ORIGINAL ARTICLE

EFFECT OF DIET COUNSELING ON KNOWLEDGE, ATTITUDE AND PRACTICE AND QUALITY OF LIFE OF DIABETIC PATIENTS IN KUANTAN, MALAYSIA

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ABSTRACT

This research was intended to assess the impact of dietary counseling for diabetic patients. By giving the advice to control the blood sugar, does it improve the wellness of the diabetic patients? This research was conducted from January until December 2011 with the aim to study the factors associated with knowledge, attitude and practice (KAP) and quality of life (QOL) of type 2 diabetic patients, and the effect of dietary counseling on their KAP and QOL. A total of 63 respondents were involved in this intervention study, including 31 respondents from the intervention group and 32 respondents from the control group. The intervention group was selected by purposive sampling based on doctor's referral for diet counseling of the respondents, while a convenience sampling method was used for the control group. Based on the baseline results of both groups, a significant correlation was found between knowledge with duration of having DM (p=0.019) and race (p=0.002). Race and educational level were found to have significant correlation with attitude where the p=0.001 and p=0.037, respectively. Significant difference was only found in race for practice scores (p=0.019). There was a significant correlation found between QOL and age (p=0.031). Further analysis comparing the pre and post intervention result shows that the total scores for KAP and QOL in the intervention group was improved after the diet counseling given, as compared to the control group, but the difference was not significant statistically. In conclusion, better methods might need to be developed for more effective health education and counseling to better improve diabetic patients' KAP and QOL, thus reducing the complications of the disease.

KEYWORDS: Diet Counseling, KAP, QOL, Diabetes Mellitus, Malaysia

INTRODUCTION

The prevalence of type 2 diabetes mellitus (DM) is increasing globally.[1-3] The dietary and nutritional counseling was reported to be effective in a number of chronic diseases including DM.[4-7] The complications of diabetes can be reduced and significant improvement in quality of life (QOL) by proper control of blood glucose, proper compliance with medication, and better understanding of the disease process.[8-9] A study conducted in South India about patients' knowledge and self-monitoring on blood glucose levels revealed that there was a large gap between knowledge and action.[8] This shows that patients did not fully adhere with the advice in dietary counseling since they did not practice it in their daily life.

As the world becomes more challenging today with the presence of more food that contributes to the existence of new diseases, we are still dealing with problems that already exist many years ago. We are facing a burden of new diseases and at the same time we need to cater for the existing chronic diseases. Without cooperation from patients in managing DM, prevalence of the disease will become worse instead of decreasing in numbers. So, this study will reveal the effect of dietary counselling on the knowledge, attitude and practice (KAP) and QOL of diabetic patients so that if the result does not show improvement, there might be a need for improvement in the educational program or dietary counselling for diabetic patients.

Diabetes is one of the chronic diseases that affect not only old people but also young people.[10] Currently 171 million people in this world suffer from DM, especially in the developed countries.[11] The prevalence of DM for all age-groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030.[12] WHO has estimated that in 2030, Malaysia would have a total number of 2.48 million diabetics compared to 0.94 million in 2000, at a 164% increase.[13]

DM is mainly due to the disorder primarily associated with abnormal glucose metabolism where the chronic elevation of plasma glucose causes many of the microvascular complications of the disease.[14-15] Type 2 DM occurs due to the

resistance of insulin secreted by the islets of Langerhans to take up glucose.[16] Therefore, it leads to chronic hyperglycaemia which will increase the risk of getting chronic complications such as coronary artery disease, kidney and eye diseases, disorders of the nerves, increases health expenditures, and eventually damages the QOL.[9, 14, 17] Along with obesity, the number of people with DM worldwide is increasing due to the population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity.[12]

A study claimed that the goals of diabetic education are to optimize metabolic control, prevent acute and chronic complications, and optimize the QOL of patients while keeping costs at acceptable level.[18] Low insights about the disease may lead to poor control and its complications.[19-20] A study shows that the new dietary education had reduced the glucose levels of diabetic patients.[21] The patients need something new and interesting to make them abide by the counseling. Significant improvement of diabetes care was achieved through integrated diabetes management based guidelines with the help of general practitioners and specialist.[22] One study from Nigeria reported that majority of the respondents did not know diabetes care which include diet and urine test, and this community never receive any organized counseling program.[23] This statement disclosed the weaknesses of the educational programs run by health professionals. Any improvement in knowledge was found to have positive impact on glycemic control.[19]

The management of DM does not only require the prescription by physician but also intensive education and counseling for the patients.[24-25] Immense efforts are needed to improve the compliance of diabetic patients on diet and exercise.[26] Dietary counseling provides personalizing nutritional care for encouraging modification of eating habits and also assist in prevention or treatment of nutrition-related illnesses.[27] Patient counseling is a process that improves patient's ability to cope and make informed decisions regarding their disease and medication, and motivate the patients to change their dietary habits and life styles, which are harmful for their current health status.[9] Researchers also noted that individual dietary assessment, face-to-face consultation, group counseling and methods to improve patients' skills produced more significant changes in diet behavior than just brief counseling.[28] The vital part of the dietetic consultation is the assessment of willingness for change regarding their own eating behavior and also the identification of hurdles for change.[28-30] Dietary counseling should be innovative and specific to the requirements of the individual and personal need. [29]

The advance level of knowledge about the disease process actually promotes diabetic patients to fight their disease. It is indispensable for health professionals to measure patients' current knowledge and beliefs on diet for operational counseling.[28] More knowledge about diabetes in reality reduces the medical overheads.[31] In addition, other study concluded that although the knowledge levels were high but attitude and practices were low.[32] High positive attitudes towards the importance of diabetes care and satisfactory diabetic patients were observed in the United Arab Emirates (UAE)[33] but it was low in the neighboring country Oman.[34] Adherence is a complex and incompletely understood behavioral process that is strongly influenced by environment, social and cultural aspects, patient-health care provider relationship, the complexity and duration of diet recommendations, patient attitudes about the benefits of diet, and techniques used to counsel and teach patients.[35-36] Adherence to diet in chronic disease is usually poorer and more subjective than other types of medical adherence.[35-36] Good practice in dietary intake really needs support from family members; as in many occasions diabetic patients perceive their dietary needs are incompatible with the preferences of other family members.[35-36] Preparation of two sets of meals may be viewed as excessively time-consuming and expensive, and selection of dietetic foods can be difficult, necessitating a thorough review and understanding of food labels. It has been reported that even with the most all-inclusive treatment plan for diabetic patients, they undergo from noteworthy to deleterious QOL.[37-38] Microvascular and macrovascular complications of DM are the most determinants for QOL of diabetic patients.[39-40] Multiple studies revealed that a better clinical and educational intervention program will ensure similar level of health related QOL of diabetic patients and non-diabetic individuals.[39-42] The current study was conducted with the intention to understand the KAP and QOL of type 2 diabetic patients on the diet therapy of the disease, specifically to assess the factors associated with, and the effectiveness of dietary counseling on KAP and QOL of diabetic patients in Kuantan, Pahang.

MATERIALS AND METHODS

This study was conducted at a health clinic in Kuantan, Pahang, Malaysia, from January to December 2011. The research design used was an experimental study to assess the effect of diet counseling while the baseline data were taken to find the factors associated with KAP and QOL of the respondents. This study involved an intervention and a control group where the intervention group received counseling by dietitian

while the control group did not receive such. The sample size was calculated using two means formula, with 80% power of study and 95% confidence interval. The value of standard deviation used was 3.36 which is the standard deviation of knowledge scores.[43] A total of 70 type 2 diabetic patients had been selected from the population of the health clinic based on their attendance. Nonetheless, there were only 63 respondents who gave a full commitment to complete the pre and post-data collection. The intervention group had been chosen based on referral by medical officer to the dietitian in charge while the control group was chosen by convenient sampling.

The inclusion criteria for the respondents in this study are: 1. Patients with type 2 DM. 2. Patients who had never received counseling from any dietitian before. 3. Patients who could understand either English or Malay. 4. Patients who had telephone number to be used for follow up session. The exclusion criteria were those who were pregnant, having a mental handicap or hearing problem, and medical personnel. There was no age limit for the respondents in this study.

The data had been collected individually through interviewer-guided questionnaire. The questionnaire was developed which covers five aspects: socio-demographic data (e.g., age, sex, educational level, occupation); knowledge; attitude; practice; and QOL. There were three domains in the knowledge section about diabetes with five questions for each domain, seven questions to assess the attitude of the respondents towards the disease and nine questions regarding practices which reflect how the respondents put their knowledge and attitude into action. The other section was for QOL which contains four domains where domain 1 and 2 comprised of eight questions each. Domain 1 was to assess the effects of DM towards the respondents' feeling and condition while domain 2 was to assess the effect of DM on their social activity. Domain 3 and 4 of the QOL section were used to get the respondents' rate on their health condition before and after receiving counseling for the intervention group, while for the control group, that question was used in comparing their health condition with the intervention group. The content of the questionnaire had been verified by the expert and face validity had been ascertained by a few people.

The respondents' demographic data together with the baseline data was collected upon their recruitment, which was during the first counseling session for the intervention group. Weight was measured by using the weighing scale which was available at the clinic. Every medical jargons used in the questionnaire had been explained by the interviewer to help the respondents to respond correctly to the questions being asked. A month later, the respondents were called for the second counseling session or known as follow-up session for continuity in dietary counseling for the intervention group. At the same time, the respondents were asked to give a response upon second data collection by using the same questionnaire.

On the other hand, in the control group, the respondents were given the same questionnaire as what was given to the intervention group for them to answer, then the baseline data had been taken without having a diet consultation with a dietitian. A month later, these respondents were called purposely for the second data collection to see whether this group had any changes or not in terms of their KAP and QOL as compared to the intervention group. If they could not come to the clinic for the follow up session, the researcher would go to their house to make sure the post data could be collected. Before that, the respondents had been asked on any changes that they make after receiving counseling and their weight was recorded.

The data was entered and analyzed using SPSS software version 12.0. This study was approved by the Ministry of Health Memo No: 07/KKM/NIHSEC/800-4/4/1 JId12 dated: 26th February 2014.

RESULT

Socio-demographic data of respondents
A total of 63 respondents completed this study. Thirty-three (52.4%) of them were male and 30 (47.6%) were female. There were 31 (49.2%) respondents for intervention while 32 (50.8%) respondents were come from the control group. From the total numbers of respondents, about three quarters of the respondents accounted 47 (74.6%) are Malays while another one quarter, which is 16 (25.4%) respondents comes from other races including Chinese, Indian and Indonesian. The mean of age was 48.92±7.74 which ranged from 26 to 67. The mean of BMI was 28.2±5.23 which ranged from 19.5 to 42.7. Most of the respondents worked in the private sector, which is accounted about 28 (44.4%). Nine (14.3%) respondents worked in the government sector while self employed and unemployed accounted about 7 (11.1%) and 19 (30.2%) respondents respectively. Among the total respondents, 17 (27.0%) had normal BMI. Another 46 (73.0%) respondents were overweight with BMI ranged from 25.0 to 42.7 kgm[2]. The median for duration of diabetes was 12±43 which ranged from 1 to 144 months. From the total numbers of respondents,

16 (25.4%) of them had low educational level while 47 (74.6%) were having a higher educational level.

KAP levels and QOL
The results for this part were based on the pre-intervention data collection. Regarding the knowledge towards DM, 79.4% (50) and 65.1% (41) out of the 63 respondents were aware that polyuria and polyphagia respectively, are the symptoms of DM. Again, the majority (84.1%, 53) of respondents knew that vomiting was not the symptom of DM but only 55.6% (35) of them knew that weight loss can be one of the symptoms of DM. On the other hand, 98.2% (62), 85.7% (54) and 81.0% (51) respondents knew that uncontrolled DM may lead to limb amputation, blindness and kidney disease, respectively. However, only 15.9% (10) of them knew that osteoarthritis is not one of the complications for DM.

When asked regarding 'healthy diet for diabetic patients', almost all of the respondents (95.2%, 60) knew that there should be low sugar in the diet of diabetic patients. Similarly, 81.0% (51) of them opted for 'false' choice of answer for a high carbohydrate diet for diabetic patients. Furthermore, the majority of them gave the correct answers for green leafy vegetables (88.9%, 56), less fatty foods (85.7%, 54) and less starchy foods (87.3%, 55). The mean knowledge scores were 38.52 ± 3.42 from the maximum of 45 marks.

As for the attitude towards diabetes mellitus, 90.5% (57), 93.6% (59) and 90.4% (57) of the study respondents agreed that stop smoking, eating low fat food and boiled food, respectively, are healthy and positive approach for diabetic patients. All respondents agreed that diabetic patients should eat a low carbohydrate diet, while 87.3% (55) of them opted for grilled food as a healthy meal. There were 79.3% (50) and 88.9% (56) of the respondents disagreed with the negative statements of 'do not need exercise to control diabetes' and 'do not need to take responsibility of self-care in controlling diabetes', respectively. The mean attitude scores were 33 ± 4, with the maximum total scores were 35.

The response regarding practice was not as encouraging as that for knowledge and attitude. More than half of the respondents which were about 37 (58.8%) seldom take whole grain products. Even though condensed milk should be avoided, but there were about 15 (23.8%) of the respondents took it in their daily meal. Most of the respondents were not aware of the importance of fruits for they were only 27 (42.8%) respondents take fruits frequently. More than half of the respondents accounted about 47 (74.6%) reported that they took vegetables for almost every day. A total of 10 (15.9%) respondents still include

sucrose or sucrose containing foods in their daily meal. Out of sixty-three (63) respondents, about 27 (42.8%) and 33 (52.4%) of them always take saturated fatty acid (SFA) and fried meals respectively. Among them, only 2 (3.2%) respondents frequently took bakery product. There were only 12 (19%) out of total respondents were practicing regular exercise. The mean practice scores were 29.21 ± 4.71 out of total maximum scores, 45.

The respondents were also asked about their quality of life, whether DM affected their feeling and condition. The majority of the respondents said that they enjoy doing pleasurable activities (76.2%, 48) and also they feel peace and relax (65.1%, 41) even though they were having DM. Furthermore, more than half of the respondents reported that they never felt nervous (57.2%, 36), sad (65.1%, 41), lonely (79.3%, 50), irritable (66.7%, 42) or difficult to sleep (52.4%, 33). The majority of them (81.0%, 51) claimed that they rarely fell down just because of they have DM. On the other hand, regarding the effects of diabetes on their social activity, the majority of the respondents reported that diabetes did not affect their physical activity (85.7%, 54), daily activity (82.6%, 52), work (85.7%, 54), relationship with family and friends (96.8%, 61) or relationship with neighbors (98.4%, 62). However, there were 20.6% (13) respondents informed that having diabetes affected their drinking and eating pattern as they have to be choosy in selecting meals.

Factors associated with KAP and QOL
Based on data from the pre-intervention data collection, there was no statistically significant correlation observed between the scores of KAP with age ($r=+0.031$, $p=0.802$; $r=-0.003$, $p=0.981$ and $r=+0.095$, $p=0.458$, respectively), nor between the scores of attitude, practice and QOL with the duration of having DM ($r=+0.224$, $p=0.077$; $r=+0.023$, $p=0.861$; and $r=+0.100$, $p=0.474$, respectively). Furthermore, no significant correlation was found between the scores of KAP and QOL with BMI ($r=+0.166$, $p=0.618$; $r=+0.238$, $p=0.061$; $r=+0.133$, $p=0.061$ and $r=+0.172$, $p=0.178$, respectively). However, there is significant correlation between knowledge scores towards DM with the duration of having DM ($r=+0.294$, $p=0.019$) and QOL scores with age ($r=+0.271$, $p=0.031$). These significant results show positive fair correlation between those variables, meaning longer duration of having DM is correlated with higher knowledge, and older respondents' age is correlated with better QOL.

On the other hand, a significant difference in the scores of KAP was also found in comparing between Malay and other races with p-values of 0.002, 0.001 and 0.019, respectively (Table 1). No

significant difference in QOL scores was found between Malay and other races, similarly no difference in the scores of KAP and QOL found between different genders and different education levels (Table 1).

Table 1: Association between knowledge, attitude, practice towards diabetes mellitus and Quality of Life (QOL) scores with socio-demographic data (using Independent *t*-test; n=63)

Scores	Knowledge		Attitude		Practice		QOL	
	Mean (sd)	*p*-value	Mean (sd)	*p*-value	Mean (sd)	*p*-value	Mean (sd)	*p*-value
Gender								
Male	37.91 (2.99)	0.135	32.06 (2.96)	0.296	28.39 (4.70)	0.152	70.42 (8.83)	0.067
Female	39.20 (3.76)		32.83 (2.85)		30.10 (4.62)		74.2 (7.06)	
Race								
Malay	39.28 (3.11)	**0.002**	33.15 (2.46)	**0.001**	28.40 (4.55)	**0.019**	73.34 (7.77)	0.063
Others	36.31 (3.42)		30.31 (3.18)		31.56 (4.47)		68.94 (8.77)	
Educational Level								
Higher education	38.98 (2.92)	0.146	32.87 (2.62)	**0.037**	28.87 (4.92)	0.338	72.43 (7.54)	0.739
Low education	37.19 (4.42)		31.13 (3.40)		30.19 (3.97)		71.63 (10.15)	

sd = standard deviation

Effect of diet counseling on KAP and QOL
In comparing between pre- and post-intervention scores, improvement was observed in the mean KAP scores in the intervention group after receiving diet counseling by a dietitian, with larger improvement seen in QOL scores and lesser improvement in knowledge and QOL scores in the control group. It was even noted that the attitude and practice scores was decreased slightly in the control group. All the mean scores are summarized in Table 2 while the changes in the intervention and control groups of their mean scores for knowledge, attitude, practice and QOL are illustrated in Figure 1, 2, 3 and 4, respectively. Further analysis using RM Anova shows that the improvements observed in the intervention group were not significant statistically when compared to the control group (Table 2).
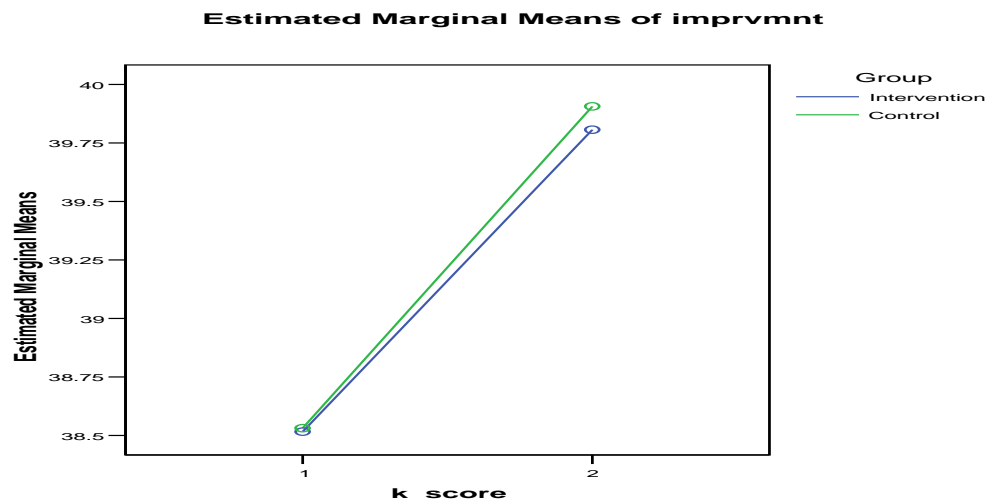

Figure 1: The change in mean knowledge scores (k_score) in intervention group (n=31) and control group (n=32) before (1) and after (2) intervention
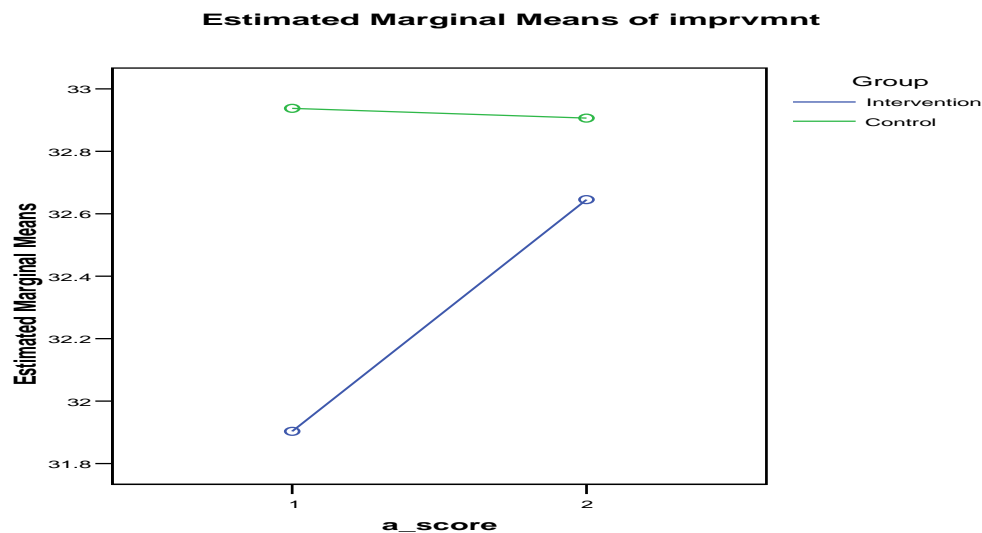
Estimated Marginal Means of imprvmnt

Figure 2: The change in mean attitude scores (a score) in intervention group (n=31) and control group (n=32) before (1) and after (2) intervention

DISCUSSION

This study was conducted to see the effects of diet counseling on KAP and also QOL among type 2 diabetic patients in Kuantan, Pahang, Malaysia. The majority of the respondents had sufficient knowledge of the common complications of DM. This could be due to the counseling that patients always received by health care providers about those complications. In these days there are a number of avenues to get the knowledge about DM which can improve patients' dietary behavior resulting in the positive changes.[44] This statement suggests that educational intervention is able to improve knowledge level, such as dietary counseling. A study reported that 54%, 34%, and 13% had poor, fair and good knowledge respectively about DM.[45] It could be because the study was conducted in a country with very limited dietary counseling services. The majority of the respondents in that study knew about healthy diet such as green leafy vegetables, choose foods with less fat, low sugar and less starchy.
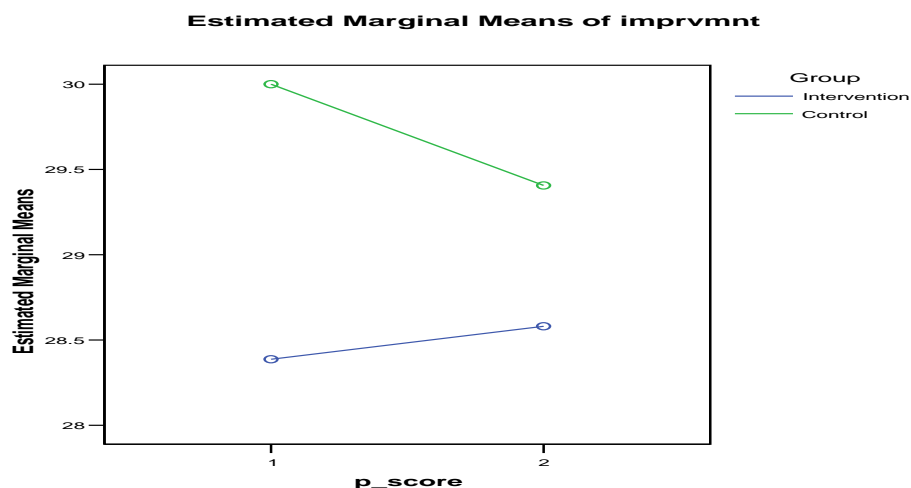
Estimated Marginal Means of imprvmnt

Figure 3: The change in mean practice scores (p_score) in intervention group (n=31) and control group (n=32) before (1) and after (2) intervention
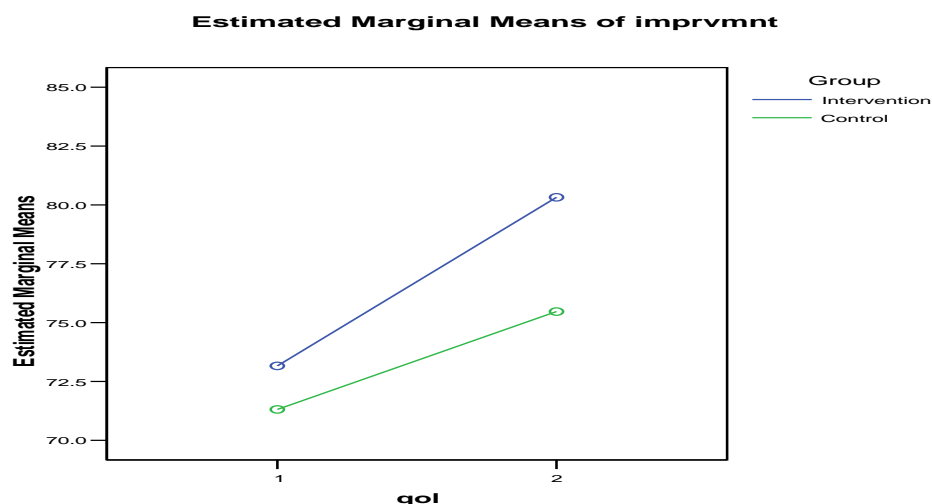
Figure 4: The change in mean Quality of Life (QoL) scores in intervention group (n=31) and control group (n=32) before (1) and after (2) intervention

In Malaysia, almost every patient will receive diet counseling, which may improve their knowledge and in this study, although most of the respondents have a positive attitude regarding DM but they often did not practice it. Even though, whole grain products are good for DM, many of the respondents seldom eat them. About half of the respondents have repeatedly taken fried meals.

This study reveals that the respondents did not have healthy lifestyles where they rarely involved in exercise activity. A previous study also reported that attitude and practice of diabetic patients were low. [46] The difference in the findings between different studies might be due to the differences in the literacy level, the training received, and the availability of information.

Table 2: Comparison of knowledge, attitude, practice towards diabetes mellitus and quality of life (QOL) scores of pre and post intervention between intervention (n=31) and control groups (n=32)

Variable / Group		Mean (sd)	*F*-statistic *(df)*	*p*-value*
Knowledge score				
Intervention	Pre	38.52 (3.60)	0.104 (1,61)	0.938
	Post	39.81 (3.80)		
Control	Pre	38.53 (3.28)		
	Post	39.91 (2.37)		
Attitude score				
Intervention	Pre	31.90 (2.75)	1.105 (1,61)	0.297
	Post	32.65 (2.80)		
Control	Pre	32.94 (3.01)		
	Post	32.91 (2.49)		
Practice score				
Intervention	Pre	28.39 (5.29)	1.196 (1,61)	0.278
	Post	28.58 (5.11)		
Control	Pre	30.00 (3.98)		
	Post	29.41 (4.98)		
QOL_score				
Intervention	Pre	73.16 (8.48)	3.231 (1,61)	0.080
	Post	80.32 (6.34)		
Control	Pre	71.31 (7.95)		
	Post	75.47 (8.60)		

*RM Anova, sd = standard deviation, df = degree of freedom

Significant correlation found between knowledge scores and duration of having DM in this study might be due to the longer duration of having DM may increase the patients' curiosity to know more about their disease, which may lead them to search information about it through medical personnel, friends, media, magazine, pamphlets or any other sources. However, there was no significant correlation between knowledge score and educational level. Age also does not influence the knowledge level of the patients. Previous study shows that low health literacy was significantly associated with worse glycemic control and poorer disease knowledge in patients with type 2 DM.[47] Another study stated that a direct relationship between level of education and good knowledge of diabetes was demonstrated. Fifty-two percent of those who had good knowledge had tertiary education, 25% had secondary education, and 14% had primary education while 9% had no formal education.[48]

The current study finds that educational level has significant association with attitude. Higher the educational level, more positive attitude was possessed by the respondents. Race was found to have significant association with knowledge, attitude and practice where Malay respondents were found to have better KAP as compared to other races. This situation occurs might be due to the fact that health education was usually provided in Malay language by healthcare providers.

This study also reveals that age had significant correlation with QOL. This could be because ageing process which may affect the QOL of the population. Mostly, elderly patients were satisfied with their life since they had already lived for a long time. Younger diabetic patients' QOL was affected much more than their older counterpart as they may need to put limits to many things. The patients with DM were more frequently lived alone and remained childless, participated in fewer social activities and indicated less personal satisfaction than control patients.[49] DM may also disturb the patient's QOL in physical, psychological and social functions.[50] However, it was reported that diabetic patients experienced better QOL in comparison to patients of other chronic diseases.[51]

There is better improvement in KAP scores after receiving diet counseling as compared to the control group even with no statistically significant difference. This could be because the experimental group received more information which prompted them to have more self-awareness. This result was supported by a previous study.[52] Another study revealed that the knowledge regarding DM can prevent the impending chronic co-morbidities of DM and can significantly improve QOL.[53] Once patients gain the knowledge about their disease, it can encourage the diabetic patients to be more aware about their diet intake and their physical activity. The long term target through diet counseling for diabetic patients is for improving metabolic control, preventing acute and chronic complications and improving their QOL.[28] Dietary counseling is very crucial because it will provide patients with ample knowledge on the management of DM.

CONCLUSION

In summary, the respondents' knowledge and attitude in this study were good. However, the practice was not at a satisfactory level. Duration of having DM and knowledge is correlated with each other. Overall, there is better improvement in KAP and QOL of diabetic patients in the intervention group but with no statistical significant difference. Therefore, dietary counseling can be very crucial in controlling DM. Diet counseling should strengthen so that diabetic patients will have better understanding regarding the management of DM. The current study design which is cross-sectional has its own inherent limitation with the minimum sample size. Consequently, future research should be done to confirm this finding and at the same time new educational method can be planned to solve the problem.

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