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The Knowledge, Attitude and Practices of Allied Healthcare Professionals and Nurses towards Blood Sugar Level Measurement (BSL) for Non-Diabetic Patients in Pre- and Post-Surgery

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ABSTRACT

Hypoglycemia complications in pre-and post-surgery are common among hospitalized patients with or without diabetes mellitus (DM) and associated with undesired treatment outcomes [(1,2,3)]. That derived our incentive to conduct this "cross-sectional study of total 102 randomly selected respondents" aims to assess the knowledge, attitude, and practices among allied healthcare professionals and nurses towards BSL measurement for hospitalized nondiabetic patients in pre-and post-surgery. Data for this study was obtained in a questionnaire-based format from respondents. The questionnaire includes questions on demographical data, participant's knowledge, attitude (reaction towards some hypoglycemic signs and symptoms), and evaluation of participant's practices. Analysis shows that 74.5% of participants were aware of hypoglycemia complications, and 20.5% had some knowledge, while the rest (4.9%) were not aware. 72.5% of the participants showed the right attitude towards the signs and symptoms of hypoglycemia. The rest of the participants (27.5%) were not able to distinguish between the signs and symptoms of cardiac complications and hypoglycemic complications. We found that 68.6% of the participants followed the guidelines of BSL measurement at their workplace (hospital) while 31.4% of participants don't. We found an association between the occupation and knowledge of the participants (P = 0.046). A significant association between occupation and practices of the participants was also found (P = 0.003). This study shows that nurses are more aware of hypoglycemia complications in pre-or post-surgery than AHPs. These results hint that AHPs need to expand their knowledge and awareness of hypoglycemia complications in pre-and post-surgery in order to avoid undesired treatment outcomes.

***Keywords*:** Blood sugar level (BSL), Hypoglycemia, Non-diabetic, pre-and post-surgery, Nil-By-Mouth (NBM), Allied Healthcare Professionals (AHPs).

INTRODUCTION

The instance of Hypoglycemia pre-and post-operation is a common issue for hospitalized patients regardless of diabetes mellitus (DM) [(1,2,3).] According to the American Diabetes Association (ADA), Canadian Diabetes Association (CDA), and the European Medicines Agency (EMA) hypoglycemia is defined as blood glucose levels (BSL) at or below 70 mg/dl (3.9 mmol/L), and severe hypoglycemia as blood glucose level (BSL) at or below 40 mg/dL (2.2 mmol/L) [(4).] Hypoglycemia complications include dizziness, uneasiness, an increase in cardiovascular events including myocardial infarction (MI), blurred vision, loss of contrast sensitivity, and irregular hormonal response even coma

[5]. Patients undergoing a surgical procedure that requires general anaesthesia are asked to fast for 8 to 12 hours- or even longer- before surgery which is called Nil-By-Mouth (NBM) [6]. Fasting is recommended for all major surgical procedures requiring general anesthesia in order to avoid serious complications intraoperatively [6]. Nil By Mouth (NBM) status can cause hypoglycemia and its related preoperative complications in non-diabetic patients [7]. Morbidity, mortality, and duration of hospitalization increases for those patients associated with hypoglycemia peri-operative periods [3,8,9]. Postoperative infection rate increases if associated with preoperative hypoglycemia [10]. Large population studies have highlighted the potential of NBM patients to experience hypoglycaemic states in hospitals and are thereby an at-risk hospital population. For example, a retrospective cohort study conducted on hospitalized patients with or without diabetes mellitus showed that the incidence of hypoglycemia is between 3.5% to 10.5% among 31,970 hospitalized patients [11]. In a similar study--another large observational study that gathered data from 126 hospitals showed that the incidence of hypoglycemia and severe hypoglycemia among patients who were admitted to the ICU were between 1.9% and 10%. [12]. In this study, we aim to assess the knowledge of allied healthcare professionals and nurses towards some serious complications of hypoglycemia. We also wanted to understand their attitudes and practices towards blood sugar level (BSL) measurement for nondiabetic patients before and after surgery. Having this information would help inform training sessions and hospital policies to avoid such undesired complications arising in pre-and post-surgery due to hypoglycemia. These changes we believe would help improve treatment outcomes.

Objective

In this study, we aim to assess the knowledge, attitude, and practices among allied healthcare professionals and nurses towards blood sugar level (BSL) measurement for hospitalized nondiabetic patients in pre-and post-surgery.

MATERIAL AND METHODS

A cross-sectional study was used for this study. A convenience sampling study design was undertaken with a population of 102 participants. Participants are from different health care specializations. A well-structured questionnaire containing subsections like demographic data, knowledge, attitude, and practices regarding BLS measurement in pre-and post-operation was constructed and circulated to hospitals. This questionnaire-known as the "knowledge attitude and practices questionnaire"- method was used to collect the required data. Demographical data included age, gender, and occupation. 14 questions covered aspects of knowledge, attitude, and practices of allied healthcare professionals and nurses towards pre-and post-surgery blood sugar level (BSL) measurement in non-diabetic patients. The questionnaire had a multiple-choice styled question as well as more specific questions pertaining to the knowledge of AHPs towards hypoglycaemic conditions- for example, whether the participants were aware of hypoglycaemic complications like seizures and arrhythmias, loss of consciousness, increasing the rate of morbidity and mortality, and increasing the rate of infection postoperatively. In order to assess the attitude of participants, the questionnaire covered participants' reactions and specific actions they took towards the most common signs and symptoms of hypoglycemia like sweating, tremors, dizziness, and tachycardia. In order to measure the practices of participants, the questionnaire sought answers to specific guidelines available at hospitals for BSL measurement and whether these guidelines included non-diabetic patients.

Inclusion criteria

All allied healthcare professionals from various specializations- Cardiac Care, Respiratory Therapy, OT and Anesthesia, etc.- like technicians, technologists, therapists, and nurses were included. These professionals are in direct contact with patients who are suitable candidates for our study. Since our data collection method was through an online questionnaire, online access for participants was a must- no telephonic interview or face-to-face contact with participants was established. AHPs and nurses in selected hospitals of Pune city were administered the questionnaire based on the geographical region under question.

Exclusion criteria

Healthcare professionals and nurses who are not in direct contact with the patients such as OT managers and or not working in the area of our study and also participants who don't have access to the online questionnaire due to reasons of poor internet connectivity.

Data entry and analysis

After receiving the data, we have reviewed the data for inconsistencies if any, and re-examined them again before encoding in order to avert any kind of errors. Data coding was carried out before entering using Excel Data Entry. Statistical Package for Social Science (IBM SPSS) was used for entering the data as well as data analysis.

ANALYSIS

Analysis was performed to obtain the percentages of the participant's demographics (Table-1).

Table 1: characteristics of the participants (n=102).

Sr. No.	Extraneous Variables	Frequency (f)	Percentage (%)
1	Age		
	20-30 years old	82	80 %
	30-40 years old	9	8.8 %
	Above 40 years old	11	10.8 %
2	Gender		
	Male	23	22.5 %
	Female	79	77.5 %
3	Occupation		
	Different healthcare specialists	52	51 %
	Nurses	50	49 %

In terms of age, (Table 1; row 1) shows that our participants were predominantly (80% of the participants) in the age range of 20-30 years. Where (8.8%) of participants age is between 30-40 years. And the rest of the participants (10.8%) are above 40 years old. Table-1 also shows that 77.5% of participants are females (Table 1; row 2). In row 3 of Table 1, for our further study, we divided the participants into two groups (1st group of nurses and the 2nd group includes the rest of allied healthcare specialists such as technicians and technologists).

Table 2: Knowledge of participants regarding specific hypoglycaemic complications in pre-and post-surgery (n=102).

Sr. No.	Extraneous Variables	Frequency (f)	Percentage (%)
4	**Knowledge regarding complications of hypoglycaemia pre- and post-surgery**		
	Yes	76	74.5 %
	No	5	4.9 %
	Some of them	21	20.6 %
5	**Knowledge regarding specific complications in pre- and post-surgery: Seizures, Loss of consciousness, increasing in morbidity and mortality rate, increasing in post-operative infection rate.**		
	Yes	76	74.5 %
	No	15	14.7 %
	Some of them	11	10.8 %
6	**Knowledge regarding "hypoglycaemia can lead to death"**		
	Yes	93	91.2 %
	No	9	8.8 %
7	**Knowledge regarding Nil by mouth (NBM) can cause hypoglycaemia**		
	Yes	52	51 %
	No	12	11.8 %
	May be	38	37.3 %

Table 2 shows the result of the knowledge of participants. Participants were asked whether they are aware of hypoglycemia complications in pre-and post-surgery and we found that 74.5 % of the participants were aware, in which 20.6 % of the participants had some knowledge regarding the hypoglycaemic complications in pre-and post-surgery, and the rest of the participants (4.9 %) were not aware of such complications. Participants also were asked whether they are aware of some specific hypoglycaemic complications in pre-and post-surgery to be more accurate in knowledge assessment. The Specific complications were asked are: A) Seizures, B) loss of consciousness, C) Increasing in morbidity and mortality rate, D) Increasing in postoperative infection rate, and we found that 74.5% of participants were aware of the specifically mentioned complications as shown in (figure-4.1). While 10.8% of the participants were aware of some of the above-mentioned complications and the rest of the participants (14.7%) were unaware. "Severe hypoglycemia can lead to death", which's one of the severe and most dangerous complications of hypoglycemia. Participants were asked if they are aware of that specific complication and results show that 91.2 % of the participants were aware of that complication of which 8.8 % of the participants were not aware. Participants were asked whether they are aware that Nil by Mouth (NBM) preoperatively can cause hypoglycemia and we found that 51 % of the participants were aware, of which 37.3 % were not sure whether Nil by Mouth (NBM) can cause hypoglycemia or not, and the rest (11.8 %) were not aware.

Table 3: Attitude of participants regarding specific signs and symptoms of Hypoglycaemic complications (n=102).

Sr. No.	Extraneous Variables	Frequency (f)	Percentage (%)
1	**Attitude towards specific hypoglycaemic complications (sweating, shakiness, dizziness, and tachycardia)**		
	Measure (BSL) (*Right attitude*)	74	72.5%
	Give antiarrhythmic drug (*Wrong attitude*)	24	23.5%
	Nothing (*Wrong attitude*)	4	3.9%
2	**Participant's willingness to follow the guidelines of BSL measurement**		
	Yes	73	71.6 %
	No	7	9.6 %
	May be	22	21.6%
3	**Believes regarding improvement outcomes if BSL is measured regularly in pre- and post-surgery.**		
	Yes	94	92.2%
	No	8	7.8%

Table 3 describes the result of the participant's attitude towards some hypoglycaemic complications (sweating, shakiness, dizziness, and tachycardia). The mentioned signs and symptoms are mostly the major signs and symptoms of hypoglycemia to be more accurate in attitude assessment. Our analysis shows that 72.5% of participants showed the right attitude which is "measuring blood sugar level (BSL)". In which 23.5% of the participants could not distinguish between the signs and symptoms of cardiac complications and hypoglycemia complications. And the rest of the participants (3.9%) tend not to take any action. We then asked the participants whether they are willing to measure BSL for non-diabetic patients in pre-and post-surgery or not and the result was as follows: A) 71.6 **%** of the participants showed their willingness to follow the guidelines of BSL measurement of non-diabetic patients in pre-and post-surgery. B) 21.6 **%** of the participants responded as they might follow the guidelines of BSL measurement of non-diabetic patients in pre-and post-surgery. C) Rest of the participants 6.9 % were unwilling to follow the guidelines of BSL measurement of non-diabetic patients in pre-and post-surgery. We found that 92.2% of the participants in our study believe that measuring blood sugar level for hospitalized patients including non-diabetic patients in

pre-and post-surgery will improve the treatment outcomes.

Figure 4: Practices of participants regarding hypoglycaemia complications in pre-and post-surgery (n=102).

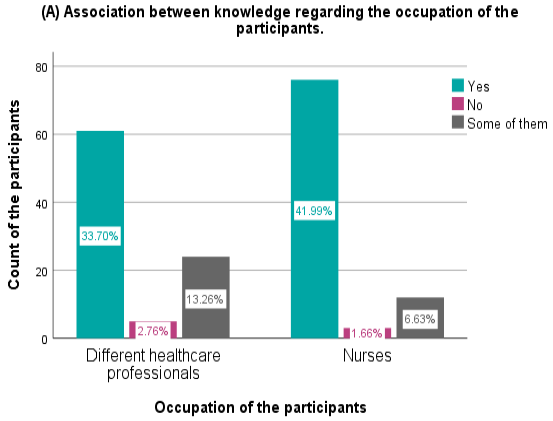
Sr. No	Extraneous Variables	Frequency (f)	Percentage (%)
1	**Availability of a guideline for BSL measurement in pre- and post-surgery**		
	Yes	73	71.6 %
	No	29	28.4 %
2	**Whether that guideline includes nondiabetic patients or not**		
	Yes	62	60.8 %
	No	40	39.2 %
3	**Insisting of BSL measurement in pre- and post-surgery.**		
	Yes	70	68.6 %
	No	32	31.4 %

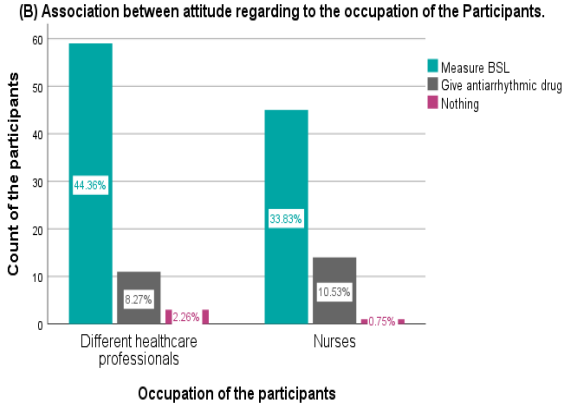
Figure 4.4- shows the result of the participant's practices. The analysis shows that 71.6 **%** of the participants have a guideline at their workplace regarding BSL measurement in pre-and post-surgery while 28.4 **%** don't have a guideline for measuring BSL of the patients in pre and pot surgery. Participants who respond as they have a guideline for BSL measurement in pre-and post-surgery were asked whether this guideline includes non-diabetic patients or not and we found that 60.8 **%** of them approved that the guideline which is available at their workplace includes non-diabetic patients in which 39.2 **%** respond as the guideline which is available at their workplace doesn't include non-diabetic patients. Participants then were asked whether there's a supervision of following the BSL measurement in pre-and post-surgery, and we found that 68.6% of participants have supervision at their workplace for BSL measurement in non-diabetic patients in pre-and post-surgery and they follow it. Where 31.4% of the participants responded as they don't have supervision at their workplace that insists on BSL measurement of non-diabetic patients in pre-and post-surgery.

Table 5: - association between knowledge, attitude, and practices regarding the occupation of participants.

Sr. No.	Characteristics	p Value
1	Knowledge	0.046
2	Attitude	0.387
3	Practices	0.003

**p<0.05*





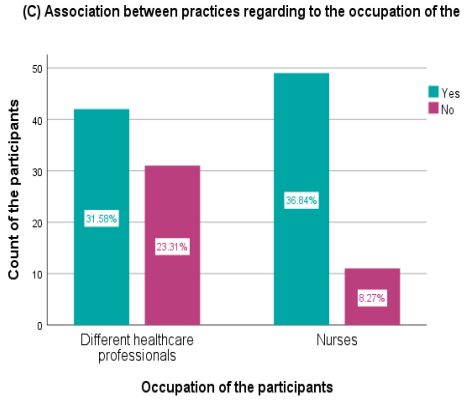


Figure 1- (A, B, C): - association between knowledge, attitude, and practices with regards to the occupation of the participants.

An effort was made to find out the association between knowledge, attitude, and practices of the participants regarding their occupation. Chi-square test was used in order to find out this association. From the outcomes of the Chi-square test, we found that there is a significant association between knowledge and occupation of the participants P=0.046 as shown in (Table-5, Figure-A). Analysis of this study also shows that the occupation of the participants is significantly associated with their practices P=0.003 as shown in (Table-5, Figure-C). We did not find a significant association between attitude and occupation of the participants. Further, we tried to find the association between knowledge, attitude, and practices regarding the participant's gender. Chi-square test was used to obtain that association. The results of Chi-square analysis showed an association but have no statistical significance.

DISCUSSION

The findings of our study highlight the importance of awareness regarding hypoglycemia complications in pre-and post-surgery regardless of diabetes mellitus (DM). The allied healthcare professionals and nurses surveyed in our study had good knowledge regarding hypoglycemia complications in pre-and post-surgery 74.5% and 20.6% had some knowledge, with only 4.9 % were not aware of hypoglycemia complications, but we found an association between the knowledge of the participants and their occupation P=0.046. These findings are also similar to another descriptive study in terms of knowledge not an association between the occupation of nurses and their knowledge which was conducted among 31 nurses where the mean knowledge regarding hypoglycemia among the participants was 81.8% [(13).] Another descriptive cross-sectional study that supports our findings was carried throughout the period 2nd of December 2013 -to- 31st of January 2015 on the Assessment of Nurses' Knowledge and Attitude about Hypoglycaemia at Mosul City Hospital among 247 nurses found that the nurses' knowledge was highly significant [(14).] However, our study disagrees with a study was conducted in the Philippines among 326 healthcare providers in the Philippine General Hospital towards In-Patient Hypoglycaemia and its Management which found low scores of the overall knowledge among healthcare providers and nurses who participated in their study [(15).] In our study, we found that good knowledge about hypoglycemia complications in pre-and post-surgery has led to a good attitude towards hypoglycemia complications. The percentage of the right attitude among allied healthcare professionals and nurses in our study is 72.5%, and the percentage of knowledge is 74.5 %, these findings are quite similar to the previous mentioned descriptive cross-sectional study which was carried in 2015 on the Assessment of Nurses' Knowledge and Attitude about Hypoglycaemia at Mosul City Hospital among 247 nurses, which found that good knowledge led to good attitude [(14).] However, our study findings regarding the attitude of allied healthcare professionals and nurses are the opposite of the findings of a study which was conducted in the Philippines among 326 healthcare providers in the Philippine General Hospital towards In-Patient Hypoglycaemia and its Management which found no association between attitude and knowledge of the participants [(15).] In this study, 71.6 % of the participants follow the guidelines of BSL measurement at their workplace and the same percentages are willing to follow any specific guidelines regarding BSL measurement for non-diabetic patients. However, 39.2 % of our participants don't have a guideline at their workplace that includes BSL measurement for non-diabetic patients and to compare our results to another study on a "National Survey of Physicians' and Allied Health Professionals' Practices and Perspectives Regarding Hypoglycaemia Management which was conducted among 671 physicians and allied health professionals (AHPs), found that only

21% of physicians and 40% of non-CDE AHPs confirmed that their practice is always driven by the current guidelines. The study also shows that 56% of the physicians and 43% of AHPs who participated in their study indicated that they are worried about hypoglycemia and that caused them to modify recommended guidelines to manage patient's hypoglycemia [16].

CONCLUSION

We found that 74.5 %of participants were aware of the hypoglycaemic complications in pre-and post-surgery. We also found that 72.5 % of participants had shown the right attitude towards hypoglycaemic complications signs and symptoms. This study shows that 68.6% of the participants follow the guidelines of blood sugar level (BSL) measurement at their workplace (hospitals). A significant association between participant's practices and their occupation P=0.003 was found in this study. Our study hints that there is an association between the age of the participants and their attitude. Therefore, we advise healthcare professionals to expand their knowledge and awareness towards hypoglycemia complications in pre-and post-surgery to avoid undesired treatment outcomes.

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Ethical Approval: Approved

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