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## Utilizing medicinal food knowledge of Sri Lankan traditional medicine for Allopathic medical care

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### Abstract

Sri Lankan traditional medical system comprises many medicinal foods used to manage diabetes mellitus, dyslipidemia, and hypertension. Utilization of evidence-based knowledge of these foods in Western medical care needs acceptance of these medicinal foods by Western doctors. This survey was conducted as a descriptive cross-sectional knowledge, attitude, and practice of medicinal foods on MBBS-qualified doctors. The sample of 713 doctors was selected using a multistage cluster sampling technique, and data were collected using a validated, self-administered, structured questionnaire. Data were analyzed using the Statistical Software for Social Sciences – SPSS (version 21). The results revealed that the most doctors did not have satisfactory knowledge (SK) of these medicinal foods, positive attitudes (PA) towards prescribing them in Western practice, and good practice (GP) of prescription them for their patients. Social media and university education were the most prominent modes of acquiring medicinal food knowledge by doctors. Significantly ( $p < 0.05$ ) different SK, PA, and GP levels of medicinal foods were observed in doctors of different ethnic and religious groups. Rural area exposure and rural school education showed significantly ( $p < 0.05$ ) higher SK, PA, and GP levels. Doctors with satisfactory knowledge were more likely (OR 34;95%CI) to prescribe medicinal foods than those with poor knowledge. It was concluded that, any attempt to utilize the evidence-based knowledge of medicinal foods of traditional medicine in Western

practice should focus first on improving the medicinal food knowledge of Western doctors. The development of an e-module on medicinal foods accessible via mobile phones and the inclusion of a short module on medicinal foods into medical student's curriculum are recommended.

**Keywords:** Medicinal foods, Traditional medicine, Non-communicable disease, Native medicine, Cross-sectional survey, Nutritional management

### Introduction

As in many parts of the world, Sri Lanka is experiencing an epidemiological transition, which alters the disease pattern of the country from communicable diseases to non-communicable diseases (NCDs)<sup>1</sup>. Due to the multifactorial etiology of most of these NCDs combat of them is most successful when medical therapy is coupled with nutritional management including specific dietary prescriptions with medicinal/functional foods and dietary supplements<sup>2</sup>. Medicinal foods that are placed between the pharmaceuticals and the traditional foods (‘‘Pharma-nutrition interface’’) may be defined as ‘foods that receive recognition as therapeutic either in traditional medicine, ethnomedicine, or biomedicine’<sup>3,2</sup>. Sri Lankan traditional medical system contains many medicinal food varieties that have been used for the management of NCDs including Diabetes mellitus (DM), Hypertension (HT), and Dyslipidaemia (DLD), and the utilization of evidence-based knowledge of these medicinal foods for the

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management of NCD patients under Western medical care will give a lot of benefits for the patient including smooth control of the disease with lower synthetic drug administration. However, this (the fusion medicine concept) should be accepted by the Western medical practitioners of Sri Lanka. The current study finds out the knowledge of Western medical practitioners of Sri Lanka on medicinal foods used in Sri Lankan traditional medicine, their attitude towards using these medicinal foods for the management of NCD patients, and their current practice of utilizing this medicinal food knowledge for the patients under their care.

### Materials and Methods

A descriptive cross-sectional survey on Western medical practitioners was conducted among a sample of Sri Lanka Medical Council (SLMC)-registered medical practitioners with an MBBS or equivalent degree, employed at government or private sector health institutions of the country. Multistage cluster sampling technique was used as the sampling technique, with Medical Officers working in health institutions located in a defined geographic area (MOH area) being defined as a cluster. In the first stage, 4 out of 9 provinces were selected randomly, and in the second stage, one district from each province. A total of twenty-three Medical Officers of Health (MOH) divisions were selected randomly from these districts. As this was the first survey in this study area relevant data needed for the calculation of sample size was not available. According to De Silva D, et al. (2020), the target total population of MBBS-qualified SLMC-registered Western medical practitioners in the country was 24000<sup>4</sup>. Considering the proportion of adequate knowledge among Western medical practitioners as 50%, at a 95% significance level with a hypothetical design effect of 1.8 and a non-respondent rate of 10% the total sample size was calculated as 760. A validated, self-administered, structured questionnaire was used as the study instrument. Separate knowledge, attitude, and practice scores were calculated. Using the median value of each score as the cut-off value, the three

dependent variables were converted to binary variables. The associations of the binary dependent variables with identified independent variables were studied for significant differences. Strict adherence to the proper methodology, a pilot study with 10% of the sample population, thorough training of data collectors before the commencement of the study, and continuous deep supervision throughout the study were performed to enhance the credibility of the survey. Data were analyzed using the Statistical Software for Social Sciences – SPSS (version 21). Before the data collection ethical clearance was obtained from the ethical review committee of the faculty of graduate studies of the University of Colombo, and administrative permission was obtained from relevant provincial directors of health services.

### Results

#### *Descriptive statistics of the sampled Western medical practitioners*

A total of 713 MBBS- or equivalent qualified doctors, representing the national western medical practitioner population were studied. The mean age of the doctors was 39.8 (Standard Deviation / SD 7.5) years and the majority (n 371, 52.0%,) were females. Most (n 564, 79.1%) of the participants belonged to the Sinhala nationality while the religion distribution dominated the Buddhists (n 505, 70.8%). Achievement of postgraduate qualifications by Western medical practitioners was very low (n 40, 5.6%). One important observation was parents of most doctors (n 372, 52.2%) had achieved a tertiary level education. Most of the doctors had the experience of studying in a rural school (n 578, 75.5%) and living in a rural area for more than one year (n 441, 61.9%).

#### *The Knowledge, attitudes, and practices of the Western medical practitioners of the medicinal foods used in traditional medicine*

The knowledge of the medicinal effects for DM, HT and DLD of six medicinal foods (Bitter gourd curry, Garlic curry, curry leaves congee, Lotus root curry,

Wild asparagus congee, and Fenugreek curry) was assessed. The mean total knowledge score of the Western doctors on medicinal foods was 3.8 (SD 1.8) which is a very low value out of the total score of 18. Out of the total knowledge-related questions, only two questions, Bitter gourd curry for diabetes mellitus (n 584, 81.9%) and Garlic curry for Dyslipidemia (n 455, 63.8%) were answered correctly by most of the Western medical practitioners.

The attitude domain of the questionnaire was composed of eight questions. The mean positive attitude score of the sample of Western doctors was 2.4 (SD 1.6). The most important finding regarding the attitude of Western doctors toward medicinal foods used in Sri Lankan traditional medicine is that the majority (n 508, 71.2%) of the doctors have a positive attitude on utilizing the medicinal food knowledge with sufficient scientific evidence for the management of patients under western medical care. The analysis of the prescription and consumption practice of medicinal foods by Western medical practitioners reveals that the mean practice score takes a low value of 1.5 (SD 1.5) out of the total score of four. Even though, medicinal foods were available for the majority (n 365, 51.2%) of the doctors, only 28.8% (n 205) had prescribed them for their patients.

#### ***Sources of gaining knowledge about medicinal foods by Western medical practitioners***

Out of the six identified modes (university education, school education, parents and family members, friends, public media, and social media) social media (n 495, 69.4%) and university education (n 443, 62.1%) appeared as the most dominant sources of delivering medicinal food knowledge to doctors. However, school education (n 0, 0%) has never contributed to this.

#### ***Test of normality and categorization of knowledge, attitude, and practice scores of Western medical practitioners***

The total knowledge, attitude, and practice scores were non-normally distributed. Both the Shapiro-

Wilk test and Kolmogorov-Smirnov tests showed statistically significant results ( $p=0.000$ ). As pre-determined, median values were considered as cut-off points to categorize knowledge, attitude, and practice scores. The categories above the median value of knowledge, attitude, and practice scores were respectively named satisfactory knowledge (SK), positive attitude (PA), and good practice (GP) while the categories below the median value were respectively named unsatisfactory knowledge (UK), negative attitude (NA) and poor practice (PP). None of the scores out of the three positive categories (SK, PA, and GP) had exceeded the 50% level.

#### ***The distribution of the positive scoring categories according to the socio-demographic factors of Western medical practitioners***

The distribution of the positive categories of the three dependent variables (SK, PA, GP) against the identified sociodemographic factors (gender, nationality, religion, parent's income group, Parents' education level, experience of rural school education, experience of living in a rural area, previous exposure to traditional medical treatments) of Western medical practitioners was analyzed. None of the Western doctor categories belonging to any sociodemographic group had exceeded the 50% level in all three positive score categories. However, most of the Sinhala doctors and Buddhist doctors had satisfactory knowledge and good practice levels.

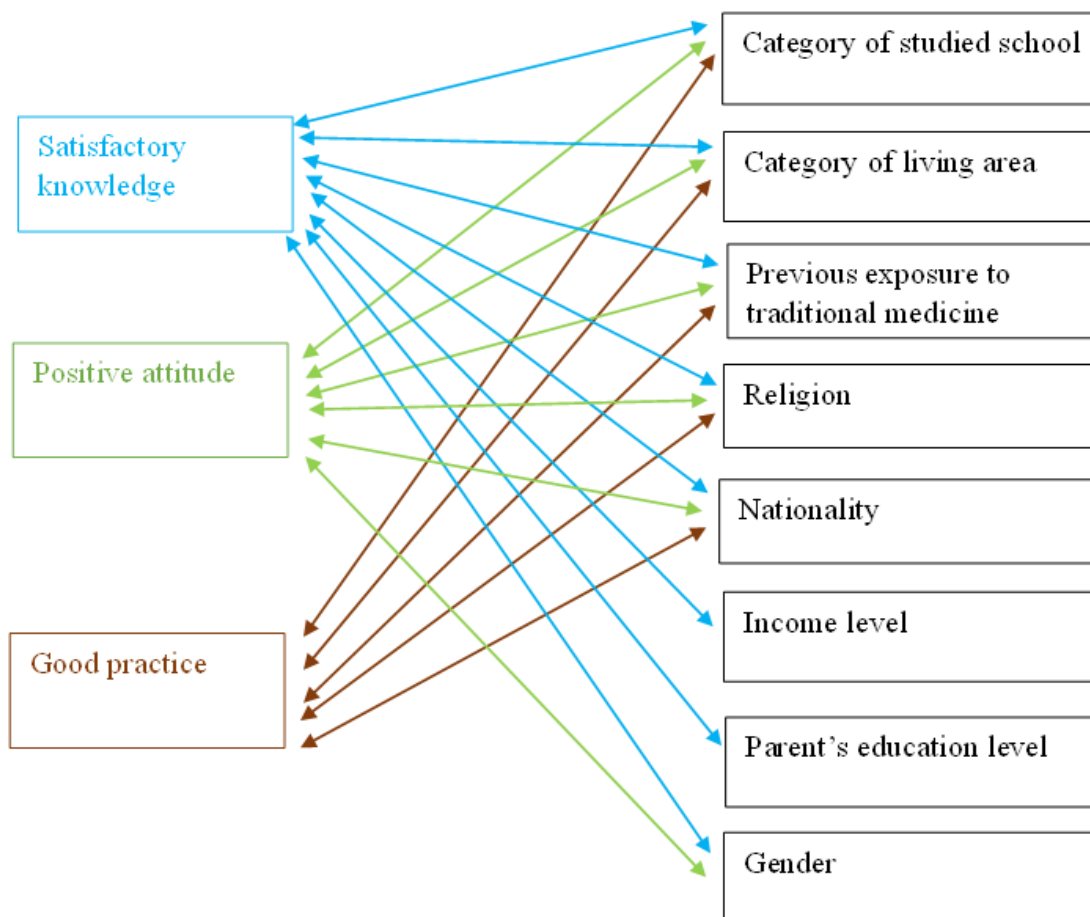
#### ***The factors associated with satisfactory knowledge, positive attitude, and good practice of doctors on medicinal foods***

Pearson's Chi-Square test was performed to see whether the identified independent variables significantly differed in the satisfactory knowledge (SK), positive attitude (PA), and good practice (GP) of Western medical practitioners. The significantly different independent variables for all three dependent variables (SK, PA, and GP) of the Western medical practitioners were the Nationality {Sinhala doctors had higher SK ( $p=0.000$ ), PA ( $p=0.001$ ), and GP ( $p=0.000$ ) of medicinal foods than the Tamil and Muslim doctors}, religion {SK ( $p=$

0.000), PA ( $p = 0.003$ ) and the GP ( $p = 0.000$ ) of medicinal foods were higher among Buddhist doctors than the catholic, Hindu, and Islam doctors}, school category {doctors with rural school exposure had higher SK ( $p = 0.000$ ), PA ( $p = 0.024$ ), and GP ( $p = 0.000$ ) of medicinal foods than those who had no experience}, category of a living area {doctors with experience of living in a rural area had higher SK ( $p = 0.000$ ), PA ( $p = 0.024$ ), and GP ( $p = 0.000$ ) than those who did not have}, previous exposure to traditional medicine {doctors with previous exposure to traditional medicine had higher SK ( $p = 0.000$ ), PA ( $p = 0.000$ ), and GP ( $p = 0.000$ ) of medicinal foods than those who had not exposed}. The gender differed both in the SK ( $p = 0.000$ ) and PA ( $p = 0.000$ ) of the doctors (higher SK in males than females and having better attitudes in females than in males). The significantly ( $p < 0.05$ ) associated independent variables with the three positive categories of dependent variables are presented in Figure 1.

### ***Association of Knowledge of medicinal foods of Doctors with the Practice of prescribing medicinal foods***

Pearson's Chi-Square test was performed to see whether the knowledge level of the doctors significantly differed in the practice of prescription of medicinal foods by them. Any positive association of a doctor's knowledge with the practice of prescription is strategically important in planning modules for improving the practice of medicinal food prescription by Western medical practitioners. The knowledge level of Western medical practitioners has significantly differed in the prescription of medicinal foods by them ( $X^2(1, N = 713) = 351.57, p < 0.000$ ). Doctors who reported good practices had satisfactory knowledge ( $n=256, 35.9\%$ ) with 34.7 times the odds of doctors with unsatisfactory knowledge ( $n=65, 9.1\%$ ) having good practices. (OR= 34.7, CI [22.7, 53.0]).



**Fig.1: Summary of the significant ( $p < 0.05$ ) associations of socio-demographic variables to testing variables from Pearson's Chi-Square test**



### ***Identification of the overall effect of covariates from binary logistic regression***

After identifying the associated variables for SK, PA, and GP of Western medical practitioners, binary logistic regression was performed for further identification of the collective effect of these variables. The logistic regression model developed for the knowledge of the doctors was statistically significant ( $\chi^2 = 24.6, p = .002$ ). The model explained 37.9% (Nagelkerke  $R^2$ ) of the variance in SK and correctly classified 70.7% of cases. Males were 2.6 times more likely to exhibit SK than females. Ever taken traditional medical treatments from a traditional medical practitioner were 111.0 times more likely to exhibit SK than those who had no previous traditional medicine exposure. Belonging to the Sinhala ethnicity was 5.0 times more likely to exhibit SK than the Muslim nationality. The regression model for the attitudes of the doctors was statistically not significant ( $\chi^2 = 5.275, p = 0.728$ ). The model explained 18.9% (Nagelkerke  $R^2$ ) of the variance in PA and correctly classified 76.3% of cases. The logistic regression model for the practice of medicinal food prescription by the doctors was statistically significant ( $\chi^2 = 13.589, p = 0.003$ ). The model explained 28.6% (Nagelkerke  $R^2$ ) of the variance in GP and correctly classified 67.5% of cases. Significant ( $p < 0.05$ ) associations for SK, PA, and GP according to binary logistic regression are presented in Table 01.

### **Discussion**

The objective of the current study is to describe the knowledge of the Western medical practitioners of medicinal foods used in Sri Lankan traditional medicine, their attitude towards prescribing them for patients under Western medical care, and their practice of prescribing them. This baseline knowledge is very important in combining the medicinal food knowledge in Sri Lankan traditional medicine with Western medical practice. Utilizing scientifically sound knowledge of any medical practice for the management of patients in another medical practice is now been practiced in many parts of the world<sup>5</sup>. Especially practices in Ayurveda and traditional Chinese medicine have been fused with Western medical practice for the benefit of the patients<sup>6</sup>. However, this is not a familiar concept in Sri Lanka. The acceptance of this by Western doctors and patients under Western medical care must be understood deeply. Their knowledge and attitude on this concept and any of their current practices related to this must be identified. Without a baseline knowledge of the above factors, attempts should not be made to implement practices on novel concepts in the Sri Lankan context.

Most of the doctors neither had satisfactory knowledge of the medicinal foods used in Sri Lankan traditional medicine nor positive attitudes towards prescribing them in Western medical care. A similar result was observed with good practice of prescribing them for their patients.

**Table 1: The significant associations for knowledge, attitude, and practice of Western medical practitioners according to binary logistic regression**

Dependent variable	Independent variable	Wald value	df	P value
SK	Nationality	10.511	2	0.001
	Previous exposure to native medicine	26.109	1	0.000
	Gender	26.675	1	0.000
GP	Exposure to rural schools	6.580	1	0.010
	Previous exposure to native medicine	76.289	1	0.000
	Gender	32.219	1	0.000

Note: Only significant variables are shown here. The detailed table in Appendix I (significance was considered  $p < 0.05$ )

In Sri Lankan medical faculties where allopathic medicine is taught, the academic program of the MBBS course does not expect the student to achieve any competencies in Sri Lankan native medicine or medicinal foods used in traditional medicine<sup>7</sup>. In the attitude domain of the questionnaire used for the study, only 0.1% of the doctors accepted the scientific basis of Sri Lankan traditional medicine while only 0.4% of the doctors accepted the effective curative ability of the Sri Lankan traditional medical treatments. Lack of knowledge of Western medical practitioners on other medical practices in the world may have influenced on these responses. The 'natural theory of disease origin' or the 'theory of four humours' explained by the great physician Hippocrates who is also the father of Western medicine says that illnesses are the result of the imbalance of four body humours (blood, black bile, yellow bile, phlegm) and four bodily conditions (hot, cold, wet, and dry) related to the four elements (earth, air, fire, and water). This theory is very similar to the Ayurveda theory of disease origin<sup>8,9</sup>. In most Western medical schools in China, the academic program of the MBBS course has a mandatory part on traditional Chinese medicine which persuades the MBBS doctors to think more broadly about the other medical practices of the world allowing them to utilize the positives of other medical practices for the benefit of the patients under their care<sup>10</sup>. If the Sri Lankan medical schools can include at least a small introductory module on Sri Lankan traditional medicine and medicinal foods used in it, the knowledge and attitudes of the Sri Lankan Western medical practitioners will be improved persuading them to utilize the medicinal food knowledge for the benefit of their patients.

The study reveals that most doctors have gained knowledge of medicinal foods in Sri Lankan traditional medicine via social media followed by their university education. Latif M. et al in their study on smartphones, social media, and medical education conclude that social media is a powerful tool for teaching and learning in medical education<sup>11</sup>. The study has found that 70% of medical students use online textbooks using mobile

applications while 62.7% of the students engage in their education activities using smartphones. The great potential social media has in medical education is that it creates the opportunity to share and express knowledge easily and faster with each other conserving time and effort and making the student relaxed and comfortable. Therefore, the development of a basic e-module on medicinal foods for medical students and Western medical practitioners will be an effective strategy to improve the medicinal food knowledge of Sri Lankan Western medical practitioners. As 62% of the doctors have gained knowledge via their university education, the inclusion of a small module on medicinal foods in the medical student's study program will be another effective and efficient way of improving the medicinal food knowledge of the Sri Lankan Western doctors.

Food cultures differ from nation to nation in the world and in Sri Lanka there is a significant difference in the food cultures of these different ethnic and religious groups<sup>12,13</sup>. Even though studies on medicinal food consumption among different ethnic and religious groups in Sri Lanka has not been studied yet, the study by Jayawardena R et al. on energy and nutrient intake among Sri Lankan adults revealed that compared to Sinhala community Muslim and Tamil community consumed higher fat content and lower fiber content<sup>13</sup>. Deviation from Sri Lankan traditional foods which include medicinal foods can lead to a dietary pattern with higher fat and lower fiber content. One important finding of the current study is significant unsatisfactory knowledge, negative attitudes, and poor practice of medicinal foods of the Muslim and Tamil doctors compared to the Sinhala doctors. A similar result was observed in Islam, Catholic, and Hindu doctors compared to the Buddhist doctors. Both these findings can reflect the differences in the food cultures of the different ethnic and religious groups of the country.

Doctors who had the experience of living in a rural area showed a significantly higher satisfactory knowledge, positive attitude, and good practice of medicinal foods compared to the doctors with no

experience of living in a rural area. In the study done by Bandara S et al, they found out that the diet of the urban Sri Lankan population has been shifting from traditional cereal-based Sri Lankan food patterns to fast foods and processed foods<sup>14</sup>. The lack of availability of traditional food varieties in urban settings of the country has highly affected the urban population to deviate from traditional Sri Lankan foods<sup>14</sup>. The difference in the knowledge, attitude, and practice of medicinal foods between urban grown-up and rural grown-up doctors may be mainly attributed to this fact. The similar difference in the KAP between the doctors who were with and without rural school exposure can also be explained on the same basis. Bandara S. et al. reveal that in Sri Lanka with the increase in income level of the people they are shifting towards a more westernized dietary pattern from the traditional Sri Lankan diet<sup>14</sup>. In the current study, one important observation is that the lower the income group of doctors higher the knowledge of medicinal foods and this may be attributed to the less exposure of the traditional Sri Lankan foods to the doctors of the higher income group of the country.

An important finding in this study is that the doctors who had a higher knowledge of medicinal foods had a higher practice of prescribing medicinal foods to their patients. Bonaccio M et al in their study on Nutrition knowledge of the Mediterranean diet and consumption revealed that those who had a higher nutritional knowledge of the Mediterranean diet had a higher practice of consuming them<sup>15</sup>. This fact emphasizes that the improvement of the medicinal food knowledge of Western medical practitioners will improve the practice of prescribing these medicinal foods to their patients.

## Conclusion

The study reveals that most Sri Lankan Western doctors do not have a satisfactory knowledge of medicinal foods used in Sri Lankan traditional medicine and the attitude of the majority of them towards prescribing these medicinal foods for patients under Western medical care is negative. The current practice of prescription of these medicinal

foods by most doctors is poor. Significantly different satisfactory knowledge, positive attitudes, and good practice levels of medicinal foods were observed in doctors of different ethnic and religious groups. A similar result was observed between doctors who had and did not have studied in rural schools, who had and did not have lived in rural settings, and who had and did not have previous exposure to traditional medicine. Social media and university education were the two best modes that delivered knowledge of medicinal foods to Western medical practitioners. Doctors who had better knowledge of medicinal foods were more likely (OR 34;95%CI) to prescribe medicinal foods than those with poor knowledge. Any attempt to utilize the evidence-based knowledge of medicinal foods used in Sri Lankan traditional medicine for the management of NCDs should focus first on improving the medicinal food knowledge of Western medical practitioners. The development of an e-module on medicinal foods accessible via mobile phones and the inclusion of a short module on medicinal foods into medical student's study program are recommended for this.

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Not applicable.

## Conflict of Interest

The authors declare that they have no competing interests.

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## Ethical Approval

The ethical clearance for the study was obtained from the ethical review committee of the faculty of graduate studies, university of Colombo, Sri Lanka (Application Number: FGS/ERC/2022/006).



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