

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

Original Article

ISSN: 2457-0400 Volume: 9 Issue: 2 Page N. 74-81 Year: 2025

www.wjahr.com

THE IMPACT OF FAMILY CAREGIVERS KNOWLEDGE ON THE HEALTH OUTCOMES OF ELDERLY DIABETIC PATIENTS

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ABSTRACT

Background: Senior diabetes management depends on family careers; whose expertise greatly affects patient results. Carers learn to manage the condition, recognize complications, and promote medication adherence, enhancing patient and carer well-being. Targeted treatments can minimize healthcare expenses and enhance senior diabetes care, especially in resource-limited settings. This study examines how family carers' diabetes affects senior diabetics' QoL. Method: This study assessed the impact of family caregivers' knowledge on elderly diabetic patients' health outcomes, involving 200 caregiver-patient dyads at Baghdad Teaching Hospital. Data on patients' demographics, diabetes characteristics, and ADL, alongside caregivers' demographics and diabetes knowledge, were collected using structured questionnaires. The study spanned three months, with interviews conducted thrice weekly. Results: Most elderly diabetic patients (56%) were aged 60-69, with 70.7% being independent in daily activities and 52% reporting complications. Good knowledge was significantly associated with secondary education (p = 0.015), shorter diabetes duration (p = 0.04), and non-smoking status (p = 0.0001). Among caregivers, good knowledge correlated with secondary education (p = 0.05), employment (p = 0.05), and being the patient's spouse (p = 0.006). A strong association was found between the knowledge levels of patients and their caregivers (p = 0.0001). Conclusion: The health outcomes of senior diabetes patients depend on carer expertise, according to this study. Patients and carers need educational interventions to improve QoL and knowledge gaps. The results support global studies on collaborative, family-centered chronic disease treatment, highlighting the importance of carers in enhancing health outcomes for senior diabetics.

KEYWORDS: The Impact, Family Caregivers, knowledge, Health Outcomes, Elderly, Diabetic Patients.

INTRODUCTION

Diabetes mellitus is a global health concern, particularly among the elderly population, who often face a higher risk of complications due to age-related physiological changes and comorbidities. Managing diabetes in older adults involves not only medical interventions but also significant lifestyle modifications, including diet, physical activity, medication adherence, and regular monitoring of blood glucose levels.^[1] However, elderly diabetic patients frequently encounter challenges in adhering to these recommendations due to physical limitations, cognitive decline, or emotional factors. In such cases, the role of family caregivers becomes crucial in ensuring the effective management of the disease and improving health outcomes.^[2] Family caregivers, often spouses, children, or other close relatives, play a pivotal role in supporting elderly diabetic patients. Their responsibilities can range from assisting with daily tasks,

such as meal preparation and medication administration, to providing emotional support and ensuring timely medical consultations.^[3] The quality of care provided by family caregivers is strongly influenced by their knowledge of diabetes management. A caregiver's understanding of the disease, including its complications, treatment modalities, and lifestyle implications, can significantly impact the health and well-being of the elderly diabetic patient.^[4] Research indicates that family caregivers with adequate knowledge about diabetes are better equipped to manage the complexities of the disease. They can recognize early warning signs of complications, support adherence to prescribed treatment plans, and encourage healthy behaviors.^[5] Conversely, caregivers with limited knowledge or misconceptions about diabetes may inadvertently contribute to poor health outcomes, including frequent hospitalizations, worsening of the condition, or a decline in the patient's

overall quality of life.^[6] The relationship between caregiver knowledge and patient outcomes is particularly important in contexts where healthcare systems face resource limitations, such as in low- and middle-income countries. In these settings, family caregivers often act as the primary source of support for elderly patients, compensating for gaps in professional healthcare services.^[7] Enhancing caregivers' knowledge through targeted educational programs and interventions can therefore serve as a cost-effective strategy to improve diabetes management and reduce the burden on healthcare systems.^[8] Moreover, the emotional and physical well-being of caregivers themselves can influence their ability to provide effective care. Studies suggest that caregivers who feel confident and wellinformed are less likely to experience burnout, stress, or feelings of inadequacy. This, in turn, creates a positive feedback loop, where caregivers' improved mental and physical health contributes to better care and, ultimately, better health outcomes for the elderly diabetic patients they support.^[9] Despite the critical role of family caregivers, limited research has been conducted on the specific impact of their knowledge on the health outcomes of elderly diabetic patients. Understanding this relationship is essential for designing interventions that empower caregivers and enhance patient care. By addressing gaps in knowledge and providing practical tools for diabetes management, healthcare systems can leverage the potential of family caregivers to improve the quality of life for elderly diabetic patients.^[10] The objective of this study is to determine the influence of family caregivers' diabetes on the QoL among elderly patients with diabetes mellitus (DM).

METHOD

This cross-sectional study was conducted to explore the impact of family caregivers' knowledge on the health outcomes of elderly diabetic patients. The study included 200 primary caregivers and their respective elderly patients with diabetes attending the geriatric department at Baghdad Teaching Hospital.

Participants: The inclusion criteria for elderly diabetic patients were males aged 60 years or older, with a physician-confirmed diagnosis of diabetes mellitus for more than one year. For caregivers, inclusion criteria required being a primary caregiver aged 18 years or older, having a familial relationship with the patient, providing care for more than a year, and being free of diabetes. Exclusion criteria included paralytic patients, dyads unwilling to participate, or caregivers who did not meet the outlined criteria.

Data Collection Tools: Data were collected through structured surveys and questionnaires over three months, from August to October 2024. For elderly diabetic patients, data were divided into two parts.

1. Part 1: Elderly Diabetes Characteristics and Clinical Data: Information collected included demographic variables (sex, age, weight, height,

education, marital status, occupation, financial status, smoking, alcohol consumption, living arrangement), diabetes-related factors (duration, treatment type, comorbidities, complications), and lifestyle habits.

- 2. Part 2: Activities of Daily Living (ADL) Questionnaire: A validated 10-item tool assessed the ability to perform basic daily tasks such as feeding, grooming, and mobility. For caregivers, data were similarly divided
- 1. Part 1: Caregiver Characteristics and Care Information: This included demographic details, relationship to the patient, years of caregiving experience, daily caregiving hours, and presence of a secondary caregiver.
- 2. Part 2: Diabetes Knowledge: The 20-item T-SDKS questionnaire assessed caregivers' understanding of diabetes management.

Data Collection Procedure: Data were collected three days per week, with three-hour sessions per visit, during which participants were interviewed and questionnaires were completed.

Data Analysis: Descriptive and analytical statistical methods were employed using SPSS (version 18). The Chi-square (X^2) test was used to examine associations between variables.

Ethical Considerations: The study received prior approval from the medical team at the geriatric clinic. Participants were informed about the study's purpose, assured confidentiality, and their right to withdraw at any time. Written consent was obtained from all participants.

RESULTS

Table 1 summarizes the distribution of patients based on various study variables.

Age Groups: Most patients were between 60-69 years (56%), followed by 70-79 years (33.3%), and 80-89 years (10.7%).

Education Levels: The majority had secondary education (50.7%), while 27.3% had primary education. **Marital Status**: The majority were married (89.3%).

Monthly Income: About 48% earned less than 500, while 34.7% earned more than 750.

Smoking: 80.7% were non-smokers, and 5.3% were active smokers.

Alcohol Consumption: None reported alcohol dependence.

Activities of Daily Living (ADL): 70.7% were independent.

Complications: Slightly over half (52%) reported complications.

Diabetes Duration: Most had diabetes for ≥ 10 years (56.7%).

Table 1: distribution of patients according to study var	iables.
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variables		frequency	percentage
	60-69	84	56.0
Age groups (years)	70-79	50	33.3
	80-89	16	10.7
	No	33	22.0
Education	Pri.	41	27.3
Education	sec.	76	50.7
Mouried	No	16	10.7
Warneu	Yes	134	89.3
	< 500	72	48.0
Monthly income	500 - 750	26	17.3
	> 750	52	34.7
	No	121	80.7
Smoking	Quit	21	14.0
	Yes	8	5.3
Alcohol	No	150	100.0
	Depend.	4	2.7
	Ind.	106	70.7
ADL	NO	2	1.3
	Semi	38	25.3
Complication	No	72	48.0
Complication	Yes	78	52.0
	\leq 5 Y	38	25.3
Time of diabetic mellitus	6-9 Y	27	18.0
	$\geq 10 \text{ Y}$	85	56.7

As show in fig 1, 80 (53.3%) of patients have poor to fair knowledge, and 70 (46.7%) have good knowledge.



Fig 1: distribution of patients according to their knowledge.

Table 2 summarizes the distribution of patients based on additional study variables.

Age Groups: Most patients were aged ≥ 60 years (30%), followed by 40-49 years (22%), 30-39 years (20.7%), and 50-59 years (17.3%). The lowest proportion was among patients aged 20-29 years (10%).

Education Levels: The majority had secondary education (62%), while 20% had primary education.

Marital Status: Most patients were married (74%), with 26% being unmarried.

Employment: 58% were unemployed, while 42% were employed.

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Relation: Patients were mostly related to their caregivers as spouses (40%), sons (32.7%), or other relatives (27.3%).

Time Spent Caring: Most caregivers spent <7 hours daily caring for the patients (78%). 13.3% spent 8-16 hours, while 8.7% spent >17 hours.

Years of Caring: The majority of caregivers had been caring for <5 years (68%), with 32% caring for >5 years. **Secondary Care**: 63.3% had access to secondary care, while 36.7% did not.

DMQ 1: 76% of patients answered "No," while 24% answered "Yes."

varia	bles	frequency	percentage
	20-29	15	10.0
	30-39	31	20.7
Age groups (years)	40-49	33	22.0
	50-59	26	17.3
	≥60	45	30.0
	No	27	18.0
Education	Pri.	30	20.0
	sec.	93	62.0
Manniad	No	39	26.0
Marrieu	Yes	111	74.0
Employment	NO	87	58.0
Employment	Yes	63	42.0
	Relative	41	27.3
Relation	SON	49	32.7
	Spouse	60	40.0
	< 7 h	117	78.0
Time spend	> 17 H	13	8.7
	8 - 16 H	20	13.3
Voors of coring	< 5 Y	102	68.0
rears of caring	> 5 Y	48	32.0
Secondary caring	No	55	36.7
secondary caring	Yes	95	63.3
	No	114	76.0
	YES	36	24.0

Table 2: distribution of patients according to study variables.

Table 3 presents the association between patient knowledge and various study variables.

Age Groups: Most patients aged 60-69 had either poorto-fair (53.8%) or good knowledge (58.6%). Patients aged 70-79 and 80-89 had relatively lower percentages of good knowledge. no significant association was observed (p = 0.7).

Education: Secondary education was significantly associated with better knowledge (51.4%, p = 0.015). Those with no education predominantly had poor-to-fair knowledge (30%).

Marital Status: Married patients predominantly had either poor-to-fair (91.3%) or good knowledge (87.1%); however, no significant association was observed (p = 0.4).

Income: Higher monthly income (>750) was associated with better knowledge, but this was not statistically significant (p = 0.1).

Diabetes Duration: Patients with diabetes for ≤ 5 years showed significantly better knowledge (p = 0.04).

Smoking: Non-smokers had significantly better knowledge (67.1%), while smokers mostly had poor-to-fair knowledge (p = 0.0001).

Activities of Daily Living (ADL): Independent individuals had better knowledge (74.3%), though this association was not statistically significant (p = 0.14).

Complications: No significant difference was observed in knowledge levels based on the presence of complications (p = 0.8).

Table 3: association between knowledge of patients and study variables.

	Knowledge		Drohuo
Age Group	Poor to fair	Good	F-value
60-69	43 (53.8%)	41 (58.6%)	
70-79	27 (33.8%)	23 (32.9%)	0.7
80-89	10 (12.5%)	6 (8.6%)	
Education	Poor to fair	Good	P-value
No Education	24 (30.0%)	9 (12.9%)	
Primary	16 (20.0%)	25 (35.7%)	0.015
Secondary	40 (50.0%)	36 (51.4%)	
Marital state	Poor to fair	Good	P-value
No	7 (8.8%)	9 (12.9%)	0.4
Yes	73 (91.3%)	61 (87.1%)	0.4
Income	Poor to fair	Good	P-value
< 500	37 (46.3%)	35 (50.0%)	0.1

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500 - 750	10 (12.5%)	16 (22.9%)		
> 750	33 (41.3%)	19 (27.1%)		
Time of DM	Poor to fair	Good	P-value	
< 5 Y	14 (17.5%)	24 (34.3%)	0.04	
6-9 Y	18 (22.5%)	9 (12.9%)		
>10 Y	48 (60.0%)	37 (52.9%)		
Smoking	Poor to fair	Good	P-value	
No	74 (92.5%)	47 (67.1%)		
Quit	4 (5.0%)	17 (24.3%)	0.0001	
Yes	2 (2.5%)	6 (8.6%)		
ADL	Poor to fair	Good	P-value	
Depend.	4 (5.0%)	0 (0.0%)		
Ind.	54 (67.5%)	52 (74.3%)	0.14	
NO	2 (2.5%)	0 (0.0%)	0.14	
Semi	20 (25.0%)	18 (25.7%)		
Complications	Poor to fair	Good	P-value	
NO	39 (48.8%)	33 (47.1%)	0.8	
Yes	41 (51 2%)	37 (52.9%)	0.8	

As show in fig 2, 94 (62.7%) of patients have poor to fair knowledge, and 56 (37.3%) have good knowledge.



Fig 2: distribution of relative according to their knowledge.

Table 4 analyzes the association between the knowledge of relatives (caregivers) and various study variables.

Age Groups: Relatives aged ≥ 60 years had the highest proportion of good knowledge (44.6%). Poor-to-fair knowledge was more common in younger age groups, particularly 20-29 years (12.8% vs. 5.4% good knowledge). This association was statistically significant (p = 0.017).

Education: Relatives with secondary education had the highest percentage of good knowledge (50%). Primary education and no education were associated with poorer knowledge levels. This association was significant (p = 0.05).

Marital Status: Married relatives had better knowledge (78.6%) compared to unmarried ones (21.4%), though the association was not significant (p = 0.3).

Employment: Employment was significantly associated with knowledge, with 67.9% of employed relatives showing good knowledge (p = 0.05).

Relation to Patient: Spouses had the highest percentage of good knowledge (53.6%), while sons (17.9%) and

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other relatives (28.6%) showed poorer knowledge. This association was statistically significant (p = 0.006).

Time Spent Caring: Relatives who spent >17 hours caring had a higher percentage of good knowledge (12.5%), but the association was not significant (p = 0.12).

Years of Caring: Those caring for ≥ 5 years had slightly better knowledge (35.7%) compared to those caring for <5 years (64.3%). This difference was not statistically significant (p = 0.4).

Secondary Care: No significant association was observed between access to secondary care and knowledge levels (p = 1.000).

DMQ 1: Knowledge levels were not significantly associated with the DMQ 1 responses (p = 0.5).

Knowledge			
Age Group	Poor to fair	Good	P-value
20-29	12 (12.8%)	3 (5.4%)	
30-39	20 (21.3%)	11 (19.6%)	
40-49	21 (22.3%)	12 (21.4%)	0.017
50-59	21 (22.3%)	5 (8.9%)	0.017
≥60	20 (21.3%)	25 (44.6%)	
Education	Poor to fair	Good	P-value
No Education	15 (16.0%)	12 (21.4%)	
Primary	14 (14.9%)	16 (28.6%)	0.05
Secondary	65 (69.1%)	28 (50.0%)	
Marital state	Poor to fair	Good	P-value
No	27 (28.7%)	12 (21.4%)	0.2
Yes	67 (71.3%)	44 (78.6%)	0.5
Employment	Poor to fair	Good	P-value
No	49 (52.1%)	38 (67.9%)	0.05
Yes	45 (47.9%)	18 (32.1%)	0.05
Relation	Poor to fair	Good	P-value
Relative	25 (26.6%)	16 (28.6%)	
Son	39 (41.5%)	10 (17.9%)	0.006
Spouse	30 (31.9%)	30 (53.6%)	
Time spend	Poor to fair	Good	P-value
< 7 h	72 (76.6%)	45 (80.4%)	
8 - 16 h	16 (17.0%)	4 (7.1%)	0.12
> 17 h	6 (6.4%)	7 (12.5%)	
Years of caring	Poor to fair	Good	P-value
< 5 Y	66 (70.2%)	36 (64.3%)	0.4
\geq 5 Y	28 (29.8%)	20 (35.7%)	0.4
Secondary caring	Poor to fair	Good	P-value
No	34 (36.2%)	21 (37.5%)	1 000
Yes	60 (63.8%)	35 (62.5%)	1.000
DMQ 1	Poor to fair	Good	P-value
No	73 (77.7%)	41 (73.2%)	0.5
Yes	21 (22.3%)	5 (26.8%)	0.5

 Table 4: association between knowledge of relative and study variables.

Table 5 presents the association between the knowledge levels of patients and their relatives (caregivers).

Knowledge of Relatives: Relatives with poor-to-fair knowledge were associated exclusively with patients

who also had poor-to-fair knowledge (85.1%). Relatives with **good= knowledge** were significantly associated with patients who also had good knowledge (100%). The association was highly statistically significant (p = 0.0001).

1/ 1/	Table 5: association	between knowledge of	patients and knowledge of relative.
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	Knowledge		Drohuo
knowledge of relative	Poor to fair	Good	P-value
Poor to fair	80 (85.1%)	0 (0.0%)	0.0001
Good	14 (14.9%)	56 (100.0%)	0.0001

DISCUSSION

The findings of this study underscore the critical influence of family caregivers' knowledge on the health outcomes and quality of life (QoL) of elderly diabetic patients. The majority of patients and their caregivers demonstrated suboptimal knowledge levels, with only 46.7% of patients and 37.3% of caregivers achieving good knowledge scores. This knowledge gap significantly correlates with patient demographics, caregivers' education levels, and caregiving practices,

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highlighting areas for targeted interventions to improve diabetes management outcomes. Among patients, higher education levels were associated with better diabetes knowledge, consistent with findings from other studies, such as those by Ayele et al. (2012) and Bains & Egede (2011), which reported that literacy and educational attainment positively influence health literacy and selfmanagement skills. Similarly, shorter diabetes duration (\leq 5 years) was linked with better knowledge, suggesting that disease chronicity might reduce motivation for

continuous learning, as previously noted by Bidonde J et al. (2017).^[11-13] Smoking also emerged as a significant determinant, with non-smokers demonstrating better knowledge. This finding aligns with research indicating that healthier lifestyle choices often correlate with greater health awareness (Miller et al., 2014).^[14] Caregivers' knowledge levels were significantly influenced by their education, relationship to the patient, and employment status. Secondary education was strongly associated with good knowledge, reflecting the role of education in equipping individuals with the skills needed to access and comprehend health information, as supported by Hu et al. (2017).^[15] Spouses had the highest knowledge levels, likely due to their close involvement in daily patient care, echoing findings by Seo K et al. (2023).^[16] Employment status also correlated positively with knowledge, suggesting that employed caregivers may have better access to resources or training, as reported by Chi NC et al. (2024).^[17] Interestingly, caregivers spending more time in caregiving roles did not necessarily have better knowledge, a finding consistent with the results of Awadalla et al. (2017), which indicated that caregiving burden might limit opportunities for education and skill development. Similarly, years of caregiving experience did not significantly improve knowledge, emphasizing the need for structured education programs irrespective of caregiving duration.^[18] A strong association was observed between the knowledge levels of patients and their caregivers, with good caregiver knowledge significantly linked to good patient knowledge (p = 0.0001). This interdependence highlights the bidirectional nature of health education within family units, as suggested by studies like those of Baig et al. (2015) and Rosal et al. (2004), which emphasize collaborative education models for chronic disease management.^[6,19] The findings underscore the need for comprehensive educational interventions targeting both elderly diabetic patients and their caregivers. Educational programs should focus on enhancing literacy about diabetes complications, treatment modalities, and selfmanagement practices. Structured caregiver training has been shown to improve health outcomes in similar contexts, as demonstrated by Rabiei et al. (2013).^[20] Moreover, the study highlights the importance of addressing sociodemographic disparities. Tailored interventions that consider factors like education, caregiving burden, and the caregiver-patient relationship can maximize the effectiveness of educational efforts. In resource-limited settings like Iraq, leveraging community workers and technology-based education health platforms could be cost-effective solutions, as supported by research from Nikpour S et al. (2022).^[5]

CONCLUSION

This study demonstrates that caregiver knowledge plays a pivotal role in shaping the health outcomes of elderly diabetic patients. Educational interventions targeting both patients and caregivers are essential to bridging knowledge gaps and enhancing QoL. The findings align

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with global research emphasizing collaborative, familycentered approaches in chronic disease management, reaffirming the critical role of caregivers in improving health outcomes for elderly diabetic patients.

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