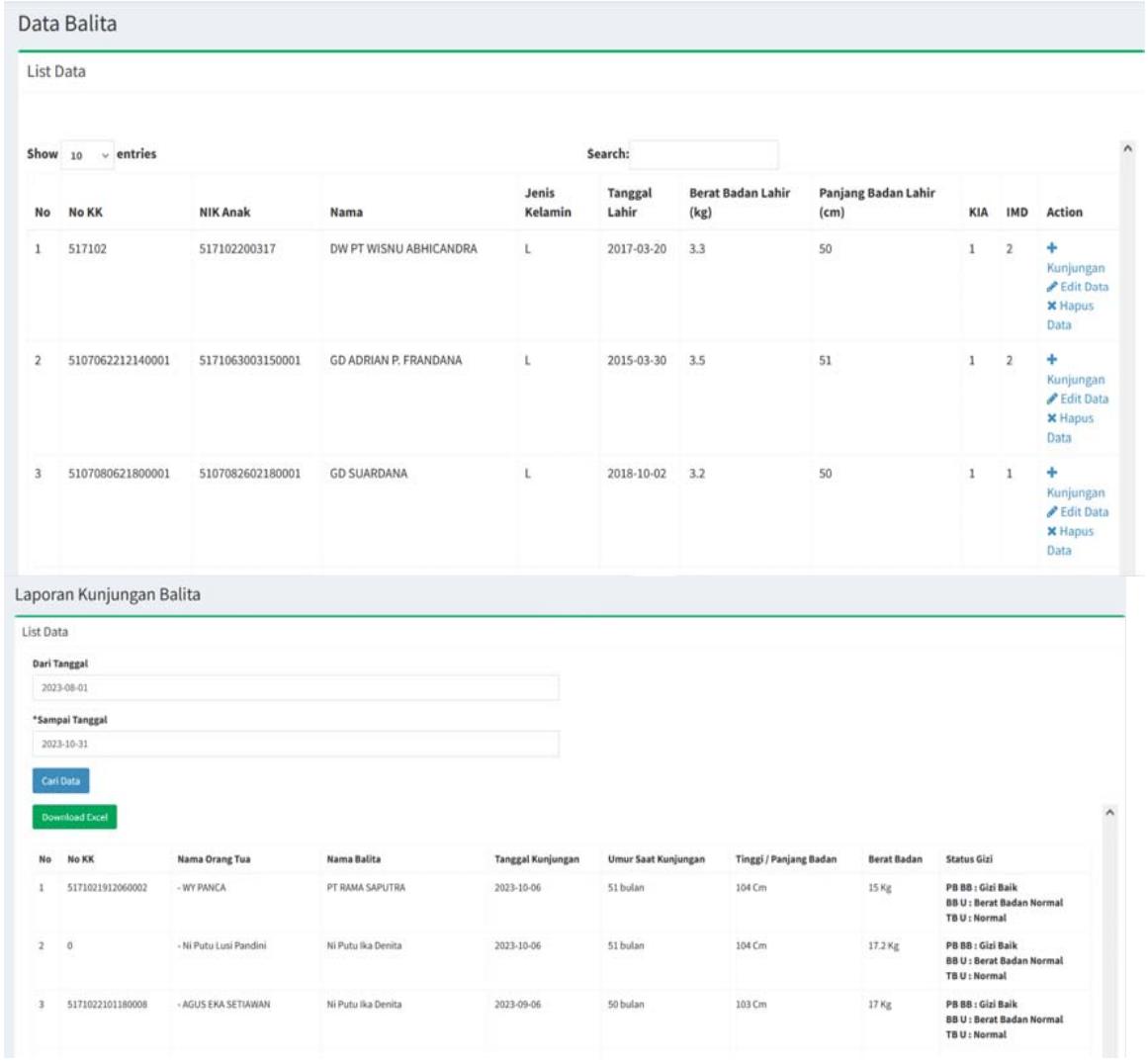


Figure 12. Data set on SIPOS

Evaluation of training activities is carried out at the *posyandu* level. The accuracy of filling out SIPOS is measured after training and after implementation. The average accuracy of filling out SIPOS after training was 80 percent which can be categorized as good. Then the post-implementation accuracy evaluation showed an increase in the accuracy of filling out SIPOS, namely to 94 percent with an average accuracy of data entry of 95 percent and report extraction of 90 percent. This shows that there is good acceptance by cadres for the use of SIPOS to help record and report toddler *posyandu* data. Analysis of the accuracy of filling in data entry features shows varying results. The data entry feature in the add parent data section which consists of clicking the parent and child data button, KK number, NIK, parent's name, cellphone number, address, and continuing to child data has a good level of accuracy where all aspects are accurate >90 percent. Meanwhile, the data entry feature in the add toddler data section which consists of the child's NIK, child name, date of birth, birth weight, birth length, gender, having a KIA book, and IMD status shows that most have a filling accuracy of >90 percent, but there is one item, namely date of birth entry, has an accuracy percentage of only 55 percent. The low level of accuracy in birth dates is because cadres experience confusion when they have to enter the date of birth format in the order of year, month, and date, while routine recording usually carried out by cadres is in date, month, and year format. The data entry feature in the add visit data section consists of the date of visit, body length, body weight, name of vitamins, and worm medicine which has good accuracy, namely >90 percent. Meanwhile, the report creation feature in digital format is divided into visit report extracts, toddler development cohort extracts, and toddler growth monitoring extracts consisting of the same items, namely entering the visit date, search data button, and clicking download Excel. Among these three items, most of the cadres experienced difficulty in entering the date of the visit for which they wanted to make a report, which was shown to have an accuracy rate of less than 80 percent.

4. CONCLUSION AND RECOMMENDATIONS

Based on field observations carried out at the Toddler *posyandu* in Penatih Dangin Puri Village, it is known that recording and reporting data on routine *posyandu* activities are still carried out conventionally. The weaknesses of this old system are that toddler data is stored manually, cadres write the same data repeatedly, cadres do not fill out report forms uniformly, the completeness of filling in varies, and limited access to data by community health center officers as supervisors of *posyandu* activities. Community service in the form of SIPOS training in collaboration with KPM Penatih Dangin Puri Village was carried out to overcome the problems faced by cadres. The training was divided into two materials, namely about *posyandu* data entry and making routine *posyandu* activity reports. The acceptance of activities by toddler *posyandu* cadres was classified as good where 100 percent of cadres were willing to take part in the training, however at the time of SIPOS implementation only 78 percent of cadres were willing to take part and could be evaluated. The level of accuracy in filling out the data entry and report extract features is mostly >80 percent, but there is an accuracy rate of <80 percent, namely in the entry date of birth feature (55 percent) and the date of visit (55 percent). This community service activity in the form of training and implementation succeeded in improving cadres' skills in carrying out data entry and reporting on information system-based toddler *posyandu* activities.

There are several limitations in community service such as the absence of a policy for information system-based recording and reporting at *posyandu*, a lack of facilities for implementing the *posyandu* information system, and there are several cadres who find it difficult to use SIPOS. There are some recommendations for next devotion: advocation for policy of implementing SIPOS to Penatih Dangin Puri Village Management, improving cadres competence in using SIPOS regularly, and facilitating the Penatih Dangin Puri Village Management to get server for SIPOS.

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