GSC Biological and Pharmaceutical Sciences
eISSN: 2581-3250 CODEN (USA): GBPSC2
Cross Ref DOI: 10.30574/gscbps
Journal homepage: https://gsconlinepress.com/journals/gscbps/

(RESEARCH ARTICLE)

Check for updates

Prospective study on meglitinide induced kidney injury in tertiary care hospital

Guduru Hari Chandana [1,*], Yerikala Ramesh [2], P Venugopalaiah [2] and Y Prapurna Chandra [3]

[1] *Department of Pharmacy Practice, Ratnam Institute of Pharmacy, Pidathapolur Village and Post, Muthukur (M), SPSR Nellore, Andhra Pradesh 524346, India.*
[2] *Department of Pharmaceutics, Ratnam Institute of Pharmacy, Pidathapolur Village and Post, Muthukur (M), SPSR Nellore, Andhra Pradesh 524346, India.*
[3] *Department of Pharmacology, Ratnam Institute of Pharmacy, Pidathapolur Village and Post, Muthukur (M), SPSR Nellore, Andhra Pradesh 524346, India.*

GSC Biological and Pharmaceutical Sciences, 2023, 25(01), 211–219

Publication history: Received on 06 September 2023; revised on 17 October 2023; accepted on 20 October 2023

Article DOI: https://doi.org/10.30574/gscbps.2023.25.1.0421

Abstract

The aim of the study is to conduct a prospective study on meglitinide induced kidney injury in tertiary care hospital. The objective is to evaluate meglitinide, quality of life, mortality, and to evaluate the severity of the adverse drug effect of the meglitinide in diabetic patients. As per the prospective study of "Meglitinide induced kidney injury". It has been concluded that the prolong intake of meglitinidein diabetic patients leads to increase in serum creatinine levels upto 11 % out of 300 study population. And incidence of kidney injury majorly seen in patients who are taking meglitinidefor a period of 6 – 10 yrs and mostly seen males in age group of 50 – 60 yrs.

Keywords: Meglitinide; Diabetic; Prospective; Tertiary care; Hospital

1. Introduction

Diabetes Mellitus is a group of metabolic disorders characterized by hyperglycemia results from defects in insulin secretion, insulin action or both [1]. The long term effect of hyperglycemia leads to destruction, malfunction, failure of different organs mainly the eyes, kidney, nerves, heart & blood vessels. Decreased levels of insulin to reach appropriate reaction and / insulin resistance of specific tissues, mostly skeletal muscles, adipose tissue, and to lesser extent, liver at the level of insulin receptors, signal transduction system, and / effectors enzymes are genes are in charge of metabolic defects [2]. Several morbidities are entangled in the evaluation of hyperglycemia. These range from auto immune destruction of beta cells of the pancreas which result in lack of insulin to malformation that develop resistance to insulin action. The deformity of carbohydrates, fat, protein metabolism in hyperglycemia is inadequate insulin activity develop from deficient insulin production or decline tissue reaction to insulin. The islets of langerhans in the pancreas contain majorly a pair of sub division of endocrine cells [3]. Insulin producing beta cells and glucagon secreting alpha cells. Based on habitant of the glucose the alpha and beta cells alternate their secretion. If there is no balance between insulin and glucagon, the glucose levels unsuitably slanted. In diabetes the insulin is neither producer nor having weaken action (insulin resistance) which leads to hyperglycemia [4]. Kidney injury is were kidneys suddenly stop working properly .it can range from minor loss of kidney function to complete kidney failure. AKI normally happens as a complication of another serious illness. Treatment for acute kidney failure typically requires a hospital stay. Most people with acute kidney failure are already hospitalized. How long you'll stay in the hospital depends on the reason for your acute kidney failure and how quickly your kidneys recover. Acute kidney failure can be fatal and requires intensive treatment. However, acute kidney failure may be reversible. If you're otherwise in good health, you may recover normal or nearly normal kidney function. At that point, you need dialysis or a kidney transplant [5]. Dialysis artificially removes waste

*Corresponding author: Guduru Hari Chandana

products and extra fluid from your blood when your kidneys can no longer do this. In haemodialysis, a machine filters waste and excess fluids.

2. Material and methods

2.1. Study site

The present study was conducted in the Department of general medicine at AC Subba Reddy Government Medical College, a1000 bedded tertiary care teaching hospital, Nellore, Andhra Pradesh [6].

2.2. Duration of study

The study was conducted for six months from March 2023 to July 2023.

2.3. Study design

Our study design comprises of prospective observational study [7].

2.4. Source of data

Patients case sheets, blood samples and patients interview [8].

2.5. Study regulation

300 members-both in patients and out patients [9].

2.6. Patient selection criteria

The patients enrolled in the study were selected based on inclusion and exclusion criteria [10].

2.6.1. Inclusion criteria:

Diabetic Patients with hypertension, kidney co-morbidities who are receiving meglitinide are included. Patients who are willing to participate in the study are included. Patients who are above >35 - < 90 years of age are included [11].

2.6.2. Exclusion criteria

- Patients who are below 20 years of age are excluded.
- Pregnancy and lactating mothers are excluded.
- Patient with medication on insulin are excluded.
- COVID-19 patients are excluded.
- Patients who are not taking meglitinide are excluded.
- Patients who are not willing to participate in the study are excluded.
- Patients who have CNS and hepatic impairment are excluded.
- Informed consent will be obtained from the eligible patients involved in the study [12].

2.6.3. Study procedure

- A standard data entry format was prepared for collecting patient details and the study was approved by Institutional Ethics Committee of Ratnam Institute of Pharmacy, Nellore and Department of General medicine, ACSR Medical College & Govt. General Hospital, Nellore.
- The data such as demographic details, history of diabetic & hypertension co-morbidities, meglitinide usage, social history in diabetic diseased were collected from the eligible patients involved in the study [13].
- The patient will be followed up for three months for the prognosis from the beginning of treatment.
- Effect of meglitinide in Diabetic induced kidney injury patients will be monitored and the data to be collected.
- Details about any smoking, drinking & other habits, social history will be conducted in questionnaire form.
- Patient counselling forms were given.
- For every follow up patient counselling is given about the usage of meglitinide and life style modifications regarding their complaints [14].
- Continuous follow up of the patients, outcome for the effect of meglitinide was observed and quality of life is measured.

- Results formatting, submitting and publishing the obtained data in appropriate indexed and good impact journals.

3. Results and discussion

Table 1 Distribution of study population based on increased serum creatinine levels

Total study population	Elevated serum creatinine levels	Percentage of incidence
300	30	10 %

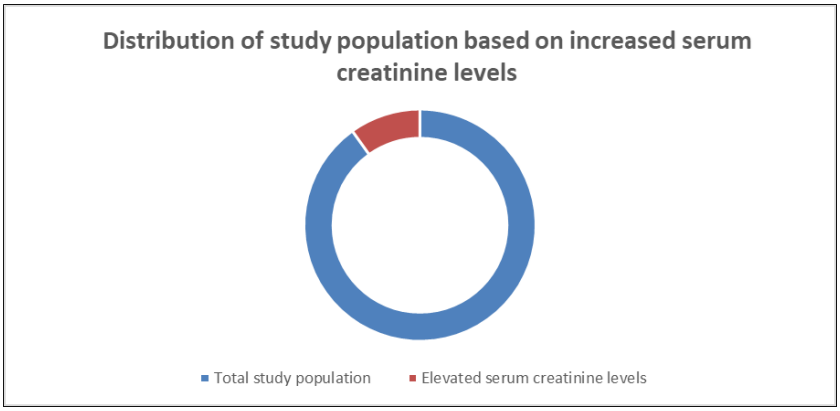


Figure 1 Distribution of study population based on increased serum creatinine levels

In total 300 population, increased serum creatine values seen in 30 subjects and rest of population is having normal serum creatinine values.

Blue colour indicates total study population of 300 subjects, orange colour indicates no. of subjects increased serum creatinine values.

Table 2 Distribution of study population based on age group and duration of meglitinide usage.

Age			Duration		
		1 – 5 yrs	6 – 10 yrs	11- 15 yrs	16 – 20 yrs
< 40 yrs	M	_	_	_	_
	F	1	-	-	-
40 – 50 yrs	M	1	1	2	_
	F	1	_	_	_
50 – 60 yrs	M	2	1	6	_
	F	_	_	_	1
60 – 70 yrs	M	3	1	1	1
	F	_	2	1	1
70 – 80 yrs	M	1	1	_	_
	F	_	_	_	_
80 – 90 yrs	M	_	_	_	_
	F	_	_	1	_

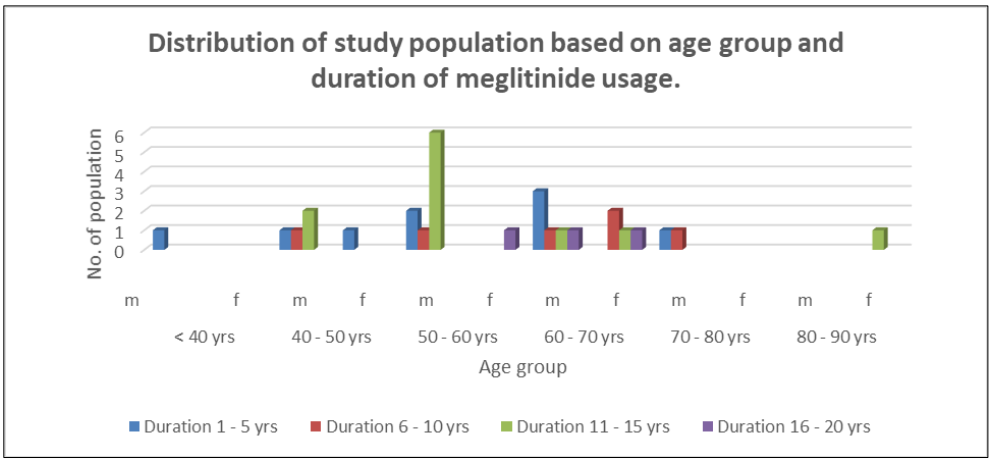


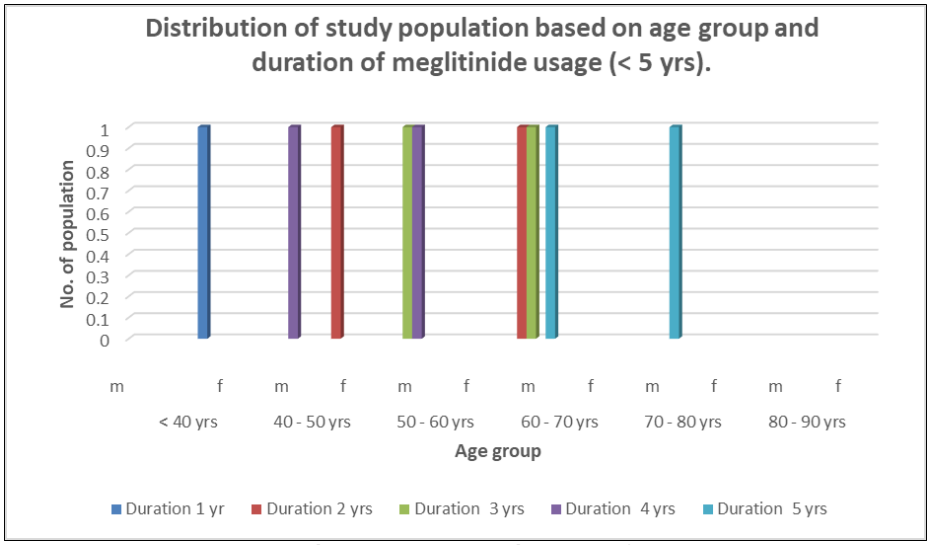
Figure 2 Distribution of study population based on age group and duration of meglitinide usage

The blue colour indicates duration of 1 – 5 yrs, orange indicates duration of 6 – 10 yrs, grey indicates duration of 11 – 15 yrs, yellow indicates duration of 16 – 20 yrs.

The Y axis indicates age group of people and X axis indicates no. of people are having risk of kidney injury. Incidence of kidney injury majorly seen in patients who are taking meglitinide for a period of 10 – 15 yrs and mostly seen males in age group of 50 – 60 yrs.

Table 3 Distribution of study population based on age group and duration of meglitinide usage (< 5 yrs)

Age			**Duration**			
		1	**2**	**3**	**4**	**5**
< 40 yrs	M	_	_	_	_	_
	F		_	_	_	_
40 – 50 yrs	M	_	1	_	1	_
	F	-	-	-	-	-
50 – 60 yrs	M	_	_	1	1	_
	F	_	_	_	_	_
60 – 70 yrs	M	_	1	1	_	1
	F	_	_	-	_	_
70 – 80 yrs	M	_	_	_	_	1
	F	_	_	_	_	_
80 – 90 yrs	M	_	_	_	_	_
	F	_	_	_	_	_



X – axis indicates age, Y – axis indicates no. of patients.

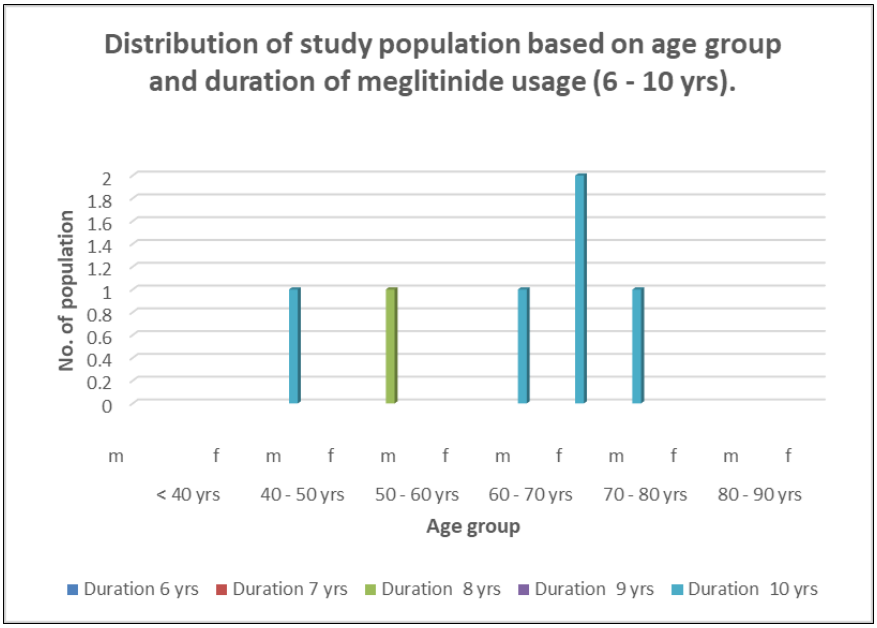
Figure 3 Distribution of study population based on age group and duration of meglitinide usage (< 5 yrs)

The blue colour indicates duration of 1 yr, orange indicates duration of 2 yrs, grey indicates duration of 3 yrs, yellow indicates duration of 16 – 204 years light blue colourindicates duration of 5 yrs.

The Y axis indicates age group of people and X axis indicates no. of people are having risk of kidney injury.

Table 4 Distribution of study population based on age group and duration of meglitinide usage (6 – 10 yrs)

Age			**Duration**			
		6	**7**	**8**	**9**	**10**
< 40 yrs	M	_	_	_	_	_
	F	_	_	_	_	_
40 – 50 yrs	M	_	_	_	_	1
	F	_	_	_	_	_
50 – 60 yrs	M	_	_	1	_	_
	F	_	_	_	_	_
60 – 70 yrs	M	_	_	_	_	1
	F	-	-	-	-	2
70 – 80 yr	M	_	_	_	_	1
	F	-	-	-	-	-
80 – 90 yrs M	M	_	_	_	_	_
	F					



X – axis indicates age, Y – axis indicates no. of patients.

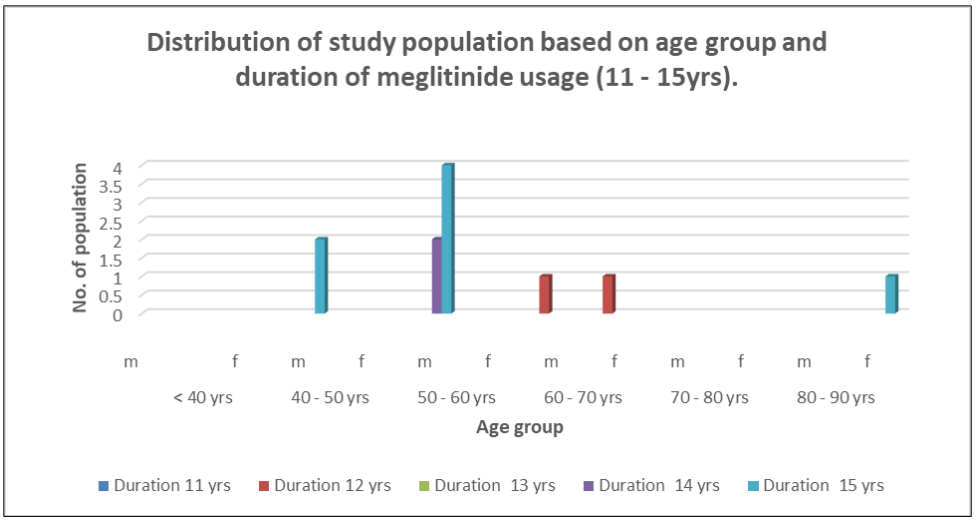
Figure 4 Distribution of study population based on age group and duration of meglitinide usage (6 - 10 yrs)

The blue colour indicates duration of 6 yr, orange indicates duration of 7 yrs, grey indicates duration of 8 yrs, yellow indicates duration of 9 yrs light blue colour indicates duration of 10 yrs.

The Y axis indicates age group of people and X axis indicates no. of people are having risk of kidney injury.

Table 5 Distribution of study population based on age group and duration of meglitinide usage (11 – 15 yrs)

Age			**Duration**			
		11	**12**	**13**	**14**	**15**
< 40 yrs M F	M	_ _	_ _	_ _	_ _	_ _
	F					
40 – 50 yrs M F	M	_	_	_	_	2
	F	_	_	_	_	_
50 – 60 yrs M F	M	_	_	_	2	4
	F	_	_	_	_	_
60 – 70 yrs M F	M	_	1	_	_	_
	F	_	1	_	_	_
70 – 80 yrs M F	M	_	_	_	_	_
	F	_	_	_	_	_
80 – 90 yrs M F	M	_	_	_	_	_
	F	_	_	_	_	1



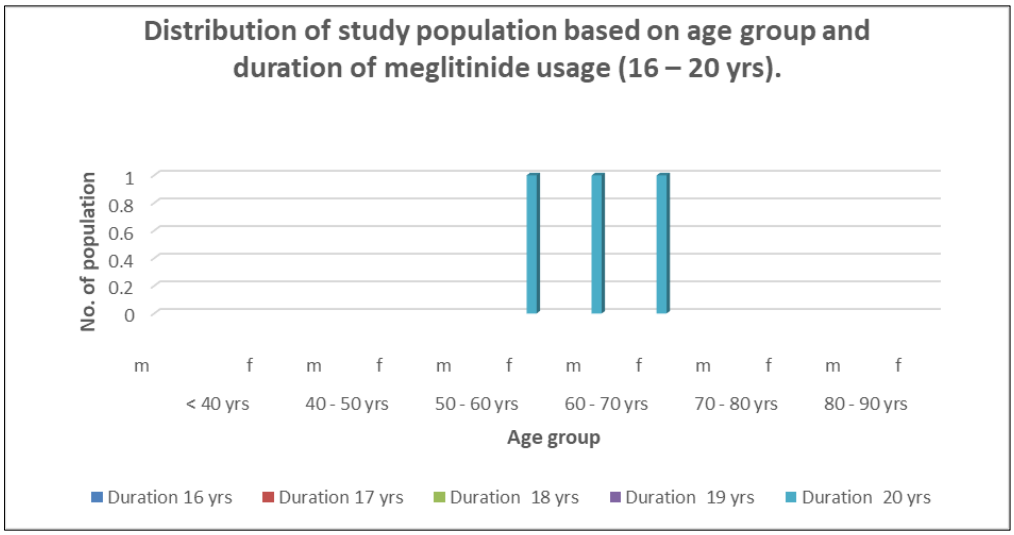
X – axis indicates age, Y – axis indicates no. of patients.

Figure 5 Distribution of study population based on age group and duration of meglitinide usage (11 - 15yrs)

The blue colour indicates duration of 11 yr, orange indicates duration of 12 yrs, grey indicates duration of 13 yrs, yellow indicates duration of 14 yrs light blue colour indicates duration of 15 yrs. The Y axis indicates age group of people and X axis indicates no. of people are having risk of kidney injury.

Table 6 Distribution of study population based on age group and duration of meglitinide usage (16 – 20 yrs)

Age			**Duration**			
		16	**17**	**18**	**19**	**20**
< 40 yrs M F	M	_	_	_	_	_
	F	_	_	_	_	_
40 – 50 yrs M F	M	_	_	_	_	_
	F	_	_	_	_	_
50 – 60 yrs M F	M	_ _	_ _	_ _	_ _	_ 1
	F					
60 – 70 yrs M F	M	_	_	_	_	1
	F	_	_	_	_	1
70 – 80 yrs M F	M	_	_	_	_	_
	F	_	_	_	_	_
80 – 90 yrs M F		_	_	_	_	_
		_	_	_	_	_



X – axis indicates age, Y – axis indicates no. of patients.

Figure 6 Distribution of study population based on age group and duration of meglitinide usage (16 – 20 yrs)

The blue colour indicates duration of 16 yr, orange indicates duration of 17 yrs, grey indicates duration of 18 yrs, yellow indicates duration of 19 yrs light blue colour indicates duration of 20 yrs.

The Y axis indicates age group of people and X axis indicates no. of people are having risk of kidney injury.

4. Conclusion

As per the prospective study of Meglitinide induced kidney injury We concluded that the prolong intake of meglitinidein diabetic patients leads to increase in serum creatinine levels upto 11 % out of 300 study population. And incidence of kidney injury majorly seen in patients who are taking meglitinide for a period of 6 – 10 yrs and mostly seen males in age group of 50 – 60 yrs.

Compliance with ethical standards

Acknowledgments

The authors are thankful to the Principal (Dr. Y. Prapurna Chandra) & HOD (Dr. Yerikala Ramesh) from Ratnam Institute of Pharmacy, Pidathapolur, SPSR Nellore, for providing the necessary facilities to carry out this research work.

Disclosure of conflict of interest

The authors declare no conflict of interest, financial or otherwise.

Funding Support

The authors declare that they have no funding for this study

References

[1] Escobar-Morreale HF, Carmina E, Dewailly D, Gambineri A, Kelestimur F, Moghetti P, Pugeat M, Qiao J, Wijeyaratne CN, Witchel SF, Norman RJ. Epidemiology, diagnosis and management of hirsutism: a consensus statement by the Androgen Excess and Polycystic Ovary Syndrome Society. Hum Reprod Update. 2012, 18:146–170.

[2] Mohammed Awezsalman, & Praveen Gujjula. Evaluation of Prescription and Rational Use of Antibiotics in a Tertiary Care Hospital. Fut J. Pharm. Health Sci, 2021, *1*(2), 71–76.

[3] Shaik Salma, Case Report on Steroid Induced Cushing Syndrome Journal of Drug Delivery and Therapeutics. 2019; 9(4- s):598-600

[4] Prakash J, Singh TB, Ghosh B, Malhotra V, Rathore SS, Vohra R, et al. Changing epidemiology of community-acquired acute kidney injury in developing countries: Analysis of 2405 cases in 26 years from eastern India. Clin Kidney J. 2013, 6:150–5.

[5] Umesh L, Shivaprasad SM, Niranjan MR, Leelavathi V, Sreedhara CG, Rajiv EN. Acute kidney injury: Experience from a state run tertiary care centre in southern India. Int J Med Res Health Sci. 2016, 5:83–7.

[6] Kashani K, Macedo E, Burdmann EA, Hooi LS, Khullar D, Bagga A, et al. Acute kidney injury risk assessment: Differences and similarities between resource- limited and resource- rich countries. Kidney Int Rep. 2017, 2:519–29.

[7] Cerda J, Bagga A, Kher V, Chakravarthi RM. The contrasting characteristics of acute kidney injury in developed and developing countries. Nat Clin Pract Nephrol. 2008, 4:138–53.

[8] Priyamvada PS, Jayasurya R, Shankar V, Parameswaran S. Epidemiology and outcomes of acute kidney injury in critically ill: Experience from a tertiary care center. Indian J Nephrol. 2018, 28:413–20.

[9] Mehta R, Bagga A, Patibandla R, Chakravarthi R. Detection and management of AKI in the developing world: The 18th Acute Disease Quality Initiative (ADQI) international consensus conference. Kidney Int Rep. 2017, 2:515–8.

[10] Yanling Wu,Yanping Ding, Yoshimasa Tanaka, Wen Zhang Risk Factors Contributing to Type 2 Diabetes and Recent Advances in the Treatment and Prevention International Journal of Medical Sciences 2014, 11(11): 1185-1200.

[11] Manjunath G Gandage, Kukunuri Dinesh Kumar, Paturu Venkatesh and Basavaraj Kesapur (2022) "Effectiveness of Oral Hypoglycaemics in Type-2 Diabetes Mellitus Patients at a Tertiary Care Hospital : A Comparative Observational Study, Fut J. Pharm. Health Sci, 2022, 2(4):321–327.

[12] Moore PK, Hsu RK, Liu KD. Management of acute kidney injury: Core curriculum 2018. Am J Kidney Dis. 2018, 72:136–48.

[13] Chawla LS, Eggers PW, Star RA, Kimmel PL. Acute kidney injury and chronic kidney disease as interconnected syndromes. N Engl J Med. 2014, 371:58–66.

[14] James MT, Bhatt M, Pannu N, Tonelli M. Long-term outcomes of acute kidney injury and strategies for improved care. Nat Rev Nephrol. 2020, 16:193–205.