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ORIGINAL ARTICLE

Understanding challenges and opportunity of data recording and reporting of malnutrition intervention programs: A qualitative study among healthcare workers in DKI Jakarta

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Abstract

Background: The number of stunting in Indonesia was reported to be 21.6% in 2022, still far from the 2024 target of 14%. The large-scale programs of nutrition-specific intervention have been done, including moderate-acute malnutrition (MAM) and severe-acute malnutrition (SAM) interventions. However, limited findings on the process of monitoring and evaluation of both interventions.

Objective: This paper aims to describe the implementation, challenges, and opportunities of malnutrition intervention data recording and reporting among healthcare workers in DKI Jakarta Province, Indonesia.

Methods: Qualitative data collection was taken with in-depth interview (IDI) and focus group discussion (FGD) in August-October 2024 towards healthcare workers in selected Puskesmas in DKI Jakarta who were involved with MAM and SAM interventions and data management. Data triangulation was done to health cadres and mothers of children under five (CU-5) as the beneficiaries.

Results: This study involved eight informants from South and Central Jakarta Puskesmas, and 16 cadres and 13 mothers who were involved in MAM and SAM interventions. The dissemination and adaptation of indicators has been done and digital data recording has been used, despite its lack of supporting resources and data integration which may affect its data quality. Leveraging resources and enabling data-sharing between facilities and maintaining communication between stakeholders are essential.

Conclusions: The process of data recording and reporting of malnutrition interventions required well-informed indicators, trained personnel, and streamlined information systems. Maintaining high quality data, collaboration between stakeholders and utilizing accessible technology are recommended for the healthcare worker to improve the process of data recording and reporting.

Keywords: MAM, SAM, malnutrition intervention, nutrition-spesific intervention, data recording, data reporting

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Introduction

As the third most populous country in the Asia (2020)[1], which accounted for 30 million (2%) of its population were children under-five (CU-5), Indonesia is currently facing the burden of stunting for these past years.[2] The prevalence of stunting in Indonesia was reported to be 21.6% in 2022, which is still far from the government's goals to reduce it to 14% by 2024.[3] By far, the Indonesian government has been focusing on the implementation of specific-nutrition intervention programs as a strategic way to reduce stunting, regulated in the Presidential Decree 2021 Number 72 about nine priority program.[4] There were six out of nine nutrition-specific intervention programs, that classified as on-track, while the other three programs still need acceleration.[5] Children under 5 years old (CU5) with severely acute malnutrition (SAM) receiving treatment and CU5 with moderately acute malnutrition (MAM) receiving additional nutrition intake, are two programs nutrition-specific intervention programs that are related with malnutrition intervention. Despite the current progress report in number and percentages, there was limited publications on exploration of factors that might foster or hinder the overall progress.

In the global setting, the sparse data on the large-scale nutrition-specific intervention outcomes on the reduction of stunting has occurred, remaining the intervention program's effectiveness being questionable.[6] There were some underlying reasons that lead to the lack of monitoring and evaluation data on intervention programs. First, the program indicator was not clearly disseminated, resulting in uneven understandings of the stakeholders, thus making the project unclear to be monitored and evaluated.[7,8] On the healthcare worker side, there are also some difficulties to undergo data recording and reporting in the digital setting. Some reports show that the healthcare workers in the primary health care were faced to the heavy burden of reporting data in 70 different applications which may be affecting the quality of the data.[9,10]

Using digital tools may also become a hindrance for the healthcare worker to perform data recording and reporting. Some researchers found that the knowledge and attitude of the healthcare workers toward the primary health care information system is low, especially in low-middle income countries, which may be due to shortage of workforce and low capacity to perform information system task.[11,12] Ideally, the healthcare workers are urged to possess the ability to effectively managing, analyzing, and interpreting data, to enhance the intervention progress.[13]

On the data infrastructure aspect, data integration between various intervention in different healthcare services is also important to capture thorough information of malnutrition intervention. Several systematic reviews on MAM and SAM interventions shows how comprehensive intervention approaches at the community-based screening and facility-based screening were beneficial to improve child's nutritional status, thus this highlights the need for data integration at both intervention end-points.[14,15] Mothers and the caregivers of the children also play vital role to ensure a continuum of care of malnourished children, which pose them to the potential socio-economic hindrance such as low education, limited access to healthcare facility, and even social stigma.[15] Involving the mothers and caregivers to actively participate in the intervention monitoring is critical, since that MAM and SAM interventions may require self-report on food consumption, resulting this type of data are prone to bias and loss of follow up.[16,17]

This qualitative study aims to explore the implementation, challenges, and opportunity of data recording and reporting of nutrition-specific intervention in several Puskesmas from DKI Jakarta Province. DKI Jakarta is accounted for 798,107 number of children, with the prevalence of stunting is 14.8%.[18] As the capital city of Indonesia, DKI Jakarta is more adaptive with the new guidelines or instructions from the MoH, thus this province is expected to have close gaps between the guidelines and the implementation process. Modification on WHO's framework of Using Nutrition Data for Decision Making[19] was used in this study, encompassing the whole process of MAM and SAM data recording and reporting business process.

Methods

This study employed a qualitative approach to explore the challenges and opportunities of data recording and reporting of MAM and SAM interventions among healthcare workers in DKI Jakarta. Data were collected by in-depth interview (IDI) to the main informant (healthcare worker in Puskesmas) and focus group discussions (FGD) to the key informants to facilitate data triangulation. This study purposely targeted DKI Jakarta Province, with the focus in Central Jakarta and South Jakarta Districts with the consideration of its CU-5 nutritional status landscape. Two Puskesmas were selected within each Central Jakarta and South Jakarta administration level to ensure a representative sample that captures the regional variations. To achieve maximum variety in participants, we involved main informants (healthcare workers) who worked in the sub-district and village level and had extensive experience in managing MAM and SAM interventions. We also performed data triangulation to manage bias, which was done to groups of health cadres who managed community-based intervention and mothers/caregivers of the CU-5 who received MAM or SAM intervention.

Data was then analysed by using thematic analysis methodology, focusing on specific themes: healthcare worker knowledge on program indicators, healthcare workers competencies and workload, facilities and resources, data quality, data integration, and health outcome evidence. We organized the data presentation by dividing the results into three sections: implementation, challenges, and opportunity sections, in which all of the specific themes were included in each section. The recording of FGD and IDI was transcripted into text, which then was coded into the specific themes by using Microsoft Excel.

This study had been accepted for ethical conduct, as issued by *Komite Etik Penelitian Kesehatan RSUP Nasional Dr. Cipto Mangunkusumo FKUI,* Number KET.999/UN2.F1/ETIK/PPM.00.02/2024.

Results

Characteristics of Informants

The main informants in this study consisted of eight participants with diverse demographic backgrounds from Puskesmas at the Sub-District and the Village levels (**Table 1**). There were four informants who came from Puskesmas in the District level, and four others from Puskesmas in the Village level. The healthcare workers that were gathered were all Puskesmas' Nutritionists.

To perform data triangulation, we gathered 16 health cadres who were responsible for MAM and SAM interventions in the community and mothers of the CU-5 who received the interventions. Towards the health cadres, we performed FGD in which 16 of the health cadres were divided into four groups. These cadres were responsible for distributing additional food for MAM CU-5. Another target of key informants were mothers of CU-5 with MAM and SAM condition, with a total of 13 people gathered for in-depth interviews.

Table 1. Characteristics of main informant

Characteristics	Total (n=8)
Age	
26-35	6
36-45	1
46-55	1
Education Level	
Diploma Degree	5
Bachelor Degree	3
Gender	
Male	1
Female	7
Role of The Occupation	
Intervention implementation	8
Data recording and reporting	8
Place of Working	
Sub-District Level Puskesmas	4
Village Level Puskesmas	4
Length of Working in Current Role Experience	
0-5 years	4
6-10 years	2
11-15 years	1
16-20 years	1

In the next section, the results are presented thematically according to the pre-determined theme (**Table 2**). For each main theme, there are some sub-theme mentioned to have a more organized presentation. To answer the specific objective of this research, the implementation, challenges, and opportunities are included in each sub-theme to present deeper analysis for each.

Implementation & Challenges

The general service flow of MAM and SAM interventions that were implemented in all study sites, began with the weight and height monthly measurement in Posyandu. After the nutritionist received the data, the Puskesmas' health worker validated all CU-5 with MAM and SAM nutrition status by repeating the weight and height measurement in Puskesmas. The data validation was done in Puskesmas, Posyandu, or home visit by the nutritionist.

> *"... we confirm it with the cadres, we ask the cadres to please ask the toddler to go back to the puskesmas, later at the puskesmas we will check again, whether the weight is in accordance with the measurements taken and or not"* #8 Main Informant, Village Puskesmas Nutritionist, 10-year experience

Table 2. Predetermined themes

Theme and Sub-Theme	Description
Program Indicator • Definition clarity • Fulfillment criteria	How the informants understand the current program indicator, including the fulfillment criteria or the definition of done of the indicators.
Competency and Workload • Competencies • Workload	How the informants are capable to perform data recording and reporting, able to operate the digital/manual tools. For the workload, it is how the informants manage the data recording and reporting tas on top of other daily workload.
Facilities and Resources • Facilities • Resources	How the facilities and resources in the Puskesmas or community-settings are available to support the data recording and reporting of MAM and SAM interventions.
Data Integration • Integration of Electronic Medical Record (EMR) • Integration of Health Information System (HIS)	The EMR and HIS were identified as the digital tools to store MAM and SAM data in Puskesmas, thus this theme explores how both systems interact with each other to capture comprehensive conditions of the intervention.
Data Quality • Accuracy • Timeliness • Completeness	How the informants perform the data recording and reporting with the consideration of the data quality aspects.
Health Outcome Evidence • Monitoring System • Feedback mechanisms	How the informants perform the overall monitoring in each end-point intervention settings, and how they provide and receive feedback of the intervention progress/outcome.

The healthcare worker in Puskesmas understood that all indicators refer to the guideline/SOP issued by the Provincial Health Office (PHO). However, there was a dispute among informants related to the indicator, recovered nutritional status (from malnutrition turning to normal), is also a program indicator that should be achieved.

> *"..but the indicators they (malnourished children) have to be normal, good nutrition, it doesn't exist yet..." #1 Main*

Informant, Sub-District Puskesmas Nutritionist, 6-year experience

In terms of training, the MoH had provided training, including guidebook socialization. On the other side, the DHO already accommodated a ToT training for the Puskesmas' team, which will be passed to the Village Level Puskesmas

"For training, it is usually accommodated by the district health office.. But after the training, we (Sub-District Puskesmas) did ToT with the Village Puskesmas team (Village Puskesmas)." #5 Main Informant, Sub-District Puskesmas Nutritionist, 11-year experience

For both the cadre and the Puskesmas' healthcare worker, they have been very busy working multiple roles. Thus, the burden of undergoing data recording and reporting for the MAM and SAM interventions were also affected. The cadre and the Puskesmas' healthcare worker should input the data in lots of forms.

"...So recording, the hassle of recording it means they (cadre) have to do quite a lot. Ehh, so they are the biggest burden, the workload (of the cadre) is already a lot so that's why we can't ask them to rush." #1 Main Informant, Sub-District Puskesmas Nutritionist, 6-year experience

For the data integration, all of the Puskesmas already use EMR in their own Puskesmas, including to record the SAM intervention. However, though the Puskesmas EMR records the overall services, the data was only localized in the Puskesmas. It does not share data with other health care facilities.

Researcher: Is the Puskesmas EMR bridging with the hospital EMR?
Nutritionist: Nope
#5 Main Informant, Sub-District Puskesmas Nutritionist, 11-year experience

After the data from Posyandu had been gathered, the Puskesmas' healthcare worker recorded the data into the specific HIS for nutrition system, which is the ePPGBM. This include all data of CU5 receiving MAM and SAM interventions. In ePPGBM, the DHO will monitor the data being submitted for each Puskesmas.

"But what is most focused on is EPPGBM, the District Health Office that looks at EPPGBM" #7 Main Informant, Sub-District Puskesmas Nutritionist, 7-year experience

As the Puskesmas' healthcare workers had already been equipped with several forms to report the MAM intervention progress, these forms were stand alone and not connected to each other. While if we look closer, the data that was recorded across these forms were related one to another. Therefore the Puskesmas' healthcare worker still needed to enter each form, with similar data components.

"... we also have to input it manually in a spreadsheet from the department, even though the data is actually the same, you can also take it from EPPGBM for case data... #1 Main Informant, Sub-District Puskesmas Nutritionist, 6-year experience

To ensure the data accuracy, especially the nutrition status of the children, the Puskesmas' healthcare worker used several ways to ensure that every child's weight and height measurements were plotted with the right nutritional status. But for the self-reporting data by the mothers of the consumed food of the children as proof of intervention, there was no validation mechanism to ensure that the food was truly consumed by the child.

"... To be honest, the food portion was too big so the child only finished half. Sometimes to be honest, there has been no verification" #1 Main Informant, Sub-District Puskesmas Nutritionist, 6-year experience

The data that was submitted by the cadre to the Puskesmas, regarding the intervention evaluation, was done through aggregated data. This included how many child had received the

PMT, how many has weight increase, and how many stayed the same.

> *"Then, when reporting to others, we usually just use aggregate data or numbers, for example, how much has increased, how much has remained the same." #1 Main Informant, Sub-District Puskesmas Nutritionist, 6-year experience*

For the SAM intervention, sometimes it was hard to ask the parent to have re-evaluation. This is due to the fact that parents tend to come to the health facility only if the children are ill. Therefore, the Puskesmas' healthcare worker asked for help from the cadre to urge the parent to come to the Puskesmas.

> *"Yes, so it's actually quite difficult for us to refer children under five to hospital because usually they feel healthy and so on. It must be because usually if the mother doesn't come, we call the cadre (to help reaching out to the mother)" #5 Main Informant, Sub-District Puskesmas Nutritionist, 11-year experience*

Opportunities

It was found that other Puskesmas had allocated incentives for cadres responsible for PMT distribution. The incentives were usually called the "transportation incentives" for the cadre, as they had to be mobile, distributing the food from the local community centre, to each house of the targeted child.

> *"There are incentives from the community health center". FGD Cadre in Puskesmas 3*
>
> *"Just transport money". FGD Cadre in Puskesmas 1*

For data integration, an initiative had been done between the Puskesmas' and Hospital Nutritionist to had Google Spreadsheet which could be filled by both sides, the hospital and Puskesmas, so that they could share the patient data. This way of data recording has helped the Puskesmas and Hospital Nutritionist on having broad picture of the ongoing intervention status for each individuals with SAM intervention from inter-healthcare facilities.

> *"There is spreadsheet link for reporting, the RSUD fills the form. It includes any clinical actions, medical prescription, food prescription, and of course patient attendance records …" #3 Main Informant, Sub-District Puskesmas Nutritionist, 20-year experience*

For data quality, certain Puskesmas used visual Comstock, representing the estimate pie chart of the remaining food. This helped the cadre to estimate the food being eaten by the child.

> *"This (the virtual Comstock) was given to us (cadre by the Puskesmas... This is how we can make the estimation of remaining portion because we can see from the photos whether it's finished, how much is left, half left, sometimes just a little bit left, we have that information..." #FGD Cadre from Puskesmas 1*

To support timely data submission, a collaboration between nutritionist and cadre had been done, immediately after the intervention being given.

> *"… usually we try to have a method of inputting together (with cadre), at least twice a month…." #1 Main Informant, Sub-District Puskesmas Nutritionist, 6-year experience*

To promote effective ways of monitoring, simple technology was involved, including the use of WhatsApp. Some Puskesmas created a WhatsApp group to communicate within this channel. The mother can use this group to ask for any assistance related with child health and nutrition. The healthcare worker from the Puskesmas attempted to respond to the chat timely.

> *"Yes, that's right. So later, if there is any information or anything, it's all through WA, through the same group as the midwife. Midwives also like quick*

responses" #2 IDI Mother from Puskesmas 3

To summarize the findings, we provide flowchart to visualize how the stakeholders are involved in the MAM and SAM interventions, including the detail process of data recording and reporting activities, and whom are the beneficiaries of the data (Appendix 1).

Discussion

The management of Moderate Acute Malnutrition (MAM) and Severe Acute Malnutrition (SAM) among children under five in Indonesia involves a structured process utilizing community health services and digital systems.[19] Posyandu conducts weight and height assessments and reports data to Puskesmas nutritionists, who upload the data to e-PPGBM, a specialized Health Information System (HIS) for monitoring nutritional status.[20] This data serves as the basis of targeted beneficiaries of malnutrition intervention.

National guidelines on supplementary food/*pemberian makanan tambahan* (2023) and malnutrition management (2020) guide implementation across all cities and districts, allowing local adaptations on its implementation.[21,22] Studies suggest that sufficient guideline dissemination, training for healthcare workers, and Ministry of Health (MoH) follow-up supervision are critical for success of program implementation in the region level.[23]

The dual roles of cadres and Puskesmas Nutritionists in managing Moderate Acute Malnutrition (MAM) and Severe Acute Malnutrition (SAM) interventions present significant challenges in terms of workload and data management. These healthcare workers are not only involved in direct service delivery but also in extensive data recording and reporting tasks. Similar finding in five LMI countries show that PHC facilities are responsible to use numerous registers and recording forms, resulting in burden to healthcare workers.[24] Studies have shown that excessive documentation requirements can detract from the quality of care provided and lead to fatigue and reduced motivation among healthcare workers.[25,26] These challenges emphasize the need for streamlined reporting processes and digital solutions that reduce duplication and ease the data entry process. Implementing digital solutions to unify reporting processes across governing bodies is needed for further streamline workflows, reduce redundancies, and enhance the timeliness and accuracy of data submission.[27]

The use of Electronic Medical Records (EMR) in Puskesmas can enhance the efficiency of patient data management, reduce errors, and improve healthcare delivery by providing real-time access to medical information.[28] Developed countries have already implemented EMRs in primary healthcare, leading to better data interoperability, improved patient care, and more efficient resource allocation.[29]

Integrating reporting processes in digital tools are essential to address the challenges faced by healthcare workers in managing administrative tasks like data entry.[30] Simplifying workflows through the integration of digital tools can significantly reduce duplication, save time, and improve the accuracy of health data.[31] The MoH has launched SATUSEHAT as centered platform to utilize all health data across healthcare. Integration and interoperability of medical record systems and data at healthcare facilities.[32] Assessing the feasibility and designing data workflow of malnutrition intervention across healthcare facilities to be interoperable and comply with SATUSEHAT standards are important to improve the data interoperability and enhance the intervention outcome.

For data quality, the accuracy aspect emerged for the self-reporting data. The MAM intervention requires the Cadre to report the remaining food being consumed by the child, by means of parent's self-reporting. Therefore, ensuring the validity of a parent's self-reporting is essential to ensure the intervention effectiveness. Study found that self-reporting caused biases.[33,34] In terms of timeliness, the data recording faces challenges when the number of children requiring evaluation is high, leading to potential delays. A study emphasized the importance of timely data collection and reporting in improving the

effectiveness of health and nutrition interventions.[35] These delays can hinder the effectiveness of interventions by limiting the ability to promptly address emerging needs on an individual basis.

To improve beneficiaries' feedback to support the comprehensiveness of the intervention, increasing mother's education on the importance of malnutrition condition is known to prevent the prevalence of malnutrition in developing countries.[16] To date, there has been numerous studies revealing the use of digital tools to improve treatment adherence, including the personalized interventions through mobile apps and telehealth services.[36] This can be done through SMS text messages, mobile app, calls, or WhatsApp, to improve treatment adherence.[37,38]

This study elaborates the topic that is still rarely discussed, related with the process of data recording and reporting of MAM and SAM interventions, which are part of the nutrition-specific interventions. This information is valuable to deeply analyze the current condition of MAM and SAM interventions monitoring and evaluation process, thus supporting basis data for shaping better monitoring and evaluation plan in the future.

However, this study was taken within the area of DKI Jakarta Province, limiting the diversity of geographical, socio-economic, political and other aspects that may affect the process of data recording and reporting in different areas. The findings of this study may not reflect the overall condition of other locations, encompassing all 34 provinces in Indonesia.

Conclusion

Both MAM and SAM interventions data recording and reporting processes in DKI Jakarta have been done according to the National MoH guidelines, with additional indicators to monitor the recovered malnourished children. Multiple roles of healthcare workers and cadres, redundancy in recording form, limited data integration, and resources were found as the challenges. To improve data quality and workload efficiency, data integration is required between systems being used in Puskesmas to report program indicators, supporting incentives, and intensive communication and collaboration between Puskesmas, cadres, mothers, and other stakeholders by using digital tools are essential to build a comprehensive monitoring intervention process. The healthcare worker in Puskesmas are urged to record intervention data in individual-based, to ensure the comprehensiveness of intervention monitoring reports. Maintaining collaboration with health cadres, caregivers, and even community leaders is beneficial to support the continuity of intervention monitoring. Using accessible technology is a potential tool to increase stakeholders' awareness in supporting intervention processes, thereby enhancing the quality of data recording and reporting.

Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship and publication of this paper.

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Abbreviations

CU-5 : Children under 5
DHO : District Health Office

DKI	: *Daerah Khusus Ibukota*
EMR	: Electronic Medical Record
e-PPGBM	: *Aplikasi elektronik-Pencatatan dan Pelaporan Gizi Berbasis Masyarakat*
HAZ	: height-for-age z-score
HIS	: Health Information System
MAM	: Moderate-acute malnutrition
MoH	: Ministry of Health
PHO	: Provincial Health Office
Puskesmas	: Pusat Kesehatan Masyarakat
SAM	: Severe-acute malnutrition
WAZ	: weight-for-age z-score
WHZ	: weight-for-age height z-score

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Appendix 1

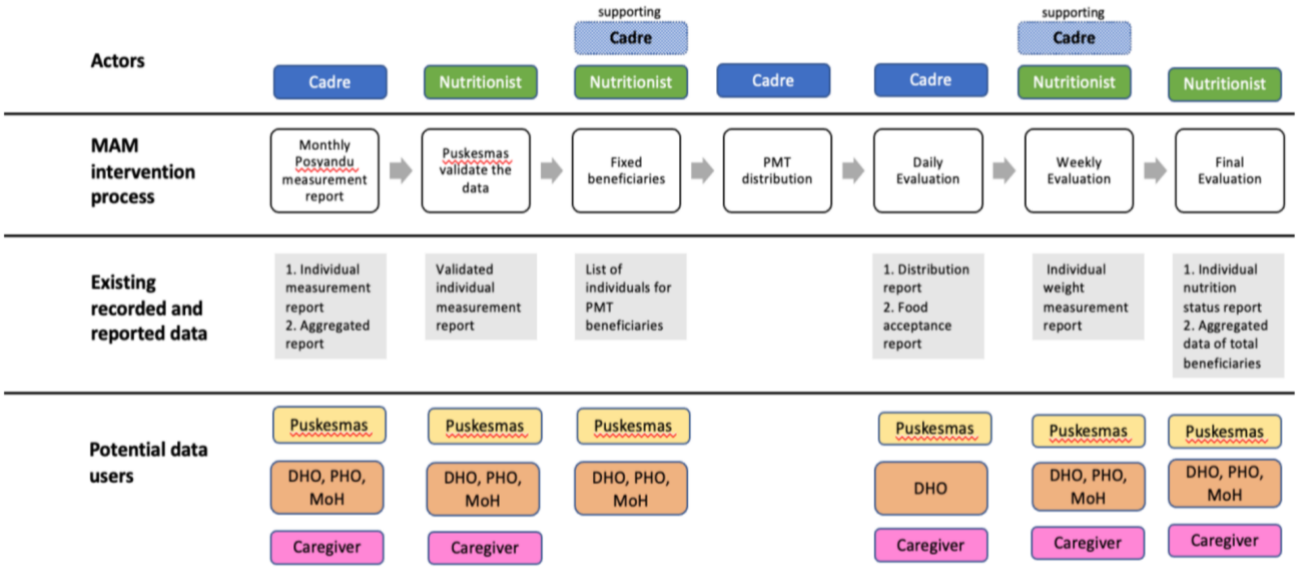

Figure 1. Flowchart of overall mechanism for MAM intervention data recording and reporting

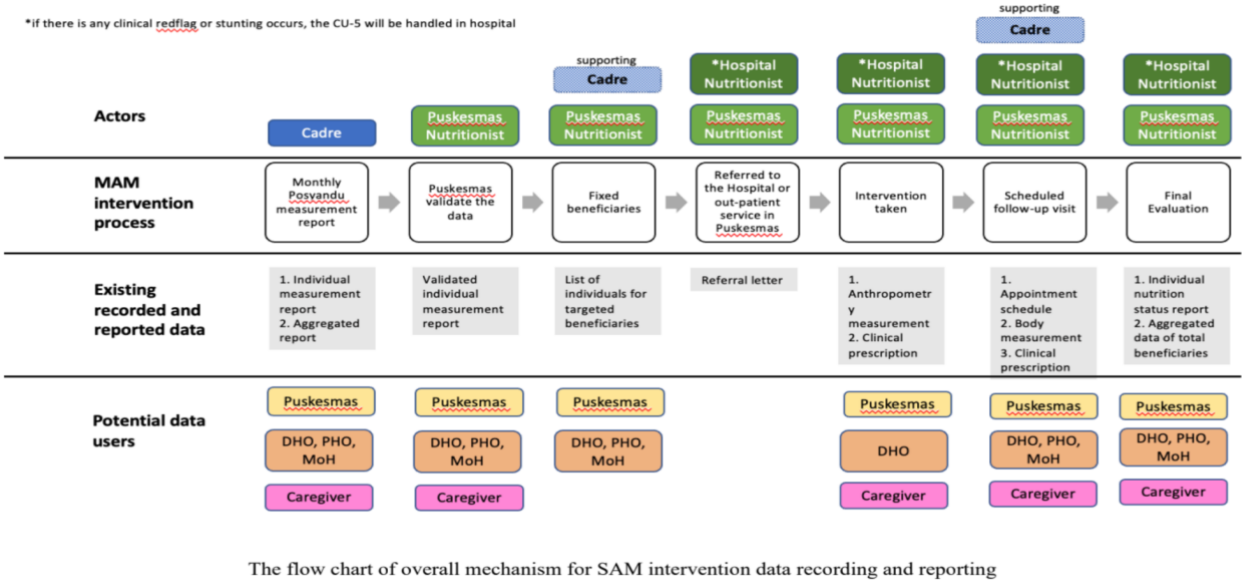

Figure 2. Flowchart of overall mechanism for SAM intervention data recording and reporting