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Overview of User Experience in Using Nutrition Information System: Scoping Review

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ABSTRACT

Manual nutrition record system which still have a few of limitation, was already developed into digital information system. The nutrition information system was implemented with the hope that officers can record and report data quickly, accurately and instantly. To determine the success of the information system implementation, an evaluation is necessary. This scoping review was conducted with the intention of obtaining an overview of the implementation of nutrition information systems in the last ten years to date. After screening using the PRISMA flow, 11 articles were obtained that were relevant to the criteria used to conduct the review. Article searches were conducted on four article search engines, namely Google Schoolar, JSTOR, PubMed, and Science Direct. Through these articles, found that the implementation of nutrition information systems has a few benefits and barriers. There are also several factors that influence this, although there are still several studies that have different results regarding the influence of these factors

INTRODUCTION

All community health centre's cadres and health workers in Indonesia are currently implementing Posyandu (Integrated Service Post) to monitor the growth and development of toddlers, by providing weighing, antenatal, immunization, family planning and supplementary feeding services. The Posyandu is the main source of recording data on toddlers, until it finally becomes a report to be forwarded from the Puskesmas to the Ministry of Health. Recording and reporting of this data was initially carried out manually (Setiarini et al., 2017). Data and information on nutritional status cannot be provided separately, so vertical coordination is needed so that existing data and information can be reported precisely and accurately. As implementation of e-Government, the surveillance system was then developed by the Directorate of Nutrition Development into an internet and SMS-based SIGIZI (Nutrition Information System) gateway as a means of covering the shortcomings of the manual recording system (Nurhayati et al., 2019; Winarno et al., 2014).

Since 2016, the Ministry of Health of the Republic of Indonesia (Kemenkes RI) has continued to develop SIGIZI into electronic recording in the form of e-PPGBM (Electronic Community-Based Nutrition Recording and Reporting) (Setiarini et al., 2017). E-PPGBM was first introduced and disseminated in 2017, which was then supported by Minister of Health Regulation no. 14 of 2019 concerning the Technical Implementation of Nutrition Surveillance which explains that the implementation of nutrition recording and reporting uses an information technology-based nutrition information system (Meidiawani et al., 2021). The information system becomes website and android, with the hope that nutrition development data and information management officers can enter indicator achievement data quickly, accurately and continuously instantly (Nurhayati et al., 2019; Putra & Nurika, 2022).

The implementation of an information system needs to be accompanied by an evaluation to determine the level of success of its implementation as a basis for development tailored to user needs (Putra & Nurika, 2022; Wibowo et al., 2023). As expected, the nutritional information system used should be able to produce data/information quickly, precisely and accurately. However, not much research has been conducted to see the results of implementing the electronic nutrition information system.

METHODS

Study Design

This study was carried out using an approach scoping review to find out the obstacles and challenges in utilizing the use of nutritional information systems, as a step in preparing research protocols by collecting various previous research articles. Scoping review is a method that can be used to identify and explore research problems through various sources from relevant literature (Tricco et al., 2016). There are stages in doing it scoping review is the identification of research questions; identify relevant articles; selecting literature from articles and data extraction; organizing, summarizing, and analysing literature; and reporting the results of data formulation (Levac et al., 2012). The question in this study is "What does the implementation of the nutrition information system look like to date?"

Inclusion and Exclusion Criteria

Inclusion Criteria

a. Articles in English or Indonesian
b. Comes from an accredited journal
c. The year of publication is in the range 2013-2023
d. Discusses the evaluation of nutritional information systems
e. Discussing the application of nutritional information systems

Exclusion criteria

a. Book form
b. WHO report
c. In the form of systematic review, meta-analysis, literature review
d. An article from Blogspot

Literature Search Strategy

Articles used in scoping review This was collected by conducting a search using the keywords information system evaluation "OR" information system implementation "AND" nutritional information system "AND" nutritional data recording "OR" nutritional data reporting on database online, in the form of Google Scholar, Science Direct, PubMed, and JSTOR.

Literature Identification

Identify deep literature scoping review It uses PRISMA as a framework for collecting and selecting literature that is appropriate to the research topic. Literatures on databases collected based on inclusion and exclusion criteria. The literature that has been collected is then carried out screening, duplication checking, and analysis.

RESULTS AND DISCUSSION

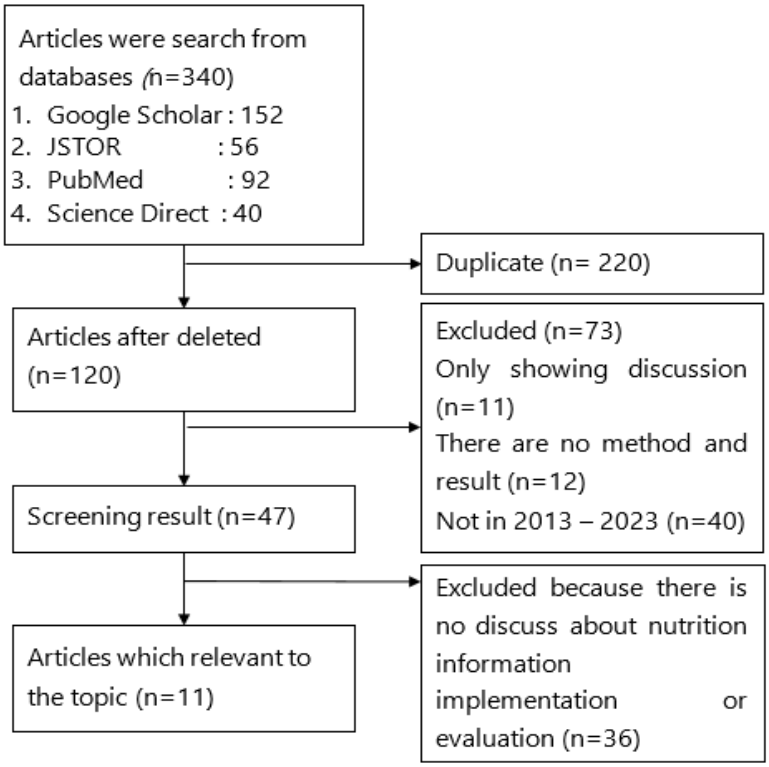

Figure 1. PRISMA Flow

Based on the results searching, 340 pieces of literature were obtained, including 152 articles from Google Scholar, 40 articles from ScienceDirect, 92 articles from PubMed, and 56 articles from JSTOR. A total of 220 articles were duplicates and were eliminated, leaving 120 articles. There were 73 articles that were also eliminated because they were not original research, only contain theory and discussion, and are not in the 2013-2023 range, leaving 47 articles remaining. Next, filtering was carried out regarding the completeness of the articles so that 11 relevant articles were obtained. A total of 8 articles are quantitative research and the remaining 3 are research with a qualitative design. All these articles discuss the implementation of nutritional information systems.

Table 1. Articles Screening Result

No.	Title	Sample	Method	Type SI	Results
1.	Analysis of the Quality and Utilization of e-PPGBM Data: Case Study at the Sumbawa District Health Center-NTB (Setiawati et al., 2020)	20 people from 4 health centers in Sumbawa Regency – West Nusa Tenggara	Descriptive qualitative	e-PPGBM application	1. The data generated is accurate but incomplete 2. Reports not available on time 3. Lack of nutrition implementers, high workload, limited infrastructure, and weak management support are obstacles to implementing e-PPGBM 4. The availability of skilled and trained e-PPGBM personnel as well as support from the Health Service plays a role in supporting the use of the e-PPGBM application in community health centers
2.	User Satisfaction of the e-PPGBM Application Based on System Quality of the Delone-McLean Success Model (Meidiawani et al., 2021)	51 e-PPGBM users in Palembang	Analytical quantitative, cross-sectional	e-PPGBM application	1. As many as 54.9% of respondents stated that the quality of the e-PPGBM application system was good. 2. 66.7% of respondents were satisfied with the e-PPGBM Application 3. System quality influences user satisfaction of the e-PPGBM application
3.	Evaluation of SIGIZI at the Trenggalek District Health Service using ModelingEntended TAM (Winarno et al., 2014)	52 SIGIZI users in Trenggalek Regency	Quantitative,cross-sectional	Website and sms gateway (Nutrition Information System/ SIGIZI)	1. There is a positive influence of CSE on PEU and ASU, PEU on PoU, and PoU on BITU. 2. There is influence between BITU and ASU 3. There is no influence of PEU on ATU and ATU on BITU 4. There is no relationship between PoU and ATU
4.	Evaluation of User Acceptance of the e-PPGBM Information System in Jember Regency (Putra & Nurika, 2022)	44 e-PPGBM users in Jember	Observational quantitative (cross-sectional)	e-PPGBM Information System	1. There is a positive relationship between PEU and PU and ATUT, PU with BITU and ATUT, ATU with BITU and ATUT with ATU, and BITU with ATU 2. Acceptance of e-PPGBM users in Jember Regency is considered good.

					3.	Most e-PPGBM users in Jember Regency feel that the information system is easy to use and intend to continue using it
5.	The Evaluation of Nutrition Information System Using Combined Method of Unified Theory of Acceptance and Usage of Technology (UTAUT) and Task Technology Fit (TTF) (Nurhayati et al., 2019)	50 health center officers using SIGIZI in Banyumas	Explanatory research (cross-sectional)	Website SIGIZI	1. 2. 3.	There is a relationship between task characteristics and technology characteristics and task-technology suitability The only factor found to be related to user acceptance was SIGIZI's performance expectations There is a relationship between SIGIZI performance expectations with task-technology suitability and technology characteristics
6.	Use and Acceptance of Electronics Recording and Reporting on Child Growth Monitoring by Cadre at Integrated Health Post (Setiarini et al., 2017)	8 cadres in 4 posyandu in Depok and Bogor	Qualitative Study	e-PPGBM application	1. 2. 3.	Most cadres agree that e-PPGBM is easy to use Most cadres agree that e-PPGBM is useful to help complete their work A number of problems experienced in using e-PPGBM are lack of facilities and infrastructure, time required to enter data, lack of incentives and financial resources, and lack of skills in using it.cell phone
7.	Personalised Nutrition Technologies and Innovation: A Cross-National Survey of Registered Dietetians (Abrahams et al., 2019)	323 nutrition information system users in the USA, UK, Australia, Canada, Israel, Mexico, Portugal, Spain and South Africa	Cross-sectional	Personalised Nutrition Technology	1. 2. 3.	Nutrition practitioners who use technology consider the use of technology to be less risky, more important, and more professional than those who do not use it Perceptions regarding the importance of biotechnology for dietetic practice were associated with higher perceived usefulness of the technology The perception of the importance of using

					information systems is related to the perception of the importance of technology 4. Technology mobile considered important by nutritionists with a higher level of education
8.	Qualitative Review of National Nutrition Surveillance Systems in the Eastern Mediterranean Region (Al Jawaldeh et al., 2023)	8 nutrition information systems in 8 countries	Qualitative	National nutrition surveillance system	1. Of the 22 Middle Eastern countries contacted, 8 countries were willing to cooperate, and only 3 countries were identified that use health information systems to record and report nutrition (Oman, Morocco and Sudan). 2. All countries have surveillance systems that collect comprehensive data including anthropometric measurements, biochemical data and other relevant indicators to identify nutritional status, especially in vulnerable populations such as pregnant women and toddlers. 3. Some countries that collect clinical signs have good nutritional assessment accuracy, which in turn has an impact on more efficient resource allocation and advanced intervention planning. 4. Weaknesses were found in the nutritional surveillance monitoring system, such as variations in sampling design which could cause variability in the representativeness of the data. 5. Incomplete geographic coverage, varying frequency of data collection, inconsistencies between reporting periods

					and data recording were also found which could have an impact on inaccessible areas as well as delays in time and relevance.
9.	Perception of the Food and Nutrition Surveillance System in the Zona da Mata Mineira region of Brazil: A qualitative approach (Gonçalves et al., 2021)	41 health workers and VAN professionals in the region Zona dan Mata Mineira	Qualitative	Brazilian Food and Nutritional Surveillance (SISVAN)	1. The interviewees acknowledged that, when someone is aware of the goals and objectives of the system used, their interest in achieving those goals increases. 2. Apart from problems with structural resources and operational capabilities, there was also a lack of clear action planning, no clear goals and results to be achieved, wrong direction of action, and a lack of clarity and knowledge regarding the purpose of surveillance. 3. The interviewee felt that there was a need to improve the quality of the system due to a few limitations (such as an unorganized and fragmented work system, lack of resources, and inadequate team composition). 4. The speakers said that there was a need to eliminate political interests in using the system and that there was a need for cooperation between the surveillance sector and the academic community at universities. 5. It is felt that SISVAN has greater potential in primary health services, such as adding an early detection system for food and nutrition situations 6. Challenges in using the nutrition information system itself include the

					gap between the objectives and use of the system, as well as the difficulty of maintaining SISVAN coverage for all targets because the use of the system is prioritized for groups of children and pregnant women.
10.	Evaluation of Nutrition Information System: A National Study Report (Moghaddasi et al., 2023)	All nutritional information systems used in teaching hospitals in Iran	Cross-sectional	Nutrition Information System	1. In general, the nutritional information system used only meets 4 of the 21 evaluation criteria 2. The nutritional information system from company A has the highest score (6) and the nutritional information system from company C has the lowest score (3)
11.	A Clinical Nutritional Information System with Personalized Nutrition Assessment (Kuo et al., 2018)	12 nutrition officers at National Cheng Kung University Hospital (NCKUH)	Cross-sectional surveys	Clinical Nutrition Information System (CNIS)	1. In general, nutrition experts are satisfied with the quality of CNIS, especially the interface and system response time, the availability of accurate data and appropriate information to facilitate nutritional counselling, as well as saving 58% of time compared to working using paper. 2. Nutritionists were not completely satisfied with CNIS support for accreditation, especially for the quality of nutrition services for mechanically ventilated patients 3. Nutrition experts hope that CNIS can be developed for use in clinical care processes and adapted to various levels of patients

a. Benefits of using a nutrition information system

Several studies in various fields have found various benefits resulting from the implementation of an information system, especially in the health sector. These benefits can include increasing access or range of services, increasing professionalism of officers, data accuracy, timeliness, satisfaction, and cost savings (Setyawan, 2016; Herwando & Sitompul, 2021; Dora & Abdul, 2020).

Nutrition information systems that have been used in various places also have their own benefits. Using a nutritional information system can make

program reporting easier (Meidiawani et al., 2021; Putra & Nurika, 2022), make it easier for users to find out data on the nutritional status of communities and toddlers (Putra & Nurika, 2022), improve individual and organizational performance (Nurhayati et al., 2019), increasing the accuracy of assessing nutritional status, and estimating nutritional status at the population level (Al Jawaldeh et al., 2023). However, these benefits can only be felt by the quality of the information system itself and balanced with training (Setiarini et al., 2017), support from the health service (Setiawati et al., 2020), fast performance of the information system, as well as adequate quality of resources with appropriate insight to use technology which can continue to develop over time (Al Jawaldeh et al., 2023; Nurhayati et al., 2019).

b. Barriers and challenges in utilizing nutrition information systems

Recording and reporting data using information systems cannot completely replace paper-based systems (Putra & Nurika, 2022). An information system used has a risk of failure. Of some of the development and implementation of information systems, it is estimated that 70% of failures occur (Doherty et al., 2012). both from the planning stage to the implementation or utilization stage. The nutritional information system is no exception, which also still has a few obstacles and challenges before, during and after implementation.

The obstacles and challenges that can occur in the use of nutrition information systems include a lack of workforce, high workload (Setiawati et al., 2020) lack of budget, and the long time it takes to collect data for entry (Wirawan et al., 2011). Inadequate facilities to support operations due to lack of support from organizations such as lack of internet access, lack of training, inadequate facilities and infrastructure can also hinder users in implementing information systems (Nurhayati et al., 2019; Setiawati et al., 2020; Wirawan et al., 2011).

Although it is known that the use of digitalization technology can increase a person's knowledge, more sophisticated technology is not necessarily easier to use (Bellah et al., 2023). Sometimes someone prefers to use simpler technology, because it is easier to use (Nurhayati et al., 2019). Information system technology that makes it difficult for users can cause a decrease in performance, which is not expected when the information system is implemented. Therefore, it is necessary to carry out regular evaluations, so that user needs and technological sophistication can be aligned. So that in the end users can easily complete their work using the information system without changing too much or reducing the quality of the information system technology itself.

c. Related factors related to the implementation of nutritional information systems

Utilization of nutrition information systems has barriers and benefits that are largely like other information systems. However, there are also factors that influence this. A number of factors influence the use of nutrition information systems in the form of user satisfaction, the quality of the nutrition SI itself (Meidiawani et al., 2021), perceptions of ease, usefulness, and attitudes in using the SI, intentions in using the SI (Putra & Nurika, 2022; Winarno et al., 2014), self-efficacy (Winarno et al., 2014), task characteristics, as well as the characteristics of nutritional SI itself (Nurhayati et al., 2019). However, there are still several studies which find that these factors do not significantly influence the use of information systems (Nurhayati et al., 2019; Sary et al., 2020; Wahyuni et al., 2015; Winarno et al., 2014). So, it is necessary to carry out regular evaluations so that developments can be carried out that are tailored to user needs and have a positive impact on user performance in recording and reporting data as well as in making decisions and policies related to nutrition by policy makers.

CONCLUSION

It is important to pay attention to its success in utilizing a nutrition information system, considering that currently the data that is the basis for decision making and policies related to nutrition is related to the information system itself. Although it is unavoidable that there are obstacles to its use, the benefits that a nutritional information system can

provide are also worth considering. Periodic evaluations need to be carried out as a basis for developing a nutrition information system that is tailored to the needs of its users, to improve the quality of the system and the performance of its users. Because several previous studies that conducted evaluations still found differences in results in the use of information systems. Another interesting thing to review further is the evaluation of the nutrition information system which was carried out using a combination of a few information system evaluation theories from experts, to see how successful the use of the information system was.

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