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Effectiveness Of An IEC Package On Knowledge Regarding Prevention Of Type-II Diabetes Mellitus Among Rural People Of Kathua(J&K).

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Abstract:

Background:

Globally, Type-II diabetes mellitus (T2DM) is a significant public health concern, especially in rural regions with low healthcare access and awareness. Due to a lack of awareness about preventative measures, rural populations in India are more vulnerable to the rising prevalence of T2DM. The purpose of this study is to assess how well an information, education, and communication (IEC) package can increase rural people' awareness of T2DM prevention in Kathua, Jammu, and Kashmir.

Methods:

For this investigation, a pre-experimental, one-group pre-test-post-test design was used. 400 adults in rural areas were chosen by non-probability convenience sampling. A systematic knowledge questionnaire that was given both before and after the IEC intervention was used to gather data. Pre-test and post-test knowledge scores were compared in order to evaluate the intervention's efficacy.

Results:

The pre-test results showed that 67.25% of participants had inadequate knowledge regarding T2DM prevention. After the IEC intervention, 61.5% of participants demonstrated adequate knowledge, while only 6.25% had inadequate knowledge. A significant improvement in knowledge was observed, with a p-value of < 0.0001, indicating the effectiveness of the IEC package in enhancing participants' understanding of T2DM prevention.

Conclusion:

The IEC package significantly improved knowledge about T2DM prevention among rural adults in Kathua. This study suggests that IEC-based interventions are effective tools for raising awareness and promoting preventive measures in rural communities, which could contribute to reducing the burden of T2DM.

Keywords:

Type-II Diabetes Mellitus, Information Education Communication (IEC), Rural Health, Preventive Measures, Knowledge Enhancement

Introduction

Since T2DM accounts for 90% of all instances of diabetes worldwide, it is one of the most important public health issues of the twenty-first century. [1] Elevated blood glucose levels, poor insulin production, and insulin resistance are the hallmarks of this chronic metabolic disease. If left untreated, T2DM can lead to severe complications, including cardiovascular diseases, kidney failure, neuropathy, retinopathy, and even premature mortality.[2] The burden of T2DM is particularly concerning in India, which is home to the second-highest number of diabetes cases worldwide. With its rapidly growing population and an increase in sedentary lifestyles, India is witnessing a significant rise in T2DM prevalence, especially in rural regions where healthcare resources and awareness remain limited.[3]

In rural areas, the lack of knowledge about T2DM prevention is exacerbated by socioeconomic challenges, cultural beliefs, and limited access to health education programs. These populations often have restricted access to healthcare services and preventive care, making them more vulnerable to non-communicable diseases like T2DM. Additionally, the adoption of unhealthy dietary habits, low levels of physical activity, and limited understanding of modifiable risk factors contribute to the rising prevalence of the disease. The

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[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.

situation is further compounded by poor health-seeking behaviors, a lack of community-level health education initiatives, and a general unawareness of the long-term consequences of unmanaged T2DM.[4]

In order to combat the expanding diabetes epidemic, prevention is essential. Community education on lifestyle changes, including as eating a balanced diet, exercising frequently, abstaining from smoking and excessive alcohol use, and controlling body weight, is necessary for effective prevention. Public health interventions targeting rural populations must not only emphasize disease prevention but also prioritize knowledge dissemination tailored to the cultural and educational context of the community. [5]

The IEC approach is a well-established strategy for promoting health awareness and encouraging behavior change in public health settings. IEC packages are designed to deliver targeted health messages using various tools such as pamphlets, posters, audiovisual aids, and interactive sessions. These materials are often culturally adapted and simplified to meet the literacy and comprehension levels of the target population. By leveraging both traditional and modern communication channels, IEC packages can bridge the knowledge gap and empower communities to take proactive measures in preventing diseases like T2DM. [6]

The effectiveness of IEC packages in health promotion has been documented across diverse populations and health domains, including maternal health, immunization, infectious diseases, and non-communicable diseases. Studies have shown that IEC-based interventions can significantly improve knowledge, attitudes, and practices related to health, thereby fostering sustainable behavior change.[7] IEC packages are essential for increasing public knowledge of type 2 diabetes, its risk factors, and preventative strategies. By engaging rural communities in structured education programs, IEC initiatives can enhance their understanding of T2DM and motivate them to adopt healthier lifestyles, ultimately reducing the disease burden.

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[4] Basu, S., & Garg, S. (2017). The barriers and challenges toward addressing the social and cultural factors influencing diabetes self-management in Indian populations. *Journal of Social Health and Diabetes*, *5*(02), 071-076.

[5] Lagisetty, P. A., Priyadarshini, S., Terrell, S., Hamati, M., Landgraf, J., Chopra, V., & Heisler, M. (2017). Culturally targeted strategies for diabetes prevention in minority population: a systematic review and framework. *The Diabetes Educator*, *43*(1), 54-77.

[6] George, S. T. Ict In Health Education/Health Promotion For Sustainable National Development.

[7] 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.

This study was conducted in the rural areas of Kathua, Jammu, and Kashmir, where awareness regarding T2DM prevention is notably limited. The main goal was to assess how well an IEC package helped rural folks learn more about preventing type 2 diabetes. The study specifically analyzed post-intervention knowledge improvements, applied the IEC intervention, and evaluated baseline knowledge levels. In contrast to no significant improvement in knowledge (H0), it was predicted that the IEC package would considerably increase participants' knowledge of T2DM prevention (H1). The potential of IEC-based health education programs to close knowledge gaps and support community-level diabetes prevention initiatives in underserved rural areas is empirically supported by this study.

Objectives

1. To assess the pre-test level of knowledge regarding the prevention of Type II Diabetes Mellitus among rural adults.
2. To assess the post-test level of knowledge regarding the prevention of Type II Diabetes Mellitus among rural adults.
3. To evaluate the effectiveness of the IEC package by comparing pre-test and post-test knowledge scores.

Methodology

Research Design and Approach: The impact of an IEC package in enhancing knowledge about T2DM prevention was evaluated using a quantitative evaluative research approach. In order to measure the changes in participants' knowledge levels before and after the intervention, a pre-experimental, one-group pre-test-post-test design was used.

Study Setting and Sample: The study was carried out in the rural regions of Jammu and Kashmir's Kathua district. Accessibility, target population availability, and research feasibility all played a role in the selection of this site. A non-probability convenience selection technique was used to pick 400 rural adults, guaranteeing that participants who were accessible and willing to participate were included.

Inclusion and Exclusion Criteria: Both male and female adults between the ages of 20 and 60 who were available and willing to participate throughout the data collecting period were included in the study. The study eliminated participants who were under 20 years old, those who were unwilling to give their assent, and those who had communication problems including deafness or muteness. These requirements made sure that individuals who could comprehend the intervention and who fit the study's objectives were included.

Data Collection Tool: A structured knowledge questionnaire was designed to evaluate participants' knowledge levels regarding the prevention of Type-II Diabetes Mellitus (T2DM). The questionnaire consisted of two sections: the first captured demographic variables, including age, gender, education, occupation, family type, and area of residence, while the second assessed knowledge related to T2DM risk factors, symptoms, complications, and preventive measures. The tool underwent validation by a panel of nursing and public health experts to ensure both content and construct validity. A Cronbach's alpha coefficient of 0.89, which indicates a high degree of internal consistency, was obtained via reliability testing during the pilot phase.

Data Collection Procedure: Using a standardized questionnaire, the pre-test was administered to determine the participants' baseline knowledge. The IEC package intervention was then carried out over a period of two weeks. To assess changes in knowledge levels, a post-test was administered using the same questionnaire following the intervention. Face-to-face interviews were used to gather data, guaranteeing that responses were consistent and clear.

Pilot Study: To determine whether the research approach was feasible, a pilot study was carried out on 400 individuals, or one-tenth of the entire sample size. It was carried out in a rural area of Kathua, J&K. The investigator introduced herself, explained the study's purpose, and obtained written consent from participants. The pilot study revealed no major flaws in the checklist, confirming the feasibility of the methodology for the main study.

Data Analysis: SPSS software version 25 was used to analyze the data that was gathered. The demographic traits and knowledge scores of the participants were compiled using descriptive statistics, such as frequency, percentage, mean, and standard deviation. To assess the efficacy of the IEC package, a paired t-test was used for inferential statistics to compare knowledge scores before and after the test. The chi-square test was also used to examine correlations between knowledge scores and sociodemographic factors. P-values below 0.05 were regarded as statistically significant.

Ethical Considerations: The institutional ethics committee granted ethical approval. The goal of the study was explained to the participants, and formal agreement was acquired before any data was collected. Throughout the study, individuals' anonymity and confidentiality were rigorously protected.

Results

Demographic Profile of Respondents

The demographic profile of the respondents is outlined in **Table 1**. The majority of participants belonged to the middle age group (31–40 years), with fewer individuals in older age brackets. The sample had a slightly higher proportion of men than women. In terms of education, most respondents had attained primary education, while a smaller proportion were graduates or illiterate. The primary occupation among participants was farming or labor, followed by private employment, with a notable segment being unemployed. Family income predominantly ranged between Rs.10,001–20,000 per month, with relatively few participants reporting higher earnings The majority of respondents were married, with a smaller proportion being divorced, separated, or single. Social habits revealed that a considerable number of participants had no harmful habits, while a notable proportion consumed alcohol, smoked, or engaged in both. A minority of participants reported a family history of diabetes, while the majority did not. All participants resided in rural areas, and joint families were the most common family structure, followed by nuclear and extended families.

Table 1: Distribution of Sociodemographic Variables Among Study Participants (n = 400)

Sociodemographic variables	Frequency	Percentage
1. Age		
a) 20 - 30 years	58	14.5 %
b) 31 - 40 years	214	53.5 %
c) 41 - 50 years	79	19.75 %
d) 51 - 60 years	35	8.75 %
e) 61 years and above	14	3.5 %
2. Gender		
a) Male	228	57%
b) Female	172	43%
3. Education status		
a) Illiterate	89	22.25%
b) Primary education	150	37.5%

c) Secondary and higher secondary education	62	15.5%
d) Graduate and above	99	24.75%
4. Occupation status		
a) Unemployed	69	17.25%
b) Farmer/ labor	202	50.5%
c) Government employee	52	13%
d) Private employee	77	19.25%
5. Family income		
a) Rs. 5000- 10,000	48	12%
b) Rs. 10,001- 20,000	234	58.5%
c) Rs. 20,001- 30,000	82	20.5%
d) > Rs. 30,000	36	9%
6. Marital status		
a) Single	45	11%
b) Married	242	60.5%
c) Divorced/ Separated	77	19.5%
d) Widowed	36	9%
7. Social habits		
a) Smoking	66	16.5%
b) Alcoholic	110	27.5%
c) Both a and b	48	12%
d) No habit	176	44%
8. Family history of DM		
a) Yes	138	34.5%
b) No	262	65.5%
9. Area of residence		
a) Urban	0	0%
b) Rural	400	100%

10. Type of family		
a) Nuclear family	162	40.5%
b) Joint family	202	50.5%
c) Extended Family	36	9%

Pre-Test Knowledge Levels Regarding Prevention of Type-II Diabetes Mellitus

The pre-test knowledge levels of the respondents are presented in **Table 2**. A majority (67.25%) of participants demonstrated inadequate knowledge about the prevention of T2DM. Moderate knowledge levels were observed in 24.25% of the respondents, while only 8.5% had adequate knowledge. These findings highlight a substantial gap in awareness and understanding of T2DM prevention prior to the intervention.

Table 2: Pre-Test Knowledge Levels Regarding Prevention of Type-II Diabetes Mellitus (n = 400)

Pre-test Knowledge level	**Frequency**	**Percentage**
Inadequate-knowledge	269	67.25%
Moderate-knowledge	97	24.25%
Adequate-knowledge	34	8.5%

Post-Test Knowledge Levels Regarding Prevention of Type-II Diabetes Mellitus

Post-test findings revealed a significant improvement in the knowledge levels of respondents, as shown in **Table 3**. After the implementation of the IEC package, 61.5% of participants achieved adequate knowledge, while 32.25% demonstrated moderate knowledge levels. Only 6.25% of respondents continued to exhibit inadequate knowledge. This marked improvement underscores the effectiveness of the IEC intervention in enhancing awareness about T2DM prevention.

Table 3: Post-Test Knowledge Levels Regarding Prevention of Type-II Diabetes Mellitus (n = 400)

Knowledge Level	**Frequency (n)**	**Percentage (%)**
Inadequate Knowledge	25	6.25%
Moderate Knowledge	129	32.25%
Adequate Knowledge	246	61.50%

Effectiveness of the IEC Package

By comparing the participants' mean pre-test and post-test knowledge scores, the efficacy of the IEC package was assessed **(Table 4).** In the post-test, the mean score increased significantly from the pre-test mean of 12.66 ± 7.07 to 28.77 ± 7.70. A statistically significant difference in knowledge levels was found using a paired t-test ($t = 22.82$, $df = 399$, $p < 0.0001$), suggesting that the intervention was successful in raising participants' knowledge.

Table 4: Effectiveness of the IEC Package: Comparison of Pre-Test and Post-Test Knowledge Scores (n = 400)

Test	Mean	SD	t-Test	DF	P-value	Result
Pre-test	12.66	7.07	22.82	399	<0.0001	**S**
Post-test	28.77	7.70				

Discussion

The present study aimed to assess the demographic profile, knowledge levels, and the impact of an IEC package on the prevention of T2DM among rural populations. Our findings reveal a significant variation in demographic characteristics, highlighting the need for tailored educational interventions to address the specific needs of diverse groups. A large proportion of respondents were within the 31-40 years age group, which is a critical age range for the onset of T2DM, suggesting a crucial window for preventive education. Gender-wise, a notable predominance of male respondents was observed, which could influence the design of gender-sensitive intervention strategies. In terms of educational status, a significant proportion of participants had primary education or were illiterate, reinforcing the necessity for simplifying educational materials to ensure better comprehension and retention of information. The occupational status of respondents indicated that a majority were farmers or laborers, positions commonly associated with sedentary lifestyles, which increases the risk of developing T2DM. Similarly, the family income distribution revealed that most participants fell within a lower income bracket, which may limit access to healthcare resources and diabetes prevention strategies, further emphasizing the role of community-based interventions in these populations. The predominance of married individuals and those residing in joint families reflects the socio-cultural fabric that could impact health behaviors, including the adoption of preventive measures for T2DM.

In the context of pre-test knowledge, the majority of participants exhibited inadequate awareness regarding T2DM and its prevention, a finding consistent with previous studies such as Deepa et al. (2014)[8], which also highlighted a substantial gap in knowledge, especially in rural India. Their study reported that a large portion of the rural population was unaware of the existence of diabetes, a pattern mirrored in our study's baseline knowledge assessment. Moreover, the findings from Dinesh et al. (2016)[9] further corroborate the low levels of self-care knowledge and neglect in key areas such as foot care among individuals with diabetes, suggesting that insufficient knowledge directly correlates with poor health management practices.

The post-test knowledge improvement after the IEC package intervention in our study aligns with findings from similar studies, such as the one by Hyder et al. (2021)[10], which demonstrated significant enhancements in knowledge, attitude, and practice following educational interventions. In their study, prediabetes education resulted in notable improvements in participants' knowledge levels and attitudes, which were reflected in their increased adoption of healthier practices. Similarly, our study observed a marked increase in knowledge regarding T2DM prevention, indicating the efficacy of educational interventions in improving health literacy within rural communities.

Our study also supports the findings of Chawla et al. (2019)[11], who reported significant improvements in glycemic control and knowledge levels following health education interventions in T2DM patients. The increase in participants' knowledge about diabetes prevention, as evidenced by the post-test results,

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[9] Dinesh, P. V., Kulkarni, A. G., & Gangadhar, N. K. (2016). Knowledge and self-care practices regarding diabetes among patients with Type 2 diabetes in Rural Sullia, Karnataka: A community-based, cross-sectional study. *Journal of family medicine and primary care*, *5*(4), 847-852.

[10] Hyder, K. M., Mohan, J., Varma, V., Ponnusankar, S., & Raja, D. (2021). Impact of prediabetes education program on Knowledge, attitude and practice among prediabetic population of south India. *Preventive medicine reports*, *23*, 101395.

[11] Chawla, S. P. S., Kaur, S., Bharti, A., Garg, R., Kaur, M., Soin, D., ... & Pal, R. (2019). Impact of health education on knowledge, attitude, practices and glycemic control in type 2 diabetes mellitus. *Journal of family medicine and primary care*, *8*(1), 261-268.

emphasizes the critical role of health education in managing and preventing chronic conditions such as T2DM. Our study's gains imply that knowledge-based interventions can be crucial in changing health-related behaviors and enhancing the health of groups that are at risk.

The overall effectiveness of the IEC package, as reflected in the significant pre-to-post test knowledge improvement, further validates the findings from other studies on the impact of diabetes education programs. The findings from studies such as that by Hyder et al. (2021) and Chawla et al. (2019) underline the importance of targeted educational interventions in improving health outcomes in rural and prediabetic populations. These studies suggest that knowledge improvement, coupled with attitude shifts and behavior changes, can lead to better management of diabetes and prevention of complications.

Conclusion

The study attests to the IEC package's efficacy in raising awareness and encouraging T2DM prevention strategies in rural areas. Tailored health education interventions are crucial for mitigating T2DM risk factors in underserved