

Research Article



A Study on the Assessment of Insulin and its Types Towards the Knowledge and Attitude Among Nursing Staff in A Tertiary Care Teaching Hospital

Satish Kumar BP¹, Gagana P², Blessy Mary Rajan³, Asha KH^{1*}

¹Associate professor, Department of Pharmacy Practice, Sri Adichunchanagiri College of Pharmacy, B G Nagar, India.

²Pharm D Intern, Sri Adichunchanagiri College of Pharmacy, B G Nagar, India.

*Corresponding author's E-mail: ashakh815085@gmail.com

Received: 11-05-2022; Revised: 23-07-2022; Accepted: 29-07-2022; Published on: 15-08-2022.

ABSTRACT

Diabetes is the most widespread chronic disease with long-term complications in the world. Insulin therapy is a life-saving treatment for hyperglycemic patients, but if administered inappropriately, it can be fatal. The majority of nurses may lack adequate knowledge of Insulin, resulting in medication administration errors that affect the patients. So, this study aims to evaluate the knowledge and attitude among nursing staff about Insulin and its types. The objective of this study is to assess the Knowledge and Attitude of Insulin and its types in Nursing staff at Adichunchanagiri Hospital and Research Centre, B.G. Nagar. A prospective observational study was conducted using self-prepared questionnaires to assess the knowledge and attitude of the nursing staff. Microsoft Excel spreadsheets were used to enter the data. SPSS statistics software was used to conduct the statistical analysis. A total of 160 participants were enrolled in the study, out of which 28.1% were male and 79.1% were female. Out of 160 participants, 24(15%) had poor knowledge, 107(66.8%) participants had average knowledge and 29(18.1%) participants had good knowledge. In this study, it was found that out of 160 participants 28 (17.5%) had a poor attitude, 71(44.3%) had an average attitude and 61(38.1%) had a poor attitude towards Insulin and its types. Overall, the study tells that the majority of the Nursing staff have average knowledge and average attitude toward insulin and its types. According to our findings, there is a significant need for nursing professionals to be trained in the administration of insulin and its importance in diabetes management to provide better patient care. This study emphasizes the significance of workplace-based training in improving insulin injection-related Knowledge, Attitude, and Practice. The findings of this study can assist nurses in developing and implementing decisions to prevent insulin administration errors.

Keywords: Administration error, Attitude, Diabetes, Insulin, knowledge, Nurses.

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DOI:
10.47583/ijpsrr.2022.v75i02.013



DOI link: <http://dx.doi.org/10.47583/ijpsrr.2022.v75i02.013>

INTRODUCTION

Diabetes is a metabolic condition characterized by chronic hyperglycemia due to disruption in the carbohydrate, fat, and protein metabolism. As a result, it has been designated as the most common global chronic disease, with long-term consequences and rising healthcare costs. Insulin is a hormone that allows blood glucose to enter cells, providing them with the energy they require to function. It also contributes to the maintenance of blood glucose levels. Insulin enables the body to store excess glucose in the liver when there is too much glucose in the bloodstream. The stored glucose isn't released until the blood glucose level decreases, such as between meals or when the body is stressed or needs an extra boost of energy. Diabetes develops as a result of a lack of effective insulin.

Insulin therapy is a life-saving treatment for hyperglycaemic patients in the hospital setting however it

can be life-threatening if administered incorrectly.¹ As a result, the Joint Commission on Accreditation of Health Care Organizations has identified it as one of five 'High Alert' medications with the highest risk of causing injury to patients due to prescription errors.² Errors related to Insulin treatment include problems with Insulin administration timing, type, and the route of administration or injection technique. Insulin-related errors and side effects are still prominent over the world. A study by the National Diabetes Inpatient Audit 2017 suggest a significant proportion of the patient on Insulin experience medication error related to their Insulin (49%).³

Health care professionals should be educated, especially Nurses who are in close contact with the patients to avoid medication errors. Nurses play an important role in Diabetes education as they constitute the largest group of healthcare professionals who have a lengthy contact with diabetic patients.⁴ They are also responsible for identifying suspicious signs of hyperglycaemia and hypoglycaemia and administration of Insulin. Therefore, they should have sound knowledge and good practice in Insulin injection techniques to administer Insulin correctly and to educate patients or their relatives properly.⁵

It is also possible that due to lack of practice reality and interest in the administration of Insulin may lead to inadequate confidence, knowledge, and skills by the Nursing staff to successfully care for those suffering from



Diabetes. It is, therefore necessary that they should know how Insulin works, when and why Insulin is needed, and how dosing regimen change is made. Knowledge and Attitude influence patients' behavior and outcomes.⁶ Inadequate knowledge among Nurses about the safe use of insulin may contribute to medication errors and patient harm. The growing number of Insulin products in the market, as well as the complexities associated with their use, may contribute to a lack of confidence and competence among nurses while delivering insulin to patients. May contribute to a lack of confidence and competence among Nurses when administering Insulin to patients. The role of Nurses in caring for and educating patients with diabetes has dramatically changed in scope and scale with the worldwide increase in the incidence and prevalence of diabetes.⁷ So it is a challenge for Nurses to cover the gap in Insulin treatment knowledge to achieve better patient care. Effective management of diabetes is essential to reduce the early and long-term complications of diabetes and inhibit the onset of associated chronic diseases.⁷

Aim of the study

Most Nurses may have insufficient knowledge of Insulin and its preparation, which leads to medication administration errors causing harm to the patients. So, this study aims to assess the knowledge of Insulin in nursing staff to provide better patient care.

MATERIALS AND METHODS

Study site

Adichunchanagiri Hospital and Research Centre BG Nagar Nagamangala Taluk, Mandya Dist.

Study design

Prospective and observational educational study.

Study period

The research took six months to complete.

Study criteria

This study will be carried out by considering the following criteria:

Inclusion Criteria

All the Nurses working in the hospital.

Exclusion criteria

Nurses who are not willing to participate in this study.

Source of data

Questionnaire forms

Method of data collection

After considering Inclusion and exclusion criteria, the Nurses will be enrolled after taking written consent forms from the Nursing staff by using self-prepared questionnaire forms to assess the knowledge and

attitude among the Nursing staff in the Adichunchanagiri Hospital and Research Centre. The data will be analyzed by using suitable statistical methods.

Study Approval

The study was approved by Institutional Ethical Committee, AH&RC, B.G Nagara, (No. IEC/AH&RC/AC/015/2021)

Statistical Analysis

The data was recorded into Microsoft Excel spreadsheets and then double-checked for accuracy. The statistical analysis was performed using IBM SPSS statistics software for windows, version 22 (Armonk, NY, USA). Descriptive statistical methods were used including means, standard deviation, and frequency. Variables included in the analysis were age, gender, qualification, experience, and department.

The chi-square test was used to assess the association among the study variables and a p-value of <0.05 was considered statistically significant.

RESULTS AND DISCUSSION

Table 1: Descriptive statistics

		Frequency	Percent
Age (in yrs.)	20-25	13	8.10%
	26-30	35	21.80%
	31-35	65	40.60%
	36-40	24	15%
	41-45	11	6.80%
	>46	12	7.50%
Sex	FEMALE	115	71.9
	MALE	45	28.1
Department	Casualty	20	12.5
	Gynaecology	17	10.6
	ICU	34	21.3
	Major OT	10	6.3
	Medicine	15	9.4
	OBG	10	6.3
	Orthopaedic	10	6.3
	Paediatric	15	9.4
	POW	15	9.4
	Surgery	14	8.8
Qualification	BSc	27	16.9
	Diploma in GNM	125	78.1
	PB BSc	8	5
Experience	Less than 10 years	90	56.3
	More than 10 years	70	43.8



A total of 160 participants were enrolled in the study, out of which 28.1% were male and 79.1% were female. Out of 160 participants, 24(15%) they have poor knowledge, 107(66.8%) participants had average knowledge and 29(18.1%) participants had good knowledge. In this study, it was found that out of 160 participants 28

(17.5%) had a poor attitude, 71(44.3%) had an average attitude and 61(38.1%) had a poor attitude toward Insulin and its types. Overall, the study tells that the majority of the Nursing staff have average knowledge and average attitude toward Insulin and its types.

Table 2: Descriptive statistics of questionnaire data

		Frequency	Percent
3. In general, onset of action of Rapid acting Insulin is:	a) 15mins	88	55%
	b) 30-60mins	53	33.1%
	c) 1-2hrs	16	10%
	d) 6-8hrs	3	1.9%
7. Duration of action of Short acting Insulin is:	a) 15mins	33	20.6%
	b) 30-60mins	88	55%
	c) 1-2mins	6	3.8%
	d) 4hrs	33	20.6%
9. Which type of Insulin cannot be manually mixed in a syringe:	a) Insulin Lispro	13	8.1%
	b) Insulin Aspart	25	15.6%
	c) Neutral Protamine Hagedorn	41	25.6%
	d) Glargine	81	50.6%
10. Which of the following Insulin is only suitable for Intravenous administration:	a) Glulisine	8	5%
	b) Aspart	12	7.5%
	c) Regular insulin	126	78.8%
	d) Detemir	14	8.8%
	c) It does not matter	20	12.5%
18. What is the optimum angle required for giving Insulin injection subcutaneously by Insulin syringe?	d) You should not use the same Insulin syringe	58	36.3%
	a) 45 degree	137	85.6%
	b) 75 degree	8	5%
	c) 120 degree	12	7.5%
	d) 180 degree	3	1.9%
19. For how many days opened Insulin vials can be used?	a) 28 days	119	74.4%
	b) 15 days	13	8.1%
	c) 10 days	18	11.3%
	d) 45 days	10	6.3%
20. What is the gap required for administration of Insulin before eating food:	a) 15min	79	49.4%
	b) 30mins	64	40%
	c) 45mins	16	10%
	d) 1hr	1	0.6%
22. Storage temperature for Insulin:	a) 36-46 degrees F	114	71.3%
	b) 56-80 degrees F	32	20%
	c) Only A	8	5%

Table 2 shows the frequency and percentage of the responses of nurses to the knowledge and attitude-related questionnaires.

Knowledge and Attitude of Nursing staff towards insulin and its types

The knowledge of participants was graded as (<11) poor, (11-18) average, (>18) good, and attitude was graded as (<3) poor, (3-5) average, and (>5) good. Out of 160 participants, 24(15%) them had poor knowledge, 107(66.8%) participants had average knowledge and 29(18.1%) participants had good knowledge, it was found that 1(0.6%) had poor knowledge, 58(36.2%) had average knowledge and 101(63.1%) had good knowledge on Insulin and its types.

In this study, it was found out of 160 participants 28 (17.5%) had a good attitude, 71(44.3%) had an average attitude and 61(38.1a %) had a poor attitude, towards Insulin and its types.

Surprisingly, in this study majority of the participants had average knowledge (66.8%) and average attitude (44.3%).

Table 3: Knowledge and Attitude score of Individual participants (N=160)

	GRADE					
	POOR		AVERAGE		GOOD	
	FRE	PER	FRE	PER	FRE	PER
Knowledge	24	15%	107	66.8%	29	18.1%
Attitude	28	17.5%	71	44.3%	61	38.1%

Association of Qualification with Knowledge-based questionnaire

Chi-Square analysis displayed that. (Table 4) Diploma in GNM qualified subjects (More than 75%) retain statistically significant higher knowledge on the onset of action of Rapid-acting Insulin (χ^2 Value =16.1; P=0.013), NPH (Neutral Protamine Hagedorn) Insulin (χ^2 Value =15.76; P=0.015); a most common method of injecting Insulin (χ^2 Value =10.1; P=0.039) and the knowledge on the Duration of action of Short-acting Insulin (χ^2 Value =16.8; P=0.01) when compared to other qualifications. (Fig 1)

Table 4: Association of Qualification with Knowledge-based questionnaire

			Qualification			χ^2 Value	P Value
			BSc	Diploma in GNM	PB BSc		
			N				
7. Duration of action of Short-acting Insulin is:	a) 15mins	N	2	31	0	16.8	0.01*
		%	6.10%	93.90%	0.00%		
	b) 30-60mins	N	16	67	5		
		%	18.20%	76.10%	5.70%		
	c) 1-2mins	N	1	3	2		
		%	16.70%	50.00%	33.30%		
	d) 4hrs	N	8	24	1		
		%	24.20%	72.70%	3.00%		

Table 4 shows a significant association between Qualifications with Knowledge, the responses were statistically significant with a p-value of less than 0.05.

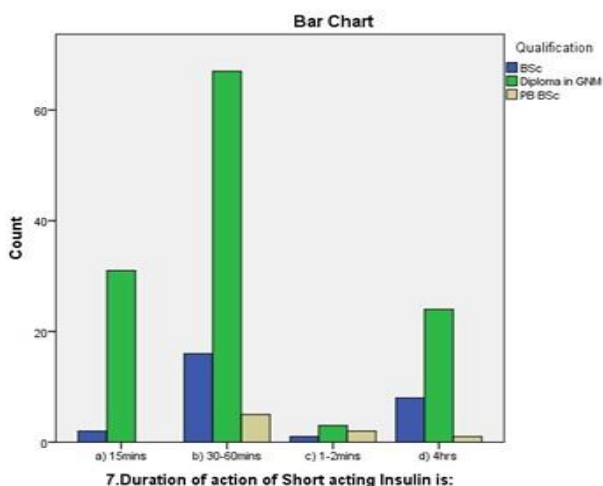


Figure 1: Association of Qualification with a Knowledge level

Figure 1 shows that there is a significant association between the qualifications and knowledge of the participants.

Association of Experience with Knowledge-based questionnaire

The majority of more than 10 years of experienced subjects (Table 5) exhibited a statistically significant higher knowledge of basal insulin (χ^2 Value =11.09; P=0.011) when compared to less than 10 years of experienced subjects. Whereas the majority of fewer than 10 years of experienced subjects exhibited a statistically significant higher knowledge of the usage of insulin vials after it was opened (χ^2 Value =9.012; P=0.029) when compared to higher than 10 years of experienced subjects. (Fig 2)

Table 5: Association of Experience with Knowledge-based questionnaire:

		N	Experience		χ ² Value	P-Value
			Less than 10 years	More than 10 years		
23. What is the color of the following? [I. Regular and Neutral Protamine Hagedorn Insulin]	a) Colourless	N	77	51	3.9	0.046*

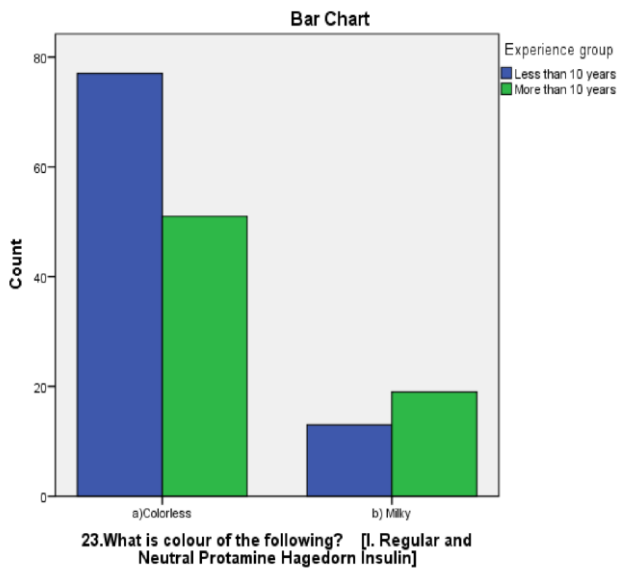


Figure 2: Association of Experience with Knowledge-based questionnaire

Fig 2 shows that there is a significant association between the Experience and Knowledge of the participants with a p-value less than 0.05.

Association of Experience with Attitude-based questionnaire

Chi-Square analysis displayed that there is no significant association between experience and attitude. (Fig 3)

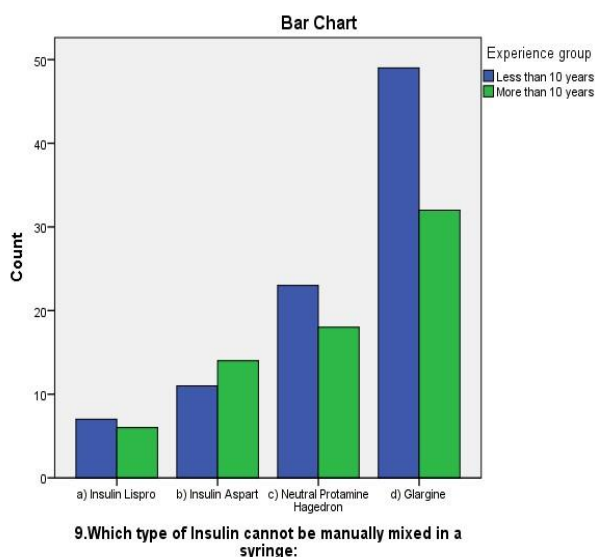


Figure 3: Association of Experience with Attitude-based questionnaire

Figure 3 shows that there is no statistically significant association between Attitude and Experience

DISCUSSION

A total of 160 people took part in the study, with an average score of (18) for their knowledge. And Attitude was graded as (<3), (3-5) average (>5) average. Out of 160 participants, 24 (15%) them had poor knowledge, 107(66.8%) participants had average knowledge and 29 (18.1%) participants had good knowledge in our study, it was found that out of 160 participants 28 (17.5%) had a poor attitude, 71(44.3%) had Average Attitude and 61 (38.1%) had poor Attitude.

As overall knowledge about Insulin was average it is necessary to conduct seminars and workshops to regularly update the knowledge of Insulin and its role in the management of diabetes.

Similarly, **Rekha Singh, T Thilagawathi et al.** conducted a study on 101 nursing staff 41 participants were female and 60 were male. Almost 80% of participants denied as trained in diabetes management in hospitalized patients in their nursing curriculum. A similar deficit in knowledge was seen in hypoglycaemia management, glucose monitoring, insulin storage, expiry of insulin, and injection techniques.

Alison Robb et al. did a study on Insulin knowledge and practice: a survey of district nurses in Northern Ireland. This study surveyed a convenience sample of 164 district nurses working within one Health and Social Care Trust in Northern Ireland to ascertain their knowledge and practice regarding insulin. Deficits in district nurses' knowledge and practice were identified in areas relating to insulin action, dosage, storage, injection site technique and rotation, hypoglycaemic/ hyperglycaemic management, pharmacological action, and prescription format. These deficits highlight the need for workplace-based learning and development programs, incorporating real-time, point-of-care interventions, to enhance and maintain district nurses' insulin knowledge and practice.

Satish Kumar B. P, Asha K H, Blessy Mary Rajan, Gagana P Conducted a prospective study among nursing staff to assess the knowledge and attitude about insulin and its types. Descriptive statistics were used to represent the study characteristics. This study tells that there is a significant association between qualification and experience with knowledge. They also confirmed that experience is an important factor to assess the knowledge and attitude among nursing staff.



CONCLUSION

The present study showed that the Nursing staffs of AH&RC have average knowledge and their attitude towards Insulin and its types was satisfactory. Insulin-related knowledge among the nurses evaluated in this study was influenced by several factors including age, duration of practice, level of education, and how frequently the Nursing staff read updates to improve their knowledge of Insulin and its types. This study points out a clear need to develop educational programs for the Nursing staff about Insulin administration and its role in the management of Diabetes to provide better patient care. Our study also highlights the need for workplace-based learning and training to further enhance Insulin injection-related Knowledge, Attitude, and Practice.

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Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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