

Developing a measure of attitudes: the holistic complementary and alternative medicine questionnaire

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SUMMARY. We have developed an 11-item scale, the Holistic Complementary and Alternative Medicine Questionnaire (HCAMQ). Six of the HCAMQ items relate to beliefs about the scientific validity of complementary and alternative medicine (CAM), and five to beliefs about holistic health (HH). The HCAMQ was completed by 50 patients attending a CAM clinic and 50 attending rheumatology outpatients; the former completed it twice. Factor analysis (oblique rotation) showed that the CAM and HH items measured distinct but related constructs. The HCAMQ has good test retest reliability ($r=0.86, 0.82$ and 0.77 for the total, CAM subscale and HH subscale, respectively). The individuals attending CAM clinics were significantly more positive on the CAM but not the HH subscale of the HCAMQ and also used less antibiotics than those attending rheumatology outpatients. Positivity towards CAM on the total HCAMQ and subscales was significantly associated with lower age, increased vitamin use, reduced painkiller use, and, other than on the HH subscale, less antibiotic use. The reason why the HH subscale failed to distinguish between the two patient groups or predict less antibiotic use is unknown. The HCAMQ appears to have good internal validity, but its external validity remains to be established.

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INTRODUCTION

There has been a substantial increase in the popularity of complementary and alternative medicine (CAM), although different studies have reported a variety of usage rates.¹⁻³ Surveys suggest that between 30 and 90% of the adult population in industrialised nations use some form of CAM to prevent or treat a variety of health problems.^{2,4} A recent UK survey of CAM use estimated that 48% of the population had used some form of CAM and that over 10% had consulted a CAM practitioner in the last year.⁵ Approximately, 95% of CAM users⁶ and 75% of the public⁷ support access to CAM via the NHS. Similar CAM use has been reported in Europe,^{8,9} Australia¹⁰ and the USA,¹¹⁻¹⁴ a recent USA survey

found that more visits are made to providers of CAM than to all US primary care physicians.¹⁴

The most frequently cited reason for consumer use of CAM is dissatisfaction with the ability of conventional medicine to adequately treat chronic illness¹⁵—i.e. with the outcome achieved by conventional medicine. However, in a study using multivariate analysis, dissatisfaction with conventional medicine failed to predict the use of CAM.¹⁵ The study found that having more education, poorer health status and a holistic philosophical orientation to health and life (i.e. belief in the importance of

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Funding
Dr. George Lewith's post is funded by a grant from the Maurice Laing Foundation.

mind, body and spirit in health) were all predictive of CAM use.¹⁶

A second reason for choosing CAM arises over dissatisfaction with the medical encounter, which is often brief and disempowering¹⁷ The concept of patient perceived control appears to be particularly important in relation to choosing CAM treatment.¹⁸⁻²¹ An internal belief in health control indicates a sense of self-empowerment, the ability to take responsibility for personal health and consequently modify lifestyle. An external belief in health control suggests that an individual's health is subject to forces beyond their personal control.

A third reason for consumer use of CAM is the dislike of the reductionist, mechanical model of medicine and the preference for a holistic, integrative model of health. The holistic model includes the view that health reflects some kind of 'balance' within the body and so is characterised as a model of distributed health. One study²² shows that holistic health (HH) beliefs are an important factor in the decision to choose CAM. A mental model of HH is consistent with a desire to avoid iatrogenic effects of conventional medicine and the belief that nutritional, emotional and lifestyle factors affect health.¹⁵ The adoption of a holistic mental model of health suggests that CAM users are not so much dissatisfied with conventional medicine but find CAM to be more congruent with their own values, beliefs and philosophical orientation.¹⁸

There are, of course, links between these three reasons. An unsatisfactory, disempowering medical encounter is likely to be inconsistent with a holistic belief of health. Similarly, people who believe CAM to be effective are likely also to adopt a holistic mental model of health. The aim of this study was to develop a single questionnaire that measured two facets of why people might choose CAM. The first facet was the belief that CAM is or is not an effective, scientific method of treatment compared with conventional medicine. The second facet is the belief in a holistic model of health. We use factor analysis to answer the question, do these facets represent distinct constructs?

METHODS

Scale development

We developed a 12-item questionnaire by using the selected items from two 'parent' questionnaires. Six items were selected from the 14-item Attitudes to Alternative Medicine Scale (AAMS), a questionnaire measuring attitudes towards CAM.^{19,20} All of these six items contain the word 'Complementary medicine' and refer specifically to the practice of CAM. The items of the AAMS were generated using qualitative methodology followed by quantitative analysis. The author of this scale suggests a 6-factor

solution following factor analysis, but this conclusion is unsound due to the small sample size ($N = 79$) used for this analysis. A further six items of the HH questionnaire were selected to measure HH beliefs, without specifically referring to CAM. These 6 items were selected from an earlier pilot questionnaire of 19 items whose items were also derived using qualitative methodology, and whose factor structure had been evaluated in a sample of 95 undergraduates (own unpublished observations), which again is an unsatisfactory sample size for this size of questionnaire. Thus, although both parent scales were developed for specific purposes on the basis of content using acceptable qualitative methods, construct validity has not been established by means of factor analysis. Factor analysis is a technique for identifying 'latent variables' in a set of intercorrelated items, and these latent variables are then assumed to correspond to the constructs (i.e. assumed hypothetical variables) that determine behavioral responses (e.g. if a set of variables is found to covary, there is an assumption of common cause). Thus, factor analysis is a way of determining the constructs underlying questionnaire responses and is, therefore, one way of determining construct validity.

Items for our questionnaire were selected from the parent questionnaires, partly on satisfactory psychometric properties based on earlier data sets, but primarily on content (i.e. content validity). The attitudes to CAM items were chosen to explore the main concerns relevant to CAM.²³⁻²⁷ Items 2 and 4 examine the lack of scientific evidence for CAM and whether CAM may be dangerous. Items 6 and 8 investigate when CAM should be used, e.g. as a last resort, and items 10 and 12 investigate how CAM works and for which ailments it should be used (mild or serious illness). HH belief items were chosen to examine patients' health beliefs in relation to their internal/external control of health issues, in particular, how lifestyle affects health status. Items 1, 3 and 11 explore how lifestyle can affect health and whether lifestyle can be controlled with the objective of changing health status. Items 5, 7 and 9 evaluate the effects of psychological factors, such as the symptoms of depression, stressful life events and conflict. These items all relate to issues involved in HH beliefs.²⁸ Thus, the questionnaire consists of six items about attitude to CAM (CAM items) and six items about HH (HH items), and these items were selected to cover a wide range of content in each of these areas. Responses to each item were made using a 6-point response format (strongly agree—strongly disagree).

Other questions

Patients were asked about the frequency of use of antibiotics, painkillers and vitamins, using a 6-point response format. These questions were used partly to help interpret the meaning of extracted factors, but also as a form of convergent validity. For example,

vitamin use might be expected to be higher in people holding high HH beliefs (if vitamins are perceived to help the body become 'in balance'), whereas antibiotic use might be expected to be lower in those with high CAM beliefs, as antibiotics are a conventional but not a CAM treatment for commonly occurring illnesses.

Patients and procedures

Patients were recruited in two different environments, a rheumatology outpatients department at Southampton General Hospital (Conventional patients) and the Centre for the Study of Complementary Medicine, Southampton (CAM patients). We selected these two environments as a way of providing discriminate validity, and by convenience. Those attending a CAM clinic should be more positive towards CAM and possibly have higher HH beliefs than those attending a conventional rheumatology outpatient clinic.

Entry to the study required patients to be willing to complete the questionnaire, over 18 years of age and fluent in English. The selection of patients was based simply on the first 50 patients in either setting who fulfilled these criteria. Participants recorded their age, sex and occupation. The rheumatology patients (the Conventional medicine group) were also requested to answer four questions about previous and current CAM use, its perceived efficacy and the types of CAM that they had used. Rheumatology patients completed the questionnaire on one occasion only, CAM patients answered the questionnaire on two occasions. The first questionnaire was administered before or after their appointment at the Centre for the Study of Complementary Medicine, Southampton, UK, and the second by postal follow-up approximately 4 weeks later. This group was allocated trial numbers to allow identification of their first and second questionnaires for test re-test reliability measurements.

Statistical methods

All the data were analysed using the SPSS 9.0 for Windows computer package. Several criteria have been proposed for the number of respondents needed to produce valid factor analysis results from questionnaires. One suggests that there should be six times the number of items (i.e. 72 patients); another that there should be at least 100 respondents.²⁹ Therefore, 100 patients were recruited, 50 from each medical environment. We used oblimin rotation because there is no reason for assuming that the underlying latent variables are orthogonal. Oblimin is an oblique form of rotation: unlike orthogonal rotation (e.g. Varimax) there is no requirement for the factors to be statistically independent. Factor loadings of above 0.03 were deemed significant by convention. Results were also examined for test re-test reliability (Pearson's correlation), differences between the centres (Independent Sample Tests and Pearson's correlation), association with age (Pearson's correlation) and gender (Independent Sample Tests).

All items of the HCAMQ were scored in the pro-CAM or pro-HH direction and those items that displayed face-valid anti-CAM or anti-HH views had their scores reversed. This meant that a low score displayed sympathy for CAM and a high score rejection of it. The antibiotics, painkiller and vitamin items were scored so that a low score indicated lower reported use, varying between 1 (=low medicine/vitamin use) and 6 (=high medicine/ vitamin use).

RESULTS

Sample characteristics

The gender and age of the Conventional, CAM patients and the total sample are shown in Table 1. Twenty percent of the Conventional medical group

Item	Total sample	Centre 1 (CAM)	Centre 2 (Conventional)	Difference?
Age in years	52.02 (15.15)	47.40 (13.94)	56.64 (15.03)	t(98) = -3.19**
Sex (frequency)				
Males	67	33	34	
Females	33	17	16	
Total HCAMQ	31.11(7.31)	26.45 (6.00)	35.59 (5.42)	t(94) = -7.85***
CAM subscale	18.75 (5.69)	14.62 (3.88)	22.64 (4.19)	t(95) = -9.77***
HH subscale (unreduced)	12.39 (3.08)	11.94 (3.27)	12.86 (2.84)	t(97) = -1.49, ns
HH subscale (reduced)	9.55 (2.67)	9.14 (2.73)	9.96 (2.57)	t(98) = -1.55, ns
Antibiotic use ^a	3.24 (0.59)	3.41(0.54)	3.08 (0.60)	t(97) = 2.86***
Painkiller use ^a	3.11(0.58)	3.16 (0.58)	3.06 (0.59)	t(98) = 0.86, ns
Vitamin use ^a	2.03 (0.99)	1.88 (0.98)	2.18 (0.99)	t(97) = -1.53, ns

a Scale 0—6, higher scores indicate greater use.
 **P<0.01.
 ***P<0.001.

were currently using CAM, 48% had used CAM in the past and, of those who had used CAM, 75% had found it valuable. Therefore, the two groups were not mutually exclusive populations, though the proportion of CAM use in the CAM groups is much higher.

Factor analysis: construct validity

Factor analysis was carried out on the total data set. The scree test from an initial exploratory principal component analysis suggested a two factor solution. Two factors were extracted using Principal Axis factoring with oblimin rotation, and the correlation between the two factors was 0.26. The pattern matrix (i.e. a table laid out to demonstrate patterns of correlation of the individual items, in this case after removing—or ‘partialing out’—the correlations between the two underlying factors) is shown in Table 2. All six CAM questions loaded highly on the first factor. Five of the I-IH items load above 0.03, but one had an unsatisfactory loading, and this loading remains unsatisfactory in the structure matrix (item 9, Table 2). Consequently, for the subsequent analysis we constructed a subscale of the six CAM items, and two subscales for each of HH items. In one HH subscale (unreduced) all six items are used, and in the other (reduced) only the five satisfactorily loading items are used, excluding item 9. There is a factor intercorrelation of 0.26 which indicates a hierarchical structure of the HCAMQ—and justifies the selection of an oblique rotation method—so that in addition to subscales, a total scale score can also be calculated.

Test re-test reliability and internal consistency

Ninety percent of the CAM group returned their second postal questionnaire. Re-test reliability of the total HCAMQ was 0.86, of the CAM subscale was 0.82, of the HH subscale (unreduced) was 0.77 and for the HH subscale (reduced) was 0.77. Alpha coefficient for the total HCAMQ was 0.80, of the CAM subscale was 0.83, of the HH was 0.83 subscale (unreduced) was 0.67 and of the HH subscale (reduced) was 0.75.

Differences between the groups: divergent validity

Table I shows means and standard deviations for each of the two patient groups for the total HCAMQ, the CAM subscale, the HH subscale (reduced and unreduced) and mean responses to the questions on use of antibiotics, painkillers and vitamins. There were significant differences between the two groups for the total HCAMQ score and the CAM subscale (CAM group being more positive than the Conventional group), but not on the HH subscale. The CAM group reported lower antibiotic use, but there were no differences on the other two validating questions. There was no relationship between gender and either the total HCAMQ score or any of its subscales.

Correlations with other variables: convergent validity

Table 3 shows the correlations between the HCAMQ total and subscale scores and other validating

Table 2 Pattern matrix of the HCAMQ, oblimin rotation

Item	Factor 1 (CAM)	Factor 2 (HH)
1. Positive thinking can help you fight off a minor illness	0.14	0.76
2. Complementary medicine should be subject to more scientific testing before it can be accepted by conventional doctors	0.53	-0.01
3. When people are stressed it is important that they are careful about other aspects of their lifestyle as their body already has enough to cope with	0.14	0.76
4. Complementary medicine can be dangerous in that it may prevent people getting proper treatment	0.78	-0.00
5. The symptoms of an illness can be made worse by depression	-0.01	0.84
6. Complementary medicine should only be used as a last resort when conventional medicine has nothing to offer	0.87	-0.00
7. If a person experiences a series of stressful life events they are more likely to become ill	-0.18	0.33
8. It is worthwhile trying complementary medicine before going to the doctor	0.57	0.18
9. Conflict with others has no effect on your health	-0.01	0.14
10. Complementary medicine should only be used in minor ailments and not in the treatment of more serious illness	0.72	-0.00
11. It is important to find a balance between work and relaxation in order to stay healthy	0.14	0.59
12. Complementary medicine builds up the body's own defences, so leading to a permanent cure	0.49	0.30

Table 3 Pearson's correlations between the total HCAMQ, the CAM and HH subscales, and other validating responses (N = 95-100 depending on correlation)				
	Total HCAMQ	CAM	HH(unreduced)	HH (reduced)
CAM	0.91***			
HH(unreduced)	0.67***	0.31**		
HH(reduced)	0.64***	0.30**	0.93**	
Antibiotic use	-0.28**	-0.29**	-0.12	-0.10
Painkiller use	-0.21*	-0.20	-0.13	-0.04
Vitamin use	0.28**	0.22*	0.27**	0.27**
Age	0.40***	0.37***	0.25*	0.23*
*P<0.05 **P<0.01. ***P<0.001.				

questions, as well as age for the two groups combined. Older people tended to have significantly less positive attitudes to CAM and HH than younger people. Less antibiotic and painkiller use, and greater vitamin use were associated with greater positivity on the total HCAMQ score. However, antibiotic use was only significantly associated with the CAM subscale, whereas vitamin use was associated with both subscales, though the relationship with the HH subscale was slightly stronger.

DISCUSSION

Do attitudes to CAM and HH beliefs represent distinct constructs? Our data are consistent with this hypothesis. An examination of the items and factor loadings in Table 2 shows that, despite the content of the CAM items being highly heterogeneous and despite the fact that individual items are generic for all forms of CAM, the responses to this set of items are very consistent: three items load >0.7, two >0.5, one at 0.49. Interestingly, the item loading at 0.49 (item 12, CAM 'builds up body's own defences, so leading to a permanent cure') also tends to load on the second factor, which is understandable in view of the nature of this item. A high degree of consistency is found in the equally heterogeneous HI-I items except that one item (item 9) fails to load and another (item 7) is only adequate. This consistency is reflected in the alpha coefficients. The factor analytic data suggests that CAM and HH beliefs are independent but are also correlated factors, and this suggests that there is some other, higher order factor structure that is responsible for the commonality between these two factors. It has recently been suggested³⁰ that culture affects cognitive processing. Eastern cultures encourage holistic cognitions whereas Western cultures encourage analytic cognitions. It may be that the higher order factor responsible for the covariation in CAM and HH beliefs reflects individual variation in a continuum of holistic versus analytic cognitive processing. In sum, it is possible to score the questionnaire either as an 11-item total score, or as a 6-item CAM subscale, or as a 5-item HH subscale.

Our data on the scale's external validity or generalisability

were less consistent. We found that those attending a CAM clinic had higher scores on the CAM subscale but not the HH subscale, and these data provide divergent validity for the CAM but not the HH subscale. However, this conclusion should be treated with caution. It may be that those attending the CAM clinic felt a sense of obligation and, therefore, reported more positive beliefs than they would have reported in another context. About half of those attending the conventional rheumatology clinic had used CAM on one or more occasions, a typical finding in a population of individuals attending rheumatology outpatients with chronic illness.^{31,32} Therefore, there is likely to be considerable overlap in attitudes to CAM, and possibly HH, between these two patient populations. In addition, the Conventional group had a higher mean age. Thus, there are several reasons for interpreting our findings with regard to group differences with caution, including the lack of difference on the HH subscale between the two groups. The lack of difference between groups for the HH subscale contradicts the earlier data that HH beliefs affect the decision to use CAM.²²

Convergent validity was found between reported vitamin use and both of the HCAMQ subscales. People who are either positive towards CAM or have high HH beliefs are more likely to take vitamins, and the strength of this relationship is (nonsignificantly) greater between HH and vitamin use. Painkiller use was unrelated to either subscale but there was a correlation with the total score, which (as the total score has greater reliability) suggests a relatively weak effect with this item. There was convergent validity between reported antibiotic use and the CAM subscale—people who use CAM clinics use antibiotics less frequently—but there was no association between the HH subscale and antibiotic use. One possible interpretation of both the convergent and divergent validity data is that holding HH beliefs does not predispose people to be negative towards conventional therapies.

In sum, we found factor analytic evidence for the existence of two constructs, one relating to beliefs about CAM and the other beliefs about HH. Of our

original 12 items, which were taken from two parent questionnaires, only 11 had good psychometric properties, and so the final questionnaire has only 11 items. Further investigation in carefully selected groups is needed to establish the validity of the HCAMQ questionnaire as a whole, in particular in relation to HH items and the way they shape or are shaped by attitudes towards CAM.

ACKNOWLEDGEMENTS

We thank Jackie Burnham for her help in preparing the manuscript and Samantha Sodergren for statistical analysis.

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