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Project No: 2019-1-TR01-KA204-074782

01: Compilation and reporting of existing mobile applications



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Table of content

1. INTRODUCTION	4
2. DETAILED AND HEALTHY INFORMATION ABOUT THE DISEASE	5
3. DETAILED ANALYSIS AWARENESS ABOUT ALZHEIMER'S DISEASE	
3.1. Statistical data at global, European, national level	7
3.2. The incidence of Alzheimer's in Turkey	9
3.3. The incidence of Alzheimer's in Romania	13
3.4. Begining and evolution	14
3.5. Methods of prevention	14
3.6. Recommadations	15
4. MOBILE APPLICATIONS DATA RELATED ALZHEIMER'S PATIENT IN EUROPE	
4.1. Alzheimer's Association	17
4.2. Alzheimer Master	17
4.3. myALZteam	17
4.4. YoTeCuido Alzheimer	17
4.5. Memory Box	18
4.6. GriCeviz	18
4.7. Kelimelik	18
4.8. Beyin Oyunları - Hafıza Düşünme Ve Beyin Egzersizi	19
4.10.Beyin Eğitim: Hafıza Oyunu	19
4.11.Memorado - Zekâ Oyunları	20
4.12.ChatYourself	20
4.13. CogniFit	20
4.14.Alzheimer's Manager	20
4.15.Stimart Roberto, memoria (also available as Stim'Art Edith on the website)	21





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Project No: 2019-1-TR01-KA204-074782

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4.16. Timeless Care	21
5. MOBILE APPLICATIONS DATA RELATED RELATIVES OF ALZHEIMER'S PATIENT IN EUROPE	
5.1. Alzheimer's Disease	22
5.2. Alzheimer's Treatment	22
5.3. Alzheimer's Disease2	22
5.4. Alzheimer's Disease3	22
5.5. Alzheimer's Relatives	23
5.6. Kelime Bulmaca - Zeka Oyunu	23
5.7. Your On-the-Go Guide for Dementia Care Advice	23
5.8. Timeless	24
5.9. Mobile App Helps Alzheimer's Caregivers	24
5.10. Remember me: an application to improve your memory	24
5.11. Brain-Boosting App May Detect Alzheimer's	24
5.12. Brain-Boosting App May Detect Alzheimer's	25
5.13. İridis	25
5.14. Alzheimer's Universe (AlzU)	25
5.15. MemoClock	25
5.16. MemorC	26
5.17. Memory Helper Care Assistance	26
5.18. Remember Me – Caregiver	27
6. EVALUATION	28
6.1. SWOT Analyse	31





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REMEM 1. INTRODUCTION

What is Alzheimer's

First described in 1906 by the German physician Alois Alzheimer's, this neurodegenerative disease causes a progressive deterioration of cognitive abilities until the patient's autonomy is lost. Symptoms include repeated memory loss, orientation problems and disturbance of executive functions (for example the patient no longer knows how to use the cell phone).

What are the risk ?

Studies have highlighted as risk factors sedentary lifestyle, obesity, diabetes, high blood pressure, smoking, excessive alcohol consumption and unbalanced eating, depression, low level of education, social isolation and absence of intellectual activities are cited among risk factors

What are the diagnostic tools?

Diagnosing Alzheimer's has long been difficult and often the patient's death has to be expected to know for sure. At present, diagnosis is much easier. It is done primarily through a clinical examination of the patient, with tests in the form of questions, to detect cognitive disorders, explained Professor Epelbaum. To confirm the disease, physicians can use medical imaging (MRI and positron emission tomography) to visualize changes in the brain and perform lumbar puncture to detect certain markers of the disease.

What are the treatments?

There is currently no curative treatment for Alzheimer's. There are, medicines to eliminate brain damage characteristic of Alzheimer's disease, amyloid plaques. However, these have proven ineffective when doctors wanted to find out if they can stop the disease itself.

When is World Alzheimer's Day?

is declared on September 21 and was launched in 1994 under the umbrella of the International Federation, Alzheimer's Disease International (ADI), which includes 100 supportive and anti-Alzheimer's associations worldwide, under the patronage. World Health Organization.

Where ?

In Europe there were 46 million patients diagnosed in 2015 and it is estimated that there will be 100 million in 2050.

Why ? According to the World Health Organization there are approximately 47 million people worldwide who suffer from dementia, 60-70% of whom suffer from Alzheimer's, each year 9,9 million new cases are diagnosed.

Dementia is a syndrome - usually chronic or progressive in nature - in which the deterioration of cognitive function (the ability to process thinking) is much more widespread than that occurring in normal aging. Thus, it affects memory, thinking, orientation, understanding, calculation, learning ability, language and judgment.

However, consciousness is not affected. Impairment of cognitive function is usually accompanied and sometimes preceded by deterioration of emotional control, social behavior or motivation. Every 3 seconds, someone in the world develops dementia.

There are over 50 million people living with dementia worldwide, and this number is expected to double every 20 years, reaching 152 million by 2050.





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The annual global cost of dementia exceeds \$ 1 billion annually, cost that will double by 2030 of the 50 million people with dementia, almost 60% live in low- and middle-income countries. Each year, there are nearly 10 million new cases. The estimated proportion of the population aged 60 and over with dementia, at one point, is between 5-8%. Currently, dementia is the fifth leading cause of death.

2. DETAILED AND HEALTHY INFORMATION ABOUT THE DISEASE

2.1. Introduction

Alzheimer's is one of the most important diseases of the 21st century. Globally, it is estimated that there are approximately 44 million people living with this condition. Most are over 65, and about two-thirds of them are women. At least in the United States, Alzheimer's kills more people each year than breast and prostate cancer in one place.

Most of us believe that the main symptom of Alzheimer's is memory loss. The four symptoms of the disease, which everyone ignores. There are several signs that may indicate the presence of the disease:

1. *lack of inhibitions*- someone who is usually shy can go to a stranger to try to hug him or kiss him;
2. *language problems* - these occur, especially in cases of progressive primary aphasia, a form of dementia that affects the ability to process and articulate words. Patients may have trouble composing sentences, speak very rarely, and fail to pronounce the words correctly.
3. *writing problems* - someone who normally did not have such problems, does not know how to write correctly or cannot write at all, not even to sign.
4. *difficulties in reading* - for someone with dementia, it becomes very difficult to read a paragraph in a newspaper or book.

Alzheimer's disease (AD) is a neurodegenerative disease that slowly and progressively destroys brain cells. In general, AD dementia is diagnosed in people aged 65 years and over. Early symptoms of AD dementia may not be recognized at the beginning by both the person concerned and their loved ones. Meanwhile, as the disease progresses, symptoms become more pronounced and may affect daily life. It is meant that practical difficulties for AD patient in everyday tasks such as dressing, bathing, and eating. More negative behaviors can be added of these initial levels of patients. In this phase, in addition to the previous findings; forgetting to take medications, incompetence in the use of the previously used goods, difficulties in reading, writing and other communication ways, non-compliance with the rules of society, increasing restlessness in the, restlessness in cooking, inability to do shopping, anger bursts, sleep disturbances are symptoms, frequently. As the disease progresses, patients may have difficulty in choosing appropriate conditions for their selves. All issues are also needed more importance in this phase. It is necessary to control household appliances working with electricity and natural gas powered.

The patient can cause serious problems at home when there are no relatives or caregivers at home. They can leave the house and get lost. They may even have problems with toilet needs. Such problems can also cause serious stress to the patient. At the same time, relatives of the patients experience serious stress. Behavioral anxiety is an important condition: they may feel responsible for their families, jobs, and even unfinished jobs. They may feel tension, insecurity and fears of different forms.



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Sometimes indifference between previously and current behaviors of patient who can react heavily to an event, can be occurred. Because of the obsessive thoughts and beliefs, patients may change their own life and the life of their family negatively. Within the hallucinations that occur in the form of seeing and hearing non-existents may be more pronounced with the progression of the disease.

Alzheimer's patients may continue this behavior regardless of repeating and asking for the same movement due to memory impairment. Again, aimless wandering in the home is one of the most common symptoms and can be considered as an important indicator of anxiety. As the disease progresses, sleep disturbances are regulated from excessive sleep to days of no sleep.

Causes of Alzheimer's

There is no certainty as to the causes of the disease. In addition to the accumulation of protein in the brain, it can be caused by disruptions in nerve conduction and damage to brain cells. According to the researches, only 20% of patients have the risk of Alzheimer's disease. The disease may be due to genetic factors as well as age, also. However, it would be wrong to associate only with hereditary reasons. Alzheimer's is a disease with insidious effects and its symptoms increase with age.

Things to do to prevent Alzheimer's Disease

According to medical science, there are no definite things or measures that protect against Alzheimer's disease. However, a number of ways to delay dementia may be offered to individuals in early aging. The first is to reduce the risk of cardiovascular and cardiovascular disease. Because such cardiovascular disorders may increase the risk of Alzheimer's and dementia. In addition, it is necessary to consider the following to prevent Alzheimer's; Nutrition: sports, music activities, cognitive activities, learning foreign language, courses for adults include painting, crafts, gardening, etc., stopping bad habits such as alcohol and smoking, reading lots of books and newspapers, watching videos of weddings, parties and an important moment, having a good time with children or pets, family meetings.

The situation of Alzheimer's patient relatives or people responsible for the patient

Every individual living in a home with Alzheimer's disease is affected by the patient's care and situation. Relatives of the patients are also obliged to do the work of the patient inside and outside the home. A carer or relatives are to faced with difficulties in dressing, washing, financial assistance, making appointments, traveling alone, managing at work and using household appliances.

Due to the course of the disease; the most important problem that compels the caregiver is the inability to receive hope or service or feedback to feed and support. For this reason; the relatives of the patients are detached from the social environment and cannot even do their private work. This situation increases the stress level of the patient's relatives, makes them feel lonely and helpless due to the lack of social relations. In addition, due to these difficulties, most relatives may experience psychological problems such as depression, anxiety and burnout.

In this context, the course of the disease, psychological and social support to the patient is important. In addition, the quality of life of the patient can be improved with the knowledge and skills to be gained to



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relatives to slow down the progression of the disease. In particular, cognitive support to be provided in the first stage, where patients' cognitive losses are low, may improve the quality of life and slow down their cognitive losses. For this purpose, the use of computer technology today is important to direct patients to this technology. There is a need for various mental activities to strengthen the patient's memory and the patient's relatives. In addition, it is time for patients to take their medication in their daily life, daily household chores, mental skills, physical activity, how to feed, social activities, wallet, glasses etc they use daily. They need an application that will let them know where they put their stuff.

3.DETAILED ANALYSIS AWARENESS ABOUT ALZHEIMER'S DESEASE

3.1. Statistical data at global, European, national level

The incidence of Alzheimer's in the world and Frequency Rate

Dementia has become one of the most burning issues on the public and political agenda in the world, as it has never been before.

Recent studies coordinated by EBC (European Brain Council) on psychiatric and neurological diseases have shown that they have very high costs, respectively 798 billion Euro / year.

Of the 19 major disease groups, the most expensive are affective diseases, dementia, psychotic diseases and vascular accidents.

The costs for each country were estimated, with great variations depending on the size of the population, the GDP and, last but not least, the health policies of the respective country. For a simple comparison, the cost of cardiovascular disease, cancer and diabetes is € 200 billion for each category (taking into account only the direct costs that could be provided).

In conclusion, the cost of neurological and psychiatric diseases is equal to the cost for all three major categories of diseases - cardiovascular, diabetes, cancer.

In 2017, there were 1,360 cases of Alzheimer's dementia per 100,000 population (1,179.61 - 1,560.26), both sexes, all ages (Figure 1).

. Although the cases of patients with mental and behavioral disorders and the rates of prevalence have increased steadily and steadily in Romania (2.2), compared with Europe (4.1) and the EU (3.7) we have a prevalence rate below the values recorded in the two zones. Hungary (1.8), Bulgaria (1.8) have below-average values for Romania, and Slovakia, Czech Republic, Estonia have above-average values for Romania, the EU and Europe.



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Decese cauzate de demență (inclusiv Alzheimer)

Unitate: Număr

Sex: Ambele

TARA / ANUL	2011	2012	2013	2014	2015	2016
Uniunea Europeană - 28 țări	198,327	225,258	239,005	248,220	286,895	294,334
Belgia	5,440	6,501	6,681	6,307	7,171	6,943
Bulgaria	171	233	185	149	177	163
Cehia	1,770	1,990	2,280	2,404	2,846	2,965
Danemarca	3,042	3,138	3,284	3,433	3,651	3,965
Germania	26,068	29,999	34,843	34,955	43,485	45,431
Estonia	83	92	86	111	101	101
Irlanda	1,222	1,499	1,742	1,904	2,131	2,275
Grecia	335	496	417	1,067	1,604	1,848
Spania	26,486	29,376	29,074	31,897	36,014	34,934
Franța	32,739	36,994	36,675	35,996	40,238	40,896
Croația	555	691	682	775	918	876
Italia	24,607	26,531	26,159	26,570	31,672	31,319
Cipru	147	173	166	179	266	271
Letonia	149	161	219	218	241	377
Lituania	170	192	255	245	276	305
Luxemburg	150	205	220	209	248	248
Ungaria	2,504	2,784	2,905	2,951	3,474	3,281
Malta	132	82	123	143	145	158
Olanda	9,152	10,415	13,405	12,492	13,863	14,866
Austria	1,267	1,619	2,158	1,923	2,206	2,518
Polonia	2,193	2,254	2,434	2,175	2,243	2,576
Portugalia	1,650	1,745	3,724	4,125	4,828	5,175
România	1,378	1,550	1,639	1,918	1,994	2,130
Slovenia	100	109	112	149	170	173
Slovacia	757	1,532	1,055	1,350	1,119	1,352
Finlanda	6,194	7,047	7,530	8,101	8,568	9,165
Suedia	6,909	7,691	7,762	7,859	8,332	8,864
Marea Britanie	42,956	50,158	53,191	58,625	68,914	71,159
Islanda	165	171	185	203	208	230
Liechtenstein	9	6	9	12	16	4
Norvegia	2,503	2,759	2,722	3,019	3,199	3,403
Suedia	5,178	5,742	5,909	5,765	6,368	5,772
Macedonia	:	:	:	2	:	:
Serbia	896	1,066	1,246	1,316	1,710	1,870
Turcia	6,445	7,921	9,250	10,691	12,498	13,424

Sursa: <http://ghdx.healthdata.org>

Figure 1. Deaths from dementia (including Alzheimer's)

Unit: Number

Gender: Both

If we analyse the situation between Italy, Turkey and Romania we can observe that it is a positive rhythm of increasing the number of patients, Italy with the biggest number, followed by Turkey and Romania. Romania is in the penultimate place among the European countries regarding the funds allocated for the care of brain diseases, a phenomenon which can be explained mainly by the absence of the care services.



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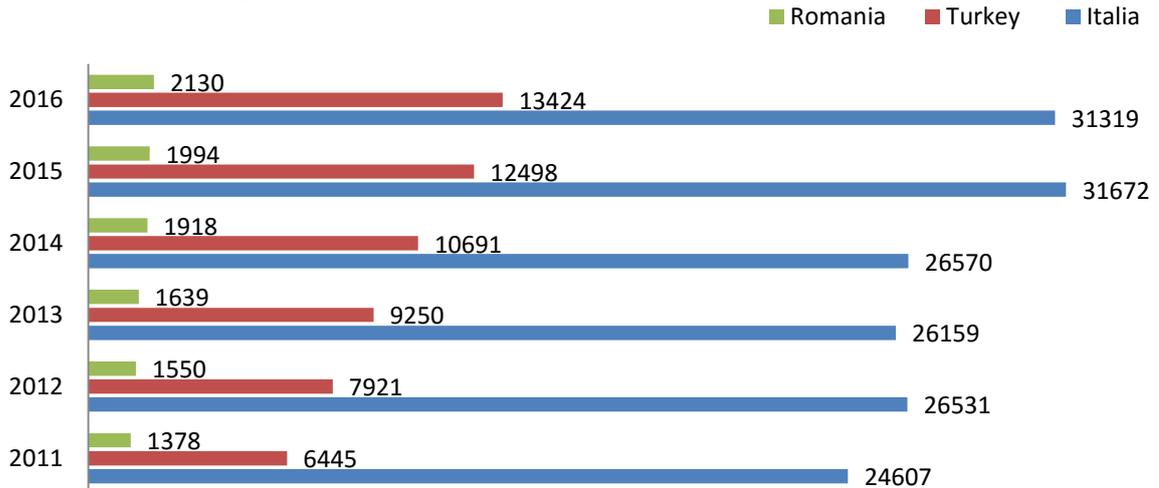


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An analyse of AD person in function of gender female (Figure 2) and male (Figure 3) give us another informations regarding the influence of geographical and behavior of patience in function of culture. This figure estimate that is expected to reach 135 million by 2050.

Analyse the patience with Alzheimer



In Turkey it is known to be about 750 thousand Alzheimer's patients. According to World Health Organization data, Turkey with a maximum of Alzheimer's disease in the world in 2050 will be one of the four countries.

3.2. The incidence of Alzheimer's in Turkey

The incidence of the disease increases with age. According to the researchs, the disease rarely is occurred before the age of 50 years.

However, the onset of the disease is usually seen more often at age 65 and over. It is seen in 3% between 65-74 years, 19% between 75-84 years and 47% of elderly people over 85 years old. Today, the most rapidly increasing age group in the world, especially in developed countries in our case Italy is people aged 65 and over. It is estimated that there are around 40 million people with dementia and Alzheimer's disease in the world

The female seems to be more vulnerable to AD disease in comparison with male population, in each country.

The question is why the Italian ladies are in such a high number which are the factors which contribute to that trend.

So another topic of project will be to inform relatives about the food and ways to prevent the AD from earlier stage and share the best practice between patients and patient relatives.

From Figure 2, we see that Malta and Cyprus has a reduced number of cases, even if they are Mediterranean islands and have the same culture like Italy and Mediterranean food.



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A specific page with receipts and life style can be a good opportunity for partners to use the platform and mobile informations as platform of good practice examples.

ȚARA / ANUL	Total	2012	2013	2014	2015	2016
Uniunea Europeană - 28 țări	136,141	155,132	163,389	169,167	195,190	198,896
Belgia	3,688	4,400	4,480	4,274	4,800	4,694
Bulgaria	114	156	117	105	118	111
Cehia	1,144	1,272	1,504	1,521	1,871	1,883
Danemarca	2,036	2,129	2,233	2,330	2,383	2,591
Germania	18,011	20,789	23,946	24,032	29,572	30,647
Estonia	61	66	57	71	77	74
Irlanda	821	979	1,192	1,267	1,422	1,482
Grecia	206	325	303	691	1,049	1,244
Spania	18,181	20,234	19,900	21,964	24,799	23,901
Franta	22,719	25,733	25,554	25,142	27,940	28,515
Croația	392	491	454	551	663	615
Italia	16,765	18,206	17,785	18,075	21,727	21,336
Cipru	94	111	84	126	171	174
Letonia	113	121	162	172	195	278
Lituania	127	136	175	177	185	228
Luxemburg	98	149	161	122	159	157
Ungaria	1,652	1,915	1,973	2,016	2,374	2,230
Malta	88	52	86	94	104	105
Olanda	6,611	7,542	9,335	8,658	9,553	10,060
Austria	883	1,128	1,493	1,324	1,533	1,756
Polonia	1,511	1,568	1,694	1,514	1,582	1,782
Portugalia	1,045	1,125	2,359	2,577	3,083	3,275
România	848	1,021	1,101	1,256	1,336	1,405
Slovenia	70	73	86	107	117	124
Slovacia	518	1,051	705	877	776	918
Finlanda	4,302	4,896	5,128	5,604	5,851	6,206
Suedia	4,713	5,236	5,231	5,312	5,534	5,800
Marca Britanică	29,329	34,228	36,091	39,213	46,216	47,305
Islanda	107	111	126	119	138	144
Liechtenstein	7	5	6	9	13	2
Norvegia	1,757	1,955	1,896	2,075	2,262	2,327
Suedia	3,570	3,995	4,112	3,887	4,402	3,980
Macedonia	:	:	:	1	:	:
Serbia	598	676	827	891	1,120	1,253
Turcia	3,775	4,777	5,457	6,433	7,492	8,184

Sursa: <http://ghdx.healthdata.org>

Figure 2. Deaths from dementia (including Alzheimer's)

Unit: Number/ Gender: Women

As we can observed the male segment as a significant target for AD diseases in Italy, followed by Turkey and on the last place Romania.



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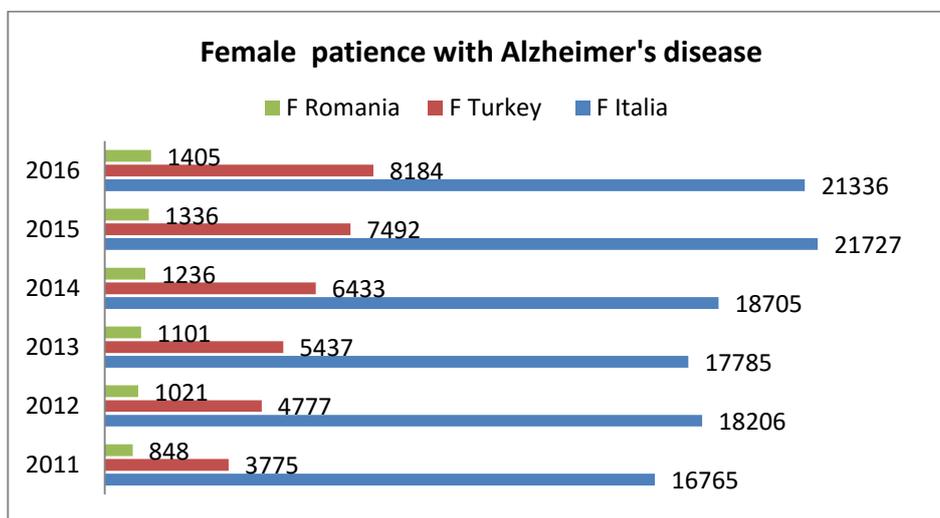
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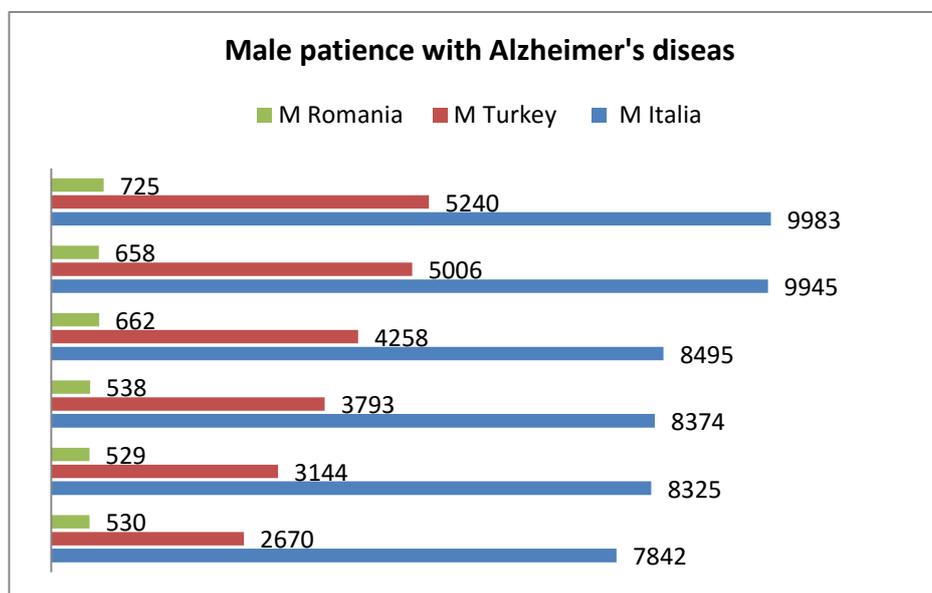
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In each country culture the traditional family it is important especially for Turkey in Italy and Romania the consumerism influence a little bit the traditional family values.



Applying the survey in each country will be a good opportunity to identify also the factors which influence the daily behavior and concepts.



The results from statistical point of view present that in Italy a mediteranean country the number of patience with AD diseases is bigger in comparition with Turkey and Romania different countires with different culture and behavior.



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Sex. Bărbați

ȚARA / ANUL	2011	2012	2013	2014	2015	2016
Uniunea Europeană - 28 țări	62,186	70,126	75,616	79,053	91,703	95,437
Belgia	1,732	2,101	2,201	2,033	2,371	2,249
Bulgaria	57	77	68	44	59	52
Cehia	626	718	776	883	975	1,082
Danemarca	1,006	1,009	1,051	1,103	1,268	1,374
Germania	8,057	9,210	10,897	10,923	13,913	14,784
Estonia	22	26	29	40	24	27
Irlanda	401	520	550	637	709	793
Grecia	129	171	114	376	555	604
Spania	8,305	9,142	9,174	9,933	11,215	11,033
France	10,020	11,261	11,121	10,854	12,298	12,381
Croatia	163	200	228	224	255	261
Italia	7,842	8,325	8,374	8,495	9,945	9,983
Cipru	53	62	82	53	95	97
Letonia	36	40	57	46	46	99
Lituania	43	56	80	68	91	77
Luxemburg	52	56	59	87	89	91
Ungaria	852	869	932	935	1,100	1,051
Malta	44	30	37	49	41	53
Olanda	2,541	2,873	4,070	3,834	4,310	4,806
Austria	384	491	665	599	673	762
Polonia	682	686	740	661	661	794
Portugalia	605	620	1,365	1,548	1,745	1,900
Romania	530	529	538	662	658	725
Slovenia	30	36	26	42	53	49
Slovacia	239	481	350	473	343	434
Finlanda	1,892	2,151	2,402	2,497	2,717	2,959
Suedia	2,196	2,455	2,531	2,547	2,798	3,064
Marea Britanie	13,627	15,930	17,100	19,412	22,698	23,853
Islanda	58	60	59	84	70	86
Liechtenstein	2	1	3	3	3	2
Norvegia	746	804	826	944	937	1,076
Suedia	1,608	1,747	1,797	1,878	1,966	1,792
Macedonia	:	:	:	1	:	:
Serbia	298	390	419	425	590	617
Turcia	2,670	3,144	3,793	4,258	5,006	5,240

Sursa: <http://ecdx.healthdata.org>

Figure 3. Deaths from dementia (including Alzheimer's)
Unit: Number/ Sex. Men

But the trend for all countries is increasing year by year. Will be interesting to define the life style and food preferences for each country to identify and share the positive aspects of life style and attitude.

3.3. The incidence of Alzheimer's in Romania

In Romania, the incident is about 270-300,000 people, with a diagnosis rate of between 10-15%. It is not yet recognized that dementia is a public health problem, as no national strategy has been developed for this condition. Considering only Alzheimer's dementia cases and, with the fact that 3-4 people are involved with another person with dementia, the quality of life of at least 1 million people in our country is deeply disturbed.

In Romania, there are 300,000 patients diagnosed with Alzheimer's disease, well above the European average, to which are added those who are cared for by the family and are undiagnosed.



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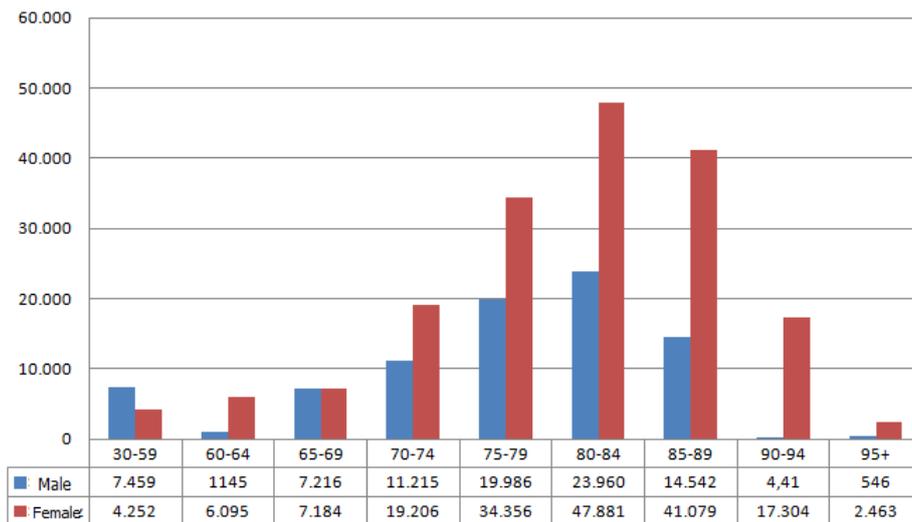
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Romania, with an increasingly aging population, risks becoming a huge reserve of people without memory, to which are added those suffering from other forms of dementia. In 2012, in Romania, there were 270,304 people with dementia. This represents 1.26% of the total population of 21,387,517. The number of people with dementia as a percentage of the population is slightly lower than the EU average of 1.55%.

The following table shows the estimated number of people with dementia between 30 and 59 years and for the following age groups, both gender.

Age group	Men with dementia	Women with dementia	Total
30-59	7.459	4.252	11.711
60-64	1.145	6.095	7.241
65-69	7.216	7.184	14.401
70-74	11.215	19.206	30.421
75-79	19.986	34.356	54.341
80-84	23.960	47.881	71.841
85-89	14.542	41.079	55.621
90-94	4.410	17.304	21.719
95+	546	2.463	3.009
TOTAL	90.484	179.820	270.305

Romanian patients with Alzheimer's disease



Regarding the number of deaths caused by Alzheimer's dementia and other types of dementia in 2017, in Romania, a percentage of 5.54% of the total deaths was registered (5.35% -5.71%).



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Prevalence of Alzheimer's dementia cases and other types of dementia in Romania, between 2010 and 2017. Prevalence of Alzheimer's dementia and other types of dementia in Romania compared to the European Union like in the tabel below present that the desease it is increasing but in comparitin with European percentage it is very low.

Anul	România	Uniunea Europeană
2007	207,622.34	6,342,188.37
2008	213,403.08	6,459,990.27
2009	218,839.21	6,590,842.32
2010	225,001.72	6,740,710.87
2011	231,183.71	6,902,436.25
2012	237,648.07	7,046,007.42
2013	243,719.51	7,184,010.60
2014	249,410.42	7,332,906.90
2015	254,996.07	7,474,989.50
2016	259,677.98	7,612,205.97
2017	264,484.06	7,740,480.91

Source: <http://ghdx.healthdata.org/gbd-results-tool>

3.4. Beginning and evolution

Alzheimer's disease progresses gradually, sometimes with short-term platelets, to severe dementia and death. The average survival time after diagnosis is about 10 years, which reflects rather the advanced age of most of these individuals than the evolution of the disease; some individuals can survive this disorder for up to 20 years.

The onset of symptoms usually occurs in the fifth and sixth decades, are often associated with known genetic mutations. Symptoms and pathology do not differ significantly at different ages of onset. However, younger individuals are more likely to survive throughout the disease, while older individuals are more likely to have numerous medical comorbidities that affect the course and treatment of the disease. The complexity of the diagnosis is higher in older adults because of the increased likelihood of having comorbid medical conditions and mixed pathology.

3.5. Methods of prevention

Being a disease whose mechanisms are not fully understood, the prevention methods are, in their turn, quite small. However, especially for Alzheimer's disease beginning at age 60, risk factors can be controlled. Taking in consideration the data base we can identify some factors which can improve the



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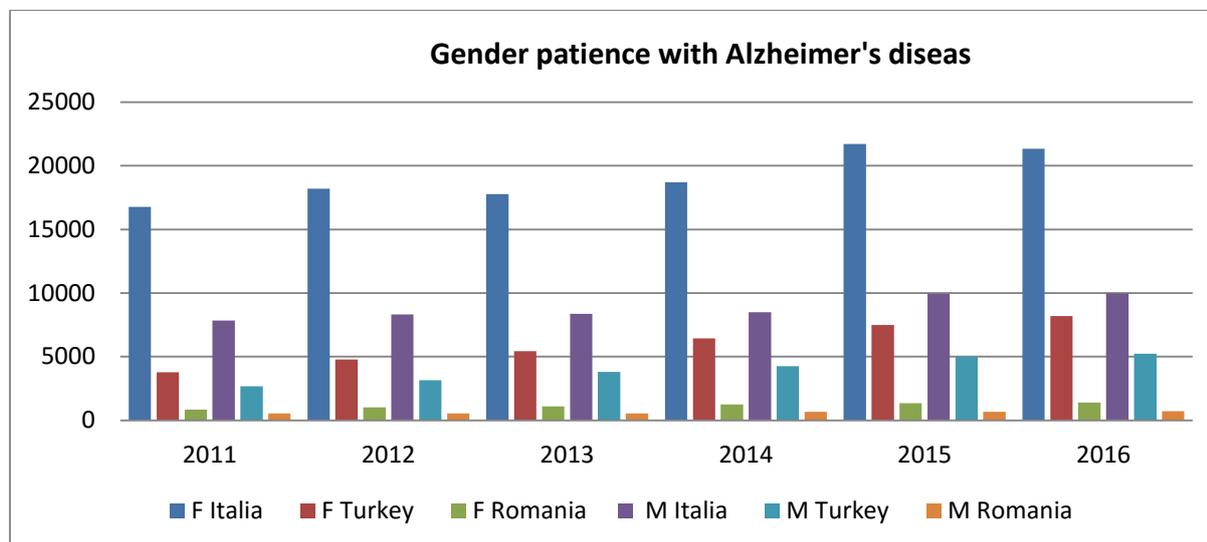
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patience life taking in consideration also some factors like; gender (female are the biggest number) , life style, food preferences, culture attitude and behavior.



3.6. Recommendations

There are several recommendations in this regard.

- ✓ **Regular physical exercises** - It is considered beneficial to perform about 150 minutes of moderate weekly exercises, both those of the cardio type and those that have the role of increasing the muscle mass. Also, coordination and balance exercises such as yoga, Tai-Chi are useful.
- ✓ **Social involvement** has proven to be helpful in maintaining an appropriate psychic tone. In this sense it is recommended:
 - involvement in volunteering activities;
 - participation in support groups;
 - sports activities or courses of different types;
 - connecting with people through social networks;
 - regular meetings with friends;
 - various social activities (walking in the park, going to museums, film, concerts).
- ✓ **The balanced diet** is a factor with an important imprint on the general state of health. From this perspective they are useful:
 - reducing / stopping sugar consumption;
 - adoption of a Mediterranean diet: vegetables, whole grains, fish, olive oil;
 - avoiding trans fats that can cause inflammation and free radical formation: fast-food, semi-prepared;
 - dietary intake of foods rich in Omega 3 fats: salmon, tuna, sardines, fish oil;



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Some studies have shown that mental stimulation slows down the evolution of the disease, so it is recommended: to constantly learn new things; improving the storage capacity; strategy games, puzzles, riddles; retaining as much visual detail as possible; choosing new routes to the house.

Sleep hygiene is equally important for reducing the risk of developing Alzheimer's, which are helpful: testing for sleep apnea syndrome and possibly treating it; establishing a sleep program; implementation of relaxing bedtime rituals to reduce anxiety, reduce stress and eliminate internal negative tension.

✓ **Proper management of stress**

- prevents the development of anxiety or depressive disorder and improves the cognitive abilities of the person.
- breathing exercises; prioritizing activities relaxing; improving the inner calm through techniques such as: meditation, prayer; engaging in fun activities; maintaining a sense of humor.
- giving up alcohol and smoking should be a priority.
- controlling body weight, cholesterol and high blood pressure are extremely beneficial to your health.

✓ **The causes of the disease** are not fully known, but their main theory involves the occurrence and storage of amyloid plaques in neurons and synapses. and your neuro fibrillary proteins. The main symptom of Alzheimer's disease is memory disorders, but they need to be integrated into a larger clinical picture in which they are:

- difficulties in making decisions,
- confusion,
- and disruption of conversational activities,
- unexplained changes in mood or personality.

The management of patients with dementia Alzheimer's is done by a multidisciplinary team consisting of: the neurologist, the psychiatrist, the geriatric, the family doctor, the clinical psychologist, the occupational therapist.

Although there are many tests that can raise the suspicion of Alzheimer's disease, the diagnosis of certainty can be made only after the patient's death, by anatomopathological examination.

Due to the complexity of the disease, there is no treatment that can cure the disease, but its symptoms can be controlled by means of drug, psychotherapeutic or occupational strategies(https://www.alzheimers.org.uk/info/20007/types_of_dementia/2/alzheimers_diseas)

Not only are people suffering from Alzheimer's disease, but they are also close to those caring for such individuals. It is important for them to know as much as possible about Alzheimer's disease and its evolution, to call on support groups and to take care of their own physical and mental health.

Alzheimer's disease is a neurodegenerative, progressive and irreversible disorder in which cognitive processes, memory processes and behavior are affected.



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4. MOBILE APPLICATIONS DATA RELATED ALZHEIMER'S PATIENT IN EUROPE

4.1 Alzheimer's Association

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease, treatment
- LINK: <https://www.alz.org/>
- DESCRIPTION: Website includes many effect articles, notifications and researches.
- TYPE: Website
- if available RUNNING OS: available from any OS
- COST: Free

4.2 Alzheimer Master

- LANGUAGE: English
- KEYWORDS: Life helper for Alzheimer's patients
- LINK: <https://play.google.com/store/apps/details?id=amaster4.amaster4>
- DESCRIPTION: Application includes voice alert and video alert with timing. Patients can add their memories
- TYPE: Mobile app
- if available RUNNING OS: Android
- COST: Free Trial with limited options, Licence cost 54,99€

4.3 myALZteam

- LANGUAGE: English
- KEYWORDS: Life stories about Alzheimer's
- LINK: <https://play.google.com/store/apps/details?id=com.myhealthteams.myalzteam>
- DESCRIPTION: App contains life stories about patients and every member can share their experiences.
- TYPE: Mobile app
- if available RUNNING OS: Android
- COST: Free

4.4 YoTeCuido Alzheimer

- LANGUAGE: Spanish
- KEYWORDS: Life stories about Alzheimer's
- LINK: <https://play.google.com/store/apps/details?id=es.lapisoft.yotecuido>
- DESCRIPTION: It contains many answers that will correspond to possible questions in patients' minds. It also includes examples of cognitive stimulating activities that can be done daily at home.
- TYPE: Mobile app



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- f. if available RUNNING OS: Android
- g. COST: Free

4.5 Memory Box

- a. LANGUAGE: English & Swedish & Danish
- b. KEYWORDS: The vision to contribute to a dementia friendly society.
- c. LINK: <https://play.google.com/store/apps/details?id=com.sci.memorybox>
- d. DESCRIPTION: It contains visual, musical and written tips for conversations and memory support. The app contains information pieces about famous events, people, places and topics from the 20th century and you can also save your favorite memories in a scrapbook.
- e. TYPE: Mobile app
- f. if available RUNNING OS: Android
- g. COST: Free

4.6 GriCeviz

- a. LANGUAGE: Turkish
- b. KEYWORDS: mind and intelligence games
- c. LINK: <https://play.google.com/store/apps/details?id=tr.com.halici.brainquiremobile>
- d. DESCRIPTION: GriCeviz, a platform that users of different ages and educational levels can benefit; It acts as an important aid in the development of the mental abilities of the children and determination of their strengths and weaknesses through the gamified mind exercises, practices, mind and intelligence games in the categories of Visual, Verbal, Numerical, Memory, Attention and Logic. TYPE: Mobile app
- e. if available RUNNING OS: Android 5.0 and up, tablet, desktop
- f. COST: Monthly Membership: 9,99 TL

4.7 Kelimelik

- a. LANGUAGE: Turkish
- b. KEYWORDS: word, memory
- c. LINK: <https://play.google.com/store/apps/details?id=com.he2apps.kelimelik>
- d. DESCRIPTION: high number of users, at the same time chat option, to strengthen memory with the TDK words
- e. TYPE: Mobile app
- f. if available RUNNING OS: Android 5.0 and up, tablet, desktop
- g. COST: Free

4.8 Beyin Oyunları - Hafıza Düşünme Ve Beyin Egzersizi

- a. LANGUAGE: Turkish
- b. KEYWORDS: word, memory
- c. LINK: <https://play.google.com/store/apps/details?id=com.brainix.free.brain.games>
- d. DESCRIPTION: Think Fast - Thinking Games-Persistence-brain-reflex-logic





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- e. TYPE: Mobile app
- f. if available RUNNING OS: Android 4.2 and up, tablet, desktop
- g. COST: Free

4.9 Beyin Eğitim: Hafıza Oyunu

- a. LANGUAGE: Turkish
- b. KEYWORDS: visual memory
- c. LINK:
<https://play.google.com/store/apps/details?id=com.kaya.brain.train.matching.game>
- d. DESCRIPTION: Train your memory with free Brain Training: Memory Game! With these "brain games" you can increase short term memory, visual memory, concentration, speed, calculation or reasoning. Upgrade your memory power and mental skills with pairs memory games. This is a useful app to try and play fun these free memory games. Fun games, increase concentration, best games.
- e. TYPE: Mobile app
- f. if available RUNNING OS: Android 4.1 and up, tablet, desktop
- g. COST: Free

4.10. Memorado - Zekâ Oyunları

- a. LANGUAGE: Turkish
- b. KEYWORDS: mind and intelligence games
- c. LINK: <https://play.google.com/store/apps/details?id=com.memorado.brain.games>
- d. DESCRIPTION: offers entertainment through personalized exercise to increase memory, concentration and reaction skills. Choose from over 450 levels within 15 neuroscience based games that will help you become smarter every day!
- e. TYPE: varies by device
- f. if available RUNNING OS: Android 4.1 and up, tablet, desktop
- g. COST: Free

4.11.ChatYourself

LANGUAGE: Italian

KEYWORDS: Face book Chabot

LINK: www.italialongeva.it/cosa-e-italia-longeva

DESCRIPTION: Chat Yourself was born with the aim of providing constant help to Alzheimer's patients and family members, through the use of a Messenger Chabot. It is a pilot project, not a medical-surgical facility.

TYPE: Face book messenger Chabot if available RUNNING OS: Face book

COST: Free





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4.12. CogniFit

LANGUAGE: Several (English, Spanish, Italian, French, Turkish etc)

KEYWORDS: mental cognitive exercises

LINK: <https://www.cognifit.com/>

DESCRIPTION: Millions of users use CogniFit to identify possible cognitive impairments and impairments, and create a personalized training program according to their needs.

TYPE: app and website

if available RUNNING OS: available on all OS

COST: (Free plus subscription plan at 19,99 Euro/month and 89,99 Euro/ year)

4.13. Alzheimer's Manager

LANGUAGE: English

KEYWORDS: health and welfare

LINK: atpointofcare.com

DESCRIPTION: The app can help patient and caregivers to manage symptoms that affect every day life

TYPE: mobile app

if available RUNNING OS: iOS

COST: free

4.14. Stimart Roberto, memoria (also available as Stim'Art Edith on the website)

LANGUAGE: Italian + others

KEYWORDS: memory games

LINK: dynseo.com

DESCRIPTION: puzzle and memory games for elders and Alzheimer's disease patients

TYPE: mobile app

if available RUNNING OS: all OS



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COST: free trial, 14,99 Euro/ 3 months)

4.15. Timeless Care

LANGUAGE: English

KEYWORDS: reminder of pictures and loved ones

LINK: <https://www.timeless.care/>

DESCRIPTION: Timeless connects Alzheimers' patients with their friends and family, reminds them of daily events and help them remember their loved ones

TYPE: mobile app

if available RUNNING OS: iOS

COST: Free

5. MOBILE APPLICATIONS DATA RELATED RELATIVES OF ALZHEIMER'S PATIENCE IN EUROPE

Currently, there are approximately 24 million people diagnosed with Alzheimer's worldwide. Of these, 6 million are in Europe.



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Symptoms of the disease include memory loss (initially short term), difficulty finding the right words, confusion, behavioral changes and mood, finding the right words, confusion, behavioral changes and mood. To facilitate the diagnosis, several mobile applications have been created in collaboration with experts in the field of dementia that were used.

5.1 Alzheimer's Disease

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease
- LINK:
https://play.google.com/store/apps/details?id=com.quizmine.alzheimerdisease_01
- DESCRIPTION: The app contains scientific explanations about alzheimer's.
- TYPE: Mobile app
- if available RUNNING OS: Android
- COST: Free Trial with limited options, Licence cost \$19.99)

5.2 Alzheimer's Treatment

- LANGUAGE: English & Spanish
- KEYWORDS: Alzheimer's disease & treatment
- LINK: <https://play.google.com/store/apps/details?id=com.proyectoultra16>
- DESCRIPTION: The app contains many articles about Alz from different sources.
- TYPE: Mobile app
- if available RUNNING OS: Android
- COST: Free

5.3 Alzheimer's Disease2

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease
- LINK: <https://play.google.com/store/apps/details?id=com.healthinfo.alzheimer.cause.prevention.management.treatment.diagnosis>
- DESCRIPTION: The app contains many articles about Alz.
- TYPE: Mobile app
- if available RUNNING OS: Android
- COST: Free

5.4 Alzheimer's Disease3

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease
- LINK: <https://www.alzheimersresearchuk.org/>
- DESCRIPTION: The website contains many beneficial articles about Alz.
- TYPE: Website
- if available RUNNING OS: available from any OS
- COST: Free





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5.5 Alzheimer's Relatives

- LANGUAGE: English
- KEYWORDS: Helping Alzheimer's Relatives
- LINK: <https://www.helpforalzheimersfamilies.com/>
- DESCRIPTION: The website contains a lot of useful information for relatives. It contains information on how to deal with the patient.
- TYPE: Website
- if available RUNNING OS: available from any OS
- COST: Free

5.6 Kelime Bulmaca - Zeka Oyunu

- LANGUAGE: Turkish
- KEYWORDS: memory development-puzzle-crossword
- LINK:
<https://play.google.com/store/apps/details?id=com.cacagezapp.kelimebulmacazekaoyunu>
- DESCRIPTION: Word puzzle
- TYPE: Mobile app
- if available RUNNING OS: available from any OS
- COST: Free

5.7. Your On-the-Go Guide for Dementia Care Advice

- LANGUAGE: English
- KEYWORDS: Relatives of Alzheimer's patients
- LINK: <https://www.helpforalzheimersfamilies.com/get-help/download-daily-companion-app/>
- DESCRIPTION: Website includes many effect articles, notifications, video and researches.
- TYPE: mobile app
- If available RUNNING OS: The Apple App Store and Google Play Store.
- COST: Free

5.8. Timeless

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease, treatment
- LINK: <https://www.timeless.care/>
- DESCRIPTION: Website includes many effect articles, notifications, video and researches.
- TYPE: mobile app
- If available RUNNING OS: This app is available only on the App Store for iPhone and iPad.
- COST: Free





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5.9. Mobile App Helps Alzheimer's Caregivers

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease, treatment
- LINK: <https://www.voanews.com/silicon-valley-technology/mobile-app-helps-alzheimers-caregivers>
- DESCRIPTION: Mobile App Helps Alzheimer's Caregivers
- TYPE: mobile app
- If available RUNNING OS: The Apple App Store and Google Play Store.
- COST: Free

5.10. Remember me: an application to improve your memory

- LANGUAGE: English, French
- KEYWORDS: Alzheimer's disease, treatment
- LINK: <http://www.silvereco.org/en/are-there-any-smartphone-applications-for-alzheimers-patients/>
- DESCRIPTION: Helping to improve the memory of Alzheimer's patients
- TYPE: mobile app
- if available RUNNING OS: The Apple App Store and Google Play Store.
- COST: Free

5.11. Brain-Boosting App May Detect Alzheimer's

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease, Brain-Boosting App May Detect Alzheimer's
- LINK: <https://www.alzheimers.net/2014-01-13/akili-app-may-detect-alzheimers/>
- DESCRIPTION: Website includes many effect articles, notifications, researches and many plays.
- TYPE: mobile app
- if available RUNNING OS: The Apple App Store
- COST: Free

5.12. The mobile game that can detect Alzheimer's risk

- LANGUAGE: English
- KEYWORDS: Alzheimer's disease & dementia
- LINK: <https://medicalxpress.com/news/2019-04-mobile-game-alzheimer.html>
- DESCRIPTION: Website includes many effect articles, notifications, researches and many play
- TYPE: mobile app
- if available RUNNING OS: The Apple App Store
- COST: Free





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5.13. İridis

- LANGUAGE: English
- KEYWORDS: Mobile App Helps Alzheimer's Caregivers
- LINK: <https://www.stir.ac.uk/about/faculties/social-sciences/our-research/telehealthcare-case-study/iridis-dementia-app/>
- DESCRIPTION: Website includes many effect articles, notifications, researches and many play
- TYPE: mobile app
- if available RUNNING OS: The Apple App Store and Google Play Store
- COST: Free

5.14. Alzheimer's Universe (AlzU)

LANGUAGE: English and Spanish

KEYWORDS: Alzheimer's disease, treatment

LINK: <https://apps.apple.com/us/app/id1067296274>

DESCRIPTION: AlzU is a proactive educational tool to learn more about the disease and also with exercises for memory and a blog for the caregiver

TYPE: mobile app

if available RUNNING OS: available for iOS

COST: Free

5.15. MemoClock

LANGUAGE: English

KEYWORDS: Time reminder

LINK: <https://www.memoclock.com>

DESCRIPTION: the app runs on 2 devices, and the caregiver can send reminder to the patient device with things to do at a specific time

TYPE: Mobile app

if available RUNNING OS: available on all OS

COST: Free, 3.99 per month for extra features

5.16. MemorC



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LANGUAGE: English

KEYWORDS:

LINK: <https://memoriesconnect.com>

DESCRIPTION: a family member, friend or caregiver prepares MemorC for the person with memory problem by adding family photos and some information about the people on the photos to the app that the patient can later use

TYPE: mobile app

if available RUNNING OS: available on iOS

COST: Free + upgrade in app

5.17. Memory Helper Care Assistance

LANGUAGE: English

KEYWORDS: care, assistance

LINK: <http://memoryhelper.com.au>

DESCRIPTION: It's display is setup and managed over the internet by a carer through their phone, laptop through the memory helper app.

TYPE: mobile app

if available RUNNING OS: iOS

COST: Free

5.18. Remember Me - Caregiver

LANGUAGE: English

KEYWORDS: memory

LINK: <https://apps.apple.com/ml/app/remember-me-caregiver/id1481000591>

DESCRIPTION: It's an interactive platform aimed at Alzheimer's family members that seeks to unite, assist and share the responsibility of caring for a loved one. It's a household manager who aims to share tasks and remove the burden of caring for a dependent person alone

TYPE: mobile app



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if available RUNNING OS: iOS

COST: Free

6. EVALUATION

Alzheimer’s disease is one of the health conditions being targeted by mobile application developers. Indeed, the efficacy of using these apps in fighting Alzheimer’s has been demonstrated the results proved that a mobile application could improve cognitive function in elderly patients. The partners Identify the non-academic categories of mobile application used until now and summary of non-academic applications it is presented in the table below:

Application	Features	Added technology
-------------	----------	------------------

The partners identify a nich on the actual application in use of the brain games and other computer-based stimulation therapy has given new light to healthcare professionals, caregivers, and the patients



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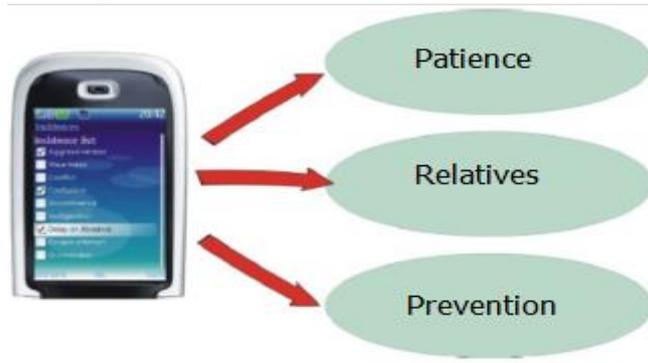
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Backup Memory	Helps patients to remember quickly by showing them related pictures; defines patient location	Bluetooth ; GPS
Tweri	Tracks the location of Alzheimer's patients	GPS
Test Memory Game	Improves memory by exercises	Just Android application
Prevent Alzheimer	Improves and trains memory through games	Just Android application

themselves. Also another target establish was the Family members because they often play a key caregiving role, especially in the initial stages of what is typically a slow decline. The staggering numbers of home health care are on top of an already struggling health care system, one that has not made the strides necessary to address this inevitable future. Taking in consideration the scientists researchs the partners are agree that new and effective prevention strategies need to be developed following the three direction of the project like in figure:



Direction of project development and implementation

A strong point of project is that research has shown that technology instruments such as iPods, help stimulate those with dementia.

- ✓ connecting people to resources that are available;
- ✓ healthcare groups providing support;
- ✓ new research has proven that the use of brain, memory, and solving problem games help stimulate the brain and reduce symptoms of AD.
- ✓ develop and create new games for patience
- ✓ create online a platform for relatives
- ✓ prepare a book for relatives and give them all the informations
- ✓ apply a survey and identify the common issues between countries TR, IT and ROU
- ✓ opportunity for digital innovation;
- ✓ monitoring work;
- ✓ participatory design;
- ✓ the rise of brain intelligent industry;
- ✓ brain training;
- ✓ cognitive training.



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The final products of project will help and also provide stimulation to improve cognitive functioning. Via service-support informations, the project developed an easy-to use application for tablets to help older adults with disabilities more readily use the technology. Also help relatives to performed usability tests with the dementia patients, as well to produce application software that meets the patients, family, and caregiver needs and expectations.

Another project application example included one that allows families to electronically send photographs, video clips, and favorite music from anywhere to loved ones for enjoyment. Such mobile apps could allow dementia persons to become less agitated and stay in their homes longer, while also providing awareness and positive change of attitude by those of another generation towards the elderly. This project products developed mobile applications in the scope of helping improve the quality of life of patients with AD or dementia.

Opportunities for the project are despite these challenges:

- ✓ there are many simple solutions to these challenges;
- ✓ mobile platforms only need to turn to their desktop predecessors;
- ✓ many computer assistive technologies have been developed under the desktop platform.

Some possible weak points identify:

- ✓ Issues may be the virtual magnifying glass that helps visually impaired users and their small text readability. In addition, dictation software and text-based web browsers may be too complicated for patients and their ability to use applications.
- ✓ In addition, the app buttons should not be too close to the Android taskbar.
- ✓ While the touch accuracy of tablet screens can be difficult to solve,
- ✓ Android platforms allow users to change the sensitivity of the touch interface, as well as provide vibration feedback when the screen is touched.
- ✓ Screen protectors can help reduce glare, especially in areas that are exposed to large amounts of sunlight.
- ✓ Rubber cases with adjustable supports can also be beneficial for patients using mobile tablets, especially when using a table or lying in bed

These simple changes can reduce the frustration experienced by patients and increase the quality of life.

6.1. SWOT Analyze of REMEM

Using all the partners information and the data base available now, we can create a SWOT Analyze of project REMEM

6. STRONG	S	W	WEAK
<ul style="list-style-type: none"> ✓ we have specialists in the field; ✓ there are a lot of applications which can be used ; ✓ there are application for patience; 		<ul style="list-style-type: none"> ✓ patients became frustrated when the accidently hit object on the taskbar, rather than hitting a user button located at the bottom of the application; 	



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<ul style="list-style-type: none"> ✓ there are applications for relatives ; ✓ significant target group; ✓ interactive monitoring; ✓ backup memory; ✓ connected patience; ✓ communication tools; ✓ portfolio of services; ✓ resources in educational community ✓ family support-passionate-low money-good help 	<ul style="list-style-type: none"> ✓ this may be possibly due to the smaller size of some images making distinct detailed characteristics unrecognizable; ✓ family resources/support for head injury; ✓ no adult day care certification; ✓ financial ruin; ✓ low natural supports; ✓ no healthcare worker certification/standards ✓ not adequate qualified backup home care help for family caregiver ✓ family supports separated in money, programs, and communication; ✓ family caregivers do not identify as caregiver and they do not know of services ; ✓ caregivers do not ask for help; ✓ unemployment issues for family and paid caregivers; ✓ not awareness that many times it is grandchildren taking care of grandparent; ✓ lack of communication to some people in their homes, isolation ; ✓ families do not stay in one place anymore; ✓ Inadequate/untrained case management system; ✓ high need groups with no services; ✓ Alzheimer taskforce-report stalled; ✓ lack of way to connect people to the right resource/barriers they experience; ✓ family has no way to review what resources available; ✓ not using educational resources to expand opportunities for high school students to increase health workforce ✓ caregivers don't call until a crisis; ✓ caregivers do it all-never ask for help for fear of what will happen; ✓ waiver wait list forces families into crisis before they get help; ✓ not a long-term plan; ✓ lack of support from policy makers; ✓ access to information and service; ✓ connecting people to the wrong resource.
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7. OPPORTUNITIES O	T TREATS
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<ul style="list-style-type: none"> ✓ connecting people to resources that are available; ✓ healthcare groups providing support; ✓ new research has proven that the use of brain, memory, and solving problem games help stimulate the brain and reduce symptoms of AD. ✓ develop and create new games for patience ✓ create online a platform for relatives ✓ prepare a book for relatives and give them all the informations ✓ apply a survey and identify the common issues between countries TR, IT and ROU ✓ opportunity for digital innovation; ✓ monitoring work; ✓ participatory design; ✓ the rise of brain intelligent industry; ✓ brain training; ✓ cognitive training 	<ul style="list-style-type: none"> ✓ unfortunately, most mobile tablets, including Android and iPad, use a capacitive touchscreen panel. ✓ unlike traditional resistive panels that only require an object to exert pressure on the panel, usually a stylus; capacitive touchscreen panels require an electrical conductor from an object, e.g. fingertip, to respond. In addition, older adults, especially AD or dementia ✓ patients, lack the capacity to understand this difference; thus, they can become easily frustrated with the application and concede using the mobile app. ✓ in addition, operating system layout and touchscreen panels can create new challenges; ✓ caregivers aging out; ✓ quality of information for caregivers and care recipients; ✓ family units falling apart; ✓ financial interest conflicts; ✓ numbers over 65 increasing dramatically; ✓ caregivers aging out/dying with no resource for care recipient; ✓ not asking for help leads to big problems; ✓ a generation who does not care.
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