

CLINICAL PROFILE OF PATIENTS WITH HYPOGLYCAEMIA PRESENTING AT TERTIARY CARE HOSPITAL.

General Medicine

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ABSTRACT

Hypoglycaemia remains the most common and serious iatrogenic cause of morbidity in diabetic patients. It is defined as blood glucose of less than 54mg/dl with neuroglycopenic symptoms or less than 40mg/dl in the absence of symptoms. The present cross-sectional study was conducted over a period of one year from 1st November 2019 to 31st October 2020 on 100 patients admitted with hypoglycaemia in Department of Medicine Government Medical College Jammu and Associated Hospitals. The detailed history, clinical examinations and relevant laboratory investigations were conducted in all patients. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00). In our study, out of 100 subjects, 77 were male and 23 were female. Hence there was predominance of males in our study. The maximum subjects belonged to 41-60 years (51%) followed by >60 years (36%). In this study, 71% and 29% of the subjects were diabetic and non-diabetic respectively in the present study. Means RBS among the diabetic and non-diabetic subjects was 38.89 ± 7.98 and 40.21 ± 6.73 respectively with statistically insignificant difference as $p > 0.05$. It was concluded that hypoglycemia is mainly medication related in diabetics and infection is the leading cause in nondiabetics. This problem needs to be addressed by treating physician from the perspective of patient education, and possibly by modification of medications as well. None of the patients should leave ED without proper evaluation of the etiology of hypoglycemia and the problem should be addressed at each individual level.

KEYWORDS

Hypoglycemia, Diabetes, Symptoms, Health and Comorbidity.

INTRODUCTION

Hypoglycaemia is defined as blood glucose of less than 54mg/dl with neuroglycopenic symptoms or less than 40mg/dl in the absence of symptoms¹. In diabetic patients, it has been implicated as a cause of death in "dead in bed syndrome" and in chronic cognitive impairment².

Hypoglycaemia remains the most common and serious iatrogenic cause of morbidity in diabetic patients. Symptoms profile provoked by hypoglycaemia is idiosyncratic and varies in character, pattern and intensity between individual³. Incidence of severe hypoglycemia varied from 0.038 to 3.2 episodes per patient per year in patients with Type 1 diabetes mellitus (DM) and from 0.0004 to 0.96 episodes per patient per year in patients with Type 2 DM^{4,5}.

Risk factors for spontaneous hypoglycemia are septic shock, comorbidities (as defined by the Charlson comorbidity index), drug interactions in polypharmacy, renal failure, liver or adrenal disease, severe heart failure and neoplasms⁶. In diabetic patients, a single episode of hypoglycaemia increases the risk of subsequent episodes, thus triggering a vicious cycle of recurrent hypoglycaemia.

Diabetic autonomic neuropathy may be a significant risk factor for hypoglycaemia in diabetic patients. Symptoms of hypoglycaemia are classified as neuroglycopenic, the result of central nervous system glucose deprivation, and neurogenic⁷ result of perception of physiological changes caused by the activation of autonomic nervous system triggered by hypoglycaemia^{8,9}.

Neuroglycopenic symptoms include sensation of warmth weakness, fatigue, as well as difficulty thinking, confusion, behavioural changes, and emotional lability, seizures, loss of consciousness and, if hypoglycaemia is severe and prolonged, brain damage and even death⁹.

Hypoglycaemia prevention is a critical component of diabetes management. Self-monitoring of blood glucose (SMBG) and continuous glucose monitoring (CGM) (recurrent asymptomatic hypoglycaemia) are essential tools to assess therapy and detect incipient hypoglycaemia.

Hypoglycaemia have significant impact on morbidity and mortality

among hospitalised patients. The current study is designed to assess clinical profile, etiology and outcome among patients of hypoglycaemia at Government Medical College, Jammu.

AIMS AND OBJECTIVES:

1. To study clinical profile of patients presenting with hypoglycaemia.
2. To study etiology of hypoglycaemia in diabetic and non-diabetic patients.
3. To study outcome in patients with hypoglycaemia.

MATERIAL AND METHODS:

This was a cross sectional study conducted over a period of one year from 1st November 2019 to 31st October 2020 on 100 patients admitted with hypoglycaemia in Department of Medicine Government Medical College Jammu and Associated Hospitals.

The detailed history, clinical examinations and relevant laboratory investigations was conducted in all patients.

Inclusion criteria:

1. Age > 18 years.
2. Documented hypoglycaemia.
3. Clinical important biochemical hypoglycaemia.
4. Asymptomatic hypoglycaemia.
5. Severe hypoglycaemia.

Exclusion criteria:

1. <18 years of age.
2. Pregnant females
3. Pseudo hypoglycaemia.
4. Probable hypoglycaemia

The patients with diabetes having hypoglycaemia were categorised according to American Diabetes Association (ADA). Sample was collected from all patients having hypoglycaemia in sodium fluoride tube and was analysed within 1 hour after collection by glucose oxidase method by (Siemen analyser/accucheck glucose meter). All relevant information regarding patients were noted on an already prescribed Performa and then was entered in the excel sheet.

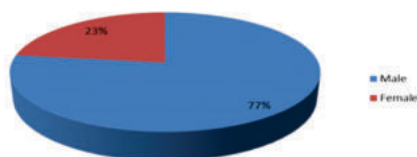
Statistical Analysis:

The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using student t-test as well as chi square test and the level of significance was set at $p < 0.05$.

RESULTS:**Table 1: Gender distribution of study population**

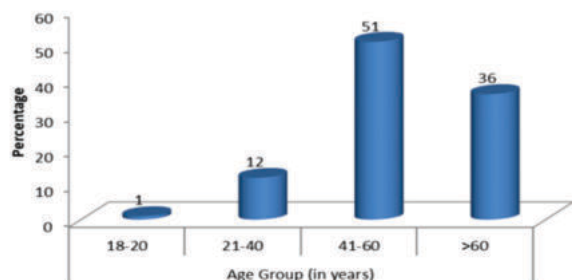
Gender	N	%
Male	77	77
Female	23	23

Out of 100 subjects, 77 were male and 23 were female (table 1, graph 1).

**Graph 1: Gender distribution of study population.****Table 2: Age distribution of study population.**

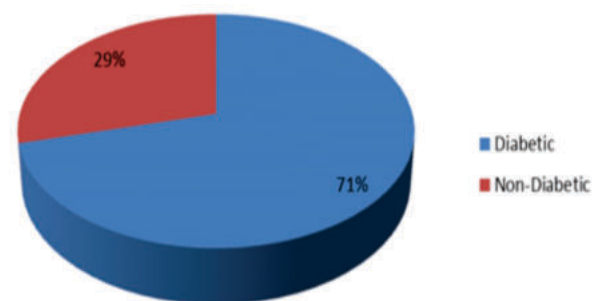
Age (in years)	N	%
18-20	1	1
21-40	12	12
41-60	51	51
>60	36	36

In this study, maximum subjects belonged to 41-60 years (51%) followed by >60 years (36%). Minimum subjects were in the age group of 18-20 years (1%) followed by 21-40 years (12%) as shown in table 2, graph 2.

**Graph 2: Age distribution of study population.****Table 3: Distribution of study population according to diabetes status.**

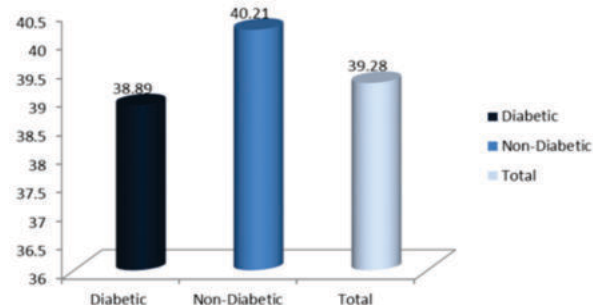
Status	N	%
Diabetic	71	71
Non-Diabetic	29	29

Table 3, graph 3 shows the distribution of study population according to diabetes status. 71% and 29% of the subjects were diabetic and non-diabetic respectively.

**Graph 3: Distribution of study population according to diabetes status.****Table 4: RBS (Random blood sugar) among the study population.**

Status	Mean RBS	SD	Range	t test	p value
Diabetic	38.89	7.98	11-56	1.95	0.09
Non-Diabetic	40.21	6.73	12-59		

Means RBS among the diabetic and non-diabetic subjects was 38.89 ± 7.98 and 40.21 ± 6.73 respectively. When mean RBS was compared among the diabetic and non-diabetic subjects, it was found to be statistically insignificant as $p > 0.05$ (table 4, graph 4).

**Graph 4: RBS (Random blood sugar) among the study population.****Table 5: Presenting symptoms among the study population.**

Symptoms	Diabetic (N=71)		Non-diabetic (N=29)		p value
	N	%	N	%	
Giddiness	13	18.31	2	6.90	0.03*
Sweating/ palpitation	9	12.68	1	3.45	<0.01*
Decreased conscious levels	46	64.79	15	51.72	0.23
Seizures	2	2.82	1	3.45	0.69
Motor deficit/ Paresthesia	1	1.41	0	0.00	0.34
Others/ nonspecific	11	15.49	10	34.48	0.03*

***Statistically significant**

Table 5, shows the presenting symptoms among the study population. All the symptoms viz giddiness, sweating/palpitation and motor deficit/paraesthesia was reported comparatively more among diabetic subjects as compared to non-diabetic subjects with statistically significant difference as $p < 0.05$. Motor deficit/paraesthesia was found in one diabetic subject. Other/non-specific symptoms were found more in non-diabetic subjects (34.48%) as compared to diabetic subjects (15.49%).

Table 6: Etiology of hypoglycemia among the study population.

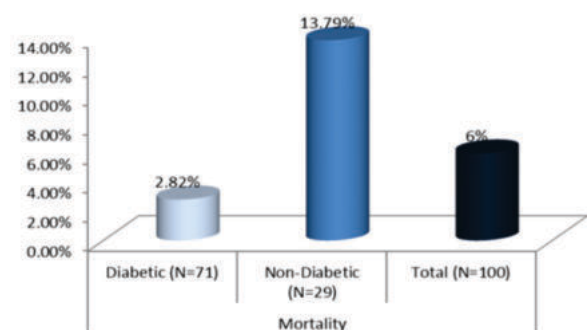
Etiology	Diabetic (N=71)		Non-diabetic (N=29)	
	N	%	N	%
Intensive control of sugars with OHA	28	39.44	-	-
Intensive control of sugars with insulin	15	21.13	-	-
Intensive control of sugars with both OHA and insulin	3	4.23	-	-
Liver disease	3	4.23	5	17.24
Renal dysfunction	9	12.68	1	3.45
Malignancies	1	1.41	3	10.34
Reactive hypoglycemia	0	0.00	1	3.45
Missing meal	1	1.41	-	-
Drugs/toxins	2	2.82	2	6.90
Infection/sepsis	9	12.68	17	58.62

In this study; among the diabetic patient's sugar was controlled by OHA, insulin and both OHA + insulin in 39.44%, 21.13% and 4.23% of the subjects respectively. Among the diabetic patients, most common etiology was renal dysfunction as well as infection/sepsis (12.68%), while among the non-diabetic patients, most common etiology was infection/sepsis (58.62%) followed by liver disease (17.24%). Malignancies were found among 10.34% of the non-diabetic patients (table 6).

Table 7: Mortality among the study population.

Status	N	%
Diabetic (N=71)	2	2.82
Non-Diabetic (N=29)	4	13.79

In our study mortality was found more in non-diabetic patients (13.79%) as compared to diabetic patients (2.82%) as shown in table 7.



Graph 5: Mortality among the study population.

DISCUSSION:

Hypoglycaemia have important effect on morbidity and mortality in hospitalised patients. With this context in mind, the current research is intended to examine the clinical profile, aetiology and outcome of patients presenting with hypoglycemia at Government Medical College, Jammu.

In our study, out of 100 subjects, 77 were male and 23 were female. Hence there was predominance of males in our study. The maximum subjects belonged to 41-60 years (51%) followed by >60 years (36%). Minimum subjects were in the age group of 18-20 years (1%) followed by 21-40 years (12%). Kumar JG et al., (2017) and Su CC, 2006 in their study also found male dominance in their study^{10,11}. Mukherjee B et al., (2018) in their study reported that mean age of patients was 57.68 years¹². In a study by Kumar JG et al., (2017), mean age distribution was 57 ± 14.7 years¹⁰.

In this study, 71% and 29% of the subjects were diabetic and non-diabetic respectively in the present study. Means RBS among the diabetic and non-diabetic subjects was 38.89±7.98 and 40.21±6.73 respectively with statistically insignificant difference as p>0.05. In a Taiwanese study (Su CC, 2006), 79.83% of the hypoglycemic episodes with ED (emergency department) attendance occurred in diabetics. Mean RBS value in diabetic patients was 39 mg/dl and in nondiabetic patients was 40.6 mg/dl as mentioned by Kumar JG et al., (2017) in their study¹⁰⁻¹¹. This finding is similar to our study.

All the symptoms viz giddiness, sweating/palpitation and motor deficit/paresthesia was reported comparatively more among diabetic subjects as compared to non-diabetic subjects with statistically significant difference as p<0.05. Motor deficit/paresthesia was found in one diabetic subject. Other/non-specific symptoms were found more in non-diabetic subjects (34.48%) as compared to diabetic subjects (15.49%) in this study. Similarly, the findings of Mukherjee B et al., (2018) and McAulay et al., (2001) are consistent to our results wherein similar prevalence of symptoms have been reported in their study^{12,13}.

There is no single symptom that is exclusive to hypoglycaemia alone. However, hypoglycaemia unawareness is a major clinical problem in the management of Diabetic patients on Insulin therapy.

In this study; among the diabetic subject's sugar was controlled by OHA, insulin and both OHA+insulin in 39.44%, 21.13% and 4.23% of the subjects respectively. Among the diabetic subjects, most common etiology was renal dysfunction as well as infection/sepsis (12.68%), while among the non-diabetic subjects, most common etiology was infection/sepsis (58.62%) followed by liver disease (17.24%). Malignancies were found among 10.34% of the non-diabetic subjects. One reason of hypoglycaemia among the diabetic subjects can be intensive control of blood glucose levels with antidiabetic drugs. Similarly, findings were reported by Kumar JG et al., in their study¹⁰.

In nondiabetic hypoglycemia attacks, Su CC study (2006) reported hypoglycemia mainly due to infections, liver and kidney disease, and malignancy¹¹. Results of the current study also support this evidence. Moreover, the current study reports the proportion of hypoglycaemia

in diabetic patients caused by renal impairment was much higher than in nondiabetic patients. Renal disease may reduce gluconeogenesis and insulin degradation and thus be associated with hypoglycaemia. Carroll MF et al., (2003) also found that insulin treatment of diabetes is the most common cause of severe hypoglycaemia in adults¹⁴.

In our study mortality was found more in non-diabetic subjects (13.79%) as compared to diabetic subjects (2.82%). Mortality of patients with severe hypoglycaemia seen in Emergency department ranged between 0.3% and 8.3% in other studies. Klatt et al., (1998) found 0.2% of death due to hypoglycaemic coma¹⁵. Macleod et al., (1993) found "dead-in-bed" syndrome may account for 6% of deaths in diabetic patients under the age of 40¹⁶.

CONCLUSION

Hypoglycemia is mainly medication related in diabetics and infection is the leading cause in nondiabetics. This problem needs to be addressed by treating physician from the perspective of patient education, and possibly by modification of medications as well. None of the patients should leave ED without proper evaluation of the etiology of hypoglycemia and the problem should be addressed at each individual level. Increasing incidence of death over the years is alarming, and further studies are needed to conclude the root cause.

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