Proceeding
Jogjakarta Communication Conference
Volume 3, No 1, pp. 603-620
ISSN 2988-5523

Health Communication Study in the Digital Era: Analysis of Handling Diabetes Mellitus Discourse in Indonesia in 10 Years (2015-2025)

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Keywords

Diabetes Mellitus; Pentahelix Model; Health Communication; Digital Media; Diabetes Prevention

ABSTRACT

Diabetes Mellitus (DM) sufferers globally continue to increase every year, based on data from the International Diabetes Federation (IDF), sufferers are projected to reach 783 million in 2045. Not only parents, diabetes cases also attack Indonesian children. This is certainly a severe issue that needs to be handled by various parties. This research was conducted to analyze various digitalization efforts carried out by the government, academics, business actors, media, and society within a period of 10 years (2015-2025) to reduce the number of diabetes sufferers in Indonesia. This research method uses qualitative with a Text Analysis approach. The theory used is the Pentahelix Model which involves five main actors, namely: academics, industry, government, community, and media. The research results show that the government is implementing the PTM, GERMAS, PIS-PK, GGL, and the National Campaign to Prevent and Treat Diabetes. Various digital communities were formed by the community, such as Sobat Diabet, Persadia, Blue Circle the Indonesian Diabetes Community, and SobatDIA. From an academic perspective, research on Diabetes was carried out from 2016 -2024 but the perspective was taken from the perspective of medical personnel communication and there were two studies on designing visual media to inform about diabetes in 2019 and 2023. It is hoped that the results of this study can become strategic recommendations for stakeholders in improving health communication to reduce the number of diabetes sufferers in Indonesia through various education on digital pages.

1. Introduction

Health problems and disease problems do not only come from individual negligence, family negligence, or group or community negligence. Most diseases suffered by individuals or diseases in the community in general come from ignorance, not understanding, and misunderstanding of various health information received, for example in the case of people with Diabetes Mellitus. Diabetes Mellitus or DM is a chronic metabolic disease or disorder with multiple etiologies characterized by high blood sugar levels and accompanied by impaired carbohydrate, lipid, and protein metabolism as a result of insulin function insufficiency. Diabetes Mellitus is a non-communicable disease, but the cause can be hereditary from parents. Other factors that cause Diabetes Mellitus are age, gender, family history of diabetes mellitus, excess body weight (obesity), and unhealthy lifestyle (Ministry of Health of the Republic of Indonesia, 2014) (Nugrahaeni & Widianawati, 2022).

According to WHO data, non-communicable diseases (NCDs) are one of the leading causes of death in the world, contributing 44% of total global deaths. One of the NCDs that contributes to the death rate is diabetes mellitus. Although diabetes itself does not directly cause death, the complications it causes can be fatal (Syamsiah, 2018). In addition, diabetes mellitus is ranked sixth as the non-communicable disease that is most responsible for the death rate in the world (WHO, 2020). The number of diabetes mellitus sufferers in the world continues to increase every year and is expected to continue to increase until 2045, indicating that diabetes is a dynamic disease. In 2021, there were around 537 million people aged 20-79 years who suffered from diabetes, with 90% of them having type 2 diabetes. This figure is predicted to continue to increase, with an estimate reaching 643 million cases in 2030 and 783 million cases in 2045 (IDF, 2022).

The Western Pacific region, which includes Southeast Asia, East Asia, Australia, and Oceania, is the region with the highest number of diabetes sufferers in the world. Currently, there are more than 205 million people in the region living with diabetes, and this number is expected to continue to increase to reach 260 million sufferers by 2045. According to IDF data, of the 10 countries with the highest cases of diabetes in the world, three of them are from the Western Pacific region, namely China which is ranked first with 140 million sufferers, Indonesia in fifth place with 19 million sufferers, and Japan in ninth place with 11 million sufferers (Susanto & Kusumastuti, 2024).

According to the Ikatan Dokter Anak Indonesia (IDAI), the prevalence of diabetes mellitus in children under 18 years of age in Indonesia has increased drastically, jumping 70 times from 2010 to 2023. Currently, there are 1,645 children diagnosed with diabetes in 13 cities, including Padang, Yogyakarta, Solo, Bandung, Jakarta, Medan, Palembang, Semarang, Malang, Makassar, Denpasar, Manado, and Surabaya. Of the total, around 46,23% of patients are aged 10-14 years, 31,05% are in the 5-9 year age range, 19% are aged 0-4 years, and around 3% are over 14 years. The majority of children with diabetes are female, with a percentage of 59,3%, while the rest are male (IDAI, 2020). In 2022, Indonesia became the country with the highest number of diabetes sufferers in Southeast Asia, with a total of 41,8 thousand cases (IDF, 2021). This places Indonesia as the country with the highest number of diabetes sufferers in ASEAN and is ranked 34th out of 204 countries in the world in the number of diabetes sufferers (Magliano et al., 2019).

Indonesia has made various efforts to face the challenges of Diabetes Mellitus over the past 10 years. Several prevention and handling programs for cases of Diabetes Mellitus from the government, community, and digital media have been carried out. The government has developed various national policies and programs to control the prevalence of DM in Indonesia. In 2015, Perkumpulan Endokrinologi Indonesia (PERKENI) published the Consensus on the Management and Prevention of Type 2 Diabetes Mellitus in Indonesia, which is the main guideline for health workers in detecting and managing DM (A. N. Rahmadani et al., 2021). In 2021, this Consensus was updated to adapt to the latest scientific developments, including technology-based approaches to monitoring DM patients. In addition, for the renewal in the dissemination of education in the current digital era, one of the approaches adopted is the use of digital communication to improve education, prevention, and management of DM. The use of smartphone-based health applications has been implemented to assist patients in monitoring their conditions. For example, the Diabetes Care application is designed to support patient self-care by providing blood glucose monitoring features, medication reminders, and educational information related to DM. Research shows that the use of this application can help control Type 2 DM and prevent more serious complications (S. Rahmadani, 2020).

The Regulation on Restrictions on Consumption of Gula, Garam, dan Lemak (GGL) which began to be implemented in 2019 is also a strategic step by the Indonesian government to reduce the incidence of Penyakit Tidak Menular (PTM) such as diabetes mellitus, hypertension, obesity, and cardiovascular disease. This policy is based on the Regulation of the Minister of Health (Permenkes)

Number 30 of 2013 concerning the inclusion of information on GGL content in processed and ready-to-eat foods (Ernalia et al., 2022). The government regulates daily consumption limits, namely no more than 50 grams of sugar, a maximum of 5 grams of salt, and 67 grams of fat per day. With this regulation, it is hoped that the public will be more aware of the importance of a healthy diet and be more selective in choosing the food and beverage products they consume. In addition to regulations on food and beverage products, the government is also promoting the Gerakan Masyarakat Hidup Sehat (GERMAS) campaign to raise awareness of the dangers of excessive GGL consumption. This campaign involves various sectors, including ministries, health institutions, and community groups, by educating the importance of a balanced diet and sufficient physical activity. This educational program is carried out through various media, such as television, social media, and health seminars in schools and workplaces (Indrayana & Palupi, 2014).

Various digital educational media have been developed to improve public understanding of Diabetes Mellitus (DM). One example is the use of digital pop-up media such as SRIKANDI, which has been proven effective in increasing the knowledge of adolescents at risk of developing Diabetes Mellitus. Research shows that after receiving education through this media, there was a significant increase in respondents' understanding of Diabetes Mellitus (Asyifa et al., 2024). In addition, according to research by Susan L. Williams (2022) in (Asyifa et al., 2024), digital media-based education has an important role in increasing individual awareness of health. The use of digital technology in diabetes mellitus education has been shown to encourage changes in better health behavior. However, these behavioral changes are generally temporary, so a more sustainable approach is needed to maintain their positive impact in the long term. Therefore, the integration of digital media with more interactive and repetitive educational strategies, such as periodic reminders or gamification systems, can be a solution to increase the effectiveness of Diabetes Mellitus education more optimally.

Indonesia has also formed the SobatDIA community as a forum and supporter in the Diabetes Mellitus prevention campaign. The Sobat Diabetes Community is an initiative of DIACARE® (Diabetes Care Indonesia) founded by Windi Intan Puspitasari with the campaign "Indonesia Lawan Diabetes". This community pilot program was first implemented in the city of Solo (Surakarta) to reduce the prevalence of diabetes which continues to increase every year. This movement aims to realize a Healthy Indonesia and Productive Indonesia through various activities, such as social actions, charity activities, socialization about diabetes, and community empowerment, especially for diabetes sufferers. SobatDIA is committed to being a part of supporting people with diabetes so that they can improve their quality of life while providing education to the wider community about the importance of diabetes prevention. On November 11, 2022, SobatDIA officially became a Foundation that has been registered and recognized by the Ministry of Law and Human Rights of the Republic of Indonesia (KEMENKUMHAM). This foundation has obtained legality based on Decree Number SK AHU-0023526.AH.01.04.TAHUN 2022, thus further strengthening its role in supporting efforts to overcome diabetes in Indonesia.

Based on these data, it can be seen that in the last ten years, the number of Diabetes Mellitus sufferers in Indonesia has increased, especially among adolescents who are still less aware of the risks of this disease. Therefore, education about diabetes needs to be provided from adolescence. Along with technological advances and increasing awareness of the importance of health education, innovative approaches to the prevention and management of diabetes are becoming increasingly relevant. The use of technology not only makes it easier to monitor health conditions but also provides access to accurate and up-to-date information for diabetes sufferers and the wider community. Lack of understanding of Diabetes Mellitus is generally caused by limited access to information about the disease (Jais, M., Tahlil, T., & Susanti, 2019) in (Soegondo, 2022). Diabetes Mellitus management must be carried out continuously (continuum care), where education plays a

very important role. The main competencies in providing education to Diabetes Mellitus sufferers involve a combination of essential knowledge, skills, and attitudes that can contribute positively to professional practice.

Previous research on education and prevention of Diabetes Mellitus (DM) through digital media has made a major contribution to increasing public awareness and knowledge about this disease. The main advantages of the methods used in previous studies are their ability to reach a wider audience, effectiveness in increasing knowledge, and interactivity that can attract the interest of education participants. The use of digital technology also allows for real-time data collection and deeper analysis of the effectiveness of education programs. However, previous studies also have several weaknesses that need to be criticized. The impact of digital education on behavioral change is still short-term, with many participants returning to old habits after some time. In addition, a less personalized approach, limited access for certain community groups, and a lack of integration with the formal health system are major challenges in implementing digital education programs. Many studies also only focus on short-term effectiveness without evaluating the long-term impact on the prevention and management of Diabetes Mellitus.

Therefore, future research needs to prioritize a sustainable and evidence-based approach by utilizing digital media and maximizing the five main actors, including academics, industry, government, community, and media, for personalized education, as well as collaboration between various parties in the field of health communication. Thus, digital education not only increases knowledge but is also able to create more significant and sustainable behavioral changes in the prevention and management of Diabetes Mellitus. The purpose of this study is to analyze various digitalization efforts carried out by the government, academics, business actors, media, and the community within a period of 10 years (2015-2025) to reduce the number of diabetes sufferers in Indonesia. With the increasing development of information technology, digital communication has become an effective means of disseminating health information, increasing public awareness, and helping diabetes sufferers manage their condition. To achieve these goals, this study will use a text analysis approach to understand how discourse about Diabetes Mellitus is constructed in digital media. The Pentahelix approach will also be used to analyze the involvement of various actors, including government, academics, business actors, media, and the community, in disseminating information related to Diabetes Mellitus. With this approach, it is hoped that the research can provide in-depth insights into the effectiveness of digital communication in efforts to prevent and treat Diabetes Mellitus in Indonesia.

Literature Review

Critical Discourse Analysis Theory and Approach

Critical Discourse Analysis is part of a multidisciplinary discourse study. Critical Discourse Analysis is important because it helps in understanding texts by identifying the main topics in a discourse. According to Van Dijk (1985), Critical Discourse Analysis focuses on social problems that impact individuals and groups, to identify who has the responsibility, who holds power, and who plays a role in solving the problem. Meanwhile, Wodak (2001) explains that Critical Discourse Analysis functions to analyze the impact of political actions taken by someone based on certain interests. Fairclough & Kress (1993) also added that Critical Discourse Analysis tries to explain how a text is produced, how social structures are formed, and how interactions occur in creating meaning from a discourse (Pramitasari & Khofifah, 2022). In general, discourse analysis plays a role in increasing public awareness of their role in social structures. This approach is based on the idea that science should be objective and not influenced by certain interests (Anwar et al., 2020).

Pentahelix Model

The Pentahelix model is a collaborative concept involving five main stakeholders, namely academics, communities, business sectors (economy), government, and media. This model is often known as ABCGM (Academician, Business, Community, Government, and Media) (Sarjito & Ghazalie, 2020). The success of this collaboration-based innovation is highly dependent on the commitment and strong synergy between the five elements. With optimal cooperation, it is hoped that innovation can be created that is supported by synergistic resources. Collaboration in the Pentahelix model has an important role in driving economic growth and social development in a region.

According to Soemaryani (2016) in Khusniyah (2020), this model serves as a guideline for creating synergy between various institutions to achieve common goals that have been set. In the context of the digital creative industry in Indonesia, the Pentahelix model plays an important role as a collaborative approach that enables cooperation between five stakeholders to achieve broader and more sustainable innovative goals (Putri & Hertati, 2023). Thus, the Pentahelix approach is not only theoretical, but also applicable and flexible to be applied in various development fields, including in creating a more participatory, informative, and inclusive health ecosystem (Sarjito & Ghazalie, 2020).

The Pentahelix approach is not only a solution in the development of the creative economy sector but is also very relevant in the public health sector, such as efforts to overcome non-communicable diseases such as Diabetes Mellitus. Each element in this model plays a strategic role: academics conduct research and develop data-based strategies; the government sets policies and regulations; businesses provide funding and technology; communities are both targets and implementers of activities; and the media disseminates information and shapes public opinion. This collaborative approach creates a mutually supportive ecosystem in overcoming DM, especially in the digital era that demands speed and accuracy of information. With synergy between elements in Pentahelix, DM prevention and control strategies can be more effective, sustainable, and reach various levels of society. Therefore, the application of this model in a digital health campaign is a strategic step to build collective awareness and change in community behavior towards a healthy lifestyle.

2. Method

In this study, the method that will be used is a qualitative approach. Qualitative research is a research approach used to understand social phenomena in depth by emphasizing the meaning, subjective experience, values, and social processes that occur in it. This research is usually conducted through descriptive data collection, such as in-depth interviews, participant observation, documentation, or text analysis, which are then analyzed interpretively to explore the meaning behind social facts or symptoms. According to Creswell (2014), qualitative research is "an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem." Meanwhile, Moleong (2017) states that qualitative research is research that aims to understand the phenomena of what is experienced by research subjects, such as behavior, perceptions, motivations, actions, and others holistically, and using descriptions in the form of words and language, in a specific natural context and by utilizing various scientific methods (Fiantika et al., 2022).

Critical Discourse Analysis is a methodological approach in qualitative research that focuses on how language is used to represent, shape, and maintain power and ideology in society. This theory views language not merely as a neutral communication tool but as a social practice that is closely

related to power structures, domination, social inequality, and relations between groups. In the context of research, Critical Discourse Analysis provides a deeper understanding of texts and their contexts, and how the texts reflect the social practices and ideological interests of certain actors or institutions. Fairclough (1995) developed a three-dimensional approach to Critical Discourse Analysis, namely: text analysis (linguistic structure), discursive practice (the process of producing and consuming texts), and social practice (the social and institutional contexts that underlie the text). Meanwhile, Van Dijk (2008) emphasized the importance of social cognition in understanding how discourse is used to control public thought and opinion, especially through mass media. In practice, Critical Discourse Analysis is often applied in studies of media, education, politics, and health to uncover how certain discourses reflect and reinforce power structures and inequality. This approach is very relevant in analyzing narratives that develop in digital media, especially in social and health issues, such as the representation of Diabetes Mellitus in the realm of digital communication (Fairclough, 1995).

The research method section in this study uses Critical Discourse Analysis to examine how digital media shapes, disseminates, and influences discourse on Diabetes Mellitus (DM) in Indonesia during the period 2015-2025. This analysis aims to understand how various actors in the Pentahelix model (government, academics, business, media, and society) contribute to digital communication related to DM, as well as how ideology, power, and certain interests influence the narratives that develop in the digital realm. This study uses a qualitative approach with the critical discourse analysis method from Fairclough (1995) and Van Dijk (2008) to trace the text structure, discursive practices, and social contexts that surround the DM discourse in digital media. Primary data were obtained from various digital media platforms such as news portals, social media, health education websites, and government and community digital campaigns related to DM (Putri & Hertati, 2023).

In this study, a collaborative approach was used by adopting the Pentahelix model as the main analytical framework. This model involves five central actors, namely government, academics, business actors, communities, and the media, each of which has a strategic role in responding to social issues, including health problems such as Diabetes Mellitus (DM). This approach not only highlights the importance of individual contributions from each sector but also emphasizes the need for synergy and cross-sector collaboration to create comprehensive and sustainable solutions. In the context of this research, the Pentahelix model is an important foothold in understanding the dynamics of digital communication that forms around the DM issue, as well as how the five elements are interconnected and influence people's perceptions and behavior towards this disease (Sjögren Forss et al., 2021). This approach provides space for a broader analysis of multi-stakeholder involvement in shaping health discourse in the digital public space.

To dig deeper into these dynamics, Critical Discourse Analysis is used as the main method. Critical Discourse Analysis is an approach that examines how language in texts or conversations reflects and shapes power, ideology, and social relations in a particular context. In the context of research on Diabetes Mellitus (DM) in Indonesia during the period 2015–2025 based on digital media, the application of Critical Discourse Analysis with the Pentahelix model allows for an in-depth analysis of the representation of DM and collaboration between stakeholders in handling it. This approach also allows for a more critical analysis of the power relations and ideologies hidden behind the dissemination of health information in the digital era.

Detailed Steps in Critical Discourse Analysis Method with Pentahelix Model :

1. Determination of Data:
   A. Data Sources: Collect texts from digital media such as news articles, health blogs, discussion forums, and social media that discuss Diabetes Mellitus during 2015–2025.
   B. Selection Criteria: Select sources representing the five actors in the Pentahelix model to ensure diversity of perspectives.
2. Text Analysis:
   A. Macrostructure (Theme): Identifying the main themes raised in the text, such as government policies related to Diabetes Mellitus, community initiatives, or media campaigns.
   B. Superstructure (Schema): Paying attention to how the text is structured to understand the flow of information delivery..
   C. Microstructure (Words and Sentences): Analyzing words, metaphors, and language styles that can reveal certain biases or ideologies.
3. Social Context Analysis:
   A. Historical and Cultural Context: Evaluate how the social, political, and cultural contexts in the period 2015–2025 influence the representation of Diabetes Mellitus in digital media.
   B. Power Practices: Identify actors or institutions that influence shaping discourses about Diabetes Mellitus and how they use media to maintain or challenge existing power structures.

3. Result and Discussion

The Role of Government Programs in Addressing the Rise of Diabetes Mellitus in Indonesia

Various programs have been launched by the Indonesian government to reduce the prevalence of Diabetes Mellitus through educational, preventive, curative, and rehabilitation approaches. Strategi Nasional Pencegahan dan Pengendalian Penyakit Tidak Menular (PTM) 2015–2025 is the main framework for dealing with non-communicable diseases such as diabetes, by emphasizing the importance of changing healthy lifestyles from an early age, increasing public awareness, and strengthening family and community-based interventions (Ministry of Health of the Republic of Indonesia). Perkumpulan Endokrinologi Indonesia (PERKENI) also supports this effort by issuing the National Consensus on Management of Type 2 Diabetes Mellitus and involving various parties such as PERSADIA and Diabetasol in education activities and strengthening diabetes management in the community (PERKENI).

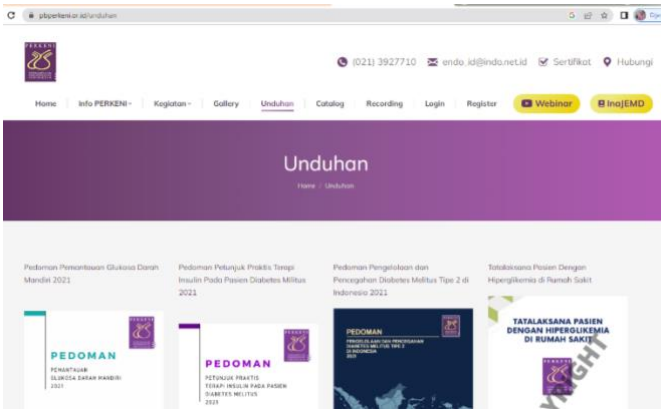

Figure 1. Digital page in the form of a website with links https://pbperkeni.or.id/unduhan

Since 2016, Gerakan Masyarakat Hidup Sehat (GERMAS) has been developed through Presidential Instruction Number 1 of 2017 as a national effort to encourage people to adopt a healthy lifestyle with seven main steps: regular physical activity, consumption of fruits and vegetables, not smoking and alcohol, regular health checks, maintaining environmental cleanliness, and using healthy toilets (GERMAS – Kemenkes).

Figure 2. Kemenkes page at the link https://ayosehat.kemkes.go.id/germas

Program Indonesia Sehat with Pendekatan Keluarga (PIS-PK), which began in 2017, focuses on family-based health services through a home visit approach by health center officers to collect family health profile data, which is then used as a basis for compiling comprehensive health interventions.

Figure 3. Digital Page related to the PIS-PK Program at the link https://puskdinoyo.malangkota.go.id/pis-pk/pis-pk-program-indonesia-sehat-dengan-pendekatan-keluarga-puskesmas-dinoyo/

This program also supports the implementation of Jaminan Kesehatan Nasional (JKN) and Standar Pelayanan Minimal (SPM) in the regions (Minister of Health Regulation No. 19 of 2017). To control the consumption of Gula, Garam, and Lemak (GGL) which is one of the main causes of diabetes and cardiovascular disease, the government through Minister of Health Regulation No. 30 of 2013 and reinforced by Minister of Health Regulation No. 63 of 2015, requires the inclusion of

GGL content information and health messages on processed and ready-to-eat food packaging to increase public awareness in choosing healthier foods (BPK Regulation).

In 2021, the Ministry of Health launched the Primary Health Care Transformation as the first pillar in the Health System Transformation, which aims to strengthen basic health services with a focus on prevention and education. This transformation includes community education, expansion of complete basic immunization, screening for major diseases such as diabetes, as well as the revitalization of Puskesmas, Posyandu, and digitalization of the primary care system (Primary Care Transformation – Ministry of Health).

In 2022, the Ministry of Health will promote the National Campaign "Cegah, Obati, Lawan Diabetes," which focuses on public education, early detection for individuals at risk, and appropriate treatment to avoid complications. This campaign uses various communication channels such as social media, webinars, and integration into school curriculum and community activities. The national theme "Cegah dan Kendalikan Diabetes untuk Masa Depanmu" is also in line with the global theme of World Diabetes Day 2022, namely "Education to Protect Tomorrow" (Sehat Negeriku - Ministry of Health). All of these programs demonstrate the Indonesian government's ongoing commitment to addressing the challenges of diabetes comprehensively through a multi-sectoral and participatory approach.

The Role of Academics Through Various Research Related to Communication and Diabetes Mellitus in Indonesia

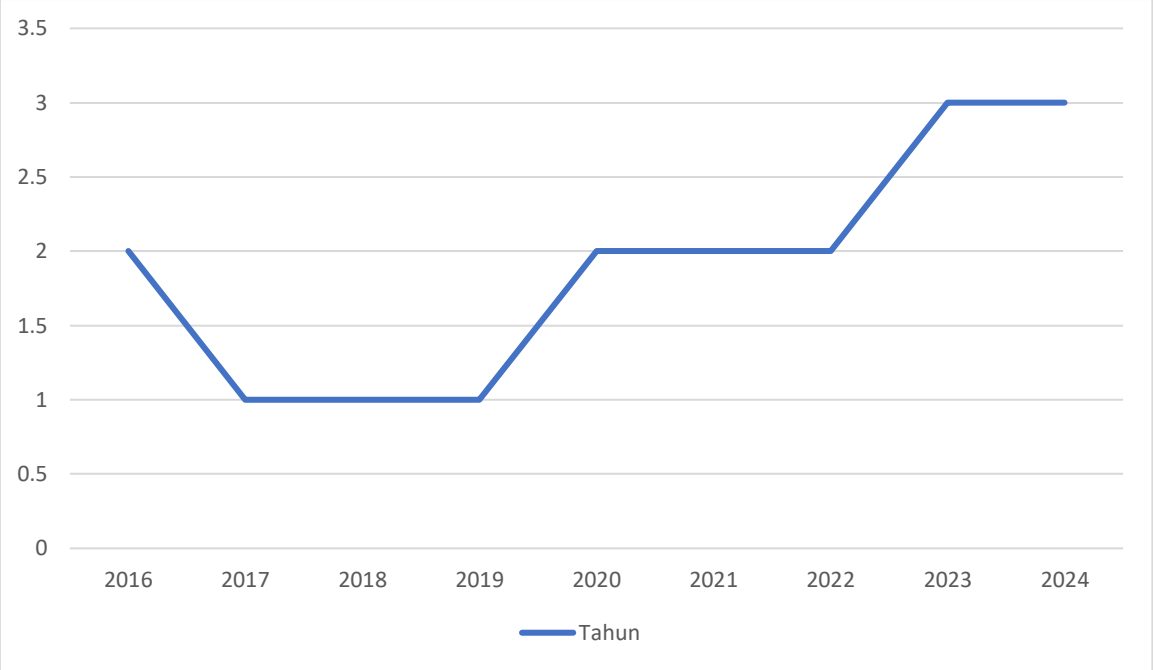

Figure 4. Number of Communication and Diabetes Research in Indonesia (2015-2025)

The object of this study consists of 19 studies in Indonesia containing elements of communication and Diabetes that have been published through Google Scholar from 2015-2025. The beginning of research in Indonesia, conducted with the objective of diabetes research, was in 2016. (Setiyawan, 2016) studied the relationship between communication between health workers and self-care in diabetes patients. This study was conducted at Karanganyar Regional Hospital with a total of 30 respondents, and the data collection technique used was a questionnaire. The results showed that

communication carried out by medical personnel was related to self-care carried out by diabetes patients. Another researcher (Yanti, 2016) studied how the interpersonal communication process is carried out by doctors in motivating diabetes patients at Hasanah Graha Arifah Hospital. The number of research subjects was 6 people, consisting of doctors and patients, with a qualitative case study method. The results showed that the communication process carried out by doctors to motivate patients through 3 stages to motivate patients to survive and live a healthy life was achieved.

In 2017, there was only one study that was the object of research, where the perspective taken was how to design an application for diabetes patients that can be used on smartphones. The results of the study (Widianto 2017) showed that the application used was an audio-visual and data-based educational media that contained how to care for patients, diagnose diabetes patients, and consult doctors interactively. (Listifani & Indrawati, 2024), Conducted a study at Jombang Regional Hospital related to how the therapeutic communication relationship carried out by nurses can have an impact on the dietary compliance of diabetes mellitus patients. The method used was quantitative, with a sample size of 65 people. The results of this study found that when nurses do not have good therapeutic communication, it becomes a problem for nurses and patients, where the care process is not optimal, and patients feel uncomfortable. Therapeutic communication from hospital nurses is said to be good at 55,4% related to dietary compliance in diabetes mellitus patients, as much as 66,2%.

Three studies in 2016 and 2017 specifically examined how communication between health workers, both doctors and nurses, impacted the treatment process for diabetes patients. 2018 was the beginning of new research on communication and diabetes using applications to educate. In 2019, educational media in the form of booklets were created (Andito & Aditya, 2019). The results of this study are one solution to the communication barriers that occur between medical personnel and diabetes patients who continue to experience cognitive decline. The design of the “Cerdas Hadapi Diabetes” booklet aims to monitor the development of diabetes patients, where the contents of this educational booklet are information about diabetes, history of drugs consumed, results of doctor consultations, and pharmacist notes.

(Datak et al., 2020) Three studies in 2016 and 2017 specifically examined how communication between health workers, both doctors and nurses, impacted the treatment process for diabetes patients. 2018 was the beginning of new research on communication and diabetes using applications to educate. In 2019, educational media in the form of booklets were created (Andito & Aditya, 2019). The results of this study are one solution to the communication barriers that occur between medical personnel and diabetes patients who continue to experience cognitive decline. The design of the "Smart Face Diabetes" booklet aims to monitor the development of diabetes patients, where the contents of this educational booklet are information about diabetes, history of drugs consumed, results of doctor consultations, and pharmacist notes.

(Solikhah, Aini, et al. 2021) Conducted research related to how to prevent diabetes through communication and education to the community in Karangjambe Hamlet, Bantul, Yogyakarta. The Focus Group Discussion method was used to generate agreement in the community on efforts to prevent DM by changing diet, and in this area, there were 12.5% of residents who were identified as having symptoms of diabetes, and the majority of hypertension. (Kalidupa & Maria, 2021) Conducted a study that was almost the same as the study in 2016 by Yanti, where their perspective looked at how nurses' therapeutic communication with diabetes mellitus patients. The novelty of Kalidupa and Maria's research was at a different research location, namely at Batu Baptist Hospital, with 37 respondents. The results further strengthen the importance of therapeutic communication carried out by medical personnel, especially nurses, which has an impact on patient motivation to

recover. Respondents said that 81% of therapeutic communication services carried out by nurses were classified as good, having an impact on patients' desire to recover by 76%.

Research related to the relationship between communication between doctors and patients was again conducted (Yulianti et al., 2022) at the Kejaksan Cirebon Health Center. Similar research has been conducted by Yanti (2016) regarding communication between doctors and diabetes patients. In this study conducted in 2022, the novelty of Yulianti's research lies in seeing the relationship between communication between doctors and diabetes mellitus patients related to the level of treatment compliance and the method used, namely the cross-sectional method with a sample size of 89 people. The results of her research also strengthen previous research where the compliance of diabetes patients is related to the method of communication used by doctors.

Research conducted by Pratama (2022) strengthens the role of communication, information, and education in diabetes patients, but in a different health facility location from previous research, namely at the Tegal Health Center. The method used is the same as the previous study, namely, quantitative with primary data through questionnaires. KIE media plays a very important role as a medium of communication and information for diabetes patients related to the therapy period, providing a sense of security for patients and a medium for measuring patient treatment compliance. (Agustina et al., 2022) provide research contribution results that strengthen previous research on the importance of medical personnel having therapeutic communication skills so that health information can be more effectively conveyed to diabetes patients, including in the form of compliance in carrying out diets and treatment processes. The four stages of therapeutic communication mastered by nurses are the pre-interaction stage, interaction, work stage, and termination stage.

After the research on visual communication conducted in 2019, Samudra (2023) again conducted research on designing visual communication to improve knowledge of gestational diabetes in pregnant women. This research focuses on one solution in the form of a visual communication campaign to minimize gestational diabetes that occurs in pregnant women and hurts babies, namely, stillbirth. Another study in 2023 was conducted by (Harahap, 2023), where the results showed that therapeutic communication carried out by the medical team had a significant impact on reducing anxiety experienced by diabetes patients. What is different in this study is that a case study was conducted on one diabetes patient, unlike several previous studies that used quantitative methods with patient samples of more than 30 people. Similar research related to IEC conducted by Pratama (2022) was again conducted by Yolanda (2023) using the pre-experimental method, one-group post-test design. The results of her study strengthen previous research, where the provision of IEC educational media affects patient compliance and the outcome of diabetes mellitus patient therapy.

In 2024, there were four studies examining communication and diabetes. (Rumagit et al., 2024) and Puspinarti et. al (2024) studied how IEC impacts diabetes patients, but both had research objects in two different locations, namely Tonsea Airmadidi Hospital and Bangka Tengah Hospital. The results also reinforce each other, where IEC influences patient knowledge and educates about the nutrition of the food consumed. Supriandi et.al (2024) conducted a study on nurses' interpersonal communication with patient compliance in taking medication, where a study like this has been conducted (Datak et al., 2020), but what is new about this study is the different research locations. The study conducted by Kamila (2024) examined how the relationship between nurses' therapeutic communication and self-efficacy of diabetes patients, where the results showed that 83,3% of respondents said that good therapeutic communication from nurses had an impact on high self-efficacy in patients. This research was conducted at the RSI Garam Kalianget with a correlational analytical research design and a cross-sectional approach.

The Role of Digital Communities in the Diabetes Mellitus Prevention Movement

Over the past 10 years, digital communities have played a role in supporting efforts to treat and prevent diabetes in Indonesia through education, empowerment, and comprehensive social support. Sobat Diabet, for example, a non-profit community established in 2014 has been actively increasing public literacy about diabetes with a focus on the younger generation, using a creative approach through digital campaigns, interactive education, and fun discussion forums in various regions such as Jakarta, Yogyakarta, Semarang, Surabaya, Bali, and Papua. The following is the Instagram page of Sobat Diabet.

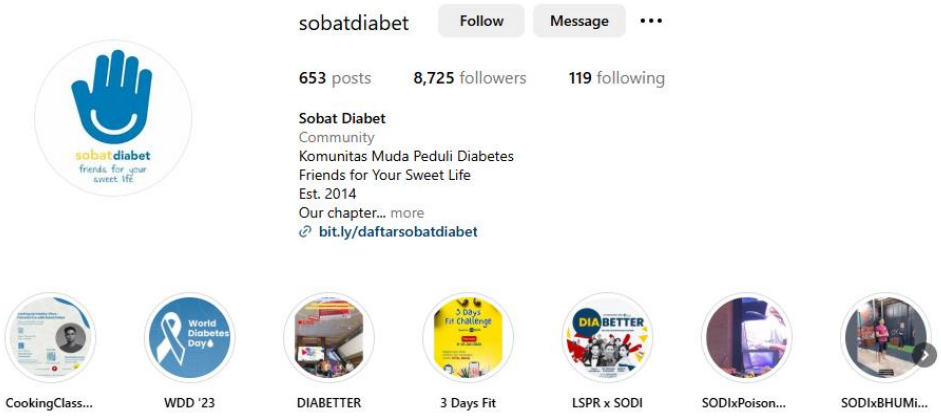

Figure 5. Instagram page @Sobat Diabet

Another Digital Community, PERSADIA (Persatuan Diabetes Indonesia), a national organization established in 1986 and with branches throughout Indonesia, is committed to education, early detection, and improving the quality of life of diabetes sufferers through seminars, training, commemoration of World Diabetes Day, and collaboration with the International Diabetes Federation (IDF) in a global network.

Figure 6. Instagram page @pbpersadia

Blue Circle Diabetes Foundation, although based in India but reaches out to the Indonesian community, also provides a technology-based approach through online workshops, blood sugar tracking applications, and a digital community platform that allows people with type 1 and type 2 diabetes to connect and support each other in managing their health.

Figure 7. Instagram page *@Blue Circle Diabetes Foundation*

In online communities, *Komunitas Diabetes Indonesia* (KDI) is a digital space that brings together thousands of members through a Facebook group, where they share experiences and information on diabetes management, and provide emotional support and motivation, especially for families and diabetes sufferers. Meanwhile, SobatDIA (Sobat Diabetes Indonesia Aktif), which was born from the DIACARE® initiative in Surakarta in 2021, is a pioneer in youth-based education by carrying out digital campaigns, health literacy training, and social actions that reach diabetes sufferers from various groups through cross-sector collaboration with hospitals, educational institutions, and community organizations. The existence of all these communities is a strategic pillar in forming a collaborative ecosystem that supports the national strategy for dealing with diabetes mellitus in Indonesia, by empowering the community to be more aware, responsive, and active in sustainably maintaining health.

The Role of Business Actors in the Diabetes Mellitus Prevention Movement

Various business actors in Indonesia have shown a strong commitment to suppressing the rate of increase in Diabetes Mellitus cases through various initiatives integrated with corporate social responsibility (CSR) programs. One example is PT. Indomining in East Kalimantan, which not only allocates a special budget for diabetes control and is also active in social activities such as counseling and healthy lifestyle campaigns in the company environment. They put up educational posters and hold routine health checks for employees, reflecting the collaboration between the private sector and local government in efforts to control diabetes mellitus in the community. In Cilegon, Banten, Krakatau Posco launched a "Health Improvement" program aimed at fighting diabetes in the local community. This program includes blood sugar checks, exercise, education related to diabetes, and the provision of healthy sugar-free food, which is implemented in collaboration with the Rwandan Health Center. This initiative shows the synergy between the industrial sector and health services in increasing awareness and prevention of diabetes at the community level. In addition, Prudential Indonesia offers a Special Diabetes Program through certain insurance products, such as PRUlink Generasi Baru (PGB) and PRUlink Syariah Generasi Baru (PSGB), with additional insurance Hospital and Surgical Cover Plus (HS Cover Plus) or PRUPrime Healthcare Plus (PPH Plus). This program is designed to reduce the number of deferrals and rejections of insurance applications for customers at risk of increased blood sugar or who already suffer from diabetes mellitus, with certain requirements such as age, duration of diabetes, body mass index, and health check results. These initiatives show that the private sector in Indonesia is increasingly aware of the importance of its role in supporting efforts to prevent and control diabetes mellitus, not only through the provision of health

services and education but also by offering financial protection solutions for individuals who are at risk or already suffer from this disease.

The Role of Digital Media in Indonesia Kompas.com in Diabetes Mellitus Education

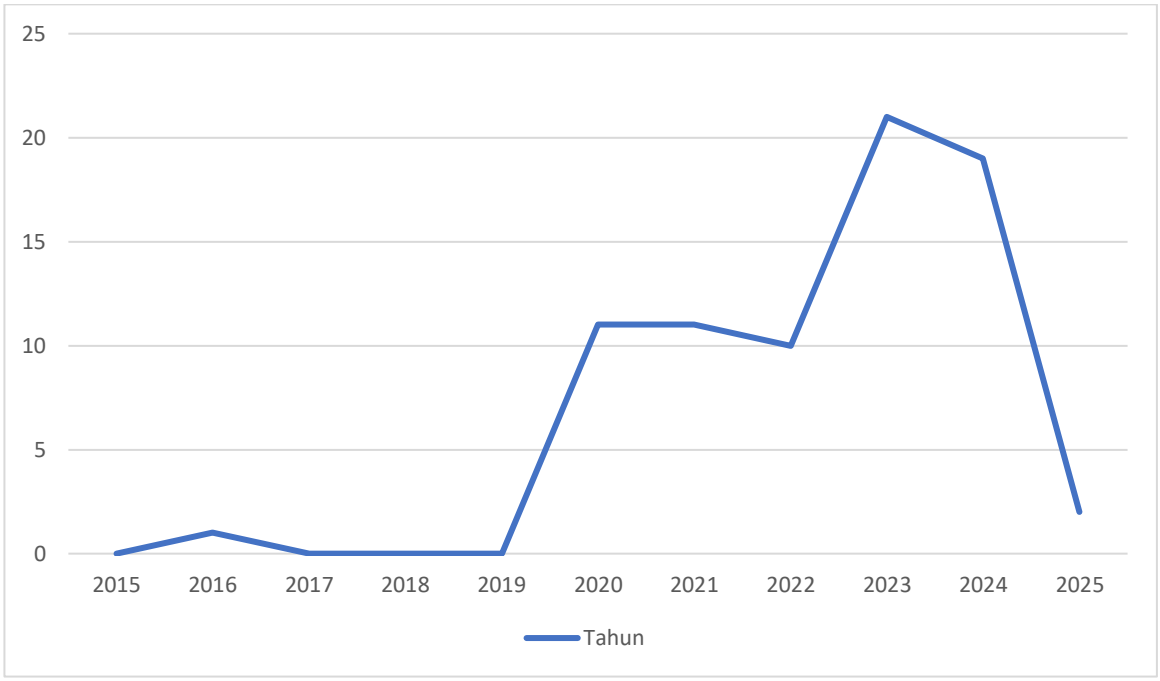

Figure 8. Number of Diabetes Mellitus News Kompas.com

The graph above shows the development of the number of articles or news published by Kompas.com related to education and information about Diabetes Mellitus from 2015 to 2025. It can be seen that from 2015 to 2019, information related to diabetes was very minimal or even non-existent. However, starting in 2020 there was a significant spike in the number of publications, peaking in 2023 with a total of 21 articles.

This increase reflects the increasing media attention to health issues, especially diabetes, which is one of the main health problems in Indonesia. Factors such as the COVID-19 pandemic, which worsens the condition of diabetes sufferers, as well as the increasing cases of diabetes in children, are the main triggers for increased media coverage. Although the number of articles decreased slightly in 2024 and 2025, it can still be seen that public awareness and education through digital media such as Kompas.com have increased significantly compared to the previous decade. This data shows the importance of the role of the media in supporting national health campaigns and disseminating information on the prevention and treatment of chronic diseases such as diabetes.

Create a Discussion

The results of this study indicate that a collaborative approach through the Pentahelix model involving elements of government, academics, business actors, communities, and the media has a significant contribution to reducing the prevalence of Diabetes Mellitus (DM) in Indonesia. This finding not only supports the initial hypothesis that multi-sector involvement can strengthen the control of non-communicable diseases but also enriches the literature by adding a dimension of collaborative practice that has so far been minimally explored in the context of DM control in Indonesia. Within the framework of critical discourse, the Critical Discourse Analysis method is used

to examine how the five elements in the Pentahelix shape the public narrative related to Diabetes. The discourse formed by digital media such as Kompas.com acts as the main channel for shaping public opinion and increasing public awareness. This finding is in line with Foucault's theory of "kuasa-pengetahuan", which states that the production of knowledge (in this case, health information) shapes the power structure in society.

Compared to previous studies that highlighted the role of government and health workers as the main actors in controlling DM, the results of this study broaden understanding by showing that other actors such as business actors (for example, PT. Indomining and Krakatau Posco) and insurance companies (Prudential Indonesia) can play an active role in providing budgets, health services, and special intervention programs. The implementation of the Pentahelix approach also shows results that are contextual to local culture. For example, exercise and education programs by community-based companies show that a participatory approach is more acceptable to local communities than a rigid medical approach. This confirms the results of previous research from WHO (2021) which stated that the effectiveness of health campaigns increases if carried out with a cultural and participatory approach.

However, there are challenges in implementing this model, especially in maintaining consistent coordination between Pentahelix elements. The government as the regulatory authority still faces bureaucratic obstacles, while the media sometimes spreads unverified information (hoaxes about DM drugs), as found in the results of Kompas.com monitoring in 2024. On the other hand, the involvement of academics is still limited to research activities, and not much involved in the preparation of evidence-based intervention strategies. In general, this study provides a new contribution by integrating the Pentahelix approach into the Diabetes Mellitus control strategy and analyzing it through Critical Discourse Analysis. This interpretation provides an alternative perspective on complex and multidimensional public health issues. To strengthen these results, further, more in-depth research is needed, including a quantitative analysis of the effectiveness of programs initiated by each Pentahelix element, as well as a longitudinal study to see the long-term impact of this collaborative approach. Thus, these findings not only provide an implementation framework for policymakers but also open up opportunities for other stakeholders to be more actively involved in overcoming the increasing DM epidemic in Indonesia.

4. Conclusion

This study reveals that controlling Diabetes Mellitus (DM) in Indonesia cannot be done partially but rather requires a cross-sector collaborative approach through the Pentahelix model involving the government, academics, business, media, and society. The main findings show that each actor in the Pentahelix contributes uniquely but complements each other: the government through national regulations and campaigns such as "Prevent, Treat, Fight Diabetes", academics through research and development of intervention strategies, business actors through financing health programs and healthy lifestyle counseling, digital media such as Kompas.com as agents of massive and sustainable information dissemination, and the community as the main actor in changing healthy living behavior. Through Critical Discourse Analysis, this study also highlights the inequality of representation and power in the construction of public discourse on DM, where the dominant discourse is still largely controlled by large institutions, while the role of communities and individuals is often only the object of the campaign, not the active subject. This is an important reflection for the formulation of more participatory and equitable policies.

The discussion points also show that the success of DM campaigns and interventions is largely determined by the sustainability of collaboration between actors, the accuracy of public communication strategies, and the integration of data and information technology in the health service system. In addition, the use of digital media has proven significant in shaping collective public awareness, with an increase in the volume and variety of educational content from year to year. The scientific contribution of this study lies in the integration of the Pentahelix approach with critical discourse analysis, which provides a theoretical and practical basis for the development of public health policies based on collaboration and critical literacy. This study shows how important cross-sector collaboration is in dealing with non-communicable diseases such as diabetes. In addition, this study also encourages prevention and treatment efforts that are more flexible, equitable, and can reach all levels of society, especially amidst today's increasingly complex health challenges.

Suggestions for further research are to conduct a deeper exploration of the effectiveness of public communication in social media-based Diabetes Mellitus campaigns, as well as to build a community empowerment model based on local data that considers the socioeconomic, cultural, and geographical conditions of each region. This aims to make Diabetes Mellitus management strategies more contextual and not only national. This research can involve cross-sector collaboration, especially with local health institutions and civil society organizations to support the decentralization of diabetes prevention and management policies at the regional level.

5. Acknowledgement

The author would like to express his deepest appreciation and gratitude to the beloved campus of Dian Nuswantoro University which has provided space, support, and opportunities for its students to develop, hone their potential, and build academic capacity independently. This research did not receive external funding support, but all parties involved have contributed with their respective capacities and professionalism so that this work can be completed properly. Hopefully, this article can provide scientific contributions in the field of public health communication, especially in controlling Diabetes Mellitus in Indonesia within a broader and more sustainable digital media scope.

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