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AN UPDATE ON THE PREVALENCE AND INCIDENCE OF EPILEPSY AMONG OLDER ADULTS

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Abstract:

This study is based on the estimation of incidence and prevalence of epilepsy among "Arizona Medicare" legatees which aged over 65 years.

Basic analysis of Medicare administration claimed data regarding 2009-2011 (specifically for the State of Arizona) was accompanied. According to this data, epilepsy was recognized as a beneficiary who basically had either ≥ one entitlement with the code of 345.xx epilepsy code or two further claims with a specific code of 780.3x (seizure) ≥ 30 days apart period. Psychiatric and stroke-related comorbidities were regulated by the diagnostic codes. Incidence and prevalence of regarding annual average were also stratified and measures by characteristic and comorbidities' demography. OR (or Odds Ratios) and confidence intervals of 95% (CI) were measured as processes of prevalence effect and incidence, furthermore, chi-square statistic was intended to compare the epilepsy cases proportions either with or without comorbidities (alpha=0.05).

Entire incidence and prevalence annual average according to the period of study was 6.1/1000 and 15.2/1000 respectively. White beneficiaries, specifical relevance to the age group from 65 to 69 years of age, the maximum prevalence was detected 85 years (which was 19.8/1000, OR 1.66, with confidence interval CI 95%, 1.53-1.81) and for Native Americans (21.2/1000 or 1.42, with confidence interval 95% 1.25-1.62). On the contrary, the rates of maximum incidence were determined for 85 years old beneficiaries and older (8.5/1000 which is 1.82, with confidence interval CI 95%, 1.60-2.07) and finally for Black beneficiaries (there is 8.7/100 which is 1.44, with confidence interval CI 95%, 1.12-1.86).

Epilepsy is basically an important neurological sickness in between "Medicare Beneficiaries" of 65 years and older. There is a high rate of epilepsy with 85 years of beneficiaries, specifically for Native Americans and Black beneficiaries as compare with other demographic sub-groups than White Beneficiaries.

Keywords: ***Epilepsy, Prevalence, Incidence, Comorbidities, Medicare***

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1.0 INTRODUCTION:

In the United States of America, epilepsy is the major neurologic disorder and most common about the older person's age groups. Epilepsy growth risk is very high in younger age (<1 year), then declines by age 20 and again radically upsurges at 60 years of age. Over the lifecycle, the disease of epilepsy is basically common between the persons of 75 years of age and elder. Epilepsy, as an enduring disease is linked to substantial mortality morbidity. We consult the preceding "Medicare Beneficiaries", from the period of 2001 to 2005 described the prevalence of annual average as 10.8/1000 and the rate of incidence as 2.4 per 1000 (Burnette, Ama and Shaibu, 2017).

Current estimates show to designate an increase in epilepsy prevalence. Those elders, whose income is low, have a high rate of epilepsy prevalence, an estimated 19.3 per 1000, according to the prevalence of 2009. According to the data of (NHIS), the "United States National Health Interview Survey" for 2010 the epilepsy prevalence for 65 years and older was 13 per 1000. The basic objective of this study is to make an estimate the incidence and prevalence of older Medicare beneficiaries' estimation according to the use of "Arizona State Medicare" data of 2009-2011 and to investigate the effect of comorbidities on the incidence and prevalence estimates (Giussani et al., 2014).

2.0 MATERIAL AND APPROACHES:

2.1Source of Data

For this study, the data has been gathered from the state of Arizona, "Medicare Administrative Data" through "Medicaid and Medicare Services". All diagnostic information from indoor and our-door patients has been collected through administrative claims to demonstrate the epilepsy validity case ascertainment (Christensen et al., 2014).

2.2Criteria of Inclusion

Following basic inclusion criteria has been used:

1- FFS (Fee-for-service) enrolled
2- After the qualification of age (which is ≥ 65 years) enrolled in "Medicare" and finally
3- Enrolled in "Medicare" specifically for 12 sequential months.

2.3Epilepsy cases definition

Epilepsy has been perfectly defined by "The International League against Epilepsy" as a featured condition by any of below-mentioned conditions:

a) Analysis of epilepsy
b) Happing of at least 2 unprovoked seizures > 24 hours separately
c) Unprovoked one seizure with the probability of sixty percent for additional seizures over next 10 years (Christensen et al., 2014).

2.4Dominant Case Definition

According to the description of Christensen et al., (2014) a specific dominant case has been identified according to an eligible beneficiary with a particular code definition regarding study time period epilepsy. Dominant cases further identified for individual years of 2009 to 2011.

2.5Incident Case Definition

These cases were divisions of dominant cases with some of the extra requirements regarding proof of the event being a fresh epilepsy diagnosis. An incomplete and limited timeframe from 2009-2011, the identification of incident cases, particularly for 2010-2011. Similarly, for the incident cases of 2010, there must have one requirement for epilepsy-free last year. There was also a requirement of at least 2 epilepsy-free years for 2011 incident cases; accordingly those individuals with ICD 9-CM 345.xx diagnosis were also excluded from the count of incident for some reasons as the risk of recurrent seizure regarding 1/3 patients with specific initial unprovoked seizure will also have additional seizures in coming five years with the comparison of 75% with 2 or 3 unprovoked seizures have additional seizures risk in coming four years. Additionally, but it is not for entire epilepsy patients who are seeking medical follow-up history, the diagnostic epilepsy code "ICD 9CM 345.xx" is not wholly representative of fresh case until and unless there is period of long preceding regarding enrolment without any verified seizure "ICD 9-CM 780.3x" or "ICD 9-CM 345.xx" epilepsy (Ip et al., 2018).

2.6Incident Case Definition

For every specific year, the prevalence was assessed as prevalent number cases regarding 1000 qualified beneficiaries. Each year's denominator was the beneficiary's number which is liable as per the inclusion criteria in that specific year, while the annual average prevalence was measured from the three particular year's average prevalence. Similarly, incidence was projected according to the incident case numbers as beneficiaries risk numbers, which are being assessed with first-time epilepsy. This risky population omitted beneficiaries formerly recognized as cases. For 2010 to 2011 the rates of incidence were

distinctly measured as the overall average annual rate of incidents. Both prevalence and incident estimates were measured for overall demographic subgroups and population. As per the epilepsy is very infrequent illness in this population the ORs (odds ratios) were utilized to relevant risk estimation for prevalence and incidence' assessments between characteristics of demography (Ip et al., 2018).

2.7Sensitivity Assessments

Regarding robustness results determination, a sequence of sensitivity assessments was conducted. For this purpose, the initial analysis observed the method for measuring the epilepsy prevalence and the unique dataset beneficiary consist the persons recognized as local residents and those who possibly in or out the "State of Arizona" in a specific beneficiary year. We also control the registered beneficiaries which are residing outside the State of Arizona (we observe that the previous address of beneficiary has matched inside of Arizona in 2009). Those beneficiaries also entered in the list of 2010 even they moved from the State of Arizona by 2010 (Liza, 2016).

Accordingly, this assessment analyzes the influential degree regarding the original average prevalence annual estimate. We also analyze the effect of having three years of data, for this purpose a previous study of "Ohio Medicaid Data" determined that three epilepsy-free years required determining the incident cases. Accordingly, their prescribed study evaluated that a decline of 10.8% in the rate of incidence using two years interval of epilepsy-free as compared to estimates using one year of the epilepsy-free period (according to calculation 4.51-4.05 per 1000 person per year). As per the study, while using three years epilepsy-free interval developed in 5.2% decline in the rate of incidence from using two epilepsy-free year's interval estimation (which is 4.05-3.84 per 1000 persons per year) (Giussani et al., 2014).

3.0 RESULTS:

Below mentioned table presents the study population characteristics, as mentioned there the enrolled number of persons were 456,363 in total at "Arizona Medicare" for the period of 2009 to 2011 and similarly, according to our prescribed criteria of epilepsy, 11,967 persons met that criteria with annual average epilepsy prevalence of 15.2 cases in total of 1000 beneficiaries. Specifically, in the period of 2010 and 2011, the 4895 persons were recognized as fresh incident cases amid the eligible beneficiaries of 425,056 risky in the prescribed time duration. Similarly, the average epilepsy rate of incidence was 6.1 in 1000 risky beneficiaries.

Characteristics of Medicare Epilepsy Prevalence and Incidence population (2009–2011).

	Prevalence		Incidence	
(n)	Total 456,363	Cases 11,967	Total 425,056	Cases 4895
Age (%)				
65–69	31.7	21.0	27.2	18.7
70–74	24.4	23.0	26.1	23.8
75–79	17.8	20.0	18.8	19.7
80–84	13.4	17.5	14.2	18.0
85 and over	12.7	18.5	13.7	19.9
Sex (%)				
Female	53.6	55.1	53.8	55.0
Male	46.4	44.9	46.2	45.0
Race (%)				
White	91.9	91.1	91.9	91.7
Black	1.8	2.4	1.8	2.5
Other	1.0	0.6	1.0	0.7
Asian and Unknown	0.7	0.4	0.7	0.4
Hispanic	1.8	1.8	1.7	1.7
Native American	2.8	3.7	2.9	2.9
County of residence (%)				
Apache	1.3	1.2	1.3	1.1
Cochise	3.3	3.0	3.4	3.0
Coconino	2.6	2.3	2.7	2.2
Gila	2.1	1.9	2.1	2.0
Graham	0.6	0.5	0.6	0.5
Greenlee	0.2	0.1	0.2	0.2
La Paz	0.7	0.7	0.7	0.6
Maricopa	47.3	43.7	46.4	42.5
Mohave	7.0	8.1	6.8	7.7
Navajo	2.3	1.9	2.3	1.7
Pima	16.0	16.5	15.6	15.5
Pinal	4.1	4.6	4.0	4.6
Santa Cruz	0.6	0.5	0.6	0.4
Yavapai	7.6	6.8	7.5	6.9
Yuma	3.9	6.0	3.8	6.5
Other (outside of Arizona)	0.5	2.3	2.0	4.5

(Source: Ip et al., 2018)

3.1Sensitivity Assessments
Multiple sensitivity assessments assessed the results' heftiness, the initial evaluated analysis showed the inclusion effect of the probable non-Arizona person in the assessment. So, after the elimination those persons which are not residing in Arizona the prevalence of per 1000 estimates were 14.9 in the period of 2009, 14.7 was in the period of 2010 and finally 15.7 in the period of 2011. So the regulated annual average prevalence was however 15.1 within 1000 which was basically a 0.7% decline from the original 15.2 within 1000 estimation (Ip et al., 2018).

4.0DISCUSSION:

This study designates incidence and prevalence of epilepsy both are on a most advanced level as compared with preceding estimates of "Medicare Beneficiaries", specifically at the age of sixty-five or over. Prevalence increase overtime period has been advised by some other studies and as per previous studies, epilepsy incidence becomes higher after seventy years of age. Similarly, this concurs according to our study findings that there are higher rates of incidence with the passage of time and specifically in older ages. Additionally, the high rate of prevalence experimented in our study for "Native American Beneficiaries" and we found them higher than estimates as per previous studies which count 9.2 in 1000 persons (Giussani et al., 2014).

Moreover, a prominent proportion (which is 19.1% or 1.87, with 95% confidence interval 1.5-2.32) regarding "Native Americans", affected with epilepsy also had comorbidities which related to stroke, as compared to other "White" beneficiaries. According to this study, "Black" beneficiaries may also have a high rate of incidence while their estimated prevalence was only a little lesser than the "Native American Beneficiaries" estimation (Mathern, Beninsig and Nehlig, 2014).

This basic finding may also be connected with "Blacks" higher risk who have the first stroke; they have twice risky as compared with "Whites", this further lead to a higher rate of incidence as compared with "White Beneficiaries". Incident and prevalent cases and the non-cases difference with the accordance of psychiatric or stroke relevant comorbidities assist preceding studies as:

a) In stroke patients also having epilepsy, a sixty percent higher subsequent stroke risk exists as compared to those who do not have epilepsy (HR = 1.60; 95% confidence interval = 1.42-1.80).
b) It is also observed that epilepsy is frequently a result of neurodegenerative and cerebrovascular disease, specifically in elderly.
c) There is a particular connection between new-onset epilepsy and pre-existing psychiatric disorders (Howel, 2012).

4.1Limitation of the Study
Multiple limitations are there which considered when findings interpret. Initially, a basic limitation of the study is that the "Medicare" associated and eligible patients are not necessarily select to enter in "Medicare" or further using the services of "Medicare" even they again enrolled. Secondly, according to other administrative data, the data of "Medicare" may not refer all the analyzed information of patients. The third is, limitation of data which is only for three years' period and the sensitivity assessment results advise probable over-estimation regarding rates of incidence (John, 2017).

Forth is that the "Medicaid Population and Medicare" both are substantially different. The Medicaid programs are basically last resort insurance for the indigent, specifically for a huge number of children and women. Similarly, the Medicaid beneficiaries have multiple fluctuations of every month as the eligibility criteria limitation. Both incidence (which is 5.4 per 1000 persons) and prevalence rate (which is 15.1 per 1000 persons) after regulating for over-estimation probability in this study are still in advanced condition rather than 2003-2005 reported US Medicare population which were 10.8 and 2.4 per 1000 people respectively (Liza, 2016) .

5.0CONCLUSION:

It is clearly observed that epilepsy is an enduring disease and become an additional cause of the burden of health care. In the healthcare policy changes times, these specific estimations regarding the rates of prevalence and incidence may support the allocation of resources. Epidemiology better understanding regarding epilepsy in senior persons is significant given the highly expected upsurge in older person's population in the United States. Moreover, a specific understanding of comorbidity conditions affects the presence of the incidence and prevalence of required epilepsy. The specific data concealing the longer timeframe and broad geographic locations are required to further analyze the geographic variation possibility in incidence and prevalence regarding multiple regions of the locale. Finally, the increased

epilepsy prevalence and incidence trend in the specified area has been found also.

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