

Technology Integration in the Daily Activities of the Elderly

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A continuous increase of the anticipated average life is expected in the near future. We have to deal with the consequences of aging, such as loneliness in an environment characterized by technology or the need to help elderly people. Technical solutions are required that solve the occurring problems associated with aging and are accepted and used. This work faces the challenge of improving the early detection of diseases like dementia, using an intelligent dialogue system that improves the chance for integrating applications of telemedicine in an intelligent home environment.

1 Introduction

1.1 Demography

Due to continuous improvement of medical care, the high standard of living in the first world and many other influences, an increase of the anticipated average life is expected (see Figure 1) [1]. In Germany, the population of people older than 80 years is the fastest growing segment of population. From currently four million people this part of the population will increase to approximately 10 million people until 2050. This implies a huge challenge to society, government and industry but also for each individual person. It is necessary to address the different kinds of limitations, for example due to illnesses, needs and other things, that come up with aging. Sustainable solutions need to be created that support elderly people in their everyday activities and to provide assistance in case of emergency. Interdisciplinary research is required for the development of solutions that help to cope with the upcoming changes in our society.

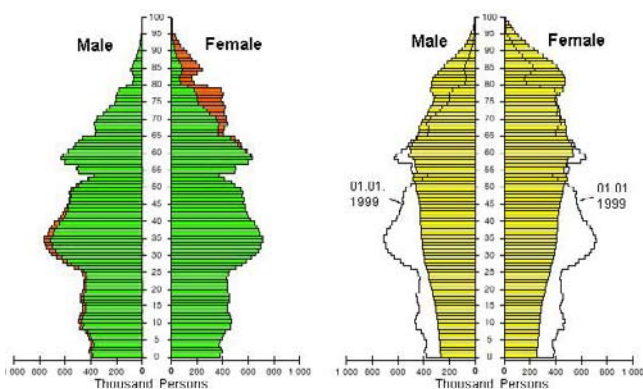


Figure 1: Population pyramid for the years 1999 (left) and 2050 (right) [1].

1.2 Dementia

One of the most prevalent and also expensive diseases of elderly people is dementia. Only considering Alzheimer's disease, approximately one percent of the 65 year old people are affected. Bickel [2, 3] points out that the prevalence of

dementia correlates with age and doubles every five years in age. As a consequence ten percent of the people suffer from dementia at the age of 80. The incidence rate shows a similar tendency. Annually, about 150,000 new people are assumed to be affected with dementia.

The first symptoms of the Alzheimer's disease show up by a light decrease of peoples efficiency. Over the course of time this worsens to a total loss of mental abilities and personality. Although other forms of dementia differ in their symptoms, the irreversible and progressive behavior is similar.

An improved early detection of dementia would improve the chances of therapy and thus also reduce the effort of taking care of the affected people [4].

2 Medical and Methodical Aspects

From a clinical point of view the prevention or the early detection of diseases maximizes the chances for better therapies. The early detection of dementia symptoms for instance is based on cognitive deficiency. During the last 15 years, the main focus was on the detection of changes in the fields of social competence and emotionality, which resulted in the main research topics **ADL** (Activities of Daily Living) and **BPSD** (Behavioral and Psychological Symptoms of Dementia) [6].

These cognitive symptoms concerning behavior and health condition are discriminating features for the design and implementation of economical screening instruments, which enable the early detection of dementia [6]. With the incorporation of biological markers, nowadays the reliable diagnosis of dementia and an estimation of the expected sickness degree is possible.

These developments also play an important role in the investigation of new ways for therapeutic intervention. In case of dementia, these interventions comprise cognitive and behavior-oriented training routines as well as medicinal therapies. One question that directly comes along while talking about diagnostic measures concerns appropriate criteria for an evaluation. Traditionally, emphasis is put on economy or cost-benefit analysis, but the impact of acceptance and attractiveness of screening instruments becomes more and more