



## **Attitudes and Practices of Pharmacists and Physicians towards Bush Medicine in Guyana**

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### **Authors' contributions**

*This research was a collaborative effort amongst all authors. Authors ET, KJ, JEC and RK designed the study. All the authors put together the research proposal. Author TT produced the questionnaire with input from all of the other authors. Author TT also performed the statistical analysis. Authors ET, KJ and JEC put together content for the video and facilitated the participation of persons in the video.*

*Author ET wrote the first draft of the manuscript. All authors managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aims:** To examine the attitudes and practices of physicians and pharmacists towards bush medicine, and explore the factors influencing their attitudes. Also, to determine whether a video educational intervention impacted attitudes.

**Study Design:** This was a cross-sectional study of registered physicians and pharmacists.

**Place and Duration of Study:** A total of 274 persons participated: 134 pharmacists attending their first Continuing Pharmacy Education (CPE) of 2015 and 140 physicians attending their annual Medical Scientific Conference.

**Methodology:** A pre-tested, self-administered questionnaire was distributed and collected, a video intervention was shown, and a post-intervention questionnaire was administered. Data were analysed using latent class cluster analysis, and the best-fitting model was determined using mainly the Bayesian Information Criterion (BIC). Logistic and multinomial regression and Fisher's

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exact test were also employed to investigate associations with demographic variables and the impact of the intervention.

**Results:** Most of the participants (56.4%) were 20-30 years old, and the majority (52%) had five years or less professional experience. Pharmacists displayed a more positive attitude to bush medicine than physicians. Most (99%) believed that patients should inform their physician/pharmacist about their bush medicine use, but only 53% routinely requested this information. More than half (52%) had personally used bush medicine, but only 38% had ever recommended its use. More than 90% believed that clinical trials should be conducted with bush medicine before it is used, and 88% were interested in further training. Ethnicity, years of professional experience and type of profession influenced attitudes and the intervention led to an improved outlook regarding bush medicine.

**Conclusion:** Overall, most participants had some misgivings about bush medicine but were willing to learn more and were interested in clinical trials. Evidence-based clinical research and training at the tertiary level or future continuing education sessions should be implemented using the content in the video as a template.

*Keywords: Attitudes; practices; bush medicine; pharmacists; physicians; Guyana.*

## 1. INTRODUCTION

Traditional medicine that is espoused in the non-indigenous populace is described as Complementary and Alternative Medicine (CAM) [1]. Throughout the world, the demand for CAM and specifically herbal remedies, is growing [2]. A study in Trinidad found that about 42% of patients attending a diabetic clinic had used herbal remedies, and 24% of these had used herbal remedies for diabetes [3]. However, one concern is that patients do not indicate to their primary care physicians or pharmacists their self-medication with herbal remedies. Some of the herbal medicines may have toxic consequences and powerful negative interactions when taken with prescribed conventional drugs [4,5]. Researchers at an Indian teaching hospital found that although the majority of patients were self-medicating with herbal remedies based on advice from family members or friends, in 98% of cases, their physicians did not know of their self-medication [5].

Research has shown that health care professionals (HCPs) use CAM but do not recommend its use for their patients [6]. There is also the concern that climate change and movement towards mainstream practices could lead to the disappearance of indigenous cultural traditions and diminished use of medicinal plants. These issues, together with the fact that researchers are advocating increasing the awareness of HCPs and patients, about the advantages and disadvantages of herbal remedies [5,7], highlight the need to revise university curricula to specifically deal with formal training about CABM [7]. Although presently, the Pharmacy programme at the local, national university, the University of Guyana (UG), has

two courses in Natural Products; there is no specific course in the Medical programme that gives attention to the field of CAM [8,9].

The term 'bush medicine' is used throughout the Caribbean to describe medicinal plants which are commonly used by traditional healers [10] and is considered to be one aspect of traditional medicine. Herbal medicine is considered as one aspect of CAM. This includes local bush medicine, for example corilla (*Momordica charantia*), also known as carilla, coraila, bitter melon or bitter gourd, for diabetes, and congo pump (*Cecropia sp.*) for kidney disease; and imported, patented herbal medications such as *Echinacea* for the common cold and St. John's wort (*Hypericum perforatum*) for depression [11,12]. Although research has been done on attitudes and practices to patented herbal medicines [13,14], few studies appear to have addressed health care professionals' attitudes to local bush medicine. One study in Brazil, showed that doctors were not cognisant of the extent to which their patients used medicinal plants for their ailments. The physicians viewed the use of medicinal plants for treatment (phytotherapy) with some reservation. However, they would support its role in primary health care if it were based on sound scientific research [15].

The role of educational interventions in improving attitudes of HCPs is well documented with varying degrees of success [16,17] and research has shown that there is an urgent need for educational interventions about bush medicine [7]. Research on the effectiveness of video educational interventions in changing attitudes and behaviours has indicated that the use of video is a particularly suitable approach [18]. Therefore, video-based information presented at

a public forum appears to be an ideal environment for deliberation about bush medicine.

In Guyana, what is understood about attitudes and practices with respect to bush medicine is limited. Furthermore, local contextual specificities need to be taken into account. This study is, therefore, both timely and relevant to fill the vacuum that presently exists. It focuses on HCPs who often have face-to-face contact with patients and it can, consequently, positively influence doctor-patient relationships and provide data that can help policymakers make sound decisions about improving the quality of health care services. The aims of this study were to examine the attitudes and practices (including personal use) of pharmacists and physicians to bush medicine and explore the factors that influence their attitudes including the effect of a video intervention on bush medicine.

## 2. MATERIALS AND METHODS

### 2.1 Study Design and Sample

This cross-sectional study began in 2014 and concluded in 2015. Those who were included were registered physicians with a Bachelor of Medicine, Bachelor of Surgery (MBBS) or Doctor of Medicine (MD) degree and above; and registered pharmacists with an Associate Degree/Diploma in Pharmacy and above. In Guyana, most HCPs obtain their tertiary level education through the local, national university – the University of Guyana. Other avenues include offshore medical schools and universities abroad in Cuba or China, for example.

Based on information about the curricula at the University of Guyana, pharmacists are exposed to more authoritative guidance about medicinal plants through two Natural Products courses which are not offered to physicians [8,9].

All participants in the study were registered practitioners<sup>1</sup>: physicians who attended the annual Guyana Medical and Scientific Conference in 2014 and pharmacists who attended their first Continuing Pharmacy Education (CPE) forum in 2015. Guyana has ten Administrative Regions and these two events are usually well attended by persons from all ten

Regions. In total, 274 persons participated: 140 physicians and 134 pharmacists.

The independent variable was the category of health professional - Physician or Pharmacist and the dependent variables were attitude and practices with respect to bush medicine.

### 2.2 The Questionnaire

A self-administered, structured questionnaire that explored the attitudes and practices of the respondents to bush medicine, was designed by the researchers for the study (see items in Table 1). The questionnaire was reviewed by a panel consisting of a doctor, herbalist, pharmacist, statistician and epidemiologist to ensure appropriate coverage of the issues under study and to enhance content validity. The reliability of the questionnaire was also examined using the test-retest method on a small cohort of Pharmacy and Medical students.

### 2.3 The Procedure

A short presentation outlining the nature and purpose of the research was done. Participants were told that, at the top of each pre-intervention questionnaire, there would be a slip of paper with a unique identification number, which had to be written on the post-intervention questionnaire. After administration and collection of the pre-questionnaire, participants were shown a 15-minute video educational intervention with information about the uses and side effects about specified bush medicine and imported herbs as well as scientific research being done on medicinal plants. Two Guyanese herbal practitioners and a pharmacist spoke on the video about the benefits of local bush medicines in Guyana, the necessity for clinical trials and the importance of requesting self-medicating information from patients. The post-intervention questionnaire was then administered, and on completion of the questionnaire, the participants were given an informative pamphlet on medicinal plants. The entire process took about one hour.

The following question and response options were placed on both the pre-and post-questionnaires to measure the impact of the video intervention:

Do you think that the use of bush medicines should be limited only to patients who have failed conventional therapy?

- (1) Bush medicine should not be used at all
- (2) Yes
- (3) No

<sup>1</sup> According to information from the Medical Council of Guyana and the Guyana Pharmacy Council, there were 328 physicians and 180 pharmacists, respectively, registered at the time of the study.

**Table 1. Attitudes and practices towards bush medicine**

<b>Item</b>	<b>N</b>	<b>Yes</b>
1. Do you believe that patients should inform their doctor/pharmacist about their use of bush medicine?	272	0.99
2. Do you specifically ask about the use of bush medicine when taking a drug history?	267	0.53
3. Have you ever recommended the use of bush medicine?	271	0.38
4. Have you ever discouraged a patient from taking bush medicine?	267	0.55
5. Do you collaborate with bush doctors to manage your patients?	269	0.06
6. Have you ever recommended a bush doctor to a patient?	270	0.07
7. Would you be willing to prescribe/dispense bush medicines along with conventional medicines?	263	0.45
8. Have you ever personally used bush medicine?	270	0.52
9. Would you allow your patients to participate in clinical trials to evaluate the efficacy of Guyanese bush medicine?	256	0.75
10. Do you think that more clinical trials should be done on Guyanese bush medicine before they are used?	267	0.97

## 2.4 Data Analysis

Data entry, cleaning and analysis were performed using Statistical Package for Social Sciences (SPSS) Version 19 (SPSS Inc., Chicago, IL, USA). The data were analysed using a variety of techniques depending on the nature of the variables and on the kind of inferences to be made. At each stage of the analysis, the 5% level was employed as the basis for determining the significance of the results.

Segmentation analysis was employed to evaluate the attitudes and practices toward bush medicine. In particular, latent class cluster analysis was employed. The models were implemented with the Latent Gold 5.0 Academic and Syntax Module. The best-fitting model was determined using primarily the Bayesian Information Criteria (BIC), which is popular for evaluating such models due to its performance. However, the Akaike Information Criterion (AIC), adjusted BIC (ABIC), and Lo-Mendell-Rubin adjusted likelihood ratio (LRT) were also reported. The model with the smallest BIC value was determined to be the best subject for substantive interpretations of the model [19].

The data were first explored to determine the number of latent classes (categories) of individuals based on their responses. Following this, the latent classifications were used as the dependent variable in a multinomial logit model with the background variables as the predictors. The results assisted with the determination of the effects of these variables on the attitudes of the respondents. Logistic and multinomial regression models were also used to investigate the

characteristics of the respondents concerning their attitude to bush medicine. Fisher's exact test was utilised to examine the impact of the intervention on attitude to bush medicine.

## 3. RESULTS

### 3.1 Sociodemographics

Most of the participants were 20-30 years old (56.4%) for both the pharmacists (57.1%) and physicians (55.7%) and they were predominantly female (60.3%). However, whereas females constituted a majority of the pharmacists (72.5%), they were in the minority among the physicians (48.9%).

A large majority of the pharmacists (96.8%) obtained their qualifications at the University of Guyana but most of the physicians (77%) obtained theirs elsewhere. Altogether, approximately 13.5% of the practitioners had post-graduate training and a majority of the health professionals (52%) had less than five years of experience. Indo-Guyanese (45.9%) was the largest ethnic group represented among the practitioners, followed by Afro-Guyanese (26.1%) and mixed individuals (25.7%).

### 3.2 Attitude and Practices to Bush Medicine

To measure attitudes and practices towards bush medicine, eleven items were presented to the respondents. The first ten (yes-no items) are shown in Table 1 along with the percentage of respondents who responded yes to each item. The final item was scored on a three-point scale and it was handled separately.

The final item asked whether the respondent thought that "the use of bush medicine should be limited only to patients who have failed conventional therapy". The three response options were:

- (1) Bush medicine should not be used at all,
- (2) Yes and
- (3) No.

The responses (267 in total) indicated that 7.5% said it should not be used at all, 22.9% said yes, whereas 69.7% said no. The practitioners who chose the first option were regarded as having a closed attitude towards bush medicine. Among the 20 individuals who chose the first option, 13 were physicians. A total of 55 individuals chose the second option. This group consisted of 23 physicians and 25 pharmacists. Choosing this option indicated that they had a somewhat negative attitude towards bush medicine; it should be a last resort. Finally, the majority of the participants chose the third option which would indicate a positive attitude towards bush medicine.

### 3.3 Analysis of Attitude to Bush Medicine

The items were formulated by the research team to explore the Guyanese context instead of attempting to confirm an established theoretical position. Hence, the BIC is used to help identify the best model before explanations of the results are provided. Estimation begins with the one-class model and this number is increased until the best fitting model is obtained.

The BIC begins to increase beyond the two-class model even though the AIC and ABIC continue to decrease (Table 2). Nevertheless, based on the BIC, the two-class model is accepted as the best. Notably, the LRT is just borderline significant for the three-class model, which provides a comparison of the three- and two-class models. Given no other information on what to expect, the two-class model is accepted as best fitting. This model has an entropy value of 0.69 which is adequate to suggest that the quality of the most likely latent class classifications is high, though there are still uncertainties.

To interpret the two classes, the conditional response probabilities to the items are inspected (see Figure 1). Figure 1 shows the probabilities of saying no to the items given that the individual is in either class 1 or class 2. It is observed that items 2, 5, 6 and 10 do not discriminate much

between the two groups. Almost everyone is positive on the ideas that patients should report the use of bush medicine (item 1) and that clinical trials should be done on Guyanese bush medicine (item 10). Added to this, very large proportions of the respondents in both classes have neither collaborated with bush doctors nor recommended a bush doctor to their patients.

The other items offer greater discrimination between the two classes and therefore provide a basis for determining the prevailing attitudes captured by the classes. Compared to class 1, a large proportion of the individuals in class 2 said no to items 3, 7, 8 and 9. These individuals have not used, or recommended the use of bush medicine and will neither prescribe bush medicine along with conventional medicine nor allow their patients to participate in clinical trials on bush medicine. They have also said yes comparatively more often to item 4, which indicates that they are more likely to have discouraged the use of bush medicine by their patients. Finally, the individuals in class 2 are less likely than those of class 1 to have asked their patients about the use of bush medicine. This combination of responses by those in class 2 compared to those in class 1 suggests a sense of strong resistance to bush medicine.

The respondents of class 1 have starkly contrasting attitudes. They are much more likely to have used bush medicine themselves and are willing to prescribe it and allow their patients to participate in bush medicine trials. However, although they are more likely to have recommended bush medicine than their counterparts in class 2, their rate of response to the item is middling. Class 1 therefore seems to represent support for bush medicine limited mainly by a lack of direct recommendations for its use. It might be, that although these individuals support the use of bush medicine, they are more concerned about the responsibilities for perceived failings or side effects. Hence, they are also interested in clinical trials and are willing to have their patients participate in such trials.

When the individuals are grouped based on their most likely class membership, class 1 accounts for approximately 37.5% of the practitioners and class 2 accounts for the remainder (62.5%). The group that expressed strong resistance to bush medicine is therefore close to half the size of the group that is more supportive of it.

### 3.4 Factors Influencing Attitude to Bush Medicine

Given that only two classes emerge from the data, the multinomial regression model is reduced to a binary logistic regression model. This model is significant overall (chi-square = 37.92, df = 9, *P*-value = 0.00), which indicates that it is useful for explaining the classifications. The model makes approximately 74.2% correct predictions and explains approximately 15% of the variance in the log-odds ratios. In the model, the variables age, gender, education (including university) and Region (practice area) lack significance and hence do not influence the attitudes of the practitioners. However, ethnicity, profession and experience have significant effects (Table 3).

#### 3.4.1 Ethnicity

Ethnicity is significantly related to the attitudes towards bush medicine in that those individuals of the largest ethnicity (Indo-Guyanese), are less likely to be classified into class 1 (support), than are individuals of the other ethnicities combined (see Table 3). The largest ethnic group is therefore associated with resistance to bush medicine. The partial odds that a minority practitioner supports versus resists bush medicine are at least 3.03 (1/0.37) and at most 4.55 (1/0.22) times larger than that of a practitioner of the largest ethnic group (based on the 95% confidence interval), which are relatively large.

#### 3.4.2 Profession

Whether or not the practitioner is a physician or pharmacist also affects attitude towards bush medicine. Physicians are less likely than pharmacists to be classified into the category which supports bush medicine (Table 3). The odds ratio of this effect lies between 0.09 and 0.54 which means that the odds that a physician resists bush medicine are between 1.85 (1/0.54) and 11.11 (1/0.09) times larger than the odds that a pharmacist resists bush medicine.

### 3.4.3 Experience

More experienced practitioners are less likely to be classified into the support for bush medicine class (Table 3). Specifically, practitioners with more than five years of experience are less likely to approve of bush medicine. The odds of classification into resistance versus support, for those with more than five years of experience, are at least 1.25 and at most 6.67 times the corresponding odds for those with at most five years of experience.

### 3.5 Effect of the Intervention

In total, 176 individuals provided usable responses to both the pre- and post-intervention questionnaires. Among these, 105 were pharmacists and 71 were physicians. Pharmacists therefore accounted for approximately 59.7% of the sample for the pre- and post-intervention surveys. In addition to this, responses to all the items were not necessarily obtained from all individuals. Hence, in addition to the reduced overall sample size for this before and after analysis, the effective sample size may vary from one item to another.

As mentioned previously, an item measuring attitude towards bush medicine was presented in both of the questionnaires - Do you think that the use of bush medicines should be limited only to patients who have failed conventional therapy?

- (1) Bush medicine should not be used at all
- (2) Yes
- (3) No

A total of 142 individuals provided useful responses to this item in both questionnaires. The cross-classification of the results (Table 4) highlights shifts in the responses between the two phases. For example, five individuals who chose the first option (should not be used at all) in the pre-intervention survey shifted to the third option (No).

Table 2. LCA model selection

Number of classes	AIC	BIC	ABIC	LRT	P-value (LRT)
1	2510.36	2546.41	2514.71		
2	2404.67	2480.39	2413.81	125.65	0.00
3	2378.06	2493.45	2391.98	47.84	0.05

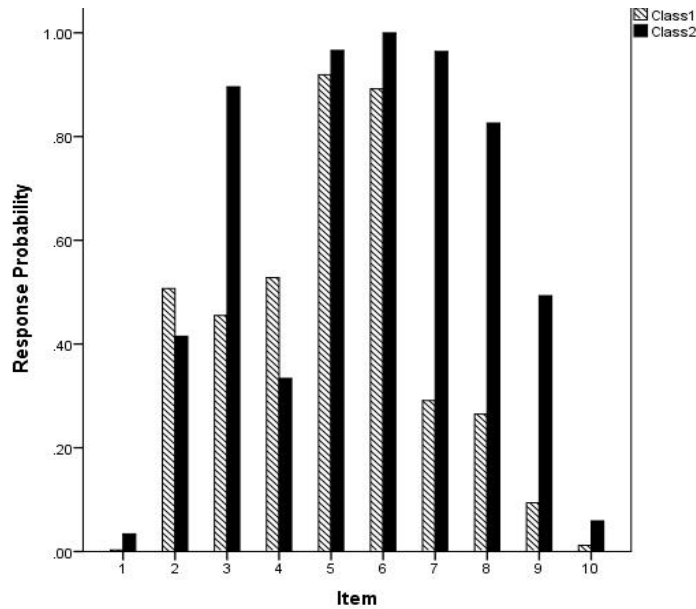


Figure 1. Response probabilities for the latent classes

Table 3. Prediction of latent classifications of attitude towards bush medicine

Variable	Logit coefficient (baseline =class 2)	Odds ratio	95% C.I. for odds ratio	
			Lower	Upper
Age 21 – 30 (baseline = age >40)	-0.44 (0.55)	0.65	0.22	1.90
Age 31 – 40 (baseline = age >40)	-0.31 (0.49)	0.73	0.28	1.93
Gender (1= male; 0= female)	-0.12 (0.32)	0.89	0.47	1.67
Ethnicity (1= majority, 0 = minority)	-0.93* (0.31)	0.40	0.22	0.73
Education (1= post-graduate; 0= lower than)	0.24 (0.57)	1.27	0.41	3.89
University (1= University of Guyana, 0 = other)	-0.84 (0.44)	0.43	0.18	1.02
Profession (1 = physician, 0 = pharmacist)	-1.49* (0.44)	0.23	0.09	0.54
Experience (1= more than 5 years, 0= 5 years or less)	-1.07* (0.43)	0.34	0.15	0.80
Region (1= Region 4, 0=other)	0.35 (0.34)	1.43	0.73	2.80
Constant	2.91* (0.75)	18.34		
R-Squared (Cox & Snell)	0.15			

\* significant at the 5% level

Table 4. Pre- and post-intervention comparison of use of bush medicine

Pre-Intervention	Post-intervention			Total
	Not used at all	Yes	No	
Yes	1 (-0.30)	24 (5.40)	12 (-2.90)	37
No	0 (-1.80)	8 (-2.90)	8(2.00)	96
Not used at all	4 (6.10)	0 (1.40)	5 (-0.60)	9
Total	5	32	105	142

in the post-intervention survey which represents movement from a closed attitude to support for bush medicine. Some individuals (12) also

shifted from a negative attitude (second option: Yes) to a positive attitude (third option: No) whereas one went from negative to a closed

attitude. Of the individuals who had selected option three in the first survey and who had a positive attitude, eight shifted to a negative attitude.

The table shows the counts and the standardised residuals enclosed in brackets.

Question: Do you think that the use of bush medicines should be limited only to patients who have failed conventional therapy?

1. According to information from the Medical Council of Guyana and the Guyana Pharmacy Council, there were 328 physicians and 180 pharmacists, respectively, registered at the time of the study.
2. 142 is the total number of persons who responded to both the pre- and post-intervention questionnaires.

Fisher's exact test was employed to evaluate the significance of the changes in classification between the two surveys given that there is sparseness in the table. This test returns a significant result (statistic = 65.81,  $P$ -value = 0.00) indicating that there is a lack of independence in the classifications between the pre- and post-intervention questionnaires. However, to arrive at the interpretation of which shifts are responsible for the significant result, the standardised residuals of the cells are examined. The especially large, standardised, residuals are 5.40 and 6.10 representing shifts from a negative attitude to primarily a positive attitude and from a closed attitude to a positive attitude, respectively. The intervention therefore seems to have led overall to improved attitude towards bush medicine.

### 3.6 Interest in Further Training about Bush Medicine

Participants were asked whether they were interested in receiving formal training in the future about CABM and overall, 88.2% indicated yes. Further exploration showed that 82.4% of physicians said yes and 93.9% of pharmacists indicated their interest.

## 4. DISCUSSION

This study investigated the attitudes and practices of doctors and pharmacists to bush medicine. It found that the attitudes varied from strong resistance to approbation as observed in other studies on physicians and pharmacists

[6,20-22]. Researchers have suggested that educational programmes and clinical, data-driven research could lead to more positive attitudes about CABM [21].

In terms of determining factors influencing attitudes, a perusal of the socio-demographic variables in this study indicated that Indo-Guyanese (majority ethnicity) health professionals tended to be less likely to support the use of bush medicine than Afro-Guyanese. Bush medicine originated with the Indigenous peoples (Amerindians, the first inhabitants of Guyana), the Africans who were brought through the slave trade and with the Chinese and East Indians who came as indentured labourers [11]. The use of bush medicine continued throughout time as is evident in the practice of Afro-Guyanese after the abolition of slavery [23] and among especially Afro-Surinamese migrants in the Netherlands, who are twice as likely to use medical plants than their counterpart Indo-Surinamese migrants [24].

Persons who were more experienced in the profession (more than five years) were less supportive of bush medicine. This trend has been noted in other studies which reported that physicians who were more recently trained had a more positive attitude with regards to CAM [25,26]. We postulate that increased mobile phone use, more access to social media sites and the proliferation of (online) radio stations which advertise and frequently highlight the use of natural remedies and nutraceuticals, have influenced the perspectives of the mostly younger viewers and listeners [27,28].

This study also found that pharmacists viewed bush medicine with much more optimism than physicians. Similarly, a study done in Trinidad and Tobago showed that pharmacists (50%) were more likely to recommend CAM than physicians (26%) [6]. These findings were not unexpected as pharmacists receive formal training in Natural Products in the Pharmacy programme at the University of Guyana [8,9]. Additionally, informal evidence indicates that pharmacists also sell imported herbs at the community pharmacies in Guyana.

In this study, approximately 38% of respondents recommended bush medicine to their patients which was slightly higher than that observed in studies in Trinidad (26%; 27% respectively) by Bahall and Legall and by Clement et al. respectively [6,7]. There was also a greater willingness among health professionals (75%) to



allow patients to participate in clinical trials to establish the efficacy of bush medicine, than the 58% of respondents who expressed such willingness in the Trinidad study [7]. In a later study, 82% of physicians supported research on the effectiveness and safety of CAM in Trinidad [6].

The findings of this study reflected those of the Trinidadian study in relation to whether respondents ever recommended a bush doctor – approximately 7% in both studies [7]. This is in sharp contrast to results of a study done in the Netherlands, where researchers found that 90% of physicians connected their patients with alternative medicine practitioners [29]; and in Australia, where these researchers reported that more than 50% of physicians recommend CAM therapy [30]. Clearly, there is some scepticism among the practitioners in the present study which may be as a result of one or more of the following factors: A lack of awareness of the usefulness, a strong belief in the potentially harmful effects and/or a lack of scientific verification about the effectiveness of herbal medicine.

It was interesting that although almost all the respondents (99%) agreed that patients should inform their physicians about their bush medicine use, only 53% of them specifically ask their clients/patients whether they are taking bush medicine. A similar study showed that overall, more than 50% of HCPs asked about CAM use [6]. On the question of whether bush medicine should only be considered when conventional therapies have failed, the findings of the present study supported those of one done in Trinidad. In the present study, 23% of the respondents answered in the affirmative, whereas 24% of them did in the study done in Trinidad [7]. The results of the two studies are also similar, in that, approximately 55% of the respective respondents indicated that they elicit information about bush medicine when taking a patient's drug history. Other researchers have suggested that the relationship between HCPs and patients can influence the amount of information garnered from patients about their CAM use [31]. It is hoped that studies such as ours, as well as opportunities to learn more about CABM, will lead to improved awareness about the importance of asking patients about the bush medicines that they are taking. Educating HCPs about bush medicine could encourage patients to feel more secure in relaying information about their self-medication.

In terms of personal use, a study in Canada found that only 20% of HCPs had ever personally used CAM [32] and one study in Trinidad found that 83% of pharmacists and 65% of physicians use CAM [6] whereas this study found that 52% of the respondents had consumed bush medicine. Overall, our findings bode well for the respondents to be receptive to learning more about CAM and bush medicine.

With respect to combining CAM and conventional medicine, one of the studies in Trinidad showed that the participants were in favour of integrative medicine [6]. This is somewhat consistent with the current finding of some enthusiasm for clinical trials. This may be an avenue for future research about the efficacy of bush medicines. Indeed, it would seem that evidence-based, randomised clinical trials on medicinal plants have a role to play in potential therapeutic modalities for patients and can help improve health care professionals' views of CABM [33].

The video intervention made a positive impact on the attitudes of the participants to bush medicine. Furthermore, there is interest in further training about CABM. The video highlighted the benefits and risks of bush medicine use, the research potential in Guyana and the need for health care personnel to enquire about self-medication use. This type of content clearly positively influenced the respondents. Therefore, we recommend that any formal training programme, whether in university curricula or Continuing Education (CE) sessions, should utilise a similar kind of content. Several researchers have alluded to the need for and role of formal training in positively influencing attitudes towards complementary and alternative treatment options [33,34]. Indeed, it is our belief that health care professionals should receive much more information about bush medicine since most of their patients or clients are probably using bush medicine and will continue to do so, especially if they perceive that conventional therapy is not working.

In addition, the Pharmacy and Medical Councils should educate and encourage their members to be involved in randomised clinical trials to establish efficacy and safety of our local bush medicine. Moreover, any future research could investigate integrating varying aspects of CAM to treat specific chronic diseases, for example, a pilot project at the Cancer Institute of Guyana. It is also hoped that the current study contributes to more prudent methods of environmental

conservation; and emphasises the need to protect indigenous, inherited knowledge and practices in the use of medicinal plants.

A limitation of this study is that the sample was not randomised. However, we believe that it was able to capture a good representation of the views of physicians and pharmacists because these two events (conference and first CE session) are very popular and generally well attended.

## 5. CONCLUSION

The results from this study indicate that pharmacists and physicians favourably view bush medicine but have some reservations. Although a considerable majority of respondents believed that the patients should report on their bush medicine use, only about half request this information in practice. Less than half would willingly prescribe or dispense bush medicine along with conventional medicine, but most were in favour of clinical trials on Guyanese bush medicine.

Ethnicity, type of health care professional and time spent in the profession influenced attitudes to bush medicine. Pharmacists compared to physicians, other ethnicities compared to Indo-Guyanese and those who were in their profession less than five years as compared to those who had spent more time, were more likely to support the use of bush medicine.

Participants were not opposed to receiving more training about bush medicine, and it is hoped that modifications in the university curricula and appropriate CE sessions can facilitate this process. The video intervention positively impacted the attitudes of the pharmacists and physicians and therefore, its content can be used as a template for the development of training events.

It is important to provide health care professionals with educational and clinical research opportunities about bush medicine to help them make the best treatment decisions for their patients or clients.

## CONSENT

Completion of the questionnaire was taken as consent to participate in the study. The participants were told about the objectives and significance of the study and that their

involvement was voluntary. Their completion of the self-administered, paper and pencil questionnaire was taken as giving consent to participate in the study.

## ETHICAL APPROVAL

The Ministry of Health, Institutional Review Board, gave ethical approval to conduct this study, which was received and preserved by the authors.

No information on the names of the participants was collected. The research proposal, including the questionnaire, was submitted to the Ministry of Health, Institutional Review Board (IRB) for approval. This was granted via a letter dated 3/07/2014 for Protocol #197 and the document number was FWA00014641.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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