A Comprehensive analysis of risk factors of diabetic nephropathy and exploring the treatment pattern.

ABSTRACT :

Diabetic nephropathy is a leading cause of end stage renal disease throughout the world. Diabetic nephropathy is common complication of type 1 and type 2 diabetes. Poorly controlled diabetes can cause damage to blood vessel clusters in kidneys that filter waste from blood this can lead to kidney damage. A variety of risk factors promotes the development and progression of diabetic nephropathy including elevated glucose levels, high blood pressure,obesity, long duration of diabetes and dyslipidaemia .most of these risk factors are modifiable by hyperglycaemic agents, anti-hypertensive and lipid lowering agents .most of the people who are prone to diabetic nephropathy are aged between 40 to 70 years of age. Males are most effected (80%) compared to females (20%). Where oral hypoglycaemic agents (97%) and calcium channel blockers (50%) plays a major role in reducing the progression of diabetic nephropathy by controlling blood pressure and glucose levels in subject . obesity is also a notable risk factor for end stage renal diseased subjects.

KEY WORDS :

Diabetic Nephropathy, End Stage Renal Disease, Hyperglycaemia, Obesity, Anti-Hypertensive, Dyslipidaemia.

INTRODUCTION :

One of the main complications of diabetes mellitus (DM) is diabetic nephropathy (DN), which left unmanaged, leads to chronic renal failure(Ayodele, Alebiosu and Salako, 2004). End-stage renal failure is 10 times more common in people with diabetes mellitus. About 80% of end-stage kidney failure is caused by diabetes and hypertension, either together or individually. A microvascular consequence of both insulin-dependent (IDDM) and non-insulin-dependent (NIDDM) diabetes mellitus known as DN causes diabetics to have higher morbidity and mortality as well as persistent proteinuria. According to studies, diabetic people have a DN prevalence of about 40% The most frequent reason for end-stage renal disease (ESRD) is DN. Choosing, starting, and individualised medication therapy for individuals with DN can be difficult for physician.

The main risk factors for the onset of diabetic nephropathy include hyperglycaemia, elevated blood pressure, and genetic predisposition. Smoking, elevated blood lipids, and the quantity and source of dietary protein all appear to be risk factors (Natesanand Kim, 2021).

Based on the results of urine albumin excretion (UAE), diabetic nephropathy has been didactically divided into the stages of microalbuminuria and macroalbuminuria(Fernando et al., 1991).When it comes to gender, men are more significantly impacted than women.

The study aims to comprehensively analyze diabetic nephropathy's risk factors and treatment patterns, exploring diverse factors for enhanced prevention and personalized management. The objectives of the study includes

- Determine a variety of diabetic nephropathy risk factors.
- Examine the techniques and therapy modalities used today.

- Provide information to support improved preventative and individualised management plans.

METHODOLOGY :

The study consisted of a prospective chart analysis, which reviewed 105 out patients medical records between November 2022 to April 2023 from Trust Multispeciality hospital.

The data was extracted from a prospectively maintained database and 105 patients were included in this study. The data analysis was based on patients age, gender, monitoring parameters and risk factors.

In the study, outpatients of both genders and age group >35 years are included in the inclusion criteria.Whereaspregnant women and new born are considered within the exclusion criterion.

In the starting a total of 117 participants were included in the study, within which 12 subjects data were found to be inappropriate and were eliminated from the study.The data analysis includes the application of tools like Microsoft Excel regarding the evaluation of subject’s data.

RESULTS AND DISCUSSION :

***Table** 1- Gender wise distribution of subjects with diabetic nephropathy.*

SL NO.	GENDER	NO. OF SUBJECTS	PERCENTAGE
1	MALE	86	82 %
2	FEMALE	19	18 %

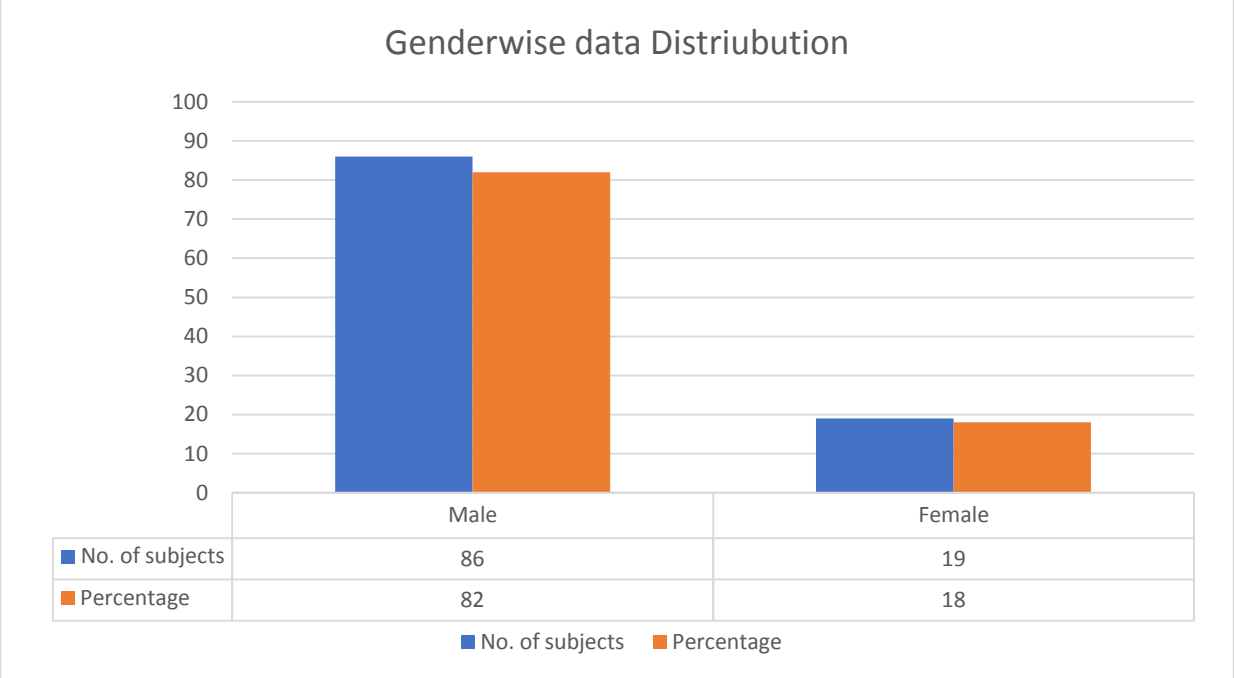


Figure 1: Gender wise distribution of subjects with diabetic nephropathy

Table 2- Age wise distribution of subjects with diabetic nephropathy

SL NO.	AGE GROUP	NO. OF SUBJECTS	PERCENTAGE
1	35-45 YEARS	9	10 %
2	46-55 YEARS	12	11%
3	56-65 YEARS	34	32 %
4	66-75 YEARS	39	37 %
5	76-85 YEARS	11	10 %

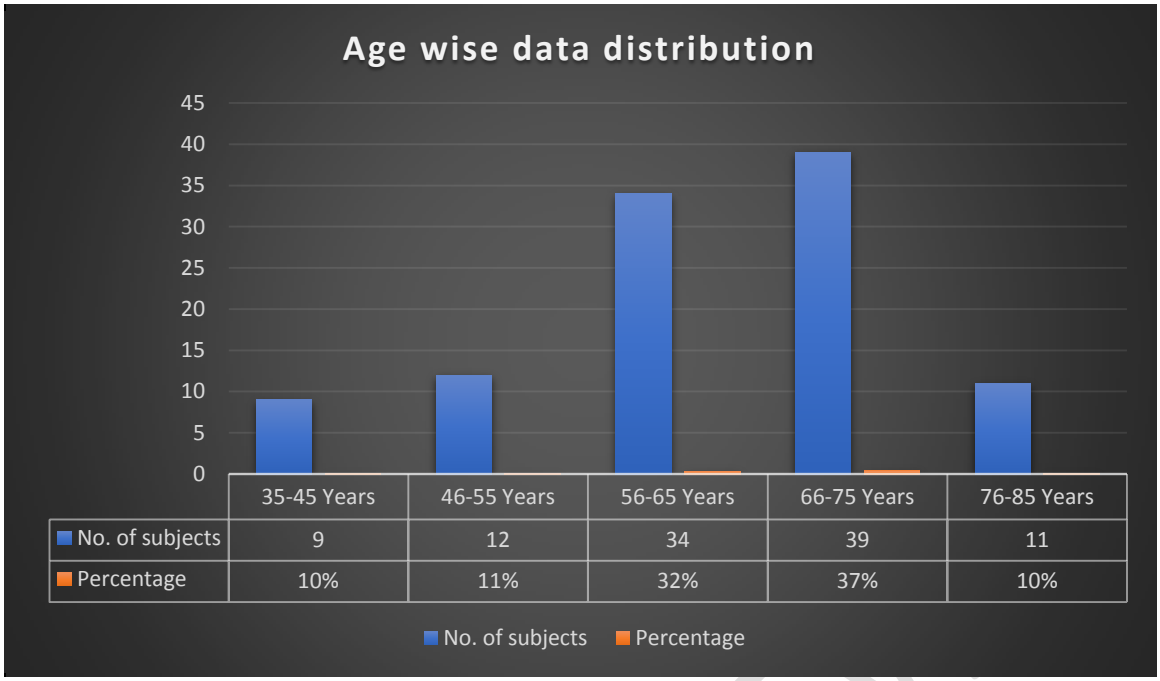


Figure 2: Age wise data distribution of subjects with diabetic nephropathy

Table3- Distribution of subjects according to types of diabetes.

SL NO.	TYPES OF DIABETES	NO. OF SUBJECTS	PERCENTAGE
1	TYPE 1 DIABETES	23	22%
2	TYPE 2 DIABETES	82	78%

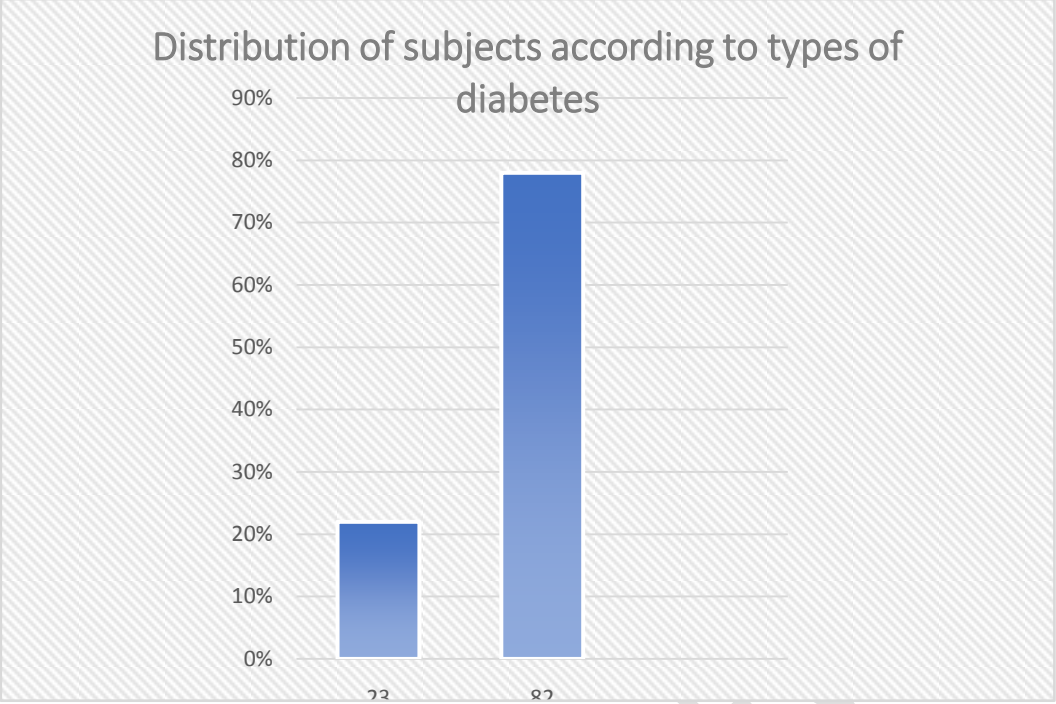


Figure 3: Distribution of subjects according to type of diabetic nephropathy

Table 4 – The percentage (%) of subjects with risk factors of Diabetic nephropathy.

S.NO	RISK FACTORS	NO. OF SUBJECTS	PERCENTAGE ON (N=105)
1	HYPERTENSION	90	85%
2	SMOKING	23	22%
3	OBESITY	67	63%
4	FAMILY HISTORY	52	49%
5	ELEVATED LIPID LEVELS	39	37%

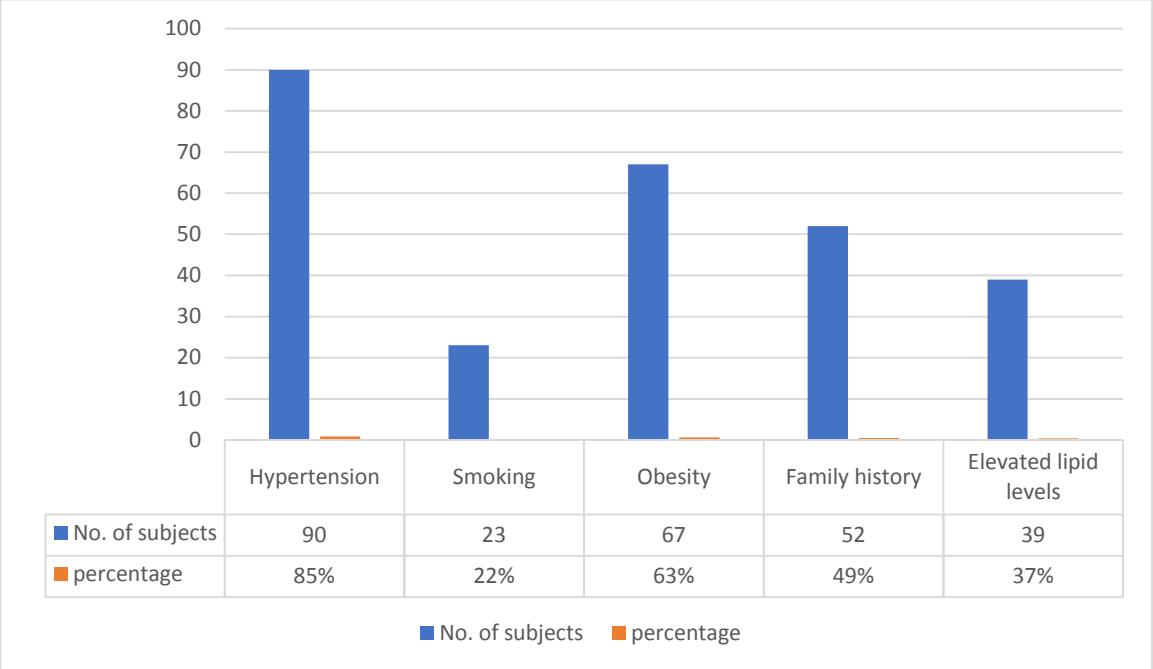
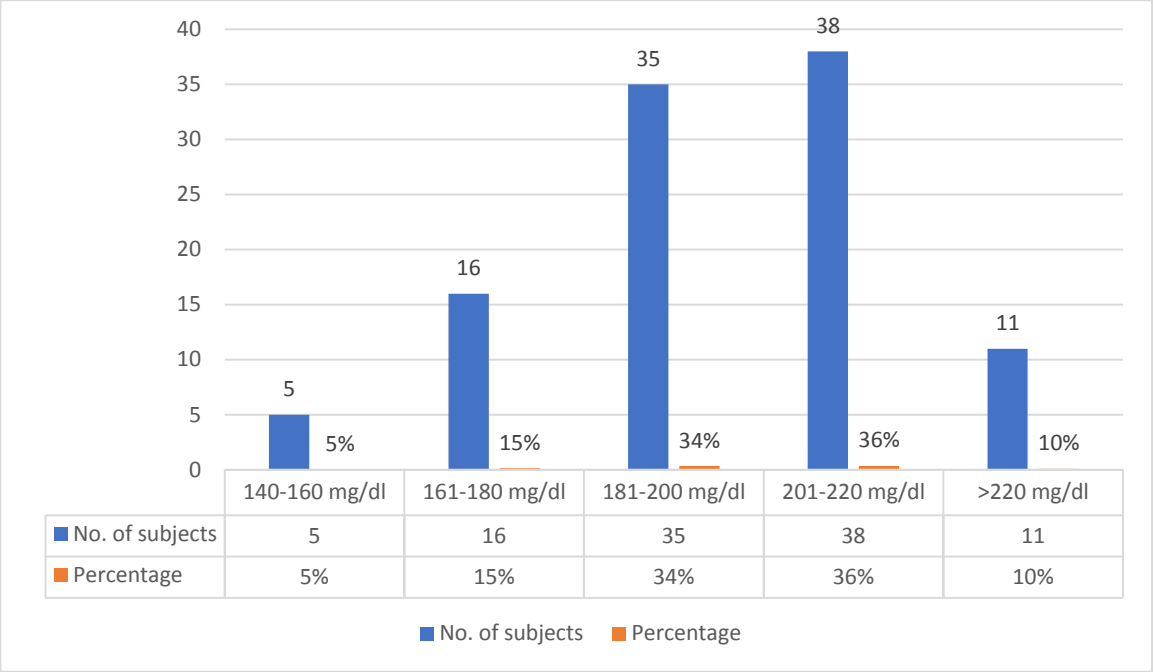


Fig. 4. The percentage (%) of subjects with risk factors of Diabetic nephropathy

Fig. 5- Distribution of subjects on basis of blood glucose levels.



S.NO	BLOOD GLUCOSE LEVELS (mg/dL)	NO.OF SUBJECTS	PERCENTAGE
1	140 -160 mg/dL	5	5 %
2	161 – 180 mg/dL	16	15%
3	181 – 200 mg/dL	35	34%
4	201 – 220 mg/dL	38	36%
5	>220 mg/dL	11	10%

Table*5- *Distribution of subjects on blood pressure values .

S.NO	BLOOD PRESSURE LEVELS	NO.OF SUBJECTS	PERCENTAGE
1	LOW BP (<120/80) mm/hg	4	4%
2	NORMAL BP (120/80) mm/hg	6	5%
3	HIGH BP (>145/95) mm/hg	95	91%

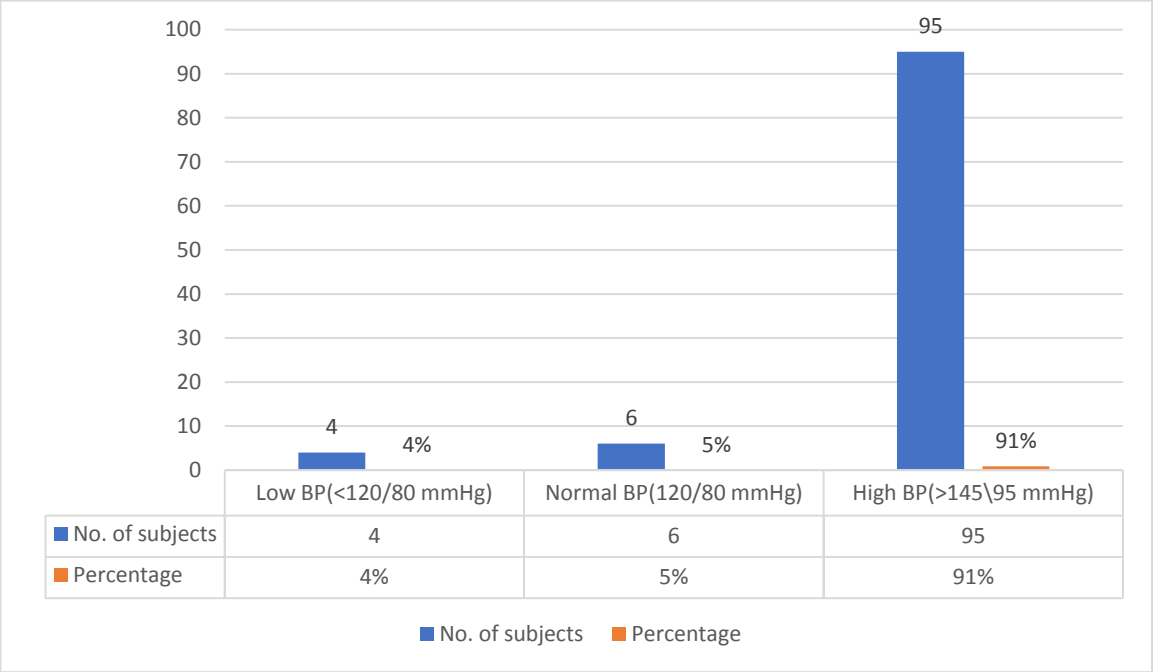
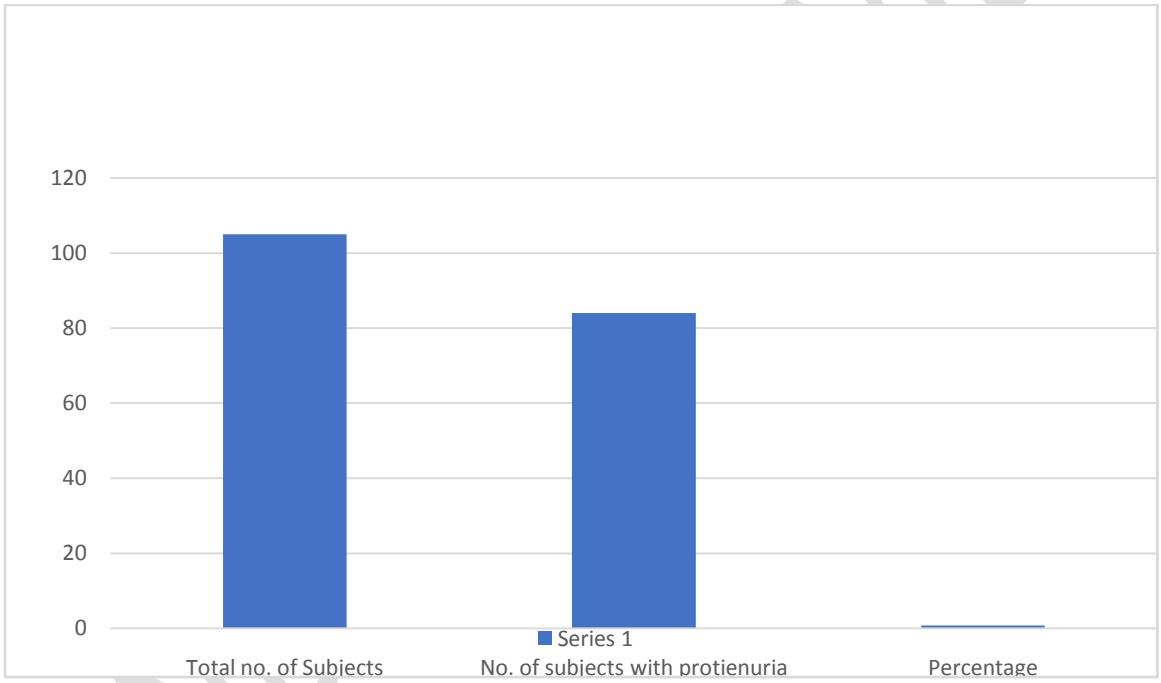


Table no .6- subjects with proteinuria

S.NO	TOTAL NUMBER OF SUBJECTS	NO. OF SUBJECTS WITH PROTEINURIA	PERCENTAGE
1	105	84	80%

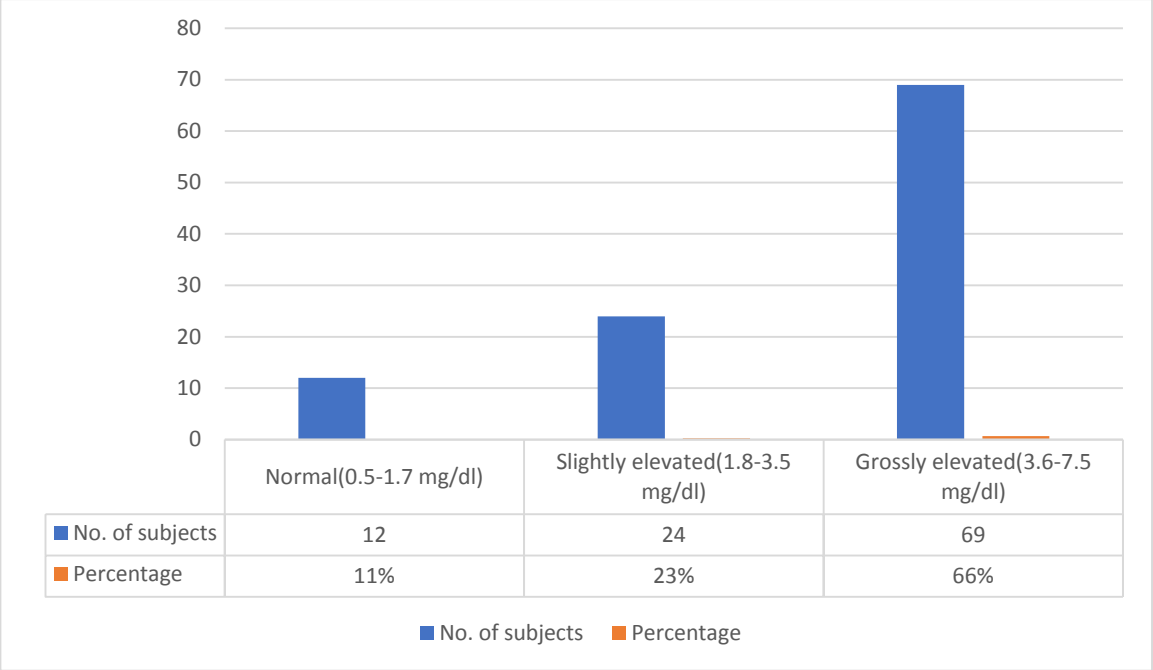
Fig. 6. subjects with proteinuria



S.NO	SERUM CREATININE LEVELS	NO.OF SUBJECTS	PERCENTAGE
1	NORMAL (0.5 – 1.7 mg/dl)	12	11 %
2	SLIGHTLY ELEVATED (1.8–3.5 mg/dl)	24	23%
3	GROSSLY ELEVATED (3.6 – 7.5 mg/dl)	69	66%

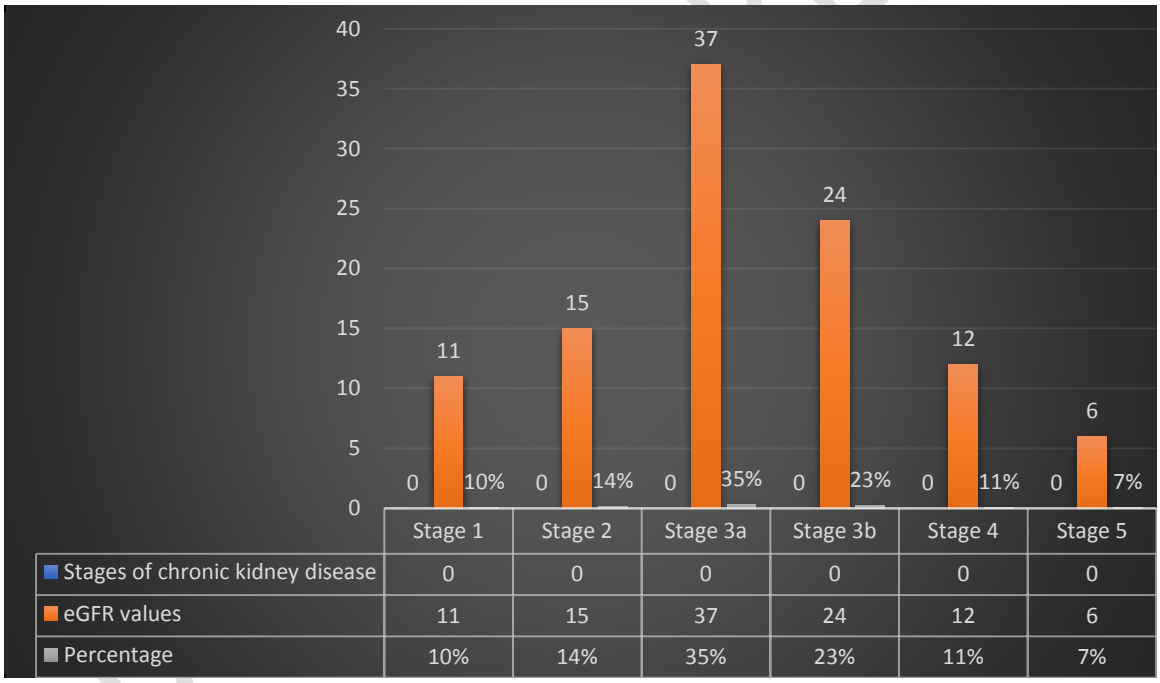
Table no. 7- Distribution of serum creatinine levels in subjects

Fig. 7- Distribution of serum creatinine levels in subjects



S.NO	STAGES OF CHRONIC KIDNEY DISEASE	e GFR VALUES	NO.OF SUBJECTS	PERCENTAGE
1	STAGE 1	>90	11	10 %
2	STAGE 2	60 - 89	15	14 %
3	STAGE 3 - a	45 - 59	37	35 %
4	STAGE 3 - b	30 - 44	24	23 %
5	STAGE 4	15 - 29	12	11 %
6	STAGE 5	<15	6	7 %

***Table** no. 8- showing stages of CKD in subjects Based on e GFR Values*



S.NO	SERUM POTASSIUM LEVELS	NO. OF SUBJECTS	PERCENTAGE

Fig. 8- Distribution of serum potassium levels of subjects.

1	**3.5 – 5.0**	**19**	**18 %**
2	**5.1 – 6.5**	**44**	**42 %**
3	**>6.5**	**42**	**40 %**

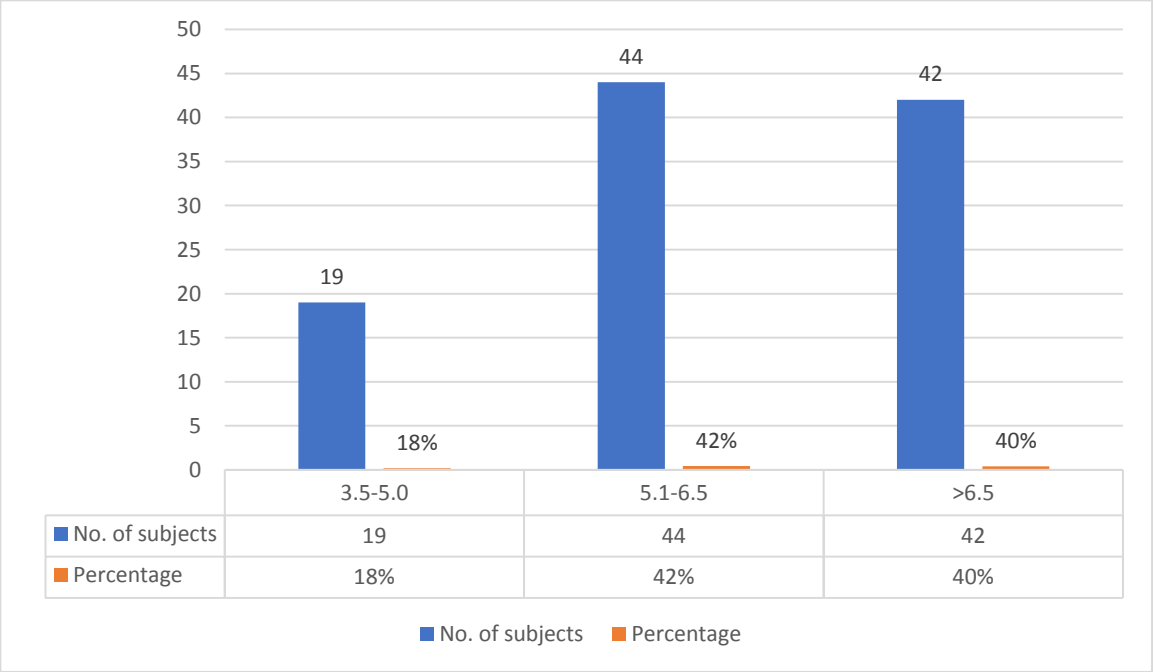
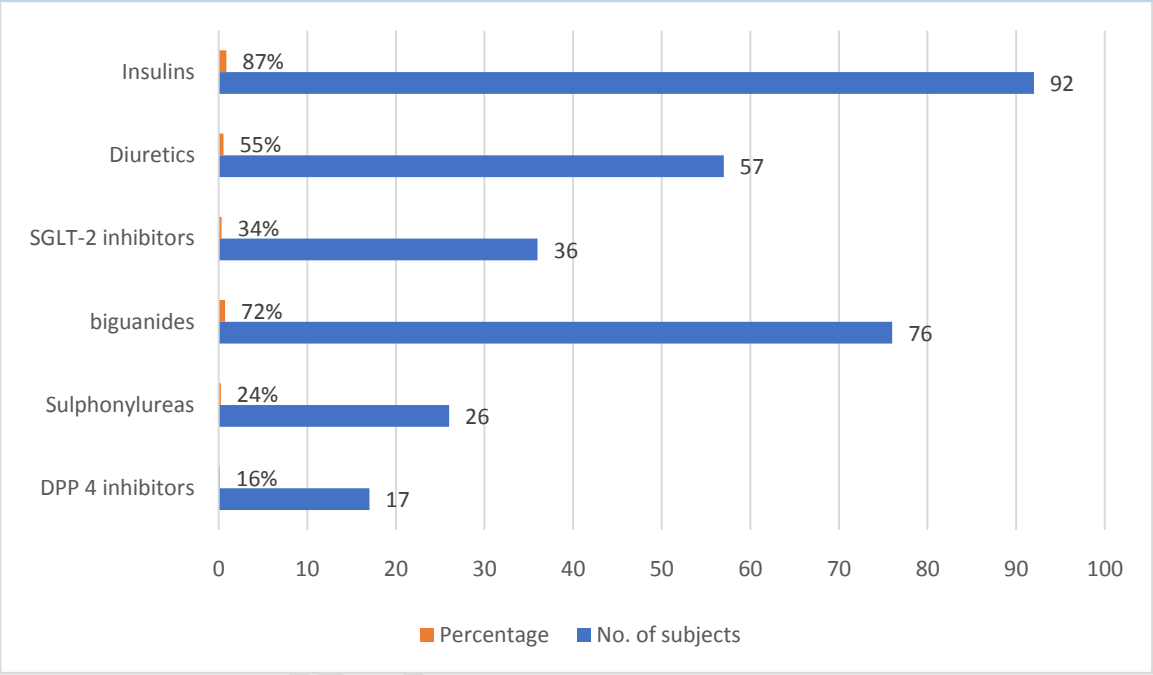


Fig.9- medication prescribed for treatment of diabetes.

Table No.9- medication prescribed to treat diabetic nephropathy complications.

S.NO	MEDICATION	NO. OF SUBJECTS	PERCENTAGE
1	DIPEPTIDYL PEPTIDASE 4 INHIBITORS	17	16 %
2	SULPHONYLUREAS	26	24%
3	BIGUANIDES	76	72%
4	SODIUM GLUCOSE TRANSPORT PROTEIN - 2 INHIBITORS	36	34%
5	DIURETICS	57	55%
6	INSULINS	92	87%



S.NO	MEDICATION	NO.OF SUBJECTS	PERCENTAGE
1	CALCIUM CHANNEL BLOCKERS	76	72 %
2	DIRECT RENIN INHIBITORS	34	32%
3	ANGIOTENSIN CONVERTING ENZYMES	32	30 %
4	MINERALO CORTICOID RECEPTOR ANTAGONISTS	36	34%

The demographic analysis of subjects with diabetic nephropathy reveals a conspicuous gender imbalance, with 82% of the cohort being male and 18% female. This observation prompts a nuanced exploration of potential gender-specific factors contributing to this divergence, such as hormonal influences or socio-behavioural variables. Moving to age distribution, the study underscores the diverse impact of diabetic nephropathy across different life stages. Notably, the prevalence peaks in the 66-75 age group, accounting for 37% of the subjects. This age-related susceptibility warrants further investigation into age-specific risk factors and clinical manifestations to inform tailored intervention strategies (Hohenstein*et al.*, 2008).

In examining diabetes types, the predominance of Type 2 diabetes (78%) aligns with established epidemiological patterns. However, a deeper exploration of the distinct phenotypic attributes of Type 1 and Type 2 diabetic nephropathy is warranted for a comprehensive understanding of their respective pathological trajectories. The study affirms the well-established association between hypertension and diabetic nephropathy, with 85% of subjects presenting with concurrent hypertension. Additionally, the coexistence of smoking (22%), obesity (63%), family history (49%), and elevated lipid levels (37%) emphasizes the intricate interplay of systemic factors contributing to the complex aetiology of diabetic nephropathy (Foggensteiner, Mulroy and Firth, 2001). Stratification of subjects based on blood glucose levels provides insights into the importance of glycaemic control. Elevated readings in significant proportions underscore the need for optimizing glucose management strategies to effectively mitigate renal complications.

Elevated blood pressure levels are prevalent in 91% of the subjects, reinforcing the intrinsic relationship between hypertension and diabetic nephropathy (Al-Rubeaan et al., 2014). Rigorous blood pressure management emerges as a paramount consideration in the comprehensive care paradigm for

afflicted individuals. Proteinuria (80%) and elevated serum creatinine levels corroborate the severity of nephropathic manifestations. These clinical markers underscore the imperative for vigilant monitoring and therapeutic interventions aimed at ameliorating renal function. Staging of Chronic Kidney Disease reveals a dynamic trajectory of renal compromise, with pronounced representation in stages 3a and 3b. The distribution across CKD stages accentuates the evolving clinical course of nephropathy, necessitating tailored therapeutic modalities corresponding to the progressive nature of the condition (Gall*et al.*, 1997).

The distribution of serum potassium levels elucidates potential electrolyte imbalances inherent in diabetic nephropathy. The notable proportion with potassium levels exceeding 6.5 necessitates judicious management to avert complications associated with hyperkalaemia. In the realm of medication patterns, the pharmacotherapeutic panorama for diabetes management encompasses a diverse array of agents, highlighting the intricate challenge of glycaemic control. Similarly, the pharmacological armamentarium for diabetic nephropathy underscores the concerted effort towards blood pressure modulation with the substantial employment of calcium channel blockers.

Conclusion

In conclusion, this comprehensive analysis of subjects with diabetic nephropathy illuminates several key facets essential for understanding and managing this complex condition. The pronounced gender disparity, with 82% males and 18% females, prompts further exploration into gender-specific factors influencing disease manifestation. Age distribution highlights a peak prevalence in the 66-75 age group, underscoring the need for age-tailored interventions. The predominance of Type 2 diabetes (78%) aligns with established trends, urging a nuanced examination of the distinctive characteristics of Type 1 and Type 2 diabetic nephropathy. Hypertension emerges as a pervasive risk factor (85%), necessitating meticulous blood pressure management in conjunction with glycaemic control.

Elevated proteinuria (80%) and serum creatinine levels substantiate the severity of nephropathy, emphasizing the importance of vigilant monitoring. Chronic Kidney Disease staging reveals a dynamic trajectory, emphasizing the progressive nature of the condition and the need for stage-specific therapeutic approaches. Electrolyte imbalances, particularly potassium levels exceeding 6.5, demand judicious management to mitigate associated complications. The pharmacotherapeutic landscape underscores the intricate challenge of glycaemic control, while the substantial use of calcium channel blockers in diabetic nephropathy treatment underscores the integrated focus on blood pressure modulation.

In essence, these findings provide a nuanced understanding of the multifactorial nature of diabetic nephropathy, guiding the development of personalized and integrative strategies for effective clinical management. Future research avenues may delve into gender-specific influences, age-tailored interventions, and the dynamic interplay between diabetes types and nephropathic manifestations.

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