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## Clinical Study

# Impact of indoor education on the lifestyles of patients with chronic disease in a secondary hospital in Qassim, Kingdom of Saudi Arabia

Farid M. Midhet, Ph.D and Abdulrahman Al-Mohaimed, MD, MHPE \*

Department of Family and Community Medicine, College of Medicine, Qassim University, Buraidah, Kingdom of Saudi Arabia

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### KEYWORDS

Education;  
 Kingdom of Saudi Arabia;  
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**Abstract Objectives:** Altering patient behavior is the key to successful management of noncommunicable diseases. Our aim was to determine the impact of indoor education in a secondary hospital in Qassim, Kingdom of Saudi Arabia, on patients' dietary habits and physical activity after discharge from the hospital.

**Methods:** We interviewed 169 patients with noncommunicable diseases who had recently been discharged from the hospital about their dietary habits and physical activity. We extracted information about their education during the hospital stay from their files and verified the information by questioning the patients.

**Results:** Of the 169 patients, 68% were female, and 53% were 60 years or older; 57% had diabetes plus hypertension or coronary artery disease, 24% had only diabetes, and 19% had only hypertension or coronary artery disease. A healthy diet and light exercise were weakly related to gender, marital status, education and income category, although no definite pattern was seen; similar results were found with regard to the underlying condition. At the time of interview, only 25% of patients had a healthy diet and were doing regular exercise. The frequency of health education sessions and the education provider being a doctor were significantly associated with having a healthier diet and regular exercise after discharge.

**Conclusions:** In our sample, indoor education had a minimal impact on patients' diet and physical activity after discharge.

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## Introduction

Kingdom of Saudi Arabia has the second highest prevalence of type 2 diabetes mellitus in the world. About 40% of Saudi

adults aged 30 years and over are either diabetic or have an impaired fasting glucose level, rendering them at risk for hypertension and coronary artery disease.<sup>1</sup> Coronary artery disease, hypertension and diabetes are also the leading causes

\* Corresponding address: Assistant Professor, Department of Family and Community Medicine, College of Medicine, Qassim University, P.O. Box 6655, Buraidah 51452, Kingdom of Saudi Arabia. Tel.: +966 3800050x2525; fax: +966 3801228.

E-mail: [armoh@qumed.edu.sa](mailto:armoh@qumed.edu.sa) (A. Al-Mohaimed)

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of death and disability in Kingdom of Saudi Arabia. While no definitive cure is available for these diseases, current treatment regimens are effective if accompanied by changes in the patient's lifestyle; altering the social and behavioral aspects of a patient's life is the key to successful management.<sup>2</sup> Secondary prevention to enable and empower patients and their families to control the disease and become a partner in its management is vital for reducing the burden of chronic diseases in Kingdom of Saudi Arabia. Preventing complications would not only help reduce health-care costs but would also improve the quality of life of patients and their families.<sup>3,4</sup>

Clinical care in general lacks emphasis on patient and family education. A review of the literature on elderly patients with heart failure, for example, showed that these patients have poor knowledge and lack understanding of their disease and self-care.<sup>5</sup> This is true in spite of the fact that there is an abundance of evidence for the positive effects of patient education in the treatment of all diseases. A short informative programme for patients with obstructive sleep apnoea significantly improved their outcomes.<sup>6</sup> In a quasi-experimental study, a tailored approach to patient education was compared with the usual approach for patients with congestive heart failure, hypertension and diabetes; patients who received education tailored to their needs and level of activity, showed greater improvement in biometric variables and adherence to prescribed regimens and had lower readmission rates.<sup>7</sup> A meta-analysis of 163 published and unpublished reports (with over 22,000 patients) found that targeted education and exercise training significantly improved physical activity in an extremely diverse patient population.<sup>8</sup> A review of studies of diabetic patients' fear of hypoglycaemia suggested that patient education decreases this fear and improves management.<sup>9</sup> A randomized controlled trial of the impact of empowerment education on the knowledge of patients with diabetes and their quality of life showed a positive effect.<sup>10</sup>

Education and encouraging patient participation in the management of chronic illness have independent effects on outcomes. A systematic review of published studies on coronary artery disease patients suggested that this approach could achieve an up to 40% reduction in poor outcomes.<sup>11</sup> A study in Iran showed a significant improvement in healthy behavior after patient education. The link between patient education and improved outcomes is a change in patient behavior. In diabetes management programmes for example, although health care professionals can plan management, its implementation depends solely or largely on the patient and his or her family. Patient education may also increase patients' satisfaction, improve the quality of life and continuity of care, relieve anxiety and result in more active participation in treatment, independence in daily activities and fewer disease complications and costs.<sup>12</sup>

Unfortunately, patient education is not given its due emphasis in many parts of the world. A study on the relation between health literacy and knowledge of disease among patients with chronic disease showed that 24% had inadequate and 12% marginal health literacy. Multivariate analysis indicated that health literacy was positively and independently correlated with disease knowledge.<sup>13</sup> Many studies have found that health literacy and formal education are not as strongly related as would be expected and that patient education can improve health literacy regardless of the level of formal educa-

tion.<sup>14-18</sup> It has been shown that patient education can improve outcomes by 50-80%.<sup>19</sup>

Studies of the impact of patient education on the outcomes of chronic diseases do not always address the dynamics of education in a hospital setting. A review in 1998 reported that the type of patient education used was not reported in most studies.<sup>9,18,20</sup> Patient and family education in an indoor setting is a multidisciplinary process based on the principles of adult learning. The learning needs of patients are assessed at admission and reassessed during their hospital stay. The education takes place when the patient or the family interacts with a physician or other health care staff. In general, it is difficult to assess and standardize all the information in a few simple variables.

Our aim was to determine the broad impact of education on patients' dietary habits and physical activity. The study was conducted in a secondary hospital in Qassim, Kingdom of Saudi Arabia, which had recently started recording various aspects of patient education, including education provider, target audience and content, in patient files.

## Material and Methods

We conducted a retrospective cohort study of adult patients with coronary artery disease, type 2 diabetes mellitus or hypertension who had recently been admitted to a secondary hospital in Qassim, Kingdom of Saudi Arabia. Recently discharged patients (within 3 months of the interview) of either sex were interviewed during their follow-up visit to outpatient clinics at the same hospital. Patients with severe disease and those with a hospital stay of more than 3 weeks were excluded.

The questionnaire was designed to elicit information on the dietary habits and physical activity of the patients at the time of the interview, including the patient's illness and demographic characteristics. The questions on diet and exercise were adapted from the National Health and Nutrition Examination Survey in the USA and the Global Physical Activity Questionnaires of the World Health Organization, respectively. Information on patient education was extracted from the patients' hospital records; we also asked all patients about the kind of education or advice they received during their hospital stay, by whom and how frequently.

Informed consent was obtained from all respondents. Data collection continued for 6 months. The interviews and data extraction were carried out by staff nurses not directly involved in patient management or patient education. Most of the patients were interviewed during their first or second follow-up visit.

We used Epi-Info software to calculate the required sample size and found that a size of 160 would have 80% power to detect an association between patient education and compliance with instructions on diet and exercise (at a 95% confidence level); the likelihood of a positive outcome was assumed to be 40% before and 60% after patient and family education.

The questionnaires were scrutinized to ensure that open-ended questions were properly coded. Data entry and analysis were performed with IBM-SPSS Statistics 19. The analysis comprised generating frequency tables and cross-tabulation to describe the associations of interest.

## Results

Interviews were successfully completed with 169 patients (115 women and 54 men). The majority of respondents were  $\geq 60$  years of age, and one third were  $\geq 70$  years. About 35% of respondents were single, divorced or widowed. About 60% had primary education or less; 12% had university level education. More than 80% of the patients had diabetes and most also had hypertension and/or coronary artery disease. A family history of diabetes, hypertension or both was found for 25–40% of patients (Table 1). Older patients were more likely to have multiple diseases; however, 25% of patients aged  $< 40$  years also had diabetes with hypertension and/or coronary artery disease (data not shown).

According to the patients' files, most were given education individually; the family was included in 42% of cases. More than 50% of patients received two or more individual sessions, and about 25% received two or more sessions with their families. The session topics included treatment plan, possible drug reactions, complications, diet and exercise (Table 2).

A significant association was found between the number of educational sessions and the pattern of diet or exercise. Pa-

tients who had only one session were likely to improve their physical activity but not their diet, and those who had three or more sessions were likely to improve their diet but not their exercise. Careful review of the information indicated that the patients might not be following the advice to improve both their diet and physical activity consistently (Table 3).

No statistically significant association was found between the type of provider and the content of patient education sessions and compliance after discharge, except that patients who received education from a doctor were more likely to have a healthy diet or to do regular light exercise (Table 4). Patients who received advice about smoking were more likely to do regular exercise.

The patients who reported that they followed the advice given to them during education during their hospital stay did not always have healthy dietary habits and do regular light exercise: only those who said that they followed the doctor's orders about the timing and dosage of their medication and about dietary restrictions were more likely to have a healthy dietary pattern or to do physical activity. The patients who said that they benefited from the education about exercise were more likely to be doing regular light exercise (Table 5).

**Table 1: Percentage distribution of patients by demographic characteristics and gender.**

Characteristic	Male (%)	Female (%)	Both sexes (%)
Number of respondents	54	115	169
Age group (years)			
< 40	0	17 (15.0)	17 (10.2)
40–49	6 (9.4)	26 (23.0)	32 (18.7)
50–59	11 (18.9)	20 (17.7)	31 (18.1)
60–69	15 (28.3)	18 (15.9)	33 (19.9)
$\geq 70$	23 (43.4)	33 (28.3)	56 (33.1)
Marital status			
Married	45 (80.8)	67 (58.3)	110 (65.3)
Divorced	0	2 (1.7)	2 (1.2)
Widowed	10 (17.3)	40 (34.8)	50 (29.3)
Single	1 (1.9)	6 (5.2)	7 (4.2)
Educational level			
Primary or less	38 (71.2)	65 (56.3)	103 (61.0)
Middle	5 (9.6)	16 (13.4)	21 (12.2)
Secondary	7 (11.5)	15 (13.4)	22 (12.8)
University	5 (7.7)	16 (14.3)	21 (12.2)
Other	0	3 (2.7)	3 (1.8)
Monthly income (quintile) (Saudi Riyals)			
$\leq 1600$	10 (19.0)	17 (14.6)	27 (15.9)
1601–2500	17 (31.0)	23 (19.8)	30 (23.2)
2500–3600	10 (19.0)	23 (19.8)	33 (19.6)
3601–6000	9 (16.7)	28 (24.0)	37 (21.7)
$> 6000$	8 (14.3)	25 (21.9)	33 (19.6)
Disease			
Diabetes only	9 (17.0)	32 (27.8)	41 (24.4)
Diabetes and hypertension or coronary artery disease	33 (60.4)	63 (55.7)	96 (57.1)
Hypertension or coronary artery disease only	12 (22.6)	19 (16.5)	31 (18.5)
Family history			
Diabetic mother	18 (34.0)	52 (44.7)	70 (41.3)
Diabetic father	11 (20.8)	41 (35.1)	52 (30.5)
Hypertensive mother	14 (26.4)	42 (36.6)	56 (33.3)
Hypertensive father	11 (20.8)	32 (27.7)	43 (25.5)

**Table 2: Percentage distribution of patients by gender and patient education received during hospital stay, as recorded in patient files.**

Patient education	Male		Female		Both sexes	
Number of respondents	54		115		169	
Number of sessions with the patient only						
None	9	17.0%	36	31.3%	45	26.8%
One	13	24.5%	20	17.4%	33	19.6%
Two	15	28.3%	24	20.9%	39	23.2%
Three or more	16	30.3%	35	30.4%	51	30.4%
Number of sessions with the patient and his or her family						
None	33	60.4%	66	57.4%	99	58.3%
One	6	11.3%	17	14.8%	23	13.7%
Two	10	18.9%	18	15.7%	28	16.7%
Three or more	5	9.5%	14	12.2%	19	11.4%
Number of sessions on treatment plan only						
None	22	41.5%	48	41.7%	70	41.7%
One	29	52.8%	63	54.8%	92	54.2%
Two or more	3	5.7%	4	3.5%	7	4.2%
Number of sessions on treatment plan and additional advice						
None	4	7.5%	13	11.3%	17	10.1%
One	13	24.5%	26	22.6%	39	23.2%
Two	18	34.0%	38	33.0%	56	33.3%
Three or more	18	33.9%	38	33.1%	56	33.3%
Target and content of first education session after admission						
Education for the patient only	43	79.2%	76	66.1%	119	70.2%
Education for the patient and his or her family	11	20.8%	35	30.4%	46	27.4%
Education on treatment plan only	25	47.2%	61	53.0%	87	51.2%
Education on treatment and other advice	29	52.8%	50	43.5%	78	46.4%

**Table 3: Number and type of patient education sessions during hospital stay and diet and exercise habits of the patients after discharge.**

Number and type of education sessions	No exercise				Light exercise			
	Unhealthy diet		Healthy diet		Unhealthy diet		Healthy diet	
Number of sessions for the patient only ( $p < 0.001$ )								
None	6	13.3%	29	64.4%	9	20.0%	1	2.2%
One	7	21.2%	8	24.2%	14	42.4%	4	12.1%
Two	3	7.5%	11	27.5%	17	42.5%	9	22.5%
Three or more	8	15.7%	8	15.7%	22	43.1%	13	25.5%
Number of sessions for the patient and his or her family ( $p = 0.001$ )								
None	14	14.3%	25	25.5%	38	38.8%	21	21.4%
One	4	16.7%	3	12.5%	13	58.3%	3	12.5%
Two	3	10.7%	15	53.6%	7	25.0%	3	10.7%
Three or more	3	15.8%	13	68.4%	3	15.8%	0	–
Number of sessions on treatment plan only ( $p = 0.038$ )								
None	10	14.3%	33	47.1%	15	21.4%	12	17.1%
One	13	14.1%	23	25.0%	42	45.7%	14	15.2%
Two or more	1	16.7%	0	–	5	66.7%	1	16.7%
Number of sessions on treatment plan and additional advice ( $p = 0.645$ )								
None	3	17.6%	3	17.6%	9	52.9%	2	11.8%
One	7	17.9%	14	35.9%	15	38.5%	3	7.7%
Two	6	10.5%	20	35.1%	19	33.3%	12	21.1%
Three or more	8	14.3%	19	33.9%	19	33.9%	10	17.9%

## Discussion

Our study suggests that the level of patient and family education in our sample was not sufficient to make an impact on lifestyle, with simultaneous, consistent improvement in diet and

physical activity, although previous studies have shown that diet and physical activity are the most significant manageable risk factors.<sup>21</sup> The reasons may include inconsistent or inaccurate recording of education sessions in the patients' files. The timing and number of sessions and whether they involved

**Table 4: Type of provider and content of patient education sessions during hospital stay and diet and exercise habits of the patients after discharge.**

Characteristics of education	No exercise				Light exercise			
	Unhealthy diet		Healthy diet		Unhealthy diet		Healthy diet	
Received any education	22	13.5%	57	35.9%	55	34.6%	26	16.0%
Health education provided by:								
Doctor ( $p = 0.014$ )	18	11.8%	58	37.5%	52	33.3%	27	17.4%
Nurse ( $p = 0.229$ )	21	17.4%	42	33.9%	40	33.0%	19	15.7%
Health educator ( $p = 0.266$ )	9	15.4%	15	26.9%	25	44.2%	8	13.5%
Content of patient education								
Treatment plan ( $p = 0.547$ )	19	15.4%	33	26.9%	55	44.2%	21	16.9%
Drug use ( $p = 0.655$ )	15	12.5%	45	37.5%	39	33.0%	20	17.0%
Drug reactions ( $p = 0.508$ )	8	16.7%	17	33.3%	20	39.6%	5	10.4%
Illness ( $p = 0.246$ )	16	19.0%	30	35.4%	27	31.6%	12	13.9%
Complications ( $p = 0.577$ )	9	19.5%	16	36.6%	13	29.3%	6	14.6%
Advice on diet ( $p = 0.100$ )	5	8.8%	17	28.1%	23	38.6%	15	24.6%
Advice on exercise ( $p = 0.057$ )	12	13.6%	25	29.6%	38	44.4%	11	12.3%
Hazards of smoking ( $p = 0.009$ )	3	8.8%	6	17.6%	20	58.8%	5	14.7%

**Table 5: Patients' opinions about education sessions during hospital stay and diet and exercise habits of the patients after discharge.**

Education	No exercise				Light exercise			
	Unhealthy diet		Healthy diet		Unhealthy diet		Healthy diet	
Received any education	22	13.5%	57	35.9%	55	34.6%	26	16.0%
Followed education regarding:								
Filling prescriptions ( $p = 0.053$ )	18	12.2%	55	38.1%	48	33.1%	24	16.5%
Drug timing and doses ( $p = 0.017$ )	21	15.2%	52	37.9%	40	29.5%	24	17.4%
Avoiding complications ( $p = 0.506$ )	8	11.1%	23	30.6%	30	40.3%	14	18.1%
Diet ( $p = 0.037$ )	7	9.1%	22	27.3%	35	44.2%	16	19.5%
Exercise ( $p = 0.095$ )	3	6.1%	15	28.6%	22	42.9%	11	22.4%
Stopping smoking ( $p = 0.538$ )	3	8.8%	11	32.4%	12	35.3%	8	23.5%
Benefitted from education on:								
Treatment plans ( $p = 0.259$ )	15	12.4%	42	36.2%	39	33.3%	21	18.1%
Drug timing and doses ( $p = 0.804$ )	16	12.4%	45	35.4%	42	32.7%	25	19.5%
Possible drug reactions ( $p = 0.244$ )	9	14.5%	17	27.3%	26	41.8%	10	16.4%
Their illness ( $p = 0.056$ )	15	19.1%	27	35.3%	26	33.8%	9	11.8%
Complications ( $p = 0.802$ )	8	14.9%	17	31.9%	19	36.2%	9	17.0%
Diet ( $p = 0.160$ )	12	12.8%	29	30.2%	39	40.7%	16	16.3%
Exercise ( $p = 0.004$ )	3	7.3%	8	17.1%	23	51.2%	11	24.4%
Smoking ( $p = 0.274$ )	3	13.6%	5	18.2%	11	45.5%	6	22.7%

the patient alone or with his or her family may also affect compliance. Some studies have found that the timing of education sessions is important: In a study in the USA, patients and their families received multiple sessions, but about 60% did not receive education at the time of discharge. Good discharge planning is mandated by the Joint Commission on Accreditation of Healthcare Organizations, which makes inpatient education essential.<sup>22</sup> Another reason could be the quality<sup>23</sup> and quantity of education given. We found a varying relation between the quality and quantity of education and its impact on lifestyle. A similar study in Japan indicated that only 15% and 28% of patients followed their doctors' instructions on diet and exercise, respectively. Furthermore, nearly 60% of patients stopped complying with their doctors' instructions within 6 months of discharge, indicating a need for better motivation and guidance for patient education.<sup>24</sup> A brief self-management programme at hospital admission was reported to reduce post-

discharge morbidity and readmission among adult asthma patients, especially for patients admitted for the first time. The programme also had a small but significant effect on medical management at discharge,<sup>25</sup> although it is not known how long this impact lasted. None of the reported patient education interventions resulted in an ideal lifestyle, with a healthy diet and regular exercise, when the effects of age and marital status were removed. While a study of patients with asthma indicated that the majority received education on how to avoid complications, younger, better educated patients were more likely to follow instructions and acquire the knowledge needed to cope with complications.<sup>18</sup>

## Conclusions

Our study suggests that patient and family education is partially successful, as a small but significant proportion of pa-

tients did improve their diet after their hospital stay; however, the desirable level of exercise was not achieved by this sample of elderly patients. Certain characteristics of patient education, such as the number of sessions, the provider of the education being a doctor, and a focus on diet and exercise during education, had a clear but small impact on diet or exercise after discharge. We conclude that, in our sample, the outcome of patient education in a hospital setting depends on the frequency of sessions during the hospital stay and the education provider being a doctor. These findings by no means negate the importance of having professional health educators in hospitals but emphasize the need for effective inter-personal skills. The effectiveness of patient education must be improved, perhaps by training doctors.

#### Author contributions

FM carried out the design, data collection, analysis and interpretation of data, and drafted the manuscript. AM participated in the design of the study, analysis and interpretation of the data, and critically reviewing the manuscript. Both authors read and approved the final manuscript.

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