Original Research Article

Prevalence of Older Age Diabetes in Rural Area of North-West Region of Bangladesh

ABSTRACT

Background: Bangladesh's north-west region consistently has worse health results than the rest of the nation. Many chronic illnesses, including diabetes, which is the seventh biggest cause of mortality in Bangladesh, fall under this category. This research compared the prevalence of diagnosed diabetes among older persons living in rural Bangladesh's north-west region.
Methods: The Centers for Medicare and Medicaid Services (CMS) Public Use Files for Medicare Beneficiaries (September 2020), which offer county level prevalence for diabetes as well as a number of other diseases among beneficiaries of Medicare fee-for-service, were used to extract data for the year 2018. Using a negative binomial regression, differences in the prevalence of diagnosed diabetes were evaluated.
Results: When compared to the Urban reference group in the final model, the prevalence of diagnosed diabetes was marginally lower in the rural group (PR: 0.98 [95% CI: 0.97-1.00]).
Conclusion: It is possible that the diagnostic prevalence of diabetes in an older adult population starts to level off due to diabetes' earlier onset. Lack of access to care in rural areas is another reason why there was no statistically significant difference in prevalence between these groups.

Keywords: Diabetes;Rural; Bangladesh.

1. INTRODUCTION

The concept that rural regions often have lower health than metropolitan areas is supported by a number of research. [1-4] Rural populations are less healthier than urban ones, and this seems to be true for people of all ages and ethnicities. [4] Individuals in rural locations often have greater rates of obesity, chronic diseases, and early mortality. [1,5,6] Fewer roads and interstates link rural communities to their surroundings. Instead, to travel to and from these numerous mountain communities, one must utilize smaller, meandering routes. This isolation hinders economic development and may discourage locals from traveling elsewhere for healthcare. Although there may not be local specialists or a big medical institution, primary care doctors are often available in these locations. This may lead to patients skipping follow-up consultations with specialists when advised to do so by their primary care provider, or it may be the difference between life and death while attempting to reach a hospital in an emergency.

High fasting blood glucose levels are the hallmark of the chronic metabolic condition known as diabetes mellitus. Diabetes comes in two main varieties. The hormone insulin, which is produced by the pancreas, is essential in both forms. The beta cells in the islets of Langerhan, groups of specialized cells in the pancreas, generate and release insulin. Insulin's job is to help the body's many tissues—including the muscles, brain, liver, and fat—take glucose from the circulation so that it may be turned into energy. [8]

An autoimmune reaction that kills the beta cells that produce insulin results in type I diabetes. This kind accounts for a very small percentage of all occurrences of diabetes and is often diagnosed in children and teenagers. 90–95% of all instances of diabetes are type II, which is far more prevalent. It is brought on by insulin resistance, which is the result of muscle, fat, and liver cells not reacting to insulin as it should, making it challenging for bloodstream glucose to be absorbed for energy generation and storage. To aid in the absorption of glucose, the circulation must have higher quantities of insulin. To fulfill the need, the pancreas' beta cells create more insulin. As a result, the body's blood glucose levels stay within normal range. Type IIdiabetes develops when beta cells over time lose the ability to produce enough insulin to keep blood glucose levels within normal range. Insulin resistance develops gradually, often over a long period of time. As a result, type IIdiabetes affects older people more often. [8,9]

Diabetes is identified through blood glucose testing. Examples of tests used to diagnose diabetes include the fasting plasma glucose test, oral glucose tolerance test, random blood test (mainly used as a screening tool), and hemoglobin A1c. The results of the majority of these tests simply display the blood glucose level on test day. The hemoglobin A1c, which evaluates typical glucose levels over a period of 2-3 months, is the exception. The test measures the amount of hemoglobin that is linked to glucose during the course of a red blood cell's 120-day life cycle. [8,9]

No matter which tests are used, a second confirmatory test utilizing the same test type is necessary for a diagnosis. [8] Depending on the type of diabetes and how severe the condition is, the course of therapy may change after diagnosis. Insulin is a constant component of type I diabetes management. Although type IIdiabetes may need to be managed with insulin, it may also be managed in other ways. An oral medicine called metformin is used to treat type II diabetes. Type IIdiabetes is often managed by changing one's diet, being more active, and decreasing weight. [8,9]

There are a number of established risk factors for type II diabetes, despite the fact that the exact cause of any type of diabetes is not fully understood. Some of these risk factors include obesity, a poor diet, inactivity, becoming older, and family history. 8,9We anticipate greater incidence of diabetes in those over 65 since old age is a risk factor. [10]

2. METHODS

2.1 Study Population

The Centres for Medicare and Medicaid Services (CMS) Public Use Files for Medicare Beneficiaries (September 2020), which provide county level prevalence for diabetes as well as a number of other conditions among beneficiaries of Medicare fee-for-service, were used to extract data for the year 2018. Using a negative binomial regression, differences in the prevalence of diagnosed diabetes were evaluated.

2.2 Statistical Analysis

This ecological research compares the prevalence of diabetes in rural and urban locations. Based on a negative binomial regression, county-level data from the CMS dataset mentioned above were utilized to determine prevalence rates of diabetes diagnoses. Because count data was being utilized and the dependent variable in this study was the number of beneficiaries who had been diagnosed with diabetes, negative binomial regression was employed.

The model would have been excessively rigid if Poisson regression had been used since it required the mean and variance to be equal. The log of the number of beneficiaries receiving payment for services served as the offset in this regression. SAS 9.4 was used for the regression and all other computations.

To calculate adjusted prevalence ratios, two models were built. Several variables that are well-known to be risk factors for type II diabetes were included into the first model to account for possible confounders. The beneficiary's average age, hypertension, high cholesterol, ischemic heart disease, and stroke were all examined as control factors.

Medicaid eligibility, the percentage of men, and chronic renal disease were also included. Chronic renal disease was included for two main reasons. The first is that one of the ways to qualify for Medicare before turning 65 is to have end-stage renal disease. The second is that chronic kidney disease is mostly brought on by diabetes, thus regions with high rates of the condition should also have high rates of diabetes.

3. RESULTS

Compared to the urban reference groups, the male population in the rural group was somewhat higher. On average, the rural group (68.6) was younger than the urban reference group (70.6). The rural group's age distribution was wider and its average age ranged from 62 to 74, in addition to being younger on average. For the urban reference group, the range for average age was 65–76 whereas it was 66–74 for urban. Rural areas' older age distribution and often younger Medicare population.

Diabetes was more prevalent among fee-for-service recipients in urban areas (30.2%) than in rural areas (29.3%). (Table 1). Similar to hypertension, chronic renal disease, high cholesterol, and stroke, urban areas had the greatest prevalence rates (Table 1). The sole chronic condition was ischemic heart disease. The urban reference group had a higher unadjusted prevalence ratio (1.10) than the rural group (1.08). For both models, the prevalence ratios were greater in urban areas (Table 2). However, neither group's analysis of the association between diagnosed diabetes and Medicare beneficiaries found it to be statistically significant.

Statistics showed a statistically significant correlation between greater rates of chronic renal disease and prevalence of diagnosed diabetes. Knowing that diabetes is the primary cause of ESRD 17, this would be predicted.

Table 1: Medicare Beneficiary Characteristics: Rural and urban

Beneficiaries Characteristics	Rural	Urban
Average Age (in Years)	68.6 ±2.4	70.6±1.3
% Male	48.9	45.5
Eligible for Medicaid (%)	31.9	24.7
Diabetes (%)	29.3	30.2
Hypertension (%)	58.8	61.2
Ischemic Heart Disease (%)	29.8	28.5
Chronic Kidney Disease (%)	14.9	16.9
High Cholesterol (%)	45.7	46
Stroke (%)	3.4	3.9

Table 2: Prevalence of Diagnosed Diabetes with 95% Confidence Intervals*

Variables	Unadjusted	Model 1	Model 2
Rural	1.07 (1.00-1.13)	0.98 (0.97-1.01)	0.99 (0.97-1.00)
Urban	1.09 (1.02-1.13)	1.00 (0.99-1.03)	1.00(0.99-1.02)
Average Age, 1 year	-	0.97 (0.98-0.99)	0.98 (0.98-0.99)
Male	-	1.00 (0.99-1.00)	-
Eligible for Medicaid	-	1.01 (1.01-1.03)**	1.01 (1.01-1.03)**
Hypertension	-	1.14 (1.10-1.16)**	1.14 (1.13-1.16)**
Chronic Kidney Disease	-	1.07 (1.06-1.12)**	1.10 (1.06-1.12)**
Stroke	-	1.08 (0.97-1.19)**	-
High Cholesterol	-	1.01 (0.99-1.03)**	-
Heart Disease	-	0.98(0.97-1.01)**	-

4. DISCUSSION

In previous research examining prevalence, rural areas were shown to have greater rates than urban areas.

Diabetes diagnoses were the sole subject of this investigation. Because of the lack of access to care in that area, it's probable that beneficiaries in those counties are less likely to go to a doctor for a diagnosis and treatment. [1,3] If this is the case, it would explain why rural Appalachia has lower prevalence rates for diabetes and other chronic illnesses, despite the majority of the evidence supporting this claim.

The Behavioral Risk Factor Surveillance System (BRFSS) data, wherein survey respondents self-reported their illness status, was utilized in several cases from the literature that revealed greater incidence of diabetes in rural areas.

When examining prevalence in a Medicare population, it is solely indicative of beneficiaries of fee-for-service Medicare, who are mostly older than 65. Those who are under 65 who have end-stage renal disease (ESRD) or who have been receiving disability payments for at least two years would have qualified. Given the age and health criteria required for eligibility, we would anticipate that diabetes and many of the other chronic illnesses examined in this research would be more prevalent in the Medicare population than in the general population.

This is much younger than any group's average age in the research utilizing the Medicare population. Furthermore, diagnoses of type II diabetes are occurring in younger patients—even in adolescence. A more accurate depiction of the population as a whole would be to include prevalence rates across all age groups. This might also be a factor in other research' findings of increased prevalence rates for diabetes and other chronic diseases.

5. CONCLUSION

Given the early age at which diabetes is diagnosed, the gap in diagnostic prevalence could eventually level out in the community of older adults. Many people with younger diagnoses may already be deceased. The beneficiaries' alternative Medicare eligibility as well as earlier death contribute to the lower average age. If this is the cause of the diagnostic prevalence seeming to level off in older persons, more research examining diabetes across all age groups would be necessary to confirm this.

ETHICAL APPROVAL

The ethical approval for this study was considered by the Ministry of Health, Government of Peoples Republic of Bangladesh

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