Effectiveness of Levels of Health Education on HbA1c in Al-Qassim Region, Saudi Arabia

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Abstract

Objective: The aim of this study is to assess the effect of different levels of health education on diabetes outcome among patients visiting the Primary Health Care (PHC) Centers in Al-Qassim Region.

Methods: This study was conducted between October 2012 and March2013. Baseline HbA1C results recorded for all those included in the study, After 6 months of health education a well-constructed questionnaire for each other diabetic patient (male or female) visiting the PHC Center, last reading for HbA1c for each patient recorded.. The majority of the health education services included in this study was related to diabetes. Sample size calculated and increased to 420 to account for the design effect. Data entry and analysis was carried out using SPSS (version 17 for Windows.

Results: Male respondent to a self-administered questionnaire is 70.1 %. Our study revealed that more exposure to all levels of health education will result in more to control diabetes compare to one or two types of health education. HbA1c level improved after health education.

Conclusion: Improving the communication skills and health awareness among service providers in in PHC Centers through well designed programs involving health educators will improve the outcome among patients with diabetes mellitus and population in general. Moreover, medical students should be involved in such activities of health education in the community related health problems.

Key words: Key words: Levels of health education; Diabetes Mellitus; HbA1c

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Introduction

Diabetes mellitus is a major clinical and public health problem. In 2011, the global prevalence of diabetes was 366 million and caused 4.6 million deaths in 2011. [1] This figure is expected to rise to 552 million by 2030 and will be the 7th leading cause of death in 2030. [1, 2] According to a recent study, the prevalence of diabetes in Saudi Arabia is 34.1% in males and 27.6% in females. [3] While the prevalence among adults of the Arabic speaking countries as a whole range between 4%–21%, with the lowest being in Somalia and the highest in Kuwait. [4] The increase in income per capita and the accompanying shift in lifestyle to more sedentary activity with high fat diets and resultant obesity apparently underlie much of the increased prevalence of diabetes mellitus. The Management of diabetes is dependent to a great extent on the affected person's own abilities to carry out self-care in his daily lives, and patient education is considered an essential component of achieving this objective. [5] There is evidence that people affected with the disease often have inadequate knowledge about the nature of diabetes, its risk factors and associated complications and that this lack of awareness may be the underlying factor affecting attitudes and practices towards its care. [6] Health education on diabetes, with consequent improvement in knowledge, attitudes and skills, leads to better control of the disease, and is widely accepted to be an integral part of comprehensive diabetes care. [7] Glycosylated hemoglobin (HbA1c) levels have been used in planning and assessing the management of diabetic patients the past couple of decades. A clinical trial has established the correlation between (HbA1c) and the development of diabetes complication and patient outcome. [8]

In the Kingdom of Saudi Arabia, the PHC centers are the best place to provide health education to patients and the general population since all Saudi citizens is registered in the Primary Health Care Centers (PHCC) of the Kingdom. One of the main elements of PHCC is health education, and if imparted adequately it can empower and motivate people to take informed decisions for their self-care to attain good health. [9] By the mid-1970s it was clear that reducing morbidity and mortality and reduction costs can best be achieved through a focus on health promotion and disease prevention. At the heart of this new approach was the role of a health educator. [10] A health educator is "a professionally prepared individual who serves in a variety of roles and is specifically trained to use appropriate educational strategies and methods to facilitate the development of policies, procedures, interventions, and systems conducive to the health of individuals, groups, and communities". [11]

The aim of this study is to assess the effectiveness of standardized health education including different levels of health educators on the control of diabetes mellitus.

This study highlights the importance of improving the communication skills and health awareness among service providers in PHC Centers, and the need to educate the diabetes patients about the dangers of an unhealthy diet, danger of noncompliance and sedentary lifestyle.

Methods

This study was conducted between October 2012 and March2013, after training PHC Centre physicians, other staff and medical students. Baseline HbA1C results recorded for all those included in the study, After 6 months of health education a well-constructed questionnaire translated into Arabic administered by the staff of the PHC Center and/or the medical students for each other diabetic patient (male or female) visiting the PHC Center, during this time we recorded the last reading for HbA1c for each patient. Our contribution was training the PHC staff in health education techniques, and introducing health education sessions conducted by the medical students in the PHC Centers. The health education services included in this study were related to diabetes; the risks associated with unhealthy diet, smoking, and physical inactivity, provision of materials; brochures, booklets, and charts to an individual or family on disease management or education and monitoring of chronic disease through self-management plan. In this study we grouped the age to those who are under 60 years and those above 60, while studying the effect of different level of health education on the control of diabetes. We also grouped the educational status of the candidates included in this study into low (below the intermediate stage; below class 9), secondary stage and university stage.

Health educators selected for the study were of three types. Firstly, health educators only trained in health education. The second group was health educators and primary health care physician. The last group includes all the three categories i.e. health educators, primary health care physician and medical students.

The primary focus of health education was on the risks associated with unhealthy diet, smoking, and physical inactivity. After 4 months of the start of the baseline survey we started the second line survey and recording the second reading of HbA1c.

In this study we put HbA1c ≤7% an indicator for the control of diabetes mellitus. ADA recommended lowering HbA1c to below or around 7%. [12] NICE recommended HbA1c levels of between 6.5% and 7.5% for the control of diabetes mellitus. [13]

Calculation of the sample size was based upon the assumption that uncontrolled HbA1c before health education as 40% (± 5%) and after health education as 30% (± 5%), which gave sample size 365 and 323 for pre and post education respectively. We increased it to 420 to account for the design effect; this number was distributed in between 9 PHC Centers in 4 cities in Qassim Region. Data entry and analysis was carried out using SPSS (version 17 for Windows), we used the frequency tables, cross-tabulation with Chi-squared test to detect statistically significant differences, and compare the means between the two groups.

Inclusion criteria: Saudi; national personnel who are resident of the Qassim Region attends PHC Center, eighteen years or over, suffer from diabetes mellitus and who agreed verbally to participate in the study.

Exclusion criteria: Non- Saudis, those below eighteen years, not diabetics and those who did not agree to participate in the study.

Ethical approval for conduction of this study was obtained from the Ethical Committee of Qassim University, College of Medicine.

Results

The number of respondents in our study was 418, 70.1% of whom were male. **See Table 1.**

The males who received health education from doctors, health educators and students were more likely to have their diabetes controlled, compared to the males who received health education from doctors and health educators or from the doctors only (p=0. 022), which was explained by **Table II**

Similarly among female respondents, likelihood of controlled diabetes was higher if they received health education from all three providers (doctors, health educators and students) (P=0.005) then followed by education done by doctors and health educators (P value = 0.013) and lastly female exposed to education by doctors only (P value =0.014). It is explained in **Table II**

In the younger respondents (age < 60 years), control of diabetes was more likely among those exposed to health education by all three providers (doctors, health educators and students) (p=0.001). In diabetic patients less than 60 years will be the same effect if they exposed to doctors and health educators or doctors alone (P value = 0.014). In age group more than 60 years noticed the diabetes was more controlled if they exposed to doctors and health educators and students (P value= 0.027) then followed by doctors and health educators (P value =0.036) in spite if they exposed to education by doctors only which is not significant . So, this is indicated more exposure to education will be more controlled for diabetes is explained in **Table III**

By educational level of participant was divided into three parts (low, secondary, University). Low level of education will be diabetes controlled in those exposed to doctors and health educators and students with statistically significant (P value 0.031). In contrast the lower level education of the participant if exposed to doctors and health educators or doctors only not significant which mean diabetic patients with low education need more exposure of health education. Secondary level education will be the same of low education only significant in those who exposed to doctors and health educators and students. For participants with university level of health education will be useful for all types of health education but more for those who exposed to doctors and health educators and students is explained in **Table IV**

HbA1c measurements in the studied group before and after health education, there is a statistically significant difference in two groups as explained in **Table V**

Table I: Percentage demographic distribution of respondents.

Respondent characteristic		Total No (418 (No) %
Gender	Male	283 (70.1)
	Female	125 (29.9)
Age group/yr	≤60	
	• Male	214 (66.9)
	• Female	106 (33.1)
	>60	
	• Male	79 (80.6)
	• Female	19 (19.4)
Marital status	Single	
	• Male	10 (76.9)
	• Female	3 (23.1)
	Married	
	• Male	263 (72)
	• Female	106 (28)
	Divorced	
	• Male	1 (25)
	• Female	3 (75)
	Widow	
	• Male	19 (90.5)
	• Female	2 (9.6)
Educational level	Low	
	• Male	91 (39.9)
	• Female	137 (60.1)
	Middle	
	• Male	51 (59.2)
	• Female	36 (40.8)
	High	
	• Male	76 (73.8)
	• Female	27 (26.2)
Family history	Maternal only	
	• Male	113 (72.4)
	• Female	43 (27.6)

Table II: Percentage of respondents by gender controlled Diabetes Mellitus per level of a health education intervention.

Gender/edu level				Controlled DM	
				Less 7	P-value
Male	Health ED Level	Doctor	Count	43	0.052
			% within controlled DM	34.7%	
		Dr+HE	Count	53	0.050
			% within controlled DM	42.7%	
		DR+HE+Stud	Count	28	0.022
			% within controlled DM	22.6%	
Female	Health ED Level	Doctor	Count	21	0.014
			% within controlled DM	31.3%	
		Dr+HE	Count	19	.
			% within controlled DM	28.4%	0.013
		DR+HE+Stud	Count	27	0.005
			% within controlled DM	40.3%	

*p-values indicate the statistical significance of differences between baseline and follow-up surveys calculated by chi-squared test

Table III: Percentage of respondents by age controlled Diabetes Mellitus per level of a health education intervention.

Age in Yr/edu level				Controlled DM	
				Less 7	P-value
<=60	Health ED Level	Doctor	Count	60	
			% within controlled DM	39.5%	0.004
		Dr+HE	Count	43	
			% within controlled DM	28.3%	0.004
		DR+HE+Stud	Count	49	
			% within controlled DM	32.2%	0.001
>60	Health ED Level	Doctor	Count	4	
			% within controlled DM	10.3%	
		Dr+HE	Count	29	0.058.
			% within controlled DM	74.4%	.
		DR+HE+Stud	Count	6	0.036.
			% within controlled DM	15.4%	0.027

*p-values indicate the statistical significance of differences between baseline and follow-up surveys calculated by chi-squared test

Table IV: Percentage of respondents by educational status controlled Diabetes Mellitus per level of a health education intervention.

Educ-group				Controlled DM		P-value
				Less 7	More 7.01	
Low	Health ED Level	Doctor	Count	32	55	.083
			% within controlled DM	30.8%	44.7%	
		Dr+HE	Count	41	42	.082
			% within controlled DM	39.4%	34.1%	
		DR+HE+Stud	Count	31	26	031
			% within controlled DM	29.8%	21.1%	
2ndry	Health ED Level	Doctor	Count	12	27	.111
			% within controlled DM	32.4%	54.0%	.
		Dr+HE	Count	13	14	109
			% within controlled DM	35.1%	28.0%	
		DR+HE+Stud	Count	12	9	.040
			% within controlled DM	32.4%	18.0%	
Univ	Health ED Level	Doctor	Count	20	32	.046
			% within controlled DM	40.0%	62.7%	.
		Dr+HE	Count	18	14	044.
			% within controlled DM	36.0%	27.5%	
		DR+HE+Stud	Count	12	5	014
			% within controlled DM	24.0%	9.8%	

*p-values indicate the statistical significance of differences between baseline and follow-up surveys calculated by chi-squared test

Table V: HbA1c measurements in the Studied group Before and After health education

	Study phase	N	Mean	Std. Deviation	*P*-value*
HbA1 C	Pre educate	425	8.2	(1.65)	<0.001
	Post educate	415	7.5	(1.20)	

*p-values indicate the statistical significance of differences between baseline and follow-up surveys calculated through compare the means between the two groups

Discussion

Respondents in the two surveys were similar with regard to gender, age, marital status, educational level, the presence of maternal history of diabetes.

On Studying the effect of different levels of health education on gender, it is observed that as we increase in the level of health education, there is a more significant difference in the control of diabetes mellitus; results of including health educator and medical students are more significant than better than doctor alone, and also doctor and health educators.

In this study the control of diabetes (HbA1c) is more significant among females than men, the explanation for that it was observed during the study that females were more committed to attending the health education session than men. All results were significant, but more significantly with the increase of the level of education by including health educators and medical students with the treating doctor. We noticed that control of diabetes is more among those are less 60 years. The cause for less control of diabetes after the age 60 is multifactorial because usually they have a chronic disease, hearing impairment, vision impairment, dementia, etc... Even then tighter control of diabetes is not recommended as a goal after the age of 60. Many older people with diabetes are under-treated and could benefit from improved glycemic control, but more aggressive management is recommended to decrease the risk factors for macrovascular disease. [14]

There was no significant difference in the control of diabetes among those who are in the low and the secondary stage, but the control of diabetes was significant among the university stage, especially by including the health educator and medical students beside the treating doctor. This small gain is nearly similar to what explained in another study, which justified this short gain is related to the short duration of health education. [15]

Regarding the significant improvement in HbAlc in the end-line survey, it is nearly similar to that achieved by others; developing empowerment based diabetes self-management support and a randomized control trial of continuous glucose monitoring devices on HbAlc. [16, 17]

Overall, by comparing the two means of HbA1c between the baseline and follow up survey, there is a statistical significant difference between the two groups, similar results obtained in a study done on patients attending Zagazig University diabetes clinic in Egypt. [18]

We can say that these results are encouraging, considering that the health education intervention was of very short duration and was of limited scope and quality. [19] A large-scale, effective and high quality health education program is likely to have much better results; such a program is expected to reduce the burden of diabetes mellitus in Saudi Arabia.

Conclusion

Improving the quality of health education in PHCC through well designed programs involving health educators will improve the awareness and practices among the population in general, but particularly among patients with diabetes mellitus. Involvement of medical students' health education in the community related health problems should be part of their community based learning as it has shown to improve the effectiveness of health education.

Limitations:

There are several limitations in our study: Firstly; a short period of health education. Secondly; the choice of PHC Centers was dependent on those are having health educators.

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