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## Community Service Activities - Counseling And Random Blood Sugar Screening (Type 2 Diabetes Mellitus)

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**Keywords:** *Diabetes Mellitus; Community Service; Early Detection*

**Abstract:** *Diabetes mellitus is a chronic disease characterized by elevated blood sugar levels as a result of impaired insulin metabolism. Uncontrolled type 2 diabetes mellitus can result in significant complications. The purpose of the community service activities is to increase the community's knowledge, awareness, and ability to prevent, detect, and manage diabetes mellitus. This activity requires collaboration between the local community, the community service team, and medical personnel. First, the public is counseled about diabetes mellitus using effective and easy-to-understand communication methods. In addition, individuals who are at a high risk or have prediabetes are identified through early screening procedures. In addition, community service activities include providing assistance and guidance to people with diabetes mellitus. During community service activities, the effectiveness of counseling and early screening was also evaluated and monitored. This activity is anticipated to provide long-term benefits to efforts to prevent and manage diabetes mellitus in the community by utilizing a holistic approach and involving active community participation.*

## INTRODUCTION

Prediabetes is a condition in which a person's blood glucose level is elevated but does not satisfy the diagnostic criteria for diabetes mellitus (DM). Typically, fasting blood glucose levels are less than 140 mg/dL. Regarding diabetes, fasting glucose levels are 126 mg/dL, and glucose levels two hours after a meal are 200 mg/dL. Therefore, prediabetes rests between these two conditions, namely 100-125 mg/dL (Fasting Blood Glucose) and 140-199 mg/dL 2 hours after a load.<sup>1</sup>

According to Singh et al. (2012), prediabetes can progress to type 2 diabetes in 25% of instances. 2.50% continue to have prediabetes, while 25% revert to normal blood glucose levels. Diabetes is not the only global cause of premature mortality.<sup>2</sup> This disease is a leading cause of blindness, cardiovascular disease, and renal failure. The International Diabetes Federation (IDF) estimates that at least 463 million people aged 20-79 will have diabetes in 2019, which corresponds to the prevalence rate of diabetes in 2019, which is 9% for women and 9.65% for men. The prevalence of diabetes is estimated to increase with population age to 19.9%, or 111,2 million persons aged 65-79 years, as the population ages. It is anticipated that the population will continue to rise until it reaches 578 million in 2300 and 700 million in 2045.<sup>3</sup>

Diabetes mellitus is a chronic disorder characterized by elevated blood sugar levels. If not properly managed, diabetes can result in severe complications. It is essential to effectively manage diabetes by controlling blood sugar levels, maintaining a healthy weight, adhering to a balanced diet, engaging in regular physical activity, and managing other risk factors. Education and early blood sugar screening play a crucial role in the prevention and treatment of diabetes. Here are a few reasons why education and early blood sugar monitoring are crucial:<sup>4</sup>

1. Early Detection: Early screening of blood sugar permits early detection of prediabetes or diabetes prior to the onset of severe symptoms. By recognizing this condition early, preventative and management measures can be taken to forestall disease progression and potential complications.
2. Individuals can learn about risk factors, healthful lifestyles, and the signs and symptoms of diabetes through education. With this knowledge, they can implement healthy lifestyle changes such as eating a well-balanced diet, engaging in regular physical activity,

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<sup>1</sup> Nidhi Bansal, "Prediabetes Diagnosis and Treatment: A Review," *World journal of diabetes* 6, no. 2 (2015): 296.

<sup>2</sup> Kavita Singh et al., "An Evidence Map of Systematic Reviews to Inform Interventions in Prediabetes," *Canadian Journal of Diabetes* 36, no. 5 (2012): 281-291; Sanjeev Rastogi et al., "Predicting and Preventing Diabetes: Translational Potential of Ayurveda Information on Pre-Diabetes," *Journal of Ayurveda and Integrative Medicine* 12, no. 4 (2021): 733-738.

<sup>3</sup> Iche Andriyani Liberty, "Hubungan Obesitas Dengan Kejadian Prediabetes Pada Wanita Usia Produktif," *Jurnal Kedokteran dan Kesehatan: Publikasi Ilmiah Fakultas Kedokteran Universitas Sriwijaya* 3, no. 2 (2016): 108-113.

<sup>4</sup> Citra Windani Mambang Sari and Ahmad Yamin, "Edukasi Berbasis Masyarakat Untuk Deteksi Dini Diabetes Melitus Tipe 2," *Media Karya Kesehatan* 1, no. 1 (2018); Aris Widiyanto et al., "Pengabdian Masyarakat Pendidikan Kesehatan Tentang Manfaat Senam Diabetes Pada Lansia Di Desa Garangan, Wonosamodro, Boyolali," *Buletin Abdi Masyarakat* 2, no. 2 (2022).

managing stress, and maintaining a healthy weight. Prevention is preferable to treatment once diabetes has already developed.

3. Education also assists individuals who have already been diagnosed with diabetes in understanding their condition and managing their blood sugar more effectively. They can learn about blood sugar measurement, proper nutrition, medication management, and the significance of physical activity. Education also improves adherence to prescribed medications and treatments.
4. Diabetes uncontrolled can lead to severe complications such as heart disease, kidney damage, nerve damage, and vision issues. It is possible to reduce or postpone the occurrence of these complications through early detection and proper management.
5. Education and early screening of blood sugar are important not only for individuals who are at high risk or already have symptoms, but also to make the public aware of the significance of maintaining healthy blood sugar levels. The greater the number of people who are aware of the risks of diabetes and who adopt a healthy lifestyle, the greater the likelihood of preventing and reducing the incidence of diabetes.

On the basis of the preceding information, we conducted activities at Kalam Kudus II High School Jakarta involving employees of the Kalam Kudus Jakarta Foundation consisting of counseling and early blood sugar screening during the productive years.

## **METHOD**

Counseling and early blood sugar screening entail multiple techniques and phases. The following are examples of typical counseling and early blood sugar screening procedures and stages:

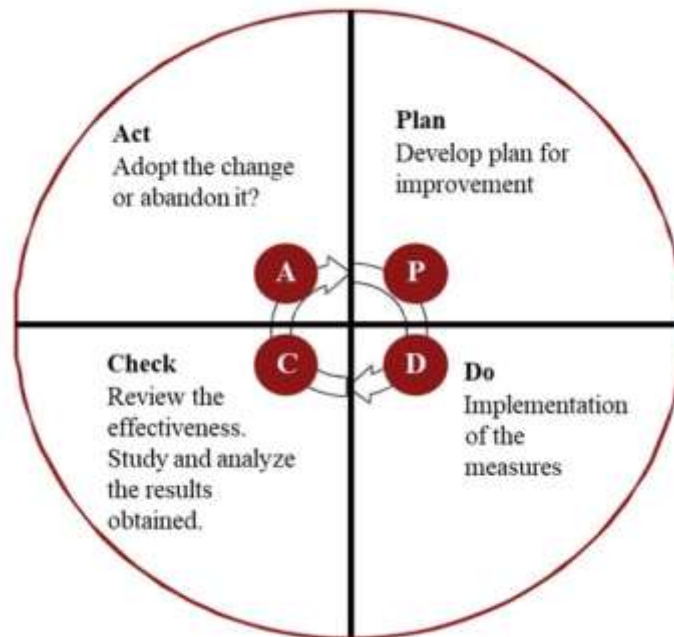
Counseling Technique:

1. Counseling can be accomplished through presentations and lectures conducted by medical personnel or health professionals. They will offer information regarding diabetes, risk factors, symptoms, treatment, and prevention. Typically, these presentations include visual elements such as PowerPoint slides, graphs, and photographs.
2. Discussion and Questions: Following the presentation, a discussion and question-and-answer session may be conducted to allow participants to ask questions and share their experiences. This discussion can enhance participants' comprehension and clear up any questions or confusion they may have.
3. Reading materials or written educational materials can be provided to participants following counseling. This material may include essential information regarding diabetes, healthful eating, physical activity, blood sugar measurement, and management steps.
4. Phases of Initial Blood Sugar Testing:
5. Identification of Target Groups: The first step is to identify the population groups that will be screened, such as the productive age group or groups with specific risk factors, such as

obesity or a family history of diabetes.

6. Participants in the screening process will be asked to complete a form or questionnaire containing information about their medical history, current symptoms, and risk factors. This information aids in risk assessment and the selection of participants who require additional testing.
7. Blood Sugar Measurement: Certain participants will undergo a blood sugar measurement. Blood glucose measurement during fasting or random blood glucose measurement is the most common method. This test can be performed with a glucometer or by submitting a blood sample to a lab for analysis.
8. The results of the blood sugar test will be interpreted in accordance with the established normal limits. Participants with results indicating elevated blood sugar or indications of prediabetes will be provided with additional information regarding the appropriate course of action.
9. Counseling and Referral: Participants with suspicious results or a high diabetes risk will receive counseling from medical professionals or nutritionists. They will provide participants with information on diabetes management and lifestyle modifications, as well as direct them to additional medical or specialist services as needed.

During community service activities, the effectiveness of counseling and early screening was also evaluated and monitored. Community and participant feedback becomes evaluation material for the improvement and development of more effective and pertinent activities.



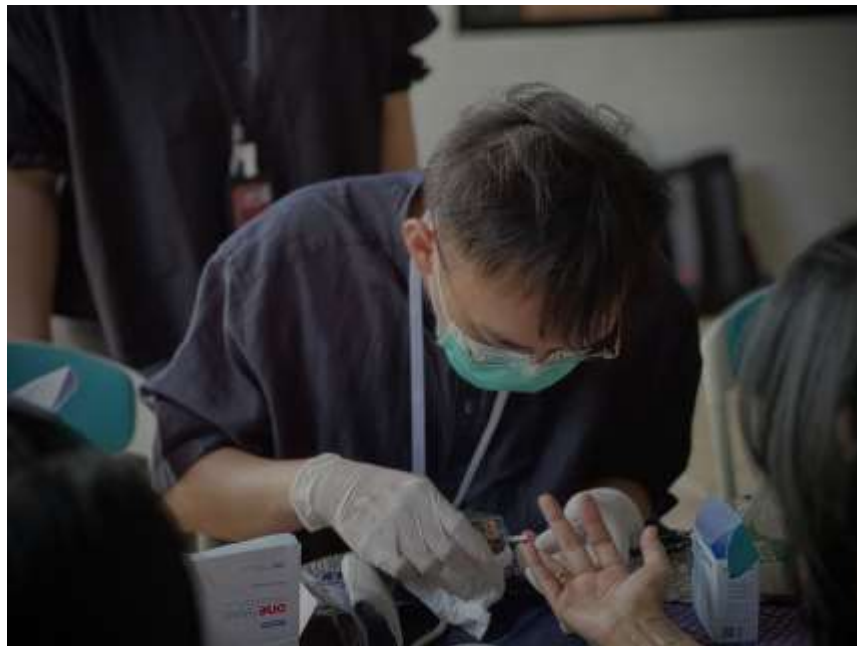
**Figure 1. Plan, Do, Check, and Act Diagram**

## RESULT

This Community Service Activity involved 72 participants with 20 men and 52 women. All respondents were given counseling through counseling and random blood sugar was checked at the time. The results of all activities are described in table 1 and photos of activities are illustrated in Figures 2-3

**Table 1. Basic Data of Participants**

Parameter	N (%)	Mean (SD)	Med (Min – Max)
Age (years)		38,94 (13,18)	37 (19 – 60)
Gender			
• Male	20 (27,8%)		
• Female	52 (72,2%)		
Random Blood Sugar		116,14 (56,9)	97,5 (81 – 414)
• RBS < 200 mg/dL	69 (95,8%)		
• RBS ≥ 200 mg/dL	3 (4,2%)		



**Figure 2. Random Blood Sugar Screening Process**



**Figure 3. Individual counseling as a follow-up to examination results**

## DISCUSSION

Diabetes mellitus is a chronic disease characterized by elevated blood sugar levels as a result of impaired insulin metabolism. Insulin is a hormone produced by the pancreas that regulates blood glucose levels. In diabetes mellitus, the body is unable to effectively produce or utilize insulin; consequently, blood sugar cannot infiltrate cells and remains elevated in the blood.<sup>5</sup>

Depending on the form, the causes of diabetes can differ. Damage to the pancreatic cells that produce insulin causes the body to produce insufficient insulin, resulting in type 1 diabetes. Among the risk factors for type 1 diabetes are genetic and environmental factors that initiate an autoimmune response.<sup>6</sup>

The most prevalent form of diabetes, type 2, is typically caused by a combination of genetic and harmful lifestyle factors. Obesity, an unhealthy diet (specifically high in fat and sugar), physical inactivity, advanced age, a family history of diabetes, hypertension, a history of gestational diabetes in women, and certain ethnicities, including Asian, African, and Hispanic, are

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<sup>5</sup> Ralph A DeFronzo et al., "Type 2 Diabetes Mellitus," *Nature reviews Disease primers* 1, no. 1 (2015): 1–22; Rajeev Goyal and Ishwarlal Jialal, "Diabetes Mellitus Type 2" (2018).

<sup>6</sup> DeFronzo et al., "Type 2 Diabetes Mellitus"; Goyal and Jialal, "Diabetes Mellitus Type 2."

risk factors for type 2 diabetes.<sup>7</sup>

In addition, there is gestational diabetes, which occurs in pregnant women. Gestational diabetes is caused by hormonal changes that influence insulin action during pregnancy. Gestational diabetes risk factors include being overweight before pregnancy, having a family history of diabetes, being older than 25 years, and having had gestational diabetes in a previous pregnancy.

Uncontrolled type 2 diabetes mellitus can result in significant complications. This condition can affect various organs and body systems, diminishing quality of life and increasing mortality risk. The following are some severe complications that can result from type 2 diabetes:<sup>8</sup>

1. Heart and Blood Vessel Conditions Type 2 diabetes increases the risk of coronary heart disease, heart attack, peripheral arterial disease, and stroke. High blood sugar and chronic inflammation caused by diabetes can damage blood vessel walls and contribute to atherosclerosis, which can obstruct blood flow and cause blockages.
2. Injury to the Kidneys (Diabetic Nephropathy): Type 2 diabetes can cause injury to the blood vessels in the kidneys, leading to diabetic nephropathy. This condition can cause progressive renal damage and ultimately kidney failure. Dialysis or a kidney transplant may be required if left untreated.
3. Impaired vision (Diabetic Retinopathy): Type 2 diabetes can cause diabetic retinopathy by damaging the blood vessels in the retina of the eye. These complications can result in vision loss, blindness, and eye conditions like cataracts and glaucoma.
4. Nerve Damage (Neuropathy) Type 2 diabetes can result in nerve damage (neuropathy) that impacts multiple body parts. Especially in the feet and hands, diabetic neuropathy can result in tingling, pain, paralysis, and loss of sensation. Also possible are disorders of the autonomic nervous system, which can impact the functioning of the cardiovascular, digestive, and other nervous systems.
5. Wounds and Infections Diabetes type 2 can impair the body's ability to heal wounds correctly. Difficult-to-heal wounds on the feet or legs can develop into diabetic ulcers, which carry a high risk of infection. Diabetes makes it easier for the infection to spread throughout the body and can lead to severe complications such as cellulitis, osteomyelitis, and sepsis.
6. Problems During Pregnancy: Women with type 2 diabetes who become pregnant have an increased risk of pregnancy complications, such as gestational diabetes, preeclampsia, premature delivery, high birth weight, and infant health problems.

Understanding the meaning of diabetes mellitus, its causes, and its risk factors is crucial for raising public awareness of this condition. With this knowledge, it is possible to reduce the risk

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<sup>7</sup> DeFronzo et al., "Type 2 Diabetes Mellitus"; Goyal and Jialal, "Diabetes Mellitus Type 2."

<sup>8</sup> Mark Stolar, "Glycemic Control and Complications in Type 2 Diabetes Mellitus," *The American journal of medicine* 123, no. 3 (2010): S3–S11.

of developing diabetes mellitus and its complications through preventative and management measures.

Counseling and early detection of diabetes mellitus are crucial to the maintenance of public health. Education about diabetes mellitus is crucial for increasing public awareness and comprehension of this disease. Individuals can learn about the risk factors, symptoms, potential complications, and necessary preventative and management measures through counseling.

In addition, early detection is crucial because uncontrolled diabetes can result in severe complications. Diabetes can increase the risk of heart disease, kidney damage, vision problems, nerve damage, difficult-to-heal wounds, and other health issues if it is not properly diagnosed or managed. With early detection and appropriate management, the risk of complications can be reduced or delayed.

Education and early detection are crucial for reducing the global burden of diabetes. By increasing awareness, education, and early detection, more individuals can adopt a healthy lifestyle, prevent or properly manage diabetes mellitus, and reduce the incidence of diabetes and its complications in the general population.

To enhance the efficacy of education and early detection, it is essential to involve trained medical personnel, health professionals, and health organizations in the development of comprehensive education programs and efficient early screening. In addition, collaboration with communities, non-governmental organizations, and the private sector can expand this program's reach and make it more accessible to those in need.

## CONCLUSION

Education and screening play a significant role in the prevention, early detection, and management of diabetes mellitus. Individuals can acquire a greater understanding of diabetes, risk factors, symptoms, and the necessary management steps through counseling. Counseling also raises public awareness regarding the significance of a healthy lifestyle, dietary modifications, physical activity, and blood sugar monitoring.

Diabetes mellitus early screening identifies individuals at high risk or with prediabetes prior to the onset of severe symptoms. Early detection allows for the initiation of preventative and management measures, such as adopting a healthy lifestyle, monitoring blood sugar, and receiving appropriate medical treatment. In addition to reducing the risk of severe complications such as heart disease, kidney damage, vision problems, nerve damage, and difficult-to-heal wounds, early detection permits more effective treatment.

Overall, diabetes mellitus education and early screening are essential for increasing awareness, prevention, early detection, and management of this condition. By involving individuals, communities, medical personnel, and health organizations, these efforts can help reduce the incidence of diabetes, enhance the quality of life for individuals, and lessen the burden of diabetes-related complications.



## REFERENCE

- Bansal, Nidhi. "Prediabetes Diagnosis and Treatment: A Review." *World journal of diabetes* 6, no. 2 (2015): 296.
- DeFronzo, Ralph A, Ele Ferrannini, Leif Groop, Robert R Henry, William H Herman, Jens Juul Holst, Frank B Hu, C Ronald Kahn, Itamar Raz, and Gerald I Shulman. "Type 2 Diabetes Mellitus." *Nature reviews Disease primers* 1, no. 1 (2015): 1–22.
- Goyal, Rajeev, and Ishwarlal Jialal. "Diabetes Mellitus Type 2" (2018).
- Liberty, Iche Andriyani. "Hubungan Obesitas Dengan Kejadian Prediabetes Pada Wanita Usia Produktif." *Jurnal Kedokteran dan Kesehatan: Publikasi Ilmiah Fakultas Kedokteran Universitas Sriwijaya* 3, no. 2 (2016): 108–113.
- Nguyen, Vi, Nam Nguyen, Bastian Schumacher, and Thanh Tran. "Practical Application of Plan–Do–Check–Act Cycle for Quality Improvement of Sustainable Packaging: A Case Study." *Applied Sciences* 10, no. 18 (September 11, 2020): 6332. <https://www.mdpi.com/2076-3417/10/18/6332>.
- Rastogi, Sanjeev, Neelendra Singh, Manish Gutch, and Arindam Bhattacharya. "Predicting and Preventing Diabetes: Translational Potential of Ayurveda Information on Pre-Diabetes." *Journal of Ayurveda and Integrative Medicine* 12, no. 4 (2021): 733–738.
- Sari, Citra Windani Mambang, and Ahmad Yamin. "Edukasi Berbasis Masyarakat Untuk Deteksi Dini Diabetes Melitus Tipe 2." *Media Karya Kesehatan* 1, no. 1 (2018).
- Singh, Kavita, Mohammed Ansari, James Galipeau, Chantelle Garritty, Erin Keely, Janine Malcolm, Mistrel Pratt, Becky Skidmore, and Alexander Sorisky. "An Evidence Map of Systematic Reviews to Inform Interventions in Prediabetes." *Canadian Journal of Diabetes* 36, no. 5 (2012): 281–291.
- Stolar, Mark. "Glycemic Control and Complications in Type 2 Diabetes Mellitus." *The American journal of medicine* 123, no. 3 (2010): S3–S11.
- Widiyanto, Aris, Atik Setiawan Wahyu, Ahmad Syauqi Mubarak, Muhtar Ludfi Anshori, Lutfi Mukhofi, Krisnanda Aditya Pradana, and Joko Tri Atmojo. "Pengabdian Masyarakat Pendidikan Kesehatan Tentang Manfaat Senam Diabetes Pada Lansia Di Desa Garangan, Wonosamodro, Boyolali." *Buletin Abdi Masyarakat* 2, no. 2 (2022).