

## The African Burden of Mental Health

Faustin Armel Etindele Sosso<sup>1\*</sup> and Philippe Kabore<sup>2</sup>

<sup>1</sup>Universite de Montreal, Biological Sciences, Canada

<sup>2</sup>Department of Economics, Social Science Faculty, University of Ottawa, Canada

### Abstract

Mental disorders and associated illnesses are the main etiology of death in the world, according the last review of literature. The present study report the economic burden assumed by African countries since the last ten years. We also show the costs engaged by the African countries in specifically Alzheimer Disease (AD), Parkinson Disease (PD) and Dementia. The present research finds that despite the lack of funds, a government doesn't have accurate planning for mental disorders. We also found that some areas of Africa invests significant money for general mental illnesses compared to other, but fewer than 5 per cent of this investments is engaged for neurodegenerative diseases.

**Keywords:** Economic burden; Neurodegenerative diseases; Alzheimer disease; Parkinson disease; Dementia; Africa; Costs

### Introduction

Alzheimer Disease (AD) and Parkinson Disease (PD) are the most famous neurodegenerative illness, leading to dementia associate with a various onset of symptoms like cognitive decline and brains failure. AD and PD consumes a huge amount of healthcare resources, and there are major public health matters in many countries, especially developing countries; which are not really ready for this long war [1]. Given the ageing population worldwide, dementia also become since the last two decades, a major public health concern. Much effort has been devoted to quantify the burden of this category of disease during the past decades. The cost for both AD and PD was estimated to account for around 1% of a country's gross domestic product. AD populations and healthcare resource utilizations are heterogeneous, and PD populations are more homogeneous [2]. Previous reviews have consistently found substantial variations in the costs of dementia across studies and countries. Surprisingly, first estimates of dementia prevalence in developing countries reported low rates (under 5%). These findings contrasted with those made in developed countries, ranging from 5 to 20%. At our knowledge, no recent study really carried out an investigation to the economic burden of African countries, and how public health or related organization handled this matter compared to developed countries [3-5].

The present research was aimed to exhibit the latest evidence on the economic impact of AD, PD and dementia on the government but also how Africans countries manage these mental disorders.

### Methods

We searched in SCOPUS, GOOGLE SCHOLAR, MEDLINE and EMBASE using comprehensive search strategies, developed in consultation with a statistician and an experienced research librarian. We used terms such as "costs", "burden", and "economic" to exhibit articles reporting economic burden. These terms were then combined with the terms "Alzheimer Disease, Parkinson Disease, dementia, government, African, neurodegenerative disease". We included studies if they: (1) included human patients with AD, PD and Dementia, (2) reported the fees induced by these three illnesses, (3) were published between January 2000 and December 2015, and (5) were in English. We excluded studies that reported costs or cost effectiveness associated with specific treatments of those pathologies. Editorials, politics and methodological articles or commentaries were excluded as well. All elected papers were screened and their results, consolidated

following geographic subdivision of Africa and length of observation. Consolidation was performed to resolve any discrepancies between sources, and to normalize raw data issued from different sources and different years. The heterogeneity on research settings, data source, population design, and results reported across the studies protects final synthesis from bias and confusing factors. The extracted direct economic burden related to AD, PD and Dementia were summarized into the following figure below. We group the raw data according to each disease. We divided the countries in five subgroups: Western Africa (WE), Central Africa (CA), Eastern Africa (EA), Northern Africa (NA), and Austral Africa (AA). We compared after each of these subgroups to see behavior and national management of neurodegenerative diseases. All dispenses were adjusted to year 2015 for all documents collected from government institutions and national organisms. We first calculated the estimation in the original currency of the country issuing data, and after using published inflation rates for the country where the study was conducted, according the World Bank's website (<http://data.worldbank.org/indicator/FP.CPI.TOTL.ZG>), and for all other countries from <http://www.rateinflation.com>. All inflation-adjusted costs were then converted to 2015 US dollars using the exchange rate published by the Bank of America (<https://www.bankofamerica.com/foreign-exchange/exchange-rates.go>).

### Results

#### Prevalence of dementia in Africa

Several studies about dementia disease have shown that, most of the countries in Africa, showed a low rate of prevalence. Prince and al. (2013) found a lower prevalence of dementia (between 2-4%) in four countries of Sub-Saharan Africa. In the other side, George-Carey and al. (2012) studied deeply dementia phenomenon in Africa. They estimated the prevalence of dementia amongst adults older than 50 years at 2.4%. They also found that dementia prevalence increase with

**\*Corresponding author:** Faustin Armel Etindele Sosso, Universite de Montreal, Biological Sciences, 90, Vincent d'Indy, Montreal, H3C 3J7, Canada, Tel: +1 514 343 6111 #1238; E-mail: [faustin.armel.etindele.sosso@umontreal.ca](mailto:faustin.armel.etindele.sosso@umontreal.ca)

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age increasing and women aged 80 and more are more exposed with a prevalence rate of 19.7%. Their study showed that Alzheimer disease and Vascular disease are the most prevalent cause of dementia with a rate of 57.1% and 19.7%, respectively.

The Table 1 below show that dementia prevalence differs from one country to another. Central Africa and South Africa seems to be the most affected by dementia disease. One can observe that the countries the most affect by dementia diseases experienced or are encountering political instability or/and armed conflict except South Africa. Given the Center for Systemic peace (2014), Central Africa and Democratic republic of Congo were extreme state fragile and warfare in mid-2014 while Nigeria was serious state fragile and warfare at the same time (<http://www.systemicpeace.org/inscrdata.html>).

From “World Alzheimer Report” (2015) the prevalence of dementia in Africa was 4.6%. Sub-Saharan Africa bloc of country had almost the same rate of prevalence which varies from 3.1 to 3.9%. We can clearly observe from Table 2 that, North Africa and Middle East are the region with a high prevalence of dementia (6%). We can also see from Table 2 that dementia prevalence is going to increase for the next decade. The number of people estimated at 4 million in 2015 in Africa is supposed to quadruple for the 35 years in order to reach 15.76 million of people. East of SSA is estimated to have the highest increase rate of dementia disease with 72% over the period 2015-2030 and 300% over the period 2015-2050.

**Economic burden of dementia disease, AD and PD**

In the section, we are going to describe the annual cost per capita in mental health by block of countries in Africa, given the raking of World Bank in 2015. Our data depicts the annual cost in mental health which is also divided between two main diseases: Alzheimer Disease (AD) and Parkinson Disease (PD).

The Figure 1 shows the annual cost per capita in mental health, AD and PD in Maghreb countries in 2015. The left axis if for mental health and the right axis is for AD and PD. One can see that Algeria spent the less in AD and PD and also in mental health disease with respectively an amount per head of 0.05\$, 0.02\$ and 4\$. That’s understandable for PD since the death rate per 100 000 is very low (0.48) which seems to

Country	Prevalence (%)
Benin	<4
Central Africa	<10
Democratic Republic of Congo	<7
Egypt	<4
Nigeria	<7
South Africa	<10

Source: George-Carey et al. [25].

**Table 1:** Dementia prevalence in Africa.

Region	Over 60 population (millions, 2015)	Crude estimated prevalence (%), 2015)	Number of people with dementia			Proportionate increases (%)	
			2015	2030	2050	2015-2030	2015-2050
Africa	87.19	4.6	4.03	6.99	15.76	74	291
North Africa /Middle East	38.93	6	2.34	4.35	10.04	86	329
SSA, Central	4.78	3.3	0.16	0.26	0.54	60	238
SSA, East	19.86	3.5	0.69	1.19	2.77	72	300
SSA, Southern	6.06	3.9	0.24	0.35	0.58	46	145
SSA, West	17.56	3.1	0.54	0.85	1.84	58	241

**Table 2:** Total population over 60, crude estimated prevalence of dementia (2015), estimated number of people with dementia (2015, 2030 and 2050) and proportionate increases (2015-2030 and 2015-2050) by GBD world region.

be a minor matter in Algeria. However, AD death rate per 100 000 in Algeria is 2.28 (Figure 2).

The cost of AD and PD in Djibouti and in Tunisia are the highest in Maghreb region. The cost of mental heal heath in Djibouti was more than 126\$ per capita in 2015 which includes 1.05\$ for AD and 1.05\$ for PD. We can see from Figure 2 that AD and PD are serious matters in Djibouti with respectively a death rate per 100 000 of 4.23 and 2.5. Despite the relatively low rate of AD and PD death rate per 100 000 in Tunisia (1.77 and 0.72), the annual cost of AD and PD were respectively 1.89\$ and 1.04\$.

In West Africa, Cabo Verde was the only country where we observed a highest cost of mental health as well as AD and PD with respectively a cost of 114.85\$, 3, 90\$ and 7.79\$ (Figure 3). The cost in AD could be justify by the fact that AD death rate per 100 000 in Cabo Verde is the highest (5.07) in West Africa. Guinea-Bissau, in other side, is the second country in West Africa where the mental health per capita is costly (88, 68\$). However, AD and PD cost remained very low in Guinea-Bissau. This fact could be enlightened by the fact that AD and PD death rate per 100 000 in Guinea-Bissau is low (3 and 3.69 respectively).

Burkina Faso, Niger, Nigeria and Sierra-Leone had the annual cost per capita in AD and PD between 0.004 and 0,09\$ in 2015 (Figure 3) although, AD and PD death rate in those countries are not very different from others countries in West Africa (Figure 4).

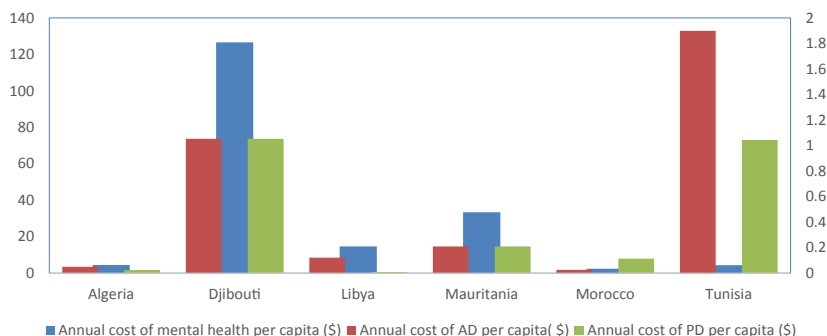
In East Africa, except Seychelles, the annual cost per capita of AD and PD is very low (Figure 5 below) for all the countries which is less than 1.59\$ (Figure 5). Only three countries (Comoros, Mauritius and Seychelles) out of seventeen present an annual cost of mental health per capita greater than 53\$.

However, except Egypt and Mauritius which seemed to have a very low rate of PD death with 0, 12 and 0.71 per 100 000 (Figure 6), the rest of countries in East Africa had a rate of death for PD per 100 000 from 1.4 to 3, 28.

From Figure 7, Sao Tome and Principe was the only country in Central Africa where the annual cost per capita of mental health as well as AD were important with an amount of 495.64\$ and 22.93\$ respectively in 2015. The annual cost per capita for health disease, AD and PD was almost inexistent in Angola, Cameroon and Congo Democratic Republic despite the fact that they all had an AD and PD death rate of 2 per 100 000 or more (Figure 8).

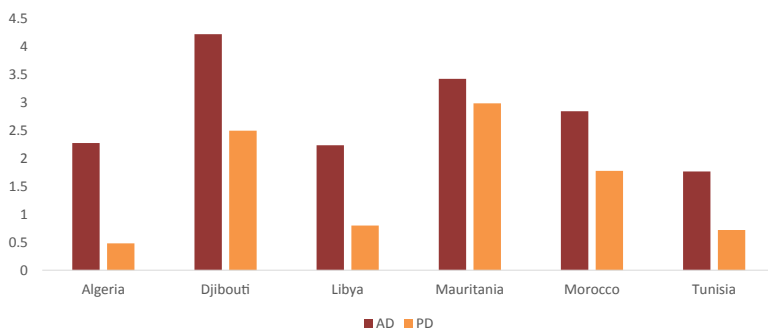
Figure 8 depicts a highest AD and PD death rate for Equatorial Guinea (5.15/100000 and 3.85/100000) between Central Africa countries, followed by Cameroon and Angola.

Between countries in Southern Africa, the annual cost per capita of mental health was important for Lesotho, Namibia and Swaziland with



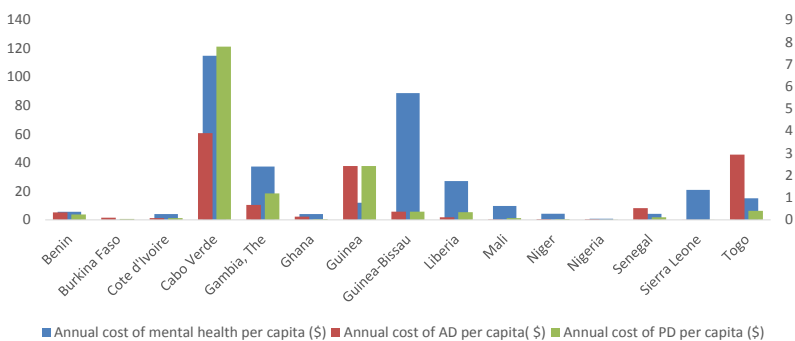
Source: WHO [2].

Figure 1: Annual cost of mental health and its components per capita in Maghreb (current US\$).



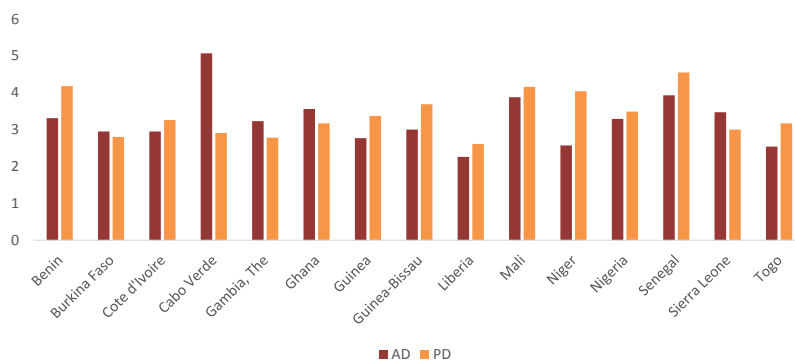
Source: WHO [2].

Figure 2: AD and PD death rate per 100 000 in Maghreb.



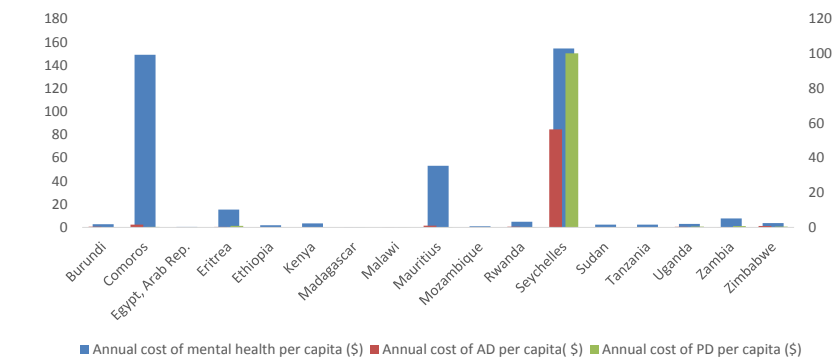
Source: WHO [2].

Figure 3: Annual cost of mental health and its components per capita in West Africa (current US\$).



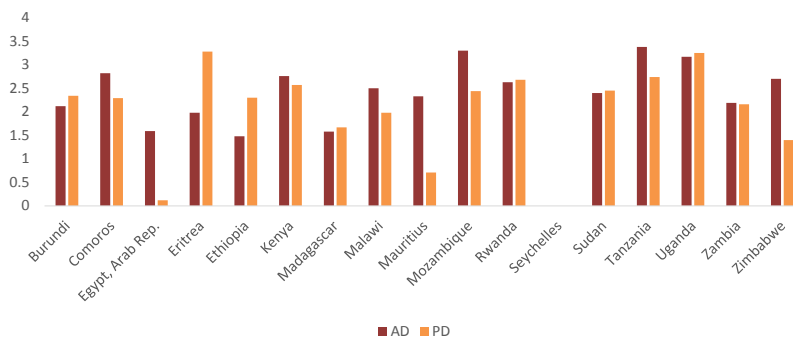
Source: WHO [2].

Figure 4: AD and PD death rate per 100 000 in West Africa.



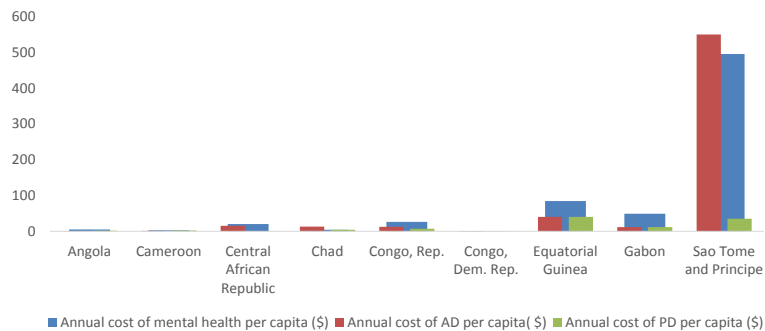
Source: WHO [2].

Figure 5: Annual cost of mental health and its components per capita in West Africa (current US\$).



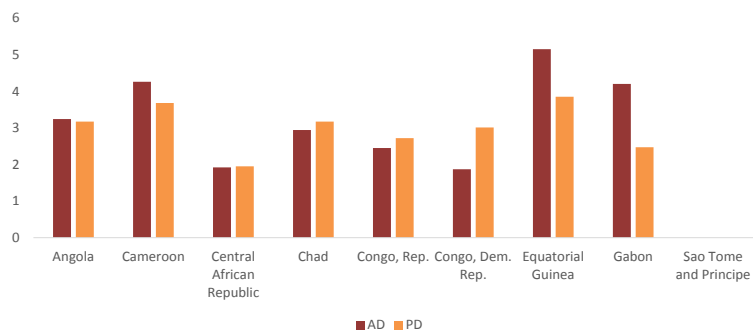
Source: WHO [2].

Figure 6: AD and PD death rate per 100 000 in East Africa.



Source: WHO [2].

Figure 7: Annual cost of mental health and its components per capita in Central Africa (current US\$).



Source: WHO [2].

Figure 8: AD and PD death rate per 100 000 in Central Africa.

respectively 58.30\$, 72.54\$ and 37.81\$, in 2015 (Figure 9). Swaziland was the country with the highest annual cost per of AD and PD per capita with respectively 10.98\$ and 3.10\$.

One can see from Figure 9 that South Africa had the lowest annual cost per capita for both health disease, AD and PD with less than 2\$ despite the fact that it recorded the highest (7.67) AD death rate per 100 000 in 2015 (Figure10).

Figure 10 showed that, according to our results, death rate from AD in Southern Africa countries is at least twice more than the death rate from PD. That is quite understandable because the annual cost of AD per capita for all those countries is also at least twice more than the annual cost of PD per capita (Figure 9).

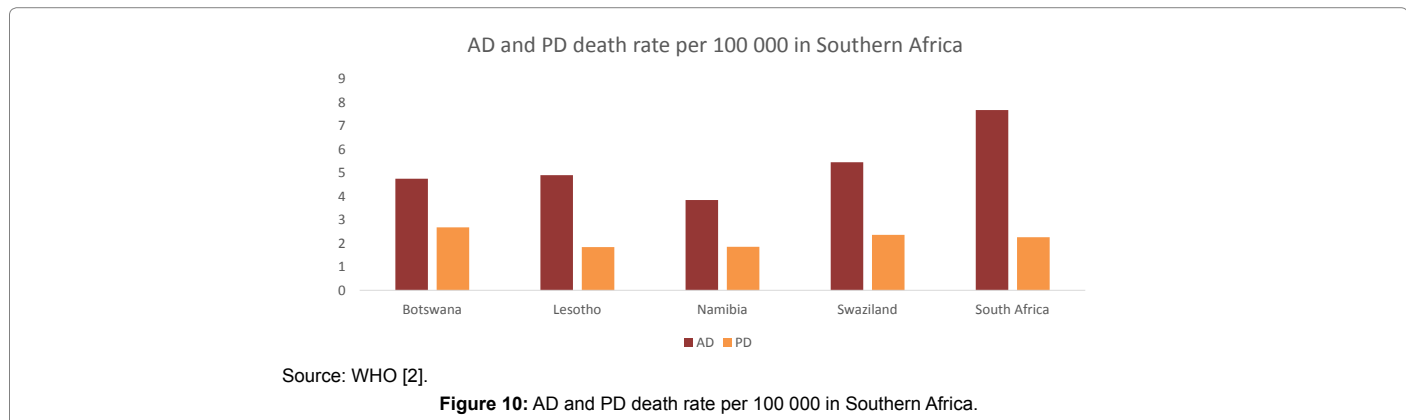
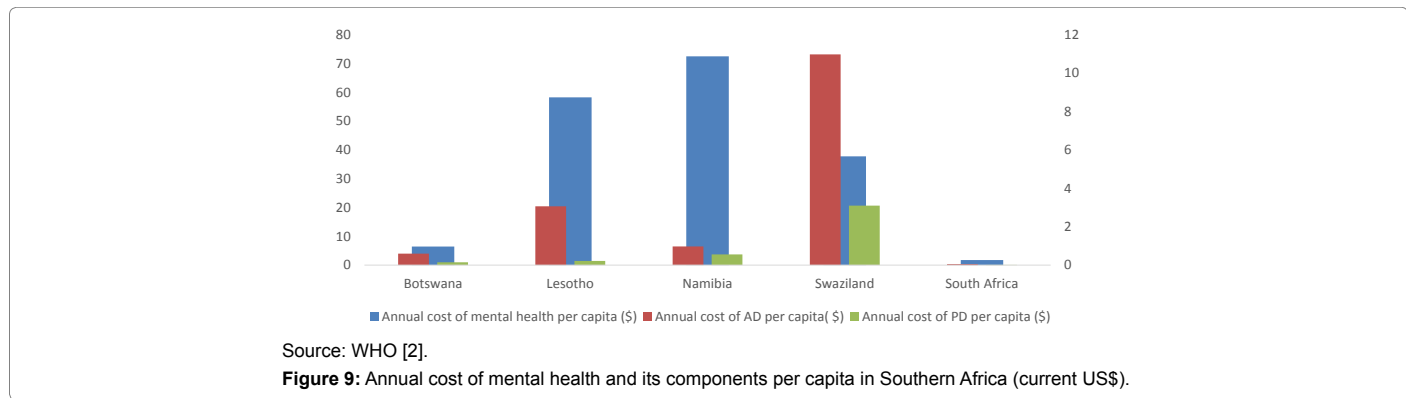
Since we have a prevalence rate for 6 countries in Africa, we are interested to analyse the link between that prevalence rate of dementia (Table 1) and the expenditure on mental health. Central Africa and South Africa had the highest prevalence rate in 2013, almost 10%. Despite this fact, the annual expenditure of mental health was only \$1.76 per capita for South Africa and \$20.36 per capita for Central Africa. It seems that in those countries there is a lack of public investment to tackle mental health issues.

From Table 1, we see that Benin and Egypt had the lowest prevalence of dementia between the samples of six countries which was less than 4%. However, Benin spent fourteen more than Egypt in mental health per capita with an annual cost of \$5.64 for Benin and \$0.38 for Egypt.

Data about Dementia prevalence and Annual cost for these 6 countries show an inadequacy between the needs of mental health and the resource invested to cope with that issue.

### Discussion

This retrospective observational design of many studies on the burden of the three majors neurodegenerative diseases published since January 2000, reveals a similar image related to the economic burden of AD and PD as seen in the past decades [6-8]. The total per-patient costs of AD are considerable and patients with PD have the same costs. But following data we collected, Dementia decreased in the same timeline. Direct and indirect costs for AD were at least twice as high as those for the PD and Dementia, but recovery equipment and social care associated with PD are almost twice, compared to AD and Dementia. Obvious changes in cost estimates between studies still existed. This review summarizes healthcare resource uses, costs, and economic impacts associated with the African country’s management of neurodegenerative disease [3,9-13]. Research on dementia in low-income countries has increased during the last years. Prevalence of dementia seems to vary between different regions of Africa, and between urban and rural areas. Beyond the usual risk factors for dementia, our studies highlighted the role of psychosocial risk factors in low-income countries [14-19]. Given the ageing population worldwide and the strong epidemiological evidence, dementia is now a major public health concern in developing countries. The burden of dementia leads global consequences. First estimates of dementia prevalence in developing countries reported low rates, compared to developed countries. For example, Sharif et al. predicted that the burden of AD in Canada will increase from approximately CA\$ 2.9 billion in 2010 to almost CA\$ 7.6 billion in 2031, in which hospitalization will be the main cost driver, accounting for 38.2% of the total costs. Mental disorders and specifically AD was in the top 10 list of most expensive conditions in 2008 for the USA, as reported by the Agency for Healthcare Research



and Quality [13,20,21]. The mean expenditures of AD and PD were estimated at US\$ 33.2 billion for women and US\$ 23.0 billion for men, compared with US\$ 37.7 billion and US\$ 33.7 billion for cancer. These findings showed that, developing countries despite the lack of funding faced less neurodegenerative disease than developed countries. And other side, if they establish an accurate public health program to handle this family of illnesses, they will probably do better in prevalence and incidence of AD, PD or Dementia [22,23]. However they can perform better than now.

## Conclusion

Africa has the potential to handle and eradicate many diseases it faces. According to the present study, we can obviously say government have a lack of interest or do not realize importance to prevent brain disorders and associated disease such as neurodegenerative diseases. Each country can develop its own specific plan to decrease the onset of AD, PD and Dementia; on the global health of his population before it becomes an irreversible major matter. This can be benefits for both economic side and clinical side of the matter.

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