

# Study of the knowledge, attitudes and practices of physicians towards obesity management in primary health care in Bahrain

Abeer Al-Ghawi<sup>1,\*</sup> and Ricardo Uauy<sup>2,3</sup>

<sup>1</sup>Ministry of Health, Nutrition Section, Public Health Directorate, PO Box 42, Manama, Kingdom of Bahrain:

<sup>2</sup>Institute of Nutrition and Food Technology (INTA), University of Chile, Santiago, Chile: <sup>3</sup>London School of Hygiene and Tropical Medicine, London, UK

Submitted 19 October 2007: Accepted 18 November 2008: First published online 23 January 2009

## Abstract

*Aim:* To examine the opinions of physicians in Bahrain regarding their role in obesity control, and to evaluate their knowledge, attitudes and practices towards obesity prevention and management in primary health care.

*Design:* A cross-sectional survey of physicians in Bahrain. A single-stage cluster sample was used, which included twelve health centres and 107 physicians. Ninety-seven physicians participated in the study with a 90% response rate. A self-administered questionnaire was used to measure physicians' knowledge and practices, their perceived role and potential limitations. Correction for design effect and finite population were considered in the analysis.

*Results:* The majority of physicians in Bahrain (92%) were aware of the obesity epidemic and 60% of them felt capable of assuming a major role in obesity control, regardless of their negative views towards the success rates of weight management. Only 36% agreed that they had effective weight-management practices. They were knowledgeable about weight-loss goals and showed a reasonable level of obesity identification, especially as part of chronic disease care (71%). Physicians reported a high rate of utilization of various weight-loss strategies, except for pharmacotherapy and surgery. The major barriers identified in patient care included time constraints (91%), lack of specialty clinics (81%), absence of guidelines (78%) and an inadequate number of dietitians (71%). Sixty-four per cent reported that training in lifestyle counselling and behaviour modification are important requirements.

*Conclusions:* Physicians in Bahrain showed a reasonable level of interest in participating in obesity prevention and management. It seems that there would be a good opportunity for better practice if physicians were supported with appropriate training and the constraints of their working environment were adequately addressed.

**Keywords**  
Obesity management  
Physicians  
Primary care  
Bahrain

There is a growing global epidemic of obesity and overweight<sup>(1)</sup>. Like in many parts of the world, the escalating obesity problem in Bahrain has reached a level of public health significance and requires urgent action. Over the last few decades Bahrain has undergone a rapid epidemiological transition, with a reliance on more sedentary jobs and an increase in the availability of high-energy food. This has led to the dramatic rise in the prevalence of obesity. In 2002, the overall prevalence of overweight and obesity was 60% among adults and 24% among schoolchildren<sup>(2,3)</sup>. Twenty-three per cent of Bahraini males and 34% of Bahraini females were obese. This is associated with increased prevalence of non-communicable diseases. CVD and cancer are the leading causes of death<sup>(4)</sup> and nearly 30% of Bahrainis aged 40–69 years have type 2 diabetes<sup>(5)</sup>.

Obesity is a sequela to an abnormal obesogenic environment and is best tackled with extensive environmental interventions, supported by appropriate policy and legislation<sup>(6)</sup>. However, obesity management is also one of the most cost-effective interventions when combined with regulatory and economic approaches. Clinical management guidelines have been developed with demonstrable efficacy, particularly for dietary counselling, physical activity, behaviour modification and pharmacotherapy<sup>(7,8)</sup>. Obese patients counselled to lose weight are more likely to be at a higher stage of readiness for weight loss<sup>(9,10)</sup>.

The primary health care (PHC) system provides the best framework for delivering weight management and physicians have unique professional characteristics which

\*Corresponding author: Email Aghawi@health.gov.bh

put them in a better position to contribute to the prevention and treatment of overweight and obesity<sup>(11)</sup>. The opportunity to deliver lifestyle advice comes from the large percentage of the population who contact their physician<sup>(4)</sup> and physicians' extensive involvement with personal prevention<sup>(12)</sup>. The family practice approach allows physicians to build a rapport, deliver advice tailored to the individual and ensure continuity of care, which provides an ideal set-up for behavioural counselling<sup>(13)</sup>. Physicians are the most frequently used source of health information<sup>(13,14)</sup> and have been found to be more cost-effective than dietitians in nutritional counselling for obese and other patients<sup>(15,16)</sup>.

Despite these facts, PHC is still underutilized for obesity counselling<sup>(7)</sup> and its capacity is usually restrained by a number of limitations<sup>(17)</sup> such as short consultation time, patients' low motivation and non-compliance, inadequate teaching materials, lack of reimbursement, low level of physicians' confidence and a shortage of dietitians<sup>(17,18)</sup>. Inadequate nutrition knowledge has also been reported by physicians themselves or documented objectively<sup>(19,20)</sup>.

In addition, it has been suggested that obesity management in PHC is deficient mainly due to low identification of patients' weight status and physicians' inefficient efforts at intervention<sup>(21)</sup>. Less than half of obese individuals are advised to lose weight by their physician<sup>(9,22)</sup>. Overweight and mild obesity is under-recognized and under-treated unless associated with other medical complications<sup>(22,23)</sup>, particularly among the paediatric population<sup>(24)</sup>. Furthermore, health professionals, including physicians, may hold negative attitudes towards obese patients<sup>(25,26)</sup>, which may be one of the reasons for the low success rate of obesity management<sup>(27)</sup>.

The present study was conducted to describe the opinions of physicians in Bahrain regarding their role in obesity control, including their capabilities and limitations, and to evaluate their knowledge, attitudes and practices towards obesity prevention and management in PHC. It is concurrent with a proposed obesity-management programme in PHC to empower Bahraini physicians with the necessary professional and structural tools to meet the challenge of the growing obesity epidemic.

## Methods

A cross-sectional survey of physicians in Bahrain was conducted in April 2006. The sample size was estimated using the Epi-Info software package version 6.04c (Centers for Disease Control and Prevention, Atlanta, GA, USA) for a 5% significance level, 10% precision and a minimum non-response rate of 30%. For logistical reasons, i.e. the lack of adequate time and resources, a single-stage cluster sampling was conducted. Ten health centres were randomly selected out of twenty-two and all physicians within the selected health centres were included. Another two randomly chosen health centres were

added during the period of data collection to account for possible non-responses, increasing the total number of physicians included to 107.

A single self-completed questionnaire was developed based on reviewed literature<sup>(11,26,28,29)</sup> and was modified further after piloting. Four- and 5-point Likert-scales were used, in which the participants had to indicate their level of agreement with each statement by selecting one from 'strongly agree', 'agree', 'neutral', 'disagree' or 'strongly disagree'; or, in practice statements, from 'all of the time', 'most of the time', 'occasionally', 'not at all' or 'don't know'.

The questionnaire consisted of five sections; in addition to gathering demographic data, it included eleven statements exploring attitudes and knowledge, three for weight problem identification, nine statements for weight-loss strategies, three statements on self-efficacy and eleven statements on major limitations.

Based on the very low response rate reported in similar studies using postal questionnaires<sup>(11)</sup>, it was decided to maximize the response rate by keeping the questionnaire as simple and short as possible and distributing it personally. After ethical approval, the data were collected, coded and entered using the EpiData software version 3.1 (EpiData Association, Odense, Denmark). Analysis was done using the STATA statistical software package version 9 (StataCorp., College Station, TX, USA) with adjustment for the design and the finite population effects to produce the correct standard errors.

Descriptive analysis of the physicians' attitudes and practices was the primary objective of the study and results are presented mainly as frequencies, adjusted percentages and their 95% confidence intervals. Means and standard deviations were used to describe the physicians' personal data.

Because of the small sample size and for ease of presenting the data, most of the responses were grouped together: 'agreed' referring to both 'agreed' and 'strongly agreed', 'disagreed' referring to both 'disagreed' and 'strongly disagreed', and 'used most of the time' referring to 'all' and 'most of the time', *v.* other responses.

Some of the key outcomes are examined in relation to physicians' demographic and professional characteristics such as gender, BMI, duration of practice, family medicine certification and attending relevant training courses using univariate and multivariable analyses. However, this should be cautiously interpreted, as identification of predictors was not the primary outcome of the study.

## Results

### *Demographic and professional characteristics*

The questionnaire was completed by ninety-seven participants, with a 90% response rate. The non-respondents were similar to the participants with respect to their gender and qualification. Nearly one-third of physicians

**Table 1** BMI of the surveyed physicians by gender, Bahrain, 2006

Gender	Normal weight (%)	Overweight (%)	Obese (%)
Male ( <i>n</i> 23)	13.0	60.9	26.1
Female ( <i>n</i> 63)	49.2	38.1	12.7

were males (*n* 29) and two-thirds were females (*n* 68). The age of the physicians ranged from 29 to 59 years. The mean duration of practice in primary care was 11 years. Seventy-eight per cent of the physicians had a degree in family medicine and only 26% had taken relevant nutrition courses.

Nearly half of the female physicians (49.2%) and only 13.0% of the male physicians had a BMI in the normal range. A large proportion of physicians, particularly male doctors, were overweight or obese (Table 1).

Although male physicians had more years of experience, a larger proportion of female physicians were family medicine graduates; but both had similar training opportunities with regard to nutrition. A significant proportion of junior physicians (those with working experience <10 years) were family medicine graduates and a significantly higher proportion of them had received more training compared with senior physicians (Table 2).

### **Physicians' attitudes and knowledge towards obesity management**

Ninety-two per cent of the physicians agreed with the statement, 'Obesity is a big health problem among children and adults in Bahrain which requires urgent action'. Weight-loss counselling was felt to be professionally rewarding among 60.4% of physicians, who also agreed that their role in obesity prevention and management is unlimited (Table 3).

Physicians who had nutrition training courses were twice as likely to believe that they can assume a major role in weight management than those who had not, but this was only marginally significant (OR\* = 2.20, 95% CI 0.98, 4.81, *P* = 0.055). Nearly two-thirds of the physicians (65.6%) believed that only a few overweight and obese individuals can successfully lose weight and will be able to maintain the weight loss. Only 36.0% of physicians reported that the weight management in their practice was effective, irrespective of their gender, length of experience, qualification and training. Nearly 85% of physicians stated that they would provide advice about weight loss even if the patient had not requested it.

The majority of physicians (88.9%) would encourage adults with a healthy body weight (BMI = 18.5–24.9 kg/m<sup>2</sup>) to maintain their weight. More than three-quarters of physicians would not restrict weight management to those who are obese (76.6%) and four out of five physicians would

treat overweight individuals even if no other co-morbidities exist (83.5%).

Most physicians (96.7%) believed that even small but sustainable weight losses can produce significant health benefits, with 82.2% agreeing that this as an important goal to set. This view was particularly held by female physicians (OR = 5.70, 95% CI 1.87, 17.97, *P* = 0.003), and a large percentage of physicians (86.8%) realized that helping patients to adopt a healthy lifestyle is another important goal by itself, irrespective of weight loss.

### **Obesity recognition**

It was found that half of the physicians (50.0%) occasionally screened their patients for weight problems and only one-third of physicians did this on a regular basis (33.3%; Table 4). The longer the physician had been in practice, the more likely s/he was to screen for weight problems (OR = 1.70, 95% CI 1.02, 3.86). Among the 95.6% of physicians who weighed their patients as part of chronic disease care, 71.4% did it on a frequent basis.

### **Weight-management strategies**

Nearly all participants included lifestyle advice in their weight-management programme. The majority stated that they advise patients on diet (97.8%) and physical activity (95.6%) most of the time (Table 5). Behavioural counselling was used less often, about two-thirds reported using it regularly (64.4%). Fifty-eight per cent of physicians used leaflets and educational materials most of the time and about a third (32.2%) used them only occasionally.

Forty-one per cent of physicians referred their patients to dietitians regularly. Involving the patient's family was reported by more than third of the physicians (39.6%). Pharmacotherapy and referral to weight-loss surgery were the least used strategies. Only 4.5% of the practitioners would prescribe medication to treat obese patients and 3.3% would refer them to surgery if clinically indicated.

### **Self-efficacy**

Physicians felt more confident treating overweight adults than obese adults or overweight/obese children (Table 6). Four out of five physicians (82.4%) felt professionally prepared to treat overweight patients. In comparison, about two-thirds (68.1%) of physicians rated themselves as professionally competent to treat obese patients and only half were confident to treat children (50.5%).

Training courses in obesity management appeared to significantly improve physicians' confidence in treating obese patients (OR = 4.60, 95% CI 1.84, 11.44, *P* = 0.002). Male doctors and trained physicians felt more confident in treating children (OR = 3.20, 95% CI 1.39, 7.42, *P* = 0.008 and OR = 1.80, 95% CI 0.95, 3.39, *P* = 0.069, respectively).

\* All odds ratios presented are adjusted.

**Table 2** Characteristics of the surveyed physicians by gender and length of experience, Bahrain, 2006

Characteristic	Males ( <i>n</i> 29)	Females ( <i>n</i> 68)	<i>P</i> *
Length of experience ≥10 years (%)	75.9	36.8	<0.001
Family medicine graduate (%)	61.5	84.6	0.016
Received training courses (%)	25.0	26.5	0.881
	Junior physicians ( <i>n</i> 47)	Senior physicians ( <i>n</i> 44)	
Family medicine graduate (%)	87.2	68.2	0.028
Received training courses (%)	36.0	15.2	0.025

\**P* value for the difference between the two categories of physician, i.e. male and female or junior and senior.

**Table 3** Physicians' attitudes and knowledge towards obesity management, Bahrain, 2006

Statement regarding physicians' attitudes and knowledge (no. of responses)	Agree (%)	Disagree (%)	Neutral (%)
Obesity is a big health problem in Bahrain and requires urgent action ( <i>n</i> 97)	92.3	7.7	–
Physicians have a limited role in obesity prevention and management which makes weight-loss counselling professionally unrewarding ( <i>n</i> 97)	32.9	60.4	6.6
Very few overweight people can reduce their weight and maintain that loss ( <i>n</i> 96)	65.6	23.3	11.1
The weight management in my practice is very effective ( <i>n</i> 96)	36.0	38.5	25.2
I would only offer advice about weight control if the patient asks for it ( <i>n</i> 97)	6.6	84.6	9.0
Adults with healthy body weight (BMI = 18.5–24.9 kg/m <sup>2</sup> ) should be encouraged by physicians to maintain their weight ( <i>n</i> 96)	88.9	5.5	5.6
Treatment for weight loss should be offered only to adults who are obese (BMI > 30 kg/m <sup>2</sup> ) ( <i>n</i> 96)	13.3	76.6	10.0
Overweight (BMI = 25.0–29.9 kg/m <sup>2</sup> ) should only be offered treatment when other co-morbidities exist ( <i>n</i> 97)	13.2	83.5	3.3
A small amount of weight loss (10% of body weight) that is sustained over time is an important goal in weight-loss therapy ( <i>n</i> 96)	82.2	10.0	7.8
Adopting healthy eating and active living is an important goal irrespective of weight loss ( <i>n</i> 97)	86.8	7.8	5.5
Even small weight loss should be encouraged as it can produce significant health benefits ( <i>n</i> 97)	96.7	3.3	–

**Table 4** Identification of weight problems by physicians in primary health care, Bahrain, 2006

Weight recorded routinely for (no. of responses)	Most of the time (%)	Occasionally (%)	Not at all (%)
Chronic disease management ( <i>n</i> 97)	71.4	24.2	4.4
Opportunistic screening (case finding) ( <i>n</i> 96)	33.3	50.0	12.2

**Table 5** Weight-management strategies reported by physicians, Bahrain, 2006

My weight-management programme includes the following as needed (no. of responses)	Most of the time (%)	Occasionally (%)	Not at all (%)
Dietary advice ( <i>n</i> 97)	97.8	2.2	–
Physical activity advice ( <i>n</i> 97)	95.6	3.3	1.1
Behavioural counselling ( <i>n</i> 96)	64.4	22.2	12.2
Referring to dietitian ( <i>n</i> 96)	41.1	53.3	3.3
Referring to weight-loss surgery ( <i>n</i> 96)	3.3	40.0	47.8
Pharmacotherapy ( <i>n</i> 94)	4.5	53.4	38.6
Leaflets and educational material ( <i>n</i> 96)	57.8	32.2	8.8
Family involvement ( <i>n</i> 97)	39.6	48.3	9.9

### Barriers to weight management

The three major obstacles identified by physicians as the most limiting in delivering optimal care to obese patients were short consultation times (91.0%), a lack of weight-management clinics (81.1%) and the absence of national weight-management guidelines (78.6%; Table 7).

Some physicians (71.1%) agreed that an inadequate number of dietitians is a limiting factor. A similar proportion

(70.0%) found that low patient motivation and poor compliance to weight-loss interventions are important barriers in weight management.

Inadequate training in providing dietary and lifestyle counselling for obese patients was stated by nearly two-thirds of physicians as a reason why they felt less efficient in providing optimal care (64.4%). However, only 30.0% of the physicians felt that inadequate knowledge was a

**Table 6** Physicians' reported self-efficacy, Bahrain, 2006

How confident and professionally prepared do you feel to treat? (no. of responses)	Confident (%)	Not confident (%)	Don't know (%)
Overweight patients ( <i>n</i> 97)	82.4	15.4	2.2
Obese patients ( <i>n</i> 97)	68.1	29.7	2.2
Overweight and obese children ( <i>n</i> 97)	50.5	46.1	3.3

**Table 7** Physicians' reported major limitations in weight-management practice, Bahrain, 2006

Potential limiting factor (no. of responses)	Agree (%)	Disagree (%)	Neutral (%)
Short consultation time/work overload ( <i>n</i> 96)	91.0	3.3	5.6
Lack of special obesity clinic to refer patients to ( <i>n</i> 96)	81.1	7.7	16.5
Lack of nationally adopted guidelines ( <i>n</i> 95)	78.6	11.2	15.6
Inadequate number of dietitians to refer patients to ( <i>n</i> 96)	71.1	13.3	7.7
Lack of patient motivation and non-compliance ( <i>n</i> 96)	70.0	16.6	10.1
Inadequate training in providing lifestyle and behavioural counselling for obese patients ( <i>n</i> 95)	64.4	27.8	5.5
Anti-obesity drugs are not available in primary health care ( <i>n</i> 96)	57.8	31.1	13.3
Lack of adequate knowledge in obesity treatment ( <i>n</i> 95)	30.0	54.4	12.5
Not being paid for the preventive services ( <i>n</i> 93)	17.1	70.5	11.1
Don't believe obesity treatment is successful ( <i>n</i> 97)	3.2	91.2	15.6
Lack of interest in obesity treatment ( <i>n</i> 97)	5.4	78.0	11.1

potential barrier to providing obesity management. This response did not differ by gender, BMI, duration of practice, qualification or training.

The lack of availability of weight-loss drugs was reported by more than half of the physicians (57.8%) as a limiting factor for successful weight management. The majority of physicians (91.2%) did not consider the low success rate in obesity management as a limitation. This view was supported particularly by physicians with fewer years of practice (OR = 12.50, 95% CI 1.60, 96.64,  $P = 0.017$ ).

A large number of physicians (78.0%) did not consider a lack of interest in obesity care as being an obstacle, particularly male (OR = 2.80, 95% CI 1.06, 7.47,  $P = 0.039$ ) and normal-weight physicians (OR = 2.80, 95% CI 1.37, 5.71,  $P = 0.006$ ).

## Discussion

From the present survey it is obvious that physicians were aware of the magnitude of obesity as a major public health problem in Bahrain. In fact, a large proportion of the physicians held strong positive views regarding their role in obesity control as reflected by their strong obligation and commitment to advice on weight loss even if not asked for by their patients. This is despite the feeling of a low level of effectiveness in their weight-loss practices and their negative views regarding the success of obese and overweight patients to lose and maintain the lost weight. The reasons for the existing disparity between the level of interest shown by physicians towards obesity management and their perceived low level of effectiveness is not clear; whether it results from real experience or from published literature on long-term obesity treatment<sup>(30,31)</sup> remains to be established.

The physicians surveyed demonstrated sufficient knowledge regarding the indication to deliver weight-control counselling and the definition of weight-loss goals<sup>(32)</sup>. The majority of physicians were aware of the importance of setting realistic weight-loss goals and the adoption of a healthier lifestyle. They also acknowledged the importance of early intervention even in the absence of co-morbidities. However, a noticeable gap exists between the physicians' attitudes and knowledge regarding weight management and their current practices. This is demonstrated by the fact that only one-third of respondents would identify their patients' weight problems on regular basis despite that the majority agreed to advice about weight loss spontaneously, similar to what has been found in an earlier study<sup>(33)</sup>. Physicians also seemed to identify weight problems as part of chronic disease care more often than for screening purposes. This suggests a therapeutic rather than preventive approach towards weight problems.

Physicians utilized various approaches in weight-loss management. Similar to other studies<sup>(11,26,29,34)</sup>, lifestyle therapy was the most frequently used approach. The benefits of long-term behavioural modification and family involvement in the management of obese patients have been clearly highlighted in the literature<sup>(35,36)</sup>. A large proportion of Bahraini physicians valued strategies that support lifestyle changes and reported using behavioural counselling or involving family members on a regular or occasional basis. This far exceeds what has been reported by other physicians<sup>(11,26,29)</sup>.

Pharmacotherapy was used less often even if clinically indicated. This is probably because drugs are expensive; or because of concerns about its safety or possible ineffectiveness. The latter is unlikely, as the majority perceived the unavailability of anti-obesity drugs in governmental clinics as a potential limitation in obesity management.



Despite its long-term cost-effectiveness, surgery is less utilized, even in developed countries. This may be due to physicians being less aware of its potential benefits, the inaccessibility to qualified surgeons or fear of possible risks<sup>(30)</sup>.

The major constraints identified by physicians to provide obesity management were mainly related to the PHC system and/or factors related to the patient. Short consultation time is a well-recognized barrier to preventive services in PHC and has been reported by the majority of physicians in other studies<sup>(26,37)</sup>. The absence of clinical guidelines was reported as an important limiting factor; however, in some developed countries where national guidelines exist, only a few practitioners demonstrated good awareness of them<sup>(12,26)</sup>. Moreover, low patient motivation and patient non-compliance were considered as limiting factors for the success of weight-loss programmes by a large proportion of physicians, as reported by others<sup>(26)</sup>.

Similar to earlier studies<sup>(11,30)</sup>, Bahraini physicians felt more confident to treat overweight than obese adults but felt less competent to treat overweight children than other surveyed physicians<sup>(38)</sup>.

The present study has several limitations. The use of cluster sampling might underestimate the actual variance; this is because participants within the same health centre are more likely to share similar experiences. However, this design effect was taken into account during the analysis.

The questionnaire was kept short to increase the response rate, but this limited the scope of the information that could be gathered. For example, the knowledge section focused on two general aspects only: the indication for intervention and weight-loss goals. Other surveys have overcome this by using separate knowledge and practice questionnaires<sup>(11)</sup>.

Furthermore, weight measurement was used as an indicator of identification of weight problems. This may have overestimated the actual practice as it is difficult to assume with certainty that measured weight was used to calculate BMI and was followed by the appropriate action. This should be considered when comparing these findings with results from developed countries, whose physicians reported measuring BMI less frequently<sup>(33)</sup>.

The study was based entirely on self-reporting. Consequently, it is possible that certain practices may have been over-reported. This can be validated by direct observation or auditing patients' records. Moreover, the study investigated the frequency that each approach was utilized, but this does not take into account the quality of advice given.

However, the present study is the first one in the region to look at physicians' attitudes, knowledge and practices towards the issue of obesity management and has several implications for clinicians and policy makers. It runs contemporaneously to the launching of a structured obesity-management practice in Bahrain. It will help highlight opportunities for interventions and identify barriers that need to be tackled in order to deliver high-

quality obesity management in the PHC system. The study's main strengths come from the high response rate and the relatively large sample size, as it captured 56% of the total population of physicians, thus minimizing selection bias and increasing precision.

To improve obesity management within the PHC system in Bahrain, the organizational structure needs to be considered seriously. The following may be suggested from the findings of the current survey.

1. The consultation time allocated for counselling and treating overweight patients needs to be increased, whether this is integrated within the same practice or delivered through special clinics.
2. Physicians should be supported with clear guidance on obesity management using evidence-based clinical guidelines, with clear referral protocols to surgery or other health professionals.
3. Physicians have a great motivational role but are more restrained by their busy clinics, which makes collaboration with other health professionals a priority that should be considered without hesitation. There should be a focus on recruiting more dietitians and/or other trained health workers who can deliver in-depth counselling and provide regular long-term follow-up, either attached to physicians' practices or working independently through easily accessible specialty clinics.
4. Nutrition education needs to be integrated within medical school curricula and postgraduates' continuing medical education.
5. The role of surgery and pharmacotherapy in obesity management needs to be emphasized. Identifying well-trained surgical teams to which to refer patients and providing licensed anti-obesity drugs at lower price are important steps to be considered to ensure comprehensiveness of care.
6. Training on lifestyle counselling and behavioural modification skills is a necessity acknowledged by physicians in the present study and has been found to improve the frequency and quality of counselling delivered to obese patients<sup>(39)</sup>, decrease negative attitudes towards tackling the problem of obesity and enhance physicians' confidence<sup>(26,40,41)</sup>, particularly in counselling parents of overweight children.
7. Our physicians need more emphasis on their preventive role in obesity. They need to translate their knowledge about the importance of early identification of weight problems into actual practice.
8. Other opportunities for more effective weight management in PHC exist and need to be discussed; these include patient registers, designated physician specialists, supervised group therapy<sup>(42)</sup> and subsidized referral to commercial slimming groups<sup>(43)</sup>.

Our study has identified areas that need to be explored further using qualitative studies. The physicians' feeling of ineffectiveness in treating obese individuals despite

their high level of interest, good amount of knowledge and the reported high utilization rate of various weight-loss approaches needs to be explored. This could be explained partly by the fact that physicians have minimal influence on patients' environment, a major determinant of the obesity epidemic. In addition, the physicians' strong perception of the external obstacles and under-reporting of their professional limitations need to be ascertained and explained further.

Because of the high prevalence of overweight among physicians, their opinions regarding the concept of being a role model, as suggested by physicians in other studies<sup>(26,34)</sup>, and the positive effect of personal experience on weight management also need to be discussed with the physicians.

## Conclusion

The present study is the first one on physicians' knowledge, attitudes and practices towards obesity prevention and management in the region, and is concurrent with the launching of the obesity clinic project in PHC in Bahrain.

It is encouraging that physicians in Bahrain are aware of the escalating obesity epidemic and are willing to participate responsibly. They had a greater sense of professional satisfaction than practitioners in other countries<sup>(11)</sup>, probably because they set realistic weight-loss goals. Despite this, they have judged their weight-management practice as ineffective. This could be due to their negative attitude towards obese patients and the success of weight management, as the majority believed that obese patients are unlikely to achieve and maintain weight loss or to comply with weight-loss strategies. In addition, they have identified a number of organization-related barriers as the major limitations in their practice, but they were less critical in appraising their knowledge and skills or addressing their negative view towards the success of weight-loss programmes.

Our physicians are well informed about the health benefits of modest weight loss. Although they have reported measuring their patients' weight more often than other physicians, it is not known to what extent this reflects actual identification of weight problems.

Physicians have utilized various approaches in weight-loss management. They have reported involving patients' families and utilized behavioural modification to a greater extent than physicians in other developed countries. However, in the absence of objective assessment, the frequency of their practices could have been over-reported.

The importance of collaboration with other health professionals, especially dietitians, is well recognized, but heavily under-resourced. Anti-obesity drugs and surgery are underutilized even if indicated, which should be considered in future nutrition education. Like other studies, training in lifestyle counselling and behaviour

modification was highlighted as an important need, and seems to predict physicians' confidence in implementing weight-management strategies.

## Acknowledgements

*Sources of funding:* None. *Conflict of interest declaration:* There were no conflicts of interest. *Author contributions:* A.A.-G. collected and analysed the data, and wrote the report; R.U. supervised and reviewed the survey. *Acknowledgements:* The authors extend special thanks to the primary care physicians who participated in the survey, to Dr Phil Edward for the great help offered in sampling and analyses, and to Mrs Claire Schofield for her continuous support.

## References

1. World Health Organization (2003) Obesity and overweight, WHO fact sheet. [http://www.who.int/hpr/NPH/docs/gso\\_obesity.pdf](http://www.who.int/hpr/NPH/docs/gso_obesity.pdf) (accessed July 2006).
2. Moosa K, Gharib N, Al-Sairafi M, Al-Raees G & Al-Amer M (2002) *National Nutrition Survey for Adult Bahrainis aged 19 Years and Above*. Kingdom of Bahrain: Ministry of Health, Nutrition Section.
3. Gharib N (2002) Nutritional status of school children in Bahrain. PhD Thesis, Cambridge University.
4. Health Information Directorate (2004) *Health Statistics*. Kingdom of Bahrain: Ministry of Health.
5. Al-Mahroos F (1998) High prevalence of diabetes in Bahrainis. Associations with ethnicity and raised plasma cholesterol. *Diabetes Care* **21**, 936–942.
6. Egger G & Swinburn B (1997) An 'ecological' approach to the obesity pandemic. *BMJ* **315**, 477–480.
7. Mercer SL, Green LW, Rosenthal AC, Husten CG, Khan LK & Dietz WH (2003) Possible lessons from the tobacco experience for obesity control. *Am J Clin Nutr* **77**, 4 Suppl., 1073S–1082S.
8. Swinburn BA, Caterson I, Seidell JC & James WPT (2004) Diet, nutrition and the prevention of excess weight gain and obesity. *Public Health Nutr* **7**, 123–146.
9. Galuska DA, Will JC, Serdula MK & Ford ES (1999) Are health care professionals advising obese patients to lose weight? *JAMA* **282**, 1576–1578.
10. Huang J, Yu H, Marin E, Brock S, Carden D & Davis T (2004) Physicians' weight loss counseling in two public hospital primary care clinics. *Acad Med* **79**, 156–161.
11. Campbell K, Engel H, Timperio A, Cooper C & Crawford D (2000) Obesity management: Australian general practitioners' attitudes and practices'. *Obes Res* **8**, 459–466.
12. Truswell AS (2000) Family physicians and patients: is effective nutrition interaction possible? *Am J Clin Nutr* **71**, 6–12.
13. Truswell AS, Hiddink GJ & Blom J (2003) Nutrition guidance by family doctors in a changing world: problems, opportunities, and future possibilities. *Am J Clin Nutr* **77**, Suppl., 1089S–1092S.
14. Vaandrager HW & Koelen MA (1997) Consumer involvement in nutritional issues: the role of information. *Am J Clin Nutr* **65**, Suppl., 1980S–1984S.
15. Olsen J, Willaing I, Ladelund S, Jorgensen T, Gundgaard J & Sorensen J (2005) Cost-effectiveness of nutritional counseling for obese patients and patients at risk of ischemic heart disease. *Int J Technol Assess Health Care* **21**, 194–202.

16. Pritchard DA, Hyndman J & Taba F (1999) Nutritional counselling in general practice: a cost effective analysis. *J Epidemiol Community Health* **53**, 311–316.
17. Glanz K (1997) Review of nutritional attitudes and counseling practices of primary care physicians. *Am J Clin Nutr* **65**, Suppl., 2016S–2019S.
18. Kushner RF (1995) Barriers to providing nutrition counseling by physicians: a survey of primary care practitioners. *Prev Med* **24**, 546–552.
19. Murray S, Narayan V, Mitchell M & Witte H (1993) Study of dietetic knowledge among members of the primary health care team. *Br J Gen Pract* **43**, 229–231.
20. Al-Numair KS (2004) Nutrition knowledge of primary care physicians in Saudi Arabia. *Pakistan J Nutr* **3**, 344–347.
21. Bramlage P, Wittchen HU, Pittrow D *et al.* (2004) Recognition and management of overweight and obesity in primary care in Germany. *Int J Obes Relat Metab Disord* **28**, 1299–1308.
22. Heath C, Grant W, Marcheni P & Kamps C (1993) Do family physicians treat obese patients? *Fam Med* **25**, 401–402.
23. Hebl MR & Xu J (2001) Weighing the care: physicians' reactions to the size of a patient. *Int J Obes Relat Metab Disord* **25**, 1246–1252.
24. O'Brien SH, Holubkov R & Reis EC (2004) Identification, evaluation, and management of obesity in an academic primary care center. *Pediatrics* **114**, 154–159.
25. Puhl R & Brownell KD (2001) Bias, discrimination, and obesity. Attitudes of medical professionals toward obese individuals. *Obes Res* **9**, 788–805.
26. Bocquier A, Verger P, Basdevant A, Andreotti G, Baretge J, Villani P & Paparonis A (2005) Overweight and obesity: knowledge, attitudes, and practices of general practitioners in France. *Obes Res* **13**, 787–795.
27. Ogden J, Bandara I, Cohen H, Farmer D, Hardie J, Minas H, Moore J, Qureshi S, Walter F & Whitehead MA (2001) General practitioners' and patients' models of obesity: whose problem is it? *Patient Educ Couns* **44**, 227–233.
28. Campbell K & Crawford D (2000) Management of obesity: attitudes and practices of Australian dietitians. *Int J Obes Relat Metab Disord* **24**, 701–710.
29. Fogelman Y, Vinker S, Lachter L, Biderman A, Itzhak B & Kitai E (2002) Managing obesity: a survey of attitudes and practices among Israeli primary care physicians. *Int J Obes Relat Metab Disord* **26**, 1393–1397.
30. Foster GD, Wadden TA, Makris AP, Davidson D, Sanderson RS, Allison DB & Kessler A (2003) Primary care physicians' attitudes about obesity and its treatment. *Obes Res* **11**, 1168–1177.
31. Levine BS, Wigren MM, Chapman DS, Bergman RL & Rivlin RS (1993) A national survey of attitudes and practices of primary-care physicians relating to nutrition: strategies for enhancing the use of clinical nutrition in medical practice. *Am J Clin Nutr* **57**, 115–119.
32. Goldstein DJ (1992) Beneficial health effects of modest weight loss. *Int J Obes Relat Metab Disord* **16**, 397–415.
33. Brotons C, Ciurana R, Piñeiro R, Kloppe P, Godycki-Cwirko M & Sammut MR (2003) Dietary advice in clinical practice: the views of general practitioners in Europe. *Am J Clin Nutr* **77**, Suppl., 1048S–1051S.
34. Cade J & O'Connell S (1991) Management of weight problems and obesity: knowledge, attitudes and current practice of general practitioners. *Br J Gen Pract* **41**, 147–150.
35. Rippe JM, McInnis KJ & Melanson KJ (2001) Physician involvement in the management of obesity as a primary medical condition. *Obes Res* **9**, Suppl., S302–S311.
36. National Institutes of Health/National Heart, Lung, and Blood Institute/National Institute of Diabetes and Digestive and Kidney Diseases (1998) *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. The Evidence Report*. Bethesda, MD: NIH.
37. Roland MO, Bartholomew J, Courtenay MJ, Morris RW & Morrell DC (1986) The 'five minute' consultation: effect of time constraint on verbal communication. *Br Med J (Clin Res Ed)* **292**, 874–876.
38. Jelalian E, Boergers J, Alday CS & Frank R (2003) Survey of physicians' attitude and practice related to pediatric obesity. *Clin Pediatr* **42**, 235–245.
39. Smikin-Silverman LR & Wing RR (1997) Management of obesity in primary care. *Obes Res* **5**, 603–612.
40. Wiese HJ, Wilson JF, Jones RA & Neises M (1992) Obesity stigma reduction in medical students. *Int J Obes Relat Metab Disord* **16**, 859–868.
41. Katz S, Feigenbaum A, Pasternak S & Vinker S (2005) An interactive course to enhance self-efficacy of family practitioners to treat obesity. *BMC Med Educ* **5**, 4.
42. Renjilian DA, Perri MG, Nezu AM, McKelvey WF, Shermer RL & Anton SD (2000) Individual versus group therapy for obesity: effects of matching participants to their treatment preferences. *J Consult Clin Psychol* **69**, 717–721.
43. Maryon-Davis A (2005) Weight management in primary care: how can it be made more effective? *Proc Nutr Soc* **64**, 97–103.