A Survey on Knowledge and Attitude of Alzheimer's Disease among General Population of Dhaka City, Bangladesh

This research paper is submitted to the Department of Pharmacy, East West University in the partial fulfillment of the requirements for the Degree of Bachelor of Pharmacy

Submitted by:-
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Declaration by the Research Candidate

I, **Md. Shakilur Rahman**, ID: 2013-3-70-011, hereby declare that the dissertation entitled "**A Survey on Knowledge, Awareness and Attitude of Alzheimer's disease among General People of Bangladesh**" submitted by me to the Department of Pharmacy, East West University and in the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy, under the supervision and guidance of **Nafisa Tanjia**, Senior Lecturer, Department of Pharmacy, East West University, Dhaka.

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Certificate by the Supervisor

This is to certify that the thesis entitled "**A Survey on Knowledge, Awareness and Attitude of Alzheimer's disease among General People of Bangladesh**" submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a record of original and genuine research work carried out by **Md. Shakilur Rahman** , ID: 2013-3-70-011 during the period 2017 of his research in the Department of Pharmacy, East West University, under the supervision and guidance of me.

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Signature of the Supervisor

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Certificate by the Chairperson

This is to certify that the thesis entitled "**A Survey on Knowledge, Awareness and Attitude of Alzheimer's disease among General People of Bangladesh**" submitted to the Department of Pharmacy, East West University for the partial fulfillment of the requirement for the award of the degree Bachelor of Pharmacy is a record of original and genuine research work carried out by **Md. Shakilur Rahman** during the period 2017 of his research in the Department of Pharmacy, East West University, under the supervision and guidance of **Nafisa Tanjia**.

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Dedication

This research work is dedicated to my beloved parents Md. Abdul Gafur & Rahima Begum, honorable faculties and loving friends.

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List of Abbreviations

AD	Alzheimer Disease
MCI	Mild Cognitive Impairment
SWS	Slow Wave Sleep
REM	Rapid Eye Movement
TBI	Traumatic Brain Injury
MRI	Magnetic Resonance Imaging
CT	Computerized Tomography
PET	Positron Emission Tomography
FDG	Fluorodeoxyglucose
FDA	Food and Drug Administration
ADAMS	Aging Demographics and Memory Study

Abstract

Alzheimer's disease (AD) is a progressive and fatal neurodegenerative disorder developed by cognitive and memory deterioration, progressive impairment of activities of daily living and a variety of neuropsychiatric symptoms and behavioral disturbances. It is the most common cause of dementia occurring mostly in patients over 45 years. The main objective of this study was to find out the level of knowledge, their perception of sign and symptoms and risk factors. In this study, data was collected from 406 mass people. Majority of them was graduate and a little portion was illiterate. In spite of having proper education, about 52% of them had no knowledge about Alzheimer's disease even 69% did not have any idea about stages of Alzheimer's disease. This may be due to their ignorance in health knowledge. Moreover, 31% has family history, only 37% knew who had AD and most of them (55%) had relation with affected person but they were not a first degree relative. 81% participants were concerned about getting Alzheimer's disease in future. Those who know about Alzheimer's disease do not have correct knowledge about the sign and symptoms, risk factors and protective factors of Alzheimer's disease. Among 406 people, 35 % said that prescription drugs are available that can prevent Alzheimer's disease which statement is false. Overall findings suggest that the sign and symptoms, risk factors, protective factors among mass people concerning Alzheimer's disease were relatively poor and needs to be improved. So, some steps should be taken with the help of professionals to make them aware of this neurodegenerative disorder.

Keywords: *Alzheimer's disease, Dementia, Neurodegenerative disorder, MRI*

CHAPTER ONE

INTRODUCTION

1.1 Talk of the beginning

The most common cause of dementia is Alzheimer's disease. It is a degenerative disease. Dementia is caused by other diseases and conditions as well. It hampers the cognitive skills of an individual such as- decline in memory, language and problem solving skills which ultimately diminishes the ability to perform daily activities. This decline occurs because nerve cells (neurons) in parts of the brain involved in cognitive function have been damaged and no longer function normally. In Alzheimer's disease, neuronal damage eventually affects parts of the brain that enable a person to carry out basic bodily functions such as walking and swallowing. People in the final stages of the disease are bed-bound and require around-the-clock care. Alzheimer's disease is ultimately fatal. Alzheimer's disease was first identified more than 100 years ago, but 70 years passed before it was recognized as the most common cause of dementia and a "major killer". Although research has revealed a great deal about Alzheimer's, much is yet to be discovered about the precise biologic changes that cause Alzheimer's, why it progresses more quickly in some than in others, and how the disease can be prevented, slowed or stopped. Researchers believe that early detection will be key to preventing, slowing and stopping Alzheimer's disease. The last 10 years have seen a tremendous growth in research on early detection. This research spurred the 2011 publication of proposed new diagnostic criteria and guidelines for Alzheimer's disease under the proposed criteria; the disease begins before symptoms such as memory loss appear, while earlier criteria require memory loss and a decline in thinking abilities for an Alzheimer's diagnosis to be made (Alzheimer's Association, 2016)
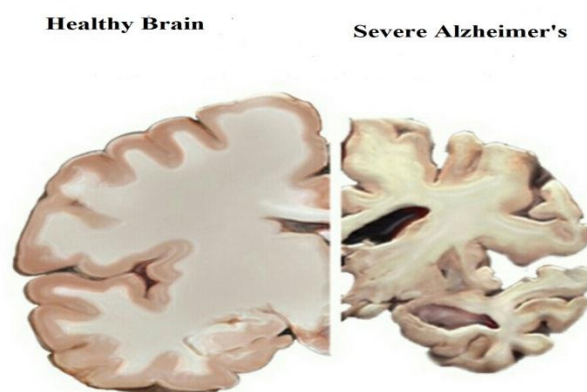
Figure 1.1: Shrinkage of the brain cells due to Alzheimer's disease (Alz.org, 2017).

Mild cognitive impairment (MCI) refers to the clinical condition between normal aging and Alzheimer's disease (AD). Individuals with MCI have memory impairment greater than what one would expect for their age, yet the general cognitive function is preserved. Similarly, activities of daily living are normal. Heterogeneity in this entity has also been recognized, and an accelerated rate of progression to AD was documented in some individuals diagnosed with MCI. A high percentage of patients with MCI develop clinical AD within 1 year. It is important for the early detection of and intervention for AD to determine the clinical subtype of MCI with a high risk of progression to AD. A Study demonstrated that a higher risk of AD progression may be involved with an altered function in specific regions such as the posterior cingulate, which are characteristic of AD. Subjects with MCI who developed AD had already exhibited significantly decreased volumes, decreased levels of regional cerebral blood flow and glucose metabolism at the posterior cingulate compared to those who remained in a non-dementia state, when they did not meet criteria for dementia. Studies on sleep architecture in AD have demonstrated that sleep disturbance is more prevalent in subjects with AD than elderly subjects without dementia. Significant changes in sleep/wake patterns, particularly loss of slow wave sleep (SWS) and increased amount and frequency of nighttime awakenings, apparently occur even at an early stage of the AD process. These disruptions of nighttime sleep increase in magnitude with increasing severity of dementia. AD patients present with significant losses of REM sleep and the breakdown of the sleep/wake circadian rhythm with significant amounts of sleep occurring during the day. While the characteristics of sleep architecture in AD and the influence of normal aging on the sleep architectures have been well documented, it has not been discussed whether there are predictors of progression from MCI to AD in terms of somnology (Shinno and Ishikawa, 2016).

1.2 Stages of Alzheimer's disease:

There are five stages associated with Alzheimer's disease:

- Preclinical Alzheimer's disease,
- Mild cognitive impairment due to Alzheimer's disease,
- Mild dementia due to Alzheimer's,

- Moderate dementia due to Alzheimer's
- Severe dementia due to Alzheimer's.

1) Preclinical Alzheimer's disease: Alzheimer's disease begins long before any symptoms become apparent. This stage is called preclinical Alzheimer's disease. This stage of Alzheimer's can last for years, possibly even decades. Although we won't notice any changes, new imaging technologies can now identify deposits of a protein called amyloid beta that is a hallmark of Alzheimer's disease. The ability to identify these early deposits may be especially important in the future as new treatments are developed for Alzheimer's disease.

2) Mild cognitive impairment (MCI) due to Alzheimer's disease: People with mild cognitive impairment have mild changes in their memory and thinking ability. These changes are not significant enough to affect work or relationships yet. People with MCI may have memory lapses when it comes to information that is usually easily remembered, such as conversations, recent events or appointments. People with MCI may also have trouble judging the amount of time needed for a task, or they may have difficulty correctly judging the number or sequence of steps needed to complete a task. The ability to make sound decisions can become harder for people with MCI. Not everyone with mild cognitive impairment has Alzheimer's disease. The same procedures used to identify preclinical Alzheimer's disease can help determine whether MCI is due to Alzheimer's disease or something else.

3) Mild dementia due to Alzheimer's disease: Alzheimer's disease is often diagnosed in the mild dementia stage, when it becomes clear to family and doctors that a person is having significant trouble with memory and thinking that impacts daily functioning. In the mild Alzheimer's stage, people may experience:

a) **Memory loss for recent events:** Individuals may have especially hard time remembering newly learned information and ask the same question over and over.

b) **Difficulty with problem-solving, complex tasks and sound judgments:** Planning a family event or balancing a checkbook may become overwhelming. Many people experience lapses in judgment, such as when making financial decisions.

c) **Changes in personality:** People may become subdued or withdrawn especially in socially challenging situations or show uncharacteristic irritability or anger. Reduced motivation to complete tasks also is common.

d) **Difficulty organizing and expressing thoughts:** Finding the right words to describe objects or clearly express ideas becomes increasingly challenging.

e) **Getting lost or misplacing belongings:** Individuals have increasing trouble finding their way around, even in familiar places. It's also common to lose or misplace things, including valuable items.

4) Moderate dementia due to Alzheimer's disease: During the moderate stage of Alzheimer's disease, people grow more confused and forgetful and begin to need more help with daily activities and self-care. People with moderate Alzheimer's disease may:

a) **Show increasingly poor judgment and deepening confusion:** Individuals lose track of where they are, the day of the week or the season. They may confuse family members or close friends with one another, or mistake strangers for family. They may wander, possibly in search of surroundings that feel more familiar. These difficulties make it unsafe to leave those in the moderate Alzheimer's stage on their own.

b) **Experience even greater memory loss:** People may forget details of their personal history, such as their address or phone number, or where they attended school. They repeat favorite stories or make up stories to fill gaps in memory.

c) **Need help with some daily activities:** Assistance may be required with choosing proper clothing for the occasion or the weather and with bathing, grooming, using the bathroom and other self-care. Some individuals occasionally lose control of their bladder or bowel movements.

d) **Undergo significant changes in personality and behavior:** It's not unusual for people with moderate Alzheimer's disease to develop unfounded suspicions for example, to become convinced that friends, family or professional caregivers are stealing from them or that a spouse is having an affair. Others may see or hear things that aren't really there. Individuals often

grow restless or agitated, especially late in the day. Some people may have outbursts of aggressive physical behavior.

5) *Severe Dementia due to Alzheimer's disease:* In the severe (late) stage of Alzheimer's disease, mental function continues to decline, and the disease has a growing impact on movement and physical capabilities. In severe Alzheimer's disease, people generally:

a) **Lose the ability to communicate coherently:** An individual can no longer converse or speak coherently, although he or she may occasionally say words or phrases.

b) **Require daily assistance with personal care:** This includes total assistance with eating, dressing, using the bathroom and all other daily self-care tasks.

c) **Experience a decline in physical abilities:** A person may become unable to walk without assistance, then unable to sit or hold up his or her head without support. Muscles may become rigid and reflexes abnormal. Eventually, a person loses the ability to swallow and to control bladder and bowel functions (Mayo Clinic, 2015).

1.3 Causes and Risk factors of Alzheimer's disease:

Scientists believe that for most people, Alzheimer's disease is caused by a combination of genetic, lifestyle and environmental factors that affect the brain over time. Less than 5 percent of the time, Alzheimer's is caused by specific genetic changes that virtually guarantee a person will develop the disease. Although the causes of Alzheimer's aren't yet fully understood, its effect on the brain is clear. Alzheimer's disease damages and kills brain cells. A brain affected by Alzheimer's disease has many fewer cells and many fewer connections among surviving cells than does a healthy brain. As more and more brain cells die, Alzheimer's leads to significant brain shrinkage. When doctors examine Alzheimer's brain tissue under the microscope, they see two types of abnormalities that are considered hallmarks of the disease:

I.   **Plaques:** These clumps of a protein called beta-amyloid may damage and destroy brain cells in several ways, including interfering with cell-to-cell

communication. Although the ultimate cause of brain-cell death in Alzheimer's isn't known, the collection of beta-amyloid on the outside of brain cells is a prime suspect.

II.   **Tangles:** Brain cells depend on an internal support and transport system to carry nutrients and other essential materials throughout their long extensions. This system requires the normal structure and functioning of a protein called tau. In Alzheimer's, threads of tau protein twist into abnormal tangles inside brain cells, leading to failure of the transport system. This failure is also strongly implicated in the decline and death of brain cells.

With the exception of the rare cases of Alzheimer's caused by genetic mutations, experts believe that Alzheimer's, like other common chronic diseases, develops as a result of multiple factors rather than a single cause (Mayo Clinic, 2015).

a) *Age*

The greatest risk factor for Alzheimer's disease is age. Most people with Alzheimer's disease are diagnosed at age 65 or older. People younger than 65 can also develop the disease, although this is much more rare. While age is the greatest risk factor, Alzheimer's is not a normal part of aging and age alone is not sufficient to cause the disease.

b) *Family History*

A family history of Alzheimer's is not necessary for an individual to develop the disease. However, individuals who have a parent, brother or sister with Alzheimer's are more likely to develop the disease than those who do not have a first-degree relative with Alzheimer's. Those who have more than one first-degree relative with Alzheimer's are at even higher risk. When diseases run in families, heredity (genetics), shared environmental and lifestyle factors, or both, may play a role. The increased risk associated with having a family history of Alzheimer's is not entirely explained by whether the individual has inherited the APOE-e4 risk gene.

c) *Cardiovascular Disease Risk Factors*

Growing evidence suggests that the health of the brain is closely linked to the overall health of the heart and blood vessels. The brain is nourished by one of the body's richest networks of blood vessels. A healthy heart helps ensure that enough blood is pumped through these blood vessels, and healthy blood vessels help ensure that the brain is supplied with the oxygen and nutrient-rich blood it needs to function normally. Many factors that increase the risk of cardiovascular disease are also associated with a higher risk of dementia. These factors include smoking, obesity in Midlife and diabetes. Some evidence suggests that impaired glucose processing (a precursor to diabetes) may also result in an increased risk for dementia. Growing evidence also implicates midlife hypertension and midlife high Cholesterol as risk factors.

Conversely, factors that protect the heart may also protect the brain and reduce the risk of developing Alzheimer's and other dementias. Physical activity appears to be one of these factors. In addition, emerging evidence suggests that consuming a diet that benefits the heart, such as one that is low in saturated fats and rich in vegetables and fruits, may be associated with reduced Alzheimer's and dementia risk.

Unlike genetic risk factors, many cardiovascular disease risk factors are modifiable that is, they can be changed to decrease the likelihood of developing cardiovascular disease and, possibly, Alzheimer's and other forms of dementia.

d) *Education*

People with fewer years of formal education are at higher risk for Alzheimer's and other dementias than those with more years of formal education. Researchers believe that having more years of education builds a "cognitive reserve" that enables individuals to better compensate for changes in the brain that could result in symptoms of Alzheimer's or another dementia. According to the cognitive reserve hypothesis, having more years of education increases the connections between neurons in the brain and enables the brain to compensate for the early brain changes of Alzheimer's by using alternate routes of neuron-to-neuron communication to complete a cognitive task.

Some scientists believe other factors may contribute to or explain the increased risk of dementia among those with lower educational attainment. These factors include being more likely to have occupations that are less mentally stimulating. In addition, lower educational attainment may reflect lower socioeconomic status, which may increase

one's likelihood of poor nutrition and decrease one's ability to afford health care or obtain suggested treatments.

e) *Social and Cognitive Engagement*

Studies suggest that remaining socially and mentally active throughout life may support brain health and possibly reduce the risk of Alzheimer's and other dementias. Remaining socially and mentally active may help build cognitive reserve, but the exact mechanism by which this may occur is unknown. More research is needed to better understand how social and cognitive engagement may affect biological processes to reduce risk.

f) *Traumatic Brain Injury (TBI)*

Moderate and severe TBIs increase the risk of developing Alzheimer's disease and other dementias. TBI is the disruption of normal brain function caused by a blow or jolt to the head or penetration of the skull by a foreign object. Not all blows or jolts to the head disrupt brain function. Moderate TBI is defined as a head injury resulting in loss of consciousness. If loss of consciousness lasts more than 24 hours, the injury is considered severe. Half of all moderate and severe TBIs are caused by motor vehicle accidents. Moderate TBI is associated with twice the risk of developing Alzheimer's and other dementias compared with no head injuries, and severe TBI associated with 4.5 times the risk. Individuals who have experienced repeated head injuries, such as boxers, football players and combat veterans, are at higher risk of dementia, cognitive impairment and neurodegenerative disease than individuals who have not experienced head injury. Evidence suggests that even repeated mild TBI might promote neurodegenerative disease. Some of these neurodegenerative diseases, such as chronic traumatic encephalopathy, can only be distinguished from Alzheimer's upon autopsy (Alzheimer's Association, 2016).

1.4 Sign and Symptoms of Alzheimer's disease:

i. *Memory loss:* Serious memory loss and confusion are not a normal part of aging. But forgetfulness caused by stress, anxiety, or depression can be mistaken for dementia, especially in someone who is older.

ii. *Agitation and mood swings:* It's common for someone suffering from AD to seem anxious or agitated. They may constantly move around and pace, get upset in certain places, or become fixated on specific details. Gwyther explained that agitation usually results from fear, confusion, fatigue, and

feeling overwhelmed from trying to make sense of a world that no longer makes sense. In addition to agitation, rapid and seemingly unprovoked mood swings are another sign of dementia going from calm to tearful to angry for no apparent reason.

iii. ***Impaired judgment:*** A person with AD will begin to make decisions that seem silly, irresponsible, or even inappropriate and are a marked departure from past behavior, such as dressing improperly for the weather or no longer being able to assess for them what is safe.

iv. ***Difficulty with familiar tasks:*** A person suffering from dementia often takes longer to complete, and may have trouble finishing, everyday tasks that he or she has done hundreds of times before. Common activities like remembering how to get to a familiar location, play a favorite game, or manage a budget may also prove difficult.

v. ***Trouble planning or problem-solving:*** As dementia progresses, ones may have trouble concentrating and find that fairly basic activities take them longer to do than before. In particular, they may struggle to develop and follow a plan, like creating and using a grocery list, following a recipe, or keeping track of monthly bills. This difficultly is far more pronounced than making the occasional error when balancing a checkbook or forgetting an item on your grocery list.

vi. ***Misplacing things:*** Finding car keys in the freezer, the remote in a sock drawer or routinely discovering other "missing" items in strange spots is usually a strong indicator that your family member may be suffering from dementia. Although we tend to associate forgetfulness with the natural aging process, people with AD don't just occasionally forget where they left their car keys or reading glasses; they leave them in unusual places and are later unable to retrace their steps to find them. Often, they'll also become suspicious and accuse someone else of hiding or stealing their belongings.

vii. ***Confusion with time or place:*** Disorientation as to time and place, such as forgetting where they live, getting easily lost, and losing track of dates, seasons, and the passage of time is a common experience for individuals with AD. Gwyther explained that the real issue with AD is perception of time. Five minutes can seem like five hours for someone with AD, so a husband may think his wife has been gone for hours or even weeks, even if it's just been a

few minutes, or he might tell his grandchild that he hasn't seen him in five years, even though he just saw them yesterday.

viii. ***Difficulty communicating:*** As dementia progresses, a person's language and communication skills diminish. He or she may stop mid-conversation and not know how to continue. Vocabulary can be especially troublesome. A person may struggle to find the right word; call things by the wrong names (e.g., a car a TV); substitute unusual or incorrect words for familiar words and names (e.g., calling one's husband "him" or "that guy"); invent new words; or use familiar words over and over again. With time, people may rely on gestures instead of speaking, revert back to speaking in a native language, or just speak less in general.

ix. ***Repetitive speech or actions:*** The frequent repetition of words, statements, questions, or activities is a hallmark of dementia and AD. Sometimes this repetitive behavior is triggered by anxiety, boredom, or fear of the environment or to achieve comfort, security, or familiarity.

x. ***Trouble with visual or spatial relationships:*** One symptom of dementia is vision problems that are different from typical age-related problems such as cataracts. People with AD tend to have difficulty reading, judging distances, and determining color or contrast as time goes on. In terms of perception, they may look in a mirror and think someone else is in the room instead of realizing they are looking at a reflection. Dementia can also cause changes in visual and spatial abilities. They can find it tough to distinguish food from the plate it's on, for instance.

xi. ***Withdrawal:*** AD can be a lonely and isolating disease that can result in a general lack of interest in surrounding activities or withdrawal from family and friends. People with AD may start to remove themselves from hobbies, social activities, work projects, or sports they previously loved, perhaps because they forget how to perform their favorite pastime, like knitting or playing the piano. It's also likely that because of all the changes they have experienced, they may feel embarrassed or ashamed and therefore avoid social situations and friends entirely.

xii. ***Loss of initiative and motivation:*** If apathy, loss of interest in social activities and hobbies, and social withdrawal occur in the early or mid-stage of AD, they may be due to depression. About 40% of people with AD also have

depression. Unfortunately, identifying depression can be difficult, and the cognitive impairment makes it difficult for the person to articulate his or her feelings. If a family member sleeps all the time or watches TV all day and refuses to do any other activities, she may have depression as well, and you should talk to her doctor.

xiii. ***Don't recognize family and friends:*** As AD progresses, their loved one may not always recognize family members and friends, which can be heart-breaking. Gwyther said that recognition does come and go for a while. In general, people forget what they just learned or whom they just met, then friends, and family last. But sometimes it's hard to explain why someone remembers one child's name and not another. Well-practiced memories and stories last longer than newer ones, but in the very late stages, people may only remember their parents.

xiv. ***Difficulty dressing:*** Dressing is difficult for dementia patients, who sometimes feel overwhelmed by the choices or may not remember even how to dress, tie a shoe lace, or buckle a belt. They may wear the same thing over and over again, forgetting that they wore the same outfit the day before. And as previously mentioned, buttoning and unbuttoning clothes can become more difficult in the mid-to-late stages of AD due to a decline in motor skills.

xv. ***Forgetting meals:*** People with dementia can literally forget to eat and drink, especially because many AD patients experience decreased appetite and interest in food. On the other hand, others forget that they've already eaten and, as a result, eat lunch or dinner multiple times a day. Additionally, the person may lose the ability to tell if a food or beverage is too hot to eat or drink, forget to chew slowly and swallow, or not remember how to use eating utensils and revert to eating with their fingers.

xvi. ***Inappropriate behavior:*** In the mid and especially late stages of Alzheimer's, a person may begin to lose control of his or her impulses and act out in inappropriate or uncharacteristic ways. Gwyther said that they may say tactless things, like 'Gosh, you got fat,' that they would have never said before. Additionally, people with AD may forget that they are married and begin to flirt and make inappropriate sexual advances, or they might start taking their clothes off at inappropriate times or in unusual settings. Shoplifting is not

uncommon among adults with AD, who don't understand or remember that they must pay for items in stores.

xvii. *Verbal and physical aggression:* As the dementia worsens over time, it is not unusual for someone to become physically or verbally aggressive. For example, verbal outbursts, including cursing, arguing, name calling, shouting, and threatening, are common, and some patients will even get physical, hitting and pushing caregivers. These aggressive acts often seem to come out of nowhere, but there's usually a reason behind the behavior that may not be readily apparent to family members or caregivers, such as physical discomfort, inability to communicate properly, or frustration at a situation.

xviii. *Trouble sleeping*: Certain symptoms, like restlessness, anxiety, agitation, disorientation, and confusion, tend to get worse as the day goes on and even continue through the night, often resulting in difficulty sleeping and wandering. Experts call this phenomenon "sun downing," and it can be due to exhaustion, changes in the person's biological clock, the inability to separate dreams from reality, and a decreased need for sleep that can occur with age. As much as 20% of Alzheimer's patients experience sun downing at some point, and it's a common reason that family members decide to put their loved one in a nursing home (Koch, 2017).

1.5 Protective factors of Alzheimer's Disease:

These are the protective factors of Alzheimer's Disease-

- Keeping mentally active
- Eating a healthy diet
- Keeping physically active
- Taking vitamins/dietary supplements (Roberts, McLaughlin and Connell, 2014)

1.6 Diagnosis:

A diagnosis of Alzheimer's disease is most commonly made by an individual's primary care physician. No single, simple test exists to diagnose Alzheimer's disease. A variety of approaches and tools are available to help make a diagnosis. They include the following:

✓ Obtaining a medical and family history from the individual, including psychiatric history and history of cognitive and behavioral changes.

✓ Asking a family member or other person close to the individual to provide input about changes in thinking skills or behavior.

✓ Seeking input from a specialist, such as a neurologist.

✓ Conducting cognitive tests and physical and neurologic examinations.

✓ Having the individual undergo a magnetic resonance imaging (MRI) scan, this can help identify brain changes, such as tumor, that could explain the individual's symptoms(Alzheimer's Association, 2016).

1.6.1 Assessing memory problems and other symptoms: To assess their symptoms, their doctor may ask them to answer questions or perform tasks associated with their cognitive skills, such as their memory, abstract thinking, problem-solving, language usage and related skills.

a) **Mental status testing:** Their doctor may conduct mental status tests to test their thinking (cognitive) and memory skills. Doctors use the scores on these tests to evaluate their degree of cognitive impairment.

b) **Neuropsychological tests:** They may be evaluated by a specialist trained in brain conditions and mental health conditions (neuropsychologist). The evaluation can include extensive tests to evaluate your memory and thinking (cognitive) skills. These tests help doctors determine if they have dementia, and if they are able to safely conduct daily tasks such as driving and managing their finances. Doctors provide as much information on what they can still do as well as what they may have lost. These tests can also evaluate if depression may be causing their symptoms.

c) **Interviews with friends and family:** Doctors may ask their family member or friend questions about them and their behavior. Doctors look for details that don't fit with their former level of function. Their family member or friend often can explain how his/her thinking (cognitive) skills, functional abilities and behaviors have changed over time.

Laboratory tests: They may have laboratory tests to rule out other disorders that cause some symptoms similar to those of Alzheimer's disease, such as a thyroid disorder or vitamin B-12 deficiency.

Brain-imaging tests: Alzheimer's disease results from the progressive loss (degeneration) of brain cells. This degeneration may show up in a variety of ways in brain scans. However, these scans alone aren't enough to make a diagnosis. Scans aren't used to diagnose the condition because there is overlap in what doctors consider normal age-related change in the brain and abnormal change. However, brain imaging can help:

- To rule out other causes, such as hemorrhages, brain tumors or strokes.
- To distinguish between different types of degenerative brain disease.
- To establish a baseline about the degree of degeneration.

The brain-imaging technologies most often used are:

a) **Magnetic resonance imaging (MRI).** An MRI uses powerful radio waves and magnets to create a detailed view of brain.

b) **Computerized tomography (CT).** A CT scan uses X-rays to obtain cross-sectional images of brain.

c) **Positron emission tomography (PET).** A PET scan uses a radioactive substance known as a tracer to detect substances in the body. There are different types of PET scans. The most commonly used PET scan is a fluorodeoxyglucose (FDG) PET scan, which can identify brain regions with decreased glucose metabolism. The pattern of metabolism change can distinguish between different types of degenerative brain disease. PET scans have recently been developed that detect clusters of amyloid proteins (plaques), which are associated with Alzheimer's disease, but this type of PET scan is typically used in the research setting.

1.6.2 Future of diagnosis:

Researchers are working on new diagnostic tools that may enable doctors to diagnose Alzheimer's dementia earlier in the course of the disease, when symptoms are very mild or before symptoms even appear. One such tool is a PET scan that can detect tau, the other hallmark abnormal protein in Alzheimer's dementia. Scientists are investigating a number of disease markers and diagnostic tests, such as genes, disease-related proteins and imaging procedures, which may accurately and reliably indicate

whether they have Alzheimer's disease and how much the disease has progressed. However, more research on these tests is necessary (Mayo Clinic, 2016).

1.7 Treatment Pattern for Alzheimer Disease:

Pharmacologic treatments employ medication to slow or stop an illness or treat its symptoms. Several drugs have been approved by the U.S. Food and Drug Administration (FDA) that temporarily improve symptoms of Alzheimer's disease by increasing the amount of chemicals called neurotransmitters in the brain. The effectiveness of these drugs varies from person to person. However, none of the treatments available today for Alzheimer's disease slows or stops the damage to neurons that causes Alzheimer's symptoms and eventually makes the disease fatal (Alzheimer's Association, 2016).

Two types of treatment patterns are available:

1.7.1 Pharmacologic Treatment: There are three FDA-approved cholinesterase inhibitors donepezil (Aricept), galantamine (Razadyne) and rivastigmine (Exelon). In clinical studies, all cholinesterase inhibitors, on average, work about equally well. But in individuals, one cholinesterase inhibitor may work better or produce fewer side effects than does another. The main side effects of these drugs include diarrhea, nausea, loss of appetite and sleep disturbances. In people with cardiac conduction disorders, serious side effects may include a slow heart rate and heart block. Taking these medications with food also may help minimize side effects (Mayo Clinic, 2014).

   a) **Donepezil (Aricept):** Donepezil is a reversible, selective anticholinesterase that was approved for use in Alzheimer's disease in 1996. As compared with tacrine and physostigmine, donepezil has minimal peripheral anticholinesterase activity and a longer plasma half-life, allowing for once-daily administration. The once-a-day regimen and the drug's reasonable tolerability and efficacy have made donepezil widely used in patients with Alzheimer's disease (Wood, Mayeux and Sano, 1999). It is the only Alzheimer's drug approved to treat all stages of the disease. (Mayo Clinic, 2014)

b) **Rivastigmine(Exelon):** Rivastigmine is a relatively selective pseudo-irreversible inhibitor of acetylcholinesterase with a 10-hour duration of action (Wood, Mayeux and Sano, 1999). It was approved in 2000 for mild to moderate Alzheimer's disease. It is taken as a pill or syrup. It is also available as a drug-releasing skin patch. The effectiveness of rivastigmine appears to be comparable to donepezil, although it may have more gastrointestinal side effects (Mayo Clinic, 2014).

c) **Galantamine (Razadyne):** It was approved in 2001 to treat mild to moderate Alzheimer's. It's taken as a pill or syrup. Some trials showed that galantamine slowed cognitive decline in people with Alzheimer's. These benefits lasted up to 36 months. (Mayo Clinic, 2014)

d) **Memantine for later stages:** Memantine (Namenda) is approved by the FDA for treatment of moderate to severe Alzheimer's disease. It works by regulating the activity of glutamate, a messenger chemical widely involved in brain functions including learning and memory. It is taken as a pill or syrup. Common side effects include dizziness, headache, confusion and agitation. Since memantine's original approval for moderate to severe Alzheimer's, researchers have conducted additional studies to determine whether memantine might also help in earlier stages. But none of this additional work shows that memantine has any benefit for mild Alzheimer's disease. (Mayo Clinic, 2014)

1.7.2 Non-Pharmacologic Therapy: Non-pharmacologic therapies are those that employ approach other than medication, such as music therapy and reminiscence therapy (therapy in which photos and other familiar items may be used to elicit recall). As with current pharmacologic therapies, non-pharmacologic therapies have not been shown to alter the course of Alzheimer's disease. Non-pharmacologic therapies are often used with the goal of maintaining or improving cognitive function, the ability to perform activities of daily living, or overall quality of life. They also may be used with the goal of reducing behavioral symptoms such as depression, apathy, wandering, sleep disturbances, agitation and aggression. Systematic reviews of published research on non-pharmacologic therapies have found that some, such as exercise and cognitive activity (for example, gardening, word games, listening to music and cooking) show promise (Alzheimer's Association, 2016).

1.8 Worldwide Prevalence of Dementia:

The distribution of dementia around world seems to vary according to cultural and socioeconomic differences among nations. Interestingly, overall prevalence of dementia in general and AD in particular appears to be higher in developed countries than in developing ones. In a review about the global burden of dementia, the higher prevalence in developed countries than in developing was attributed to differences in the level of exposure to cerebrovascular risk factors like hypertension, smoking, obesity, and diabetes. In 2001, 60.1% of all people with dementia were living in developing countries; this proportion is expected to rise to 71.2% by 2040 (Low *et al.*, 2010).

a) **European Studies:** A collaborative study of European population-based cohorts identified the total of 2346 cases of mild to severe dementia in 11 cohorts. Age-standardized prevalence was 6.4% for dementia (all causes), 4.4% for AD. The Rotterdam Study estimated the prevalence of dementia and its subtypes in Ommoord, suburb of Rotterdam, and examined the relationship of the disease expressions with educational level. The results showed high prevalence of overall dementia and AD in subjects with low levels of education. In Italy, the ILSA Study estimated that the average incidence rates per 1000 person-years were 12.47 for overall dementia, 6.55 for AD. They yet found out that women carry high risk of developing AD, whereas men carry high risk of developing VaD.

b) **North American Studies:** It is estimated that 5.2 million old Americans have Alzheimer's disease, that is, one in nine individuals aged 65 years or older (11%), and the majority are women, probably because women generally live longer than men. AD is already the sixth leading cause of all deaths in USA and the fifth cause among Americans aged more than 65 years. Based on the Aging Demographics and Memory Study (ADAMS) about 14% of people aged more than 71 years in USA have dementia. Dramatic increases in the number of people aged more than 85 years across all racial and ethnic groups will affect the number of people living with AD in the next years. In USA, by 2030 the number of patients with AD will increase 50%, and by 2050 it may nearly triple. About 450 thousands older Americans with AD died in 2013, a large proportion as result of complications of AD.

c) **Latin American Studies:** The prevalence of dementia in Latin America is almost similar to that encountered in North America. This phenomenon may be due to the special combination of low average educational attainment and high vascular risk profile among Latin American elderly populations. In fact the Delphi Consensus Study found that, after the age of 75, the prevalence of dementia in the poorest regions of Latin America was higher than in other developed regions of the world.

d) **Asian Studies:** The burden of dementia is increasing exponentially especially in Asia-Pacific region, where more than 60% of the population reside. The prevalence of dementia seems to be higher in developed countries, like Japan and Korea, than in countries with low incomes in Asia. A Japanese study found that the prevalence of dementia equals 11% among those aged more than 65 years, whereas a Korean one found the prevalence of 6.3%. Another study conducted in Korea, the Seoul study, showed that the prevalence of dementia, excluding very mild cases, was about 5.3% for overall dementia and 4.3% for AD. The prevalence of dementia greatly varies between different ethnic groups living in the same country, like in Singapore, that is probably the most multicultural region of Asia. A Singaporean study showed low standardized dementia prevalence among the ethnic Chinese (2.5% among the elderly) when compared to the ethnic Malays (4.0% among the elderly) and this finding was independent of the frequency of vascular risk factors. Whereas these differences are due to different genetics or lifestyle it remains a matter of debate.

e) **Chinese Studies:** At the most populous country of the world, aging population is occurring in a wide scale. In 2000, 10% of the total China population had 60 years or more and by 2050 one in four Chinese people will be aged more than 65 years. Compared with Western countries and Caucasian populations, studies in China suggest low prevalence of overall dementia (average 3% in different studies). A meta-analysis showed that the prevalence in a population aged 60 years or older for AD was 1.9%. Higher prevalence numbers were concentrated in metropolitan cities and in provinces near east coast. Nowadays, the estimated number of older people with dementia in mainland China, Hong Kong, and Taiwan together is about 8.4 million (Rizzi, Rosset and Roriz-Cruz, 2014).

CHAPTER TWO

LITERATURE REVIEW

2.1 Public beliefs and knowledge about risk and protective factors for Alzheimer's disease.

J. Scott Roberts , Sara J. McLaughlin, and Cathleen M. Connell conducted a research on public beliefs and knowledge about risk and protective factors for Alzheimer's disease among 1641 adults. The purpose of this study was to assess public beliefs and knowledge about risk and protective factors for Alzheimer's disease.

The result of this study showed that most of the participants (60.1%) indicated interest in learning their AD risk. 29.4% expressed worry about getting Alzheimer's disease someday. Many failed to recognize that medications to prevent AD are not available (39.1%) or that having an affected first-degree relative is associated with increased disease risk (32%). Many respondents believed that various actions (e.g., mental activity, eating a healthy diet) would be effective in reducing AD risk.

The research concluded that older and middle-aged adults were interested in their AD risk status and believed that steps can be taken to reduce disease risk. Tailored education efforts were needed to address potential misconceptions about risk and protective factors (Roberts, McLaughlin and Connell, 2014).

2.2 Public knowledge about dementia in Germany—results of a population survey

Lüdecke, von dem Knesebeck and Kofahl conducted a survey on public knowledge about dementia among 1795 persons aged between 18–79 years. The survey was conducted based on several questions and almost 1795 persons filled out the questionnaire (response rate 78 %). The method of analyses was based on a German mail survey conducted in 2012.

This study result shows that respondents were asked about their knowledge and attitudes about dementia. Knowledge about cause, prevention, diagnosis, treatment and life impact of dementia was characterized by a relatively high uncertainty. People with care experiences and people from higher status groups knew more about dementia. People with more knowledge were less likely to believe that dementia patients have a high quality of life, but tend to be less skeptical about early detection of dementia.

It was concluded that to increase knowledge, reduce uncertainty and modify attitudes towards dementia and those who were afflicted, educational programs and contact-

based approaches should be considered (Lüdecke, von dem Knesebeck and Kofahl, 2015).

2.3 Public knowledge and beliefs about dementia risk reduction: a national survey of Australians

Ben J Smith, Suha Ali and Henry Quach conducted a survey on public knowledge and beliefs about dementia risk reduction. The study intended to investigate whether Australian adults recognized Alzheimer's disease and other forms of dementia as an important health issue, and hold beliefs and knowledge that are consistent with recommendations concerning dementia risk reduction. This research was undertaken to guide national brain health awareness and education strategies.

A cross-sectional telephone survey was undertaken of 1,003 Australians aged 20–75 years. The survey measured the importance placed on dementia, beliefs and confidence related to risk reduction, knowledge of risk reduction methods, and the perceived age-relevance of these. The data were stratified by sex, age, educational attainment, household income, language preference and previous exposure to dementia during analysis and multivariable logistic regression was also undertaken to identify variables independently associated with beliefs and knowledge.

The result of this survey showed that people aged 60 years and over identified dementia as very important (17.2%) more often than those aged 40–59 years (5.1%) or 20–39 years (2.1%). While 41.5% of respondents believed the risk of dementia could be reduced, 26.9% were very confident that they could achieve this. Mental activity (57.1%) was identified as beneficial much more often than physical activity (31.3%), healthy eating (23.3%) and other cardiovascular health behaviours. Women, people of English-speaking origin, and those having contact with a person with dementia, showed better knowledge of several health behaviors.

The survey concluded that growing attention was given to population risk reduction to combat the dramatic increase in the burden of disease due to dementia. In Australia many people did not yet hold beliefs and knowledge that support this, which highlights the need for concerted awareness raising that dementia was not an inevitable aspect of ageing, and for education about the role of vascular health in dementia risk reduction(Smith, Ali and Quach, 2014).

2.4 Knowledge of dementia among South Asian (Indian) older people in Manchester, UK

Purandare N, Luthra V, and many others conducted a research on knowledge of dementia among South Asian (Indian) older people in Manchester, UK. The aim of this study was to examine knowledge of dementia in South Asian older people, as compared with Caucasian older people. This study was conducted by Dementia Knowledge Questionnaire (DKQ) and the DKQ was translated into Gujarathi and Urdu by the professional translators.

The result of this survey showed that one hundred and ninety-one DKQs from Indian and 55 DKQs from Caucasian (white UK/Irish/European) older people were included in the analyses. The knowledge of dementia was poor in both Indian and Caucasian older people. The median (25th–75th percentile) total DKQ scores were 3 (2–5) in Indians and 6 (3.5–9) in Caucasians (p<0.001). Indian older people showed significantly less knowledge about basic aspects (p<0.001) and epidemiology (p<0.001) of dementia when compared to Caucasian older people. Both groups faired equally badly on questions about a etiology (p¼0.91) and symptomatology (p¼0.66). Indian older people were less aware of personality, reasoning, and speech being the affected in dementia (p<0.001, p<0.001 and p¼0.04, respectively).

The research concluded that Indian older people in Manchester (UK) did not see to have sufficient knowledge about dementia, which may be one of the reasons for their relative absence in the local dementia treatment clinics (Purandare et al., 2007).

2.5 A Population-Based Study on the Incidence of Dementia Disorders between 85 and 88 Years of Age

Aevarsson and Skoog conducted a study on the incidence of dementia disorders among 347 nondemented 85-year-old residents from the institutions in the city of Gothenburg, Sweden. The study was conducted to investigate the incidence of Alzheimer's disease, vascular dementia and other dementias in a population between 85 and 88 years of age.

The measurements of this study was neuropsychiatric, neuropsychological, and physical examinations, key informant interviews, comprehensive laboratory tests,

electrocardiography, chest radiography and computed tomography (CT-scan) of the head.

The result of this study showed that sufficient information was obtained about 92% of the subjects at risk. 63 subjects (18.2%) became demented between ages 85 and 88, giving an incidence of 90.1/1000/year (61.3/1000/year for men and 102.7/1000/year for women; P = .085). The incidence of Alzheimer's disease was 36.3/1000/year, vascular dementia 39.0/1000/year (P = 1.000), and that of other dementias 9.1/1000/year.

The study concluded that almost one-tenth of nondemented persons between the ages of 85 and 88 become demented each year, emphasizing the magnitude of the dementia problem in the very old, the fastest growing segment of western populations (Aevarsson and Skoog, 1996).

2.6 Prevalence and Subtypes of Dementia in Taiwan: A community Survey of 5297 Individuals

This study was conducted among a total of 2753 men and 2544 women from four urban and four rural communities age ranged from 41 to 88 years (28% of them were at least 65 years old) in prevalence and subtypes of Dementia in Taiwan. Their education ranged from 0 to 20 years; 27% of them had less than 1 year of formal schooling. The aim of this study was to find the prevalence rate of dementia in Taiwan, the relative frequencies of its subtypes, and its associations with age, education, gender, and residence location.

This study shows that thirty-one cases of dementia were identified by the DSM-III-R criteria, including 18 cases of Alzheimer's disease, 10 cases of vascular dementia, and three cases of other dementias. The prevalence rate in individuals aged 65 and over was 2.0%. Aging and illiteracy were associated with higher rates of dementia; gender and residence location made no difference.

The study concluded that the prevalence rate of dementia was low in this Chinese population consistent with common findings from other parts of the world and high rate of dementia was associated with older age and illiteracy, and Alzheimer's disease was the most frequent cause (Liu et al., 1995).

2.7 Prevalence of Alzheimer's disease and vascular dementia: association with education. The Rotterdam study

A. Ott, M. M. Breteler and many others conducted a study on prevalence of Alzheimer's disease and vascular dementia among 7528 participants of the Rotterdam study aged 55-106 years in Ommoord, a suburb of Rotterdam. The aim of this study was to estimate the prevalence of dementia and its subtypes in the general population and examine the relation of the disease to education.

The result of this study showed that 474 cases of dementia were detected, giving an overall prevalence of 6.3%. Prevalence ranged from 0.4% (5/1181 subjects) at age 55-59 years to 43.2% (19/44) at 95 years and over. Alzheimer's disease was the main subdiagnosis (339 cases; 72%); it was also the main cause of the pronounced increase in dementia with age. The relative proportion of vascular dementia (76 cases; 16%), Parkinson's disease dementia (30; 6%), and other dementias (24; 5%) decreased with age. A substantially higher prevalence of dementia was found in subjects with a low level of education.

The study concluded that the prevalence of dementia increases exponentially with age. About one third of the population aged 85 and over has dementia. Three quarters of all dementia is due to Alzheimer's disease. In this study an inverse dose-response relation was found between education and dementia—in particular, Alzheimer's disease (Ott et al., 1994).

2.8 Risk Factors for Alzheimer Disease: A Population-Based Case-Control Study in Istanbul, Turkey

The population based case control study was aiming to study risk factors for Alzheimer disease (AD) in Istanbul, Turkey. They screened people over age 70 in the community for cognitive impairment. The screen positives and a proportion of screen negatives underwent neurologic examination in the second phase. The sample of 57 "probable" AD patients and controls were 127 cognitively normal individuals were identified by neurologic examination. Odds ratios (OR) were calculated using multivariate logistic regression analysis. Sample who had a university/college degree had a protective effect on AD risk (OR = 0.10, 95% confidence interval [CI] = 0.02–0.50). Exposure to occupational electromagnetic field had an OR of 4.02 (95% CI =

1.02–15.78). Use of electricity for residential heating also showed elevated risk (OR = 2.77, 95% CI = 1.12–6.85). The study results suggest that having a higher education is protective from AD and that electromagnetic field exposure at work or at home is a significant risk factor (Harmanci et al., 2003).

2.9 Prevalence of Alzheimer's disease and Other Dementing Disorders: Assiut-Upper Egypt Study

The aim of this study was to determine the prevalence rate of Alzheimer's disease (AD) and other types of dementias among the population over the age of 60 years in Assiut governorate. A 3-phase cross-sectional population-based study was carried out to screen 2,000 subjects residing in 11 different locations representing the sociocultural status of the area. We subjected each proband to a modified form of the Mini Mental State Examination test. Subjects scored 21 or less were investigated according to a standardized protocol. We found 90 demented subjects yielding a crude prevalence ratio (case per 100 population over the age of 60) of 4.5. A diagnosis of subtypes of dementia was reached in 83 cases. Prevalence ratios for dementia subtypes were 2.2 for AD, 0.95 for multi-infarct dementia. 0.55 for mixed dementias and 0.45 for secondary dementias. Age-specific prevalence tends to be doubled every 5 years. Occupation, level of education and residence did not affect the prevalence or severity of dementia. Comparison with other studies suggests that dementia of all types is as frequent in Assiut governorate as elsewhere (Farrag et al., 1998).

2.10 Midlife vascular risk factors and Alzheimer's disease in later life: longitudinal, population based study.

Miia Kivipelto, Eeva-Liisa Helkala and many others conducted a research on midlife vascular risk factors and Alzheimer's disease in later life. The objective of this study was examining the relation of midlife raised blood pressure and serum cholesterol concentrations to Alzheimer's disease in later life.

This study was undertaken with 1449 (73%) participants aged 65–79 from Kuopio and Joensuu, eastern Finland.

The result of this study shows that people with raised systolic blood pressure (≥160 mm Hg) or high serum cholesterol concentration (≥6.5 mmol/l) in midlife had a significantly higher risk of Alzheimer's disease in later life, even after adjustment for

age, body mass index, education, vascular events, smoking status, and alcohol consumption, than those with normal systolic blood pressure (odds ratio 2.3, 95% confidence interval 1.0 to 5.5) or serum cholesterol (odds ratio 2.1, 1.0 to 4.4). Participants with both of these risk factors in midlife had a significantly higher risk of developing Alzheimer's disease than those with either of the risk factors alone (odds ratio 3.5, 1.6 to 7.9). Diastolic blood pressure in midlife had no significant effect on the risk of Alzheimer's disease.

The research concluded that raised systolic blood pressure and high serum cholesterol concentration, and in particular the combination of these risks, in midlife increases the risk of Alzheimer's disease in later life (Kivipelto, 2001).

Aim and Objective of the Study

1. To determine the knowledge level of general people in Bangladesh about Alzheimer's disease.

2. Their perception about sign and symptoms, risk factors of Alzheimer's disease.

3. To find out their habitual patterns that may influence the early detection, diagnosis and prevalence of Alzheimer's disease.

CHAPTER THREE

METHODOLOGY

Methodology

3.1 Type of the Study

It was a survey based study.

3.2 Study Population and Study Area

The data was collected from different areas of Bangladesh including all classes of people. But most of the collections are done in Dhaka city. The areas include in this study are Malibag, Moghbazar, Mohakhali, Uttara, Old Dhaka, Rampura, Badda, Banasree, Mirpur. The targeted group was Government employee, Private employee, housewives, and retired person.

3.3 Total Number of Participants

The survey was conducted among 406 people including male and female aged between 18-65.

3.4 Inclusion Criteria

- Both male and female.
- Age should be 18 or above.

3.5 Exclusion Criteria

- People age below 18 years
- Unwilling to participate

3.6 Data Collection Method

The data was collected through questionnaire that is formed in English language. It consists of multiple choice type questions to find out the knowledge about Alzheimer's disease .The data was collected by face to face interview.

3.7 Development of the Questionnaire

The questionnaire was developed based on different findings in available journal and research paper.

3.8 Data collecting period

The duration of data collection was about four months that started from January 2017 to April 2017.

3.9 Data Analysis

After collecting, all the data were checked and analyzed with the help of Microsoft Office Excel 2010.

CHAPTER FOUR
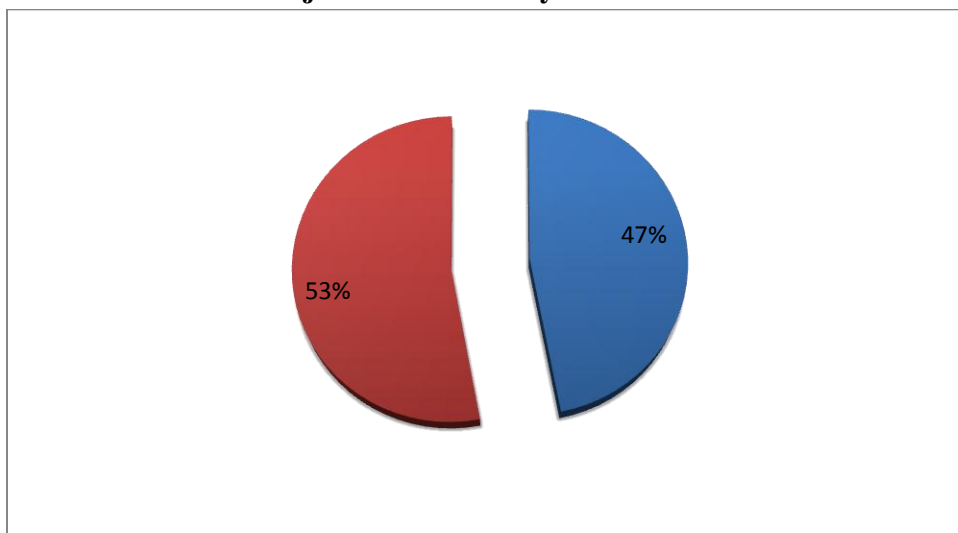
RESULT

4.1 Gender of the Subjects of the Survey

Figure 4.1: Gender of the Subjects of the Survey

Among the participants 47% were male and 53% were female.
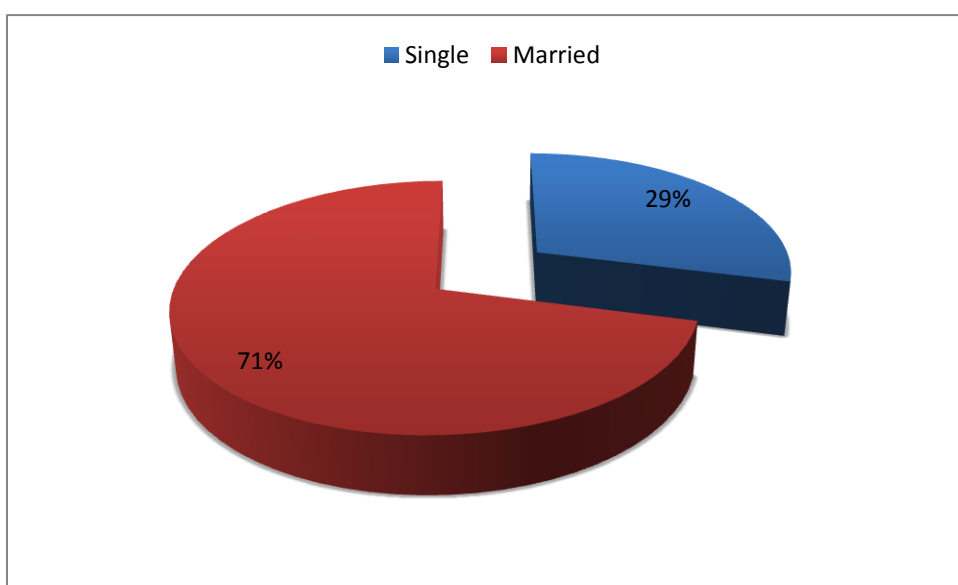
4.2 Marital Status of the Subjects

Figure 4.2: Marital Status of the Subjects

Majority participants were (71%) were married; only few of them (29%) were single.

4.3 Education Level of the Subjects
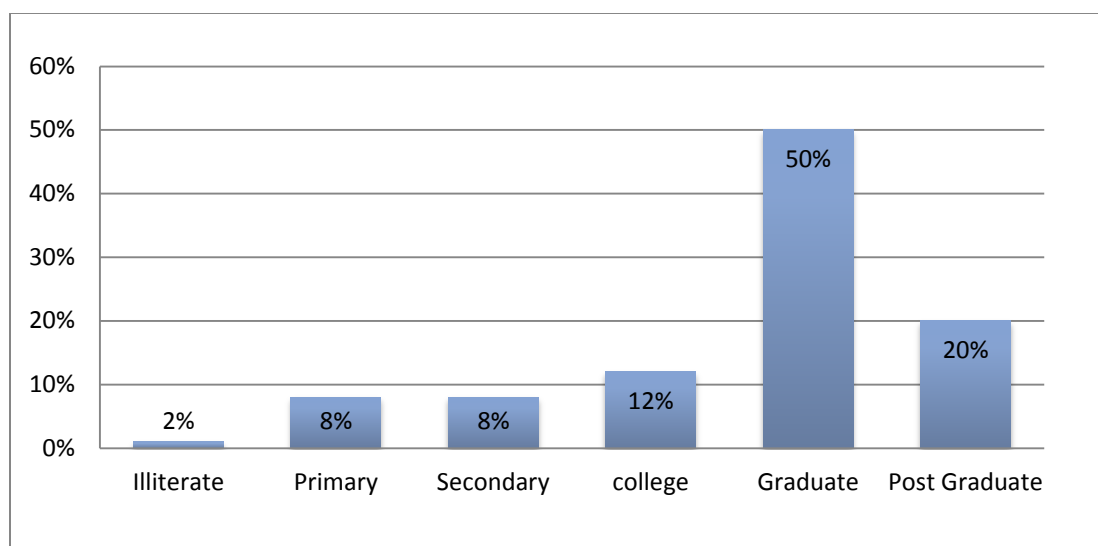
Figure 4.3: Education Level of the Subjects

Among all (406) the respondents, majority of the participants have up to graduate level(50%) education in which (20%) were post graduate and 12% completed college, 8% secondary, 8% have passed primary and only 2% were illiterate.

4.4 Occupation of the subjects
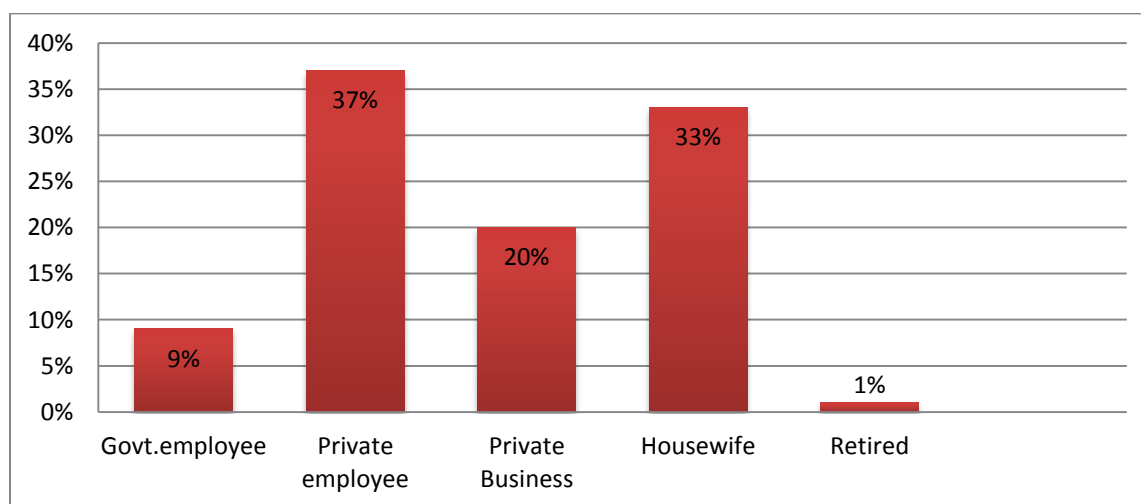
Figure 4.4: Occupation of the subjects

Among all (406) the respondents, majority of the participants are private employee 37%, 33% were housewives, 20% were doing private business, 9% were Govt. employee and only 1% were retired.

4.5 Living with family
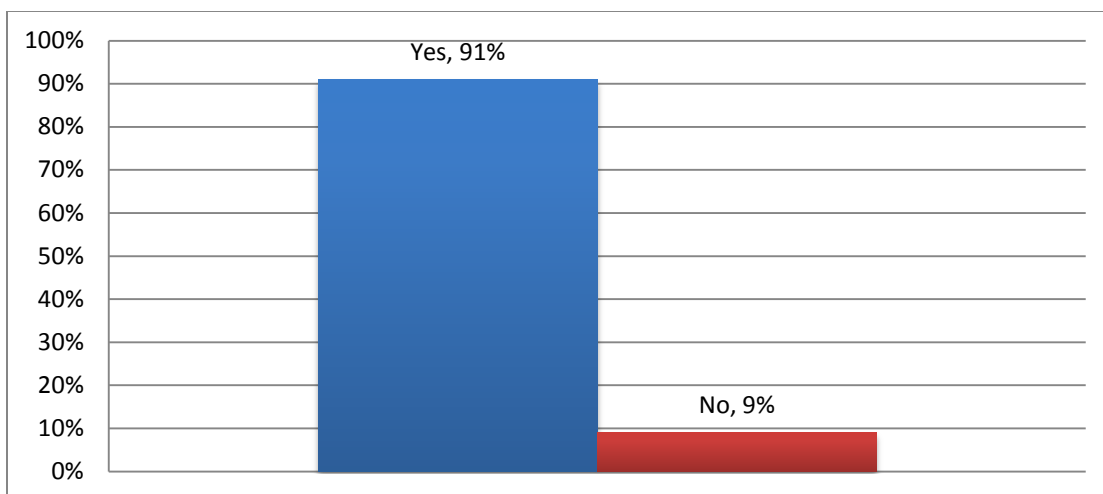
Figure 4.5: Living with family

Majority of the participants were living with family (91%) and the rest of them did not live with family (9%).
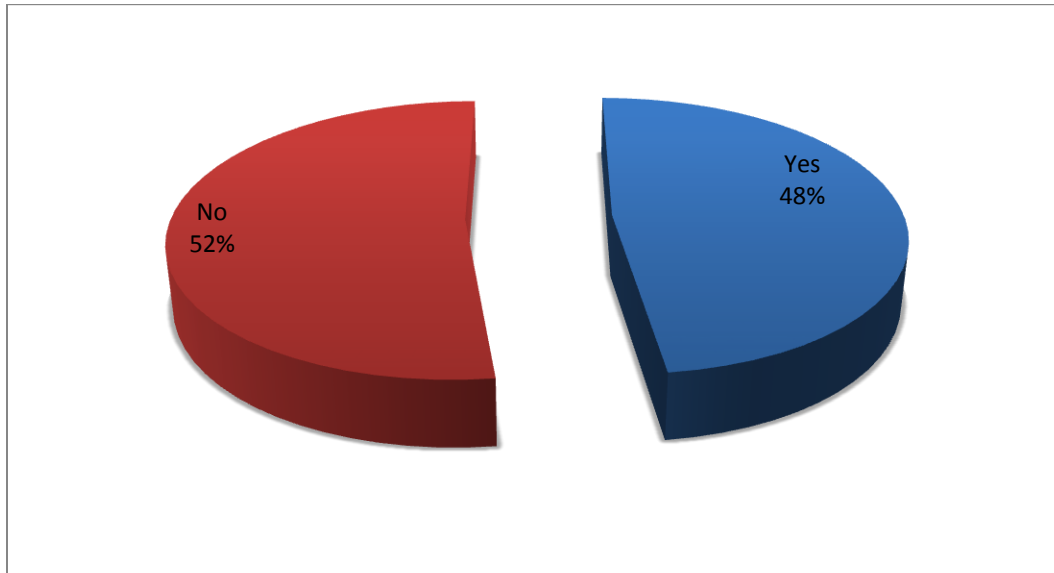
4.6 Knowledge about Alzheimer's Disease

Figure 4.6 : Knowledge about Alzheimer's disease

Among 406 participants 48% knew about Alzheimer's disease and the rest of them 52% didn't know.

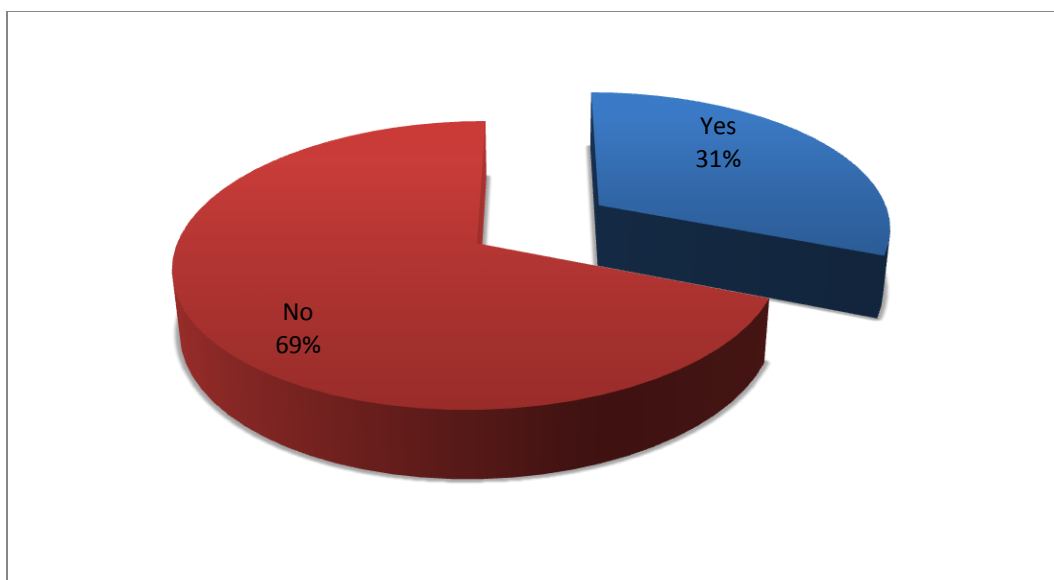**4.7 Family History of Alzheimer's Disease**

Figure 4.7: Family History of Alzheimer's disease

About 31% of participants had a family history of Alzheimer's disease and the rest of 69% did not have that history.

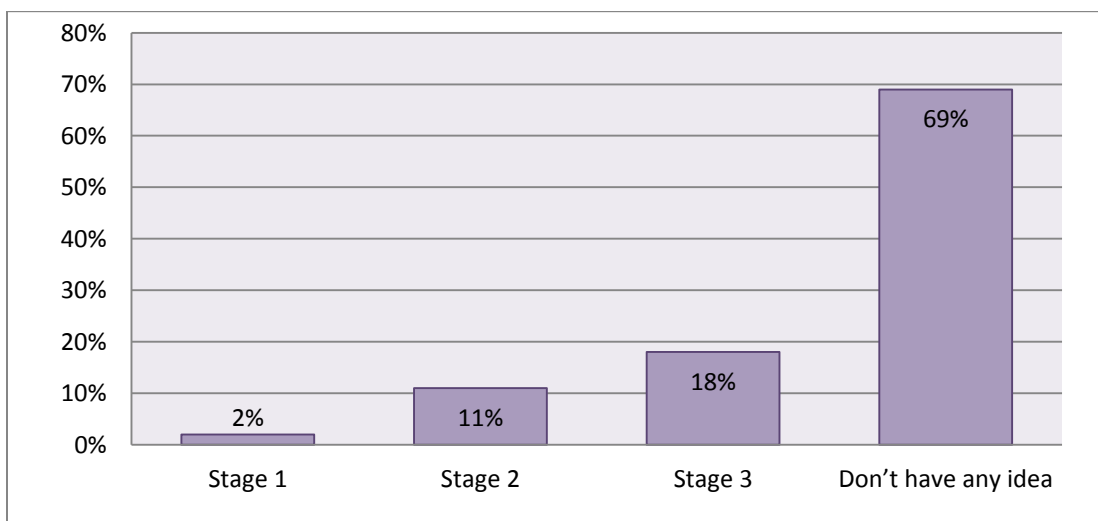**4.8 Knowledge about Stages of Alzheimer's Disease**

Figure 4.8: Knowledge about Stages of Alzheimer's disease

Among 406 participants 2% know about Alzheimer's disease stage 1, 11% know about Alzheimer's disease stage 2, 18% know about Alzheimer's disease stage 3, and the rest of them 69% don't know about Alzheimer's disease stage.
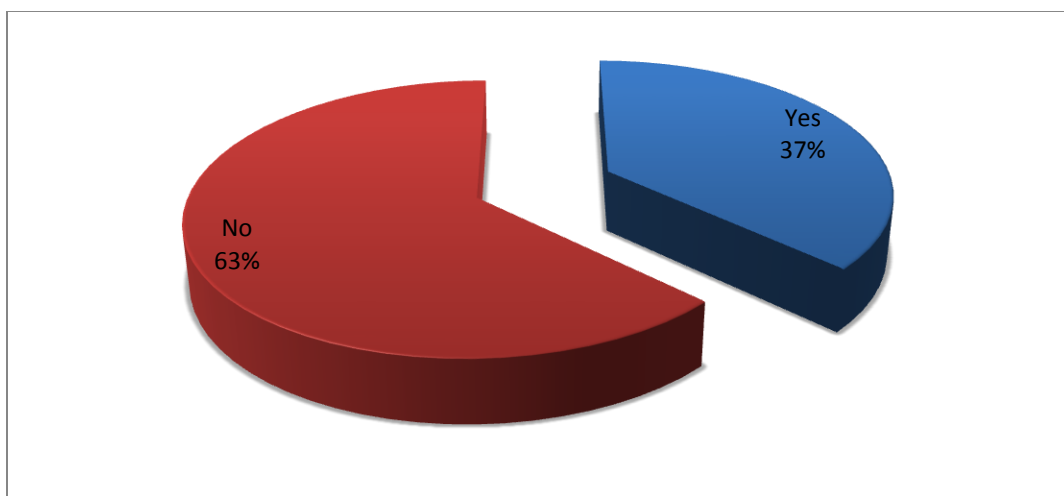
4.9 Do you know anyone who had AD?

Figure 4.9: Do you know anyone who had AD?

Among 406 participants only 37% knew who had AD and rest of them didn't know about who had AD.

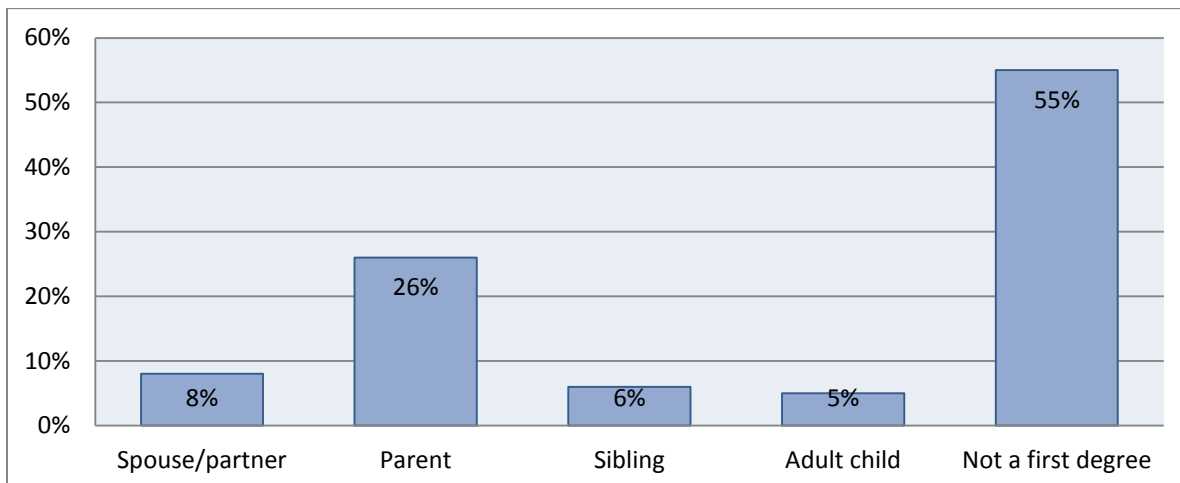**4.10   Relation with affected person**

Figure 4.10: Relation with affected person

Among 406 participants, 8% have relations as spouse/partner with affected person, 26% have relations as parents with affected person, 6% have relations as sibling with affected person, 5% have relations as adult child with affected person. 55% have relations with affected person but they are not a first degree relative.

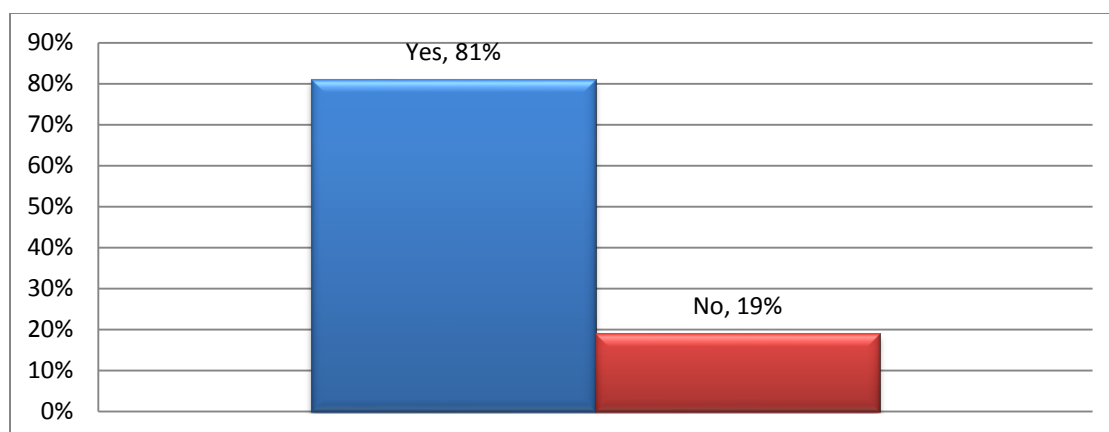**4.11   Concerned about getting Alzheimer's disease**

Figure 4.11: Concerned about getting Alzheimer's disease

Among 406 participants 81% said they were concerned about getting Alzheimer's disease and 19% said they were not concerned about getting Alzheimer's disease.

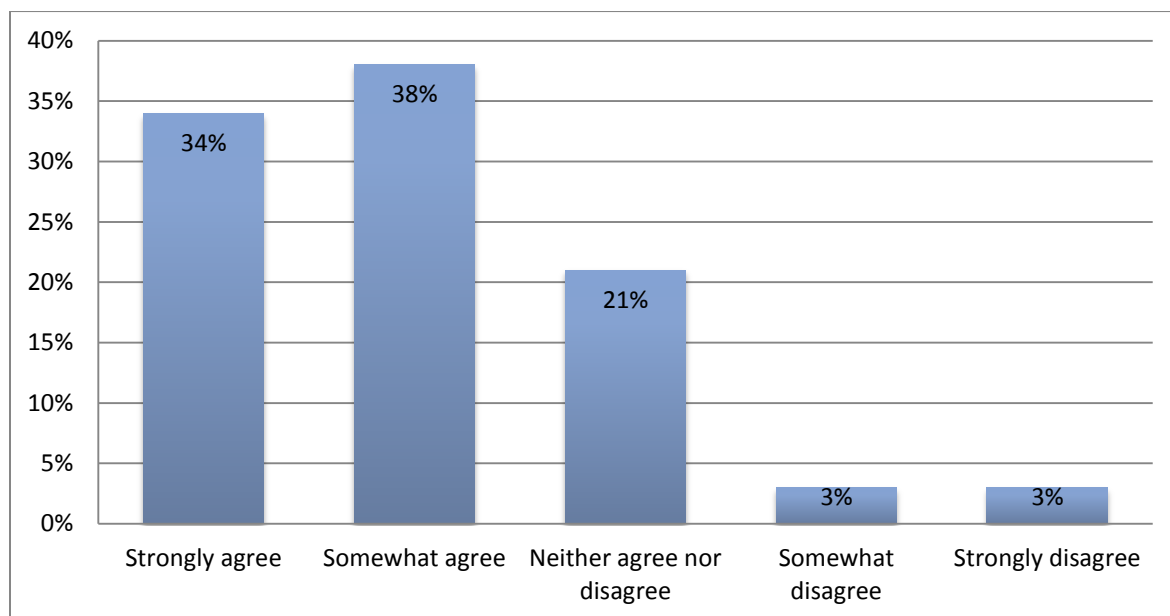**4.12 Chances of someday getting Alzheimer's disease.**

Figure 4.12: Chances of someday getting Alzheimer's disease.

Among 406 participants, 34% were strongly agree, 38% were somewhat agree, 21% were neither agree nor disagree, 3% were somewhat disagree and 3% were strongly disagree that they would like to know their chances of someday getting Alzheimer's disease.

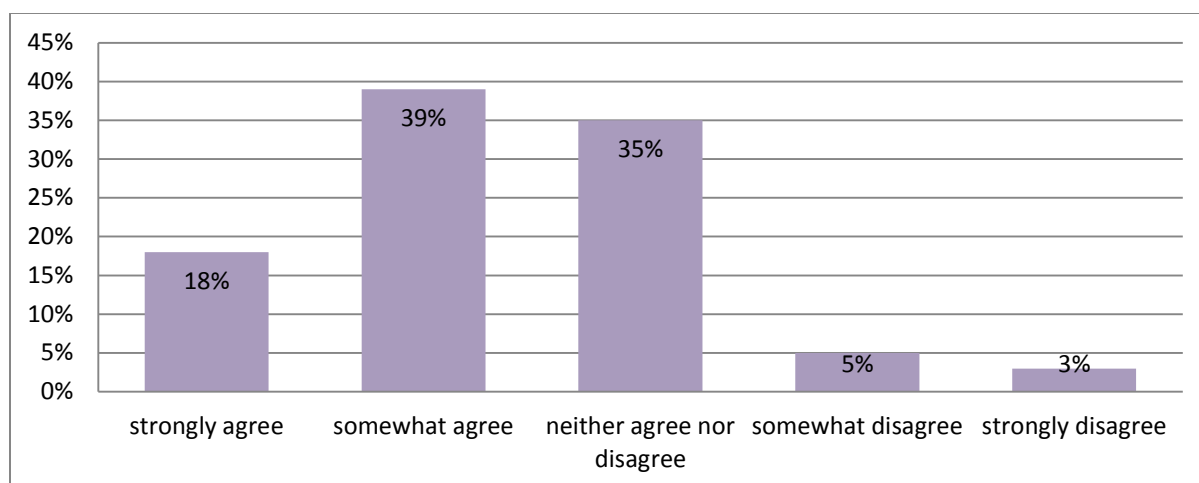### 4.13 You believe you will get Alzheimer's someday

Figure 4.13: You believe you will get Alzheimer's someday

Among 406 participants, 18% were strongly agree, 39% were somewhat agree, 35% were neither agree nor disagree, 5% were somewhat disagree and 3% were strongly disagree that they believe they would get Alzheimer's disease someday.

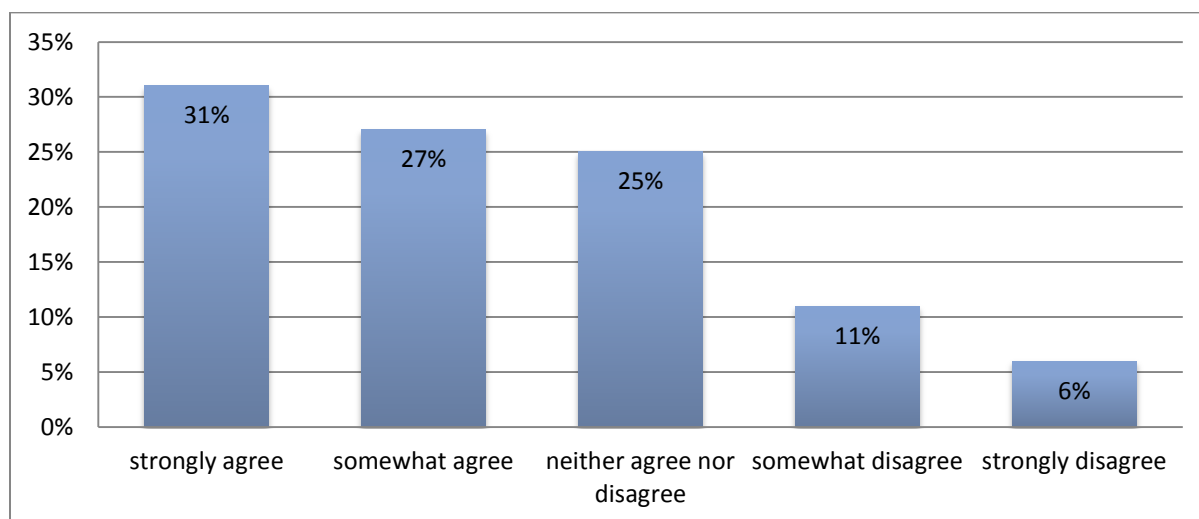### 4.14 You worry about getting Alzheimer's someday

Figure 4.14: You worry about getting Alzheimer's someday

Among 406 participants, 31% were strongly agree, 27% were somewhat agree, 25% were neither agree nor disagree, 11% were somewhat disagree and 6% were strongly disagree that they worried about getting Alzheimer's disease someday.

4.15 Knowledge Regarding Alzheimer's Disease

Table 4.1: Knowledge Regarding Alzheimer's disease

	Yes(%)	No(%)
Prescription drugs that prevent Alzheimer's disease are available	65%	35%
People with AD are not capable of making informed decisions	71%	29%
AD could be contagious	36%	64%
All humans if they live long enough, will probably develop AD	68%	32%
AD is a form of insanity	42%	58%
AD is a normal process of aging, like graying of hair or wrinkles	58%	42%
Persons with AD develop physical and mental problems	71%	29%
The major symptom of AD is memory loss	70%	30%
In people over 75 years of age, forgetfulness is indicative of the beginning of AD.	75%	25%
When a spouse of someone elderly dies, the survivor can suffer a type of depression that appears as if it was AD	64%	36%
Stuttering is an inevitable part of AD	43%	57%
Elderly men are more likely to develop AD than elderly women	54%	46%
AD is generally fatal	40%	60%
The majority of people that suffer from AD live in institutions, like asylums	44%	56%
Aluminum has been identified as a significant cause of AD	43%	57%
AD can be diagnosed with a blood test	40%	60%
High blood pressure (hypertension) medication can cause symptoms similar to those of AD	45%	55%

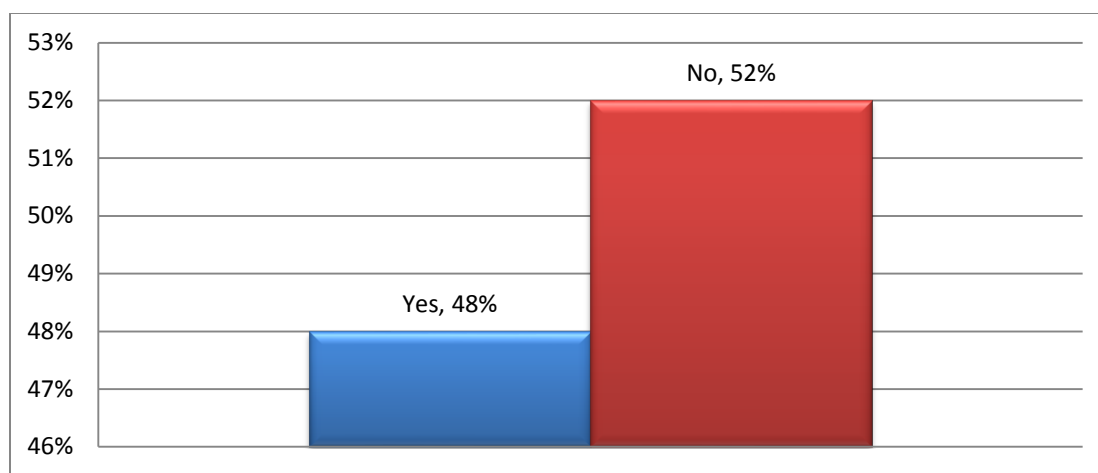**4.16 Knowledge about Protective Factors of Alzheimer Disease.**

Figure 4.16: Knowledge about Protective Factors of Alzheimer Disease.

Among 406 participants, 48% knew about the protective factors of Alzheimer's disease and the rest of them 52% didn't know about the protective factors of Alzheimer's disease.

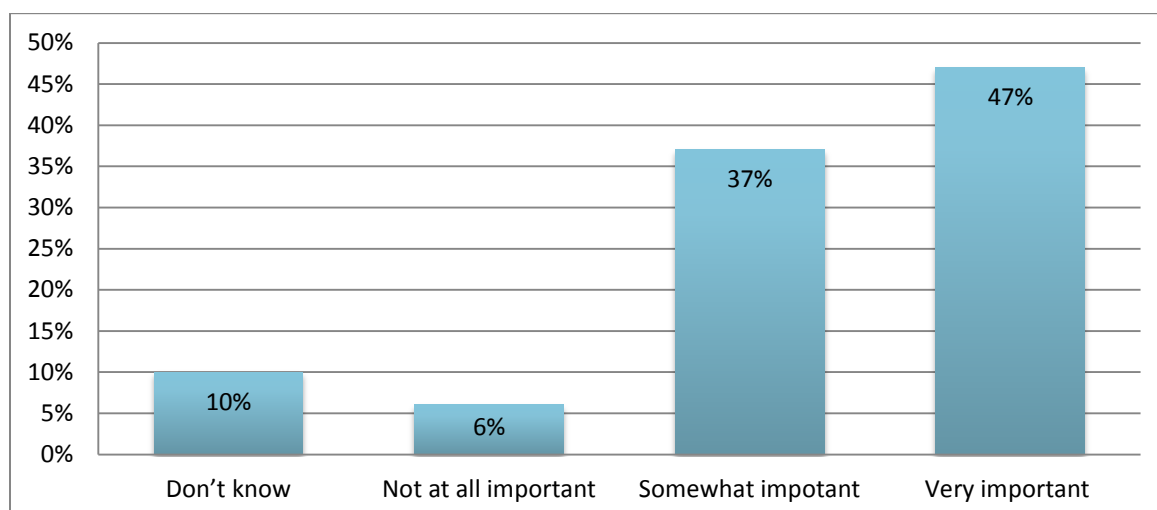**4.17 Protective Factors (Keeping mentally active)**

Figure 4.17: Protective Factors (Keeping mentally active)

Among 406 participants, 10% did not know about keeping mentally active, 6% were thought that keeping mentally active is not at all important, 37% were thought that keeping mentally active is somewhat important, 47% were thought keeping mentally active is very important as a protective factor of Alzheimer's disease.

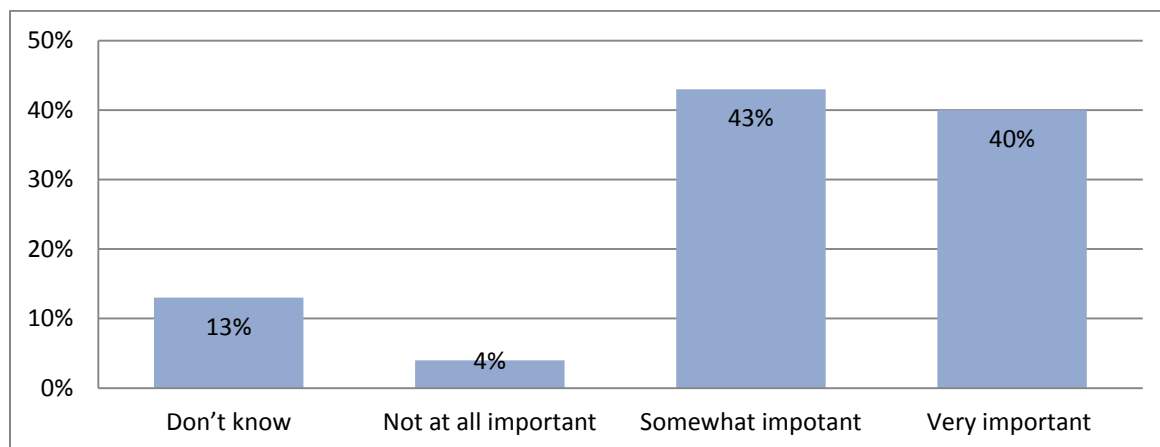## 4.18 Protective Factors (Eating a healthy diet)

Figure 4.18: Protective Factors (Eating a healthy diet)

Among 406 participants, 13% did not know about eating a healthy diet, 4% were thought that eating a healthy diet is not at all important, 43% were thought that eating a healthy diet is somewhat important, 40% were thought eating a healthy diet is very important as a protective factor of Alzheimer's disease.

4.19 Protective Factors (Keeping physically active)
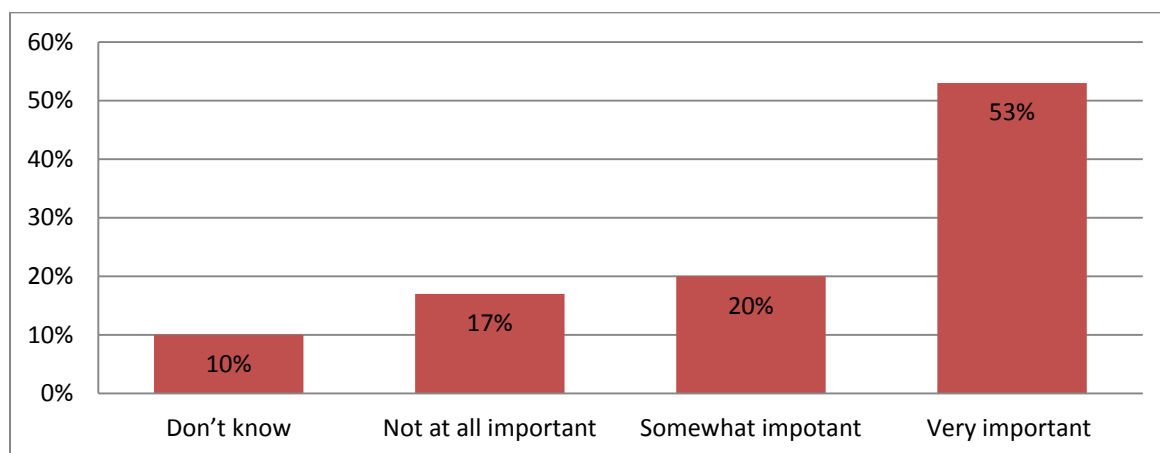

Figure 4.19: Protective Factors (Keeping physically active)

Among 406 participants, 10% did not know about keeping physically active, 17% were thought that keeping physically active is not at all important, 20% were thought that keeping physically active is somewhat important, 53% were thought keeping physically active is very important as a protective factor of Alzheimer's disease.

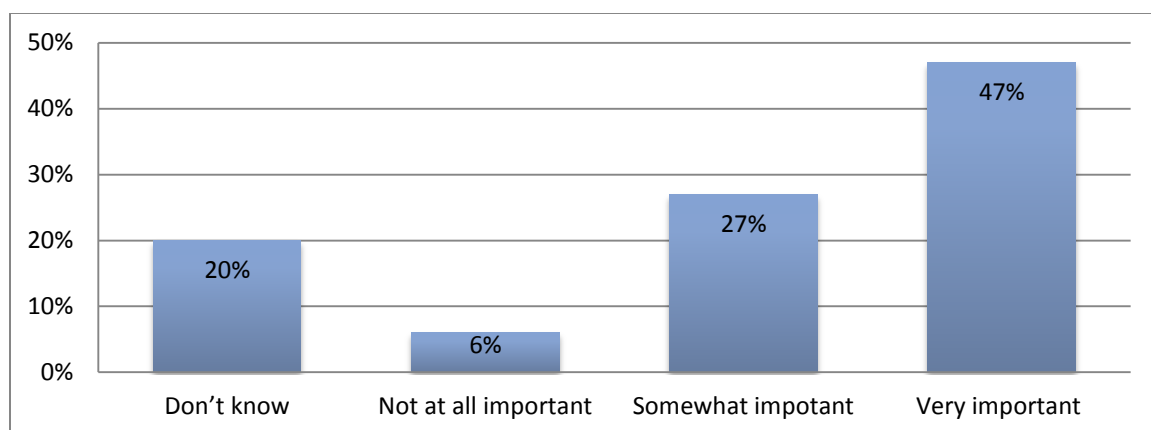**4.20 Protective Factors (Taking vitamins/dietary supplements)**

Figure 4.20: Protective Factors (Taking vitamins/dietary supplements)

Among 406 participants, 20% did not know about taking vitamins/dietary, 6% were thought that taking vitamins/dietary supplements is not at all important, 27% were thought that taking vitamins/dietary supplements is somewhat important, 47% were thought taking vitamins/dietary supplements is very important as a protective factor of Alzheimer's disease.

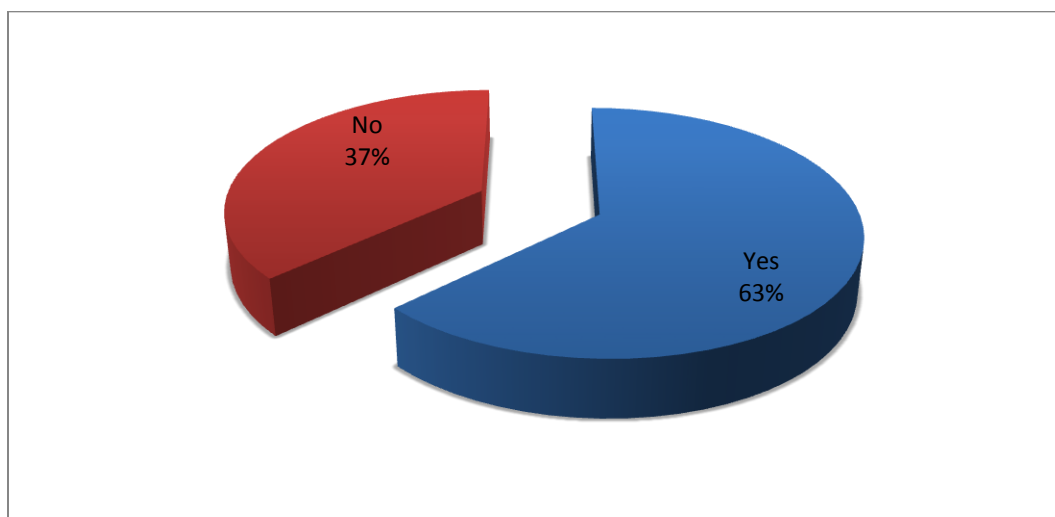**4.21 Knowledge about Sign and Symptoms of Alzheimer's disease.**

Figure 4.21: Knowledge about Sign and Symptoms of Alzheimer's disease.

Among 406 participants only 63% know about the sign and symptoms of Alzheimer disease and 37% doesn't know about the sign and symptoms of Alzheimer disease.

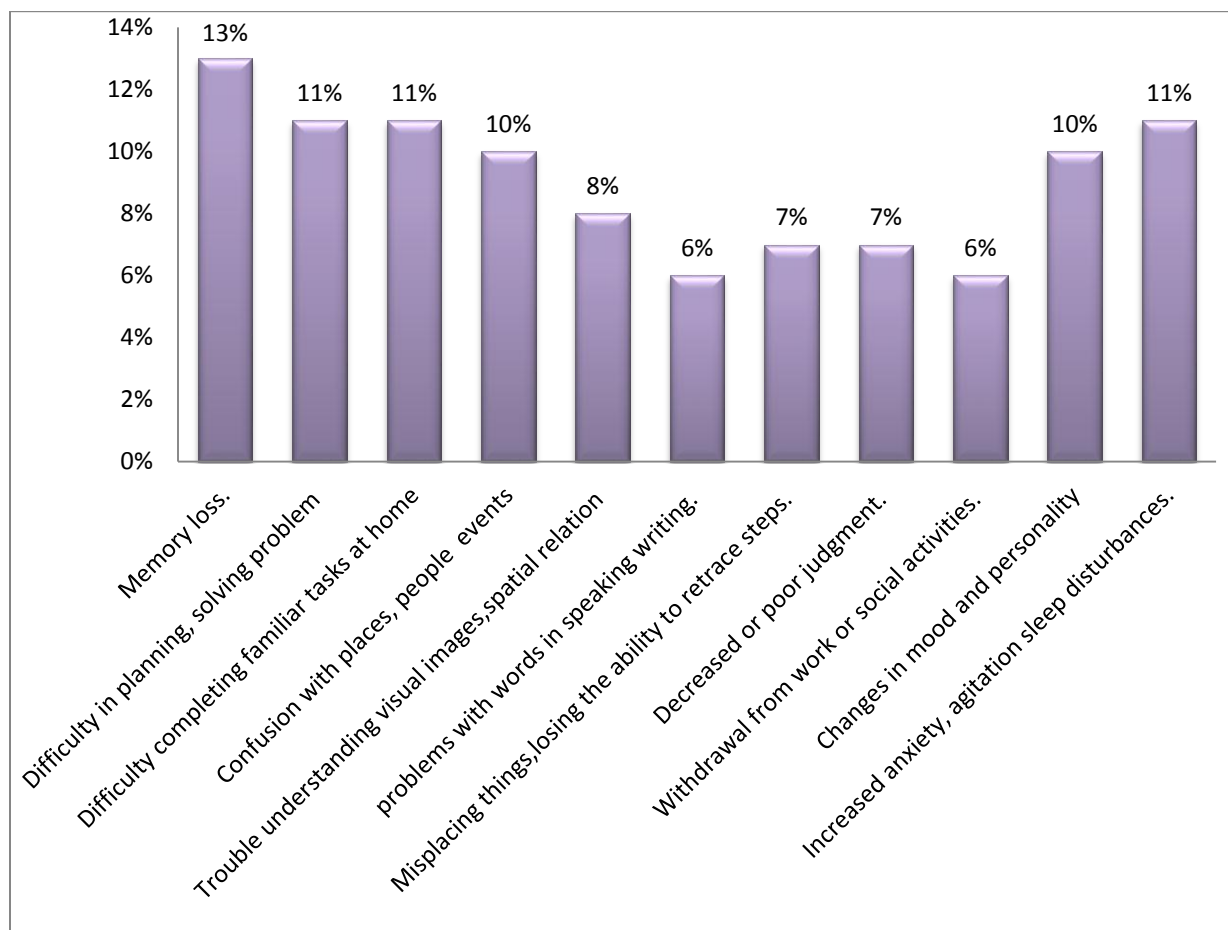**4.22 Selection of the signs and symptoms of Alzheimer's disease**

Figure 4.22: Selection of the signs and symptoms of Alzheimer's disease

Among the participants, 13% picked up memory loss that disrupts daily life, 11% picked up difficulty in planning or solving problems, 11% picked up difficulty completing familiar tasks at home, at work or at leisure that were once easy, 10% picked up confusion with places, people and events, 8% picked up trouble understanding visual images and spatial relationships, 6% picked up new problems with words when speaking or writing, 7% picked up misplacing things and losing the ability to retrace steps, 7% picked up decreased or poor judgment, 6% picked up withdrawal from work or social activities, 10% picked up changes in mood and personality, including apathy and depression, 11% picked up increased anxiety, agitation and sleep disturbances as the sign and symptoms of Alzheimer disease.

4.23 Knowledge about Risk factor of Alzheimer Disease
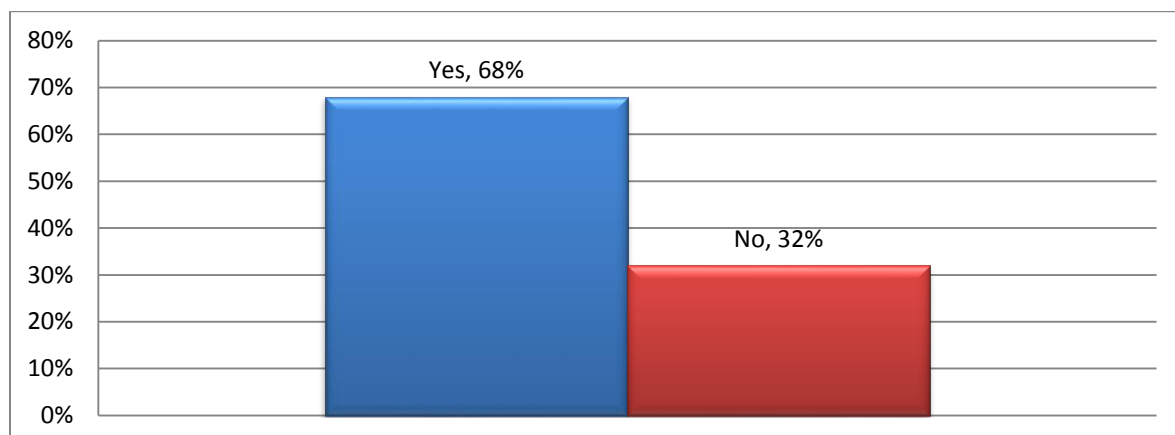
Figure 4.23: Knowledge about Risk factor of Alzheimer Disease

Among 406 participants only 68% knew about risk factor of Alzheimer disease and 32% didn't know about risk factor of Alzheimer disease.

4.24 Selection of risk factor of Alzheimer Disease.

Figure 4.24: Selection of risk factor of Alzheimer Disease.

Among the participants, 16% picked up genetics, 20% picked up stress, 18% picked up age, 12% picked up family history, 6% picked up cardiovascular disease, 5% picked up education, 7% picked up social and cognitive engagement, and 16% picked up traumatic brain injury (TBI) as the risk factor of Alzheimer disease.

CHAPTER FIVE

DISCUSSION

DISCUSSION

To establish an effective health care policy for Alzheimer's disease (AD) requires an appreciation of the attitudes and perceptions of the general public. T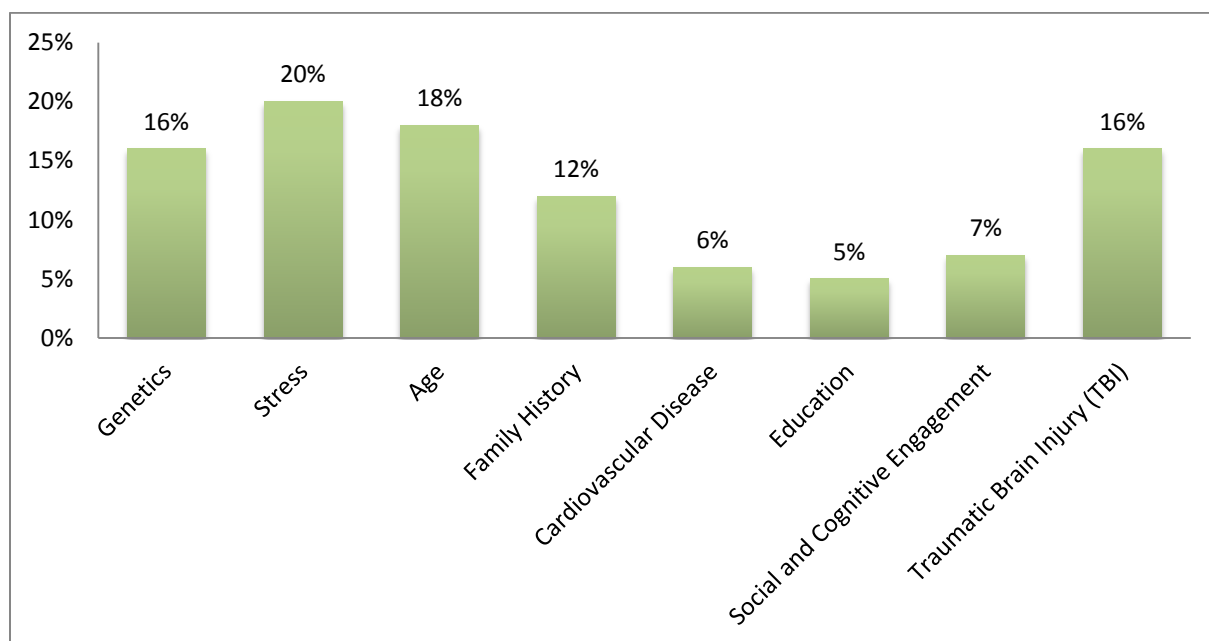he general public is a heterogeneous group that includes individuals with a wide variety of experience with AD, from those who have little or no experience with the disease to those who provide care for a person with AD, and to AD patients themselves. It is important to be aware that most individuals caring for a person with AD were not always in the role of a caregiver; thus, their knowledge, attitudes and perceptions surrounding AD are likely to have changed considerably as this role developed. This study was performed on 406 participants. Among them 2% of the participants were illiterate and majority (50%) completed graduation. Only few of them completed SSC (8%) and HSC (12%) level.

Most of them are unaware of the basic knowledge of Alzheimer's disease (AD). 52% of all the subjects said that they had no knowledge about Alzheimer's disease even 69% did not have any idea about stages of Alzheimer's disease, 37% did not know about the sign and symptoms of Alzheimer's disease and 32% did not know the risk factors of Alzheimer's disease.

A study was conducted by Werner in Israel among 150 community-dwelling men and women aged 45 and the majority of the participants (from 52% to 95%) recognized almost all symptoms of AD to be, indeed, warning signs of the disease. The most frequently recognized symptom was 'Inability to remember the way back home' and difficulty remembering where the glasses or the keys were, were the only warning symptoms recognized by less than 50% of the participants as AD symptoms. They found that participants' knowledge about AD symptoms overall was fair, only a slight percentage reported memory problems to be symptoms of the disease (Werner, 2003).

In another study performed by Smyth *et al.*, (2013) in Queensland, Australia among diverse staff group (N = 360), in terms of age, professional group (nursing, medicine, allied health, support staff) and work setting from a regional health service. Researchers found that Overall knowledge about Alzheimer's disease was of a generally moderate level with significant differences being observed by professional group and whether the respondent had any professional or personal experience caring for someone with dementia. Knowledge was lower for some of the specific content, especially those that were more medically-oriented, such as 'risk factors' and 'course of the disease.'

Knowledge was higher for those who had experienced dementia-specific training, such as attendance at a series of relevant workshops (Smyth *et al*., 2013).

In Northern Ireland, a survey was performed by McParland *et al.*,(2012) over 1204 respondents. Most of the respondents were aware that dementia was a disease of the brain (94%), 54% viewed dementia as a mental illness, and 28% believed that dementia was part of the normal aging process. A high percentage of respondents were aware that there are drug treatments to help with dementia (75%). However 64% of respondents were unaware that diet and exercise may have a preventative effect on the likelihood of developing dementia. They found that the general public in Northern Ireland has a reasonably good level of knowledge about dementia. However, attitudinal measures indicate the stereotyping and infantilization of people with dementia (McParland et al., 2012).

In our study, 37% knew who had AD and 26% reported that they had a close relation affected with the disease. Only 81% were concerned about getting Alzheimer's disease and among them 34% said that they would like to know their chances of someday getting Alzheimer's disease, 18% said that they believe they would get Alzheimer's disease someday, 31% had some worry about getting Alzheimer's disease someday. This result signifies with the study result of Roberts which states that (63.8%) reported having known someone with AD, 13.3% reported having had a close relative affected with the disease, 60.1% said they would like to know their chances of developing AD, 22.9% reported a belief that they would one day have AD and 29.4% noted some worry about the disease (Roberts *et al*., 2014).

A study was performed by Wortmann among 1641 participants and most of them around 60.9% correctly answered the item regarding availability of prescription drugs to prevent AD (Wortmann *et al*., 2010). Our study result also shows 35% of all the subjects answered that prescription drugs are available that can prevent Alzheimer's disease which statement is false.

Moreover in another study which states that 51.3% of respondents endorsed genetics as a very important risk factor for AD. Approximately 20.5% believed stress to be very important in increasing AD risk. Several strategies for reducing AD risk were endorsed: keeping mentally active (61.4% reporting as very important), eating a healthy diet

(44.3%), keeping physically active (40.6%) and taking vitamins/herbal supplements (20.5%) (Smith, Ali and Quach, 2014). In our study, 16% supported genetics as a very important risk factor and 20% believed stress to be very important in increasing AD risk. Several strategies for reducing AD risk were allowed: Keeping mentally active (47% said as very important), eating a healthy diet (40%), keeping physically active (53%) and taking vitamins/dietary supplements (47%). The result of this survey showed low levels of knowledge about sign and symptoms, risk factors and protective factors of Alzheimer's disease.

CHAPTER SIX

CONCLUSION

Conclusion

At the end of the study, the results of this survey revealed low levels of knowledge and awareness regarding Alzheimer's disease sign and symptoms, risk factors, protective factors and its treatment pattern among a relatively large sample of people. It has been found that the knowledge level about Alzheimer's disease is also low among the educated people. They are even unaware about the term Alzheimer's disease. These findings emphasis on raising awareness about Alzheimer's disease among Bangladesh people as an effective way to overcome a challenging neurodegenerative disorder. Raising awareness of the disease can help people change behaviors that can prevent and delay the disease. Raising awareness will also increase the probability that the disease will get the attention it deserves to develop effective diagnoses and treatments. Raising awareness will ultimately lead to research to find a cure for Alzheimer's disease. So, relevant educational programs are needed to improve the knowledge level of people regarding Alzheimer's disease. Efforts should be made by government and non-governmental agencies to improve Alzheimer's disease knowledge among general people.

CHAPTER SEVEN

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