

The Situation of Alzheimer's Disease in Bangladesh: Facilities, Expertise, and Awareness among General People

Nipa Roy^{1*} Al-Maruf Hassan², Rukaieya Alom³, Md. Habibur Rahman Rajib⁴ and Khondaker Abdullah Al-Mamun²

¹Institute of Natural Sciences, United International University, Dhaka, Bangladesh

²Department of Computer Science and Engineering, United International University, Dhaka, Bangladesh

³Jahangirnagar University, Dhaka, Bangladesh

⁴AIMS Lab, United International University, Dhaka, Bangladesh

Abstract

The situation of Alzheimer's disease (AD) in Bangladesh is investigated in this study, which depicted the overall condition in the country to treat AD affected individuals. Our team performed a brief online survey on the institutions and hospitals dealing with the mental health related issues to find expertise among the practitioners on AD. A survey was also done on the syllabus of trained caregivers such as nurses, or any other group of people receiving training on handling AD patients. There are nontrivial issues needed immediate attention from the government such as national policy for senior citizens that have facilities for AD affected people, specific training module to handle AD patients, and specific expertise to treat AD patients. This study also suggests taking initiatives to a broad level to make people aware of this disease, starting with acknowledging AD as a disease rather than being a generalized mental disorder.

Keywords: Alzheimer's Disease (AD) • COVID-19 • Dementia • Stroke • Tumor • Parkinson's disease.

Introduction

Alzheimer's disease (AD), which is the most common cause of dementia, is an irreversible neurodegenerative disorder that affects people demolishing their nerve cells, neurons (mainly, the loss of connections between neurons in the brain) [1]. This slowly leads people towards the loss of cognitive functioning, thinking, remembering, reasoning, and behavioral abilities, and ended up making them unable to perform everyday necessities. The brain starts a decade, or more before memory and other cognitive problems appear, which is a symptom-free pre-clinical stage of AD [1]. Memory problems are typically one of the first signs (symptoms vary from person to person) of cognitive impairment related to AD, called mild cognitive impairment (MCI) [1]. Eventually, brain tissue shrinks significantly in the severe stage after mild and moderate stages of AD. People with memory and thinking concerns should talk to their doctor to find out whether their symptoms are due to Alzheimer's, or another cause, such as stroke, tumor, Parkinson's disease, sleep disturbances, side effects of medication, an infection, or a non-Alzheimer's dementia. Some of these conditions may be treatable and possibly reversible.

Among other neurodegenerative disorders Alzheimer's disease (AD) is highly recognized due to its severe health risk and the unavailability of any permanent cure. This is one of the major causes of death and the biggest threats in the recent era, which makes the victims vulnerable to other viruses such as COVID-19 as AD usually occurs in old age. However, nonfamilial early-onset Alzheimer's disease, which is estimated to account for only 3.5% of total AD, can develop in people who are in their 30s or 40s, showing symptoms in their 50s or early 60s [2,3]. The genetic heritability of AD ranges from 49% to 79%, around 0.1% of which have an onset before the age of 65 of the affected individuals [4-6]. The disease can have devastating effects on the caregivers,

and family members of the patients, including people losing their ability to take care of their own necessities [7-9].

Before the pandemic due to COVID-19, AD was ranked as the third leading cause of death in the United States, just behind heart disease and cancer, as a cause of death for older people. AD is one of the greatest economical threats acknowledged by most developed countries. Research shows that the expenditure due to AD will be 7 billion USD in 2030 only in the United States [1] including caregivers. At present the number of affected individuals is higher in developed countries, which correlates with the proportion of senior citizens [10,11]. According to Alzheimer Disease International, nearly 44 million people have Alzheimer's disease, or a related dementia at a worldwide level [12], and the number of affected people around the globe would be 65.7 million by 2030 [13]. Being an overpopulated country and most people living in rural areas, there is a very little to the lack of concern about AD in Bangladesh among general people.

The number of people with dementia living in their own home for longer is always increasing, often supported by one of their family members [14]. Sometimes they stay at the old home, or other facilities under the care of paid caregivers. However, this number seems very few after taking the socio-economic structure in Bangladesh as availing such facilities often exceeds the gross income of families. According to the WHO data published in 2017 Alzheimer's, or dementia deaths in Bangladesh reached 9, 917, or 1.26% of the total deaths, which was the last data found in this aspect that ranks Bangladesh number 152 in the world.

Literature Review

The World Factbook 2011 (published by the US Central Intelligence Agency) states that health expenditure in Bangladesh around 40% of the population live below the poverty line and there are more than 7 million people over the age of 65. These facts indicated that Bangladesh can face obstacles to deal with any chronic diseases such as dementia. This disease is becoming an overwhelming threat as elderly people have high susceptibilities of other life-risking diseases including the recent pandemic COVID-19, which was observed from reports all over the world.

According to the World Health Organization (WHO) Global Dementia Observatory Provisional Country Profile 2017, for every 100K populations,

*Address for Correspondence: Nipa Roy, Institute of Natural Sciences, United International University, Dhaka, Bangladesh, Tel: 8801911921783; E-mail: niparoybd@gmail.com

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the available number of neurologists is 0.09 with no geriatricians, no long term care facilities, no adult day centres, and no outpatient social care centres in Bangladesh. The same report says that there is an existence of a dementia representative within the ministry with no integrated dementia plan and no available guidance for health and social care staff to manage dementia risk. However, there are a few non-government organization (NGO) making some trivial impact in dementia such as Sir William Beveridge Foundation and SAJIDA Home Care, which will be our focusses in the latter sections.

Section II has information on the existing theories to understand AD and its impact on neurophysiology. Section III briefly focuses on the overall situation of AD and research progress. An elaborate study is approached in Sec. IV in terms of expertise of practitioners, caregiver specialization for AD, and organizations working in favor of AD (specifically private organizations) in Bangladesh. The gross effect of AD in economy is the concern of the next Sec. V, which also discusses the awareness of AD among general people. The necessities, as well as opportunities for research in AD are summarized in Sec. VI A. Some concluding remarks are included in the last section, Sec. VI A.

Early symptoms

Practitioners start to recognize symptoms from mild cognitive impairment, which is one stage latter than the approach of AD [15]. Before the final stage of dis- integration, i.e., dementia, there are two more stages of diagnosis known as preclinical and mild cognitive impairment [1], between which neurons get affected from the preclinical stage.

The approach of AD can be prevented by arranging proper precautions once preclinical stage is possible to diagnose. There are several approaches for this prevention like targeting the vascular systems, glucose metabolism, or lower inflammation, and lifestyle interventions such as exercise, diet, and behavioral approaches. These might take decades to fully set in for showing explicit symptoms most likely after a person's 60s, or for an early onset between 30s to mid-60s (less than 10% of all people with Alzheimer's) [16].

Only after years of brain changes individuals experience explicit symptoms such as memory loss and language problems. Latter symptoms include impaired communication, disorientation, confusion, poor judgment, behavioral changes, and ultimately end up with difficulties speaking, swallowing, and walking [16]. Symptoms occur due to the damages of nerve cells (neurons) in parts of the brain involved in thinking, learning, and memory (cognitive function). Eventually, nerve cells in parts of the brain that enables a person to carry out basic bodily functions, such as walking and swallowing, also get affected, which causes the victims bed-bound so that they require around-the-clock care.

The hallmark pathologies of Alzheimer's disease are the accumulation of the protein fragment beta-amyloid (plaques) outside the neurons in the brain and twisted strands of the protein tau (tangles) inside the neurons. These changes are accompanied by the death of neurons and damage to brain tissue. Alzheimer's disease is a slowly progressive brain disease that begins many years before symptoms emerge, which is ultimately fatal [16].

Global situation of AD

Alzheimer's disease is a globally acknowledged severe disease and most of the developed countries have reports on the effects of AD on the socio-economic structure. In the United States, the number of Americans of age 65 and older with Alzheimer's dementia may grow to 13.8 million [16] by 2030. This represents a steep increase from the estimated 5.8 million Americans age 65 and older who have Alzheimer's dementia today. Official death certificates recorded 1,22,019 deaths from AD in 2018, the latest year for which data are available, making Alzheimer's the sixth leading cause of death in the United States and the fifth leading cause of death among Americans of age 65 and older.

Between 2000 and 2018, deaths resulting from stroke, HIV, and heart disease decreased, whereas reported deaths from AD increased by 146.2%. In 2019, more than 16 million family members and other unpaid caregivers provided an estimated 18.6 billion hours of care to people with Alzheimer's, or other dementias. Total payments in 2020 for health care, long-term care, and

hospice services for people of age 65 and older with dementia are estimated to be 305 billion USD [16]. Like other developed countries in Europe, North America, Australia, and some of the Asian countries, the United States has web- sites to provide guidance for people to recognize and take precautions to prevent such AD [1,15].

In developing and developed countries in Asia, the prevalence of AD is related to age, sex, and social and cultural backgrounds [17–20]. There are alarming risk factors in the health sector due to AD, and the social- economic effect of this disease is also nontrivial [18,20]. In some overpopulated countries, AD has been a major social burden due to its effects on elderly people [21]. The role of caregiver management has also come to the focus for a long time in these countries [22].

Some countries in South Asia are also concerned about AD. Our neighbour India is concerned about the effect of AD on social structure and economic development for a long time [23,24]. The Dementia India Report 2010 by the Alzheimer's and Related Disorders Society of India estimated that the number of people with dementia in India is 3.7 million and this number is set to double in the next 20 years. The Government of India established the National Institute of Ageing and special provisions for people with dementia in the National Policy for Older People. There are a number of studies in rural areas about the effect of AD in the life of mass people [25–27]. Pakistan is also aware of the effect of AD on the social, as well as economic issues because they have a number of studies on the progression of AD, symptoms, and guidelines for practitioners [28,29]. Nepal has studies on the protocols for doctors to deal with AD [30]. Sri Lanka has strategies, as well as a number of studies regarding the prevalence and approaches to deal with AD [31–33].

Situation of AD in Bangladesh

The World Factbook 2011 (published by the US Central Intelligence Agency) states that the density of physicians stands at 0.295 per 1,000 head of population and the density of hospital beds is 0.4 per 1,000 head of population in Bangladesh. We can expect the AD expertise will receive a trivial role in this country. In this section we are going to study the overall situation related to the expertise in AD and caregiver background. There are also discussions about the organizations working on AD in Bangladesh.

Expertise of practitioners

Physicians tend to test individuals for Alzheimer's dis- ease by obtaining a medical and family history, as well as psychiatric history from the point of view of specialists such as neurologists, neuropsychologists, geriatricians, and geriatric psychiatrists [16]. This also includes conducting problem-solving, memory and other cognitive tests, and physical and neurologic examinations such as using positron emission tomography imaging of the brain to find out if the individual has high levels of beta- amyloid, using lumbar puncture to determine the levels of beta-amyloid and certain types of tau in cerebrospinal fluid. We include a through research on the expertise of physicians in Bangladesh in the above mentioned fields to find out the potential to diagnose AD patients and to contribute to the treatment of those individuals. In this Healthcare facilities in Bangladesh include primary health workers to big hospitals where we are going to focus on renown hospitals, which have neuroscience and/or department dealing with brain issues. As most of the facilities are located in Dhaka, our team focused on the entire Dhaka division to get available expert lists from Bangabandhu Sheikh Mujib Medical University Hospital, National Institute of Neurosciences & Hospital, National Institute of Mental Health and Hospital, Square Hospi- tals Ltd., Evercare Hospital Dhaka, United Hospital Lim- ited, Modern Psychiatric Hospital (Pvt.), Monon Psy- criatic Hospital, Brain and Mind Hospital, New Mukti Clinic, Bangladesh Specialized Hospital, City Hospital & Diagnostic Center, LABAID Specialized Hospital, Central Hospital Ltd., Asgar Ali Hospital, S.P.R.C & Neurology Hospital, Dhaka Central International Medical College & Hospital (DCIMCH), AMZ Hospital Ltd., Aichi Medical College & Hospital, AL-MANAR HOSPITAL LTD., Khidmah Hospital Private Limited, Green Life Medical College and Hospital, Ibn Sina Trust (Zigatola, Kallyanpur, Mirpur, Badda, Uttara, Labagh, Malibagh, Doyagonj, Keranijonj, and Savar). Besides Dhaka, we did look for other divisions and the facilities enlisted in this search are: Ibn Sina Trust (Jessore, Bogura, and Chittagong); Al Haramain Hospital Private Limited, Oasis Hospital, North East

Medical College & Hospital from Sylhet; Labaid Diagnostics Barisal, Islami Bank Hospital, South Apollo Diagnostic Complex (Pvt.) Ltd., and Medinova Medical Services from Barisal; National Hospital Pvt. Ltd. and CSCR (Pvt.) Ltd. from Chit-tagong; Mymensingh Medical College & Hospital from Mymensingh; CDM Hospital and Rajshahi Medical College & Hospital from Rajshahi. Our team went through the personal information of the consultants and/or doctors once the lists found on the valid website of the institutions mentioned here as shown in Figure 1.

The number of experts from different fields from the above mentioned institutions is depicted in Figure 2. We find that the number of practitioners, as well as experts is highest in Neurology, and the lowest in Neurophysiology. However, the numbers are not sufficient enough compared to the population density in Bangladesh and they are mostly clustered in Dhaka. This indicates that the facilities for mental health problems have scarcity in the country even though we have data from both public and private facilities. When we take one certain institution, e.g., National Institute of Neurosciences & Hospital in Figure 3, or LABAID in Figure 4, the number of experts in each field varies from the combined numbers, and order of highest and lowest is also different for separate scenario in the institutions.

If we look at one institute, the expertise lacks all the necessary fields in one institution to treat AD patients that we mentioned earlier in this section. We also found the scarcity of AD-related training history from the profile of the experts, which is different for other diseases such as Parkinson's disease, or bipolar disorders. Our team searched in google scholar, as well as domestic and international journals for the research activities of the experts we focused on related to AD, which also proved the scarcity of AD patients' data, or other basic research works with AD patients. Furthermore, we were far from finding any evidence that all the experts in the existing fields in one institution interact with each other to screen AD patients, or acknowledge AD as a severe threat to the society. However, there are some social organizations working on building awareness of AD, which we are going to discuss latter.

Caregiver situation

In developed countries, caregivers are often available for AD affected individuals for their home, as well as old home facilities. There are institutions working for aged people, some of which are focused on AD. Those organizations give all kinds of support for AD patients and research on AD along with training for caregivers and old home services. Developed Countries like the USA, Australia, and European countries are concerned about their aged people's health, especially about Alzheimer's dementia [34].

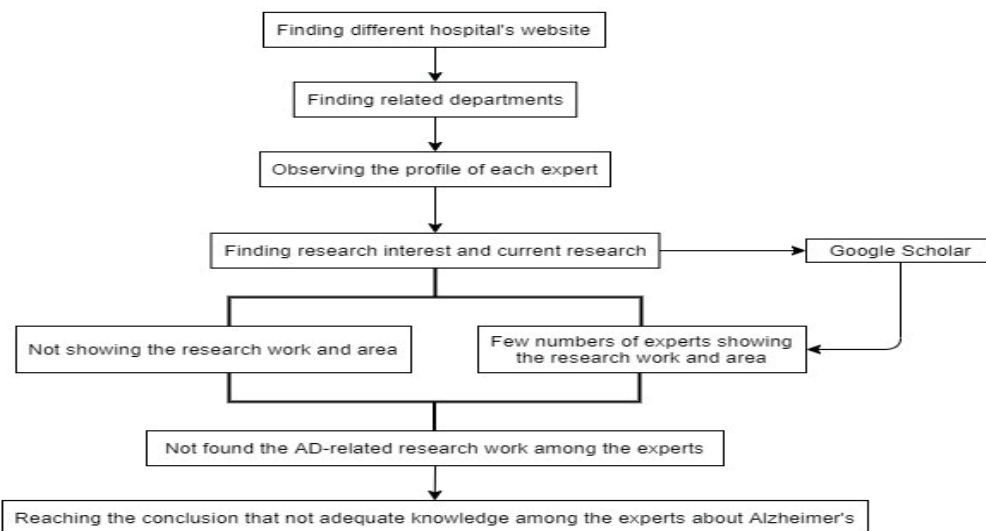


Figure 1. Working procedure to identify the expertise and understand the situation of Alzheimer's in Bangladesh, as discussed in Sec. IV A.

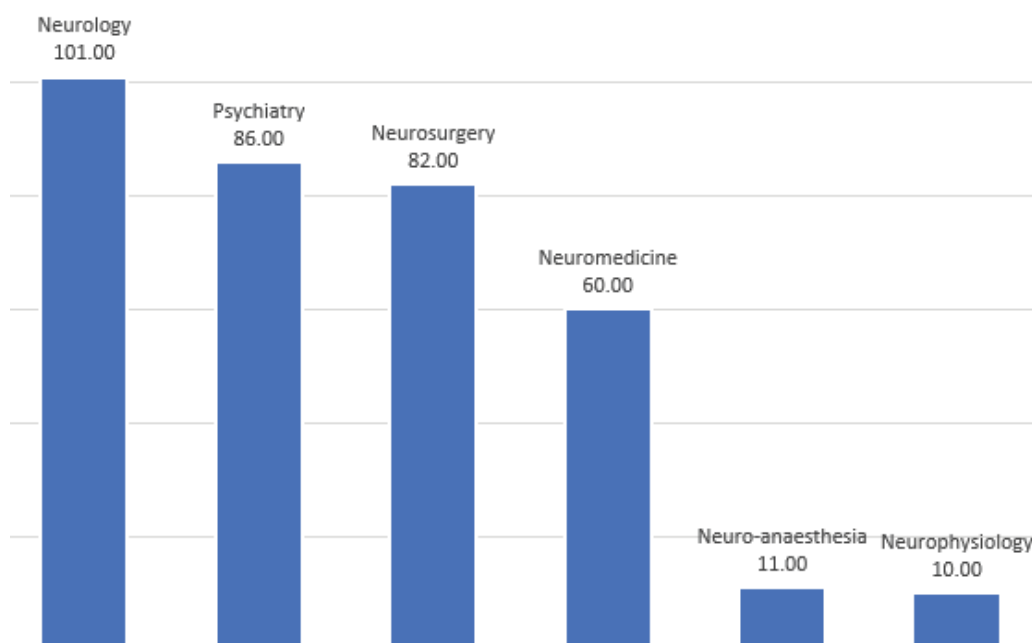


Figure 2. The number of people in certain specialized field in the institutions mentioned in Sec. IV A found from the website data. The height of the bar diagram indicates the number of experts in certain field mentioned above each bar with the exact number of experts in that field.

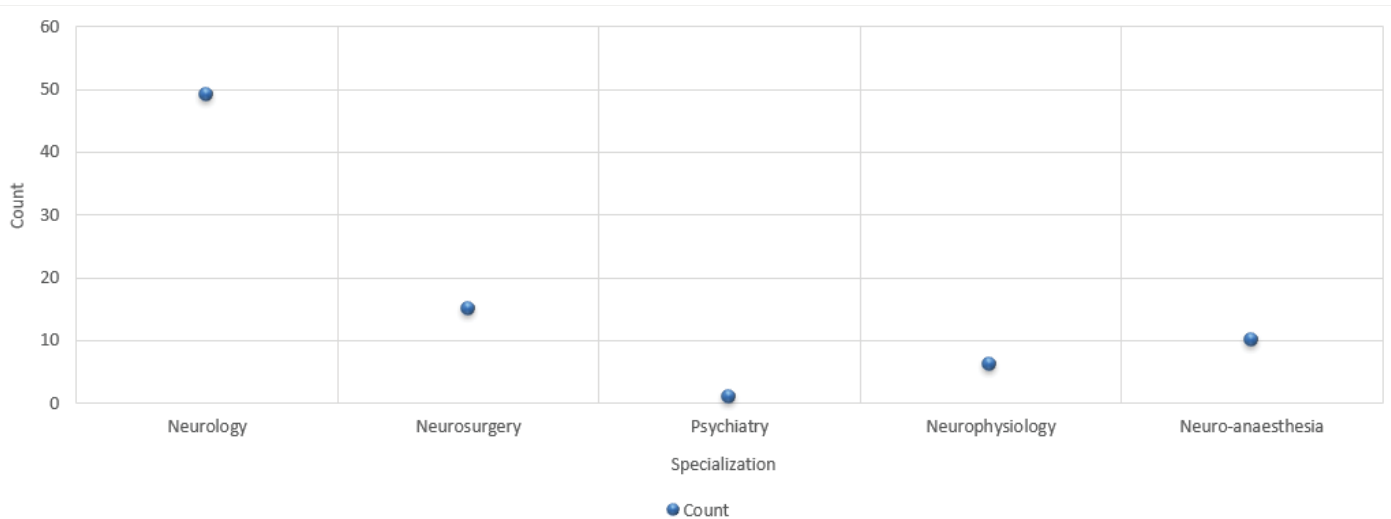


Figure 3. The number of people in certain specialized field in National Institute of Neurosciences & Hospital (Government, or public facility) found on the website. The number of experts is plotted for each field found from the website data.

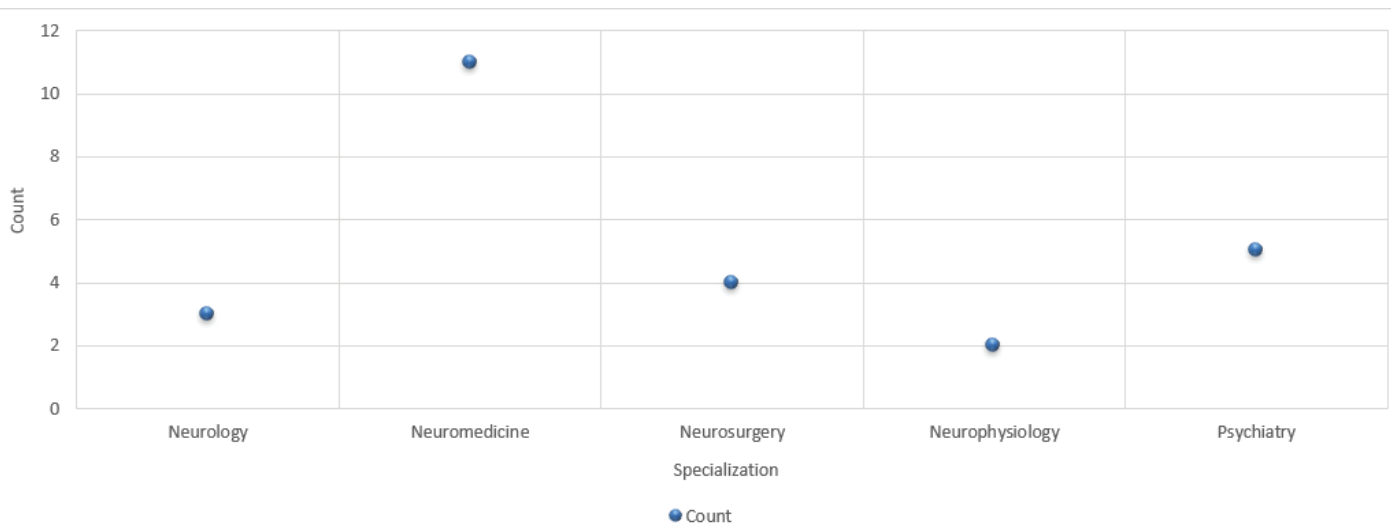


Figure 4. The number of people in certain specialized field in LABAID (Private facility) found on the website. The number of experts is plotted for each field found from the website data.

Most of these developed countries also have certain strategies to improve the quality of life of the people with dementia [35]. Online based survey gives us some significant statistical records in certain years like Norway has the highest proportion of nurses and midwives per head in Europe (1,744 per 100,000) in 2015 [36]; according to NHS England, there were about 17,000 nursing and residential care homes in England housing about 400,000 people in 2019 where 14% of the residents were 85 or over; and in the USA about 15.7 million adult family caregivers care for someone who has Alzheimer’s disease, or other dementia [34].

In Bangladesh the density of caregiver professionals is 3.067% per 10000 population according to the World Health Organization (WHO) Global Dementia Observatory Provisional Country Profile 2017 [37]. The same report says that for every 100k population, the available number of neurologists is 0.9 (we had a short survey on this in Sec. IV A) with no geriatricians, no long-term care facilities, no adult day care centres, and no outpatient social care centres in Bangladesh [37].

Now we focus on the type of training available in Bangladesh and if there is any special training for adult caregiving. For pre-service education, namely Diploma in Nursing, there are 43 Nursing Institutes with 1570 seats are operationalized and providing 3-years Diploma in Nursing Science and Midwifery course since 2008 [38]. Nursing Institute attached to National Medical College Hospitals provides a 4-years Bachelor of Science (B.Sc) in Nursing since 2011 for the candidates having a Higher Secondary School Certificate with a science background. There are 12 Nursing Colleges in the

private sector also opens the scope for 365 students to study 4-years B.Sc in Nursing. For in-service education, the College of Nursing affiliated with the Dhaka University under the Faculty of Medicine is operating as a constituent College for the B.Sc in Nursing and B.Sc in Public Health Nursing Degrees. In addition to these, students have also been placed in the communities for community practice although a few nurses get the chance of promotion either in education, or services sector. In the syllabus of the professional courses, there is Adult Nursing I, II, and III, and Mental Health and Introduction to Psychiatric Nursing with minimum possible credits [39].

We can see the standard course of the acknowledged caregivers, i.e., nurses in Bangladesh is insufficient for handling AD patients. However, years of experience can be adequate for these caregivers to provide professional care for such patients, which will increase the cost for this purpose (discussed in Sec. V A).

Organizations working in favor of AD

As we have observed that the expertise medical facilities are inadequate to deal with AD in Bangladesh although some non-government organizations (NGOs) are still working to make a difference in the society.

Sir William Beveridge Foundation has one unit “Dementia Bangladesh centred on providing dementia care training for key staff by Alzheimer’s Associations in Australia as well as by their experienced tutors in Bangladesh [40]. They held their first International Dementia Conference in Dhaka, Bangladesh in 2014 to create awareness on the Challenges of an Ageing

Staff Nurse Salary Comparison by Years of Experience in Bangladesh

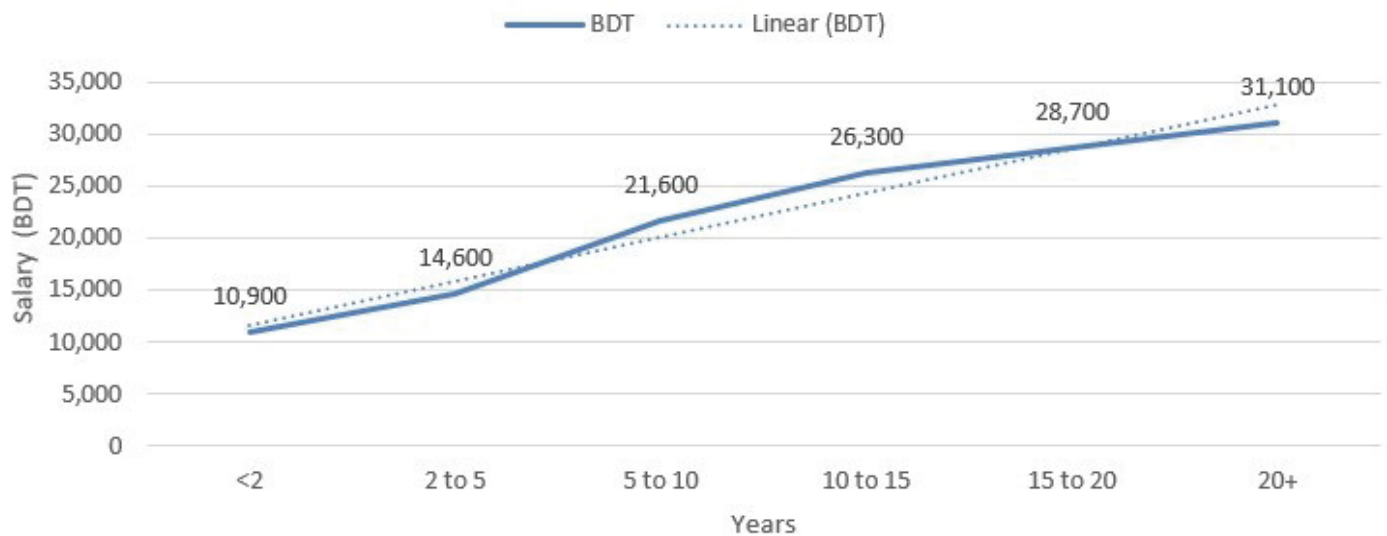


Figure 5. The cost to afford healthcare professionals as a care-giver for any patients in government facilities. This cost varies with the years of experience of the specific caregiver according to government salary structure.

Population for a Developing Country, which revealed that over 35 million people worldwide live with the condition and this number is expected to double by 2030 and triple by 2050 to 115 million.

SAJIDA Home Care is providing home-based health care to 36 patients in various locations in Dhaka city with 62 caregivers where 23 among them having Dementia Care Skills training with Mr. Md. Rashed Suhrawardy, experienced in Dementia Care with a rich background in Home Care [41]. Upon completion of the training, caregivers are receiving certificates from Bangladesh Dementia Task Force (BDTF). BDTF is a social media based organization that promotes Dementia issues in Bangladesh by raising awareness.

Alzheimer's Society of Bangladesh (ASB) is a humanitarian, non-government non-profit voluntary organization established to make a platform for the social workers, caregivers, and doctors in 2006 responding to the needs of dementia affected people with a view of improving the quality of their lives. It is worthwhile to mention here that ASB for the first time moved the Dementia movement in Bangladesh. Since its inception ASB has relentlessly been carrying out a wide range of programs for awareness raising, education and training, and rendering support and research on dementia. Having recognized its pivotal role and valuable contribution to the field of dementia, Alzheimer's Disease International (ADI) gave Alzheimer's Society of Bangladesh its full membership in 2009.

There are other organizations working with elderly people, which do not explicitly mention AD, or dementia. Bangladesh Association for the Aged and Institute of Geriatric Medicine is one of the prime non-government organization at the national level working for the welfare of the elderly people in Bangladesh since it was established in 1960. It is registered with the Department of Social Services and Social Welfare and devoted to the welfare of aged persons above 55 years of age. The services provided by this Association include neurological support. Some other NGOs working with elder people are Help Age International Bangladesh (works internationally for aged people), Resource Integration Centre, Dhaka Ahsania Mission, and Old Rehabilitation Centre. Service Centre for Elderly People (SCEP) in Rajshahi started working for the elderly in 1994 with a slogan "A Care for the Generation". It provides health service and recreational facilities to the older persons of age 60 and more for their social and emotional peace.

Life-style Development Program for Elderly People is an innovative and integrated Young Power in Social Action (YPSA) program supported by PKSF (Palli Karma Sahayak Foundation) and concerns the wellbeing of the older community at Sitakund, Chittagong. YPSA is committed to work on issues

related to the empowerment of elderly people and to improve their lifestyles by building strong relationships with local government. Counseling is being provided to family members and the elderly in order to gain an understanding of the issues related to old age. Ministry of Social welfare of Bangladesh has taken a project named Oboshor, which is a senior citizen care and hospitality complex at Sreemangal, Sylhet division. Some other Old home cares worth to mention are Apon Nibas Old Home Care, Child and Old age care, Arunima, and Milton Home care.

There is a dearth need of professional and efficient caregivers in the society. Formal caregiver training for handling the needs of elderly people or AD patients are absent in our country and people in general are dependent on house servant, or family members for care giving such patients. To cope with the need of time, Subarta is imparting practical and theoretical training for caregivers to take care of elderly people. On completion of training, they are put to duty either at any centre, or at outdoor (at an elderly resident's house). The Caregivers are mostly recruited from the village area with sound physique and capability and an arrangement with Geriatric Faculty Department of Albama University of USA and their representatives. Alzheimer's Society Bangladesh has a translated manual for caregivers to follow when handling AD patients.

Effect of AD in economy

The expenses of health services and longterm care for people with Alzheimer's, or other dementias are related to the type of medical facilities and care individual receives. In countries like Bangladesh there is a lack of the potential insurance services available for health care and government-endorsed guidelines and standards for dementia care, which are available in developed country around the globe. According to the report of WHO global dementia observatory provisional country profile 2017 Bangladesh is a Lower middle income around the globe, and has estimated dementia prevalence in the country's GBD region around 3.7% [37]. The World Factbook 2011 (published by the US Central Intelligence Agency) states that health expenditure in Bangladesh stands at 3.4% of GDP (2009).

Generally, people with Alzheimer's, or other dementias that live at home get unpaid assistance from relatives and family members. A study showed that in 50

If we look at the paid facilities, there are 50 out-patient psychological wellness facilities, 31 community-based mental inpatient units, 11 community residential facilities, and one 500 bedded mental emergency clinic. The estimated cost for a personal caregiver at home can be more than a few

times the usual salary of a health-care professional shown in Figure 5 for government facilities.

The higher the year of experience is the higher the cost for that individual would be to appoint that person in a hospital, or have this person at home as a caregiver. Private sectors cost much more than this, and so the personal caregiver at home from such sectors.

The awareness of general people and researchers regarding AD

According to World Bank statistics, the average life expectancy in Bangladesh has increased by 24 years to 72 years in the past four and a half decades since 1971. A report published in the Daily Sun (July 21, 2018) mentioned that the health experts said the decline in child mortality rates and deaths at later ages contributed to the rise in average life expectancy. The government distinguished the people aged above 60 years as senior citizens from 2013. Now the country has about 1.5 crore senior citizens, about 8.0% of the total population reported by the Bangladesh Bureau of Statistics (BBS). In 1990, 4.98% of the total population were elderly, which became to 6.1% in 2001, 7.2% in 2012, 7.3% in 2013, 7.8% in 2014, 7.7% in 2015, and 7.5% in 2016. Population scientists anticipate that the number of senior citizens will stand reach 2.0 crores in 2025, 4.5 crores in 2050, and 5.5 crores in 2060, and hence the rate of AD patients will increase too. Being an overpopulated country and most people living in rural areas, there is a little concern about AD in Bangladesh among general people.

Bangladesh has a relatively young population with 8% of the total population being over 60. One can imagine that these older people there would be at least a few thousand suffering from some form of dementia. Senior citizens often will not receive the support they need or deserve from their family or society. The main reason for this indifference in our society is that we are simply insensitive to this issue. The situation can be even worse in rural villages than in towns, as there is usually more social taboo associated, more migration of younger people to cities or abroad and a lack of proper medical and community-based support services.

Considering all the above, the NGOs working on dementia issues in Bangladesh have formed a working platform called "Dementia Action Alliance of Bangladesh" with help from Alzheimer's Disease International (ADI) where creating awareness is the first priority. Training healthcare workers on dementia and supporting organizations to identify "caregivers" with the expertise to take care of dementia patients are also on the agenda. Taking care of dementia patients in Bangladesh is still far from a priority in the country's healthcare plan. Dementia is not only a medical problem; it has many other social and legal implications. However, everybody involved in dementia care agrees that it has become an urgent necessity to develop a comprehensive awareness and management program.

Proposed strategies in AD research

In some countries we can see there are a number of data available to study the prevalence of AD when we do not have sufficient resources in Bangladesh to deal with it. Even in South Asia, countries like India, Pakistan, Nepal, and Sri Lanka got advance approaches in the study of AD that allows them to take steps like including social and cultural aspects in the support units of AD, which is mentioned in Sec. III. In this circumstance, we need to start building database for AD patients and care systems. Our research proposes the following strategies to build databases, as well as increasing the quality of the life of AD patients.

1. To study the prevalence, the first approach is to record and share data for AD patients honoring the privacy policy. All government institutions dealing with such patients should have concerns about this part. Furthermore, experts (physicians, or psychologists and psychiatrists) handling AD patients are also responsible for the success of this study. The information should include age, sex, geographical location, academic background, and economic condition of the subjects.
2. The organizations (both government and non-government) working with caregiver training should follow a specific training module validated in Bangladesh context. In this case we need to verify and

make possible moderations to the existing ones, which could be direct translations of the care-giver guidelines, as well as training modules.

3. In Bangladesh context, we need to design a screening test for AD patients, which also need clinical validation. This could be questionnaire-based screening test avoiding the direct translation from any other languages rather than Bangla.
4. We have to launch awareness programs for this severe brain disease to include the rural areas and people with a poor economical background. As these mental diseases are sensitive subject to mass people, researchers need strategies for their approaches that can be favorable to communicate among them.
5. The family members of AD patients have a great burden on them due to the inability of the patients to deal with their everyday life. The primary care-giver of such victims comes from the family for our social structure in Bangladesh. We have to build a module to educate the family member of AD patients about the systematic approaches to manage AD affected individuals.

Further research will include searching for the cure of AD, which is the ultimate goal of a number of countries in the world. This step needs expertise from relevant areas and collaboration.

Discussion and Conclusion

Alzheimer's disease is often treated "fatal", and people target the preclinical stage to increase awareness, as well as the prevention of AD. Most of the developed countries in the world have websites showing important information on AD and they have major research outcomes including precautions and prevention methods. Some of the countries in South Asia are also concerned about this major neural disease and designing their healthcare system accordingly.

AD has a significant impact on the quality of life of the affected individuals and caregivers. It also a nontrivial fact in the economic condition of the family, as well as the whole country. We need to study the economic loss in the actual currency to have a whole picture of the gross effect of AD on the economy, which will lead us to seek prevention of such disease.

The first and foremost step to handle the AD situation in Bangladesh can be acknowledging AD as a disease, not a disorder. Research on developing a training module for family members and caregivers can increase the quality of life of AD affected people. This will put the AD affected people in a less vulnerable position in severe situations like a pandemic. Researchers need collaboration to build a database of AD in Bangladesh. Pharmacologists, Biochemists, Biomedical Engineers, Doctors, and other relevant experts can come together to start to design suitable cure and work on trials so that this disease can come from "fatal" to the controlling stage, and eventually, curable.

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