

An Observational Questionnaire Based Study on Nursing Students' At a Tertiary Care Hospital -Erudition, Opinion and Exercise on Diabetic Nutrition of the Patients

Dr. SRIDEVI S.A ^{1*} and Dr. B.KALAISELVI ²

¹Ph.D. Research Scholar, Faculty of Medicine-Pharmacology,
Dr. MGR Educational and Research Institute Deemed to be University, Maduravoyal, Chennai, India.

*Corresponding Author Email: sridevidakshya@gmail.com

²Professor, Department of pharmacology-, ACS medical college and hospital,
Dr. MGR Educational and Research Institute Deemed to be University,
Maduravoyal, Chennai, India.

Abstract

Background: Non-insulin dependent diabetes projects as a major threat which is increasing in India progressively. The mortality and morbidity due to diabetes mellitus keeps increasing also due to inadequate knowledge of health workers and paramedical. **Purpose:** This study mainly focusses on the ability of the nursing students at their academic stage whether they have adequate knowledge, attitude and practice domains towards diabetic patients. This study was done at a private medical college and hospital, among the nursing students. **Methods:** It is a cross sectional survey study where the erudition, opinion and exercise about diabetic nutrition of 200 nursing students were evaluated at a private medical college. Data was analyzed as per the latest SPSS. The assessment seems more significant among the final year nursing students than other batches of study. **Results:** This study shows that the final year nursing students were better than second year and third year students. All three domains were good among final year nursing students than their juniors. Statistical significance were obtained among the final year hostellers who had more connection with the diabetic patients who had the complete opportunity to attend the ward postings and lectures than their juniors. **Conclusion:** Knowing the nutritional pattern of diabetic patients helps the nursing students in prevention of progression of diabetes.

Keywords: Nursing Students; Diabetic Questionnaire; Nutritional Management; Exercise Domain; Opinion Domain.

INTRODUCTION

Longevity, sedentary lifestyle and obesity contribute to the increased chronic non-communicable diseases.¹ Considered an epidemic because it is present with a high incidence in all continents, it is also a public health problem due to social damages and costs related to treatment, in addition to the high morbidity and mortality.² To study the erudition (learning skill), the opinion (approach skill), the exercise (performance skill) of all batches of nursing students about the nutrition pattern of diabetic patients at a tertiary care medical college and hospital is the major objective of this study. A recent position statement jointly issued by the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics.³

Non-insulin dependent diabetes called as type 2 diabetes is of major concern because of its association with other co morbid conditions namely: hypertension, obesity, hyper lipidemia and coronary artery heart disease (CAHD). All these collectively damage the health of an individual leading to early complications and death. The lack of systematized care, professionals' lack of

knowledge about clinical management and the partial (non)compliance with the policies aimed at the person living with DM, as well as the lack of commitment of the nurses to follow the recommended protocols and manuals, are factors that contribute to poor DM control.⁴ The nutrition plays a vital role in preventing the progression of any metabolic syndrome. The opinions, exercise and erudition of the diet pattern must be made aware to all health professionals. Nurses' negative attitudes can affect their practice on nutritional management of diabetes. Other factors include time, nutrition education, organizational support, and resource availability⁵⁻⁷.

This begins at the level of nursing care where they provide the immediate bedside care. Thus, nurses should be aware of the guidelines for the nutritional management of diabetes.⁸ Hence the nursing students are to be trained with utmost depth of curriculum about the nutrition and diet pattern for the diabetic patients. Adequate knowledge, positive attitudes, and good practice of nurses are important to achievement of therapeutic goals for patients in diabetes and supporting patients in their self-care practice.⁹⁻¹⁰

METHOD

Study population: nursing students in a tertiary care medical college

Inclusion criteria: all the nursing students who gets trained at the tertiary care medical college

Exclusion criteria: MBBS, BDS, physiotherapy and pharmacy students are excluded.

Study duration: 6 months

Study method: observational questionnaire based study

Research Design: cross sectional study.

Study sample: Out of 340, 187 students participated in the study.

There were four batches of nursing students each with a strength of 85 students ie 340. The Google form was framed which included all three domains and sent to the students where only 187 expressed their concern and participated in the study. Those responded to the domains were collected in the Google sheet. The results were analyzed using statistics software.

Ethical considerations

Ethics committee approval letter has been obtained for the study with the reference number ethics committee approval letter (NO. 823/2023/IEC/ACSMCHDt.08.06.2023). Permission to start the study was obtained from dean, principal of nursing and other coordinators of the nursing college.

Informed Consent: The willingness to participate the study was asked as the first question in the Google Doc questionnaire form.

RESULTS

The outcomes of their erudition, opinion and knowledge have been tabulated as results as mentioned below:

Table 1: shows their demographic details, year of study, gender and mode of stay.

Table 1: demographic details, year of study, gender and mode of stay

Variables	Age(years)	Numbers	n= 211	
Age (years)	18	41		
	19	56		
	20	59		
	21	55		
	Total	211		
Academic year	First year	41		
	Second year	56		
	Third year	59		
	Final year	55		
	Total	211		
			Male	Female
sex	First year	41	20	21
	Second year	56	19	37
	Third year	59	21	38
	Final year	55	23	32
	Total	211	83	128
			Hostellers	Days-scholar
Mode of stay	First year	41	32	9
	Second year	56	35	21
	Third year	59	42	17
	Final year	55	49	6
	Total	211	158	53

Table 2 The questionnaire was taken from a study done by Farzaei.¹¹ the Nutritional Management of Diabetes Knowledge Test was also included based on study done by a researcher.¹² and this has been modified as per the requirement of this research at the tertiary care hospital. Willingness to participate was obtained along with the questionnaire in Google form format. The learning domain of the nutritional pattern required for the diabetic patients has been recorded.

Table 2: Learning domain

No	Questionnaire item	First year(n=41)		Second year(n=56)		Third year(n=59)		Final year(n=55)	
		yes	no	yes	no	yes	no	yes	no
1	Patients must include all food items	11	30	21	35	34	25	37	18
2	Every meal should have Carbohydrates, proteins and fats	12	29	23	33	31	28	36	19
3	Oil and ghee increases LDL levels	10	31	24	32	32	27	35	20
4	Does all meal have the label of carbohydrate content in the food?	9	32	20	36	30	29	38	17
5	Does morning tea/ coffee raises blood sugar level?	11	30	21	35	31	28	39	16
6	Carbohydrate is more important than protein	9	32	23	33	32	27	37	18
7	Fasting blood sugar should be below 126 mg/dl	10	31	26	30	33	26	36	19
8	Patient should have candy in times of giddiness	12	29	21	35	34	25	35	20
9	Toned milk is better than full cream milk	7	34	20	36	35	24	39	16
10	Maximum contribution of calories is from carbohydrates	6	35	27	29	36	23	37	18
11	Fruits contain carbohydrates	9	32	22	34	36	23	38	17
12	Extra calorie diet must be restricted	11	30	21	35	35	24	36	19
13	Ghee is better than animal protein	9	32	25	31	34	25	32	23

14	Walking 30 minutes a day reduces hyperglycemia	8	33	21	35	33	26	33	22
15	Carbohydrate alone increases glucose level.	11	30	24	32	34	25	34	21
16	Weight gain causes diabetes.	9	32	25	31	35	24	35	20
17	Blood pressure is associated with diabetes.	8	33	22	34	34	25	36	19
18	Patient should include fiber in the diet	9	32	21	35	33	26	35	20
19	Protein intake can be increased than usual.	11	30	21	35	32	27	38	17
20	High fat diet should never be included	7	34	20	36	30	29	39	16

Scoring: correct (1), incorrect (2)

Table 3 shows opinion about dietary pattern of diabetics. First year students are designated as 'A', second year as 'B', third year as 'C', and final year as 'D'. Scoring is recorded as: 1 never, 2 rarely, 3 sometimes, 4 often, 5 always, in the score of (1 to 5)

Table 3: Opinion domain

Response (n)					
Questionnaire	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
1.diet and glucose profile go hand in hand	A (11) B(10) C(9) D(7)	A(9) B(8) C(9) D(7)	A(8) B(13) C(15) D (11)	A(6) B(14) C(13) D(15)	A(7) B(11) C(13) D(15)
2. diabetic diet chart mandatory for all hospitalized patients	A(10) B(8) C(8) D(8)	A(10) B(11) C(9) D(8)	A(7) B(14) C(15) D (9)	A(8) B(14) C(13) D(16)	A(6) B(10) C(13) D(14)
3. calorie calculation important at the beginning of assessment	A(9) B(8) C(8) D(9)	A(11) B(10) C(10) D(5)	A(7) B(15) C(11) D (10)	A(8) B(13) C(15) D(15)	A(6) B(11) C(15) D(16)
4.weight to be calculated to all hospitalized patients	A(10) B(9) C(8) D(8)	A(8) B(9) C(10) D(6)	A(5) B(12) C(10) D(13)	A(8) B(15) C(15) D(14)	A(8) B(11) C(15) D(14)
5. Obese patients need extra care than non-obese among diabetics.	A(10) B(8) C(8) D(8)	A(10) B(11) C(9) D(8)	A(7) B(14) C(15) D (9)	A(8) B(14) C(13) D(16)	A(6) B(10) C(13) D(14)
6. Once diagnosed, should always follow diet chart plan.	A(13) B(9) C(5) D(10)	A(7) B(9) C(13) D(4)	A(2) B(15) C(18) D (16)	A(9) B(15) C(14) D(17)	A(10) B(12) C(15) D(17)
7. Nutritionist plays vital role in the hospitalized patients.	A(6) B(3) C(9) D(7)	A(15) B(10) C(9) D(7)	A(2) B(17) C(15) D (11)	A(9) B(14) C(13) D(15)	A(10) B(11) C(13) D(15)
8. Life style modification helps in the non-progression of diabetes.	A(6) B(6) C(8) D(8)	A(10) B(9) C(8) D(7)	A(9) B(14) C(14) D (12)	A(7) B(15) C(12) D(15)	A(9) B(12) C(17) D(13)
9. Diet chart controls weight of the patient.	A(7) B(10) C(8) D(10)	A(9) B(8) C(9) D(7)	A(10) B(13) C(15) D (9)	A(8) B(14) C(14) D(14)	A(7) B(11) C(13) D(15)
10. doctors, paramedics, nurses and all other hospital attenders must be aware of the diabetic diet chart	A(11) B(12) C(9)	A(9) B(8) C(9)	A(8) B(12) C(15)	A(6) B(13) C(13)	A(7) B(11) C(13)

	D(7)	D(7)	D (11)	D(15)	D(15)
11. based on the diet chart, nurses have to inform the patient's relative daily	A(7) B(10) C(8) D(10)	A(9) B(8) C(9) D(7)	A(10) B(13) C(15) D (9)	A(8) B(14) C(14) D(14)	A(7) B(11) C(13) D(15)
12. Diet chart awareness to be given by the nurses than nutritionist for the patient.	A(18) B(9) C(12) D(7)	A(11) B(9) C(9) D(7)	A(10) B(10) C(15) D (15)	A(8) B(14) C(13) D(11)	A(8) B(14) C(17) D(15)
13. Only the nurses give mental support about diabetic chart than the doctors or nutritionist.	A(6) B(6) C(8) D(8)	A(10) B(9) C(8) D(7)	A(9) B(14) C(14) D (12)	A(7) B(15) C(12) D(15)	A(9) B(12) C(17) D(13)
14.nurses look after daily whether proper meal is delivered than the attenders	A(6) B(3) C(9) D(7)	A(15) B(10) C(9) D(7)	A(2) B(17) C(15) D (11)	A(9) B(14) C(13) D(15)	A(10) B(11) C(13) D(15)
15. Nurses only should report the calorie intake and monitor the glucose profile on a daily basis.	A(13) B(9) C(5) D(10)	A(7) B(9) C(13) D(4)	A(2) B(15) C(18) D (16)	A(9) B(15) C(14) D(17)	A(10) B(12) C(15) D(17)

A= first year, B=second year C= third year and D=final year

Table 4 shows Participants' exercise skill in implementing diabetic diet pattern and the Scoring is given as: never (0), sometimes (1), often (2), and always (3) which range from (0 to 3 score).

Table 4: Exercise domain

Questionnaire	Never	Sometimes	Often	Always
1.I use the diet chart sheet entry daily for the patient	A(13) B(10) C(8) D(7)	A(10) B(13) C(18) D(7)	A(06) B(19) C(23) D(17)	A(12) B(19) C(19) D(27)
2. I calculate the ratio of weight in kg by height in meter square.	A(9) B(8) C(9) D(7)	A(15) B(10) C(15) D(12)	A(6) B(19) C(15) D(16)	A(13) B(17) C(20) D(20)
3. I will ask about the history of their diet at home.	A(9) B(10) C(8) D(11)	A(10) B(9) C(11) D(11)	A(12) B(8) C(18) D(15)	A(10) B(19) C(22) D(19)
4. I will monitor if there is any weight gain or loss and report it to the doctor	A(7) B(11) C(12) D(11)	A(12) B(13) C(9) D(11)	A(14) B(18) C(19) D(14)	A(8) B(14) C(19) D(19)
5. I will inform their relatives the daily blood sugar profile to their attenders.	A(10) B(11) C(11) D(13)	A(13) B(8) C(14) D(10)	A(10) B(18) C(15) D(13)	A(8) B(19) C(19) D(19)
6. I will modify the diet only after the confirmation from the nutritionist	A(6) B(15) C(12) D(7)	A(9) B(11) C(12) D(12)	A(10) B(15) C(18) D(16)	A(6) B(15) C(17) D(21)
7. If there is increase sugar level for a non-diabetic patient, I will inform the physician	A(11) B(15) C(12) D(7)	A(9) B(13) C(9) D(12)	A(8) B(14) C(20) D(16)	A(13) B(14) C(18) D(21)

8. I will arrange nutritional counseling for the non-diabetic patients with increased glucose	A(12) B(9) C(13) D(9)	A(14) B(15) C(15) D(5)	A(7) B(20) C(11) D(10)	A(8) B(13) C(18) D(15)
9. I will record the daily meal intake in their case sheets	A(16) B(10) C(13) D(8)	A(10) B(17) C(15) D(11)	A(5) B(12) C(15) D(18)	A(8) B(15) C(15) D(18)
10. I motivate them to strictly follow the diabetic diet chart	A(13) B(8) C(13) D(8)	A(10) B(16) C(14) D(12)	A(7) B(14) C(15) D(14)	A(11) B(19) C(15) D(19)
11. I will show them glucose report to the patient and explain the effectiveness of the diet	A(13) B(11) C(10) D(13)	A(12) B(14) C(18) D(8)	A(7) B(15) C(18) D(20)	A(9) B(20) C(19) D(27)
12. I will monitor the anti-diabetic drugs causing hypoglycemia	A(7) B(11) C(11) D(15)	A(12) B(8) C(14) D(22)	A(14) B(18) C(20) D(14)	A(8) B(19) C(14) D(14)
13. I mention the diet chart at the time of their discharge	A(11) B(17) C(12) D(12)	A(16) B(13) C(14) D(12)	A(8) B(12) C(19) D(16)	A(6) B(13) C(14) D(15)
14. I will inform the relatives to calculate the diet chart and record at home after discharge	A(9) B(11) C(11) D(10)	A(14) B(13) C(14) D(12)	A(10) B(13) C(20) D(14)	A(8) B(19) C(14) D(19)
15. I review the patients diabetic diet pattern when they come for next visit	A(12) B(12) C(12) D(7)	A(11) B(9) C(14) D(12)	A(8) B(6) C(18) D(16)	A(10) B(18) C(13) D(20)

A= first year, B=second year C= third year and D=final year

Procedure and data collection

All the data were collected via Google sheet questionnaire. The parameters included the age, sex, year of study, mode of stay. These were the demographic particulars. Rest were the questionnaires assessing their erudition, opinion and exercises regarding nutritional management in the diabetic patients. The higher the score in knowledge domain shows their depth in it. In the attitude scale it varies from 15 to 75 based on their response of agree to disagree. The standardized score has been obtained and categorized into better, good and poor scoring. The practices questionnaire utilized the four-point liker scale where they responded as never to always. Based on this the scoring was given. Here again the category given as better, good and poor. All the students were asked for their in participating in the study. Special request had been taken from the nursing principal before the start of the study. She played the key role in circulating the Google form to all the respective years of nursing students. The data reports were kept confidential and the identity of the students were not revealed to ensure genuineness of the study.

Statistical analysis

Descriptive statistical analysis was done for each of the parameters. The mean, median, lowest score, highest score, average were calculated. The continuous variables, categorical variables and ordinal variables were calculated using multiple linear aggression analysis. The p value of <0.005 is considered to be significant statistically.

The socio demographic parameters, their method of stay, year of study are summarized in table1. There was more of nursing students from final year than the first and second year. The mean numbers were ± 55 for final year students when compared to first and second year which was 41 and 51 respectively. The response was better among hostellers (n=6) than day-scholars (n=55).

The knowledge score were standardized with showed maximum of 13.48 ± 2.3 among the final year students when compared to rest of the years. The first year, second year and third year students showed moderate knowledge of less than 12 when compared to final year students. The attitude score was again higher for final year (62 ± 2.3) when compared to first year (54 ± 3.1), second year (56 ± 2.1) and third year (57 ± 3.1). The practices score for final year (73 ± 2.3) when compared to first year (52 ± 3.1), second year (63 ± 2.1) and third year (68 ± 3.1). The correlation and aggression study was done using Pearsons' and linear aggression analysis respectively. The p value for knowledge ($p=0.037$), attitude ($p=0.045$) and attitude ($p=0.049$) were observed.

The multiple linear aggression method analyzed whether females had better knowledge than male nursing students which had p value $=0.008$. Similarly the analysis measured that hostellers showed statistical significance than the day-scholars with $p=0.006$.

DISCUSSION

Diabetes mellitus is one of the fastest growing chronic diseases globally, with a significant burden on individuals and societies¹³. The dietitian is the nutrition expert in the health care team. However, dietitian is not available all the time to answer the patient's dietary enquiries.¹⁴ Management of diabetes includes nutritional therapy, exercise, monitoring, pharmacologic therapy, and patient education. Nutritional management is a key element of diabetes care. An effective nutritional management helps achieve and maintain glycemic control and contributes to the well-being and quality of life of patients.¹⁵ Nurses in primary health care characterize their training for diabetes education as insufficient to meet the demand. The practice is still based on a biomedical model of healing, the education process uses transmission methods and it has few tools for its instrumentalization¹⁶. The findings help us how much training was given to the nursing students in managing the diabetic patients based on the nutritional knowledge, attitude and practices. To summarize the final year students had better parameters when compared to other batches. The Study shows good significance when compared to studies done at Middle East.¹⁷ Yet, results of previous studies suggest significant knowledge gap among nurses with regards to nutritional management of patients with diabetes.¹⁸

The nurses of this study revealed a practice centered on the biomedical model, based on the transmission method of providing guidelines and imposing conditions, especially when one observes the construction of the relative on diabetes education.¹⁹ The training gaps significantly affect the nurses' idea of their capacity to act, mainly due to the superficiality of the approach of technical and managerial procedures and skills in the context of diabetes education, making the practice a simple repetition of recommended actions.²⁰ However, the training process is not limited to university education, as pointed out by the participants. Continuing education emerges in this context as "learning at work", dynamic, accompanying professional maturation and it requires individual and institutional investments to meet the needs of the labor market once the processes of learning and teaching are incorporated into the daily life of the organizations.²¹ The nursing students had better knowledge when compared to a study done by Bad shah et al .Results showed that that (54%) had poor knowledge about diabetic diet indicated by total knowledge of less than 60%, 21.3% of the nurses had average knowledge, while 13.33 % had good and only 13 % of the studied participants had excellent knowledge regarding diabetic dietary management which was above 80% score

according to arbitrary scale on questionnaire.²² This reality has been described by similar studies carried out in Brazil and Portugal.²³ Similar study was done by oyewole et al were they showed deficiency in their parameters. Overall, 58% Of The Nurses Had Adequate Knowledge Of DM. However, the Findings of the Study, Shows Deficiency in Some Critical Areas. Approximately, Fifty-Five Percent of the Nurses Practice below Expected DM Skills And 48.9% Of Them Exhibited Negative Attitude towards Care Of Patients with DM.²⁴ A similar study quotes that” Nurses have a key role to play in primary care in expanding, connecting and coordinating care. Nurses have crucial role and clear responsibilities when managing patients with diabetes mellitus by regular care and identifying various symptoms or complications at the early stage thus assist in leading normal or comfort life for diabetics²⁵.

Another study done in Tehran. Another study showed poor results than our study.²⁶ Diabetes can be treated and its consequences avoided or delayed with diet, physical activity, medication and regular screening and treatment for complications.²⁷ The valid reason being Primary health care centers are the entry point for most patients with diabetes.²⁸ Similar to the present study results, yet another study reported that only 3.9% of the nurses had a certificate as a ‘diabetes educator’ in Turkey.²⁹ A study proved a positive correlation between nursing education and prevention of diabetes.³⁰

CONCLUSION

To conclude, among the nursing students at a private medical college the final year students had better knowledge, attitude and practices than the first, second and third year nursing students. Moreover, the female nurses and the hostellers were better than male and days-scholars in terms of their focus on nutritional management. A national study among nurses using pre and post questionnaire based study after a proper training will create a major impact and progression in the diabetic patients.

Limitations and Recommendations

The study was limited only to nursing students. It must have been extended to other paramedical and physiotherapy students also.

Conflict of interest

There are no conflicts of interests among the authors.

Funding source

There are no requirements for funding for this research.

References

- 1) Flor LS, Campos MR. The prevalence of diabetes mellitus and its associated factors in the Brazilian adult population: evidence from a population-based survey. Rev Bras Epidemiol 2017
- 2) Fernandes JR, Ogurtsova K, Linnenkamp U, Guariguata L, Seuring T, Zhang P, et al. IDF Diabetes Atlas estimates of 2014 global health expenditures on diabetes. Diabetes Res Clin Pract 2016

- 3) Powers MA, Bardsley J, Cypress M, Duker P, Funnell MM, Hess Fischl A, et al. Diabetes self-management education and support in type 2 diabetes: a joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. *Diabetes Care*. 2015;38:1372–82
- 4) Salci MA, Meirelles BHS, Silva DMGV. Primary care for diabetes mellitus patients from the perspective of the care model for chronic conditions. *Rev Latino-Am Enfermagem*. 2017
- 5) Boocock RC, Lake AA, Haste A, Moore HJ. Clinicians' perceived barriers and enablers to the dietary management of adults with type 2 diabetes in primary care: a systematic review. *J Hum Nutr Dietetics*. 2021; 34(6):1042–52.
- 6) Gianfrancesco C, Johnson M. Exploring the provision of diabetes nutrition education by practice nurses in primary care settings. *J Hum Nutr Dietetics*. 2020;33(2):263–73
- 7) Hulbert LR, Zhang X, Ng BP, Nhim K, Khan T, Cannon MJ. Health Care Providers' knowledge, attitudes, and Practices and the Association with Referrals to the National Diabetes Prevention Program Lifestyle Change Program. *Am J Health Promotion*. 2022;36(2):236–47
- 8) Naz S, Jan A, Muhammad D. Assessment of nurses' knowledge regarding nutritional management of diabetic patients in public and private sector tertiary care hospital, Peshawar. *Rehman J Health Sci*. 2021; 3(2):68–71.
- 9) Al-Mugheed K, Bayraktar N, Al-Bsheish M, et al. Patient safety attitudes among doctors and nurses: associations with workload, adverse events, experience. *Healthcare*. Vol.10. No.4. MDPI. 2022: 631
- 10) RPHN EYORR. Primary Health Care Nurses' Competencies and Resources availability for diabetes Mellitus Care at Local Government Areas of Ibadan. *Int J Caring Sci*. 2020;13(1):368–80
- 11) Farzaei et al. *BMC Medical Education* (2023) 23:192 Nurses' knowledge, attitudes, and practice with regards to nutritional management of diabetes mellitus.
- 12) Mogre V, Ansah GA, Marfo DN, Garti HA. Assessing nurses' knowledge levels in the nutritional management of diabetes. *Int J Afr Nurs Sci*. 2015;3:40–3
- 13) Sorensen H, Toft. Prevention of diabetes mortality at ages younger than 25 years: access to medications and high-quality health care. *Lancet Diabetes Endocrinol*. 2022;10(3):151–2
- 14) Dudek, S.G. (2010) *Nutrition Essentials for Nursing Practice*, 6th edition, Lippincott Williams & Wilkins, Philadelphia, PA.
- 15) Middelbeek RJ, Hafida S, Schrager C. Medical nutrition therapy for the treatment of diabetes: prioritizing recommendations based on evidence. *Nutrition guide for physicians and related healthcare professions*. Springer; 2022:pp. 109–119.
- 16) **Magda Coeli Vitorino Sales Coêlho, Camila Aparecida Pinheiro Landim Almeida, Ana Roberta Vilarouca da Silva et al.** Training in diabetes education: meanings attributed by primary care nurses 2018. *Rev. Bras. Enferm*.
- 17) Alotaibi A, Al-Ganmi A, Gholizadeh L, Perry L. Diabetes knowledge of nurses in different countries: an integrative review. *Nurse Education Today*. 2016; 39:32–49.

- 18) Alotaibi A, Gholizadeh L, Al-Ganmi AHA, et al.. Factors influencing nurses' knowledge acquisition of diabetes care and its management: a qualitative study. *J Clin Nurs*. 2018; 27(23–24):4340–52.
- 19) Oliveira GYM, Almeida AMO, Girão ALA, Freitas CHA. Nursing interventions for promoting self-care of persons with type 2 diabetes: an integrative review. *Rev Eletr Enferm* 2016
- 20) Ortega MCB, Cecagno D, Llor AMS, Siqueira HCH, Montesinos MJL, Soler LM. Academic training of nursing professionals and its relevance to the workplace. *Rev Latino-Am Enfermagem*. 2015
- 21) Miccas FL, Batista SHSS. Permanent education in health: a review. *Rev Saúde Pública* [Internet]. 2014 [cited 2017 Nov 09]; 48(1):170- 85.
- 22) Badshah S, Naz S, ullah S, Aziz F, et al Knowledge of Nurses regarding Nutritional management of Diabetes mellitus Patients in Tertiary Care Hospitals, Peshawar. *IJRDO - Journal of Health Sciences and Nursing*. 2020; 5(1)
- 23) Verchota G, Sawin KJ. Testing components of a self-management theory in adolescents with Type 1 Diabetes Mellitus. *Nurs Res* 2016 World Health Organization (2018) Global report on diabetes.
- 24) Oyewole EY, Ojewale LY, Abimbola OO. Primary Health Care Nurses' Competencies and Resources availability for diabetes Mellitus Care at Local Government Areas of Ibadan. *Int J Caring Sci*. 2020;13(1):368–80
- 25) Oyewole, E., Ojewale. A., and Oluwatosin, O. (2020) primary health care nurses' competencies and resources availability for diabetes mellitus care at local government areas of Ibadan.
- 26) Emami M, Zarezadeh M, Sharifzadeh M, Fazelifarsani Z, Khorshidi M. Evaluation of nutritional assessment quality and rate of referral to dietitian in Shariati hospital, Tehran-Iran: a clinical audit. *J Nutritional Sci Dietetics*. 2019;5(1):8–13
- 27) World Health Organization (2018) Global report on diabetes.
- 28) Abdulhadi N, Elliott J., Almaniri and Wahlstorm, R. (2013). Diabetes self-management and education of people living with diabetes: A survey in primary health care in Muscat Oman.
- 29) Samancioglu S, Ozturk Donmez R, Arda Surucu H, Bayindir Cevik A. Experiences of clinic nurses regarding diabetes education in Turkey'health system. *Health Syst Policy Res*. 2017; 4(3):1–5.
- 30) Mohammed Ibrahim Yacoub , Waddah M, Demmeh et al . Outcomes of diabetic education program for registered nurses caring for individuals with diabetes. *The Journal of Continuing Education in Nursing*, 2015;46(3):129–133