Nutrition knowledge, attitudes and practices: a comparison between medical practitioners and medical students in Bahrain

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Keywords

Nutrition, Medical personnel, Bahrain

Abstract

The objective of this study was to evaluate nutrition knowledge, attitudes and practices in Bahrain. A cross-sectional survey was carried out in 1998. Highly statistically significant differences ($p < 0.0001$) were observed between practitioners and students in relation to knowledge concerning recommended daily allowance. The results suggest that more attention should be given to nutrition in medical curricula for undergraduates and postgraduates.

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Introduction

Nutrition information from medical and health-related workers is held in high regard by the general public. It is essential, therefore, to ensure sound and safe nutrition advice given to the public and patients (Jackson, 2001). Practical and effective nutrition education and health promotion programmes are highly recommended by the government in Bahrain to prevent and control nutrition-related problems (Ministry of Health, 1997). Provision of dietary advice used to be the province of the nutritionist and dietician, but they are in short supply and the public expects their physicians to provide them with nutritional health information – in Western countries a high proportion of people expect their medical professionals to answer all their nutrition-related questions (Garner and Lumpkin, 1990; Buttriss, 1997). Therefore, the physician's office seems to be an important place for nutrition and health education. Receiving information about nutrition and dietary behaviour from medical professionals has been shown to be positively and significantly correlated with adoption of dietary behaviour to reduce the risk of nutrition related chronic disease (Ankeny *et al.*, 1991).

In Bahrain, it was estimated that the average person visits his physician 4.4 times a year (Ministry of Health, 1997) and expects the physician to have an adequate knowledge of health and nutrition practices that help in making appropriate dietary recommendations. In general, medical professionals are trusted by the community and the nutrition. Health education would be more effective if the educators, such as medical practitioners, received sufficient education on nutrition, were aware of recent nutrition matters and had made the necessary dietary changes themselves. If those in the medical profession act as health educators they must realise that many positive outcomes of the health education process are directly related to their personal motivation and behaviour.

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However, the general public perceives medical professionals as the best and most credible source of nutritional information, little is known about medical professionals' beliefs regarding the importance of nutritional information in promoting healthy dietary behaviour and lifestyle. Studies from several countries suggest that the general nutritional knowledge of medical professionals and medical students is inadequate (Heywood and Wootton, 1992; Hiddink *et al.*, 1995; Kushner, 1995). Medical professionals complain that they lack the confidence to explain the meaning of many nutritional terms and the relation between dietary nutrients and specific health conditions (Judd, 1988; Kushner, 1995; Helman, 1997). Knowledge about the assessment and management of under nutrition among doctors, medical students and nurses was found to be poor (Nightingale and Reeves, 1999). Younger physicians and female physicians who had healthier personal diets were more likely to have good nutrition knowledge and greater confidence about their knowledge (Glanz and Gilboy, 1992; Glanz, 1997).

Diet-related chronic diseases such as heart disease, diabetes, hypertension, obesity, cancer and anaemia are major public health problems in Bahrain. About 30 per cent and 12 per cent of total deaths in this country were due to heart disease and cancer respectively (Musaiger, 2000). Obesity has reached an epidemic stage in both Bahraini adolescents and adults. Sound information and practices related to dietary management of these chronic diseases are needed for both medical professionals and medical students in order to prevent and control such diseases.

The aim of this paper, therefore, is to assess nutrition knowledge and attitudes of both medical professionals and medical students in Bahrain, which have not been studied before. In the absence of prior evidence, we hypothesised that medical professionals have better nutrition knowledge and practices than medical students due to the experience of the former group. We also hypothesised that both medical professionals and medical students would lack adequate nutrition information due to the insufficiency of nutrition information available in medical curricula.

Methods

Sampling design

A cross-sectional survey on medical practitioners and medical students was carried out from October to December 1998. Selection of the study sample was subject to the fulfilment of certain criteria. For the medical practitioners, they had to be registered with the Ministry of Health and working in the public sector. An attempt was made to include all the Bahraini practitioners who were registered with the Ministry of Health according to the 1998 directory of doctors (Ministry of Health, 1998). They included medical practitioners who are working in one of the three areas – Salmaniya Medical Complex (the main hospital in the country), Psychiatric Hospital, and Health Centers. For the medical students, they had to be registered in the Arabian Gulf University (AGU), the only medical school in Bahrain, and be in the clinical years of their course to ensure that they had started their practical experience. This is because during practical experience the students gain more information on nutrition and diseases, as well as being exposed to patients who need dietary management. For this reason, medical students who were in their first three years were excluded from the study sample. Identifying the medical students sample depended on the registration list of the students registered in the AGU for the year 1998/1999 (AGU, 1998).

Self completion questionnaires were sent to 300 medical practitioners and 100 medical students.

The questionnaire

The questionnaire used in this study was adapted from that prepared for Market and Opinion Research International/National Diary Council (MORI/NDC, 1992). The questionnaire was divided into four sections. The first section related to socio-economic background of medical practitioners and medical students. The second section was designed to test the nutrition knowledge, and the third section was intended to examine nutrition beliefs and attitudes. The fourth section was focused on nutrition practices of practitioners and students. In general, the questions were focused on nutrition knowledge

and awareness to indicate the degree of agreement with, and level of importance given, to statements covering diet, lifestyle and health, and the importance of health promotion to specific groups of people. A five-point Likert scale that ranged from "strongly agree" to "strongly disagree" and from "very important" to "not at all important" was used.
A three-point scale was also used as follows: "have enough", "need more" and "lack". Respondents were asked to indicate whether they had ever modified their own diet to eat a healthy diet. A three-point scale was also used to include "made great effort", "made fair effort" and "made no effort". Motivating and barrier factors for intake of a healthy diet were obtained by using multiple choice questions.

Data collection

The questionnaire was designed, revised and piloted before its use in the study to establish its reliability and readability. The questionnaires were distributed and collected with the assistance of secretaries in medical areas (for the purpose of health administration, the Ministry of Health has divided Bahrain into five medical areas). Each study subject received the questionnaire in a good quality envelope that was addressed by name. The questionnaire contained a covering letter from the investigators explaining the purpose of the study and the importance of their participation. In addition to the covering letter, the questionnaire contained a recommendation letter from the Directory of Training at the Ministry of Health, to increase the response rate. Furthermore, the chief of the medical staff in each of the study areas was visited personally in his office before distribution of the questionnaires to explain the purpose and the importance of the study. In addition, all the chiefs of the medical staff received a telephone call after one month of distributing the questionnaires to encourage their participation and response. Fieldwork was conducted between October and December, 1998.

Data analysis

Data were stored and analysed using the SPSS software package. Chi-square (χ^2) analysis was used to test the statistical significance of differences in knowledge, attitudes and practices between medical practitioners and medical students. The test was considered significant if p-value was equal to, or less than, 0.05.

Results

Sample characteristics

Final response rates of 171 (57 per cent) and 66 (66 per cent) were obtained from medical practitioners and medical students, respectively.

Of the 171 medical practitioners who returned their questionnaires, 46 per cent were males and 54 per cent were females. Their ages ranged from 23 to 62 years, with a mean age of 33.4 ± 7.7 years. The majority (61.4 per cent) worked in Salmaniya Medical Complex, the main governmental hospital in the country. The mean years for practising medicine since qualification were 7 ± 7.4 years. Of the medical students, 41 per cent were males and 59 per cent were females. Their ages ranged from 18 to 27 years, with a mean age of 20.9 ± 1.9 years. There was no significant difference in the proportion of male and female between medical professionals and medical students. However, the difference in mean age was statistically significant between these two groups ($p < 0.01$).

Nutritional knowledge

Proportions of correct answers to identify foods rich in fat, fibre and starch were studied. Percentages of correct answers were high for questions related to fibre in both practitioners and students, and slightly lower for questions about starch and fat. About 40 per cent of practitioners and 42 per cent of students knew that there is no difference between whole milk and whole fat yogurt. In general, there was no significant difference between practitioners and students in their nutritional knowledge about which foods are rich in fat, fibre and starch. The exception was knowledge related to the fat content of egg yolk and egg white, where 73 per cent and 48 per cent of medical professionals and medical students believed that egg yolk contains fat, while egg white has no fat ($p < 0.0003$).

About 42 per cent of practitioners and 15 per cent of students chose the correct percentage of the recommended daily allowance (RDA) for energy from carbohydrates. Most of those who chose the correct percentage of the RDA for energy from fat were practitioners (27.5 per cent) than students (18 per cent). Only 10.5 per cent of practitioners and 8 per cent of students gave correct answers for the desirable daily intake of dietary fibre. It is worth mentioning that a relatively high proportion of both practitioners and students did not give correct information about the RDA for energy from carbohydrates and from fat, as well as the desirable daily intake of dietary fibre. Using χ^2 test, the difference in knowledge related to RDA between medical practitioners and medical students was highly statistically significant ($p < 0.001$).

Understanding nutrition terminology

Medical practitioners and students were asked how confident they felt about understanding nutrition terms related to fat and fibre (Table I) and general nutrition terms (Table II). A larger number of practitioners felt that they had adequate information on nutrition terms, compared to the number of students. However, both groups felt they needed more information about most of the terms. Some terms of a very specialist nature caused significant problems for both study groups (fatty acids, non-starch polysaccharides and extrinsic sugar). Practitioners were significantly less confident than medical students about the terms extrinsic sugar ($p < 0.001$), polyunsaturated fat ($p < 0.005$), monounsaturated fat ($p < 0.03$) and non-starch polysaccharides ($p < 0.02$). In general, practitioners expressed more confidence in their ability to explain the subclass of fatty acids compared with students, who expressed more confidence in explaining terms related to carbohydrates, calories and protein.

Nutritional attitudes

Focusing on nutrition and healthy eating, both practitioners and students had positive attitudes ("strongly agree" and "agree") to almost all the most commonly recognised techniques for improving diet. Almost, all the medical practitioners and medical students agreed that reduction in total fat intake (99 per cent of practitioners and 100 per cent of students) and

Table I Which of the following nutrition terms related to fat and fibre do you feel that you need more information about?

		I have enough		I need more		I lack		
Terms	Group	No.	%	No.	%	No.	%	*p*-value
1. Fat								
Cholesterol	Medical practitioners	63	36.8	97	56.8	11	6.4	0.3454
	Medical students	22	33.3	36	54.6	8	12.1	
Saturated fat	Medical practitioners	36	21.0	112	65.5	23	13.5	0.1107
	Medical students	10	15.2	40	60.6	16	24.2	
Polyunsaturated fat	Medical practitioners	35	20.5	110	64.3	26	15.2	0.0058
	Medical students	8	12.1	36	54.6	22	33.3	
Monounsaturated fats	Medical practitioners	22	12.9	117	68.4	32	18.7	0.0308
	Medical students	7	10.6	36	54.6	23	34.8	
Trans-fatty acids	Medical practitioners	8	4.7	104	60.8	59	34.5	0.2006
	Medical students	3	4.5	32	48.5	31	47.0	
2. Fibre								
Fibre	Medical practitioners	62	36.3	96	56.1	13	7.6	0.1762
	Medical students	23	34.9	42	63.6	1	1.5	
Non-starch polysaccharides	Medical practitioners	13	7.6	118	69.0	40	23.4	0.0241
	Medical students	11	16.7	34	51.5	21	31.8	
Starch	Medical practitioners	44	25.7	109	63.8	18	10.5	0.6359
	Medical students	21	31.8	39	59.1	6	9.1	

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avoiding high cholesterol foods (96.5 per cent and 97 per cent, respectively) were the main steps to eating a healthy diet. Changing cooking methods and switching from saturated to polyunsaturated fat achieved a more positive attitude among practitioners (92 per cent and 94 per cent, respectively) than students (80 per cent and 74 per cent, respectively). There was a strong agreement on the importance of increasing dietary fibre intake (100 per cent and 91 per cent among medical practitioners and medical students, respectively). Although there was a positive attitude to reducing sugar intake among both groups, it scored less than increasing dietary fibre intake (90 per cent and 71 per cent in practitioners and students, respectively). Lower priority was placed on promoting the intake of starchy foods.

Medical practitioners and students believed that dietary advice is particularly important for several sectors of the population. Parents with children less than 5-years-old, the elderly, adolescents and the general public were considered to be important or fairly important for the targeting of dietary advice. The elderly were thought to need more attention than other groups (Table III).

Nutritional practice

Table IV shows how practitioners rated their own diet. It appears that the overall health habits of the groups surveyed were good and there was a high percentage practicing good food habits. About 25 per cent of practitioners and 20 per cent of students stated that a healthy diet is not only important, but that their diet is as healthy as it could be.

Healthy eating efforts were reported more by practitioners than students. About 78 per cent of practitioners and 45 per cent of students were attempting to eat more of the foods they feel that are lower in fat. Furthermore, 75 per cent of practitioners and 51.5 per cent of students were attempting to eat more fruits and vegetables, while 72.5 per cent and 36 per cent ate more dietary fibre, respectively. There was a significant difference between the practitioners and the students in healthy eating efforts (Table V).

The students were more likely than the practitioners to identify reasons that prevented them from practising healthy eating. Irregular working hours was the main barrier for both practitioners (48 per cent) and students (50 per cent). Other reasons given were: "healthy eating is boring", "doesn't want to change the eating habits" and "not interested in healthy eating". A relatively high proportion of students (19.6 per cent) said they were not interested in practising healthy eating, compared with 2.9 per cent of practitioners.

When asked about the factors that motivate both practitioners and students to make changes to their diet towards more healthy

Table II Which of the following nutrition terms do you feel that you need more information about?

		I have enough		I need more		I lack		
Nutrition terms	Group	No.	%	No.	%	No.	%	*p*-value
Carbohydrate	Medical practitioners	77	45.0	83	48.5	11	6.5	0.1066
	Medical students	31	47.0	35	53.0	–	–	
Calories	Medical practitioners	55	32.2	98	57.3	18	10.5	0.3328
	Medical students	24	36.4	39	59.1	3	4.5	
Protein	Medical practitioners	73	42.7	88	51.5	10	5.8	0.2300
	Medical students	34	51.5	31	47	1	1.5	
Energy	Medical practitioners	51	29.8	106	62.0	14	8.2	0.4902
	Medical students	25	37.9	36	54.5	5	7.6	
Pulses	Medical practitioners	22	12.9	102	59.6	47	27.5	0.1058
	Medical students	9	13.6	30	45.5	27	40.9	
Extrinsic sugars	Medical practitioners	17	10.0	117	68.4	37	21.6	0.0013
	Medical students	5	7.6	31	47.0	30	45.4	
Balanced diet	Medical practitioners	48	28.1	111	64.9	12	7.0	0.7824
	Medical students	20	30.3	40	60.6	6	9.1	

Table III How important do you consider dietary advice to people with the following conditions or groups of people?

People	Group	Very important (%)	Fairly important (%)	Don't know (%)	Not very important (%)	*p*-value
Parents with children under five years	Medical practitioners	55.9	33.3	4.7	7.1	0.0139
	Medical students	36.4	40.9	13.6	9.1	
The elderly	Medical practitioners	60.8	32.7	2.9	3.6	0.4469
	Medical students	50.1	43.9	3.0	3.0	
Adolescents	Medical practitioners	54.4	35.6	1.8	8.2	0.0549
	Medical students	36.4	43.9	3.0	16.7	
The general public	Medical practitioners	43.9	50.9	2.3	2.9	0.0254
	Medical students	22.7	68.3	4.5	4.5	

Table IV Which of the following statements best describes your own diet?

Statements	Medical practitioners[a] No.	%	Medical students No.	%	*p*-value
1. Having a healthy diet is important to me, and I think my diet is already as healthy as I can make it	41	24.4	13	19.7	0.0006
2. Having a healthy diet is important to me, but it worries me that I am not doing enough	88	52.4	28	42.4	
3. I try to eat a healthy diet, but I don't worry too much	31	18.4	10	15.2	
4. Mostly I just eat food I like, and I don't worry whether it is healthy or not	8	4.8	15	22.7	
Did you make any effort to eat a healthy diet over the past three years?					
1. I made a great deal of effort	47	28.0	13	19.7	0.0007
2. I made a fair amount of effort	99	58.9	30	45.5	
3. I did not make any effort	22	13.1	23	34.8	

Note: [a] Three practitioners did not answer this question

eating, "to stay healthy" was seen as a particularly strong motivator (78 and 61 per cent, respectively), compared with losing weight (53 and 44 per cent) and personal ill health (16 and 18 per cent), as shown in Table VI.

Discussion

This study, as in other studies in Western countries (Jack *et al.*, 1990; Parker *et al.*, 1992; Helman, 1997), found that medical practitioners' and medical students' nutritional knowledge is inadequate. Our results show that medical practitioners scored better than medical students in nutritional knowledge questions. The same finding was demonstrated by Mlodinow and Connor (1988) and Brett *et al.* (1986). A reverse result was found by Podell *et al.* (1975) with practising physicians scoring lower than medical students. However, there were almost the same nutrition knowledge scores among primary care physicians and senior medical students in two studies conducted separately in Taiwan (Pin Hu *et al.*, 1997a, b).

The low nutritional knowledge scores were noticeable for questions related to the RDA. The medical practitioners and medical students

Table V Which of the following healthy eating efforts did you make?

Statements		Medical practitioners No.	%	Medical students No.	%	*p*-value
I ate less fatty foods	Yes	134	78.4	30	45.4	
	No	37	21.6	36	54.6	0.0001
I ate more starchy foods	Yes	42	24.6	7	10.6	
	No	129	75.4	59	89.4	0.0176
I ate more fruit and vegetables	Yes	129	75.4	34	51.5	
	No	42	24.6	32	48.5	0.0001
I ate less sugary foods	Yes	99	57.9	25	37.9	
	No	72	42.1	41	62.1	0.0002
I ate more fibre	Yes	124	72.5	24	36.4	
	No	47	27.5	42	63.6	0.0001
I used low calorie products	Yes	79	46.2	13	19.7	
	No	92	53.8	53	80.3	0.0001

demonstrated limited knowledge regarding the RDA for energy from carbohydrates and fat and the desirable daily intake of dietary fibre. This could reflect the belief that this topic is more the domain of specialists such as nutritionists and dietitians, or that this information is available in more specialist sources that our subjects may not be in contact with.

Table VI Barriers and motivators towards eating a healthy diet[a]

Barriers/motivators	Medical practitioners (%)	Medical students (%)
Barriers		
Irregular working hours	47.9	50.0
I don't want to change my eating habits	14.6	25.7
Not interested in healthy eating	12.9	19.6
Healthy eating is boring	19.8	28.7
Others[b]	11.1	21.2
Motivators		
Personal ill health	15.7	18.1
To lose weight	53.2	43.9
To stay healthy	77.7	60.6
Media and advertising	5.8	7.5
Others[c]	2.3	6.0

Note: [a] The total is not equal to 100.0 because of multiple answers; [b] Others include social life, busy, poor appetite and habits; [c] Others include maintaining weight, to gain weight, friends and relatives pressure

The low effectiveness of nutrition training courses and the college curriculum that was mentioned by both medical practitioners and medical students is in line with other studies (Weinsier *et al.*, 1986; Kushner, 1995). Furthermore, this criticism of the medical college curriculum is supported by Musaiger (1990) who indicates that the curriculum of the medical college in the AGU does not include relevant and adequate information on nutrition and dietary management of diseases. The same deficiencies in the medical curriculum have been found in other countries (Hiddink *et al.*, 1997; Warden *et al.*, 1996; Guagnano *et al.*, 2001; Taren *et al.*, 2001). Research has shown a general dissatisfaction among professionals with the quality of training in nutrition they receive, both before and after qualification. Although professionals turn to the media for advice, they tend to think that information provided by the media is confusing and contradictory (Buttriss, 1997).

In this study, a high percentage of practitioners stated that they lacked the information about specific nutritional terms, and most of them felt that they needed more information on these terms. Other studies have shown even less confidence about nutritional terms among health professionals (general practitioners and practice nurses) in the UK (Buttriss, 1997; MORI/NDC, 1992). This lack of confidence relates especially

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to explaining nutritional terms to patients. In this study, this was the main barrier mentioned by practitioners to giving their patients the nutritional counselling they need, a finding which echoes that of other studies (Heywood and Wootton, 1992; Hiddink *et al.*, 1995; Helman, 1997).

Interest in learning more about nutrition was slightly higher among medical practitioners than medical students. This is consistent with the study by Brett *et al.* (1986). In general, a high proportion of both medical practitioners and medical students were interested in nutrition and they wanted to know more about it. This is similar to the findings of other studies (Kushner, 1995; Warden *et al.*, 1996).

These respondents were more in favour of giving dietary advice to particular age groups, which is in line with the study of MORI/NDC (1992). They saw adolescents as a less important target group for dietary advice, which suggests that they do not appreciate the health and nutritional problems of adolescents. Musaiger (1998) reported that adolescents are a neglected target group in health programmes in Arabian Gulf countries, as most of these programmes focus on the medical condition and health of mothers and children. These respondents were also more positive about giving nutritional advice to groups with clear medical problems than they were about giving it to other population groups, a result that is consistent with the findings of other investigators (Brett *et al.*, 1986; Jack *et al.*, 1990; Warden *et al.*, 1996). This means that medical practitioners and medical students concentrate on nutrition for treatment of medical conditions more than health promotion for people in general.

Knowledge and attitude have a strong influence over personal health practices and behaviour. In this study, medical practitioners had a higher percentage of positive nutritional knowledge, attitudes and interest in nutrition education compared with students. This may explain why medical practitioners were more likely to practice healthy eating than did students, who in some cases did not make any effort to have a healthy diet, and who were generally less concerned about healthy eating. The tendency of students to be less concerned with diet than practitioners is in line with research in Taiwan (Pin Hu *et al.*, 1997a, b). However, a lower percentage than our study: about 70 per cent of practitioners and 50 per cent of students made an effort to practice healthy eating behaviour compared with 85 per cent and 65 per cent, respectively, in this study. In this study, practitioners were more likely to practice healthy eating than a group of practitioners studied in the USA, where less than 40 per cent of the physicians reported that they practiced nutritional related behaviour (Levine *et al.*, 1993).

In terms of the motivating factors listed by both medical practitioners and medical students "to stay healthy" was given the most priority followed by "to lose weight", and less priority was given to "personal ill health". These barriers were also nominated by professionals in a UK study (MORI/NDC, 1992), although the UK professionals nominated treatment of medical problems as their main motivator.

Some limitations should be considered when interpreting the findings of this study. First, the sample size is rather small, and the response rate rather low, which may affect the results. Second, the medical professionals working in private and other sectors were excluded from this study. These groups may have different knowledge and attitudes towards nutrition. Third, the effect of gender on nutrition information and practices of both medical professionals and medical students was not investigated, mainly due to small sample size.

Despite these limitations, the findings of this study suggest that further attention should be directed towards the teaching of nutrition within medical curricula for undergraduate and postgraduate courses. Some practitioners and students already identified dietitians as suitable sources of nutrition information. Nutritionists and dietitians should be involved in the medical curriculum. If medical practitioners and medical students were sensitized to nutrition, they would be more likely to use it in their medical practice and continue to improve their nutritional knowledge and skills (Hodgson *et al.*, 2000; Thomson *et al.*, 2000). Furthermore, the nutritional learning process would be enhanced if the knowledge and skills to be learned were perceived as meaningful to

successful medical practice. More emphasis should be given to the application of nutritional principles to the major public health problems (such as obesity, heart disease and diabetes), rather than only to metabolism. This seems to be especially important for postgraduate training of both general practitioners and family physicians because of their direct links with the community.

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