



EFFECTIVENESS OF STRUCTURED EDUCATION ON SELF-ADMINISTRATION OF INSULIN IN TERMS OF KNOWLEDGE AND PRACTICE AMONG CLIENTS WITH DIABETES MELLITUS AT SELECTED HOSPITALS OF RANCHI, JHARKHAND

Nursing

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ABSTRACT

Background: Diabetes mellitus (DM) is a chronic metabolic disorder that poses a significant global health burden. **Objective:** To evaluate the effectiveness of structured education on knowledge and practice of insulin self-administration among clients with DM. **Methods:** A quantitative quasi-experimental one-group pre-test post-test design was conducted among 60 clients with DM selected by purposive sampling from hospitals in Ranchi. Structured teaching was delivered using posters, flip charts, flash cards, pamphlets, and practical demonstrations. Data were collected using a structured questionnaire and checklist, and analyzed with descriptive and inferential statistics. **Results:** Pre-intervention, 85% of participants had poor knowledge and 71.7% had unfavorable practices. Post-intervention, mean knowledge scores improved from 6.80 to 18.83 and mean practice scores from 5.18 to 11.02, both statistically significant ($p < 0.05$). Education level was significantly associated with knowledge, while prior history of insulin self-administration was associated with practice. **Conclusion:** Structured education programs significantly improve knowledge and practice of insulin self-administration among clients with DM.

KEYWORDS

Diabetes Mellitus; Structured Education; Self-Administration of Insulin; Knowledge; Practice; Insulin Therapy

INTRODUCTION

Diabetes mellitus (DM) is one of the fastest-growing global health challenges, with prevalence projected to rise from 177 million to 370 million by 2030 (1). It is a metabolic disorder characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Long-term complications include retinopathy, nephropathy, neuropathy, cardiovascular diseases, and increased mortality (4).

Effective management of diabetes requires a multidisciplinary approach with emphasis on patient education and self-care. Evidence suggests that structured outpatient education leads to better glycemic outcomes compared to inpatient sessions (2). Nurses play a pivotal role in equipping patients with knowledge and skills required for effective self-management of insulin therapy (8).

In Jharkhand, knowledge gaps remain substantial; a multicentric study showed the state had one of the lowest composite knowledge scores regarding diabetes (3). Hence, this study was undertaken to assess the impact of structured education on knowledge and practice regarding insulin self-administration among clients in Ranchi-

METHODS

A quasi-experimental one-group pre-test post-test design was adopted. The study was conducted in selected hospitals of Ranchi, Jharkhand, on 60 clients with diabetes mellitus meeting inclusion criteria. Purposive sampling was used. Ethical clearance and informed consent were obtained. Instruments: A structured questionnaire assessed knowledge and an observation checklist assessed practice. Intervention: Participants received 30-minute structured teaching on DM and insulin administration using posters, flip charts, flash cards, and demonstration of subcutaneous injection. Pamphlets were distributed. Post-test was conducted after 7 days using the same tools. Data analysis: Descriptive statistics summarized demographic data. Paired t-tests evaluated pre- and post-intervention differences. Chi-square tested associations between demographic variables and pre-test scores. Significance was set at $p < 0.05$.

RESULTS

Most participants were aged 46–61 years (46.8%), male (65%), Hindu

(86.7%), married (95%), and rural residents (53.3%). Education levels varied, with 21.7% having no formal education. Knowledge and practice: Pre-test showed 85% had poor knowledge and 71.7% unfavorable practice. Post-test revealed significant improvements: mean knowledge increased from 6.80 (SD 2.43) to 18.83 (SD 2.29), and mean practice from 5.18 (SD 1.41) to 11.02 (SD 1.56). Both were statistically significant ($p < 0.05$). Associations: Educational status was significantly associated with pre-test knowledge ($\chi^2 = 18.488, p = 0.002$). Prior history of self-administration of insulin was significantly associated with pre-test practice ($\chi^2 = 4.87, p = 0.027$).

DISCUSSION

The findings demonstrate the effectiveness of structured education in improving both knowledge and practice of insulin self-administration. This is consistent with earlier studies showing that diabetes education significantly enhances self-care practices and glycemic control (5,6). Similar to Shaini et al. (4), our results confirmed that clients with higher education were more likely to demonstrate better baseline knowledge. Education delivered through interactive methods such as demonstration, visual aids, and reinforcement was particularly effective. These results support global evidence that structured diabetes education is critical in chronic disease management (7,8,9).

Limitations

The study was limited to 60 clients, selected purposively from hospitals in Ranchi. Randomization was not used, which may limit generalizability. The focus was restricted to clients with insulin therapy, primarily type 1 DM.

Table 1: Distribution of Pre-test Scores on the Level of Knowledge and Practice on Self Administration of Insulin:

PRE-TEST KNOWLEDGE	PRE-TEST PRACTICE
Poor-51	Unfavorable-43
Good -9	favourable -17

Table 2: Mean and Standard Deviation of Pre-test and Post-test Knowledge and Practice on Self Administration of Insulin: N=60

Pre-test knowledge	Post-test knowledge	Pre-test practice	Post-test practice
Mean- 6.80	Mean-18.83	Mean -5.18	Mean-11.02
SD-2.43	SD-2.29	SD-1.41	SD-1.56

Table-3: Association Between Various Demographic Variables with Pre-test Knowledge on Self Administration of Insulin

Demographics Variable	Category	Level of Knowledge Regarding Self Administration of Insulin		Percentage %	Chi Square Test Result	
		N	Good			
		Poor %	N			
Age	30 - 45 Yrs	15	88.2%	2	11.8%	X ² =.352 DF=2 P=0.839
	46-61 Yrs	23	82.1%	5	17.9%	
	62- 77 Yrs	13	86.7%	2	13.3%	
Gender	Male	33	84.6%	6	15.4%	X ² =0.013 DF=1 P=0.909
	Female	18	85.7%	3	14.3%	
Religion	Hindu	44	84.6%	8	X ² =2.986 DF=3 P=0.334	
	Muslim	5	100%	0		
	Christian	1	50.0%	1		
	Sikh	1	100.0%	0		
Educational Status	No Formal Education	12	92.3%	1	7.7%	X ² =18.488 DF=5 P=0.002*
	Primary	7	100.0%	0	0.0%	
	Middle	16	94.1%	1	5.9%	
	Higher	4	57.1%	3	42.9%	
	Secondary Diploma Degree	3	42.9%	4	57.1%	
Occupation	Business	11	78.6%	3	21.4%	X ² =1.528 DF=4 P=0.822
	Clerical	2	100.0%	0	0.0%	
	Professional	15	88.2%	2	11.8%	
	Homemaker	16	88.9%	2	22.2%	
	Others	7	77.8%	2	0.0%	
Marital Status	Single	2	100.0%	0	0.0%	X ² =0.557 DF=2 P=0.757
	Married	48	84.2%	9	15.8%	
	Widow	1	100.0%	0	0.0%	
Location	Urban	22	78.6%	6	21.4%	X ² =1.702 DF=1 P=0.365
	Rural	29	90.6%	3	9.4%	
Family History	Father	17	89.5%	2	10.5%	X ² =1.702 DF=1 P=0.365
	Mother	9	100.0%	0	0.0%	
	Sibling	3	75.0%	1	25.0%	
	Grandparents	3	100.0%	0	0.0%	
	No Family History	19	76.0%	6	24.0%	
Source of Information	Mass Media	3	100.0%	0	0.0%	X ² =1.869 DF=3 P=0.600
	Health Care	43	84.3%	8	15.7%	
	Others	2	66.7%	1	33.3%	
	No Information	3	100.0%	0	0.0%	
Duration of Illness	0-3 Yrs	25	78.1%	7	21.9%	X ² =3.267 DF=2 P=0.195
	3 - 5 Yrs	11	100.0%	0	0.0%	
	Above 5 Yrs	15	88.2%	2	11.8%	
History of Self Administration of Insulin	No	31	81.6%	7	18.4%	X ² =0.951 DF=1 P=0.321
	Yes	20	90.9%	2	9.1%	

Note : * significant at p<0.05

Table -4: Association Between Demographic Variables with Pre-test Practice on Self Administration of Insulin

Demographics Variable	Category	Level of Practice regarding self administration of insulin		Chi Square Test Result	
		Un-favorable Practice	Favorable Practice		
		N	N		
Age	30 -45 Yrs	11	64.7%	6	X ² =0.94 DF=2 P=0.623
	62- 77 Yrs	8	53.3%	7	

Gender	Male	21	53.8%	18	46.2%	X ² =0.06 DF=1 P=0.807
	Female	12	57.1%	9	42.9%	
Religion	Hindu	28	53.8%	24	46.2%	X ² =0.91 DF=3 P=0.281
	Muslim	3	60.0%	2	40.0%	
	Christian	1	50.0%	1	50.0%	
	Sikh	1	100.0%	0	0.0%	
Educational Status	No Formal Education	6	46.2%	7	53.8%	X ² =3.24 DF=5 P=0.662
	Primary	3	42.9%	4	57.1%	
	Middle	10	58.8%	7	41.2%	
	Higher	3	42.9%	4	57.1%	
	Secondary Diploma Degree	4	57.1%	3	42.9%	
Occupation	Business	8	57.1%	6	42.9%	X ² =2.57 DF=4 P=0.631
	Clerical	0	0.0%	2	100.0%	
	Professional	10	58.8%	7	41.2%	
	Home-makers	10	55.6%	8	44.4%	
	Others	5	55.6%	4	44.4%	
Marital Status	Single	2	100.0%	0	0.0%	X ² =2.584 DF=2 P=0.275
	Married	30	52.6%	27	47.4%	
	Widow	1	100.0%	0	0.0%	
Locality	Urban	16	57.1%	12	42.1%	X ² =0.097 DF=1 P=0.755
	Rural	17	53.1%	15	46.9%	
Family History	Father	11	57.9%	8	42.1%	X ² =1.37 DF=4 P=0.84
	Mother	4	44.4%	5	55.6%	
	Siblings	3	75.0%	1	25.0%	
	Grandparents	2	66.7%	1	33.3%	
Source of Information	Mass Media	1	33.3%	2	66.7%	X ² =4.70 DF=3 P=0.195
	Health Care	30	58.8%	21	41.2%	
	Others	0	0.0%	3	100.0%	
Duration of Illness	0- 3 Yrs	21	65.6%	11	34.4%	X ² =3.43 DF=2 P=0.179
	3 - 5 Yrs	4	36.4%	7	63.6%	
	Above 5 Yrs	8	47.1%	9	52.9%	
History of Self Administration of Insulin	No	25	65.8%	13	34.2%	X ² =4.87 DF=1 P=0.027
	Yes	8	36.4%	14	63.6%	

Note : * Significant at p<0.05

CONCLUSION

Structured education significantly improves knowledge and practice of insulin self-administration among clients with DM. Nurses and healthcare providers should integrate structured educational strategies, using demonstration and reinforcement, into routine diabetes care to improve outcomes and quality of life.

REFERENCES (Vancouver Style)

- Wiley J, Westbrook M, Long J, Greenfield JR, Day RO, Braithwaite J. Diabetes education: the experiences of young adults with type 1 diabetes. *Diabetes Ther.* 2014;5:299-321.
- Pieber TR, Brunner GA, Schmedl WJ, Schattenberg S, Kaufmann P, Krejcs GJ. Evaluation of a structured outpatient group education program for intensive insulin therapy. *Diabetes Care.* 1995;18(5):625-30.
- Kaushal K, Parashar A, Dhadwal DS, Jaswal VM, Jaret P, Mazta SR. Awareness and Knowledge of Diabetes among Adult Population of Shimla Using CURES-9 Questionnaire. *Educ Health Prof.* 2023;6(1):27-33.
- Surendranath A, Nagaraju B, Padmavathi GV, Anand SC, Fayaz P, Balachandra G. Knowledge and practice of insulin self-administration among patients with diabetes mellitus. *Asian J Pharm Clin Res.* 2012;5(1):63-6.
- Gathu CW, Shabani J, Kuniyha N, Ratanis R. Effect of diabetes self-management education on glycaemic control among type 2 diabetic patients: a randomized controlled trial. *Afr J Prim Health Care Fam Med.* 2018;10(1):1-9.
- REPOSE Study Group. Relative effectiveness of insulin pump treatment over multiple daily injections and structured education for type 1 diabetes: cluster randomized trial. *BMJ.* 2017;356:j1285.
- Davies M. The reality of glycaemic control in insulin-treated diabetes: defining the clinical challenges. *Int J Obes.* 2004;28(Suppl 2):S14-22.
- Jiang XJ, Jiang H, Lu YH, Liu SL, Wang JP, Tang RS, et al. Self-efficacy-focused structured education for type 2 diabetes: a multicentre randomized trial. *J Clin Nurs.* 2019;28(17-18):3299-309.

9. Lawton J, Rankin D. How do structured education programmes work? Ethnographic study of the DAFNE programme for type 1 diabetes in the UK. *Soc Sci Med.* 2010;71(3):486-93.
10. Jarvis J, Skinner TC, Carey ME, Davies MJ. How can structured self-management education improve outcomes in type 2 diabetes? *Diabetes Obes Metab.* 2010;12(1):12-9.
11. Murphy K, Casey D, Dinneen S, Lawton J, Brown F. Factors influencing diabetes self-management after a structured education (DAFNE) programme. *J Clin Nurs.* 2011;20(9-10):1282-92.
12. Mohamed H, Al-Lenjawi B, Amuna P, Zotor F, Elmahdi H. Culturally sensitive patient-centred educational programme for self-management of type 2 diabetes: a randomized trial. *Prim Care Diabetes.* 2013;7(3):199-206.