



Diabetes Mellitus Management Model in Bojonegoro District: A Literature Review

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ABSTRACT

Diabetes Mellitus (DM) is a non-communicable disease with a steadily increasing prevalence in Indonesia, including in Bojonegoro Regency. DM management requires a comprehensive and sustainable model to prevent complications and improve patients' quality of life. To analyze the Diabetes Mellitus management model in Bojonegoro Regency based on existing literature and policies, and to identify factors influencing its effectiveness. This literature review used a systematic approach by analyzing scientific publications, government reports, and policy documents from 2020-2025. The literature search focused on DM management models at the community health center (Puskesmas), hospital, and community levels. The DM management model in Bojonegoro Regency adopts a five-pillar diabetes approach, encompassing education, dietary management, exercise, stress management, and drug therapy. The Chronic Disease Management Program (PROLANIS) serves as the backbone of DM management at the community health center level, with support from Sosodoro Djatikoesoemo Regional General Hospital (RSUD) as the referral hospital. The DM management model in Bojonegoro Regency shows integration between primary and secondary services with an emphasis on community empowerment, although it still faces challenges in terms of patient compliance and service accessibility.

Keywords: diabetes mellitus, five pillars of diabetes, treatment model

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BACKGROUND

Diabetes Mellitus (DM) is a non-communicable disease (NCD) with a steadily increasing prevalence globally, including in Indonesia. According to the International Diabetes Federation (IDF), the prevalence of diabetes in Indonesia reached 6.2% in 2021 and is projected to increase to 7.2% by 2045. This situation highlights the urgency of developing effective and sustainable management models.

Bojonegoro Regency, as a regency in East Java, faces similar challenges in managing diabetes. Its geographic and demographic characteristics, consisting of both rural and urban areas, demand an adaptive approach to implementing diabetes management programs. The complexity of diabetes, which requires long-term, multidisciplinary management, necessitates an integrated and sustainable management model.

An effective diabetes management model must encompass preventive, promotive, curative, and rehabilitative aspects. This approach focuses not only on controlling blood glucose levels but also on preventing complications, improving patients' quality of life, and empowering communities in self-management. In Indonesia, the Chronic Disease



Management (PROLANIS) program has been implemented since 2010 as the main strategy in managing DM and hypertension at the primary health care level.

Bojonegoro Regency has developed a diabetes management model that integrates services at Sosodoro Djatikoesoemo Regional General Hospital (RSUD) as a referral hospital with a network of community health centers (Puskesmas) throughout the regency. This model also utilizes local communication media, such as Malowopati FM radio, to educate the public about diabetes and its management.

This literature review aims to analyze the diabetes management model in Bojonegoro Regency based on available evidence, identify the strengths and weaknesses of existing models, and provide recommendations for developing more effective management models in the future.

METHODS

This literature review uses a systematic approach by searching for and analyzing scientific publications, government reports, and policy documents related to diabetes mellitus management, specifically in Bojonegoro Regency. The literature search was conducted using the keywords "Diabetes Mellitus," "management model," "Bojonegoro Regency," "PROLANIS," "diabetes management," and "Indonesia."

The inclusion criteria were: (1) publications within the 2020-2025 timeframe, (2) relevance to the theme of diabetes management in Indonesia or specifically Bojonegoro Regency, (3) availability in Indonesian or English, and (4) accessibility online through academic databases or credible government sources.

The databases used included PubMed, ResearchGate, Google Scholar, and the official website of the Bojonegoro Regency Government. The analysis was conducted by identifying key themes, the management model implemented, and factors influencing program effectiveness.

RESULTS

Prevalence and Characteristics of Diabetes Mellitus in Bojonegoro Regency: Diabetes mellitus in Bojonegoro Regency shows a pattern similar to the national trend. Based on data from the Dander Community Health Center, most DM patients who come for treatment already experience complications, which occur due to non-compliance with the DM diet, skipping regular health check-ups due to reluctance to queue, and patients' ignorance of the need to take their medication regularly.

The characteristics of DM patients in Bojonegoro Regency are similar to the national profile, with the majority of patients being aged 40 and over with complex risk factors. According to Dr. Megawati from Sosodoro Djatikoesoemo Regional Hospital, diabetes is a condition where blood sugar levels rise above normal, usually over a long period of time or chronically, due to insulin resistance or failure of the insulin-producing pancreas.

Diabetes Mellitus Management Model in Indonesia and Its Implementation

Diabetes Mellitus Management Model in Indonesia and Its Implementation

1. Chronic Disease Management Program (PROLANIS)

Since 2010, the Indonesian government has initiated a chronic disease management program called PROLANIS (Chronic Disease Control Program), targeting diabetes and hypertension. This program continued with the initial implementation of universal health coverage (UHC) in 2014. PROLANIS is a chronic disease management program that aims to:

- a) Prevent disease complications
- b) Improve participants' quality of life



- c) Reduce healthcare costs
- d) Increase participant satisfaction

The implementation of the preventive program for diabetes mellitus (PROLANIS) in Indonesian community health centers (Puskesmas) demonstrates the importance of a qualitative approach in program evaluation. This program involves various components such as medical consultations, group education, reminders, home visits, and health clubs.

2. Community-Based Approach

Strengthening primary health care by integrating health and community-based interventions is crucial for improving health outcomes. Systematic reviews demonstrate the effectiveness of community-based interventions in improving health outcomes for patients with type 2 diabetes.

This community-based model includes:

- a) Community empowerment in diabetes management
- b) Ongoing education about healthy lifestyles
- c) Integrated referral systems
- d) Community-based monitoring and evaluation

Diabetes Mellitus Management Model in Bojonegoro Regency

1. Five Pillars of Diabetes Management

Based on the educational program delivered by Sosodoro Djatikoesoemo Regional Hospital via Malowopati FM radio, there are five pillars of diabetes management implemented in Bojonegoro Regency: diet or managing eating patterns, exercising at least 150 minutes per week, blood sugar control, stress management, and drug therapy.

a) Health Education and Promotion

The management model in Bojonegoro Regency utilizes local communication media to educate the public. The SAPA! program on Malowopati 95.8 FM is used as a talk show with the theme "Manage Diabetes, Prosper Your Life," hosted by a local broadcaster featuring specialist doctors from Sosodoro Djatikoesoemo Regional Hospital.

This approach has the following advantages:

- 1) Extensive reach throughout Bojonegoro Regency
- 2) Use of local languages easily understood by the community
- 3) Interactivity through radio programs
- 4) Continuity of education through regular programs

b) Diet Management

DM management consists of four pillars: education or counseling, meal planning, pharmacological intervention, and exercise. Counseling with these four pillars for DM patients has been shown to reduce blood sugar levels.

The diet program in Bojonegoro Regency includes:

- 1) Education about complex and simple carbohydrates
- 2) Portion management and meal frequency
- 3) Individual and group nutrition counseling
- 4) Specific recommendations for those aged 40 and over on a low-carbohydrate diet

c) Exercise and Physical Activity Program

The recommendation for a minimum of 150 minutes of exercise per week is an integral part of the five pillars of diabetes management in Bojonegoro Regency. This program includes:



- 1) Community-level diabetes exercise
 - 2) Walking clubs for diabetes patients
 - 3) Education on appropriate types and intensity of exercise
 - 4) Physical activity monitoring through health workers
 - d) Blood Sugar Monitoring and Control

The monitoring program includes recommendations that healthy individuals should have their blood sugar checked at least once a year, and those at risk for high blood sugar should have their blood sugar checked every three to six months.

The monitoring system includes:

 - 1) Routine blood sugar checks at the community health center
 - 2) Home monitoring with a glucometer
 - 3) Recording and reporting of test results
 - 4) Referrals to specialists if necessary
 - e) Stress Management and Psychosocial Support

Stress management is an important component of diabetes management in Bojonegoro Regency through:

 - 1) Individual and group counseling
 - 2) Support groups for fellow diabetes sufferers
 - 3) Family education about psychosocial support
 - 4) Integration with mental health programs
2. Integration of Primary and Secondary Services

The treatment model in Bojonegoro Regency integrates services between community health centers (Puskesmas) as gatekeepers and Sosodoro Djatikoesoemo Regional General Hospital (RSUD) as a referral hospital. A comparison of the management of diabetes mellitus patients in Indonesia between tertiary hospitals and primary healthcare facilities demonstrates the importance of service integration.

This referral system includes:

 - a) Clear referral protocols
 - b) A communication system between healthcare facilities
 - c) Back-referrals for follow-up at community health centers
 - d) A shared care model between general practitioners and specialists
3. Empowerment of Cadres and Communities

Community empowerment programs in Bojonegoro Regency include:

 - a) Training health cadres on early detection of diabetes
 - b) Integrated PTM Development Post (Posbindu) Program
 - c) Family education on diabetes patient care
 - d) Establishment of peer support groups

Challenges in Implementing the Handling Model

1. Patient Compliance

Factors influencing complications in diabetes patients at the Dander Community Health Center in Bojonegoro Regency include non-compliance with the diabetes diet, skipping regular health check-ups due to reluctance to queue, and patients' lack of awareness of the importance of taking their medications regularly.

Efforts to improve compliance include:

- a. Ongoing education about the consequences of non-compliance
- b. Reminder systems via SMS or mobile applications
- c. Motivational and behavior change counseling



- d. Family involvement in the treatment process
2. Service Accessibility
Challenges to accessibility in Bojonegoro Regency include:
 - a. Geographical distance to health facilities
 - b. Limited transportation in rural areas
 - c. Long queues at health facilities
 - d. Limited service hours
3. Health Resources
Resource limitations include:
 - a. Ratio of health workers to population
 - b. Availability of antidiabetic medications
 - c. Laboratory testing facilities
 - d. Blood sugar monitoring equipment

Impact and Effectiveness of the Program

The direct medical costs of type 2 diabetes and its complications in Indonesia demonstrate the importance of effective prevention and management programs from a payer perspective. The comprehensive management model in Bojonegoro Regency has the potential to:

1. Reduce Healthcare Costs
Prevention of complications through good management can reduce long-term treatment costs.
2. Improve Quality of Life
Education and psychosocial support programs help patients better manage their disease.
3. Reduce Complication Rates
Routine monitoring and integrated management can prevent or delay the onset of diabetes complications.

DISCUSSION

Innovation in Handling Models

1. Utilization of Local Media
The SAPA! Malowopati FM program is an innovation in utilizing local media for diabetes education, demonstrating the adaptation of the management model to the local context of Bojonegoro Regency.
2. Integration with Other Programs
The diabetes management model in Bojonegoro Regency is integrated with other health programs, such as:
 - a. The Non-Communicable Diseases Control Program
 - b. The Healthy Living Community Movement (GERMAS) Program
 - c. The Healthy Indonesia Program with a Family Approach (PIS-PK)
3. Use of Technology
Although still limited, there are efforts to utilize technology in diabetes management:
 - a. Health information systems for monitoring
 - b. Telemedicine for remote consultations
 - c. Mobile applications for education and reminders
4. Comparison with International Models
The DM management model in Bojonegoro Regency shares similarities with international best practices in the following areas:



- a. Chronic Care Model: Focuses on proactive care, self-management support, and an organized delivery system.
 - b. Team-based Care: Involves various healthcare professionals in patient management.
 - c. Patient-centered Care: Emphasizes active patient participation in disease management.
 - d. Population Health Approach: Focuses on population-level prevention through health promotion programs.
5. Success Factors

Based on literature analysis, factors contributing to the success of the DM management model in Bojonegoro Regency include:

- a. Local Government Commitment
Policy support and budget allocation for the NCD program.
- b. Cross-Sectoral Collaboration
Involvement of various stakeholders, including local media and the community.
- c. Adaptation to the Local Context
The program is tailored to the socio-cultural characteristics of the Bojonegoro community.
- d. Program Continuity
Sustainable program implementation with regular monitoring and evaluation.
- e. Resource Capacity
Increasing the capacity of health workers through training and development.

CONCLUSION

1. The Diabetes Mellitus management model in Bojonegoro Regency has adopted a comprehensive approach by integrating five pillars of diabetes management: education, diet, exercise, stress management, and drug therapy. This program is supported by an integrated service system between community health centers (Puskesmas) and Sosodoro Djatikoesoemo Regional General Hospital (RSUD), as well as innovation in utilizing local media for public education.
2. The success of this model lies in its holistic and adaptive approach to the local context, but it still faces challenges in terms of patient compliance, service accessibility, and resource limitations. The PROLANIS program, as the backbone of DM management at the primary level, has demonstrated a positive impact on chronic disease management, although it requires continuous evaluation and improvement.
3. The implementation of the five pillars of diabetes, supported by a robust referral system and education programs through local media, is a key strength of the management model in Bojonegoro Regency. However, further innovation in the use of technology, strengthening health information systems, and increasing service accessibility is needed to achieve optimal results.
4. The DM management model in Bojonegoro Regency can serve as an example for other regions in developing an integrated, community-based approach. Long-term success requires sustained commitment from the local government, active community participation, and regular program evaluation for continuous improvement.
5. This management model needs to be continuously developed, taking into account advances in health technology, changes in disease epidemiology, and socioeconomic



dynamics. Integration with other health programs and strengthening cross-sector partnerships will be key to achieving the goal of effective and sustainable DM control in Bojonegoro Regency.

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