



“A Study to Assess the Effectiveness of QR-Coded Information Booklet Regarding Type I Diabetes Mellitus on Knowledge Among Parents of Children with Type 1 Diabetes Mellitus in Selected Hospitals.”

Mrs Priyadarshani Vehale^{1a*}, Dr. Sujata Sawant^{2b}, Ms Shubhangi Lohakare^{3c}, Mr. Sairaj Barge^{4c}, Mr. Shrikrushna Dhere^{5c}, Ms. Amrapali Dangane^{6c}, Ms. Rasika Dhumal^{7c}

*Corresponding Author,

a. Clinical Instructor, Dr D. Y. Patil Institute of Nursing Education, Pimpri, Pune.

b. Principal, Dr D. Y. Patil Institute of Nursing Education, Pimpri, Pune.

c. Third Year GNM Students, Dr D. Y. Patil Institute of Nursing Education, Pimpri, Pune.

(Received: 27 September 2025 Revised: 05 October 2025 Accepted: 18 November 2025)

KEYWORDS

Assess, Effectiveness, QR-coded Information booklet, Type –I Diabetes Mellitus, Children.

ABSTRACT:

Introduction: Diabetes is a prevalent chronic disease affecting approximately 2-4% of the global population, and its progression is associated with a heightened risk of vascular, renal, retinal, and neuropathy complications, which can lead to premature disability and death.

Aim: To assess the Effectiveness of QR-coded Information booklet regarding type I diabetes mellitus on knowledge among parents of children with type 1 diabetes mellitus in selected hospitals.

Methodology: A Quantitative research approach was used for the study. Pre-experimental design (pre-test and post-test) research design was used. The study was conducted in a selected hospital. The population used for this study was parents of children with type 1 diabetes mellitus. The sample consisted of 50 parents of children with Type 1 Diabetes Mellitus from the selected hospitals. Non-probability convenient sampling technique was used.

Results: The Results of the study indicated that the average knowledge score in the pre-test was 5.7, which increased to 13.2 in the post-test. The t-value for this test was 10.7 with 49 degrees of freedom. The corresponding p-value was small (less than 0.05), and the null hypothesis was rejected.

Conclusion: The study concluded that the knowledge among parents increased significantly after the QR-coded information booklet. The QR-coded information booklet is significantly effective in improving the knowledge among parents regarding Type 1 Diabetes Mellitus.

1. Introduction

Diabetes is a chronic disease characterised by insufficient insulin production or ineffective use of insulin in the body. Type 1 diabetes results from a lack of insulin production. India has the highest number of diabetics, with more than 62 million affected individuals, accounting for over 7.1% of the adult population. Diabetes-related deaths in India are estimated to be close to 1 million annually. The country's growing middle class, combined with genetic susceptibility and adoption of high-calorie, low-activity lifestyles, contribute to the

high incidence of diabetes. India is projected to have the greatest increase in diabetes diagnoses by 2030.¹

Diabetes mellitus is a condition where the body can't produce enough insulin. According to the WHO guideline, the normal sugar level for a normal person is 60-100 mg/dl. Diabetes has basically two types. Insulin-dependent diabetes mellitus (IDDM), Non-insulin-dependent diabetes mellitus (NIDDM). NIDDM can occur in 80% of all diabetes cases. It is more prominent in adults and older people. Generally, type 2 diabetes mellitus spreads very slowly. In fact, the exact causes of diabetes are not known yet. Apart from that, there are



some other factors are there which increase the chance of diabetes, such as age and race, environmental factors, obesity, and family history. The symptoms of diabetes mellitus are polydipsia, polyphagia, polyuria, blurred vision, dizziness, extreme tiredness, genital itching, nausea and vomiting, slow healing of wounds and many more.²

Fasting blood glucose, Random blood glucose test, HbA1c test, and Glucose tolerance test are used to confirm the diagnosis of diabetes. Treatment of diabetes mellitus includes dietary management, regular physical activity, and, in pharmacological management, there are many oral antidiabetic drugs, which help to reduce blood glucose levels, like sulfonylurea, biguanides, meglitinides, etc. There are some portable pumps for continuous administration of regular insulin; yoga is also ideally suited for diabetes mellitus³

A study was conducted to assess the effectiveness of an information booklet on complications of Diabetes mellitus among patients with Diabetes mellitus at a selected hospital, Kolkata to help patients with Diabetes mellitus have adequate knowledge about complications of Diabetes mellitus, which reduces the occurrence of complications and thereby leads to a better quality of life. The research hypothesis aimed at finding the effectiveness of the information booklet and the association of selected background factors of patients with Diabetes mellitus and pre-test knowledge score. An evaluative research approach was used for the study. The research design adopted was the one-group pretest and post-test research design. The data were collected from 30 patients with Diabetes mellitus using a convenience sampling technique. The tools included in the study were a Demographic proforma for selected personal information and a structured knowledge questionnaire. The reliability scores obtained for the knowledge score were 0.88. The pilot study was conducted in the Calcutta Medical Research Institute between 16th September 2011 and 22nd September 2011. The significant findings of the study were based on the data based on background factors of patients with Diabetes mellitus and the data on the effectiveness of the information booklet on Complications of Diabetes mellitus among patients with Diabetes mellitus. The obtained “t” value is 12.18 with $df=29$ is greater than the critical ratio 0.05 level of significance, 2.04. Here null hypothesis is rejected and the alternative hypothesis is accepted. The information

booklet is found to be effective. The study concludes that an information booklet can improve the knowledge level among patients with Diabetes mellitus.⁴

A study to assess the level of knowledge regarding diabetes mellitus among selected communities, Coimbatore. A convenient sample of 50 samples was selected for this study. Data collection was conducted to assess the level of knowledge regarding diabetes mellitus; it was assessed by using a semi-structured questionnaire. An informational booklet was given to the sample regarding diabetic management. It was concluded that the general population had poor knowledge regarding diabetes mellitus because of ignorance and a strong perception of diabetes mellitus.⁵

2. Objectives

- To assess the effectiveness of a QR-coded information booklet on knowledge among parents of children with Type 1 Diabetes Mellitus.
- To compare the pre- and post-test scores.

HYPOTHESIS

H₀: There is no significant difference in pretest and post-test knowledge scores of parents.

H₁: There is a significant difference in the pretest and post-test knowledge scores of parents.

3. METHODS:

Research approach: Quantitative research approach.

Research design: Pre-experimental design (pre-test and post-test) research design.

Variables

Independent Variable: The independent variable in this study is the QR-coded information booklet on Type 1 diabetes mellitus.

Dependent Variable: The dependent variable in this study is the level of knowledge regarding Type 1 diabetes mellitus among parents of children diagnosed with Type 1 diabetes.

SETTING OF THE STUDY: The study was conducted in a selected hospital.

TARGET POPULATION: The population used for this study is parents of children with type 1 diabetes mellitus.



SAMPLE SIZE: The sample consisted of 50 parents of children with Type 1 Diabetes Mellitus from the selected hospitals.

SAMPLING TECHNIQUE: Non-probability convenient sampling technique is used.

INCLUSION CRITERIA

- Parents of children diagnosed with Type 1 Diabetes Mellitus.
- Parents who were willing to participate in the study.
- Parents who could read either English, Hindi, or Marathi.
- Parents who had access to a smartphone or QR code scanning device.

EXCLUSION CRITERIA

- Parents who were not willing to participate.
- Parents who had already received prior formal training about Type 1 Diabetes Mellitus.
- Parents who were not available during the time of data collection.

TOOLS AND TECHNIQUES

- **SECTION A:** Demographic Data
- **SECTION B:** Pre-test and Post-test Questionnaires: - to assess the knowledge of parents regarding Type 1 Diabetes Mellitus.
- **Checklist:** - To measure the effectiveness of the QR-coded information booklet.

4. Results

Table 1: Description of samples (parents of children) based on their personal characteristics in terms of frequency and percentage, N=50

Demographic variable	Freq	%
Age		
1 - 5 years	17	34%
6 - 10 years	16	32%
11 - 15 years	13	26%
15 - 18 years	4	8%

Gender		
Male	28	56%
Female	22	44%
Education		
No formal education	20	40%
Primary	19	38%
Secondary and higher secondary	8	16%
Graduation and post-graduation	3	6%
Monthly family income		
Less than Rs. 10000	14	28%
Rs. 10001 to 15000	14	28%
Rs. 15001 to 20000	13	26%
More than Rs. 20000	9	18%
Type of family		
Nuclear	25	50%
Joint	18	36%
Extended	6	12%
Single parent	1	2%
Living area		
Urban	29	58%
Rural	13	26%
Semi-urban	7	14%
Semi-rural	1	2%
How many years ago was your child diagnosed with type 1 diabetes mellitus		
Less than 1 year	21	42%
1-2 years	14	28%
2-5 years	8	16%
More than 5 years	7	14%

Table 1 indicated that the 34% of the parents of children with Type 1 Diabetes Mellitus had age 1-5 years, 56% of



them were males, 40% of them did not have formal education, 28% of them had monthly family income less than Rs.10000, 28% of them had monthly family income Rs. 10001-15000, 50% of them had nuclear family, 58% of them were from urban area, 42% of their child was diagnosed with type 1 diabetes mellitus less than one year.

Section II

Analysis of data related to the effectiveness of a QR-coded information booklet on knowledge regarding type I diabetes mellitus among parents of children with Type 1 Diabetes Mellitus

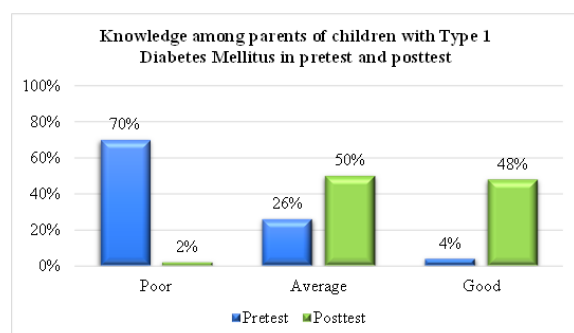


Figure 1 showed that in the pretest, 70% of the patients of children with type I diabetes mellitus had poor knowledge, 26% of them had average knowledge, and 4% of them had good knowledge regarding type I diabetes mellitus. In the posttest, 2% of them had poor knowledge, 50% of them had average knowledge, and 48% of them had good knowledge regarding type I diabetes mellitus. This indicates that there is a remarkable improvement in the knowledge among parents after the QR-coded information booklet regarding type I diabetes mellitus.

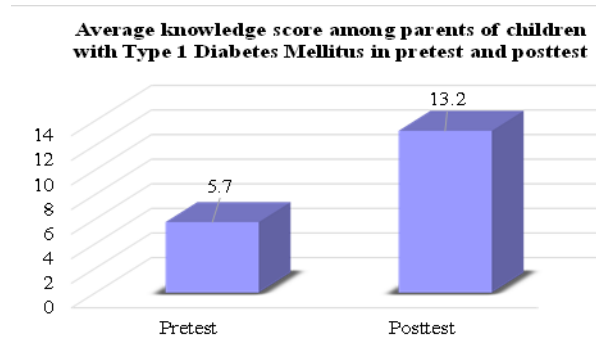


Figure 2: Paired t-test for the effectiveness of a QR-coded information booklet on knowledge regarding

type I diabetes mellitus among parents of children with Type 1 Diabetes Mellitus. N=50

Figure 2 indicates that the average knowledge score in the pretest was 5.7, which increased to 13.2 in the posttest. T-value for this test was 10.7 with 49 degrees of freedom. The corresponding p-value was small (less than 0.05), and the null hypothesis was rejected. Average knowledge score in the post-test was significantly higher than that in the pretest. The QR-coded information booklet is significantly effective in improving knowledge regarding type I diabetes mellitus among parents of children with Type 1 Diabetes Mellitus.

Table 2: Fisher's exact test for the association between demographic variables and knowledge of QR-coded information booklet. N=50

Demographic variable		Knowledge			p-value
		Poor	Average	Good	
Age	1 - 5 years	15	2	0	0.135
	6 - 10 years	11	5	0	
	11 - 15 years	6	5	2	
	15 - 18 years	3	1	0	
Gender	Male	24	4	0	0.015
	Female	11	9	2	
Education	No formal education	16	3	1	0.179
	Primary	12	7	0	
	Secondary and higher secondary	5	3	0	
	Graduation and post-graduation	2	0	1	
Monthly family income	Less than Rs. 10000	10	4	0	0.733
	Rs. 10001 to 15000	10	4	0	



	Rs. 15001 to 20000	8	4	1	
	More than Rs. 20000	7	1	1	
Type of family	Nuclear	18	6	1	0.646
	Joint	12	6	0	
	Extended	4	1	1	
	Single parent	1	0	0	
Living area	Urban	20	8	1	1.000
	Rural	9	3	1	
	Semi-urban	5	2	0	
	Semi-rural	1	0	0	
How many years ago was your child diagnosed with type 1 diabetes mellitus	Less than 1 year	17	4	0	0.078
	1-2 years	10	4	0	
	2-5 years	4	4	0	
	More than 5 years	4	1	2	

Table 2 shows that the p-value corresponding to gender is small (less than 0.05), and the null hypothesis is rejected. Demographic variable gender was found to have a significant association with the knowledge among parents regarding type 1 diabetes mellitus.

Knowledge	Pretest		Post-test	
	Freq	%	Freq	%
What is type 1 diabetes mellitus?	32	64%	35	70%
What is the risk factor of children with type 1 diabetes mellitus?	17	34%	35	70%
Which organ is responsible for diabetes mellitus?	15	30%	32	64%
Which organ produces insulin in the body?	15	30%	34	68%

What are the main reasons for insulin injection?	18	36%	35	70%
What are the symptoms of high blood sugar?	6	12%	35	70%
What is the name of the device used to test blood sugar?	20	40%	34	68%
What is the normal range for blood glucose levels?	20	40%	32	64%
What is the normal range of fasting blood sugar levels?	18	36%	31	62%
What is the normal range of blood sugar levels after meal?	15	30%	33	66%
Control of blood sugar level is best identified by?	5	10%	33	66%
What should you do if you feel symptoms of low blood sugar?	32	64%	33	66%
Why is it important to monitor your blood glucose level yourself?	2	4%	29	58%
How often is it recommended to test your blood glucose when diabetes mellitus is diagnosed?	10	20%	32	64%
How often should BSL be checked once treatment is finalized?	4	8%	32	64%
What is the primary treatment for type 1 diabetes mellitus?	17	34%	32	64%
What level of physical activity is recommended for children with type 1 diabetes?	6	12%	33	66%
Which is the best physical activity for children with diabetes mellitus?	7	14%	32	64%
Do you need to check your feet for any signs of injury or infectious diseases?	11	22%	35	70%
How important is it to track your blood sugar and insulin doses?	17	34%	31	62%



Table 3: Item analysis

N=50

Table 3 presents the frequency and percentage of correct responses by parents of children to each knowledge item in the pretest and post-test. It indicates that there is a remarkable improvement in the correct responses to each knowledge item in the post-test as compared to the pretest. The QR-coded information booklet is effective in improving the knowledge among parents of children with Type 1 Diabetes Mellitus.

5. Discussion

Shobha Gaikwad et al conducted a study to assess the effect of an information booklet on the knowledge of caregivers regarding the management of juvenile diabetes in selected areas of Mumbai. The purpose of the study was to assess the knowledge of the caregivers before and after the administration of the booklet and to 2nd its relationship with the variables. A one-group pretest-post-test design was used in the study, which comprised 50 caregivers of children with juvenile diabetes who were selected by a purposive sampling technique. The tool used was a structured interview schedule. Data analysis was done using descriptive and inferential statistics. The result of the study indicated that knowledge was gained after the administration of the information booklet, and the more the age better the knowledge gained by the caregivers.⁶

Conclusion:

The study concluded that the knowledge among parents increased significantly after the QR-coded information booklet. The QR-coded information booklet is significantly effective in improving the knowledge among parents regarding Type 1 Diabetes Mellitus.

References:

1. Anjana RM, Deepa M, Pradeepa R, Mahanta J, Narain K, Das HK, Et Al. Prevalence of Diabetes and Prediabetes In 15 States of India: Results from the ICMR-INDIAB Population-Based Cross-Sectional Study. *Lancet Diabetes Endocrinol.* 2017 Aug;5(8):585-96
2. Grant RW, Moure AF, And Florez JC. Genetic Architecture of Type 2 Diabetes: Recent Progress and Clinical Implications. *Diabetes Care* 2009.32 (6).1107-1114
3. Davidson, Mayer B. *Diabetes Mellitus Diagnosis and Treatment*. 4th Edition. Philadelphia. Saunders. C.: 1998.449
4. Susmita Mondal (July 2024). "A Study to Assess the Effectiveness of an Information Booklet on Complications of Diabetes Mellitus among Patients with Diabetes Mellitus at a Selected Hospital, Kolkata.". *INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT*, 9(7), B1- 9. [Http://Doi.One/10.1729/Journal.41974](http://doi.org/10.1729/Journal.41974)
5. S. Parimala, R. Deepa. A Study to Assess the Level of Knowledge Regarding Diabetes Mellitus among Selected Communities, Coimbatore. *International Journal of Nursing Education and Research*. 2021; 9(3):317-1. DOI: 10.52711/2454-2660.2021.00074
6. <https://www.researchgate.net/publication/36162709> a study to assess the effect of information booklet on the knowledge of caregivers regarding the management of children with juvenile diabetes in a selected area of Mumbai