



Impact Of IEC On The Association Between Socio-Demographic Factors And Knowledge Regarding Type II Diabetes Mellitus Prevention In A Rural Population Of Kathua, Jammu & Kashmir

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Abstract

Background: Type II Diabetes Mellitus (T2DM) remains a significant public health issue, especially in rural regions where awareness of preventive measures is often inadequate. Socio-demographic factors play a crucial role in determining individuals' knowledge and their capacity to implement preventive strategies. This study investigates the relationship between socio-demographic variables and knowledge about T2DM prevention, assessing changes before and after an IEC-based educational intervention.

Methods: A quantitative cross-sectional study employing a pre-test-post-test design was carried out among 400 rural participants in Kathua, J&K. Participants' knowledge of T2DM prevention was evaluated using a structured questionnaire. The relationship between socio-demographic factors and knowledge levels was examined through chi-square analysis.

Results: Chi-square analysis revealed significant associations between socio-demographic factors (age, gender, education, marital status, occupation, family income, social habits, and type of family) and knowledge levels regarding T2DM prevention, both in the pre-test and post-test phases ($p < 0.05$). These associations highlight how different socio-demographic variables influence participants' knowledge about T2DM prevention.

Conclusion: Socio-demographic factors are significantly associated with knowledge levels regarding T2DM prevention. The IEC intervention effectively modified these associations, highlighting the need for targeted education strategies in rural public health programs.

Keywords: Type II Diabetes Mellitus, knowledge association, socio-demographic factors, IEC intervention, rural population, public health.

Introduction

Type II Diabetes Mellitus (T2DM) accounts for 90% of all diabetes cases globally, making it one of the most important public health challenges of the twenty-first century.¹ This chronic metabolic condition is characterized by high blood glucose levels, insulin resistance, and insufficient insulin secretion. If left unmanaged, T2DM can result in severe complications, including cardiovascular diseases, kidney failure, neuropathy, retinopathy, and even premature mortality.² India has the world's second-highest incidence of diabetes cases, with rural communities especially vulnerable due to poor healthcare access and low awareness of preventive treatments.³

In rural settings, demographic variables such as age, gender, and occupation can significantly influence individuals' knowledge and awareness of type 2 diabetes mellitus (T2DM).⁴ Older individuals often have limited access to information and may not be as proactive in seeking health education, leading to a gap in understanding the risks and prevention strategies for T2DM. Gender also plays a role, as women in certain rural communities may have less access to health resources and education than men. Occupation and income level further compound the issue, as those in lower socioeconomic groups may lack the financial resources to attend health programs or access preventive care services.⁵ Consequently, these demographic factors are closely associated with a poorer knowledge base about T2DM prevention and management, contributing to the higher prevalence of the disease in rural populations.⁶

Health education interventions such as Information, Education, and Communication (IEC) strategies have been widely recognized as effective tools for improving knowledge and promoting behavior change in

¹ Dunachie, S., & Chamnan, P. (2019). The double burden of diabetes and global infection in low and middle-income countries. *Transactions of The Royal Society of Tropical Medicine and Hygiene*, 113(2), 56-64.

² Antar, S. A., Ashour, N. A., Sharaky, M., Khattab, M., Ashour, N. A., Zaid, R. T., ... & Al-Karmalawy, A. A. (2023). Diabetes mellitus: Classification, mediators, and complications; A gate to identify potential targets for the development of new effective treatments. *Biomedicine & Pharmacotherapy*, 168, 115734.

³ Gupta, S. K., Lakshmi, P. V. M., Chakrapani, V., Rastogi, A., & Kaur, M. (2024). Understanding the diabetes self-care behaviour in rural areas: Perspective of patients with type 2 diabetes mellitus and healthcare professionals. *Plos one*, 19(2), e0297132.

⁴ Abdulrahman, M., Husain, Z. S., Abdouli, K. A., Kazim, M. N., Ahmad, F. S. M., & Carrick, F. R. (2020). Association between knowledge, awareness, and practice of patients with type 2 diabetes with socio-economic status, adherence to medication and disease complications. *diabetes research and clinical practice*, 163, 108124.

⁵ Abbasi, Y. F., See, O. G., Ping, N. Y., Balasubramanian, G. P., Hoon, Y. C., & Paruchuri, S. (2018). Diabetes knowledge, attitude, and practice among type 2 diabetes mellitus patients in Kuala Muda District, Malaysia—A cross-sectional study. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 12(6), 1057-1063.

⁶ Sharma, P. K., Rajpal, N., Upadhyay, S., Shaha, D., & Deo, N. (2021). Status of diabetes control and knowledge about diabetes in patients. *Endocrinologia, diabetes y nutricion*, 68(10), 716-727.

public health. IEC approaches involve delivering structured health messages through various mediums, including pamphlets, posters, audiovisual aids, and interactive discussions, ensuring that information is accessible and culturally relevant. By addressing knowledge gaps through targeted education programs, IEC strategies empower communities to make informed health choices and adopt preventive measures.⁷ IEC-based interventions have been shown to be beneficial in raising awareness and promoting long-term behavior change in a variety of public health domains, including maternity health, vaccination, and non-communicable illnesses.⁸ In the context of T2DM prevention, IEC strategies can play a crucial role in enhancing community-level awareness by disseminating information on risk factors, healthy lifestyle modifications, and early detection measures. Rural populations, who often have limited exposure to formal health education, can particularly benefit from such interventions.

This study was conducted in rural areas of Kathua, Jammu, and Kashmir, where T2DM prevention awareness remains low. The primary goal was to investigate the effect of an IEC intervention on the relationship between socio-demographic characteristics and knowledge on T2DM prevention. The study assessed pre-test knowledge levels in relation to socio-demographic variables, implemented the IEC intervention, and evaluated post-test knowledge levels to determine changes across different socio-demographic groups. It was hypothesized that the IEC intervention would significantly influence the association between socio-demographic factors and knowledge regarding T2DM prevention (H_1), as opposed to having no significant impact (H_0). This study provides empirical evidence on how IEC-based educational interventions can modify knowledge patterns and strengthen community-level diabetes prevention strategies in underserved rural populations.

Objectives

1. To assess the association between pre-test knowledge levels and socio-demographic variables in a rural population of Kathua, Jammu & Kashmir.
2. To evaluate the association between post-test knowledge levels and socio-demographic variables after an IEC-based educational intervention.
3. To analyze the impact of IEC intervention on the association between socio-demographic factors and knowledge regarding Type II Diabetes Mellitus (T2DM) prevention in the study population.

⁷ George, S. T. Ict In Health Education/Health Promotion For Sustainable National Development.

⁸ Halliday, T. A. (2020). Use of information, education and communication (IEC)-based materials: An effective teaching-learning strategy in nutrition education. *International Journal of Research and Scientific Innovation*, 7(9), 350-354.

Methodology

Research Design and Approach

This study employed a quantitative, pre-experimental one-group pre-test-post-test design to assess the effectiveness of an Information, Education, and Communication (IEC) intervention on knowledge related to Type II Diabetes Mellitus (T2DM) prevention among rural adults in Kathua, Jammu & Kashmir. By comparing knowledge levels before and after the intervention, the study aimed to measure the impact of IEC-based education while also analyzing the role of socio-demographic factors in shaping awareness of T2DM prevention within the same participant group.

Study Setting and Sample

The study was conducted in rural areas of Kathua, J&K, selected for its accessibility and need for diabetes awareness programs. A non-probability convenience sampling method was used to recruit 400 participants who were available and willing to participate.

Inclusion and Exclusion Criteria

Adults aged 20 to 60 years who provided written informed consent were included. Individuals under 20 or over 60 years, those unwilling to participate, and those with communication impairments were excluded to ensure comprehension of the intervention.

Data Collection Tool and Procedure

A structured questionnaire assessed participants' demographic characteristics and knowledge of T2DM prevention, covering risk factors, symptoms, complications, and preventive measures. The tool was validated by public health experts and achieved a Cronbach's alpha of 0.89, indicating high reliability.

Data were collected in three phases:

- **Pre-test:** Participants' baseline knowledge regarding Type II Diabetes Mellitus (T2DM) prevention and its association with socio-demographic factors was assessed.
- **Intervention:** A two-week Information, Education, and Communication (IEC) session was conducted, focusing on T2DM risk factors, preventive strategies, and lifestyle modifications.
- **Post-test:** The same questionnaire was re-administered to evaluate changes in knowledge regarding T2DM prevention and its relationship with socio-demographic variables.

Face-to-face interviews were conducted throughout to ensure clarity, accuracy of responses, and a thorough understanding of the information provided during the intervention.

Data Analysis

The data analysis was conducted using SPSS version 25. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and knowledge levels. The association between knowledge levels and socio-demographic variables was examined using the Chi-square test, with a p-value of less than 0.05 considered statistically significant.

Ethical Considerations

Ethical clearance was secured from the Institutional Ethics Committee. Written informed consent was obtained from all participants, ensuring their confidentiality throughout the study. Additionally, they were informed of their right to withdraw from the study at any stage without any consequences.

Results

Demographic Characteristics of the Respondents

The study included 400 rural participants from Kathua, Jammu & Kashmir, with the majority aged 31-40 years (53.5%) and a higher proportion of males (57%). Most participants had primary education (37.5%), while 24.75% were graduates and above. The predominant occupation was farming/labor (50.5%), followed by private employment (19.25%). The majority of participants had a family income of Rs. 10,001-20,000 (58.5%) and were married (60.5%). Regarding social habits, 44% reported having no habits, while 27.5% consumed alcohol. A family history of diabetes was noted in 34.5% of respondents. All participants were from rural areas (100%), and joint families (50.5%) were the most common household structure.

Knowledge Levels Regarding the Prevention of T2DM Before and After Intervention

The distribution of participants based on knowledge levels regarding Type II Diabetes Mellitus (T2DM) prevention was assessed before and after the intervention.(Figure 1). In the pre-test, 67.25% of participants had inadequate knowledge, 24.25% had moderate knowledge, and 8.5% had adequate knowledge. After the intervention, the proportion of participants with inadequate knowledge decreased to 6.25%, while 32.25% had moderate knowledge, and 61.5% demonstrated adequate knowledge. The data indicate a shift in the knowledge distribution, reflecting the impact of the educational intervention on participants' understanding of T2DM prevention.

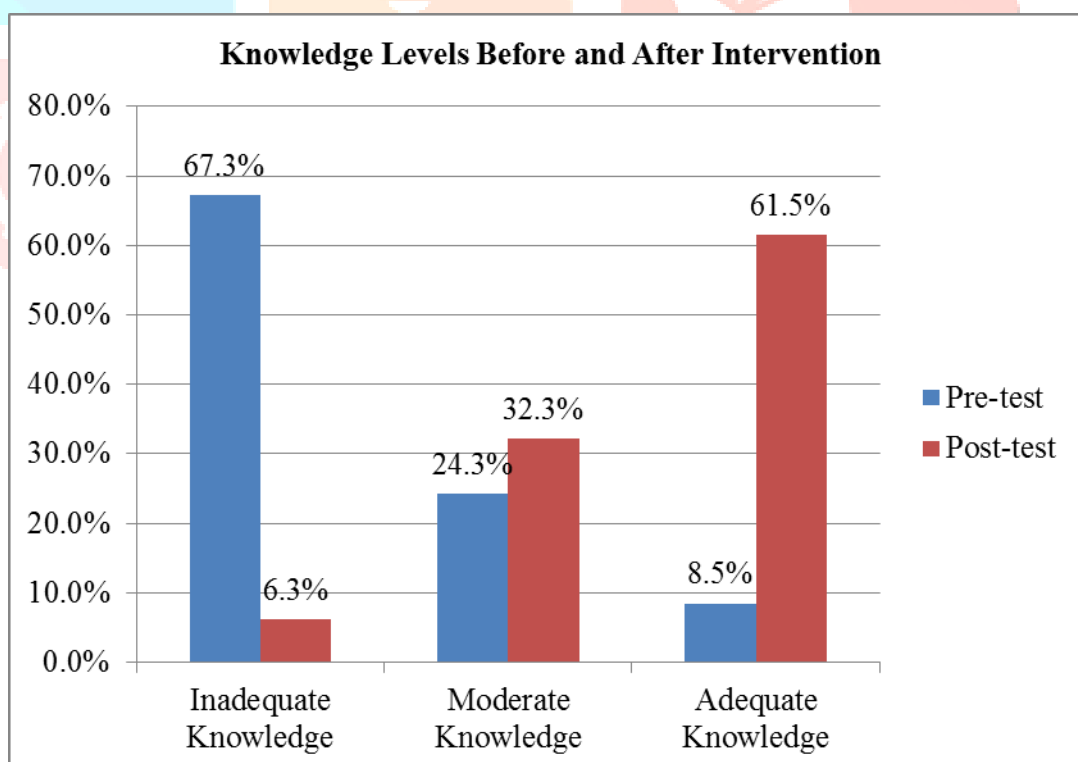


Figure 1: Knowledge Levels Regarding the Prevention of T2DM Before and After Intervention

Table 1: Association Between Pre-test Level of Knowledge with Their Selected Socio-Demographic Variables

n=40

Socio-Demographic Variables	Frequency	Level of knowledge			Df	P value	F value	Result
		Inadequate knowledge	Moderate knowledge	Adequate knowledge				
Age in years					8	0.00001	17.93	S
20 - 30 years	58	32	17	9				
31 - 40 years	214	160	43	11				
41 - 50 years	79	52	20	7				
51 – 60 years	35	17	13	5				
61 years and above	14	8	4	2				
Gender					2	0.04	4.03	S
Male	228	144	62	22				
Female	172	125	35	12				
Educational Status					6	0.004	8.18	S
Illiterate	89	55	29	5				
Primary	150	105	34	11				
Secondary and higher secondary education	99	67	23	9				
Graduate	62	42	11	9				
Occupational Status					6	0.00001	43.95	S
Unemployed	69	35	26	8				
Farmer/ labour	202	166	23	13				
Government employee	52	29	18	5				
Private employee	77	39	30	8				
Family Income					6	0.00001	29.97	S
Rs. 5000 - 10,000	48	25	15	8				
Rs. 10,001 - 20,000	234	182	40	12				
Rs. 20,001 -30,000	82	43	29	10				
Rs. >30,000	36	19	13	4				
Marital status					6	0.00001	17.28	S
Single	45	24	12	9				

Married	242	168	62	12				
Divorced/ Separated	77	56	12	9				
Widowed	36	21	11	4				
Social habits								
Smoking	66	34	25	7	6	0.00001	23.85	S
Alcoholic	110	78	23	9				
Both a and b	48	23	17	8				
No habit	176	134	32	10				
Family history of DM								
Yes	138	88	38	12	2	0.24	1.32	NS
No	262	181	59	22				
Area of residence								
Urban	0	0	0	0	2	1	0	NS
Rural	400	269	97	34				
Type of family								
Nuclear	162	127	21	14	4	0.00001	27.18	S
Joint	202	126	63	13				
Extended	36	16	13	7				

Table no 2: Association between Post-test level of knowledge with their selected Socio demographic variables.

n=40

Socio Demographic Variables	Frequency	Level of knowledge			Df	P value	χ^2 value	Result
		Inadequate knowledge	Moderate knowledge	Adequate knowledge				
Age in years					8	0.0024	9.21	S
20-30 years	58	5	18	35				
31-40 years	214	9	62	143				
41-50 years	79	6	31	42				
51-60years	35	4	14	17				
61 years and above	14	1	4	9				
Gender					2	0.0007	11.48	S
Male	228	16	88	124				
Female	172	9	41	122				
Educational Status					6	0.0002	13.88	S
Illiterate	89	6	16	67				
Primary	150	8	59	83				
Secondary and higher secondary education	99	6	30	63				
Graduate	62	5	24	33				
Occupational Status					6	0.0000 1	20.42	S
Unemployed	69	4	27	38				
Farmer/ labour	202	8	50	144				
Government employee	52	6	24	22				
Private employee	77	7	28	42				
Family Income					6	0.0000 1	19.11	S
Rs. 5000- 10,000	48	6	14	28				
Rs. 10,001- 20,000	234	9	69	156				
Rs. 20,001-30,000	82	5	38	39				
Rs. >30,000	36	5	8	23				
Marital status					6	0.0007	11.43	S
Single	45	5	16	24				

Married	242	9	76	157				
Divorced/ Separated	77	6	29	42				
Widowed	36	5	8	23				
Social habits								
Smoking	66	7	21	38	6	0.0005	12.19	S
Alcoholic	110	6	25	79				
Both a and b	48	3	22	23				
No habit	176	9	61	106				
Family history of DM								
Yes	138	10	40	88	2	0.27	1.20	NS
No	262	15	89	158				
Area of residence								
Urban	0	0	0	0	2	1	0	NS
Rural	400	25	129	246				
Type of family								
Nuclear	162	8	40	114	4	0.0001	15.87	S
Joint	202	11	78	113				
Extended	36	6	11	19				

Comparison of Pre and Post-Test Knowledge and Socio-Demographic Associations

The analysis revealed significant associations ($p < 0.05$) between pre-test knowledge levels and age, gender, education, occupation, family income, marital status, social habits, and type of family. Younger participants (20-30 years), males, graduates, government/private employees, and those with higher income (>Rs. 30,000) demonstrated better knowledge. Married individuals and those with no social habits had relatively higher awareness. However, family history of diabetes and area of residence did not show significant associations ($p > 0.05$), indicating that these factors did not influence baseline knowledge levels. (Table 1)

Post-test analysis showed significant associations ($p < 0.05$) between knowledge levels and age, gender, education, occupation, family income, marital status, social habits, and type of family. Younger participants (20-30 years), males, graduates, private/government employees, and those with higher income (>Rs. 30,000) demonstrated greater knowledge improvement. Married individuals and those with no social habits had higher awareness. Family history of diabetes and area of residence did not show significant associations ($p > 0.05$), suggesting these factors did not influence post-test knowledge levels. (Table 2)

The study demonstrated a notable enhancement in knowledge about T2DM prevention following the IEC-based educational intervention. Socio-demographic variables, including age, gender, education level, occupation, family income, marital status, social habits, and family structure, were significantly associated with knowledge levels both pre- and post-intervention. Participants who were younger, male, graduates, and from higher-income households exhibited greater awareness. Additionally, individuals without smoking or alcohol consumption habits showed higher knowledge levels. Conversely, factors such as a family history of diabetes and area of residence did not have a significant impact. These results emphasize the importance of tailoring diabetes prevention education to specific demographic groups for greater effectiveness.

Discussion

The present study evaluated the impact of an Information, Education, and Communication (IEC) intervention on the association between socio-demographic factors and knowledge levels regarding T2DM prevention in a rural population of Kathua, Jammu & Kashmir. The findings indicate that while the intervention significantly improved overall knowledge, it largely reinforced pre-existing associations between socio-demographic factors and knowledge levels, highlighting the role of targeted educational strategies in enhancing diabetes awareness.

Several socio-demographic factors were associated with knowledge levels both before and after the intervention. Younger participants, males, graduates, and those with higher incomes demonstrated better knowledge, consistent with findings from studies like Aguayo et al. ⁹, which reported that younger

⁹ Aguayo-Mazzucato, C., Diaque, P., Hernandez, S., Rosas, S., Kostic, A., & Caballero, A. E. (2019). Understanding the growing epidemic of type 2 diabetes in the Hispanic population living in the United States. *Diabetes/metabolism research and reviews*, 35(2), e3097.

individuals were more receptive to health education. Similarly, Sehrawat et al.¹⁰ found that occupation was the only factor significantly correlated with pre-test knowledge, whereas the present study identified multiple socio-demographic influences.

Gender disparities in knowledge levels were observed, with males demonstrating higher awareness, a trend also noted by Pinchoff et al.¹¹ in rural India. Education was a key determinant, as graduates exhibited superior knowledge, aligning with Caruso et al.,¹² who emphasized the role of education in improving health literacy. Social habits also played a role, with non-smokers and non-alcohol users demonstrating better knowledge, mirroring the findings of Siddiqui et al.¹³

The IEC intervention reinforced existing associations rather than altering them. While education, income, and social habits continued to influence knowledge post-intervention, factors such as family history of diabetes and area of residence remained non-significant, similar to results reported by Ranasinghe et al.¹⁴ and Almousa et al.¹⁵ These findings highlight the need for tailored educational strategies targeting specific demographic groups to maximize the effectiveness of diabetes prevention programs.

Conclusion

The study evaluates the impact of an IEC intervention on modifying the association between socio-demographic factors and knowledge regarding T2DM prevention in a rural population. It highlights how targeted education can bridge knowledge gaps and enhance diabetes awareness across different demographic groups.

¹⁰ Sehrawat, V., Prakash, K., & Sharma, R. (2018). Effectiveness of teaching program regarding foot care management on the knowledge and practice of clients with type 2 diabetes mellitus in selected community of Dehradun. *International Journal of Medical Science and Public Health*, 7(11), 1.

¹¹ Pinchoff, J., Santhya, K. G., White, C., Rampal, S., Acharya, R., & Ngo, T. D. (2020). Gender specific differences in COVID-19 knowledge, behavior and health effects among adolescents and young adults in Uttar Pradesh and Bihar, India. *PloS one*, 15(12), e0244053.

¹² Caruso, R., Magon, A., Baroni, I., Dellafiore, F., Arrigoni, C., Pittella, F., & Ausili, D. (2018). Health literacy in type 2 diabetes patients: a systematic review of systematic reviews. *Acta diabetologica*, 55, 1-12.

¹³ Siddiqui, I., Baig, M. M., & Khan, N. A. (2024). Environmental and Lifestyle Determinants of Type 2 Diabetes Mellitus.

¹⁴ Ranasinghe, P., Jayawardena, R., Gamage, N., Sivanandam, N., & Misra, A. (2021). Prevalence and trends of the diabetes epidemic in urban and rural India: A pooled systematic review and meta-analysis of 1.7 million adults. *Annals of epidemiology*, 58, 128-148.

¹⁵ Almousa, A. Y., Hakami, O. A., Qutob, R. A., Alghamdi, A. H., Alaryni, A. A., Alammari, Y. M., ... & Amlih, M. F. (2023). Knowledge, attitude, and practice toward diabetes mellitus and their association with socioeconomic status among patients with type 2 diabetes mellitus in Saudi Arabia. *Cureus*, 15(5).