

ORIGINAL ARTICLE

Dementia Burden, Prevention, Intervention and Care in Jordan

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Abstract

Dementia is a significant public health concern in Jordan, ranking as the 7th cause of death among individuals over 80 and the 8th cause of death for females of all ages. This systematic review aims to provide a comprehensive overview of dementia burden and care in Jordan, highlighting the increasing prevalence and associated risk factors. The review synthesizes data from all available studies related to dementia in Jordan, revealing a 77% increase in dementia prevalence between 1990-2021 for all ages, with a notable rise in related death rates. Key demographic trends indicate a growing elderly population in Jordan, necessitating proactive healthcare policy measures. Identified risk factors include poor education, hypertension, diabetes, and social isolation, with a call for culturally tailored interventions. Despite recognition of dementia by the World Health Organization (WHO) as a public health priority, Jordan lacks a national dementia plan, leading to gaps in diagnosis, care, and support. Non-Governmental Organizations play a crucial role in raising awareness and providing care, yet challenges such as stigma, resource limitations, and inadequate healthcare infrastructure persist. Finally, we emphasize the urgent need for evidence-based guidelines, public education, and research initiatives to improve dementia care and support for affected individuals and their families in Jordan.

Keywords: dementia, cognitive impairment, burden, prevalence, risk factors, interventions, challenges, Jordan.

INTRODUCTION

Dementia in Jordan is the 7th cause of death of people over 80 years old, the 8th cause of death for females of all ages and the 7th cause of disability-adjusted life year for people older than 70 years old (1). Dementia is a syndrome that can be caused by several diseases that progressively impair brain

function, leading to a decline in cognition beyond the expected consequences of aging (2). It is the most severe form of cognitive decline on a spectrum ranging from mild cognitive impairment (MCI) to dementia. Depending on the underlying cause, dementia can be classified into several subtypes, including Alzheimer's Disease

(AD), Vascular Dementia (VD), Lewy Body Dementia (LBD) and Frontotemporal Dementia (FTD). Dementia can also be caused by repetitive physical brain injuries and nutritional deficiencies. The different forms of dementia can co-exist in what is referred to as Mixed Dementia; for example, AD may overlap with VD. Dementia imposes a tremendous physical, psychological, social and economic strain on people living with dementia, as well as their caregivers, families and the society at large. A lack of awareness and understanding of dementia is common, resulting in stigmatization and barriers to diagnosis and care (2).

In this systematic review, we summarize available data on the burden and care of dementia in Jordan. Our aim is to survey the landscape of dementia in Jordan. We performed a systematic literature review, which included other published reviews, meta-analyses, and original research related to dementia prevention, intervention, and risk factors in Jordan. We have also identified gaps in knowledge and challenges in these areas and provided recommendations and research directions to improve dementia care and the lives of people affected by dementia, as well as their healthcare providers and families in Jordan. The new insights and recommendations highlight the importance of a national effort to address the rising rates of dementia in Jordan and develop nationwide policies to decrease the impact of dementia on Jordanians, their families and the healthcare system in Jordan.

1. Dementia Prevalence

Jordan is a Middle Eastern country with a lower-middle income economy (3). According to the Global Burden of Disease (GBD) study, in 2021, the number of people with dementia in Jordan was estimated at 27,346 (8.9%), with a 4% death rate, for

people over 70 years old (4). Dementia in Jordan has increased in prevalence from 1990 to 2021 by 77% for all ages, which was also associated with an increase in related death rates by 53.42% (4). For Jordanians aged 55 and older, the prevalence of dementia was estimated to be 3.05%, while the death rate was 2.88% (4). A study conducted in the north of Jordan estimated the annual increase in the prevalence of dementia for people older than 50 years (March 2019-April 2020) to be 1.29%, comprising 406 patients (5).

2. Demographic Shift

According to the Jordanian Department of Statistics 2021 report, there are 11,734,000 people living in Jordan, with an annual population growth rate of 1.9% (6). Future projections for the Jordanian population indicate that the proportion of older individuals (age 65 years old and above) will significantly increase because of the expected improvement in life expectancy for both sexes. According to the Jordanian National Population Commission, the proportion of older individuals of the total Jordanian population will increase from 5.6% in 2023 to 6.1% in 2030 and to 11% in the year 2050 (7). Life expectancy in Jordan has increased from 71.9 to 75 years for men and from 72.1 to 77 years for women between 1990-2021 and is forecasted to increase to 84 and 84.7 years for men and women, respectively by 2050 (8).

Increased life expectancy for both men and women indicate improvements in overall health and well-being for Jordanians. Nevertheless, these demographic changes highlight the need for proactive measures to address the healthcare and support needs of the growing elderly population. As the number of people living with dementia continues to rise because of increased

longevity due to improved health care, there is an urgent need to identify and implement preventive approaches specifically tailored to mitigate the effects of aging in the Jordanian population.

3. Region-Specific Risk Factors

We summarize below available research related to risk factors associated with dementia in Jordan. A growing body of evidence highlights the importance of early prevention and management of risk factors that have been linked to dementia. These risk factors include hypertension, smoking, obesity, diabetes, traumatic brain injury, high LDL cholesterol, depression, physical inactivity, poor education, hearing loss, air pollution, and social isolation (9,10).

Since nearly all the evidence supporting these risk factors comes from studies conducted in high-income countries (HIC), risk factors might be different for lower- and middle-income countries (LMIC), such as Jordan. Similarly, interventions might also need to be tailored to the specific cultural context and environment (11). The number of people with dementia in LMIC is rising faster than in HIC because of the increase in life expectancy and the greater burden of risk factors (11). According to the report of the Lancet Commission on Dementia, 9 modifiable risk factors account for 35% of dementia worldwide: poor education, high blood pressure, obesity, hearing loss, depression, diabetes, physical inactivity, smoking, and social isolation (11). However, evidence supporting this conclusion came from HIC, and there are almost no studies examining the impact of these risk factors on the incidence of dementia in LMIC (12). A single study from Iran was the only study from a Middle Eastern country to report that diabetes, obesity, overweight, physical inactivity, and smoking are responsible for

30.8% of Alzheimer's disease-related dementia (13). In northern Jordan, a multivariate analysis for dementia was conducted and found older age, male gender, family history of dementia, and illiteracy to be predictive of dementia (5). However, marital status, number of comorbidities such as diabetes and heart disease, and smoking did not predict dementia (5). Although these findings are in line with several publications reporting significant associations with age, male sex, family history and illiteracy, in other reports, marital status (being single), smoking, and the number of comorbidities were significantly associated with dementia, a discrepancy likely to be explained by socioeconomic differences between HIC and LMIC (14). These differences highlight the need for context- and culture-specific studies in Jordan to obtain more accurate risk estimates and more effective preventive interventions.

4. Dementia and Public Health Initiatives

In 2017, WHO declared dementia as a public health priority, endorsing a global action plan with a comprehensive blueprint for action divided into the following seven dementia-related areas: dementia prioritization; awareness and society inclusion; risk reduction; diagnosis, treatment and care; information systems for dementia; carers support; and research and innovation (2). To facilitate monitoring, WHO developed the Global Dementia Observatory (GDO), a data portal that compiles country-specific data on 35 key dementia indicators across the global action plan's seven strategic areas (15).

Unfortunately, according to WHO GDO, Jordan does not have a national dementia-specific plan, which is embedded in an overall aging plan. A national dementia plan

should include specific recommendations for diversity, equity and inclusion of people from under-served communities and under-represented cultures and ethnicities to ensure help is population-specific and directed to people who need it most (16). In 2017, WHO-GDO reported the status of dementia in Jordan in a range of action areas and cross-cutting principles (17). The following areas were recommended to be included in the specific action plan for Jordan: dementia risk reduction and dementia-friendly communities. In addition, the plan indicated the importance of inclusion, equity and human rights as guiding principles. However, the following specific actions were not included in the action plan for Jordan: dementia diagnosis, care and support, workforce training, improved information system, research and innovation, and support for dementia carers and families (17). Furthermore, the following guiding principles were not included in the action plan for Jordan: empowerment, multisectoral collaboration and universal health coverage (17). The following information was also missing in the 2017 WHO-GDO report on dementia in Jordan: the policy report, the last two years of the planning or management report, records for routine hospital admissions or routine outpatient intervention and treatment for people with dementia for monitoring purposes. However, routine pharmaceutical records and antipsychotic prescription records for people with dementia for monitoring purposes were available (18).

Finally, the WHO Global Action Plan on the Public Health Response to dementia emphasizes the importance of evidence-based and attainable information for people with dementia, carers and clinicians (19). The Action Plan discerns the gap between the demand for dementia prevention, treatment

and care and the provision of evidence-based services. These gaps can lead to misdiagnosis or delayed diagnosis, lack of healthcare providers' collaboration and under-treatment for comorbid conditions. Thus, in this review, we highlight gaps in knowledge and of the need for an updated, evidence-based national clinical practice guidelines for dementia care in Jordan. Additionally, we emphasize the importance of continuous assessment to ensure patient-centered, cost-effective, sustainable and culturally appropriate dementia diagnosis, treatment and care (19).

5. Non-Governmental Organizations Related to Dementia Care in Jordan

Non-Governmental Organizations (NGOs) play a vital role in caring for dementia-affected people in Jordan. Al-Oun for Alzheimer's Patient Care Association (AACA), established in 2020, aims to raise awareness and offer support for people with Alzheimer's Disease and their caregivers (20). Other non-profit, elderly healthcare foundations, mainly found in the capital city Amman include Al-Malath Foundation for Humanistic Care and Al-Wahda Association for the Care and Protection of the Elderly. Fewer foundations can be found in other governorates of Jordan; for example, Al-Rasheed Association for the Care and Rehabilitation of the Elderly and Ahl Al-Khair Association for the Care and Rehabilitation of the Elderly in Zarqa, Juzur Al-Khair Association for the Elderly in Ajloun, Irbid Elderly to Hosting the Elderly in Irbid and Hamza bin Abdulmutallab Association for the Care of the Elderly in Tafileh (21). These NGOs provide care, support and service to elderly people and increase societal awareness of issues related to elderly health, particularly dementia care. In addition, there are several elderly nursing homes, particularly in Amman, that provide

medical care and social services while hosting the elderly, such as Al-Osra Al-Baydaa Association - Dar Al-Dyafa for Elderly, and Society Samir Shamma Homes (21).

6. Challenges

Dementia healthcare in Jordan faces many challenges that impact patients' outcomes include population growth, resource limitations, uneven distribution of healthcare workforce, inadequate specialized geriatric care, high cost of medications, and financial burden (22–24). Other socioeconomic challenges also impede dementia care improvement such as low public awareness of dementia, societal stigma and misconceptions, low literacy and poverty in rural areas (25).

Jordan is a country with limited natural resources. Because of Jordan's distinct geographic location along with its profound political stability and internal security, it had to cope with the repercussions of regional conflicts and instability. Many of the neighboring countries have suffered from internal and external crises, which led to several waves of high numbers of refugees emigrating to Jordan, increasing population growth and overwhelming Jordan's infrastructure including its healthcare system (6). Below, we address these challenges, offering recommendations to foster a more equitable environment for dementia prevention, diagnosis, care, policy, and management.

RISK FACTORS

1. Low-Density Lipoprotein (LDL) Cholesterol

Several studies investigated whether high LDL cholesterol is a risk factor for dementia. High-quality evidence suggests that high midlife, but not late-life LDL cholesterol, is a

risk factor for dementia (9). A systematic review and meta-analysis involving seventeen studies with more than a million participants found that midlife hypercholesterolemia is linked to a higher incidence of mild cognitive impairment and all-cause dementia. Specifically, for each 1 mmol/L increase in LDL cholesterol, there is an 8% rise in the likelihood of developing all-cause dementia (26). Moreover, a simulated trial using data from 6,373 individuals between the ages of 55 and 80 found that long-term statin use was associated with a lower 10-year risk of dementia or mortality (27).

In Jordan, there are no direct studies specifically investigating the link between LDL cholesterol and dementia. However, two studies addressed the association between lipid profile in general and dementia (28,29). A 2014 study examined the relationship between changes in cognitive function in older Jordanians and serum copper and lipid concentrations. The study included 102 subjects over 60 years old; 50 control volunteers and 52 dementia patients. The study found no significant differences between the two groups in their lipid profiles (28). Another 2018 case-control study included 71 Jordanians, including 38 patients with Alzheimer's disease of late-onset (age ≥ 65) and 33 age-matched controls. The study showed no significant differences in lipid profiles between the control and diseased individuals including total cholesterol, triglycerides, and high- (HDL) and low- (LDL) density lipoproteins (29). The discrepancy between the Jordanian studies and the global literature regarding the link between LDL cholesterol and dementia risk may be attributed to the small sample sizes used in the Jordanian studies. Additionally, and importantly, the Jordanian studies are primarily cross-sectional studies of older

adults, in contrast to the global longitudinal cohort studies, which is required to link midlife LDL to late-life risk of dementia.

2. Diabetes Mellitus

A 2024 meta-analysis investigated the relationship between diabetes mellitus and dementia risk, which included 15 articles published between 2012 and 2023. The results showed a significantly higher risk of dementia in people with diabetes (30). This study followed another 2013 meta-analysis comprised of 28 articles published between 1997 and 2011 that examined the link between diabetes mellitus and the risk of one or more forms of dementia. The analysis revealed that in comparison to non-diabetics, those with diabetes had a significantly greater risk of all types of dementia (31).

A case-control study conducted in 2021 on the risk factors for dementia among older hospitalized Jordanian patients comprised of 416 controls and 406 patients with dementia. The study investigated the effects of comorbidities, including diabetes, coronary heart disease, and stroke, and found a significantly increased risk of dementia in the presence of comorbidities (5). A 2024 cross-sectional study determined risk factors for and predictors of cognitive decline in 220 older adults (age >60 years) in Jordan. The study used the Elderly Cognitive Assessment Questionnaire (ECAQ) coupled with face-to-face household interview and found no significant association between diabetes and cognitive impairment (32). The negative association may be related to the small sample size or the limitations of using a questionnaire to confirm the presence of dementia and diabetes.

3. Hypertension

In a cohort study that included 1440 individuals followed up for more than 18 years, systolic hypertension (≥ 140 mmHg in

midlife; mean age 55 years) was linked to increased risk of all types of dementia (33). This was supported by the 2020 Lancet Report, which confirmed that midlife hypertension is associated with increased risk of dementia, and that blood pressure tends to decrease near the onset of dementia (11).

A 2024 cross-sectional study investigated the role of hypertension as a risk factor for cognitive impairment in Jordan. The study showed that hypertension was significantly associated with cognitive impairment ($p = 0.01$) (32). No other studies addressed hypertension as a risk factor in Jordan, despite it being a common comorbidity among dementia patients in Jordan (34).

4. Obesity and Body Mass Index (BMI):

A meta-analysis and systematic review of 14 studies with 77,890 participants investigated the relationship between obesity and dementia and found that midlife obesity was associated with all-cause dementia in late life (35). Another analysis of 21 studies involving 5,060,687 participants investigated the relationship between central obesity, determined by waist circumference or waist-to-hip ratio, and cognitive impairment. It found that central obesity was linked to a higher risk of cognitive impairment and dementia, with higher levels in those over 65 years old than other ages (36). A 2021 case-control study conducted in Jordan investigated BMI as a risk factor for dementia and found no significant association with dementia (5). Authors attributed the discrepancy with other studies to differences in socioeconomic and lifestyle factors of the populations studied. However, other studies show that obesity is a risk factor for those over 65, and including individuals with different ages may have masked the association in older individuals.

5. Education and Cognitive Activity

The level of cognitive stimulation and overall educational attainment have been shown to have protective effects against dementia (11). In fact, a prospective study conducted in Canada found lower risk of dementia in participants with high cognitive stimulation at work than in participants whose work involves low cognitive stimulation (37). In Jordan, a study conducted on 406 participants found that low level of education (illiteracy) was associated with increased risk of dementia (5).

6. Hearing Loss

Hearing loss is an extremely prevalent condition worldwide, affecting nearly 430 million individuals according to WHO (38). More specifically, it is prevalent in 63% of adults older than 70 years old according to some studies (39), whereby the incidence of hearing loss almost doubles every 10 years of a person's life (40). Worldwide, hearing loss is a well-established risk factor for dementia according to the Lancet 2024 report (9). A prospective cohort study based on 1984 older adults as a part of the Health ABC study in the United States concluded that hearing loss is independently associated with accelerated cognitive decline and incident cognitive impairment in community-based older adults (41). However, no studies have yet investigated the relationship between hearing loss and the incidence of dementia in Jordan.

7. Depression

The relationship between depression and dementia was shown to be bidirectional, as depression can be a symptom of developing dementia, a reaction to cognitive impairment or a cause of cognitive impairment (11).

Nonetheless, the LANCET 2024 report concluded that depression more than doubles the risk of dementia based on a meta-analysis (9). Regarding the link between depression and dementia in the Jordanian population, there is little evidence apart from a study that reported depression to be associated with moderate levels of aging-related cognitive impairment among nursing homes residents (42).

8. Smoking

Tobacco smoking is a well-established risk factor for dementia; specifically, midlife smoking was shown to be a stronger risk factor for dementia than smoking in late life (9). In concordance with that, another study with 4000 participants showed that early adulthood smoking (age 33-44) was the strongest factor for later development of dementia (43). In contrast, a study conducted in Jordan reported that smoking is not a significant risk factor for the later development of dementia (5). Another study investigated the neuropsychiatric manifestations of dementia in the Jordanian population also reported that smoking is not a significant predictor of neuropsychiatric symptoms among dementia patients (44). The negative associations between smoking and dementia in these studies may be related to the fact that the cross-sectional studies were conducted on older Jordanians, whereas the link to dementia relates to smoking in midlife. Other explanations for the apparent lack of associations include the small sample size, the specific population (hospitalized patients) and specific non-cognitive (neuropsychiatric) symptoms investigated.

Risk factors are summarized in Table 1.

Table 1: Risk Factors for Dementia

Risk Factor	Description	Reference
Low-Density Lipoprotein (LDL) Cholesterol	High midlife (but not late-life) LDL cholesterol is associated with increased dementia risk, with an 8% rise in incidence per 1 mmol/L increase.	Livingston G, Huntley J, Liu KY, Costafreda SG, Selbæk G, Alladi S, et al. Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. The Lancet. 2024 Aug;404(10452):572–628. Wee J, Sukudom S, Bhat S, Marklund M, Peiris NJ, Hoyos CM, et al. The relationship between midlife dyslipidemia and lifetime incidence of dementia: A systematic review and meta-analysis of cohort studies. Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring. 2023 Jan 8;15(1).
Diabetes Mellitus	Diabetes mellitus is associated with a significantly higher risk of dementia	Cao F, Yang F, Li J, Guo W, Zhang C, Gao F, et al. The relationship between diabetes and the dementia risk: a meta-analysis. Diabetol Metab Syndr. 2024 May 14;16(1):101.
Hypertension	Midlife systolic hypertension (≥ 140 mm Hg; mean age 55) linked to increased risk of all types of dementia	McGrath ER, Beiser AS, DeCarli C, Plourde KL, Vasan RS, Greenberg SM, et al. Blood pressure from mid- to late life and risk of incident dementia. Neurology. 2017 Dec 12;89(24):2447–54.
Obesity and Body Mass Index (BMI)	Midlife obesity and central obesity are linked to higher late-life dementia risk	Qu Y, Hu HY, Ou YN, Shen XN, Xu W, Wang ZT, et al. Association of body mass index with risk of cognitive impairment and dementia: A systematic review and meta-analysis of prospective studies. Neurosci Biobehav Rev. 2020 Aug;115:189–98. Tang X, Zhao W, Lu M, Zhang X, Zhang P, Xin Z, et al. Relationship between Central Obesity and the incidence of Cognitive Impairment and Dementia from Cohort Studies Involving 5,060,687 Participants. Neurosci Biobehav Rev. 2021 Nov;130:301–13.

Risk Factor	Description	Reference
Education and Cognitive Activity	Lower educational level (illiteracy) is associated with increased risk of dementia, while a higher level of cognitive stimulation have been shown to be protective.	Livingston G, Huntley J, Sommerlad A, Ames D, Ballard C, Banerjee S, et al. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. <i>The Lancet</i> . 2020 Aug;396(10248):413–46 Kofahi R, Aljezawi M, Abdalrahim A, Al Qadire M, Obiedat D, Aqaileh S. Annual Period Prevalence and Risk Factors of Dementia Among Older Jordanian Hospitalized Patients. <i>Int J Gen Med</i> . 2021 Feb;Volume 14:641–7.
Hearing Loss	Hearing loss is well established independent risk factor for dementia and cognitive decline.	Lin, F. R., Yaffe, K., Xia, J., Xue, Q. L., Harris, T. B., Purchase-Helzner, E., Satterfield, S., Ayonayon, H. N., Ferrucci, L., Simonsick, E. M., & Health ABC Study Group (2013). Hearing loss and cognitive decline in older adults. <i>JAMA internal medicine</i> , 173(4), 293–299. https://doi.org/10.1001/jamainternmed.2013.1868 Livingston G, Huntley J, Liu KY, Costafreda SG, Selbæk G, Alladi S, et al. Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. <i>The Lancet</i> [Internet]. 2024 Aug 10;404(10452):572–628.
Depression	The presence of depression more than doubles the risk of later development of depression	Livingston G, Huntley J, Liu KY, Costafreda SG, Selbæk G, Alladi S, et al. Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. <i>The Lancet</i> . 2024 Aug;404(10452):572–628
Smoking	Midlife smoking (rather than late life smoking) is associated with an increased risk of dementia later in life.	Livingston G, Huntley J, Liu KY, Costafreda SG, Selbæk G, Alladi S, et al. Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. <i>The Lancet</i> . 2024 Aug;404(10452):572–628

PREVENTION

Tremendous success has been achieved over the past two decades in the prevention of dementia by targeting and reducing well established risk factors, as evident by the 13% reduction in age-specific dementia

incidence in Europe and North America (45). In fact, reductions in risk factors discussed above have the potential to prevent 40% of cases of dementia (11). For example, individuals with healthy lifestyles; i.e., those who exercise regularly, do not smoke, avoid

alcohol, and are engaged in cognitive activities in late life have a lower incidence of dementia and delayed onset of age-related dementia, in addition to longer life expectancy (46). Finally, it should be noted that some studies suggest that higher socioeconomic status is associated with a lower incidence of dementia (47), which may in part be explained by better education, better access to healthcare, and awareness of the harmful effects of risk factors, leading to a healthier lifestyle and avoidance of those risk factors.

INTERVENTION

Dementia is a progressive condition that requires ongoing reassessment and use of tailored approaches to meet the changing care needs of individuals and carers over time. These needs are influenced by various factors including their own life course, family, friendship, cultural background, and environment, as well as changing cognitive, neuropsychiatric, functional, and physical symptoms. Despite the availability of evidence-based practices, dementia remains frequently under detected, and many individuals and their carers needs continue to go unmet (11,48).

In Jordan, there have been only a few studies investigating interventions for dementia once a diagnosis has been established. This underscores the need for further research in this area.

One study explored the feasibility and acceptability of implementing digital cognitive stimulation interventions for individuals with dementia. The study found that using digital touchscreen technology to deliver Cognitive Stimulation Therapy (CST) content showed promising improvements. This approach not only simplifies the process for staff but can potentially offer benefits for

individuals living with dementia. Importantly, the findings indicated that delivering CST via digital touchscreen technology is both feasible and acceptable, providing reassurance about the practicality of this approach (49).

Additionally, a mixed-method feasibility study was conducted in Jordan to assess the use of digital touch screens to deliver reminiscence therapy which showed a positive statistically significant and clinically meaningful difference in several relevant variables, including communication and cognitive abilities (50).

Another study explored the therapeutic potential of head-mounted display (HMD)-based Virtual Reality Relaxation Therapy (VRRT) sessions for people with dementia in Jordan. The VRRT intervention significantly reduced apathy, as evidenced by a decrease in Person-Environment Apathy Rating (PEAR) scores from 17.20 to 11.15. The study showed enhanced cognitive abilities in participants, as evidenced by a significant rise in their Saint Louis University Mental Status (SLUMS) scores from 15.11 to 19.70. The levels of anxiety and depression exhibited a significant decrease after the implementation of VRRT, with anxiety levels decreasing from 13.66 to 8.23 and depression levels decreasing from 13.62 to 9.33. Furthermore, 70% of participants demonstrated statistically significant decreases in indifference (51).

Global best practices for dementia care include; managing medical conditions, such as hypertension, diabetes, and chronic obstructive pulmonary disease (COPD); preventing and treating infections and delirium; ensuring a safe environment to prevent falls, and maintain function; medication rationalization; treatment of symptoms with behavioral interventions; use

of supportive and social services, including assistance with activities of daily living, physical activity, meaningful activities, social engagement, healthy nutrition and hydration, and addressing family carer needs (9,16,48).

However, most dementia interventions have been developed in HICs and should be co-designed with local communities to ensure appropriateness for the contexts, cultures, beliefs, and practices, which vary among countries. In LMICs, dementia often goes unrecognized and when diagnosed, resources for treatment and care are insufficient (52).

The applicability of evidence-based interventions in LMICs can be uncertain due to limited healthcare infrastructure and cultural differences that may affect their effectiveness. While core principles should be consistent across countries, interventions must be tailored to local language and cultural needs (53,54).

1. Evidence-Based Interventions for Dementia

a. Multidisciplinary Care

Multicomponent dementia care models focus on person-centered care coordination to assess risks and needs for individuals with dementia and their carers. A meta-analysis found that coordinated interventions improve neuropsychiatric symptoms and reduce carer burden. Some studies show reduced care home admissions and cost-effectiveness, which have not been confirmed by meta-analyses (55). Additionally, the close collaboration between primary and specialized care significantly reduces healthcare costs (56).

b. Carer Interventions

Caring for a person with dementia is challenging and can lead to anxiety and depression, especially early in the disease. A

meta-analysis found a 31.2% prevalence of depression among family carers (57). Evidence suggests that some carer interventions are effective. These include education, stress management, coping skills, emotional support, and future planning. These interventions reduce depression, burden, and stress (11). They are effective in high-income countries, but little evidence exists for their effectiveness in LMIC countries (58). A meta-analysis of internet-based psychoeducation for carers showed a small effect on depressive symptoms but not on anxiety, burden, or quality of life (59).

c. Interventions for Cognitive Symptoms

• Cholinesterase Inhibitors and Memantine

Cholinesterase inhibitors and memantine are the currently approved medications for treating cognitive symptoms in individuals with Alzheimer's disease and Lewy body dementia. Meta-analyses of randomized controlled trials suggest that these medications are linked to a decrease in symptom severity, enhanced cognition, better performance in daily activities, and a reduction in mortality among those with severe dementia (60). A study examining a registry of all new Alzheimer's dementia diagnoses in Sweden revealed that individuals treated with cholinesterase inhibitors had slightly, but consistently, dose-dependent better performance on the Mini-Mental State Examination (MMSE) over an average follow-up of five years than a matched group who did not use these inhibitors (61).

Another similar, propensity-matched, long-term study demonstrated even greater differences between individuals with dementia who did and did not use cholinesterase inhibitors. In 1,572 dementia

patients, those on cholinesterase inhibitors experienced an average MMSE score decline of 5.4 points, compared to a 10.8-point decline for those not taking the inhibitors over a follow-up period of 13.6 years. There was also a significant correlation between the use of cholinesterase inhibitors and lower all-cause mortality rates (62). Moreover, in a study involving 592 patients with Lewy body dementia, the 100 participants on cholinesterase inhibitors and the 273 participants taking both cholinesterase inhibitors and memantine exhibited a notably lower risk of death compared to 219 participants who did not use either medication (63). Clinical trials indicate that while these medications do not halt cognitive decline, they offer modest short-term advantages. Stopping these medications is associated with poorer long-term outcomes. Physicians can prescribe these relatively inexpensive and readily available treatments (particularly in high-income countries) with minimal side effects for patients with Alzheimer's disease and Lewy body dementia (9).

• *Amyloid β -Targeting Antibodies for Alzheimer's Disease*

Recent trials of anti-amyloid- β monoclonal antibodies for mild cognitive impairment (MCI) due to Alzheimer's disease and mild Alzheimer's dementia have shown mixed results. The CLARITY-AD trial (lecanemab) demonstrated a 0.45-point improvement on the Clinical Dementia Rating Scale-Sum of Boxes (CDR-SB) after 18 months, indicating less decline in cognition, daily activities, and composite outcomes (64). The TRAILBLAZER-ALZ 2 trial (donanemab) reported a smaller decline in cognition and functioning compared to placebo (65). The ENGAGE and EMERGE trials (aducanumab) had mixed outcomes,

with one showing a 0.39-point improvement on the CDR-SB and the other favoring placebo; Gantenerumab trials showed amyloid plaque reduction but no significant clinical improvement and Solanezumab trials did not slow cognitive decline but had a minor effect on CDR-SB (66). While effective at reducing amyloid plaques in the brain, anti-amyloid therapies show only modest clinical benefits, highlighting the multifactorial nature of AD, where amyloid- β buildup is likely only a part the complex pathophysiology of the disease (67).

Furthermore, these treatments are associated with amyloid-related imaging abnormalities (ARIA), which include edema (ARIA-E) and microhemorrhages (ARIA-H). Apolipoprotein E (APOE) ϵ 4 homozygous carriers are at the highest risk, with 33-41% incidence of ARIA-E for lecanemab and donanemab (65). Consequently, United States Food and Drug Administration (FDA) guidance recommends genotyping for APOE gene and patient counseling prior to treatment (68). The use of antibodies targeting amyloid- β for Alzheimer's disease is surrounded by several controversies. The cognitive benefits they provide are modest, and their clinical significance and duration remain uncertain. Treatment involves frequent infusions over 18 months, alongside regular MRI scans for safety monitoring, presenting challenges for healthcare systems that may lack the necessary infrastructure. Cost is another significant barrier; for example, lecanemab is priced at \$26,500 per patient per year, not including additional expenses for screening and monitoring. This high cost complicates widespread implementation. Furthermore, side effects such as brain edema and hemorrhage can affect up to 20% of patients receiving lecanemab and nearly double that for those

on donanemab, necessitating close monitoring. Finally, most real-world patients with Alzheimer's disease do not meet the eligibility criteria for clinical trials, limiting the generalizability of the findings (9).

• *Cognitive Stimulation Therapy and Cognitive Training*

Cognition-oriented treatments refer to a group of interventions focused on engaging thinking and cognition in an effort to improve or maintain cognitive processes and reduce functional impairment due to impaired cognition. Cognitive stimulation involves engagement in activities and discussions (usually in a group setting) aimed at the general enhancement of cognitive and social functioning and includes reality orientation group sessions or classes. Based on a systematic review of 15 randomized trials in 718 patients with dementia, cognitive stimulation improves cognition, quality of life, and communication in patients with mild-to-moderate dementia (69).

Cognitive training is a guided practice on structured tasks aimed at improving specific cognitive processes and abilities such as speed of information processing, attention, memory, and problem-solving. According to a systematic review of 33 randomized trials in 2,000 patients with mild-to-moderate dementia, cognitive training improves cognition and reduces disease severity compared to usual treatments or non-cognitive activities. However, when compared to other non-pharmacological interventions such as cognitive stimulation or cognitive rehabilitation, it did not show significant superiority (70).

2. Interventions for Neuropsychiatric Symptoms of Dementia

• *Activity interventions*

A systematic review and meta-analysis of seven studies of tailored activity program

interventions that use activities tailored to abilities and interests of persons living with dementia identified a moderate effect on improving quality of life, decreasing neuropsychiatric symptoms, and decreasing carer burden (71). Small pilot trials in LMICs demonstrated similar effects and confirmed that the outcomes can be applied across different cultural and socioeconomic settings (72,73). These interventions are also cost-effective because of decreased use of routine health-care systems by people receiving the intervention (74). Good-quality randomized controlled trials of exercise interventions for people with dementia reported that these interventions did not improve neuropsychiatric symptoms, cognition, or functioning (75,76). Overall, current evidence supports earlier studies showing that coordinated care, along with various activities and active engagement, can reduce depression and neuropsychiatric symptoms in people with dementia. Additionally, these approaches can improve overall well-being for these individuals. In some cases, they can also provide significant benefits for caregivers, such as saving time in caregiving tasks (9).

• *Sleep Disturbance Mitigation*

Dysregulation of the sleep-wake cycle is common in individuals with dementia due to multiple mechanisms, including pathophysiological processes affecting the hypothalamus and brainstem, inadequate activity and light exposure, pain, anxiety, among other environmental factors (77). A meta-analysis reported that the pooled prevalence of clinically significant sleep disturbances in community-dwelling individuals with dementia is 19%. This prevalence has remained unchanged over time, indicating that treatment options have not improved sleep in this population. Sleep

disturbances are less common in individuals with Alzheimer's disease (24%, 95% CI 16–33; n=310) compared to those with Lewy-body dementia (49%, 95% CI 37–61; n=65) (78).

There is limited evidence to support the effectiveness of medications improving sleep. A review of nine low-quality randomized controlled trials found low-certainty evidence from a small trial (n=30) suggesting that 50 mg of trazodone taken for two weeks might increase total sleep time by an average of 42.5 minutes. However, there was no significant impact on other sleep parameters. In a study involving 274 individuals with mild-to-moderate Alzheimer's disease, the use of an orexin antagonist for four weeks resulted in an average increase in sleep duration of 28.2 minutes and a decrease in time spent awake after sleep onset by 15.7 minutes. Importantly, this did not lead to an increase in adverse effects, although it did not affect the number of awakenings (79). There is no evidence supporting the efficacy of melatonin. Additionally, there are no clinical trials examining the effects of benzodiazepines, zopiclone, zaleplon, or zolpidem on sleep in individuals with dementia, although these medications may pose significant risks (9). Longitudinal studies in primary care have shown that higher doses of Z-drugs (such as zopiclone, zaleplon, and zolpidem—equivalent to ≥ 7.5 mg of zopiclone or >5 mg of diazepam) in people with dementia are associated with increased risks of fractures and strokes, suggesting that their use for this purpose should be avoided (80). Currently, there is no conclusive evidence that non-pharmacological interventions improve sleep in dementia, although some trials are underway to investigate this further.

• *Depression Treatment*

Evidence shows that antidepressants are no more effective than placebo for depression in people with dementia (11). Depression in people with dementia is likely different from depression in those without dementia, and the brain changes in different subtypes of dementia could reduce the efficacy of antidepressants (81). A Cochrane review of randomized clinical trials of psychological treatments for depression and anxiety in individuals with mild cognitive impairment or dementia found that cognitive-behavioral therapy (CBT)-based interventions, when added to usual care, had a significant effect on depressive symptoms or diagnosed depression. However, these treatments showed little to no benefit for individuals without baseline depressive symptoms or diagnosis. Supportive and counseling therapies were not found to be effective (82).

• *Management of Psychosis, Agitation, and Delirium*

Comprehensive clinical assessment is essential in suspected psychosis in dementia, as misremembering experienced by individuals with dementia is distinct from delusions, and new psychotic symptoms might be due to delirium (83). If a person with dementia is not distressed by psychosis, then they might not require treatment. Management should continue to start with non-pharmacological interventions to maximize stimulation, such as improving hearing and sight and increasing social interaction. Antipsychotics are associated with increased dementia-related mortality and should be used only when psychosis causes significant distress or functional impairment. Risperidone and aripiprazole have the strongest evidence for treating dementia-related psychosis, with risperidone showing a lower risk of stroke when used for delusions (84). Cholinesterase

inhibitors have a very small effect on improving psychosis in people with Alzheimer's disease, as shown by a meta-analysis of individual participant data from 12 randomized trials of cholinesterase inhibitors for psychotic symptoms as secondary outcomes in Alzheimer's disease (85). Agitation in dementia should be addressed first through non-pharmacological strategies. If medication is needed, risperidone is widely licensed and has the strongest evidence based on clinical trials for the treatment of agitation (9). Brexpiprazole has recently been approved by the United States FDA for agitation in Alzheimer's disease, though its efficacy is comparable to other atypical antipsychotics (86,87). Antipsychotics should be used cautiously due to increased risks of cardiovascular events and mortality (88).

Delirium is common, underrecognized and undertreated in older adults. It often coexists with dementia, but no definite evidence exists that any medication improves it. Benzodiazepines are ineffective and like antipsychotics, they are associated with increased mortality and morbidity (11). Delirium is associated with worse cognitive and functional outcomes, increased hospital stay, and a higher risk of mortality. It is a risk factor for long-term cognitive decline, with hospital-based studies showing a significant association between delirium and future cognitive deterioration (89,90). The management of delirium should prioritize treating the underlying cause and using non-pharmacological interventions such as optimizing sensory stimulation, pain management, and nutritional support. Hospitalized individuals with delirium require close post-discharge monitoring due to their high risk of cognitive and functional decline. Whether preventing and managing delirium in individuals without dementia

helps reduce the risk of developing dementia remains unclear and requires further investigation (91).

3. Alternative Interventions

• Reminiscence Therapy

Reminiscence therapy includes discussing past activities, events, memories and experiences, often using photographs, audio recordings, or other prompts. The intensity of reminiscence therapy can range from simple recall of a few select experiences to a structured in-depth review of the patient's entire life, including re-evaluation of positive and negative experiences. Therapy focused on relatively preserved past experiences may help patients with dementia develop cognitive strategies and help patients stay connected with their sense of self. Woods et al. (2018) found that reminiscence therapy may improve communication and interaction, and quality of life in care home settings, but may have little to no effect on cognition in patients with dementia (92). The British National Institute for Health and Care Excellent (NICE), an executive non-departmental public body that provides national guidance and advice to improve health and social care in the United Kingdom, suggests group reminiscence therapy for patients with mild-to-moderate dementia (16).

• Occupational Therapy

Occupational therapy may improve daily function and reduce caregiver burden according to a trial with 135 patients over 65 years old with mild to moderate dementia (93). The British National Institute for Health and Care Excellence (NICE) recommends considering occupational therapy for patients with mild-to-moderate dementia (16). The European Federation of Neurological Science (EFNS) recommends occupational therapy to improve patients' functioning and reduce the need for informal care (94).

• Music Therapy

A meta-analysis conducted by van der Steen et al. (2018) found that providing individuals with dementia in institutional care at least five sessions of a music-based therapeutic intervention reduces depressive symptoms and improves overall behavioral issues. Additionally, this intervention may enhance emotional well-being and quality of life while reducing anxiety, but it is unlikely

to have a significant effect on agitation, aggression, or cognitive function (95). Active music-making may slightly improve cognitive functioning in adults ≥ 65 years old with probable mild cognitive impairment or dementia according to a meta-analysis of 21 studies (96).

Evidence-based interventions are summarized in Table 2.

Table 2: Evidence-Based Interventions for Dementia

Intervention	Description	References
Multidisciplinary Care	Coordinated, comprehensive interventions improve neuropsychiatric symptoms and reduce carer burden	Backhouse et al. (2017) Meta-Analysis
Carer Interventions	Education, stress management, coping skills, support and future planning reduce depression, burden, and stress for caregivers.	Livingston et al. 2020 report of the Lancet Commission.
Cholinesterase Inhibitors and Memantine	Improve cognition, symptom severity and daily function, reduces mortality in severe dementia.	Profyri et al. (2022) Systematic review and Meta-Analysis
Amyloid β-Targeting Antibodies for Alzheimer's Disease	Drugs like aducanumab and lecanemab aim to reduce amyloid plaques; modest benefit with risk of adverse effects; FDA approved with caution. High cost complicates implementation.	Livingston et al. 2024 report of the Lancet Commission
Cognitive Stimulation Therapy and Cognitive Training	Group-based activities shown to improve cognition, quality of life and communication in mild-to-moderate dementia.	Woods et al. (2012) Cochrane Database
Activity Interventions	Tailored physical and recreational activities have moderate effect on improving quality of life, neuropsychiatric symptoms and carer burden.	Jeong J. et al. (2023) Systematic Review and Meta-Analysis
Sleep Disturbance Mitigation	-Limited evidence to support medications. -No evidence supporting melatonin or non-pharmacological interventions. -High doses of Z-drugs increase risk of fractures and strokes.	- McCleery et al. (2016) Cochrane Database -Livingston et al. 2024 report of the Lancet Commission -Richardson et al. (2020)

Intervention	Description	References
Depression Treatment	-Antidepressants are no more effective than placebo for depression in dementia. -Cognitive-Behavioral Therapy (CBT)-based interventions are beneficial.	-Livingston et al. 2020 report of the Lancet Commission. -Orgeta et al. (2022) Cochrane Database
Management of Psychosis, Agitation, and Delirium	-Non-pharmacological interventions should be used first for psychosis and agitation in patients with dementia. -Antipsychotics (risperidone and aripiprazole have the strongest evidence) to be used cautiously; increase risk of cardiovascular events and mortality. -Risperidone has the strongest evidence for agitation. -Delirium; prioritize treating underlying cause and using non-pharmacological interventions	-Ismail et al. (2022) -Livingston et al. 2024 report of the Lancet Commission -Schneider et al. (2005) Meta-Analysis -Khachaturian et al. (2020)
Reminiscence Therapy	-Discussing past activities, events and memories. -May improve communication, interaction, and quality of life.	-Woods et al. (2018) Cochrane Database -NICE; Dementia Guidance
Occupational Therapy	May improve daily function and reduce caregiver burden	-Graff et al. (2006) BMJ -NICE; Dementia Guidance
Music Therapy	-Improves overall behavioral issues. -May enhance emotional well-being and quality of life while reducing anxiety. -May slightly improve cognitive functioning in older adults with mild cognitive impairment or dementia	-Van der Steen et al. (2018) Cochrane Database. -Dorris et al. (2021) Systematic review and Meta-Analysis

DEMENTIA RESEARCH DIRECTIONS IN JORDAN

According to the 2017 WHO GDO, dementia-related publications in Jordan accounted for only 0.3% of all outputs in PubMed that year. The report also highlighted the lack of involvement of people with dementia in the research process, including investigational pharmacological trials. This indicates a gap in patient-centered research approaches and a deficiency in efforts to develop or test new treatments or

interventions for dementia in Jordan. Furthermore, the annual government investment in dementia research was not reported, raising concerns about either a lack of funding specifically allocated to this area or insufficient reporting policies regarding research funding (97). With the expected increase in dementia cases, greater attention should be directed toward dementia research in Jordan. Current studies identify the following key areas for future research and development (summarized in Table 3):

Table 3: Recommendations to Reduce Dementia Burden and Improve Care in Jordan

- Address the general population knowledge gap about dementia through public education and awareness initiatives.
- Establish and develop national comprehensive guidelines for dementia care to ensure consistent and effective care for individuals with dementia and their carers.
- Incorporate dementia education programs into medical, nursing and pharmacy students curricula to prepare health care workers for the expected future demand.
- Establish and develop a comprehensive dementia research agenda to guide studies, allocate resources, and address specific needs for the Jordanian population.
- Conduct comprehensive studies to determine dementia prevalence and its associated risk factors in Jordan, to allocate resources, inform healthcare planning for future demands, raise awareness, and implement prevention strategies.
- Explore culturally acceptable and feasible interventions for improving care and quality of life for individuals with dementia in different settings.

1. Public Education and Awareness

Research conducted in Jordan reveals a significant gap in knowledge and awareness about dementia among the general population. However, there is a positive attitude toward dementia patients (25). Additionally, even healthcare professionals, such as nurses, demonstrated lack of knowledge about Alzheimer's disease, which has been attributed to insufficient knowledge acquired during university education or lack of ongoing training after employment (98). To enhance understanding and support for those affected by dementia, it is essential to address this knowledge gap through public education and awareness initiatives.

2. Development of National Guidelines and Standards

Currently, Jordan lacks approved guidelines and standards for dementia care and support. Establishing comprehensive national guidelines is crucial to ensuring consistent and effective care for individuals with dementia across the country (97).

3. Integration of Dementia Care into Healthcare Curricula

Dementia education programs play a crucial role in preparing medical, nursing and

pharmacy students for effective dementia care. It is recommended that individuals living with dementia be involved in the co-production, design and curriculum development to enhance its relevance and applicability (99). In Jordan, it is essential to incorporate basic dementia competencies into the curricula for healthcare workers to prepare the workforce for the growing demand for dementia care. Currently, only a few educational programs provide such training (97).

4. Establishment of a Dementia Research Agenda

Jordan lacks a comprehensive research agenda dedicated to dementia. Developing a focused research plan is vital to guiding studies, allocating resources effectively, and addressing the specific needs of the Jordanian population (97).

5. Epidemiological Studies on Dementia Prevalence and Risk Factors

According to the 2024 report from the Lancet Standing Commission, there is a significant potential for risk reduction in LMIC countries, particularly among minority and lower socioeconomic groups. New evidence indicates that these populations

often bear a higher burden of modifiable risk factors compared to their counterparts in high-income countries, leading to a greater likelihood of developing dementia at a younger age (9). Comprehensive studies to determine dementia prevalence and its associated risk factors in Jordan are necessary to allocate vital resources and inform healthcare planning for future demands. It is also crucial to identify the factors that put the population at risk for developing dementia in order to raise awareness and implement prevention strategies, as these factors may vary between countries (5). A study conducted in Jordan reported a high prevalence and persistence of neuropsychiatric symptoms, which negatively impact patients' quality of life. The study concluded that future longitudinal research is needed to emphasize the importance of early diagnosis and management of neuropsychiatric symptoms in preventing dementia progression (44).

6. Exploration of Culturally Appropriate Interventions

Research into culturally appropriate interventions for improving care and quality of life for dementia patients in various settings remains scarce in Jordan. Few studies investigated digital cognitive stimulation therapy and reminiscence therapy that showed potential in enhancing cognitive abilities, quality of life, and social connections for individuals with dementia in Jordan (49,51). Further investigation into culturally acceptable and feasible interventions can provide valuable insights into effective care strategies for individuals with dementia. Addressing these areas through dedicated research and policy development is fundamental to enhancing dementia care and support in Jordan. This will help meet the needs of an aging

population and improve the quality of life for dementia patients and their families.

CHALLENGES

Current life expectancy in Jordan is 75 years for men and 77 years for women which has significantly increased over the past decades and is forecasted to increase to 84 and 84.7 years for men and women, respectively by 2050 (8). According to Jordanian National Population Commission, the proportion of old people will increase from 5.6% in 2023 of the total Jordanian population to 6.1% in the year 2030 and to 11% in the year 2050; thus, increasing the burden of dementia and other aging-related diseases (7). Additionally, the continuous political instability and wars in the surrounding region led to multiple waves of refugees seeking safety in Jordan, which contributed to even higher dementia rates and a greater burden of dementia (100).

In Jordan, the prevalence of dementia rose by 77% between 1990 and 2021 (4). The global prevalence of dementia is expected to nearly double every 20 years (2), whereas in the Middle East and North Africa (MENA) region, the prevalence is expected to rise by 438% over 40 years (2010-2050), suggesting rate of dementia will double every 10 years (101). The predicted increase in the prevalence of dementia in Jordan is lower than what is expected globally and in the MENA region, which might be due to low diagnosis rates in Jordan or because of Jordan's predominantly young population (102).

Prompt diagnosis of dementia is recognized as a critical priority since the identification of underlying causes and associated risk factors is crucial to optimizing and tailoring intervention (103). However, while the 2024 Lancet Commission report on dementia highlights the importance of early

detection of cognitive impairment, it primarily focuses on identifying and mitigating modifiable risk factors throughout life, rather than recommending specific screening tests (104). Studies are still lacking in Jordan, but challenging barriers to diagnosis in Jordan may include denial, stigma and fear, lack of knowledge, normalization of symptoms, desire to preserve independency, lack of need acknowledgement, recent changes in the society leading to lack of social network support, carer difficulties related to time management with their other duties and limited financial capabilities, lack of access to adequate healthcare, and lack of diagnosis services (105). The lack of specialized healthcare and access to it impose additional challenges including recognition of symptoms as a problem, and lack of knowledge, education, awareness campaigns, and social support (25). Evidence supporting diagnosis methods comes mainly from HICs (9). Dementia identification as a medical condition has been challenging in LMICs, in part due to paucity of studies and the limited resources that are mainly focused on infectious diseases, leaving mental health disorders often stigmatized and overlooked (9).

In general, patients in Jordan are more likely to present to healthcare services in the late stages of dementia (105). This might be due to several reasons such as strong family ties, good support at home and lack of health education, awareness, resources, accessibility, and belief (106). Because most studies related to diagnosis were developed in HICs, they may not be suitable for LMICs like Jordan where literacy status and culture are different, rendering guidelines and approaches inadequate and likely biased (106). A Jordanian study assessing cognitive

impairment utilized a screening test that was developed for Singapore, a HIC, but later validated for developing countries (32,107).

One quality indicator for dementia care is the diagnostic rate, defined as the proportion of individuals with dementia who receive a diagnosis. However, the recording of dementia diagnostic rate is not available for Jordan according to WHO (108). Nonetheless, it is likely that the diagnosis rate is relatively low in Jordan, as many cases of dementia go undiagnosed due to factors discussed above such as limited awareness, cultural barriers, and limited access to healthcare services (106). The rationale for timely diagnosis is to ensure that patients with dementia are provided with early and adequate care and support (103). Diagnosis of dementia remains a challenge in primary care; advanced imaging and laboratory biomarkers that can detect dementia precisely are still costly and unavailable and most often require a multidisciplinary approach by several mental health specialists (109). As discussed above, management of dementia symptoms includes close monitoring and control of risk factors that require changes in lifestyle such as physical activity and food intake (110), as well as pharmacological therapies approved to slow symptom progression (111,112). Thus, lack of communication between health care givers on one side and families and patients on the other impose a challenge to dementia care in Jordan, exacerbated by the patients' communication difficulties (113). In this regard, caregivers most often need assistance as caring for patients with dementia can be overwhelming (114). In Jordan, caregivers are mainly younger family members who face financial burden due to taking care of dementia patients. Additionally, the number of caregivers in Jordan is decreasing due to

financial constraints that force young caregivers to travel abroad seeking job opportunities. Although Jordanian society emphasizes family ties and respect toward the elderly due to religious and cultural beliefs, recent changes in culture might change these habits and behaviors in society (106). Changes in the society may be related to working or studying abroad or in other cities in Jordan, high financial demands forcing people to have more than one job. Thus, the changes may weaken some families' ties and social support networks.

Among Jordanians, awareness and knowledge of dementia are inadequate, although attitude toward dementia is positive (5). This finding highlights the importance of improving the experience in geriatric clinical practice, dementia education and training, and informal caregiving experience. In addition, social challenges are critical obstacles to proper dementia diagnosis and care in Jordan such as stigmatization and shame. There is limited research conducted to assess stigma in the Jordanian society regarding dementia (100). In addition, inadequate number and unequal distribution of day care centers in Jordan that provide social activities and services for patients with dementia represent an additional challenge (25).

Regional and local collaborations tackling dementia are highly needed. Unfortunately, collaborations are limited including policy and research collaborations (115). Therefore, more efforts between institutions are needed. Such efforts should be targeted towards healthcare educational programs to identify high-risk individuals and ultimately improve the standard of dementia care.

In 2007, senior citizens in Jordan were included in the civil health insurance program; however, to date there are no

specific geriatric services offered to the older age group within the Ministry of Health services or mental health services. Therefore, older people usually receive care within the chronic diseases services of the public sector (106).

Additional obstacles are observed, such as limited funding, shortage of neurologists and geriatricians, restrictive regulations, stigma and shame during data collection, and non-supportive research culture in the traditional Jordanian society (15). In developing countries, including Jordan, conducting more extensive research in dementia should be a high priority, and collaborations with national, regional and international research partners might be helpful to overcome the limited resources.

Regarding legislations, there are no dementia-specific laws in Jordan. However, the rights of people with dementia are addressed within wider frameworks such as the Jordanian Constitution, which prohibits discrimination and mandates equal rights and treatment (116); the National Strategy for Older Persons (2025–2030), which includes provisions for improving healthcare, protecting and supporting old people, including those with dementia (117); the Ministry of Health, which oversees regulations that ensure equal access to healthcare services for all citizens (118); and the Social Security Laws which provide financial support to eligible older persons, despite the limited coverage (119). Older women and men in Jordan encounter increasing challenges to meet their financial needs, given their reduced ability to work and limited and inadequate pensions. The Jordanian pension system has limited coverage; in 2021, only 45.8% of the elderly population in Jordan received pensions and 66% of pensions were below the national

poverty line, according to the 2021 Bulletin (120). According to the 2018 HelpAge International survey, two-thirds of older Jordanian men and women had debts (112); particularly, older women and elderly refugees. Only 16% of older women receive pensions and elderly Syrian refugees cannot receive their pensions from Syria; instead, they rely on humanitarian assistance (112). It is worth mentioning that 10-15% of the Jordan population are Syrian refugees, who are more prone to age-related illnesses, including dementia (100). Limited financial

resources of elderly people in Jordan negatively affect their chances of receiving appropriate medical care and support when they have dementia.

In summary, dementia care in Jordan is in dire need of improvement, and a systematic and comprehensive approach is needed to develop the infrastructure and processes needed to support people with dementia, their families and healthcare workers and address the growing demand for dementia care in Jordan.

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العبء والوقاية والتدخل والرعاية في مرض الخرف في الأردن

ونام الزيادة¹، إباء الزيادة²، محمد الجمل³، أحمد القطاونة²، بهاء الدين شفاقوج²، نبيل الكايد^{2،4}

الملخص

يُعدّ الخرف قضية صحية عامة و بارزة في الأردن، حيث يحتل المرتبة السابعة كسبب للوفاة بين الأفراد فوق سن الثمانين، والمرتبة الثامنة كسبب للوفاة بين الإناث من جميع الأعمار. تهدف هذه المراجعة المنهجية إلى تقديم نظرة شاملة حول عبء الخرف ورعايته في الأردن، مع تسليط الضوء على الارتفاع المستمر في معدل الانتشار والعوامل المرتبطة به. جمعت هذه المراجعة البيانات المتاحة من جميع الدراسات المتعلقة بأمراض الخرف في الأردن، مبيّنة زيادة نسبتها 77% في معدل الانتشار بين الأعوام 1990-2021 لجميع الفئات العمرية، إلى جانب ارتفاع ملحوظ في معدلات الوفيات المرتبطة به. وتشير الاتجاهات الديموغرافية الأساسية إلى تزايد أعداد كبار السن في الأردن، مما يستدعي تبني سياسات صحية استباقية. وقد شملت عوامل الخطر المحددة: تدني مستوى التعليم، ارتفاع ضغط الدم، داء السكري، والعزلة الاجتماعية، داعية إلى تدخلات متخصصة و متكيفة ثقافياً. وعلى الرغم من اعتراف منظمة الصحة العالمية بالخرف كأولوية في الصحة العامة، فإن الأردن يفتقر إلى خطة وطنية خاصة بأمراض الخرف، الأمر الذي ينجم عنه فجوات في التشخيص والرعاية والدعم. وتضطلع المنظمات غير الحكومية بدور محوري في رفع مستوى الوعي وتقديم الرعاية، إلا أن التحديات كالوصمة، و محدودية الموارد، وضعف البنية التحتية الصحية ما تزال قائمة. وأخيراً، نؤكد الحاجة الملحة إلى وضع إرشادات قائمة على الأدلة، وتعزيز التثقيف المجتمعي وإطلاق مبادرات بحثية لتحسين رعاية المصابين بالخرف ودعم أسرهم في الأردن.

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بورتلاند، أوريغون، الولايات المتحدة

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