Introduction

Hearing is one of the most desirous divine gifts for humans. Hearing is the basis of language development Growth and development of knowledge and thoughts depend on hearing. Language and speech are the only natural methods for communication, so hearing is a fundamentally important adaptation for survival, maintenance, and reproduction .It is integral to a fully lived human life (**Ann et al., 2010).**

The geriatric population worldwide is growing today, 40 million people in the United States are ages 65 and older, but this number is projected to more than double to 89 million by 2050. Although the "oldest old" those ages 85 and older represent only15 percent of the population ages 65 and older today, their numbers are projected to rise rapidly over the next 40 years. Rapid changes in age structure can have major social and economic consequences, especially when they are unanticipated **(Linda et al., 2011).**

Progressive age related sensorineural hearing loss is often called presbycusis. In susceptible individuals, the early effects of presbycusis are occasionally seen around age 40 years. Around age 55-60 years, an individual's hearing starts to worsen at a faster rate. 36 million Americans have a hearing loss—this includes 17% of adult population. The incidence of hearing loss increases with age and this because

of contributing factors from age, ototoxicity, noise exposure and chronic conditions e.g. (diabetes and heart diseases) **(Takahashi et al., 2007).**

Hearing impairment is the most common sensory deficit in the elderly, and it is becoming a severe social and health problem. Especially in the elderly, hearing loss can impair the exchange of information, thus significantly impacting everyday life, causing loneliness, isolation, dependence, and frustration, as well as communication disorders. Due to the aging of the population in the developed world, presbycusis is a growing problem that has been reported to cause participation restriction or activity limitation **(Christensen &Kockrow, 2011).**

Activities of daily living (ADL) are the third component of comprehensive geriatric assessment that used to assess functional disability in the elderly and these are essentially routine activities that everybody engages in as a necessary part of everyday life, including basic (ADL) such as washing and eating, also include instrumental (ADL) such as shopping and house work. Hearing impairment in elderly affects on (ADL) and lead to dependency **(Linsley et al., 2012).**

Management of age related hearing impairment requires early detection of the degree of a person's hearing loss. Presbycusis called untreated hearing loss because there

is no medical treatment for auditory deficiency and degeneration of hair cells in the corti, but hearing aids are very effective devices for improvement of hearing and everyday life in the elderly **(Barbare, 2013).**

The nurse has a crucial role in the community and especially in the field of audiology ,the nurse assist in all screening and diagnostic tests to detect the degree of loss, also she instruct the patients about the importance of using hearing aids and how to use it. She should inform them about the regular auditory examination, and inform them about the nature of impairment and how to cope with it (**Barbare, 2013).**

Significance of the study:

Hearing loss has been referred to as *the invisible disability* and *a silent disorder*. This might be related to the *fact that* professionals often ignore hearing problems among the elderly. Such ignorance could be due to a focus on other diagnoses and sensory problems. Sensory problems that frequently appears in older age and are often assessed with higher priority **(Veras &Mattos, 2007).**

Hearing loss is frequently denied, minimized or ignored by the elderly. Percentage of age structure of the elderly in Egypt at age group (60-64) about 6.7% Male and 2.9% female and age group 65 years and above about 5% male and 2.9 female. In Egypt percentage of hearing loss 6,156,555 and percentage of sensorineural hearing loss in population (65 years) is 44.3 % **(WHO, 2009).**

Aim of the Study

The aim of this study was to evaluate the effect of hearing impairment on daily living activities among elderly through:

- Assessing the elderly knowledge about hearing impairment.
- Assessing dependency of daily living activities on elderly with hearing impairment.

Research questions:

- Is there relation between socio-demographic data and elderly knowledge about hearing impairment?
- Is there relation between hearing impairment and activities of daily living?
- To what extent hearing impairment grades effect on daily living activities?

Operational Definitions

Aging: (Ageing) (British English) or **aging** (American English) is the accumulation of changes in a person over time. Ageing in humans refers to a multidimensional process of physical, psychological, and social change. Some dimensions of ageing grow and expand over time while others decline **(Phillips et al., 2010).**

Gerontology: is the broad term that used to define the study of aging and/ or the aged. This includes the biophysical aspects of aging. Under the umbrella of gerontology are several subfields, including geriatrics, social gerontology, geropsycholog, gerontological nursing and gerontological rehabilitation nursing **(Jones et al., 2011).**

Geriatrics: is defined as a branch of medicine that deals with the problems and diseases of old age and aging people. Geriatrics is further defined as a subspecialty of medicine concerned with the physiological and pathological aspects of the aged but not limited to, the clinical problems of senescence and senility **(Linda et al., 2011).**

Successful aging is: the process of optimizing opportunities for health, Participation and security to enhance quality of life as people age. It applies to both individuals and population groups also, allow people to realize their potential for physical, social, and mental well-being

throughout the life course and to participate in society, while providing them with adequate protection, security and care when they need **(WHO, 2009).**

"**Presbycusis**" refers to hearing loss that is associated with the cochlear degenerative process of aging. That is bilateral, symmetrical, and slowly progressive **(Ciobra et al., 2011).**

Part 1: Elderly with hearing impairment

WHO (2013) defined the elderly population as a person that passes with chronological age that begins from 65 years to 74 years and this group called young old. Secondary group begin from the age 75 years to 84 years and called older adults. The third group begins from 85 years and older and called oldest old.

Global demographic changes in the elderly:

We are living in historic times. Worldwide, the older population is growing at a dramatic rate the world`s 65 and older population is projected to triple by midcentury, from 516 million in 2009 to 1.55 billion according to projections by 2050 the number of older people in the world **(Kochkin, 2011).**

The most rapid growth in the older population is occurring in less developed countries such that between 2006 and 2030 the percentage increase in persons aged 65 years or over will increase by 14 % in these countries as compared with 51 % in more developed countries **(Weinstein&Barbara, 2013).**

The older population in the United States- comprising individuals 65 years of age or older - numbered 40.4 million in 2010 (the most recent year for which data are available).This represents a 15% increase from 2000, when

there were 35 million people 65 years of age or older. The older population is projected to increase to 55 million by 2020 and to 72.1 million by 2030 **(Ann et al., 2010).**

The older population is getting older with the most dramatic growth among the "oldest old" namely those 85 years of age or over, although the 85 + population accounted for 12% of the elderly population in the year 2000. It is projected to account for nearly 20% of the elderly population in the year 2050. In absolute terms 5,5 million people or 2% of the U.S population, was 85 or older as of July, 2007 and by 2020 it is projected that 85+ population will reach 6,6 million, representing a 15 %. The oldest old will number 19 million in 2050 **(Barbare, 2013).**

Age related changes:

The process of normal aging, independent of disease is accompanied by a myriad of changes in body systems. modifications occur in both structure and function of organs and are most pronounced in advanced age of 85 years or older .Many of these alterations are characterized by a decline in physiological reserve, so that, although baseline function is preserved, organ systems become progressively less capable of maintaining homeostasis in the face of stresses imposed by the environment, disease, or medical therapies .Age related changes are strongly impacted by genetics, as well as by long-term lifestyle factors, including

physical activity, diet, alcohol consumption, and tobacco use . Furthermore, great heterogeneity occurs among older adults; clinical manifestations of aging can range from stability to significant decline in function of specific organ systems **(Cathy &Cress, 2012).**

Medical problems are very common among older adults. As stated earlier, it is common for older adults to have several chronic medical conditions at the same time. As a result of these medical illnesses, older adults experience a variety of problems with activities of daily living (ADLs), which include bathing, dressing, eating, toileting, continence, and transferring. These problems often impact older adult's ability to live independently, because their functional decline may prevent them from bathing on a regular basis, preparing food for them, or paying their bills on time, which all affect the individual's quality of life **(Jean et al., 2010).**

Senses are the primary interface with the environment. Humans receive and process information from the environment through hearing, vision, taste, smell, and touch, Sensory changes occur with ageing. As hearing and vision deteriorate with age it is important to ensure that older people have access to annual tests and updated aids. Sensory diminished and incoming information may be distorted or difficult to understand. As a result, the older person may give up some enjoyable activities or lose contact with friends and

family who are important sources of support. These problems can be reduced or overcome by following the suggestions described in the sections below **(Conley&Pierre, 2012).**

Hearing is one of the sensory changes that diminished with age. As a result of decreased body water, older adults tend to accumulate an increased amount of hard cerumen in their ears, which may affect hearing. The removal of the cerumen often requires assistance of a health care professional, and this may increase hearing acuity. Hearing impairments, while a normal change of aging, occur frequently in the older population as a result of environmental exposure to noise pollution, as well as genetics. The prevalence of presbycusis, or high-pitched hearing loss, also rises with age **(Wallance & Meredith, 2008).**

Overview of the ear:

The ear is the sense organ that enables us to hear. Hearing can be defined as the perception of sound energy via the brain and central nervous system. Hearing consists of two components: identification of sounds (what the sound is) and localization of those sounds (where the sounds are coming from). The ear is divided into three main parts: the outer ear, the middle ear, and the inner ear***(figure1)***. The inner ear is filled with fluid. The inner ear also contains the receptors for sound which convert fluid motion into electrical signals

known as action potentials that are sent to the brain to enable sound perception **(Ross&Pawlina, 2010).**

The airborne sound waves must therefore be channeled toward and transferred into the inner ear for hearing to occur. The role of the outer and middle ear is to transmit sound to the inner ear. They also help compensate for the loss in sound energy that naturally occurs when the sound waves pass from air into water by amplifying the sound energy during the process of sound transmission. In addition to converting sound waves into nerve action potentials, the inner ear is also responsible for the sense of equilibrium, which relates to general abilities for balance and coordination **(Ross &Pawlina, 2010).**

Anatomy and physiology of the ear:

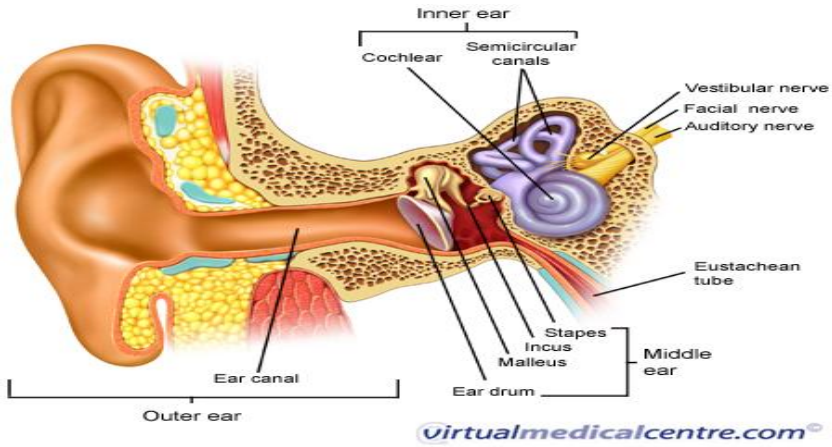

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Figure (1): Anatomy of the ear.

The outer ear acts as a funnel to conduct air vibrations through to the eardrum (**Figure 1)**. It also has the function of sound localization. Sound localization for sounds approaching from the left or the right is determined in two ways. Firstly, the sound wave reaches the ear closer to the sound slightly earlier than it reaches the other ear. Secondly, the sound is less intense when it reaches the second ear, because the head acts as a sound barrier, partially disrupting the spreading of the sound waves. All these cues are integrated by the brain to determine the location of the source of the sound. It is therefore difficult to localize sound with only one ear. The outer ear consists of the pinna and the ear canal **(Saladian, 2013).**

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Figure (2): Outer part of the ear that called pinna

Pinna:

The pinna is a prominent skin-covered flap located on the side of the head, and is the visible part of the ear externally **(figure2**). It is shaped and supported by cartilage except for the earlobe. It collects sound waves and channels them down the external ear canal through patterns formed on the pinna known as whorls and recesses. Its shape also partially shields sound waves that approach the ear from the rear, therefore enabling a person to tell whether a sound is coming directly from the front or the back **(Sherwood, 2013**).

Ear canal:

The ear canal is roughly 3cm long in adults and slightly S-shaped. It is supported by cartilage at its opening, and by bone for the rest of its length. Skin lines the canal, and contains glands that produce secretions that mix with dead skin cells to produce cerumen (earwax). Cerumen, along with the fine hairs that guard the entrance to the ear canal, helps prevent airborne particles from reaching the inner portions of the ear canal, where they could accumulate or injure the eardrum and interfere with hearing. Cerumen usually dries up and falls out of the canal. However, it can sometimes become impact and disrupt hearing (**Sherwood, 2013**).

Middle ear:

The middle ear is located between the external and inner ear. It is separated from the ear canal of the outer ear by the tympanic membrane (the eardrum). The middle ear functions to transfer the vibrations of the eardrum to the inner ear fluid. This transfer of sound vibrations is possible through a chain of movable small bones, called ossicles, which extend across the middle ear, and their corresponding small muscles (**Roeser et al., 2011).**

1-Tympanic membrane (eardrum):

The tympanic membrane is commonly known as the eardrum, and separates the ear canal from the middle ear. It is about 1cm in diameter and slightly concaves (curving inward) on its outer surface. It vibrates freely in response to sound. The membrane is highly innervated, making it highly sensitive to pain. For the membrane to move freely when air strikes it, the resting air pressure on both sides of the tympanic membrane must be equal **(Saladian, 2013).**

The outside of the membrane is exposed to atmospheric pressure (pressure of the environment in which we find ourselves) through the auditory tube, so that the cavity in which it is located, called the tympanic cavity, is continuous with the cells in the jaw and throat area. Normally, the auditory tube is flattered and closed, but