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ORIGINAL ARTICLE

Impact of a Family-Based Educational Intervention on Knowledge, Attitudes, and Burden of Alzheimer's Caregivers

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ABSTRACT

Background: Family caregivers always encounter high levels of psychological distress and physical strain when caring for a person with dementia. Family-based intervention is an important option for providing effective and practical support.

The study aimed to examine the effects of a specific educational intervention on improving Alzheimer's caregivers' knowledge and attitudes and explore how it reduces their subjective burdens.

Material and Methods: A quasi-experimental research design was used with a purposive sample of 80 Alzheimer caregivers recruited conveniently from the Geriatric Society Association located at Almontazahat District, Jeddah, Saudi Arabia. To achieve the objectives of the current study 4 tools were used including demographic and personal data, Alzheimer's Disease Knowledge Scale (ADKS), The Dementia Attitudes Scale, and the burden scale of caregivers. Validity and reliability of the tools were confirmed and Cronbach's alpha of the Dementia Attitudes Scale was 0.87 and Cronbach's alpha of the burden scale of caregivers 0.941.

Results: the age of the studied subjects ranged from 20 to 60 years with a mean of 35.6±12.2 years. the studied subject's knowledge level and attitudes were improved post-intervention than before. These differences were statistically significant (t: 108.008, P:<0.001). While, the studied subject's disease burden level was decreased post-intervention than before These differences were statistically significant (t: 8.378, P:<0.001). There is a weak positive significant relation between the studied subject's knowledge level and attitude regarding dementia (r:0.286, P:0.010). Whereas there is no correlation noted between knowledge level and caregiver burden with no statistical significance (r: -.048, P: 0.674).

Conclusion and recommendation: the findings concluded that the studied subject's knowledge, attitude, and burden level were improved post-intervention than before with statistically significant differences. Therefore, it is recommended to develop a well-planned and structured educational program should be undertaken to improve the level of awareness and contribute to a better understanding of AD and dementia.

Keywords: Alzheimer's burden, caregivers' attitudes, families, intervention, knowledge.

INTRODUCTION

As life expectancy rises globally, chronic conditions associated with aging are becoming more prevalent. Alzheimer's disease accounts for 50% of dementia cases, and it is a challenging issue (Alzheimer's Disease International (ADI) 2018) It is now recognized that Alzheimer's dementia type poses a serious public health threat (Wimo,2018). Globally, 47 million people are living with dementia, a number that has been predicted to rise to 75 million by 2030 and 132 million by 2050 [Wimo,2018]. Family caregivers (hereafter, "caregivers") have an expanded role in this context (Drummond et al.,2019). By offering caregivers educational and social support interventions, caregivers build social relationships, get emotional comfort and information (Khalil, Aladwan, and Ajehani (2020).

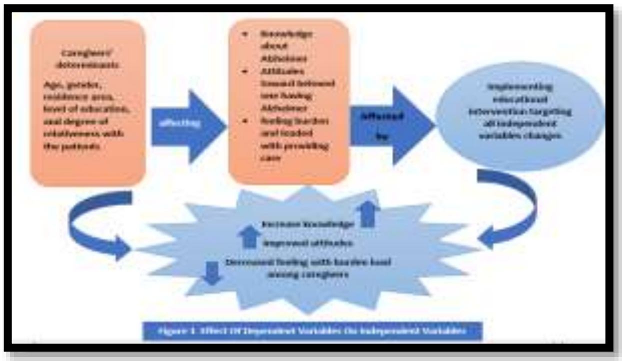
By 2050, the Alzheimer's Association estimates that the global Alzheimer's prevalence may reach 68% (Alzheimer's Association, 2019). Approximately 130 thousand people in Saudi Arabia have Alzheimer's disease, according to the Saudi Alzheimer's Association 2019. Love and devotion are expressed in that caregiver's role. As a result, the family system places an important emphasis on supporting each other (Chaudhuri & Das, 2006). Alzheimer's disease (AD) diagnosis and assessment can be stressful for the caregiver from a mental, physical, and financial perspective (Hongmei et al., 2015). In addition, the majority of family members would prefer not to receive a diagnosis in case their ability to live a normal life is destroyed (Cathleen & Mary 1996). To help families and caregivers manage Alzheimer's disease, families and caregivers need to understand what triggers the behaviors of Alzheimer's patients (Majoni & Oremus, 2017). The problem arises due to a lack of medical knowledge, social skills, and emotional skills, which makes it difficult to provide care to patients. Moreover, it can lead to burden and stress (Chaudhuri & Das 2006).

The level of perception of AD and burden of family caregivers has not been measured (Zawadzki et al., 2011) & (Zwingmann et al.,2018). The attitude assumed by the caregiver towards Alzheimer's disease can determine how much investment is made in the care, possibly increasing emotional distress and burden (Zawadzki et al., 2011). In the "learned helplessness" model, the experience of negative outcomes can be attributed to cognitive attributions or explanations. The caregiver's stress model proposed by Pearlin et al. (1990) relied on the family network, cultural background, and personal history to model the impacts of stress on caregivers' lives. Furthermore, there are difficulties related to employment, family, social life, finances, and some intrapsychic issues such as self-esteem and control. It was reported to the family caregivers that they were not getting any medical support and community resources for the management of AD. As well as medical, financial, emotional, and legal support. It will be easier for families to support their aging loved ones when they have a clear understanding of what factors can cause their behavior to change (Majoni & Oremus. 2017).

Additionally, the disease may result in increased subjective burdens. Due to this problem, the patients are not receiving proper physical and psychological care. According to a study conducted by Khalil, Aladwani, and Aljehan (2020), they concluded that the knowledge of the respondents was moderate while their attitude was negative, and, felt burden toward having Alzheimer's patients.

Significance of the Study: This negatively affects the patients' caregivers' because they are unaware of the problem. Saudi Arabia is fast becoming well-known as a country with an increasing prevalence of Alzheimer's disease. As a result, Alzheimer's families caregivers feel burdened nationally or internationally. In addition, there is a lack of consultants and institutions who can manage these difficulties faced by caregivers of Alzheimer's patients. As far as we know, the family caregivers did not attend the awareness program which does not exist. In addition, few studies have been conducted on this research area.

Conceptual Framework: Identifying factors that influence caregivers' decisions to care for their beloved Alzheimer patients is challenging. This study examines factors such as knowledge, attitudes, and the burden of giving care. Knowledge and attitudes can shape how we react to other people. A caregiver's approach to handling patients (burden of care) is influenced by their understanding of and attitude towards the behavioral symptoms the patient presents. According to this research, to identify the burden level among caregivers when they help to provide care for their patients (outcomes), the research teams aimed to identify the participant's level of knowledge and their attitudes, as well as burden level and its causes. And, then the effect of an interventional family-based educational program would explore how it reduces their subjective burdens as well as the factors that made participants have an increased burden of care. In addition, how do caregivers' determinant factors affect the level of care they provide to the participants? In addition, how do the caregiver's determinant factors affect the knowledge and the attitudes of the caregiver's loved one with Alzheimer's, and how are these factors affecting the burden of care level. As such, and by focusing on the outcome, Bennett's hierarchy model might prove useful for determining the burden of care level for caregivers and measuring the effects of an educational intervention on improving their knowledge and attitudes, and exploring how it decreases their burden of care toward loved Alzheimer patients. (Figure 1)



METHODOLOGY

Design: A quasi-experimental design was used.

Study Setting: Researchers at the Geriatric Society Association in Saudi Arabia's Almontazahat District in Jeddah carried out the research for this project. This is the only facility in Jeddah dedicated to the care of old individuals, specifically those suffering from Alzheimer's disease. In other words, the association's purpose is to provide assistance to 300 elderly people and the family members who care for them. Only 100 Alzheimer's patients' family caregivers are employed by the organisation..

Sampling technique and size calculation: A roasoft sample calculation recommended a minimum sample size of 80 caregivers with Alzheimer's patients who were recruited conveniently

The following equation is used to calculate the sample size n and margin of error E are given by

$$x = Z(^{c}/_{100})^{2}r(100-r)$$
$$n = ^{N\,x}/_{((N-1)E^{2}+x)}$$
$$E = \mathrm{Sqrt}[^{(N-n)x}/_{n(N-1)}]$$

where N is the population size, r is the fraction of responses that you are interested in, and Z(c/100) is the critical value for the confidence level of 95%, for a margin error of 5%

Inclusion criteria: Family caregivers who agree to participate in the study and are free from any mental illness burden, able to read and write, Arabic or English speakers, and their age did not exceed 45 years.

Exclusion criteria: All people didn't meet the inclusion given criteria.

Tools of the Study: To achieve the objectives of the current study 4 tools were used as follows:

1. The first instrument is to assess sociodemographic background. This involves asking participants questions such as age, marital status, level of education, and if they have previously attended workshops.
2. The second instrument is the Alzheimer's Disease Knowledge Scale (ADKS), which measures knowledge about Alzheimer's disease.
3. The Dementia Attitudes Scale was developed by O'Conner and McFadden for measuring attitudes toward dementia.
4. A fourth instrument is the Burden Scale for Family Caregivers (BSFC-s) developed by Graessel and coworkers (2014), which includes 10 items.

Validity and Reliability of the Scale: According to the original authors, the scale in its English version has structural validity. The instruments were translated into Arabic and then back-translated into English.

Pilot Study: A 10 participant was recruited to pilot the tools and to assess ambiguities, time requirements, and any difficulties the participants may have had in reading or understanding.

The 10 participants in that study will not be included in the current study. The reliability was done using Cronbach's alpha test and reported as Cronbach's alpha of the Dementia Attitudes Scale was 0.87 and Cronbach's alpha of the burden scale of caregivers 0.941.

Data Collection Procedure: After permission has been received from the CONJ research unit, KAIMRC, and IRB, the data collection process was begun. All family caregivers enrolled with the Geriatric Association, Jeddah, KSA was notified about the study, and they had been invited to participate with a leaflet and a brief explanation and/or discussion. The association manager prepared the patients' list names in a sampling frame. When using a table of allocation to study groups, families of Alzheimer's patients were identified by their code number

After receiving consent from the group to participate in the educational program, the program was conducted in 3-hours blocks every other day for 2 weeks. Each session lasted 45-60 minutes and covered the following objectives:

- Educate family caregivers about Alzheimer's disease.
- Help family caregivers recognize potential risk factors and causes of Alzheimer's disease
- Enable family caregivers to apply the different stress management and behavioral techniques to manage their beloved patients (communication, stress management techniques).

the program was conducted 3-hour blocks every other day for one week. Each session lasted 45-60 minutes into 6 sessions as follows:

Sessions number	Objectives	Content outlines
1.	○ Fill out a pre-test questionnaire ○ Explain the purpose and the plan of the program ○ Identify the caregiver's concerns and burdens concerning their caring with their patients	The first session was for an hour, half was given for pre-testing, and the other half was for warming up and identifying participants' concerns regarding the care of someone with Alzheimer's as well as their subjective burden related to this care.
2.	• Define Alzheimer • List difference between Alzheimer's and dementia • Discuss the warning signals of Alzheimer's.	The second session was focusing on the definition of Alzheimer's, the differences between Alzheimer's and dementia, as well as the warning signals that could be used to catch such patients in their early stages
3.	• Explain Alzheimer's stages • Define behavioral and psychological symptoms of Alzheimer's • Discuss the pharmacological and nonpharmacological treatment modalities of Alzheimer's	• In the 3rd session, a discuss Alzehimer cases, stages of alAlzheimerbehavioral disorders Alzheimer's patients, and pharmacological and nonpharmacological treatment modalities of Alzheimer's.

4.	Apply strategies to deal with : • Meeting basic needs of Alzheimer's patients including feeding, cleaning and hygiene, and routine care during the day. • How to communicate with their beloved one, especially with hallucination and delusional thoughts. • Teach how the caregivers maintain a safe environment and how to protect the patient from falls and injury. • Discuss how to deal with sundown syndrome and sleep pattern disturbances.	• During the 4th session, participants were learned what are the behavioral and symptoms management interventions which include: • How they can Adjust their living situation to the needs of a person with Alzheimer's disease • How they can deal with the Communication difficulties of their beloved one • Hygienic care including shower time, cleanliness, feeding, and involuntary urination. • Hallucinations and delusion management • How to deal with the patients' sundown syndrome and sleep pattern problems • How do you protect an Alzheimer's patient and maintain his safety in a home environment?
5.	• Discus how caregivers can deal with their feeling of loneliness, guilt, anxiety and depression and, behavioral managements • Discuss the services and resources that can help them to decrease burden.	5th session was concerned with how caregivers can deal with their feeling of loneliness, guilt, anxiety, and depression, behavioral management were explained and discussed such as stress management techniques sharing the responsibility with other persons in the patient's family to minimize burden and apply time out technique. Help families to identify how to access the services that could be provided by governmental institutions in Saudi Arabia.
6.	• Listen for Feedback from participants • Encourage the participants to ask question • Evaluate the program from the participant's points of view • Summarize the main points of learning experiences aquiered through the program • Ask to fill the post questionnaire.	• During the last sessions, participants were encouraged to provide feedback, ask questions, and summarize the results of the educational intervention. In addition, participants had given the opportunity to fill out a survey at the end of this session and the program.

Data Management and Analysis Plan: Using SPSS version 21.0, the data were coded and analyzed. Descriptive statistics were used to represent discrete variables as frequencies and percentages, and interval and ratio variables as means and standard deviations. For comparisons of knowledge evaluation item means between pre and post interventions, independent sample t-tests will be conducted. Moreover, the pre-and post-test scores of the family caregiver were analyzed using paired t-tests (that is, before and after the educational program). The associations between the participants' sociodemographic characteristics and their knowledge and attitudes will be tested using appropriate statistical tests, and the significance level was tested on $P < 0.05$.

Ethical Considerations: Formal approval was sought from the research unit at the College of Nursing, Jeddah, the KAIMRC, and the IRB.

RESULTS

Table 1: Dispersal of Study Subjects as per their Sociodemographic Data

Sociodemographic data	No. (80)	%
Age (Years)		
20 to less than 30	32	40.0
30 to less than 40	14	17.5
40 to less than 50	25	31.3
50 and more	9	11.3
Mean ± SD	35.6±12.2	
Min-Max	20-60	
Marital		
Single	33	41.3
Married	24	30.0
Divorced	13	16.3
Widow	10	12.5
Education		
Primary school	18	22.5
Middle school	16	20.0
High school	21	26.3
Bachelor's degree	22	27.5
Master	3	3.8
Family members have or had AD or dementia		
Yes	14	17.5
No	66	82.5
Currently or previously a caregiver for someone with AD or dementia		
Yes	13	16.3
No	67	83.8
Attended a support group or educational program related to AD or dementia		
Yes	8	10.0
No	72	90.0
Working or act as a volunteer who involved in working with people who have AD or dementia		
Yes	26	32.5
No	54	67.5

Table 1: showed that the age of the studied subjects ranged from 20 to 60 years with a mean of 35.6±12.2 years. Slightly more than two-fifths (41.3%) are single and less than one-third (30.0%) are married. Less than one quarter (22.5%) of them had a primary level of education one-fifth of them had the middle level of education, more than one-quarter of them had finished high school and have bachelor's degree (26.3% and 27.5% respectively) and the minority (3.8%) of them had master's degree.

Table 2: portrayed that the studied subject's knowledge level was improved post-intervention than before were around thirty percent (31.3%) of them had good knowledge level regarding Alzheimer's disease with a mean of 48.2±18.0 pre the program implementation that increased to 70% who have good knowledge level with a mean of 66.0±9.4 post the program.

Regarding the studied subject's dementia-related attitude, the table showed that the studied subject's attitude was improved post-intervention than before were less than half (47%) of them had a positive attitude regarding Alzheimer's disease with a mean of 67.4±13.8 pre the program implementation that increased to 63% with a mean of 68.2±14.2 post the program.

Concerning the studied subject's disease burden, the table also presented that the studied subject's burden level was decreased post-intervention than before where around one third (33%) of them had a high level of burden due to Alzheimer's disease with a mean of 30.5±20.1 pre the program implementation that decreased to 27% with a mean of 34.7±17.2 post the program.

Table 2: Study Subjects' Alzheimer's Disease Knowledge Prior to and Following the Intervention

	Pre		Post		t test P value
	No.	%	No.	%	
Alzheimer's disease knowledge level					
Poor	23	28.8	8	10.0	
Fair	32	40.0	16	20.0	
Good	25	31.3	56	70.0	
Mean% ± SD	48.2±18.0		66.0±9.4		t:-7.541 P:<0.001*
Dementia attitudes					
Negative attitude	33	41.3	17	21.3	
Positive attitude	47	58.8	63	78.8	
Mean% ± SD	67.4±13.8		68.2±14.2		t:108.008 P:<0.001*
Burden of Family Caregivers					
Low burden	47	58.8	53	66.3	
High burden	33	41.3	27	33.8	
Mean% ± SD	30.5±20.1		34.7±17.2		t: 8.378 P:<0.001*

FET: Fisher Exact Test P:P value of test of significance *: significant P at $P \leq 0.05$

Table 3: showed that there is a statistically significant association noted between the studied subject's knowledge level regarding Alzheimer's disease and their age, marital status, level of education, and attendance of support groups related to dementia.

Table 3: Association between The Study Subjects Alzheimer's Disease Knowledge Level and Their Sociodemographic Data.

Sociodemographic data	Alzheimer's Disease Knowledge Level								Test of sig.
	Poor		Fair		Good		Total		
	No.	%	No.	%	No.	%	No.	%	
Age (Years)									
20 to less than 30	1	3.1%	4	12.5%	27	84.4%	32	100.0%	FET:25.318 P:<0.001*
30 to less than 40	5	35.7%	7	50.0%	2	14.3%	14	100.0%	
40 to less than 50	2	8.0%	5	20.0%	18	72.0%	25	100.0%	
50 and more	0	0.0%	0	0.0%	9	100.0%	9	100.0%	
Marital									
Single	1	3.0%	4	12.1%	28	84.8%	33	100.0%	FET:13.438 P:0.018*
Married	4	16.7%	9	37.5%	11	45.8%	24	100.0%	
Divorced	3	23.1%	1	7.7%	9	69.2%	13	100.0%	
Widow	0	0.0%	2	20.0%	8	80.0%	10	100.0%	
Education									
Primary school	0	0.0%	4	22.2%	14	77.8%	18	100.0%	FET: 17.272 P:0.009*
Middle school	4	25.0%	7	43.8%	5	31.2%	16	100.0%	
High school	3	14.3%	1	4.8%	17	81.0%	21	100.0%	
Bachelor's degree	1	4.5%	4	18.2%	17	77.3%	22	100.0%	
Master	0	0.0%	0	0.0%	3	100.0%	3	100.0%	
Family members with or without Alzheimer's disease or other forms of dementia									
Yes	2	14.3%	1	7.1%	11	78.6%	14	100.0%	FET: 1.936 P:0.373
No	6	9.1%	15	22.7%	45	68.2%	66	100.0%	
Caregivers for someone with Alzheimer's disease or dementia									
Yes	2	15.4%	1	7.7%	10	76.9%	13	100.0%	FET: 1.785 P:0.392
No	6	9.0%	15	22.4%	46	68.7%	67	100.0%	
Attended a support group or educational program related to AD or dementia									
Yes	3	37.5%	1	12.5%	4	50.0%	8	100.0%	FET: 5.601 P:0.037*
No	5	6.9%	15	20.8%	52	72.2%	72	100.0%	
Working or act as a volunteer who involved in working with people who have AD or dementia									
Yes	3	11.5%	8	30.8%	15	57.7%	26	100.0%	FET: 3.231 P:0.216
No	5	9.3%	8	14.8%	41	75.9%	54	100.0%	

FET: Fisher Exact Test P:P value of test of significance *: significant P at P ≤0.05

Table 4: showed that there is a statistically significant association noted between the studied subject's dementia-related attitude and their age, marital status, attendance of support groups related to dementia, and if they working or act as a volunteer who involved in working with people who have AD or dementia.

Table 4: Association between The Study Subjects Dementia Attitude Level and Their Sociodemographic Data

Sociodemographic data	Dementia Attitudes						Test of sig.
	Negative attitude		Positive attitude		Total		
	No.	%	No.	%	No.	%	
Age (Years)							
20 to less than 30	6	18.8%	26	81.2%	32	100.0%	FET: 12.098 P:0.004*
30 to less than 40	8	57.1%	6	42.9%	14	100.0%	
40 to less than 50	3	12.0%	22	88.0%	25	100.0%	
50 and more	0	0.0%	9	100.0%	9	100.0%	
Marital							
Single	4	12.1%	29	87.9%	33	100.0%	FET: 11.253 P:0.007*
Married	6	25.0%	18	75.0%	24	100.0%	
Divorced	7	53.8%	6	46.2%	13	100.0%	
Widow	0	0.0%	10	100.0%	10	100.0%	
Education							
Primary school	3	16.7%	15	83.3%	18	100.0%	FET: 1.345 P:0.886
Middle school	4	25.0%	12	75.0%	16	100.0%	
High school	4	19.0%	17	81.0%	21	100.0%	
Bachelor's degree	6	27.3%	16	72.7%	22	100.0%	
Master	0	0.0%	3	100.0%	3	100.0%	
Have family members who have or had AD or dementia							
Yes	4	28.6%	10	71.4%	14	100.0%	FET: .544 P:0.461
No	13	19.7%	53	80.3%	66	100.0%	
Currently or previously a caregiver for someone with AD or dementia							
Yes	3	23.1%	10	76.9%	13	100.0%	FET: .031 P:0.860
No	14	20.9%	53	79.1%	67	100.0%	
Attended a support group or educational program related to AD or dementia							
Yes	4	50.0%	4	50.0%	8	100.0%	FET: 4.390 P:0.036*
No	13	18.1%	59	81.9%	72	100.0%	
Working or act as a volunteer who involved in working with people who have AD or dementia							
Yes	10	38.5%	16	61.5%	26	100.0%	FET:6.819 P:0.009*
No	7	13.0%	47	87.0%	54	100.0%	

FET: Fisher Exact Test P:P value of test of significance *: significant P at P ≤0.05

Table 5: showed that there is a statistically significant association noted between the studied caregiver burden and their marital status (FET: 9.789, P:0.018).

Table 6: portrayed the correlation matrix between total knowledge, attitude, and caregiver burden regarding Alzheimer's disease and dementia. There is a weak positive significant relation between the studied subject's knowledge level and attitude regarding dementia (r:0.286, P:0.010). Whereas there is no correlation noted between knowledge level and caregiver burden with no statistical significance (r: -

.048, P: 0.674). Finally, there is a weak positive significant relation between the studied subject's caregiver burden and attitude regarding dementia (r:0.371, P:0.001).

Table 5: Association between The Study Subjects Family Caregiver Burden Level and Their Sociodemographic Data

Sociodemographic data	Family Caregivers Burden						Test of sig.
	Low burden		High burden		Total		
	No.	%	No.	%	No.	%	
Age (Years)							
20 to less than 30	18	56.2%	14	43.8%	32	100.0%	FET: 2.620 P:0.457
30 to less than 40	10	71.4%	4	28.6%	14	100.0%	
40 to less than 50	19	76.0%	6	24.0%	25	100.0%	
50 and more	6	66.7%	3	33.3%	9	100.0%	
Marital							
Single	19	57.6%	14	42.4%	33	100.0%	FET: 9.789 P:0.018*
Married	14	58.3%	10	41.7%	24	100.0%	
Divorced	13	100.0%	0	0.0%	13	100.0%	
Widow	7	70.0%	3	30.0%	10	100.0%	
Education							
Primary school	12	66.7%	6	33.3%	18	100.0%	FET: 1.925 P:0.809
Middle school	9	56.2%	7	43.8%	16	100.0%	
High school	14	66.7%	7	33.3%	21	100.0%	
Bachelor's degree	15	68.2%	7	31.8%	22	100.0%	
Master	3	100.0%	0	0.0%	3	100.0%	
Family members have or had AD or dementia							
Yes	11	78.6%	3	21.4%	14	100.0%	FET: 1.152 P:0.283
No	42	63.6%	24	36.4%	66	100.0%	
Currently or previously a caregiver for someone with AD or dementia							
Yes	9	69.2%	4	30.8%	13	100.0%	FET:0.062 P:0.804
No	44	65.7%	23	34.3%	67	100.0%	
Attended a support group or educational program related to AD or dementia							
Yes	7	87.5%	1	12.5%	8	100.0%	FET: 1.795 P:0.180
No	46	63.9%	26	36.1%	72	100.0%	
Working or act as a volunteer who involved in working with people who have AD or dementia							
Yes	14	53.8%	12	46.2%	26	100.0%	FET: 2.650 P:0.104
No	39	72.2%	15	27.8%	54	100.0%	

FET: Fisher Exact Test P:P value of test of significance *: significant P at P ≤0.05

Table 6: Data from the study participants' attitudes of dementia and the burden on family caregivers are shown in a matrix of correlations.

Variables	Alzheimer's Disease Knowledge Level		Dementia Attitudes		Family Caregivers Burden	
	r	P	r	P	r	P
Alzheimer's Disease Knowledge Level			.286*	.010	-.048	.674
Dementia Attitudes	.286*	.010			.371**	.001
Family Caregivers Burden	-.048	.674	.371**	.001		

r: Pearson Correlation P: P-value of Pearson Correlation **: Correlation is significant at the 0.01 level

DISCUSSION

One of the main objectives of the MOH celebration on world Alzheimer's day is to enhance and raise awareness about Alzheimer's worldwide (MOH, 2020). The current study was conducted on a group of eighty caregivers aged 20 to 60 years with a mean of 35.6±12.2 years. Slightly more than two-fifths of them are single. And less than one-quarter of them had a primary level of education compared to more than one-quarter who had finished high school or had bachelor's degrees.

Since this study is not the only one dealing with AD assessment and service evaluation, this study focuses on caregivers' training to raise their awareness, skills, and attitude toward AD. And gain the benefits of minimizing their burden. Sometimes the problems of AD care come from misunderstanding and misconception of AD, so it is highly important to deal with this issue. In this regards Tan et al, 2021 study "Dementia knowledge and its demographic correlates amongst informal dementia caregivers in Singapore" stated that the study participants have a misconception regarding AD. So, training will reinforce the correction of these misconceptions and correct any rumors or myths regarding the disease.

The researchers in the current study start their study by assessment of the participant's knowledge level and they found that the studied subject's knowledge level was improved post-intervention than before where around thirty percent of them had good knowledge level regarding Alzheimer's disease with a mean of 48.2±18.0 pre the program implementation that increased to seventy percent who have good knowledge level with a mean of 66.0±9.4 post the program. These differences were statistically significant. These findings go in line with Khalil et al study in Jeddah (2020) as they found that respondents in their study had limited knowledge of Alzheimer's (Khalil, Aladwani, Aljehani, 2020). These findings confirm that training plays a vital role in raising awareness regarding the disease.

Furthermore, the current study looking for dementia-related attitude among the studied participants showed that the studied subject's attitude was improved post-intervention than before where less than half of them had a positive attitude regarding Alzheimer's disease with a mean of 67.4±13.8 pre the program implementation that increased to more than sixty percent with a mean of 68.2±14.2 post the program. These differences were statistically significant. These findings shed the light on the importance of understanding and interpreting why the burden is present and what are the factors affecting it.

All of these factors are taken into consideration in burden control training in the current study, where the studied subject's disease burden, the study also presented that the studied subject's burden level was decreased post-intervention than before where around one-third of them had a high level of burden due to Alzheimer's disease pre the program implementation that decreased to less than thirty percent post the program. Furthermore, the current study showed that there is a statistically significant association noted between the studied caregiver burden and their marital status, which are support Reed et al, 2014 and Liu et al, 2020 study findings. Burden control is one of the objectives of caregivers, especially those who have multiple responsibilities, that's why the studied caregiver was concerned with the understanding of its reasons and the correct ways to minimize it. So, the current study regarding this point was satisfactory as expected.

These findings are supported by the current study, where there is a statistically significant association noted between the studied subject's knowledge level regarding Alzheimer's disease and their age, marital status, level of education, and attendance of support groups related to dementia. Such findings were expected since older caregivers are more conscious to get knowledge to deal effectively with the AD patients and also their educational level, relation, and previous experience of the support groups affect their knowledge acquisition and interest.

These studies go in line with the current study aim, while the current study shed the light regarding the correlation matrix between total knowledge, attitude, and caregiver burden regarding Alzheimer's disease and dementia and portrayed that, there is a weak positive significant relation between the studied subject's knowledge level and attitude regarding dementia, with a weak positive significant relation between the studied subject's caregiver burden and attitude regarding dementia.

The concern given to caregiver's attitude toward AD is a brilliant idea, especially among the new caregivers who may become overwhelmed by the new responsibilities, which become more serious if these caregivers are facing this issue for the first time and didn't have any idea about the disease at all. Additionally, the burden level among these groups may be doubled than those who have previous experience. So, community health nurses and psychiatric care nurses must understand this issue and put this point of view into consideration when they going to plan and conduct a training session for these groups of caregivers. These facts are also reported by Burow, (2022), who considers that studying attitude is the first step among caregiver support.

Preserving dignity as well as the quality of life may be the main aim in such conditions among older people, caregivers must understand that their role goes beyond providing basic care such as feeding, changing clothes, and or other activities related to basic human needs. Psychological care and support sometimes exceed physiological care in its importance (Alzheimer's Association, 2022). So, understanding of this issue is highly appreciated to decrease the burden and affect the caregiver's attitude. Finally, caregiver support is also recommended to enhance the care provided to the elderly with AD at their end-of-life stage.

CONCLUSION

From the previous findings, it is concluded that the studied subject's knowledge, attitude, and burden level were improved post-intervention than before with statistically significant differences. There is a statistically significant association noted between the studied subject's knowledge level regarding Alzheimer's disease and their age, marital status, level of education, and attendance of support groups related to dementia and there is a statistically significant association noted between the studied subject's dementia-related attitude and their age, marital status, attendance of support groups related to dementia, and if they working or act as a volunteer who involved in working with people who have AD or dementia, and also there is a statistically significant association noted between the studied caregiver burden and their marital status. Finally, there is a weak positive significant relation between the studied subject's knowledge level and attitude regarding dementia, and there is a weak positive significant relation between the studied subject's caregiver burden and attitude regarding dementia. Whereas there is no correlation noted between knowledge level and caregiver burden with no statistical significance.

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