RESEARCH ARTICLE

Role of community pharmacists in the prevention and management of the metabolic syndrome in Kuwait

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Abstract *Background* The metabolic syndrome is a cluster of cardiovascular risk factors and its prevalence is alarmingly high in Kuwait, affecting nearly one third of the adult population. There is lack of information about the role of community pharmacists in the care of patients with the metabolic syndrome. *Objective* To assess the awareness and opinions of community pharmacists about the metabolic syndrome and identify the services they provide for identification, management and monitoring of patients with the metabolic syndrome. *Setting* Community pharmacies in Kuwait. *Method* A descriptive, cross-sectional study was performed on a randomly selected sample of 225 community pharmacists. Data were collected via face-to-face structured interview of the pharmacists using a pre-tested questionnaire. *Main outcome measures* Pharmacists' knowledge and views on the metabolic syndrome, monitoring services provided, self-reported practices and perceived effectiveness of the various management interventions for the metabolic syndrome. *Results* The response rate was 97.8 %. Nine pharmacists claimed to know about the metabolic syndrome, but only one pharmacist could identify the condition correctly. After being given a definition of the metabolic syndrome, 67.7 % of respondents strongly agreed that its prevalence was rising in Kuwait. Nearly two thirds of respondents reported providing height and weight measurement service while 82.7 and 59.5 % of pharmacies provided blood pressure and blood glucose measurements, respectively. Waist circumference and lipid profile measurements were the least provided services (1.8 %). Respondents claimed to be involved in counseling patients on lifestyle modifications including increased exercise (98.1 %) and weight reduction through diet (96.9 %). Most pharmacists were involved in encouraging patients' adherence with prescribed treatments (98.6 %) and perceived these as the most effective intervention for the management of the metabolic syndrome (95.0 %). Respondents were less involved in monitoring patients' response to therapy (75.0 %) and documenting patient care services (5.0 %). *Conclusion* This study revealed significant deficits in awareness among community pharmacists about the metabolic syndrome. Given the proper education and training, community pharmacists could be important front-line contributors to the control of this emerging epidemic in Kuwait.

Keywords Community pharmacists · Kuwait · Metabolic syndrome

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Impact of findings on practice

- In view of the accessibility of community pharmacies, pharmacist in Kuwait should be encouraged to become actively involved in the prevention and management of the metabolic syndrome.
- Proper education and training of community pharmacists to provide effective pharmaceutical care services for patients with the metabolic syndrome are urgently needed.

Introduction

The metabolic syndrome is a cluster of cardiovascular risk factors. Patients diagnosed with this syndrome usually have three or more of the following dysmetabolic abnormalities: elevated fasting blood glucose, high blood pressure, elevated triglycerides, low high density lipoprotein cholesterol (HDL-C) and central adiposity that is evident as an increased waist circumference [1]. It is a high risk condition that can result in serious complications including type 2 diabetes and cardiovascular diseases [2, 3].

The metabolic syndrome represents a growing health problem in Kuwait and its prevalence is alarmingly high among the population. In a nationwide cross-sectional study, the prevalence of overweight, obesity and the metabolic syndrome among adult Kuwaitis were 80.4, 47.5 and 36.2 %, respectively [4]. Other studies show high prevalence of this syndrome in groups of patients attending primary healthcare facilities in Kuwait [5, 6]. Type 2 diabetes mellitus is another challenging health problem in Kuwait [7]. Therefore, there is an urgent need for effective interventions to halt the increasing prevalence of the metabolic syndrome and its complications.

In developed countries, community pharmacists have long been recognized as health advisors and trustful source of health information [8]. They have been involved in interventional programs alongside physicians for the management of chronic diseases such as diabetes, dyslipidemia and hypertension [9–13]. It is evident that community pharmacists can contribute significantly to the detection and management of patients with the metabolic syndrome. In the USA, community pharmacists were successfully involved in a cardiovascular health and wellness program in which they provided a metabolic syndrome screening service and patient education on lifestyle modifications with improved outcomes [14]. Another study has shown that a pharmacist-physician collaborative practice in the care of patients with the metabolic syndrome increased the proportion of patients who no longer met criteria for the syndrome and yielded improved control of blood pressure and triglycerides levels over a 6 month period [15].

In contrast to the significant contribution of community pharmacists in the healthcare system in developed countries, their role in developing countries is still limited. In Kuwait, pharmacists' attempts to apply emerging roles of the profession have not been impressive; many of them hardly provide significant patient-oriented services in their practice [16]. In the community setting, most of pharmacists' involvement in health promotion and education are primarily focused on pharmaceutical product management with less emphasis on patient counseling on health behavior modification [17].

The recognition and control of the metabolic syndrome represent a real challenge for all healthcare providers in Kuwait, including pharmacists. Despite the fact that this syndrome is an emerging epidemic in Kuwait, there is lack of information about the role of community pharmacists in its prevention and management.

Aim of the study

This study sought to determine the community pharmacists' awareness and opinions about the metabolic syndrome, explore the services they provide for identifying and monitoring patients, and describe the current self-reported practice of the pharmacists in the prevention and management of the metabolic syndrome.

Method

A descriptive, cross-sectional survey of community pharmacists was conducted from July 2010 to January 2011 in Kuwait. The study population consisted of fully licensed pharmacists working at community pharmacies throughout Kuwait. Ethical approval was obtained from the "Human Ethical Committee, Health Science Centre, Kuwait University". This work was conducted in compliance with the requirements of the facility's Institutional Review Board/ Human Subjects Research Committee.

The sample size was calculated using Java Applets for Power and Sample Size [18]. It was found that a sample size of 186 pharmacists would be needed to determine a 20 % difference in proportion between two groups (e.g., male vs. female) with an 80 % power and at a 5 % significance level. Due to the lack of lists with the names and addresses of community pharmacists in Kuwait, the community pharmacies lists at different governorates were obtained from the Ministry of Health at the time of the study and were used for sample selection. The lists included a total of 307 pharmacies distributed in the five governorates of Kuwait. A larger sample of 225 community pharmacies was selected to adjust for possible non-response, using stratified and systematic random sampling according to the methodology described by World Health Organization [19]. The stratification was at the level of the five governorates of Kuwait (Capital, Al-Ahmadi, Al-Farwaniyah, Hawalli and Al-Jahra). If a pharmacy employed more than one pharmacist, only one was included. Out of the 225 reached pharmacists, 220 agreed to participate in the study (response rate 97.8 %).

A questionnaire was designed to address the objectives of the study after a literature review on the topic. The developed questionnaire contained closed- and open-ended

questions. It was pre-tested for content, design, readability and comprehension on 15 community pharmacists, and modifications were made as necessary. The final version of the questionnaire had five sections. The first section provided information on the sociodemographic characteristics of the respondents. The second section determined the awareness of pharmacists about the concept of the metabolic syndrome. In this section, a closed-ended question was first posed to check if the respondent had ever heard about the metabolic syndrome. If the respondent claimed to be aware of the syndrome, three questions were followed to verify his/her knowledge about the condition. These questions covered the components of the syndrome, the required number of components to qualify someone for having the syndrome, and its health-related complications. Respondents who were unaware of the metabolic syndrome were provided with verbal and written information about the syndrome including its definition, required components and main complications. This was performed to allow the pharmacists to respond to the questions about the services they provide to patients. The third section was designed to reveal the respondents' opinions about the syndrome as a growing health problem in Kuwait. It included statements for which respondents were asked to indicate their level of agreement on a 5-point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree). Section four included questions about the availability of services for measurement of weight, height, blood pressure, blood glucose and lipid profile at the pharmacy. This part also included questions to find out the type of devices used for weight and blood pressure measurements and the respondent's preferred method for evaluating obesity. The last section was designed to describe the respondents' role in the prevention and management of the syndrome. In this section, a 5-point Likert scale (very uninvolved, uninvolved, uncertain, involved, very involved) was used to determine respondents' involvement in counseling patients on seven aspects of lifestyle modifications; and in providing seven services to the patients for the prevention and management of the syndrome. The respondents were also asked to indicate on a 5-point Likert scale (very ineffective, ineffective, neither effective nor ineffective, effective, very effective) their perceived effectiveness of four main interventions used for the management of patients with the metabolic syndrome.

Data were collected via face-to-face structured interview of the respondents in their pharmacies by the researcher (pharmacist). The interview lasted approximately 15–20 min. On reaching a pharmacy, the purpose of the study was explained to the pharmacist and, he/she was invited to participate in the survey. Pharmacists were free to decide to participate and no incentives were offered for participation. The data were collected anonymously.

Participants were assured of confidentiality and they gave written consent to participate in the study.

Data were entered into SPSS version 17 (Chicago, Illinois) and descriptive and comparative analysis were conducted. Responses are presented as means and standard deviations (SD); and percentages and 95 % confidence intervals. The confidence intervals were computed using EpiCalc 2000 (CDC, USA). A one-sample t test between proportions was performed to determine whether there was a significant difference between the percent choosing the following responses ('agreed' or 'strongly agreed' vs. 'strongly disagreed' or 'disagreed', 'involved' or 'very involved' vs. 'very uninvolved' or 'uninvolved' and 'effective' or 'very effective' vs. 'very ineffective' or 'ineffective'). Statistical significance was accepted at P value of <0.05.

Results

A total of 220 community pharmacists participated in the study (response rate 97.8 %), 138 (62.7 %) males and 82 (37.3 %) females. Their mean (SD) age and years of experience as practitioners were 34.2 (7.5) years and 10.5 (7.4) years, respectively. The basic qualifications of respondents were B.Pharm (98.2 %) and M.Pharm (1.8 %). Only 7.3 % of the respondents had post-graduate qualifications in pharmacy.

Of the 220 pharmacists, nine (4.1 %, 95 % CI: 2.0–7.9 %) claimed to know about the metabolic syndrome but only one pharmacist (0.5 %) could describe the condition correctly. Table 1 shows the respondents' opinions about the metabolic syndrome as a health problem in Kuwait after providing them with information about its definition, required components and main complications. The majority of respondents 'agreed' or 'strongly agreed' that the syndrome relates largely to obesity and sedentary lifestyle (99.1 %), early identification of patients is necessary (97.3 %), modification of lifestyles of the public is needed (96.0 %) and that the syndrome is common and has a rising prevalence in Kuwait (94.5 %). All the above mentioned values were significantly greater than the corresponding values for respondents who 'strongly disagreed' or 'disagreed' ($P < 0.001$). However, the percentage of respondents, who 'strongly disagreed' or 'disagreed' that the public in Kuwait are aware of the link between the metabolic syndrome and its health-related complications (45.0 %) was significantly greater than that for respondents who 'strongly agreed' or 'agreed' (34.5 %) ($P < 0.05$).

Regarding the availability of the monitoring services, 68.2 % of the respondents reported providing height and weight measurement services, while 7.3 % provided only

Table 1 Respondents' opinions about the metabolic syndrome ($n = 220$)

	Strongly disagree Proportion (%) of respondents (95 % CI) (a)	Disagree Proportion (%) of respondents (95 % CI) (b)	Neutral Proportion (%) of respondents (95 % CI)	Agree Proportion (%) of respondents (95 % CI) (c)	Strongly agree Proportion (%) of respondents (95 % CI) (d)	P value (c + d vs. a + b)
Metabolic syndrome is common and has a raising prevalence in Kuwait	0.5 % (0.02–2.9 %)	2.7 % (1.1–6.1 %)	2.3 % (0.8–5.5 %)	26.8 % (21.2–33.3 %)	67.7 % (61.1–73.8 %)	<0.001[a]
Metabolic syndrome relates largely to obesity and sedentary lifestyles	–	0.5 % (0.02–2.9 %)	0.5 % (0.02–2.9 %)	30.0 % (24.1–36.6 %)	69.1 % (62.5–75.0 %)	<0.001[a]
The link between metabolic syndrome and the high risk for cardiovascular diseases and type 2 diabetes is well understood by the public in Kuwait	0.5 % (0.02–2.9 %)	44.5 % (37.9–51.4 %)	20.5 % (15.5–26.5 %)	30.9 % (25.0–37.5 %)	3.6 % (1.7–7.3 %)	0.03[b]
More attention must be given to modifications of lifestyles of the general public in Kuwait	0.9 % (0.2–3.6 %)	1.8 % (0.6–4.9 %)	1.4 % (0.4–4.3 %)	25.5 % (20.0–31.8 %)	70.5 % (63.9–76.3 %)	<0.001[a]
Individual patients with metabolic syndrome need to be identified early so that their multiple risk factors can be reduced	–	1.4 % (0.4–4.3 %)	1.4 % (0.4–4.3 %)	26.4 % (20.8–32.8 %)	70.9 % (64.4–76.7 %)	<0.001[a]

[a] (c) + (d) significantly greater than (a) + (b)

[b] (a) + (b) significantly greater than (c) + (d)

weight measurement. The type of weight measurement tool available at 56.4 % of the pharmacies is a balance that measures weight and height, calculates body mass index (BMI) and estimates body fat content. Ninety three (42.3 %) respondents indicated BMI as their preferred method for obesity evaluation. Twenty six percent of respondents used weight as a direct measure for evaluating obesity, while 29.1 % utilized methods such as individual's general appearance and roughly relating weight to height. Blood pressure measurement was available in 82.7 % of the pharmacies with the wrist automated device being most commonly used (49.1 %). Only 17.3 % of the pharmacists reported using the upper arm mercury sphygmomanometer for blood pressure monitoring. Blood glucose measurement was available in 59.5 % of the pharmacies, while waist circumference and lipid profile measurements were the least provided services (1.8 %).

Table 2 shows the extent of respondents' involvement in advising patients with the syndrome regarding seven aspects of lifestyle modifications. The percentages of respondents, who claimed to be 'involved' or 'very involved' in counseling patients on increasing physical activity (98.1 %), weight reduction through diet (96.9 %), salt restriction (94.1 %), smoking cessation (87.8 %), cholesterol-lowering diet (87.7 %) and increasing soluble fiber consumption (60.5 %) were significantly greater than those who were 'very uninvolved' or 'uninvolved' ($P < 0.001$). Only six (2.7 %) respondents reported advising patients to increase consumption of plant stanol/sterol.

Table 3 shows the involvement of respondents in providing seven services to patients for the prevention and management of the metabolic syndrome. Most respondents indicated that they were 'involved' or 'very involved' in encouraging patients' adherence with the prescribed treatment (98.6 %), selling equipment for home monitoring (97.3 %), advising patients on routine weight, blood pressure and blood glucose monitoring (96.8 %) and about nonprescription treatments (90.5 %). Three quarters of respondents indicated that they were 'involved' or 'very involved' in monitoring patients' response to therapy, but only 5.0 % of them reported keeping records of patients care services. All respondents reported that they were 'involved' or 'very involved' in referring patients to physicians if required. All values were significantly greater than those respondents who were 'very uninvolved' or 'uninvolved' ($P < 0.001$).

Table 4 shows the pharmacists' perceptions of the effectiveness of four main interventions used for the management of the syndrome. Majority of respondents ranked the following interventions as being 'effective' or 'very effective': use of prescribed medications (95.0 %), increased exercise (94.1 %) and weight loss programs (92.3 %). Only 60.4 % of respondents perceived the use of dietary supplements and herbals as being 'very effective' or 'effective'. All these values were significantly greater than the corresponding values for respondents who perceived these interventions as being 'very ineffective' or 'ineffective' ($P < 0.001$). It is noteworthy that about one quarter of respondents (25.9 %) perceived the use of

Table 2 Respondents' involvement in advising patients with the metabolic syndrome regarding lifestyle modifications (n = 220)

	Very uninvolved Proportion (%) of respondents (95 % CI) (a)	Uninvolved Proportion (%) of respondents (95 % CI) (b)	Uncertain Proportion (%) of respondents (95 % CI)	Involved Proportion (%) of respondents (95 % CI) (c)	Very involved Proportion (%) of respondents (95 % CI) (d)	P value (c + d vs. a + b)
Weight loss through low calorie diet	0.5 % (0.02–2.9 %)	1.8 % (0.6–4.9 %)	0.9 % (0.2–3.6 %)	25.5 % (20.0–31.8 %)	71.4 % (64.8–77.1 %)	<0.001[a]
Increase physical activity	–	1.4 % (0.4–4.3 %)	0.5 % (0.02–2.9 %)	28.6 % (22.9–35.2 %)	69.5 % (63.0–75.5 %)	<0.001[a]
Salt restriction for hypertensive patients	–	5.5 % (3.0–9.6 %)	0.5 % (0.02–2.9 %)	31.8 % (25.8–38.5 %)	62.3 % (55.5–68.6 %)	<0.001[a]
Cholesterol-lowering diet (composed of reduced cholesterol/saturated fat intake)	–	10.9 % (7.3–16.0 %)	1.4 % (0.4–4.3 %)	49.5 % (42.8–56.3 %)	38.2 % (31.8–45.0 %)	<0.001[a]
Increase consumption of plant stanol/sterol	0.9 % (0.2–3.6 %)	6.8 % (4.0–11.2 %)	89.5 % (84.5–93.1 %)	2.7 % (1.1–6.1 %)	–	0.03[b]
Increase consumption of soluble fiber	–	37.7 % (31.4–44.5 %)	1.8 % (0.6–4.9 %)	49.1 % (42.3–55.9 %)	11.4 % (7.6–16.5 %)	<0.001[a]
Smoking cessation	–	11.8 % (8.0–17.0 %)	0.5 % (0.02–2.9 %)	35.5 % (29.2–42.2 %)	52.3 % (45.5–59.0 %)	<0.001[a]

[a] (c) + (d) significantly greater than (a) + (b)

[b] (a) + (b) significantly greater than (c) + (d)

Table 3 Respondents' involvement in providing services to patients for the prevention and management of the metabolic syndrome (n = 220)

	Very uninvolved Proportion (%) of respondents (95 % CI) (a)	Uninvolved Proportion (%) of respondents (95 % CI) (b)	Uncertain Proportion (%) of respondents (95 % CI)	Involved Proportion (%) of respondents (95 % CI) (c)	Very involved Proportion (%) of respondents (95 % CI) (d)	P value (c + d vs. a + b)
Advise patients on the importance of routine weight, blood pressure and blood glucose monitoring and the importance of achieving the target goals	0.5 % (0.02–2.9 %)	2.3 % (0.8–5.5 %)	0.5 % (0.02–2.9 %)	37.7 % (31.4–44.5 %)	59.1 % (52.3–65.6 %)	<0.001[a]
Selling equipment for home blood pressure and blood glucose monitoring	0.5 % (0.02–2.9 %)	1.8 % (0.6–4.9 %)	0.5 % (0.02–2.9 %)	93.2 % (88.8–96.0 %)	4.1 % (2.01–7.9 %)	<0.001[a]
Advise patients about nonprescription treatments and self-care for the components of the metabolic syndrome	0.5 % (0.02–2.9 %)	9.1 % (5.8–13.9 %)	–	58.2 % (51.4–64.7 %)	32.3 % (26.2–38.9 %)	<0.001[a]
Encourage patient adherence with treatment	0.5 % (0.02–2.9 %)	0.9 % (0.2–3.6 %)	–	19.5 % (14.7–25.5 %)	79.1 % (73.0–84.1 %)	<0.001[a]
Monitor patients' response to the treatment	–	24.5 % (19.1–30.9 %)	0.5 % (0.02–2.9 %)	65.9 % (59.2–72.1 %)	9.1 % (5.8–13.9 %)	<0.001[a]
Keeping records of patient care services in the pharmacy	0.9 % (0.2–3.6 %)	93.2 % (88.8–96.0 %)	0.9 % (0.2–3.6 %)	4.1 % (2.01–7.9 %)	0.9 % (0.2–3.6 %)	<0.001[b]
Refer patients to physicians if required	–	–	–	18.2 % (13.5–24.1 %)	81.8 % (75.9–86.6 %)	<0.001[a]

[a] (c) + (d) significantly greater than (a) + (b)

[b] (a) + (b) significantly greater than (c) + (d)

Table 4 Respondents' perceived effectiveness of some of the interventions in patients with the metabolic syndrome ($n = 220$)

	Very ineffective Proportion (%) of respondents (95 % CI) (a)	Ineffective Proportion (%) of respondents (95 % CI) (b)	Neither effective nor ineffective Proportion (%) of respondents (95 % CI)	Effective Proportion (%) of respondents (95 % CI) (c)	Very effective Proportion (%) of respondents (95 % CI) (d)	P value (c + d vs. a + b)
Weight-loss program	0.5 % (0.02–2.9 %)	2.3 % (0.8–5.5 %)	5.0 % (2.7–9.0 %)	30.5 % (24.5–37.0 %)	61.8 % (55.0–68.2 %)	<0.001[a]
Increase exercise	–	0.5 % (0.02–2.9 %)	5.5 % (3.0–9.6 %)	30.9 % (25.0–37.5 %)	63.2 % (56.4–69.5 %)	<0.001[a]
Use of prescribed medications for the treatment of the individual components of metabolic syndrome	–	0.5 % (0.02–2.9 %)	4.5 % (2.3–8.5 %)	37.7 % (31.4–44.5 %)	57.3 % (50.4–63.9 %)	<0.001[a]
Use dietary supplements and herbals	4.1 % (2.0–7.9 %)	9.5 % (6.1–14.4 %)	25.9 % (20.4–32.3 %)	44.5 % (37.9–51.4 %)	15.9 % (11.5–21.6 %)	<0.001[a]

[a] (c) + (d) significantly greater than (a) + (b)

dietary supplements and herbals as 'neither effective nor ineffective'.

Discussion

To the best of our knowledge, this is the first study to evaluate the role of community pharmacists in the identification, management and monitoring of patients with the metabolic syndrome in Kuwait and probably in the Middle East. In Kuwait, where the metabolic syndrome affects about one third of the adult population, the contribution of all healthcare professionals in fighting this epidemic is crucial. The present findings reveal a very low level of awareness among community pharmacists regarding the condition even though they appear to routinely provide some services to patients for the management and monitoring of the individual components of the syndrome.

After the respondents were given a definition of the metabolic syndrome, most of them recognized it as a common health problem in Kuwait that is largely related to obesity and sedentary lifestyles of the public. These findings have highlighted the need for educational programs to encourage public to adopt healthy lifestyles. In Kuwait, community pharmacists are potentially well suited to integrate health education activities into their practice and to influence the lifestyle habits of the consumers due to their easy accessibility and frequent contact with the population. Pharmacists also believe that early identification of untreated patients is needed for risk reduction. The role of pharmacists in early identification of high risk patients and their referral to physicians has been reported by several studies [14, 20–22]. Hence, the active involvement of the community pharmacists of Kuwait in early detection of

individuals at risk and provision of interventions for risk reduction in collaboration with physicians needs to be encouraged.

The current results show that almost two thirds of pharmacies provide weight and height measurement services. The commonest weighing device is a balance that calculates BMI and estimates body fat content by bioelectrical impedance analysis (BIA). There is a great debate in the literature as to the value of different assessment tools for predicting obesity-related risk factors [23, 24]. Nonetheless, the availability of these tools in many pharmacies in Kuwait creates opportunities for pharmacists to identify overweight or obese patients and counsel them on the proper lifestyle changes for weight loss. It has been reported that community pharmacists are well positioned to provide weight management advice to the public [25]. Indeed, the majority of respondents claimed to be involved in counseling patients on lifestyle modifications including dietary control and exercise. Lifestyle interventions are considered as first-line treatment for the metabolic syndrome and proved to significantly reduce the incidence of type 2 diabetes compared to drug therapy [26]. Most respondents also reported that they frequently counsel patients on smoking cessation. Metabolic syndrome is a high risk condition and patients with the syndrome should be encouraged to quit smoking to control their risk factors. It has been shown that community pharmacists are uniquely placed for providing public with smoking cessation service [27].

Our findings show that blood pressure measurement is available in most of the pharmacies, with the wrist automated device being most commonly used. This can be explained by its integration into the weighing machines available at these pharmacies. Using this machine, blood pressure is measured

while the patient is standing, which is contrary to standard clinical practice guidelines for hypertension [28]. Blood glucose measurement service is available in more than half of the pharmacies. Beside these monitoring services, there is a definite need for the provision of patient-oriented pharmaceutical care services for patients with chronic diseases in community pharmacies of Kuwait. It has been reported that implementation of pharmaceutical care services for management of diabetes and hypertension in community pharmacy practice resulted in improved patient management and outcomes [9, 10, 12]. The study reveals that lipid profile measurement was the least provided service in pharmacies. Several studies reported the role of community pharmacists in establishing lipid intervention programs, in which they provided a wide range of services to patients with dyslipidemia such as point-of-care lipid testing and patient education [11, 29, 30].

The majority of pharmacists believe that their professional responsibilities include advising patients about nonprescription therapies and encouraging patients' adherence with prescribed therapies. These findings are comparable to those reported by a study conducted in the USA [31]. Three quarters of the respondents claimed to monitor patients' response to treatment, but only few indicated that they kept records of patient care services. The introduction of patient care documentation systems into the community pharmacies in Kuwait is needed to improve the quality of the provided services and possibly in the future, to be used as basis for pharmacists' remuneration.

Pharmacists perceived the use of prescribed therapies as the most effective intervention for management of the metabolic syndrome. Interestingly, there was less agreement among respondents on the effectiveness of dietary supplements and herbals with almost one quarter believing that they are neither effective nor ineffective. Despite the fact that many pharmacists promote the use of dietary supplements and herbals, some studies have shown that pharmacists perceive them as being relatively less effective compared to lifestyle interventions for management of coronary heart disease and obesity [31, 32].

Our study highlights the need to design and implement effective educational programs to prepare community pharmacists to provide efficient pharmaceutical care services to patients with the metabolic syndrome in Kuwait. It was surprising to find that only one pharmacist was aware about the syndrome among all the surveyed pharmacists. This deficit in awareness can be addressed through continuing education programs to ensure that pharmacists have adequate background knowledge regarding the syndrome. The study also encourages further research in this area to explore the opinions of patients and physicians about the role the pharmacists can play in the care of patients with the metabolic syndrome.

Limitations and strengths

We acknowledge that this study, using face-to-face structured interview, has some limitations. First, the information given by respondents may be influenced by what is perceived to be the right answer to give. The extent of truthful answers or verifying respondents' claims is not possible in this type of study. Second, pharmacists' responses to some questions were dependent on their ability to recall experiences with patients. The strength of this study is that we used appropriate sampling method and sample size to generate a representative data about the community pharmacists. Further strength is the high response rate. The results can, therefore, be generalized at the study population level in Kuwait. The use of structured interviews as a useful tool of quantitative research in this study reduced the risk of missing data, allowed the observation of respondents' environment and resulted in high response rate. On the whole, this study fills in an important gap in the literature and provides useful information about the role of community pharmacists in the prevention and management of the metabolic syndrome in the Middle East.

Conclusion

This study revealed a low level of awareness among community pharmacists about the metabolic syndrome. Community pharmacists recognized that the syndrome is an important health problem in Kuwait that necessitates urgent interventions. Many pharmacists indicated that they provide useful services to patients with the syndrome, but the provision of patient-oriented services, such as monitoring therapy and documenting patient care services needs to be encouraged. The current results indicate that interventions are needed to improve pharmacists' knowledge and practice to provide efficient pharmaceutical services to patients with the metabolic syndrome. Given proper education and training, community pharmacists can be important front-line contributors to the control of this emerging epidemic in Kuwait.

Conflicts of interest Authors have no conflicts of interest with regard to the data produced.

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