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ORIGINAL ARTICLE

Prevalence of Diabetic Complications in Urban and Rural Population of Punjab

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ABSTRACT

Background: The incidence of diabetes is rapidly increasing worldwide and it involves both rural and urban population. Majority of diabetes consequences occur due to its complication that brought a significant burden to pts as well as health care system.
Aim: To assess the prevalence of diabetic complications in urban and rural population.
Study design: Cross-section descriptive study.
Methodology: Present study enrolled 1000 diabetic patients visiting urban and rural health facilities. The type-2 diabetic patients aged 18-70 years were included. Data was collected through questionnaire; data was entered and analyzed in SPSS Vr 24.0
Results: Among 600 patients of urban area, 62.6% were males while among 600 patients of rural area, 82.2% were male. From urban area, 51.2% patients and from rural area, 57.8% patients were above 50 years old. In urban area, 52% patients had infected wounds, 43.8% had cataract, 38.8% had heart problems and 36.1% had stroke. Among rural patients, 48.5% had infected wounds, 38% had diabetic foot, 47.5% had cataract, 33.5% had renal failure and 52.3% had heart problems. In urban population, non-compliance of medication (69%) while in rural population, lack of routine investigations (90.1%) were main factors associated with diabetic complications.
Conclusion: Study concluded that diabetic complications were prevalent in both urban and rural areas but rural population was more effected than urban population.
Keywords: Prevalence, Diabetes, Complications, Urban and Rural Population.

INTRODUCTION

The diabetes mellitus (DM) is one of the complex metabolic disorders characterize by improper hyperglycaemia due to either complete or partial insulin deficiency or insulin resistance.[1-3] The different kinds of diabetes comprise: Type-1 diabetes that occurs due to autoimmune β cell destruction in pancreas and Type-2 diabetes is caused by enhanced resistance to insulin action while gestational diabetes is a type of glucose intolerance in which pregnant females are affected.[4] The type-2 diabetes is responsible for majority of total prevalence of diabetes (>85%)[5].

The DM is a most prevalent disease and a leading health issue among world population.[6] The incidence of diabetes is rapidly increasing worldwide and it involves both rural and urban populations.[7] As per WHO, the diabetes mellitus in 2015 was considered 6th most significant cause of mortality in the world. During 2017, almost 274 million individual in urban areas while 146 million individuals in rural areas were living with diabetes mellitus.[8] In Pakistan, the recent prevalence of T2DM (Type 2 diabetes mellitus) is 11.77% while 14.81 percent in the urban and 10.34 percent in the rural areas[7].

The rise in number of diabetic people or diabetes long duration is possible to alter disease profile among numerous populaces in the world, particularly caused by an elevated prevalence of diabetes associated complications.[9] Diabetic patients at macro-vascular level may develop IHD (ischemic heart disease), peripheral and cerebro-vascular diseases that often cause morbidity and death. Diabetes at micro-vascular level can cause neuropathies (neuronal damage), nephropathy (renal disease) and retinopathy (vision impairment) that are much common causes for chronic renal disease, irreversible blindness as well as non-traumatic lower limb amputations[10]. In addition to such complications, cataract, glaucoma, skin infections, foot problems, erection problems, urinary tract and females genital tract infections are common among patients with diabetes as well.[11] It confirms the diabetes severity because reported problems affect the numerous systems within human body while sequelae can acutely compromise the life quality of patients[10].

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Currently, numerous researches have demonstrated a difference between both urban and rural inhabitants regarding frequency of persistent disease and its outcome.[12] A study carried out in Myanmar found that metabolic risk factors were much prevalent in urban dwellers, while behavioral higher risk factors were observed in rural residents[13]. A study carried out in Republic of Ireland between 1998 and 2015 demonstrated that diabetic complications prevalence is rising[14]. Several studies carried out in Ethiopia highlighted that incidence of nephropathy, neuropathy, visual impairment and foot ulcer were 15.7%, 29.5%, 33.8% and 13.6%, respectively[15,16]. More than half (59.7 percent) of the patients were affected with one or more complications due to diabetes[17]. A study carried out in Pakistan by Zia and coworkers (2016) showed that among 692 patients diagnosed, 0.56% had retinopathy, 0.28% had neuropathy, 0.84% patients had nephropathy, 28.17% had IHD and 8.45% were found with stroke while 5.35% patients had peripheral vascular disease[18].

Screening for both micro- as well as macro-vascular complications will have significant implications to understand the vigorous screening need and to plan out effective management and preventive strategies so as to reduce the load of this persistent devastating disease on health care expenditure and resources[19].

The objective of the study was to assess the prevalence of diabetic complications in urban and rural population**.**

METHODOLOGY

It was a cross-sectional descriptive study in which 1200 diabetic patients visiting urban and rural health facilities of Pakistan were included. The study was conducted at urban (Services Hospital Lahore, Lahore General Hospital Lahore, Nishtar Hospital Multan, Bahawal Victoria Hospital Bahawalpur, DHQ Gujranwala, Allama Iqbal Memorial Hospital Sialkot) and rural (RHC Choong, THQ Kamoki, RHC Uch Sharif Bahawalpur, RHC Sher Shah Multan, RHC Kotli Loharan Sialkot, DHQ Nankana Sahib) health facilities of Punjab (Pakistan). The type-2 diabetic patients aged 18-70 years were included. Hyperglycaemia secondary causes namely pregnancy, corticosteroid treatment and other pharmacotherapy causing hyperglycaemia, persistent calcific pancreatitis and type-I diabetes cases were excluded. Demographic details, diabetic complications and factors associated with diabetic complications

were noted. Data was collected through questionnaire. Verbal consent was taken from respondents. Confidentially of data was ensured that data will not be utilized except for the academic purpose.

Statistical analysis: All data was analyzed through SPSS version 24.0. Frequencies and percentages were calculated and data was presented in tables.

RESULTS

Among 600 patients of urban area, more than half 376 (62.6%) were males and 224 (37.4%) were females as shown in Table-1. Among 600 patients of rural area, 493 (82.2%) were male and only 107 (17.8%) were female patients. Table highlighted that among 600 patients of urban area, 73 (12.2%) were upto 40 years old and 220 (36.6%) were 41-50 years old while 307 (51.2%) patients were above 50 years old. Among 600 patients of rural area, 64 (10.6%) were upto 40 years old and 190 (31.6%) were 41-50 years old while 346 (57.8%) patients were above 50 years old.

Table-2 depicted that the presenting complaints among both urban and rural patients and found that in urban area 312(52%) patients had infected wounds, 196(32.6%) had diabetic foot, 263 (43.8%) had cataract, 79(13.1%) patients had glaucoma, 143(23.8%) had numbness in extremities, 165(27.5%) had history of renal failure, 233 (38.8%) had history of heart problems and 217 (36.1%) patients had history of stroke. Similarly among rural patients, 291 (48.5%) had infected wounds, 228(38%) patients had diabetic foot, 285 (47.5%) had cataract, 58 (9.6%) had glaucoma, 116(19.3%) patients had numbness in extremities, 201(33.5%) had history of renal failure, 314 (52.2%) had history of heart problems and 56(9.3%) patients had history of stroke.

Table-3 demonstrated that among urban population, non-compliance of medication was the main factor associated with diabetic complications for 414(69%) patients, followed by lack of routine investigations 347(57.8%), poverty 246(41%), frequent visits to quack 173(28.8%), Illiteracy 119(19.8%) and lack of medical facility 3(0.6%). Likewise among rural population, lack of routine investigations was the main factor associated with diabetic complications for 541(90.1%) patients, followed by non-compliance of medication 523(87.1%), frequent visits to quacks 471(78.5%), lack of awareness about health education programmes 398(66.3%), lack of medical facility 395 (65.8%), poverty 367(61%) and illiteracy 351(58.5%).

Table-1: Patients' profile

Parameters	Urban		Rural	
	Freq.	%age	Freq.	%age
Gender				
Male	376	62.6	493	82.2
Female	224	37.4	107	17.8
Total	600	100.0	600	100.0
Age				
≤40 years	73	12.2	64	10.6
41-50 years	220	36.6	190	31.6
Above 50 years	307	51.2	346	57.8
Total	600	100.0	600	100.0

Table-2: Frequency distribution of patients according to presenting complaints

Presenting complains	Urban		Rural	
	Yes	No	Yes	No
Infected wounds	312 (52%)	288 (48%)	291 (48.5%)	309 (51.5%)
Diabetic foot	196 (32.6%)	404 (67.3%)	228 (38%)	372 (62%)
Cataract	263 (43.8%)	337 (56.1%)	285 (47.5%)	315 (52.5%)
Glaucoma	79 (13.1%)	521 (86.8%)	58 (9.6%)	542 (90.3%)
Numbness in extremities	143 (23.8%)	457 (76.1%)	116 (19.3%)	484 (80.6%)
H/O Renal failure	165 (27.5%)	435 (72.5%)	201 (33.5%)	399 (66.5%)
H/O Heart problems	233 (38.8%)	367 (61.1%)	314 (52.3%)	286 (47.6%)
H/O Stroke	217 (36.1%)	383 (63.8%)	56 (9.3%)	544 (90.6%)

Table-3: Factors associated with diabetic complications

Contributing Factors	Urban		Rural	
	Yes	No	Yes	No
Illiteracy	119 (19.8%)	481 (80.1%)	351 (58.5%)	249 (41.5%)
Poverty	246 (41%)	354 (59%)	367 (61%)	233 (38.8%)
Lack of medical facility	3 (0.5%)	597 (99.5%)	395 (65.8%)	205 (34.1%)
Frequent visit to quack	173 (28.8%)	427 (71.1%)	471 (78.5%)	129 (21.5%)
Lack of awareness about health education programs	119 (19.8%)	481 (80.1%)	398 (66.3%)	202 (33.6%)
Compliance of medication	186 (31%)	414 (69%)	77 (12.8%)	523 (87.1%)
Routine investigations	253 (42.1%)	347 (57.8%)	59 (9.8%)	541 (90.1%)

DISCUSSION

Diabetes mellitus is a most prevalent chronic diseases and an important global health issue. Its prevalence is rapidly increasing worldwide in both urban and rural population. Pakistan is also facing same situation as the disease prevalence is rising in both urban and rural population. Therefore current study was carried out at urban (Services Hospital Lahore, Lahore General Hospital Lahore, Nishtar Hospital Multan, Bahawal Victoria Hospital Bahawalpur, DHQ Gujranwala, Allama Iqbal Memorial Hospital Sialkot) and rural (RHC Choong, THQ Kamoki, RHC Uch Sharif Bahawalpur, RHC Sher Shah Multan, RHC Kotli Loharan Sialkot, DHQ Nankana Sahib) health facilities of Punjab (Pakistan) to assess the diabetic complications. To obtain proper results, total 1200 patients were included in the study and found that most of the patients from urban (62.6%) and rural (82.2%) areas were males while 37.4% and 17.8% were females, respectively. But the findings of a similar study undertaken by Tóth and fellows (2019) showed different scenario that most of the patients from urban (63.9%) and rural (63.8%) areas were females while 36.1% and 36.9% were males, respectively.[6] Another study performed by Aung and teammates (2018) indicated that from both areas the male and females were almost equal as 48.9% patients from urban and 50.4% from rural areas were males while 51.1% and 49.6% were females, respectively[8]. But a most recent study conducted by Nazeer and comrades (2020) demonstrated that in urban area, less than half (48.8%) and in rural area more than half (66.0%) patients were male while in urban area more than half (51.2%) and in rural area less than half (34.0%) patients were female[20].

As far as age of the patients is concerned, study highlighted that only 12.2% and 10.6% patients from urban and rural areas were upto 40 years old while 87.8% and 89.4% were above 40 years old, respectively. Virtually same results were also reported by a recent study undertaken by Tai and coworkers (2020) who confirmed that only 19.3% and 9.7% patients from urban and rural areas were upto 40 years old and remaining significant proportion was more than 40 years old[12].

When the presenting complaints among both urban and rural patients were evaluated, study disclosed that in urban area majority of the patients (52%) had infected wound, followed by cataract (43.8%), heart problems (38.8%), stroke (36.1%), diabetic

foot (32.6%), renal failure (27.5%), numbness in extremities (23.8%) and glaucoma (13.1%). Similar in rural area most of the patients (52.2%) had heart problems, followed by infected wounds (48.5%), cataract (47.5%), diabetic foot (38%), renal failure (33.5%), numbness in extremities (19.3%), glaucoma (9.6%) and stroke (9.3%) which shows that infected wound, cataract and heart problems were more prevalent in both urban and rural population. However, a similar study performed by Natarajan and Sezhiyan (2017) elucidated that hypertension was more prevalent among urban population (68%), followed by nephropathy (60%), neuropathy (46%) and diabetic foot (45%). This study further showed same situation in rural population that majority of the patients (73%) had hypertension, followed by nephropathy (63%), neuropathy (56.8%) and diabetic foot (53%)[21]. The findings of a study carried out by Viswanathan and associates (2006) confirmed that infected wound was higher in rural than urban population (26% versus 34%) while the rates of amputation were also found elevated in rural than urban population (3% versus 8%)[22]. A study done by Shaikh and collaborators (2008) elucidated that 57.4% patients with diabetic retinopathy were from rural area while 42.5% from urban area[23.].

Study revealed that illiteracy, poverty, lack of medical facility, frequent visit to quack, lack of awareness about health education programs, routine investigations and non-compliance of medication were the factors associated with diabetic complications but these factors effected more rural population than urban population. In our study medication compliance was more in urban area (31%) than rural area (12.8%) but found unsatisfactory even in urban population. Non-compliance to medication could be the leading cause for diabetic complications. A study carried out by Padmanabha et al. (2020) also reported that non compliance to medication was found more among rural population (60.0%) than the urban population (40%)[24].

Limitations: Our study had limitations like financial constraints, lack of resources, short duration of study and lack of genetic workup.

CONCLUSION

It was concluded that infected wound, diabetic food, renal failure and heart problems were more prevalent in rural population while cataract, glaucoma, numbness in extremities and stroke were observed more in urban population. Illiteracy, poverty, lack of medical facility, frequent visit to quack, lack of awareness about health education programs, routine investigations and lack of medication compliance were the factors associated with diabetic complications but these factors effected more rural population than urban population.

Authors' Contribution: SN&AM: Conceptualized the study, analyzed the data, and formulated the initial draft, **NK&AHS:** Contributed to the histomorphological evaluation, **SAK&SA:** Contributed to the analysis of data and proofread the draft, **MI:** Contributed to the proofreading the manuscript for intellectual content.

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