Artificial Intelligence and Health Communication: Utilisation of "SIMPATI" Application in Accelerating Stunting Management in Sumedang Regency

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Abstract

The purpose of this study is to determine how the health communication process, using the SIMPATI application, accelerates stunting management in Sumedang, and to identify the barriers to health communication during the use of SIMPATI. According to presidenri.go.id, Munir (2023) mentioned that a technology-based application called the Integrated Stunting Prevention System (SIMPATI) contributed to stunting management in Sumedang. This phenomenon is unique and warrants study, as it relates to achieving the vision of Indonesia Emas (Golden Indonesia) 2045: a nation free from stunting. How has Sumedang leveraged Artificial Intelligence (AI). Among many regions in Indonesia, Sumedang is making new breakthroughs through AI to reduce stunting. Thus, the purpose of this study is to determine the health communication process using SIMPATI application in accelerating stunting management in Sumedang; and to find out health communication barriers during the use of SIMPATI. This research employs a qualitative approach using a case study method. Data were collected through observation, literature review, and in-depth interviews. The results showed that the health communication process was carried out by the Sumedang government through optimizing digital media. The existence of AI in the SIMPATI application is seen as a step to accelerate the reduction of the stunting rate in Sumedang. Researchers found that health communication components were optimized in this case. The SIMPATI application was socialized by trained health communicators to convey the message of 'stunting reduction' in Sumedang. The barriers to AI in Sumedang Regency's health communication include technical, personal, language, and cultural barriers
Keywords: Artificial Intelligence, SIMPATI, Stunting Reduction, Sumedang

Introduction

When artificial intelligence becomes a part of human life, opportunities for digital transformation expand significantly. Sumedang Regency leverages this opportunity to develop a health communication program aimed at reducing the stunting rate, aligned with the vision of Indonesia Emas 2045 (Golden Indonesia 2045). The Kominfo.go.id website (2023) states that preparing the "golden generation" of 2045 is not an easy task, as stunting is still a major nutritional problem for infants and children under the age of two. Therefore, this condition must be addressed immediately, as it will hinder the momentum toward Indonesia's Golden Generation 2045 (Kominfo, 2023).

Data related to *Sistem Informasi Penanganan Stunting Terintegrasi* (SIMPATI) AI application was conveyed on jabar.antaranews. com page. Hardiana (2023) mentioned that Dony

Ahmad Munir, Sumedang Regency's District Head, admitted that he was proud that the application made by his district was replicated by the Ministry of Health to handle stunting in other regions. According to Dony, the presence and appreciation given by the Health Minister motivated him to make the regency as the best in Indonesia. Hardiana (2023) reported that Dony Ahmad Munir, the District Head of Sumedang Regency, acknowledged (Hardiana, 2023).

In this research, the authors are interested in describing how AI accelerates stunting rate reduction and optimizes Sumedang's health communication process. Quoted from presidenri. go.id, on Monday, January 2, at the Jakarta Presidential Complex, Munir (2023) mentioned a technology-based application called SIMPATI contributed to Sumedang Regency's stunting management. Through this application, all

stakeholders can understand how to overcome stunting (Setpres, 2023).

The phemomenon of using SIMPATI is unique and interesting to study, as stated in the previous paragraph, the application launch received attention and appreciation from the Indonesian government, including the President and Minister of Health. Moreover, it is relevant with achieving Golden Indonesia 2045, towards Indonesia without stunting. Among many regions in Indonesia, Sumedang is making new breakthroughs through AI to maximize stunting rate reduction. Therefore, the purpose of the study is to determine the health communication process using SIMPATI application to accelerate stunting rate reduction in Sumedang Regency; and to figure out the health communication barriers during the application use.

Previous research literature related to AI and stunting was also found. One of them was conducted by Jungwirth, D., & Haluza, D. (2023), which stated that AI has the potential to support new knowledge discovery. The researchers used "text-davinci-003" model of GPT-3, using the default parameters of OpenAI playground. The study aimed to test GPT-3's ability to advance public health and explore the feasibility of using AI. They found that GPT-3 was able to collect, summarize, and generate sensible blocks of text relevant to public health issue, shedding light on valuable application areas for itself. The research also showed that AI can contribute to public health research. They also concluded that good scientific practices also need to be followed for AI contributions, and a broad scientific discourse on AI contributions is needed within the health field. (Jungwirth, D., & Haluza 2023).

Another research was conducted by Derevianko, A., Pizzoli, S. F. M., Pesapane, F., Rotili, A., Monzani, D., Grasso, R., & Pravettoni, G. (2023). Derevianko et al (2023) mentioned that interest in applying AI in radiology to improve diagnostic procedures has increased in the last decade. Although AI has potential benefits that cover all steps, including the communication process, the use of AI in radiology also poses challenges in doctor-patient communication during the time of diagnosis.

This systematic review focuses on the role of patient and patient-doctor interpersonal communication skills when AI is implemented in cancer diagnosis communication. It is concluded that AI has benefits in assisting doctors performing diagnosis. Future research could improve patient's confidence by providing adequate information on the beneficial use of AI, and improve medical compliance by providing adequate training on doctor-patient diagnosis communication. (Derevianko, A., Pizzoli, S. F. M., Pesapane, F., Rotili, A., Monzani, D., Grasso, R. & Pravettoni 2023).

Both studies show the urgency of the authors' research about use of AI in health communication. While Jungwirth, D., & Haluza, D. (2023) focuses on AI contribution in public health research, Derevianko et al (2023) pointed out benefits of using AI in healthcare. Nevertheless, Derevianko et all (2023) highlighted health communication barriers in using AI to diagnose and communicate the results to the patients. Both studies shows the urgency of the authors' research that examines AI in health communication process, especially in accelerating stunting rate reduction.

Another study by Aggarwal, A., Tam, C. C., Wu, D., Li, X., & Qiao, S. (2023) showed AI's contribution in healthy lifestyle promotion. Aggarwal et al (2023) found high efficacy of AI chatbots in promoting healthy lifestyle (n=6, 40%), smoking cettation (n=4, 27%), adherence to medication or treatment (n=2, 13%), and reduction to substance abuse (n=1, 7%). However, mixed results were found regarding feasibility, acceptability, and usability. To develop the AI chatbot behavior change strategy, selected behavior change theories and experts' consultation were used. The respondents reported that the AI chatbot offered a non-judgemental space to communicate sensitive information. However, the reported results need to be interpreted carefully due to moderate-to-high internal validity risks, inadequate description of AI techniques, and generalizability limitations.

AI chatbots have demonstrated the efficacy of health behavior change interventions among large and diverse populations. (Aggarwal, A., Tam, C. C., Wu, D., Li, X., & Qiao 2023).

In contrast to the three studies above, Prasetyo, A., Noviana, N., Rosdiana, W., Anwar, M. A., Harwijayanti, B. P., & Fahlevi, M (2023) looked at the phenomenon of stunting in Indonesia. Prasetyo et al (2023) mentioned that accelerating stunting rate reduction is one of the priority agendas in Indonesia's health sector, which is implemented through various regional and tiered approaches. An integrated framework management in a regional-based stunting convergence system can be a solution to accelerate stunting reduction rate. The article provides an alternative to accelerate stunting reduction rate through an integrated system based on service governance in districts/cities, considering the fact that in the last three years, the districts/cities in five Kalimantan provinces have not achieved their best results.

Prasetyo et al (2023) also explained that the local governments need to socialize and disseminate the commitment of stunting rate reduction, as there is a need to reaffirm commitment and encourage all parties to actively contribute to the efforts. This study has limitations in the implementation of dimensions that can develop in a context that correlates with several perspectives, such as regional planning, budget capacity, and local capacity. (Prasetyo, A., Noviana, N., Rosdiana, W., Anwar, M. A., Harwijayanti, B. P., & Fahlevi 2023).

In line with the research conducted by the authors, Prasetyo et al's (2023) research shows the importance of stunting rate reduction steps, emphasizing the district/city-level service governance-based systems integration in Indonesia. This is also the focus of the authors' research, which looks at a system in the form of AI to reduce stunting rates in Sumedang district.

In addition, another study which support the authors' research data was conducted by Yuliansyah, H., Sukesi, T. W., Mulasari, S. A., & Ali, W. N. S. W. (2023). Yuliansyah et al

(2023) examined AI and malnutrition, which has not been widely done. It aims to identify AI implementation in predicting malnutrition using bibliometric analysis. Bibliometric analysis consist of four stages: defining the purpose and scope, selecting analysis techniques, collecting data, and presenting findings. Based on five words searched: "malnutrition", "artificial intelligence", "machine learning", "artificial neural networks" and "deep learning". It was found that machine learning is is the most widely used AI approach for malnutrition research. In addition, deep learning techniques are reported to continue to grow as AI new methods are introduced. The use of deep learning, reinforecement learning, and transfer learning methods are widely used in malnutrition prediction research. The analyzed results help to improve the review quality by mapping the areas for malnutrition research (Yuliansyah, H., Sukesi, T. W., Mulasari, S. A., & Ali 2023). Yuliansyah et al (2023) showed that the way AI works in malnutrition is inseparable from machine learning. This is different from the authors' research, which focuses on the health communication process of AI in SIMPATI.

Similarly, Haris, M. S., Anshori, M., & Khudori, A. N. (2023) has also conducted research on machine learning algorithms for stunting. Based on the data from the Ministry of Health and the Central Bureau of Statistics, East Java Province's stunting prevalence value is 26.8%, considered high according to World Health Organization (WHO) standards. Random forest, one of the machine learning algorithms can learn patterns from labelled data so that it can be used as a method for predicting data. Therefore, the research acts as an effort to provide solutions to East Java's stunting problems. The results of this study show that only 12 out of 20 candidate factors are considered as the causal factors based on their correlational values. However, the the prediction results obtained using the random forest algorithm in this study with data consisting of 12 features and a dataset consisting of only 38 data, have an error value of 1.02 MAE and 1.64 in MST. This is not better than multiple linear

regression, which is able to produce smaller error values of 0.93 in MAE and 1.34 in MSE. (Haris, M. S., Anshori, M., & Khudori, 2023).

Haris et al's (2023) research shows the solution to East Java's stunting problems using random forest as one of AI's machine learning algorithms. This research is initial data for the authors to conduct a different research, focusing on the use of SIMPATI AI in health communication to prevent stunting in a different location, Sumedang Regency.

Based on this background, the authors conduct this study to complement previous research findings on AI in health communication. If examined further, this study can also illustrate the use of AI in health communication process to accelerate stunting reduction rate in Sumedang Regency.

Research Methods

This study adopts a qualitative approach through a case study method, which aims to uncover or explore an issue or case that is unique and developing in the community (Creswell, 2015). In this study, the uniqueness of the case is the use of SIMPATI AI in health sector, namely the SIMPATI application which is claimed to be an AI that helps accelerate the reduction of stunting in Sumedang. Several data collection techniques were used, including observation, in-depth interview, and literature study.

1. Observation, the author observes the growing research phenomenon of the use of SIMPATI to accelerate the reduction of stunting rates in Sumedang. This observation process is carried out both online and offline.
2. In-depth interviews, this data collection technique is very important to obtain research results directly from the informants involved. The author also conducts interviews according to research needs. Interviews were conducted online through the zoom meeting platform and offline.
3. Literature study, this technique is also

very helpful in the research process conducted by the author. The author obtained various primary and secondary supporting data regarding the urgency of AI in the health sector, especially the use of AI in accelerating stunting reduction. Through this literature study, the author can find out the differences between existing research and the research conducted by the author.

Results and Discussion

Reducing the stunting rate is still one of Indonesian governement's main goal towards reaching the Golden Indonesia 2045. The rapid development of digital technology and the emergence of AI makes Sumedang Regency the object of this research, as it used AI in accelerating the stunting rate reduction in Sumedang. In this case, the author found research results regarding health communication using AI in accelerating stunting rate reduction. The research informants in this study can be seen in the following table.

Table 1. Identity of the Informants

No	Informant	Profession	Data Catagory
1	IY	Medical personnel (Public health)	Primary data
2	NK	Midwife	Primary data
3	NG	Sub-district staff in Sumedang	Primary data
4	IO	One of Sumedang's village head	Primary data

| 5 | NA | ITB Lecturer/ Expert of Brain Machine Interface/ Artificial Intelligence Study Center | Secondary data |
| 6 | OV | Posyandu Cadre in Sumedang | Secondary data |

(Souce : Research Results, 2023)

In the research, interviews were conducted with the six informants above. The data obtained varied, ranging from primary to secondary data. The results showed that the health communication process was carried out by the Sumedang government through optimising digital media. The existence of SIMPATI AI application is sought as a step to accelerate the stunting rate reduction. Therefore, the authors present the research findings into several sections aligned with the research objectives.

SIMPATI for Accelerating Stunting Rate Reduction in Sumedang

Referring to previous studies that discuss new methods in reducing stunting rate, the authors sees that the research focus on stunting and digital transformation are important to be studied first. One of the research is presented by Andrianof (2022) who saw many cases of stunted toddlers within the community.

According to Andrianof (2022), an expert system that can help users diagnose stunting more quickly is needed. The use of an expert system with the Forward Chaining & Naïve Bayes method can help and facilitate users in detecting stunted toddlers. The web-based system designed to produce stunting diagnoses was successfully implemented using Forward Chaining & Naïve Bayes, showing the percentage of toddlers affected by stunting as the output. The PHP programming language is very suitable for expert systems in determining the occurrence of stunted toddlers, as the PHP programming language has a good ability to process data. (Andrianof, 2022).

Andrianof's (2022) research highlighted a web-based system that can help diagnose stunting more quickly. The data also shows digital technology implementation that has been done to help detect stunting. Considering the fact that stunting prevalence rate is high in several regions across Indonesia, various efforts have been made, one of the effort is found in Andrianof's research (2022). The difference is, in this research, the author raises an application called SIMPATI which is stated as AI used to manage stunting in Sumedang.

The first research finding was about the reasons for using SIMPATI in the health communication process. Based on the interview with NK, a midwife who works at one of the health centres in Sumedang, the use of SIMPATI was an innovation initiated by Sumedang Regency's Head District to help accelerate the stunting reduction prevalence in the Regency. The following is an excerpt of the interview:

> *"Yes, SIMPATI [application] was used because Sumedang Regency's head district at that time wanted to find ways to accelerate the reduction of stunting in Sumedang. In 2022, the prevalence of stunting in Sumedang was high and it included areas that were highlighted as areas with a high prevalence of stunting in West Java. Yes, then came the innovation of SIMPATI, this is also the result of collaboration with Telkomsel."* (Interview with NK)

In addition to NK, the author also managed to interview another medical worker, IY, who works at one of the health centres in Sumedang Regency. IY is a medical worker in the field of health promotion, one of her focus is the stunting reduction programme. IY added several points about the reasons for using SIMPATI in

accelerating stunting rate reduction in Sumedang. Below is an excerpt of her interview:

> *"The use of SIMPATI really facilitates cross-sector communication in accelerating stunting reduction. I feel really helped by this SIMPATI. In the beginning, SIMPATI appeared as an innovation made by Sumedang in reducing stunting, and this is proven. With SIMPATI, yes, we are also easier [sic] to work because it facilitates cross-sector communication to reduce stunting in an application, called SIMPATI."*
> (Interview with IY)

These two informants show that there are reasons for using SIMPATI in accelerating stunting reduction in Sumedang. This is also reinforced by the interview results with the District Secretary in one of Sumedang's areas, NG, as follow:

> *"SIMPATI emerged as an innovation or idea from Sumedang Regency's Head District [...] at that time, Sumedang was one of the areas with high stunting prevalence in West Java. This innovation is the result of Sumedang Regency's collaboration with Telkomsel, which wants to contribute to help accelerate stunting reduction. On its journey to date, SIMPATI has clearly helped reduce stunting, because we can all access the data, making the communication and coordination process easier. The health office can also know which areas have high stunting rates. Likewise, health workers are also clearly involved in it."*
> (Interview with NG)

The interview excerpt strengthens the research results obtained by the author regarding the reasons for using SIMPATI. The authors see that the background of using SIMPATI is part of the health communication process in accelerating the stunting rate reduction in Sumedang. Why is this so? This is because the use of the application originated from the high prevalence of stunting rates in Sumedang, so Sumedang Regency's head district and his staff innovated and collaborated with various parties, one of which was Telkomsel, to make the application. The authors also found previous research of applications related to stunting in Bangladesh.

VU, NU (2022) have researched Machine Learning techniques application in identifying important stunting risk factors and predicting the prevalence of stunting among children under 5 years old in rural Bangladesh. There are two important findings obtained from this study. First, investment in sanitation and water, household size, and distance between sanitation facility and household were found to be the most important predictors of stunting incidence. Second, Random Forest, as a supervised learning algorithm, showed the best performance with 61.2% recall and 58.3% accuracy in detecting stunting incidence using WASH and SRHR indicators. Despite the potential, it is recommended to include other socio-demographic factors to improve the prediction performance. The results of the study provide a more sustainable and scalable method to diagnose early stunting, which enables timely intervention and rapid relief for any child affected by stunting. (VU, 2022).

Although the research by VU, NU (2022) was conducted in Bangladesh, it has the same research focus as the author, which are the efforts made to accelerate stunting rate reduction. The Machine Learning techniques application show the use of information technology systems in predicting the stunting prevalence in Bangladesh. The difference, in the research conducted by the author, is that SIMPATI application is used as a result of collaboration with Telkomsel as celullar network provider. This shows the importance of efforts that must be made to accelerate stunting rate reduction, even though with different tools or types of technology systems. Therefore, the authors try to describe the research results in the table below.

Tabel 2. Reasons for Using SIMPATI in Accelerating Stunting Reduction in Sumedang

No	Research Results Description	Main Points
1	The high prevalence of stunting at that time made Sumedang one of the areas with the highest stunting rate in West Java.	Sumedang is one of the areas with the highest stuntint prevalence in West Java
2	Innovation used to acclerate sunting prevalence in Sumedang Regency	Innovative use of technology
3	Cross-sector communication between parties in finding the right solution to reduce stunting rates	Cross-sector communication
4	Support and collaboration with Telkomsel as a form of reducing stunting rates in Sumedang	Collaboration with companies engaged in digital technology

(Source : Research Results, 2023)

Health Communication Process in Accelerating Stunting Reduction through SIMPATI Application

As described in previous findings, SIMPATI emerged as a result of technological innovation optimised by Sumedang to reduce stunting prevalence in Sumedang. This was also conveyed directly by Sumedang's District Head in various mass media news. He explained that the application presents a number of clear data and information, such as villages with high stunting prevalence rates, statistical data on stunted children, and the cause of stunting within a certain village. According to him, stunting management in each village will be different based on the obstacles faced.

"So each village has different obstacles, stunting problems, then through artificial intelligence, we give recommendations. So, stunting management is intervened in each village differently. This is part of collaborating with all existing components to deal with stunting." (Setpres, 2023). (Interview excerpt from president. go.id)

Another statement was also conveyed on jawapos.com, that Sumedang made an innovation using AI to reduce stunting prevalence rate. The following is an excerpt of the statement:

"Data from the toddlers weight at the posyandu every month is inputted into the application. This includes head circumference, weight, and height data. The data is then processed with AI. So, the data that comes out is included in the regional data. So, stunting management is intervened, [and] each village can have different treatments" (Safutra, 2023). (Excerpt from jawapos.com)

If the author looks closely at several reports in the mass media, including one from the Indonesian president's website and jawapos above, SIMPATI is said to be AI that can help accelerate stunting rate reduction in Sumedang Regency. Why? On the website, the Sumedang district head explains that SIMPATI presents a number of clear data and information such as villages with high stunting prevalence rates, statistical data on children affected by stunting, and the causes of stunting per village.

The two statements above show that there is an optimisation of health communication components in this case. SIMPATI application is socialised by trained health communicators, to convey the message of "reducing stunting" in Sumedang, through the SIMPATI application. The author describes the main points in the table of research results below.

Table 3. Analysis of Health Communication Process to Accelerate Stunting Reduction through SIMPATI in Sumedang

No	Component	Research Results	Description of the Health Communication Process that Occurs
1	Communicator	Health workers, local village officials, community leaders, religious leaders, cadres	The selection of the right health communicator has been proven to help achieve the expected results in stunting reductino health communicatin programm in Sumedang Regency.
2	Message	Health promotion on the accelerated stunting reduction programme through digital collaboration using SIMPATI	The message conveyed was the use of SIMPATi as a technology-based effort to accelerate stunting rate reduction in Sumedang.
3	Media	The use of SIMPATI (Integrated Stunting Management Information System)	SIMPATI as a medium used and promoted in various cross-sectors, from policy makers to implementers
4	Communicant	The primary target is Sumedang regency's people who have children, so that their children are identified as having stunting symptoms or not. The secondary target is the entire Sumedang district community, to be aware of SIMPATI as a technology-based innovation that can be optimised to accelerate stunting reduction rate in Sumedang.	In the process of health communication to reduce stunting prevalence rate, knowing the target audience is important to determine the message delivery technique that suits characteristics of the communicants.
5	Effect	The result achieved was a significant reduction in stunting prevalence rate in Sumedang Regency.	Data obtained, one of which is from antara.news (2023) states that there is a high decline in stunting prevalence, from 32.2% in 2018, drastically decreased to 8.27% in 2022.

(Source : Research Results, 2023)

In table 3, the authors display the health communication components used by Sumedang in accelerating stunting rate reduction. The health communication process that has been carried out by the regency involves communicators, messages, media, communicants, and the expected effects of using SIMPATI. However, in its implementation, it is necessary to review each component of health communication. Therefore, futher explanation is presented below.

Selection of Health Communicators in SIMPATI as a Programme to Accelerate Reduction of Stunting Prevalence in Sumedang

In this case, Sumedang has used the involvement of health communicators in accordance with its own programme objectives, namely reducing the prevalence of stunting. This was also conveyed by the author's informants through interviews that have been conducted. As the author has included in table 3 of the research results, health communicators in using SIMPATI to accelerate stunting reduction involve several people. The following are excerpts from interviews with informants NK and IY.

"In terms of communicators, the SIMPATI programme is socialised directly by the policy holder, namely the Regent and his staff who convey it to all staff in each sub-district. In addition, it also collaborates with the Sumedang Health Office which socialises to the health promotion team at each health centre in Sumedang. This means that doctors, health promotion teams, midwives, and cadres are also actively involved. In addition, there are also sub-district heads, social secretaries, village heads, health cadres, religious cadres of course." (Interview exerpt with IY)

"The point is that the communicators chosen are relevant, the goal is to have cross-sector collaboration,

because this really helps us, in terms of reducing the prevalence of stunting in Sumedang. The cadres involved are also trained to use SIMPATI." (Interview exerpt with NK)

The author sees that Sumedang applies the selection of health communicators based on cross-sector collaboration aspects. This is a concrete action to optimise the use of SIMPATI as a tool that helps accelerate the reduction of stunting prevalence in Sumedang. The author's findings are also supported by previous research that mentions the importance of health communicator collaboration.

Covvey, J. R., Arya, V., Mager, N. D., Gilman, N., Herring, M., Ochs, L., & Waddington, L. (2023) explained in his research that in addition to communicating with patients directly at the individual level, pharmacists can also influence health communication at the macro level. This includes collaboration with other healthcare providers. Effective communication is critical to improving collaboration and closing the health disparity gap that often exists due to social determinants of health among underserved patient populations. However, behaviour change cannot be sustained without recognising the multiple levels of influence that affect health communication.

Unfortunately, health communication alone cannot correct inadequate access to health services or unhealthy living environments. To close the gaps that lead to health disparities, pharmacists must look for broad ways to utilise health communication strategies and develop interventions that have multi-level influence. Ultimately, pharmacists are integral members of a high-performing healthcare team. Effective communication and collaboration among health professionals and at various levels will help meet the goals and objectives of a health programme. (Covvey, J. R., Arya, V., Mager, N. D., Gilman, N., Herring, M., Ochs, L., & Waddington 2023).

Covvet et al (2023) mentioned the important point of effective communication

and collaboration between health professionals at various levels. The difference in the author's research lies in the broader involvement of communicators. This is in accordance with the data from interviews with informants who stated that the communicator components involved included the sub-district head, village head, religious leaders, health cadres, midwives, health promotion team, social services, and others. This shows that there is cross-sector collaboration, not only in terms of health workers.

Messages conveyed in SIMPATI as a tool that helps accelerate the reduction of stunting prevalence in Sumedang

Based on the interview results, the message component used in SIMPATI application is the acceleration of reducing stunting prevalence in Sumedang. NK conveyed the message delivery technique:

> *"The message is conveyed as simple as possible so the community understands. First [we tell] the nutritional status of the toddler is, then the actions that must be taken so that the child is healthy again, and their nutritional status improves. The goal is so the SIMPATI application can help accelerate the stunting rate reduction in Sumedang. The way it works is that*

> *posyandu cadres enter child data in the application, then after obtaining nutritional data, we make home visits, involving the village PKK and other cadres." (interview excerpt with NK)*

In the interview excerpt, there are challenges in the health message component, including how to deliver the message, regarding the stunting rate reduction goal, as simple as possible so it is easy to be understood by the community. The delivery of this message is not something that is easily accepted, because the communicants' characteristics are divers. This challenge was also mentioned by another informant:

> *"There are challenges in delivering simple and easy-to-understand messages. Because, even though we have used SIMPATI through Posyandu, for example, including coaching cadres, there is still a tendency to be shy. So, we have to be careful". (Interview excerpt with NK)*

Referring to the interview and observations that have been carried out as well, the authors sees that this health message component can be classified into several categories. This makes it easier to analyse message components that play an important role to accelerate the stunting prevalence reduction in Sumedang.

Table 4. Message Components in the Health Communication Process of Using SIMPATI in Sumedang

No	Health Message Component	Explanation
1	Message Content	Socialisation of SIMPATI application to the public through Posyandu activities and coaching of health and religious cadres are also involved.
2	Message delivery techniques	Health messages are delivered using informative techniques (informing SIMPATI) and persuasive techniques (inviting the community to get involved in accelerating stunting reduction in Sumedang).
3	Purpose of message delivery	Messages delivered as a form of health promotion programme to help accelerate stunting reduction in Sumedang.

(Source : Research Results, 2023)

The message components categorisation above is based on the research findings analysis. In this study, health messages are divided into three categories: message content, message delivery techniques, and message delivery objectives.

Media Components in the Health Communication Process to Accelerate Stunting Rate Reduction in Sumedang

In this research, SIMPATI is clearly visible as a media component used in accelerating the stunting reduction rate in Sumedang Regency. This is also confirmed by various primary and secondary data obtained. A statement from Sumedang Regency's head district was published on the website of the Indonesian cabinet secretary (2023) as follows:

> *"The point is that we use technology as tools, an electronic-based government system. We have a platform called SIMPATI (Integrated Stunting Management Information System). "This platform has spatial, territorial spatial data, which sub-district has the highest stunting rate; the second is statistical data, by name by address, who is stunted; then there is analytical data, how each village is stunting because of what," said the head district of Sumedang Regency, Dony Ahmad Munir, as stated on the website" (Rahmat, 2023)*

Referring to the quote above, the authors observe that SIMPATI is a tool, an artificial intelligence system. There is analytical data in it, which can show the villages with high numbers of stunted children in Sumedang Regency. Similarly, this is also supported by the news on detik.com webpage. The difference is that Aziz (2022) mentions another perspective from Bappenas RI, appointing Sumedang as the pilot project location for AI use.

Aziz (2022) explained on the detik.com website that Sumedang Regency was chosen by the Ministry of National Development Planning/ Bappenas RI as the location of the pilot project for the use of Artificial Intelligence in the Formulation of Regional Dimension Policies. This was revealed at a meeting that took place at Sumedang Regency Bappeda Media Centre. Secretary Herman Suryatman, who was present on the occasion, said that his party had carried out 'sharing sessions' with the Ministry of PPN/ Bappenas about the use AI for decision making. (Aziz, 2022).

Meanwhile, interviews were also conducted with experts, as a data triangulation technique. NA, an lecturer at the Bandung Institute of Technology (ITB) who is also an expert in AI, expressed his views on the concept of AI, as follows. In his interview, NA also explained that a tool must be reviewed to check whether it matches AI characteristics.

Tabel 5. The Concept of Artificial Intelligence (AI) and its Role in Healthcare

No	Main Points		Description
1	Review AI characteristics	-	There are input and output processes
		-	If it's just simple mapping, then it's not AI
		-	It involves elements of intelligence and elements of learning algorithms
		-	There is classification, clustering, and prediction
2	How AI works with health workers	-	Health workers are trained to operate the AI; While doctors or health workers do not need to know how it works, they just need to know how to operate it.
3	Advantages of AI	-	Helps speed up a task
		-	Recommend an intervention

| 4 | Weaknesses of AI | - | When it comes to the life and death of patients, AI should not be used, because it is unexplainable, there is an element of bias |
| | | - | The effect of global warming and climate change, because it produces large carbon emissions |

Source : (Research Results, 2023)

Based on data in table 5, Artificial Intelligence plays a role in the health sector. In terms of SIMPATI, it is clear that SIMPATI is the media used in accelerating the stunting reduction rate in Sumedang. In this case, the author wants to explain that the use of SIMPATI shows the ease of obtaining the necessary data about stunting and recommendations for stunting interventions that can be spread in each programme. As stated by IY, the author's informant who is a health promotion team at one of the health centres in Sumedang.

"SIMPATI facilitates centralised reporting of data on stunting, so the Health Office and other policy makers can also access it. The data filled in by the cadres is material for further interventions, which may have different stunting interventions in each region". (Interview excerpt with IY)

"Stunting in Sumedang area is greatly helped by SIMPATI [as it informs] the results of nutritional status, whether there is an increase or not, it is immediately visible, so it is faster to intervene". (Interview excerpt with NK)

The interview excerpt shows the optimisation of SIMPATI as a media component used in the health communication process to accelerate stunting rate reduction in Sumedang. In addition, below are further explanation of the communicant component and the effect component in this study.

1.1 Communicant Components in the Health Communication Process to Accelerate the Stunting Prevalence Reduction in Sumedang

In this component, the author discusses research findings that show that whatever health communication programme is carried out, the most important thing to do is to know the communicants or target of the programme. The message delivery technique has to be in accordance with the characteristics of these communicants.

In this study, the author also found that the communicants component in the process of accelerating stunting reduction is divided into two:

1. Primary target, all the people in Sumedang Regency
2. Secondary target, people who have children indicated to be stunted.

The caegorization of the targets can also show different ways of delivering health messages. This means that the the communicators must know the characteristics of their communicants, to determine the message delivery technique to their communicators. The authors also recognize the importance of this communicant component in previous studies.

First, Wulandari, R. D., Laksono, A. D., Kusrini, I., & Tahangnacca, M. (2022) showed in their research to analyse the most appropriate maternal characteristics for stunting prevention policies. The results showed that mothers who graduated from elementary school and below

were 1.263 times more likely to have stunted children compared to mothers with tertiary education. Mothers who graduated from junior high school were 1.222 times more likely to have a stunted child compared to mothers with a college education. Mothers who graduated from senior high school were 1.122 times more likely to have a stunted child compared to mothers with a tertiary education. Mothers who were never married were 1.138 times more likely to have a stunted child compared to divorced/widowed mothers. Meanwhile, married mothers are 0.936 times more likely than divorced/widowed mothers to have stunted children. This study concludes that the target group for stunting prevention policies are mothers with low education and unmarried. (Wulandari, R. D., Laksono, A. D., Kusrini, I., & Tahangnacca, 2022).

Secondly, another study conducted by Hall, C., Syafiq, A., Crookston, B., Bennett, C., Hasan, M. R., Linehan, M., & Dearden, K. (2018) states that one in four children under the age of 5 in developing countries is stunted (chronically undernourished). Reducing stunting can be challenging, as it is in Indonesia. Indonesia's National Nutrition Communication Campaign [KKGN] provided an effective behaviour change communication intervention that reached 40 million people. The results of the study fully engaged stakeholders at all levels; proactively involved journalists in the nutrition campaign; the use of humorous public service announcements with limited technical information was effective in engaging priority populations; and social media (YouTube adverts, web advertorials, Facebook pages, Twitter, Instagram) extended the reach of the campaign and reinforced messages delivered by other sources. (Hall et al. 2018).

Referring to the two previous studies, the author sees that the communicant component is considered as a target group for stunting prevention policies. For example, in the research of Wulandari et all (2022), it was stated that communicants were low-educated and unmarried mothers. Meanwhile, research by Hall C, et all (2018) mentioned that humorous public service

advertisement were adjusted to the characteristics of the audience. This strengthens the facts that the communicants' characteristics determine the message delivery technique.

Besides, the author sees another point that is an important part of the effect component, which are communication barriers. To achive the effect of communication, sometimes there are various obstacles. In this case, communication barriers which are also a challenge for using SIMPATI in the future, are in the form of technical barriers, personal barriers, language barriers, and cultural barriers.

1. Technical barriers, related to the evaluation of the SIMPATI application, which is considered the result of AI. This can be checked in table 5 about the advantages and disadvantages of AI conveyed by informant NA as an Artificial Intelligence expert.
2. Personal barriers, originated from each individual's involvement. These personal barriers can be in the form of prejudice, individual perceptions, or other things that arise from the individuals involved. This was confirmed by IY and NK as health workers who experienced it.
3. Language barriers, for example, there are foreign languages that are difficult to understand in operating SIMPATI. This can happen especially to new people who are using SIMPATI for the first time. This was also conveyed by IY as a factor that could hinder the process of using SIMPATI.
4. Cultural barriers, this is related to the cultural elements attached to certain beliefs. For example, the myth that stunting is hereditary and other cultural tendencies

Conclusion

AI and Health Communication will be inseparable in the future. This is a finding that the authors acquired when conducting this research. Overall, the authors managed to find the optimisation of the health communication components used in SIMPATI. The SIMPATI

application is socialised by trained health communicators to convey the message of "reducing stunting" in Sumedang, through SIMPATI application. The health communication process involves various diverse communication components in it. The obstacles which becomes a challenge for the health communiction process are technical barriers, personal barriers, language barriers, and cultural barriers.

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