1 Introduction

The last decade has seen a dramatic increase in the sale and use of complementary and alternative medicine (CAM), especially herbal dietary supplements, within the UK. Sales of herbal dietary supplements by individuals within the UK have been increasing[1]. Use of CAM by the UK population can be attributed to several factors, including personal belief, increased media publicity and changes in public attitude[1,2]. However, there is a considerable debate around the definition of CAM, which varies over time[3]. CAM can be defined as “any health-improving technique outside of the mainstream of conventional medicine”[3].

People who use CAM may do so because they hold beliefs about health, treatment and illness which are congruent with CAM, have chronic health problems, or are disillusioned with the experience and outcomes from conventional medicine[4]. Currently CAM is utilized by substantial numbers of people, with recent population-based estimates of yearly adult use in the UK between 20% to 28%[3]. The prevalence of CAM use in the general population in the USA increased from 34% in 1990 to 39% in 1997[3] and remained stable from 1997 to 2002. In the UK, 46% of...
the population can be expected to use one or more CAM therapies in their life time\(^3\). There is very high interest in CAM remedies by diabetic patients for active engagement in health and disease self-management\(^3\). The objective of this study is to determine whether individuals with self-reported features of metabolic syndrome (FeMS) were more likely to use different CAM therapies compared with individuals without FeMS. FeMS was defined as any individuals having at least one clinically diagnosed self-reported health condition of diabetes or hypertension or hyperlipidemia or obesity.

2 Materials and methods

2.1 Subjects

The study protocol was approved by the Faculty Research Ethics Committee, University of West London (FREC31/Feb07), UK. The participants in this study were 25 years or older and employed by University of West London, UK. A total of 300 individuals were randomly invited to participate in this study. Participants were asked to complete a self-administered questionnaire on their socio-demographic characteristics, lifestyle characteristics, perceived health status, and regular CAM use in the past 12 months.

Metabolic syndrome is a metabolic abnormality associated with dyslipidemia, hypertension, abdominal obesity, and impaired glucose tolerance. The diagnosis of FeMS was defined as any individuals having at least one self-reported clinically diagnosed health condition of diabetes, hypertension, hyperlipidemia, or obesity. FeMS has been reported and defined in previous studies\(^7\).

2.2 Statistical analysis

Cross tabulation/Chi-square statistics were used to compare individuals with FeMS to those without FeMS. Statistical analysis was performed using SPSS (version 15), and a \(P\) value of less than 0.05 was considered as statistically significant.

3 Results

3.1 Subject characteristics

Of the 300 questionnaires administered, 192 individuals completed and returned the questionnaires (64% response rate). The majority (83%, \(n=159\)) were under 54 years and 65% were females. Self-reported FeMS were: diabetes \((n=10)\), hypertension \((n=11)\), hyperlipidemia \((n=19)\) and obesity \((n=39)\). Just over a quarter of individuals had at least one self-reported FeMS.

3.2 Use of CAM therapy

Among individuals with FeMS \((n=54)\), approximately 69% \((n=37)\) had only one self-reported health condition of either diabetes or hypertension or hyperlipidemia or obesity, while 24% \((n=13)\) and 7% \((n=4)\) had two and three or four self-reported conditions, respectively. Over a third were currently using or had used CAM in the past 12 months (Table 1). The five most common CAM remedies used were nutritional supplements \((n=66)\), massage therapy \((n=32)\), acupuncture \((n=26)\), yoga \((n=20)\), aromatherapy \((n=16)\) and herbal supplements \((n=16)\) (Table 1). The average expenditure on CAM therapy per month was found to be £37.20 with a range of £5.00 to £75.00. Table 1 shows that individuals with FeMS were more likely to use different CAM therapies, such as nutritional and herbal supplements, aromatherapy and massage therapy \((P<0.05)\) than those without FeMS. Furthermore, individuals with FeMS were significantly less likely to report or discuss the use of different CAM therapies with their general practitioners (Table 1). Individuals with FeMS tended to be older; young individuals were less likely to have FeMS compared with older individuals \((P<0.01)\) (data not shown). Individuals with higher education levels of university or postgraduate degrees were more likely to have FeMS compared with individuals with secondary school education \((P=0.027)\) (data not shown). Gender, ethnicity and income status of the individuals did not show any significant associations with FeMS.

4 Discussion

There is considerable debate around the definition of CAM and whether it includes approaches such as home remedies, dietary and herbal supplements\(^3\). Surveys conducted in various developed countries have shown that personal use of dietary and herbal supplements is becoming widespread and increasingly popular\(^8\). This was particularly true for the individuals with FeMS participating in this study (Table 1). One possible explanation for this is that individuals with FeMS may have had less success in treating their own health problems and their continued problems may have prompted them to seek CAM therapies. Other studies have also revealed that patients suffering from chronic diseases have a higher use of alternative therapies than those who do not have any chronic diseases\(^11\). A recent survey conducted in Switzerland demonstrated that patients with type 1 diabetes were more likely to use CAM, especially herbal supplements to improve general wellbeing and ameliorate glucose homeostasis\(^12\).

One of the important findings in this study was that individuals with FeMS were less likely to report the use of CAM to their general practitioners, which could be due to being worried about their doctors’ response. People may be hesitant to report the use of various CAM therapies, as doctors may ask them to stop using CAM therapies because of their potentially adverse effects or interactions with regular medications. Interaction between CAM use and prescription medicine is indeed possible, and there are many reports in the literature of interactions, adverse
effects and even fatalities associated with CAM use. Canter and Ernst suggested that the concomitant use of multiple herbal supplements is poorly reported to doctors and may place older people at risk of negative herb-drug interaction. This issue needs to be addressed by educating the general public or patients to encourage discussion on the use of different CAM with their doctors. It would be beneficial to patients if doctors and other health care providers acknowledge the use of CAM, and learn to discuss CAM use with their patients.

There are some potential limitations to this study. Despite a good response rate of 64%, the small sample that was only inclusive of university staff is a limitation and data cannot be generalised to the wider population. Using recall as the method to document the use of CAM therapies in the past 12 months is a potential source of inaccuracies and bias in self-reporting, or of perceived medical conditions (diabetes, hypertension, hyperlipidemia and obesity), though previous studies have shown that self-reports are reliable tools.

In summary, individuals with FeMS were more likely to use different CAM therapies, especially nutritional and herbal supplements, aromatherapy and massage therapy than individuals without FeMS. This study provides preliminary data which point to the need for future studies on the use and safety of different CAM practices in people with FeMS. Healthcare professional should be conscious of the increasing number of patients using CAM remedies.

Table 1 The use of different CAM therapies by individuals with and without FeMS

<table>
<thead>
<tr>
<th>CAM therapies</th>
<th>Respondents with FeMS (n=54)</th>
<th>Respondents without FeMS (n=138)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Acupuncture</td>
<td>4</td>
<td>7.4</td>
<td>22</td>
</tr>
<tr>
<td>Shiatsu</td>
<td>3</td>
<td>5.6</td>
<td>3</td>
</tr>
<tr>
<td>Chiropractic</td>
<td>5</td>
<td>9.3</td>
<td>5</td>
</tr>
<tr>
<td>Massage therapy</td>
<td>18</td>
<td>33.3</td>
<td>14</td>
</tr>
<tr>
<td>Reflexology</td>
<td>4</td>
<td>7.4</td>
<td>11</td>
</tr>
<tr>
<td>Aromatherapy</td>
<td>8</td>
<td>14.8</td>
<td>8</td>
</tr>
<tr>
<td>Meditation training</td>
<td>3</td>
<td>5.6</td>
<td>4</td>
</tr>
<tr>
<td>Yoga</td>
<td>8</td>
<td>14.8</td>
<td>12</td>
</tr>
<tr>
<td>Herbal supplements</td>
<td>9</td>
<td>17.0</td>
<td>7</td>
</tr>
<tr>
<td>Dietary/nutritional supplements</td>
<td>34</td>
<td>63.0</td>
<td>32</td>
</tr>
<tr>
<td>Naturopathy</td>
<td>1</td>
<td>1.9</td>
<td>1</td>
</tr>
<tr>
<td>Ayurveda medicine</td>
<td>1</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>Osteopathy</td>
<td>2</td>
<td>3.7</td>
<td>10</td>
</tr>
<tr>
<td>Homeopathy</td>
<td>3</td>
<td>5.6</td>
<td>6</td>
</tr>
<tr>
<td>Hypnosis</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Traditional Chinese medicine</td>
<td>2</td>
<td>3.7</td>
<td>5</td>
</tr>
</tbody>
</table>

Use of CAM (n=192)

Currently or in the past 12 months: 30 55.5 46 33.3 0.003**

Discuss the use of CAM with GP (n=61)*

Discussed with GP: 4 16.0 18 50.0 0.006***

Use of one or more CAM therapies (n=76)

Have used only one CAM therapy: 5 9.3 11 8.0
Have used two CAM therapies: 11 20.4 16 11.6
Have used three or more CAM therapies: 14 25.9 19 13.8 0.033****

Data are presented as n (%); *P<0.05 shows that individuals with FeMS were more likely to use dietary or nutritional supplements (P=0.001), herbal supplements (P=0.017), massage therapy (P=0.001) and aromatherapy (P=0.045) than their counterparts without FeMS. **P=0.003 shows that individuals with FeMS are more likely to use CAM therapies currently or in the past 12 months compared to persons without FeMS. ***P=0.006 shows that individuals with FeMS were significantly less likely to report or discuss the use of CAM therapies with their General Practitioner or doctor. ****P=0.033 shows that individuals with FeMS were more likely to use 3 or more types of CAM than individuals without FeMS. *Respondents with and without FeMS n=25 and n=36 respectively. CAM: complementary and alternative medicine; FeMS: features of metabolic syndrome; GP: general practitioner.
and the use of CAM should be explored with patients before any clinical judgments are made.

5 Acknowledgements

This study was supported by grants from the University of West London. We thank Dr. Senan Devendra (consultant endocrinologist) for technical assistants and continues support.

6 Conflict of interests and author contributions

The authors declare that they have no conflict of interests. R.A designed the study and conducted the research, wrote the manuscript and performed data analysis; Z.P reviewed and edited manuscript and contributed to discussion; N.R and A.T reviewed and edited manuscript, contributed to discussion and data analysis. All authors critically reviewed the manuscript and agreed the final version submitted for publication.

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