

“The importance of the Dementia care workforce in addressing the needs of people with Alzheimer’s Disease and related dementias (AD/ ADRD)”

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Abstract:

this study aims to specifying the role of workforce in addressing the needs of people with Alzheimer's Disease and related dementias (AD/ ADRD and in managing behavioral symptoms; reducing injuries, emergency hospital visits Alzheimer's disease is the most common form of dementia and a neurodegenerative illness that can affect the brain. Dementia is characterized by a decline in memory, language, problem-solving, and other cognitive skills, which affects a person's capacity to carry out day-to-day activities. This reduction in cognitive abilities can have a significant impact on a person's quality of life. This deterioration is as a result of damaged or destroyed nerve cells (neurons) in areas of the brain that are responsible for cognitive function. a descriptive and analytic technique has been adopted since it is the most suitable method for this sort of research. This study will have depended on the quantitative approach that mainly defines the form of information that will be collected. The results of this study showed that Adults suffering with Alzheimer's disease provide a unique set of challenges for caregivers, necessitating a huge labour force that is also highly skilled. The current workforce in the health care industry does not have a sufficient number of professionals or direct care providers who are able to meet the requirements of this population's care requirements.

Key words: Dementia care – Workforce – Alzheimer’s Disease - behavioral symptoms

Introduction:

Dementia is a catch-all term for a group of neurocognitive disorders that can have a negative impact on a person's ability to carry out their everyday tasks. Dementia can be caused by a wide variety of factors, such as Alzheimer's disease (AD), vascular disease, the presence of Lewy bodies, frontotemporal dementia, and traumatic brain injury. Progressive memory loss and cognitive impairment are hallmarks of Alzheimer's disease and related dementias (ADRD), as are functional impairments in the performance of daily activities like eating, making meals, bathing, paying bills, and expressing one's emotions. Alzheimer's disease (AD) accounts for 60-80% of all dementias, making it the leading cause of dementia in persons 65 and older (Tarawneh, R, 2012).

Each of the roughly 100 billion neurons in a normal adult brain has several projections. Neurons can communicate with one another by means of these extensions. Small bursts of chemicals emitted by one neuron and picked up by another are how information is transmitted across synapses. Approximately 100 trillion synapses can be found in the human brain. That's because they speed up the transmission of messages throughout the brain. Memories, ideas, perceptions, emotions, movements, and abilities all have their molecular foundations in these impulses. Alzheimer's disease is characterized by numerous abnormalities in the brain, including the accumulation of the protein fragment beta-amyloid into clumps (called beta-amyloid plaques) outside neurons and the formation of an aberrant version of the protein tau (called tau tangles) inside neurons. Other hallmarks of Alzheimer's disease include the accumulation of tau and beta-amyloid, as well as the subsequent damage and loss of neurons, known as neurodegeneration (Alzheimer's Association, 2012).

Dr. Alois Alzheimer is credited with identifying the disease that bears his name. Alzheimer first observed abnormalities in the brain tissue of a deceased woman with a rare mental disease in 1906. Memory loss, trouble communicating, and erratic behaviour were among her symptoms. After her passing, he performed an autopsy on her brain and discovered several aberrant clumps (now known as amyloid plaques) and tangled bundles of fibres (now called neurofibrillary, or tau, tangles). These neurofibrillary tangles and plaques in the brain are still considered hallmarks of Alzheimer's disease. The disintegration of synapses between brain neurons is another hallmark. Messages are sent from one area of the brain to another, and from the brain to other parts of the body, via neurons (Bhushan, I., 2018).

Alzheimer's disease is the most common form of dementia and a neurodegenerative illness that can affect the brain. Dementia is characterized by a decline in memory, language, problem-solving, and other cognitive skills, which affects a person's capacity to carry out day-to-day activities. This reduction in cognitive abilities can have a significant impact on a person's quality of life. This deterioration is as a result of damaged or destroyed nerve cells (neurons) in areas of the brain that are responsible for cognitive function. The deterioration and destruction of neurons in Alzheimer's disease gradually affects other regions of the brain, including those that enable a person to

carry out fundamental physiological activities like walking and swallowing. Patients who are at the last stages of the illness are unable to leave their beds and require round-the-clock care. Alzheimer's illness almost often results in death (Wilson, R,2012).

As the disease gets worse, people with ADRD need more and more care and support, such as medical treatment, prescription drugs, medical equipment, home safety modifications, safety services, personal care, adult day care, and, in the end, full-time residential services. There is no cure for ADRD right now, and effective treatments that change the disease are still hard to find. Because of this, ADRD can put a big financial burden on payers, patients and their families, healthcare delivery systems, and society as a whole. Recent estimates from the Alzheimer's Association say that the total direct medical costs of ADRD in the U.S. will go from \$236 billion in 2016 to more than \$1 trillion in 2050. This is because the number of older people is expected to grow (Alzheimer's Association, 2016).

The stress that is placed on individuals and families is perhaps even more overwhelming than the costs of care. Affected persons eventually develop a total dependence on the assistance of other people. This point is driven home by the fact that in 2014, about 15 million unpaid members of families and friends gave a total of over 17 billion hours of unpaid care. It is reasonable to anticipate that millions of baby boomers, as an increasing number of them reach the age at which they are at a greater risk of developing Alzheimer's, will spend their retirement years either living with the disease themselves or providing care for someone else who has the disease (Alzheimer's Association., 2015).

It is essential for those responsible for developing health policy and other decisions to acquire a full grasp of the economic burden of AD/ADRD, particularly in light of the fact that this burden is expected to increase in the coming years. Over the past few years, a number of studies have been conducted to evaluate the direct and indirect costs related with ADRD. The majority of research have produced definitions (AD/ADRD), data sources, cost estimating methodologies, cost components, and the stage at which costs were gathered that are significantly different from one another. A comprehensive analysis and synthesis of previous research, taking into account both the direct and indirect expenses of AD/ADRD (Deb, A., 2017).

AD is different from other diseases in how common it is and how it acts. This makes it hard for national leaders to deal with. National governments must now spend a lot of money on preventing, helping, and researching this disease, and they must pair these investments with good policy and lawmaking. But it's clear that governments can't do this on their own. Advocate groups like ARDSI, ADI, and the Alzheimer's Association have led the way in making many of the national plans. In fact, partnerships between the public and private sectors have been shown to be crucial to moving projects forward, especially when resources are limited. Care providers, researchers, doctors, pharmaceutical and biotechnology companies, and people with dementia and their families all play important roles in making plans that meet the needs of each country (Rosow, K., et al., 2011).

The statement of the problem:

Unfortunately, many persons who have been diagnosed with dementia do not receive the necessary evaluations, care planning, and person-centered attention that they require. Clinicians can play a significant role in managing behavioral symptoms; reducing injuries, emergency hospital visits, hunger, and disease; and alleviating the stress of caring for patients with dementia, even if the options for care may appear restricted. Those with dementia have a wide range of medical and psychosocial issues, and primary care physicians already have a lot on their plates. As a result, a growing body of evidence demonstrates that interdisciplinary, team-based approaches to primary care for people with AD/DRD and their families can significantly enhance treatment outcomes. Therefore, the problem of the study crystallizes in a main question: **What is the importance of the Dementia care workforce in addressing the needs of people with Alzheimer's Disease and related dementias (AD/ADRD)?**

Questions of the study:

1. What is the needs of people with Alzheimer's Disease and related dementias (AD/ADRD)?
2. What the role of workforce in addressing in managing behavioral symptoms; reducing injuries, emergency hospital visits?

Objectives of the study:

1. Providing the needs of people with Alzheimer's Disease and related dementias (AD/ADRD)
2. Specifying the role of workforce in addressing in managing behavioral symptoms; reducing injuries, emergency hospital visits?

Significant of the study:

1. helping to ensure policymakers create the infrastructure necessary to address the challenges arising from the prevalence of AD/DRD
2. assist individuals and families affected by Alzheimer's and other dementias.
3. advancing research, enhancing care and support, and increasing collaboration across federal.
4. Enhance care quality and efficiency.
5. Expand supports for people living with Alzheimer's disease and their families.

The limits of the study:

Principal limitations include the fact that only a fraction of people with incident AD were included in the analysis. For this reason, further research is needed to determine how widely applicable these results are. In addition, the variation in cognitive trajectories may be underestimated because we may have under sampled those whose

disease progressed too slowly to be diagnosed within the observation period or too swiftly to meet inclusion requirements.

Definitions of the study:

Alzheimer's disease:

is a progressive neurodegenerative ailment that causes brain atrophy and cell death. it is the most prevalent cause of dementia, which is a progressive decrease in cognitive, behavioral, and social abilities that impairs a person's independence.

Dementia:

is a syndrome in which the brain's ability to think and reason gets worse than what would be expected from biological ageing.

Literature review:

dealing with Alzheimer's dementia

Studies have shown over and over that people with Alzheimer's and other dementias can have a better quality of life if they and their caregivers take action. Active management involves:

- Making effective use of current therapeutic modalities.
- Skillful handling of comorbidities.
- Care coordination among physicians, other health care professionals, and nonprofessional caregivers.
- Engagement in activities that are meaningful and give one's life significance.
- Having ways to connect with other people who also have dementia, such as through support groups and other services.
- Learning as much as possible about the disease.
- Setting up plans for the future.

Alzheimer's disease and dementia risk factors:

Experts believe that the development of Alzheimer's disease, like the development of other common chronic disorders, is the consequence of a mix of factors rather than a single cause. This is also the case with other frequent chronic disorders.

1. Age

The fact that Alzheimer's dementia typically affects people who are at least 65 years old makes age the most significant of these three risk factors. As was discussed in the section titled "Prevalence," the percentage of people who are affected by Alzheimer's dementia skyrockets with increasing age. People who are 65 to 74 years old have a 3 percent chance of developing Alzheimer's dementia. People who are 75 to 84 years old have a 17 percent chance of developing Alzheimer's dementia. People who are 85 or older have a 32 percent chance of developing Alzheimer's dementia. 51 It is vital to keep in mind that Alzheimer's dementia is not a natural consequence of reaching the age of 58, nor is it a natural consequence of reaching an age old enough to create Alzheimer's dementia on its own. (Weuve, J., et al., 2018).

2. APOE

The APOE gene codes for a protein that carries cholesterol through the circulatory system. Each individual receives one of three different versions (alleles) of the APOE gene from each parent: e2, e3, or e4. This results in six distinct APOE pairs: e2/e2, e2/e3, e2/e4, e3/e3, e3/e4, and e4/e4. These two words tend to appear together less frequently in some racial and ethnic groupings than in others, according to the research. A higher risk of getting Alzheimer's disease is associated with the e4 version of APOE compared to the e3 form, however, it is not a sure thing. Compared to carrying the e3 form, having the e2 form may reduce the danger. With just one e4 allele, one's risk of having Alzheimer's is triple that of someone with two e3 alleles, and with two e4 alleles, one's risk increases by a factor of eight to twelve. Those with the e4 variant of the APOE gene also have an increased risk of developing Alzheimer's disease at a younger age compared to those with the e2 or e3 forms of the gene.

About 56% of Alzheimer's patients had at least one copy of the APOE-e4 gene, and 11% had two copies, according to a meta-analysis of 20 published publications showing the frequency of the e4 variant among adults with Alzheimer's. The APOE-e4 gene was also found to be present in at least one copy in another study involving 1,770 people with Alzheimer's disease from 26 centers (Ward, A., et al.,2012)

3. Family History:

There is no requirement for a person to have a history of Alzheimer's in their family for them to be at risk for developing the illness themselves. On the other hand, people who have a father, brother, or sister who suffers from Alzheimer's dementia have a greater risk of developing the disease themselves in comparison to people who do not have a first-degree relative who has Alzheimer's. Those who have multiple close relatives affected by Alzheimer's disease are at an even greater risk. Both genetic predisposition and shared environmental and lifestyle factors (such as access to nutritious foods and habits related to physical activity) may contribute to the prevalence of a disease within a family. Independent of well-established genetic risk markers like APOE-e4, having a parent with dementia has been found to raise one's own risk of developing the condition in later life, as shown in a recent large population-based study (Grujičić, J., 2021)

Although previous research has linked having a parent with dementia to an increased risk of developing the disease oneself, this study found that after controlling for other potential risk factors, such as APOE status, the risk of developing dementia was similar regardless of which parent had the condition (Maye, J. E., 2016)

What, Who, And Where Alzheimer's Care Is Provided

Alzheimer's disease is a progressive condition that typically progresses over the course of seven to 10 years. It is a long-term illness. Adults who have dementia typically spend a greater proportion of their lives in the final stage, which is characterized by severe dementia, than they do in the earlier stages, which include mild dementia and moderate dementia. Adults diagnosed with Alzheimer's disease have specific requirements that differ from those of healthy elderly persons of the same age and those suffering from long-term conditions that do not impact memory. Their caretakers have a variety of requirements as well. Understanding the varying care requirements of

persons who are in the early, middle, and late stages of Alzheimer's disease should be the first step in the workforce planning process. (Warshaw, G. A.,2014).

1. Early Stage: Diagnosis and Support at Home

Families of elderly patients with Alzheimer's disease are typically the ones who initially bring them to the notice of a health care professional, in contrast to patients with the vast majority of other chronic conditions. It can be difficult to obtain a diagnosis of Alzheimer's disease since the older adult who is suffering from the condition may not have any insights into his or her own symptoms. Families may be hesitant to seek a diagnosis or aid for their relatives who are afflicted with Alzheimer's disease since there is still a stigma associated with the condition. It can be difficult for laypeople and even some medical specialists to tell the difference between normal aging and Alzheimer's disease-related memory loss. The difficulty of diagnosing Alzheimer's disease is compounded by the fact that the symptoms can be similar to those of other conditions, such as depression or pharmaceutical side effects. The National Institute on Aging and the Alzheimer's Association, however, constantly revise the criteria used to diagnose Alzheimer's disease (McKhann, G. M., et al., 2011).

The patient and his or her family will benefit from education and a referral to an experienced professional such as a community-based nurse or social worker once Alzheimer's disease has been diagnosed. In an ideal situation, both the patient and his or her family will be referred to the services offered by the Alzheimer's Association, Area Agencies on Aging, and several other community-based social service organizations.

2. The Middle Stage: Worsening Symptoms and Constant Caregiving

As a person with Alzheimer's disease continues to experience a decline in their cognitive or physical abilities, they will require ongoing care and assistance with activities such as taking a shower, getting dressed, and managing their prescription regimen. It is estimated that approximately 87 percent of seniors who require long-term care services, the majority of whom have Alzheimer's disease, receive care from family members who do not receive payment for their services. Towards the middle stage of the disease, the majority of care is provided in the patient's own home. However, during the latter stages of the disease, when many persons with Alzheimer's reside in facilities, family members continue to play an essential role as advocates and carers. (Rousseau, D., 2013).

Personality and mood shifts, as well as the emergence of new behavioral signs, are not uncommon among patients. The confusion of a person with Alzheimer's disease can be momentarily and dramatically exacerbated by even relatively minor medical issues, such as a urinary tract infection or the flu. Any reason for hospitalization raises the risk of agitation and disorientation. Providing the care that a person with Alzheimer's disease demands can be difficult and disruptive to the caregiver's life, employment, and personal relationships. In-home direct care workers and community-based day care programs staffed by nurses, occupational therapists, or activity professionals, as well as direct care workers, can provide some respite for the patient's family members and

lengthen the time that they can maintain the patient in the home setting (Fong, T. G., et al., 2012).

3. Late Stage: Care in a Hospital:

Adults with Alzheimer's disease have a dramatic physical deterioration and a high need for care as the disease develops from mild to severe cognitive impairment. Some households are able to provide care for an elderly relative with Alzheimer's disease in the comfort of their own home. A large percentage of patients, however, will require institutional care at some point throughout their recovery. There is a 70% mortality rate among those with dementia who reside in nursing facilities.

Most of the day-to-day care at the nursing home is given by direct care workers. In nursing homes, nurses, other professionals, and direct care workers with special training in dementia care are needed, but they are not always there. In the late stages of Alzheimer's disease, it is important for the health care team to help families make hard decisions about the level and type of care that should be given. However, this is often overlooked. Medicare hospice services can help people in their homes or in nursing homes when they are near the end of their lives (Warshaw, G. A., et al., 2014).

The Current Workforce

The majority of those who get Alzheimer's are in their later years. As a result, the requirements of the population affected by Alzheimer's disease for the workforce in the health care industry are very congruent with those of the ever-increasing population of elderly people who are becoming increasingly fragile.

The following is a synopsis of the functions performed by the many medical specialties that collaborate to deliver care to elderly patients diagnosed with Alzheimer's disease. Although we are aware of the types of workers this population will require, we do not yet have a good grasp on the exact number of individuals who will be needed in each field to meet the population's anticipated care requirements. A report on the general supply-and-demand projections for the health workforce is scheduled to be completed by the newly established National Center for Health Workforce Analysis within the Health Resources and Services Administration in 2014. This will help close the knowledge gap that currently exists.

Care providers in a wide variety of fields assist with the upkeep of each adult with Alzheimer's disease over the duration of the disease's seven- to ten-year progression and can benefit from specialist dementia care education. Primary care physicians, certain medical subspecialists, registered nurses, social workers, and direct care workers round out the essential team.

1) Primary Care physicians:

Adults living with Alzheimer's disease and their families are more likely to receive continuous, all-encompassing treatment from primary care clinicians in conventional offices or health care team settings. Healthcare providers who fall within this category may be NPs, PAs, or MDs. By the year 2025, there will be a greater demand for primary care physicians to treat seniors than there already is. From 2010 to 2025, population growth is forecast to reach 15.2 percent. On the other hand, the number of people aged 65 and over is expected to climb by 60 percent, and a significant portion of that group will be affected by Alzheimer's.

The demand for nurse practitioners is expected to rise as interprofessional care models like the patient-centered medical home gain popularity. NPs will be in high demand during the next few years, with a projected 34% growth in employment between 2012 and 2022, according to the BLS. These NPs will need advanced education focused on geriatrics and dementia care (Gavil, A. I., 2016).

States authorize physician assistants to practice medicine in collaboration with physicians. One-third of visits to physician assistants are made by older persons, although less than one percent of the more than 92,000 physician assistants in the United States specialize in geriatrics. 2,15 The Bureau of Labor Statistics anticipates a 38 percent rise in demand for physician assistants between 2012 and 2022, and these clinicians will also require specialist training in geriatrics and Alzheimer's disease. Evolving methods of treatment and the training of a greater number of nurse practitioners and physician assistants may help mitigate the shortage of primary care physicians. Nurse practitioners have proven their capacity to deliver effective treatment in nursing homes and general care offices. In addition, the patient-centered medical home model increases the utilization of interprofessional teams in primary care settings (Liu, et al., 2012).

2) certain medical subspecialists

Geriatricians are experts at caring for older adults, including those with Alzheimer's disease. They have worked well with primary care doctors and nurses on interprofessional teams to improve the efficiency and quality of care for people with the disease. Accrediting bodies for graduate medical education and medical board certification for geriatricians require specific Alzheimer's disease training.

In 2012, there were only 1,554 certified geriatric psychiatrists. Each year, between 65 and 70 fellows are trained through the 68 fellowship programs in geriatric psychiatry. In a report from 2012, the Institute of Medicine (IOM) looked at what the growing number of older adults needs in terms of mental health workers. The report came to the conclusion that the growth of the population is much faster than the rate at which specialists in 2012, join the workforce. trainees occupied only 54 percent of the limited number of fellowship seats that were available in this field. There is a scarcity of mental health care providers across the board, including those who work with older persons (Brotherton, S. E., 2012).

3) registered nurses:

The nursing labour force is comprised of 2.8 million registered nurses and 690,000 licensed practical nurses. The majority of the medical professionals that work in residential long-term care facilities hold licenses as licensed practical nurses. In comparison, only 7% of the nurses who work in nursing homes and assisted living facilities are registered nurses, yet the majority of them are in command of the nursing staff. In the majority of these types of facilities, registered nurses serve as the supervisors of multidisciplinary teams composed of licensed practical nurses and direct care workers.

From 2012 to 2022, there is anticipated to be a 19 percent increase in available jobs for registered nurses, while there is anticipated to be a 25 percent growth in available jobs for licensed practical nurses over the same time period. When compared to the average growth of 11 percent for all occupations, this growth is significantly higher. One

contributor to this growth rate that is much greater than the average is the increased prevalence of chronic diseases. This is just one of the many factors that contribute to this growth (Warshaw, G. A., et al., 2014).

4) Social Workers

Social workers provide counseling services to individuals and families in different types of settings to assist them in coping with acute, chronic, or life-threatening illnesses. For instance, they offer case management and interventions to remove obstacles that stand in the way of receiving medical care. In the United States, there were 607,300 people working as social workers in the year 2012. In 2006, 73 percent of social workers provided their services to older persons; however, only 12 percent of social workers recognized "ageing" as their practice area. According to projections made by the Bureau of Labor Statistics, the number of jobs available for social workers would expand by 19 percent between the years 2012 and 2022, which will result in the requirement for 114,100 more social workers (Sheldon, G. F., et al., 2008).

Nurses and social workers play an important part in the process of teaching families how to properly care for Alzheimer's disease patients who live in their midst through the delivery of educational programs. They have the potential to make their work more efficient if new models of care are developed that integrate medical treatment with long-term services and supports. Despite this, there will be an increase in the demand for social workers, registered nurses, and licensed practical nurses as a result of the growing number of senior individuals who are affected by Alzheimer's disease.

5) Direct Care Workers:

Direct care workers include certified nursing aides, home health care aides, and personal care aides. Direct care workers also provide assistance in hospitals. According to the most recent estimates, their total number is 2.3 million, which represents 31 percent of the workers in the health care industry. These professions do not require a high school certificate and instead call for only brief training on the job. The majority of direct care workers are now employed in home and community-based settings rather than in institutional settings. This shift occurred in recent years. During the same time period, it is anticipated that the need for home health aides will increase by the same amount, climbing from 875,100 to 1,299,000. 14 Even with the shift toward home and community-based care, the number of certified nursing assistants working in long-term care facilities will need to increase by 21 percent, going from 1,479,800 to 1,792,000. This represents an increase of 32,400 positions (Stone, R., 2010).

Training guidelines established by Medicare and Medicaid must be adhered to by certified nursing assistants and home health aides who work in nursing homes and home health agencies that are recognized by Medicare and Medicaid. These aides are required by federal law to complete seventy-five hours of classroom instruction before they can begin working in these settings. As part of the Patient Protection and Affordable Care Act (ACA), nurse aides are required to complete specialized training in the care of patients diagnosed with dementia. This training must come from a program that has been approved by the Alzheimer's Association (Redfoot, D., 2013).

An increase in the demand for personal assistance or home health services will take place at the same time as there will be a reduction in the number of family caregivers who are available to provide these services. Because of this, there will be a higher

demand for direct care workers who are compensated. This trend is already in motion, with the growth in demand for workers in home health services anticipated to climb by 62 percent between the years 2006 and 2016. It is now difficult to find appropriate individuals to fill these strenuous but low-paying occupations, and this difficulty will only rise as the demand for these jobs grows (Khatutsky, G., et al., 2011).

Methodology:

In accordance with the study's problems and the nature of the issue, which seeks to determine people with Alzheimer's Disease and related dementias (AD/ ADRD, a descriptive and analytic technique has been adopted since it is the most suitable method for this sort of research. This study will have depended on the quantitative approach that mainly defines the form of information that will be collected. As the Quantitative approach collects numeric data, so this study adopted a Deductive approach will be used.

The purpose of these criteria is to find people whose cognitive paths cover a wide range, from fully functional to completely demented. We did not include 1,690 people who were potentially eligible for follow-up because 836 of them had cognitive impairment at baseline (679 with moderate cognitive impairment, 157 with dementia) and 116 of them could not be tracked (due to death or recent enrollment). One thousand two hundred and thirty-nine (97.1%) of these participants had at least one follow-up evaluation, and another 1,239 had at least four years of follow-up, making them eligible for the current analysis. Some 226 of these 1,239 people developed AD during the course of the study's follow-up, and their data served as the foundation for the main statistical analysis.

Clinical Evaluation

The clinical evaluation was conducted in a standardized manner for all of the participants and included neuropsychological tests in addition to a full history and physical examination. This evaluation was utilized by an experienced physician to classify patients according to whether they had moderate cognitive impairment, dementia, or Alzheimer's disease by applying the criteria that were specified elsewhere. In order to properly diagnose these conditions, it is essential to ascertain whether or not there is an impairment in a variety of cognitive domains. In order to ensure maximal consistency in these evaluations over time and between different diagnosticians, an algorithm was developed to score impairment in five different cognitive areas.

When there was a discrepancy between the algorithmic ratings and the neuropsychologist's examination of the patient's schooling and any known cognitive impairments, the neuropsychologist re-rated the patient in that domain. This was done when there was a disagreement between the algorithmic ratings and the examination. A history of cognitive decline and impairment in at least two cognitive domains are required for a diagnosis of dementia or Alzheimer's disease (AD), as specified in the criteria developed by a joint working group of the National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association (McKhann et al., 1984). For a diagnosis of AD, at least one of the cognitive domains affected must be memory.

Assessment of Cognitive Function

In each research, annual clinical evaluations included a battery of 18 cognitive performance tests. The Mini-Mental-State-Examination was exclusively used for

diagnostic purposes. Seven out of the remaining seventeen tests focused on episodic memory. These included word list memorization, recall, and recognition, as well as immediate and delayed recall of the East Boston story and Story A from Logical Memory. Measures of semantic memory included the Verbal Fluency Measure, a test of word recognition, and a 15-item version of the Boston Naming Test. Working memory was evaluated with the Digit Ordering and Digit Span Forward and Backward tests; perceptual speed was measured with the Symbol Digit Modalities Test and the Number Comparison task; and visual spatial ability was evaluated with the Judgment of Line Orientation (15 items) and the Standard Progressive Matrices (11).

Results and Discussion:

The mean score on the global cognition composite, with higher scores suggesting better cognitive ability at baseline. We developed 2 models to characterize shifts in this cognitive index. Both the first and second models allowed for the rate of cognitive deterioration to increase once and twice, respectively, throughout the observation period. A lower value for the Deviance Information Criterion indicates that the model with two change points better fits the data than the model with only one (1,369 versus 1,468)

In this section, we present a brief overview of the model's findings. In the initial half of the trajectory, there was no deviance from a 0% yearly rate of change in cognition, indicating that cognitive abilities were stable. On average, the reduction in global cognitive function started about 7.5 years before the diagnosis of AD was made, with a loss of 0.087 units per year. At about 5.5 years later, or a mean of 2.0 years before the onset of dementia, the worldwide rate of cognitive decline had more than tripled to a mean yearly loss of 0.370-units per year. According to the table's random effects, there were substantial individual differences in the degree of impairment at the time of AD diagnosis, the rate of cognitive decline, and the timing of the change points.

For the purpose of simplicity, the model operated under the assumption that the random effects were uncorrelated. After removing this limitation, we repeated the research to determine whether or not it had an impact. However, on the whole, the findings of this investigation were quite similar to the ones found in the first study. Follow-up was conducted on participants of the initial trial for a period ranging from four to seventeen years. We repeated the study four times, but each time we restricted participation to individuals who had been followed for a minimum of five years. This allowed us to determine whether or not the inclusion of individuals in this group with less follow-up affected our estimates of the temporal course cognitive decline takes in the disease. The results of these studies showed that the baseline idea was accurately represented.

To better understand the heterogeneity in the paths of cognitive decline, we examined postmortem data. A total of 143 individuals died during the observation period of whom 137 (95.8%) underwent a brain autopsy and uniform neuropathologic examination, the results of which were available at the time of these analyses in 126. The 126 with postmortem data completed fewer annual clinical evaluations than the 100 subjects without postmortem data and were older at baseline, but the subgroups did not differ in age at AD diagnosis. To determine whether the subgroups had different trajectories of change in cognitive function, we repeated the original analysis with a term added for presence or absence of postmortem data.

We compared individual trajectories predicted by the model to the pathologic results and cognitive data. We chose at random trajectories of people who had AD and no other known pathologic conditions. There are no discernible distinctions between the pathogenic categories. Analyses of the postmortem subgroup were performed to further explore cognitive-pathologic relationships. Higher levels of AD pathology were linked to reduced cognitive performance at AD diagnosis, but not to any other components of the trajectory. A later model found that cerebral infarction was related to a later initial change point but no other trajectory components. Both Lewy bodies and hippocampal sclerosis were far too rare to warrant statistical testing.

Mild cognitive impairment is generally considered to be an early indicator of dementia progression in AD. In keeping with this theory, we found that mild to moderate cognitive decline lasted for an average of 5.5 years, was followed by a period of cognitive stability, and then was followed by a rapid deterioration. The data do, however, highlight the measuring difficulties that plague observational and intervention studies with moderate cognitive impairment. Particularly, the large confidence intervals surrounding the transition points demonstrate to the difficulties in precisely defining the beginning and end points of this time frame. Furthermore, modest cognitive impairment was typically identified years after the first change point, and in some cases not until after dementia had already set in. Disease progression is likely due to ongoing pathologic processes, which is the fundamental issue. Therefore, there is a high probability of inaccuracy when attempting to classify the illness course using diagnostic or statistical approaches, especially in the early stages of the disease when the clinical signs are less obvious.

It's important to highlight the study's strengths. A consistent clinical evaluation using well known criteria administered by an experienced clinician helped classify patients with moderate cognitive impairment, dementia, and AD. Our ability to reliably estimate person-specific trajectories of cognitive decline and link them to postmortem findings was bolstered by the availability of a psychometrically sound measure of cognition, multiple cognitive assessments in each individual at evenly spaced intervals, and high rates of participation in follow-up and autopsy.

Conclusion:

Adults suffering with Alzheimer's disease provide a unique set of challenges for caregivers, necessitating a huge labour force that is also highly skilled. The current workforce in the health care industry does not have a sufficient number of professionals or direct care providers who are able to meet the requirements of this population's care requirements. Many elderly people living with dementia are at risk of receiving substandard care if there is not an urgent and considerable commitment to expanding the health care workforce to handle this challenge. As a consequence of this, their offspring and grandkids will be saddled with extremely difficult tasks for which they will not receive an adequate amount of support.

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