


Knowledge, attitude and practices of ayurvedic medicine practitioners in Kerala towards millets and millet-based diet: a prospective cross-sectional online survey study

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ABSTRACT

Introduction Diet and lifestyle play pivotal roles in Ayurveda's preventive and therapeutic principles. The rich culinary heritage of Kerala harmoniously aligns with Ayurvedic dietetic principles. With the recent designation of 2023 as the International Year of Millets, there has been a surge of interest in integrating millets into dietary practices worldwide. Ayurveda physicians are poised to offer nutritional guidance to endorse health.

Methods A cross-sectional online survey was conducted from 26 July to 9 August 2023 among Ayurveda practitioners in Kerala. The survey used a semi-structured questionnaire finalised through the face and content validity, comprising eight items each for knowledge, attitudes and practices (KAP) domains. A target sample size of 422 participants was determined through convenience sampling methodology. Spearman's rank correlation test was used to examine the correlations between KAP while binary logistic regression analyses were employed to identify determinants associated with favourable levels of KAP among participants.

Results A total of 386 complete responses were used for analysis. The average scores for KAP items were 5.21, 6.36 and 5.34, respectively, (range 0–8). It was found that better Knowledge scores were associated with more favourable Attitudes towards the prescription of millet-based diet (MBD) (adjusted Odds Ratio (AOR): 3.04) and even more positive responses towards Practice (AOR: 8.59).

Conclusion The knowledge of Ayurveda practitioners in Kerala regarding the use of MBD is satisfactory. There is a significant relationship between Knowledge and Attitude as well as Practice. This study has underscored the importance of education and awareness in shaping favourable attitudes and practices related to MBD, aligning with Ayurvedic principles. Despite practitioners demonstrating good KAP behaviour towards MBD, gaps persist in certain aspects of contemporary knowledge and limitations in translating knowledge into practice. Addressing these gaps and barriers is essential to promote the widespread adoption and prescription of MBD.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The United Nations' declaration of 2023 as the International Year of Millets 2023 sparked a surge in millet consumption. Ayurveda, India's traditional medical system, has long promoted millet usage due to its emphasis on dietary principles for disease prevention and treatment.

WHAT THIS STUDY ADDS

⇒ This study reveals the current knowledge, attitudes and practices among Ayurvedic practitioners regarding millet-based diet (MBD), highlighting the barriers to their integration into prescriptions.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study could drive research to address gaps in Ayurvedic practitioners' knowledge and practices, fostering better integration of MBD.
⇒ The study provides a foundation for developing government-level strategies to promote millet usage, contributing to the achievement of Sustainable Development Goals.

INTRODUCTION

Millets are nutrient-rich cereals from the Poaceae family and are considered as one of the oldest cultivated crops.¹ But after the Green Revolution, the focus on millets waned.² However, recognising their potential to combat malnutrition and bolster food security, India proposed declaring 2023 as the International Year of Millets (IYoM2023) to the United Nations. In this context, there has been a burgeoning global focus on the nutritional and health benefits of millets.^{3 4} IYoM2023 holds particular significance in Kerala (the southernmost state in India) as its gastronomic landscape stands out with its distinctive millet-based diet

(MBD), historically devised to cater to the health needs of various segments of the population especially the tribal villages of Idukki and Palakkad districts of Kerala.^{5,6} The traditional milieu of Kerala intricately intertwines with the dietary principles of Ayurveda, forming a cohesive tradition deeply rooted in Ayurvedic dietary practices that serve as a cornerstone in shaping Kerala's culinary landscape which is evident from 'Hortus malabaricus' a 17th-century AD Dutch publication written by H A Van Rheede.^{7,8}

Millets are classified in Ayurveda as 'Trinadhanya' (grains derived from grass) or 'Kshudra Dhanya' (small grains). Ayurvedic treatises extensively discuss the categorisation of grains within the framework of 'Dhanya varga' (group of grains) recommending the incorporation of millets into the diet, especially for managing conditions like diabetes, obesity and other related diseases.⁹ The inclusion of millets as a staple ingredient in traditional recipes holds significant importance due to their high fibre content and essential nutrients which contribute to maintaining a balanced diet. Their nutrient density, high fibre content and low glycaemic index make millets appealing to individuals with lifestyle-related illnesses. The use of MBD will further enhance environmentally sustainable cultivation practices, contribute to dietary diversity and aid support local economies to sustain in this fast-paced world and finally address food security challenges.¹⁰ Consequently, millet consumption aligns with Sustainable Development Goal (SDG) No. 2 by offering essential nutrients through natural food sources.¹¹

Given the paramount importance of diet and lifestyle in Ayurvedic preventive and therapeutic approaches, Ayurveda practitioners hold a distinctive position in offering guidance regarding the use of specific dietary interventions within clinical settings. These practitioners, deeply rooted in traditional wisdom, can offer valuable insights into the historical and professional understanding of millets. An exploration of their attitudes, practices and knowledge can shed light on the integration of millets into contemporary dietary and healthcare paradigms. The design, implementation and interpretation of Knowledge, Attitude and Practice (KAP) surveys represent pivotal steps in understanding complex behavioural patterns and informing targeted interventions across diverse domains and for their relative ease in conception, execution and analysis.¹² Thus, this study endeavours to investigate the perspectives of Ayurvedic physicians in Kerala regarding millets and their role within the MBD through a KAP study.

Objective

The primary objective is to evaluate the KAP of Ayurvedic physicians in Kerala regarding millets and MBD. The secondary objective is to assess the favourable factors associated with good knowledge, positive attitude and good practice towards MBD in Kerala.

MATERIALS AND METHODS

The study was reported as per the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.¹³ (see online supplemental file - STROBE checklist)

Study design and setting

The descriptive cross-sectional questionnaire-based survey was conducted between 26 July and 9 August 2023 by using social media platforms. Participants were recruited through personal networks and practitioner cohorts by sharing an invitation to participate via Google Forms link. Prior to providing consent to participation, participants were briefed on the objectives, procedures, voluntary nature of participation, with a declaration for confidentiality on the Google link itself.

Following the introduction, an informed consent statement was presented in the Google Forms emphasising that participation is voluntary and that participants can withdraw without completing the survey.

Study participants

The study cohort comprised registered Ayurvedic physicians from Kerala including private practitioners, academicians, doctors in government service, researchers and industry professionals who had completed a minimum of 5½ years of undergraduate education in Ayurveda and consented to provide responses to the survey questionnaire.

Survey instrument

The semi-structured questionnaire in English language was developed through validation procedures to ensure methodological robustness. A 32-question draft was subjected to face validity assessment by 10 experts and revision based on percentage agreement scores yielded questionnaire with 29 questions.

Following this, content validity was done by six domain experts using established criteria. Item-level Content Validity Index, Scale-level Content Validity Index based on the average method and Scale-level Content Validity Index based on the Universal Agreement method were computed. Questions scoring below the threshold of 0.83 underwent refinement or rejection resulting in a final questionnaire consisting of 24 questions.¹⁴ Each domain—KAP—comprised eight questions.

The questionnaire contained two sections. The initial segment was intended to gather sociodemographic data. The second part encompassed a diverse array of questions, in three domains of KAP, all of which were mandatory for respondents to complete. The question types were thoughtfully varied, ranging from binary 'yes' or 'no' queries which led to subsequent open-ended questions based on respondents' answers. Additionally, a significant proportion of questions adopted a closed-ended format, presenting respondents with multiple-choice options. In select instances, respondents were granted the freedom to input their responses in an open-ended format, reflecting

their individual thoughts and insights. On average, the survey administration required approximately 10 min for completion. Prior to dissemination, the final questionnaire underwent a pilot test involving 10 volunteers to assess the reliability.

Sample size

The sample size was calculated using the formula: $n = ((Z^2 \times P \times (1-P)) / d^2)$.¹⁵ It was assumed that 50% of the Ayurveda practitioners in the State will have good knowledge regarding millets and MBD, therefore P was set as 0.5. With an absolute precision of 5% ($d=0.05$), the required sample size was calculated as 384. With a non-response rate of 10%, the final sample size was calculated as 422.

Sampling

Considering the dispersed nature of the population, a non-probability convenience snowball sampling method was chosen. This decision was also driven by practicality and cost-effectiveness in line with using Google Forms.

Fielding of the questionnaire

The survey link was distributed via email, verified social networks, personal contacts and professional networks. Snowball sampling facilitated participant referral among peers and contacts. Google Forms gathered participants' Travancore-Cochin Medical Councils registration numbers to ensure only registered practitioners were included.

Data management and statistical methods

Access to the data was restricted to authorised investigators to ensure confidentiality. The statistical analysts were provided with anonymised data sets. The data was then exported in MS Excel, incomplete entries and outliers were removed and thereafter subjected to statistical analysis.

Statistical analysis

The data on continuous variables were presented as mean and SD and categorical data as frequency and percentage. The continuous data were compared using an independent sample t-test or one-way analysis of variance and the categorical variables with χ^2 test. The responses depicting correct knowledge, positive attitude and good practice were given a score of one while all the other responses were scored as zero. The total score for all three domains ranged from 0 to 8. The overall scores in all three domains were categorised as poor if the score ranged from 0 to 4 and good for the scores ranging from 5 to 8.

Three logistic regression models were constructed with KAP scores serving as the dependent variables. Socio-demographic characteristics such as gender (male or female), age (based on quartiles) and educational level (graduate/postgraduate/doctorate) were entered as independent variables in these models. Knowledge was included as a variable in the regression model for attitudes while both knowledge (categorised as good or

poor) and attitudes (categorised as positive or negative) were included as variables in the regression model for practice. Age was categorised into four categories based on the quartiles. Adjusted ORs (AORs) were calculated to identify potential predictors of higher KAP scores. Analyses were conducted using IBM SPSS software V.29.0. Statistical significance was determined using a two-sided p value of <0.05 . Stata V.16.1 has been used to generate forest plots to predict the determinants of good knowledge, positive attitude and good practice.

RESULTS

In the final analysis, 386 responses were incorporated. The mean age of the participants was 33.8 ± 8.89 where the majority of the respondents (56.7%) were in the age group of 28–38 years and 77.4% were women. Among the total participants, 59.1% (228) had BAMS (Bachelor of Ayurvedic Medicine and Surgery) qualifications and 38.1% (147) had MD (Doctor of Medicine)/(MS (Master of Surgery) degrees (table 1). Almost 72.5% of the respondents cited books or articles as sources of information followed by traditional Ayurveda treatises (30.3%). (online supplemental figure 1a). It is noteworthy to mention that 89.6% are aware of the use of millets in their diet. A substantial majority, accounting for 77.2%, exhibited awareness regarding the commemoration of the 'IYoM2023'. A cross-tabulation of the respondent's characteristics with KAP domains is given in online supplemental table 1.

Around 89.1% (344 individuals) demonstrated familiarity with the description of millets as outlined in Ayurveda treatises and 74.4% of the participants were cognisant of the properties attributed to millets within the Ayurveda repertoire. Around half of the participants (47.7%) possessed the knowledge to differentiate various types of millets. Only 31.9% of the practitioners indicated possessing awareness regarding potential adverse effects linked to the consumption of millets, while 56% of the respondents acknowledged being familiar with disease-specific dietary recommendations involving millets, as per Ayurveda.

An overwhelmingly high percentage of practitioners (97.9%) expressed support for the promotion of millets through the IYoM2023. Furthermore, 95.6% of practitioners endorsed the notion that millets should be advocated as part of a patient's diet regimen. Despite this positive attitude, practice trends revealed a discrepancy with only 43.3% of participants regularly incorporating millets into their own diets. Nonetheless, a substantial proportion of respondents (83.9%) aligning with their supportive attitude reported prescribing millets as part of their patients' dietary recommendations. A good proportion of participants (72.0%) responded that they favour MBR (Millet Based Diet) in specific diseases compared with other cereal-based recipes (table 2). A minority of respondents (26.4%) indicated withdrawing MBR from a patient's diet due to their perceived lack of suitability

Table 1 Characteristics of the study participants and their responses on various aspects of millets-based diet

Characteristics (N=386)	n (%)	Knowledge scores	P value	Attitude scores	P value	Practice scores	P value
Age category							
≤27 years	86 (22.3)	4.45±1.950	<0.001*	6.64±1.051	0.081	5.33±1.881	0.278
28–32 years	114 (29.5)	5.11±1.894		6.27±0.998		5.21±1.792	
33–38 years	105 (27.2)	5.50±1.787		6.27±1.273		5.21±2.032	
>38 years	81 (21.0)	5.78±1.830		6.30±1.239		5.69±1.814	
Gender							
Male	87 (22.5)	5.10±2.338	0.547	6.30±1.111	0.589	4.97±2.233	0.037
Female	299 (77.5)	5.24±1.779		6.37±1.159		5.44±1.763	
Educational qualification							
Graduate	228 (59.1)	4.80±1.961	<0.001*	6.46±1.131	0.042	5.32±1.851	0.836
Postgraduate/ doctorate	158 (40.9)	5.81±1.686		6.22±1.158		5.36±1.943	
Domains							
Good knowledge	262 (67.9)						
Positive attitude	365 (94.6)						
Good practice	293 (75.9)						
KAP domain overall score		5.21±1.917		6.36±1.147		5.34±1.887	

Scores have been presented as mean±SD.
 P value compared using the independent sample t-test for gender and educational qualification while one-way ANOVA has been used to compare KAP scores among different age categories.
 *denotes p-value <0.05
 ANOVA, analysis of variance; KAP, Knowledge, Attitude and Practice.

for specific types of diseases. On evaluating attitudes towards the ease of inclusion of MBD, a diverse response emerged with 54.1% expressing a favourable view while 45.9% considered it not easy. Respondents cited several factors contributing to patients' non-compliance with the inclusion of millets in their diet when advised such as lack of knowledge or familiarity, unfavourable taste, limited availability, deviation from staple food choices, high cost and perceived difficulty in cooking. (online supplemental figure 1b).

49.2% answered affirmatively about the safety of millets while 50.8% expressed reservations. The majority of practitioners indicated that they incorporate specific MBR by specifying their frequency of use (87.6%) and by mentioning the name of the millet and the particular recipe for consumption (85.8%) in their dietary recommendations to patients. Finger millet (96.3%) followed by little millet (38.3%) was the most commonly prescribed millet (online supplemental figure 1c). Respondents identified several barriers contributing to the limited utilisation including lack of familiarity, restricted accessibility, high cost and the perception that millets may not fulfil the necessary nutritional requirements compared with other food items (online supplemental figure 1d).

The comprehensive responses of practitioners across the KAP domains are outlined in table 1. In general, 67.9% of respondents exhibited a commendable level

of knowledge, 94.6% displayed a positive attitude towards MBD and 75.9% showcased favourable practices supporting MBD. The overall mean domain score for Knowledge was 5.21±1.917, 6.36±1.147 for Attitude and 5.34±1.887 for Practice (table 1). The scores of 5 and above are deemed indicative of favourable levels in the context of this study.

Logistic regression analysis was performed to determine the association between gender, age group, educational qualification and knowledge about MBD. The results of the univariate analysis have been shown in (table 3). The distribution of knowledge about MBD varied among genders with 32 (36.8%) men and 55 (63.2%) women exhibiting good knowledge. The observed trend suggests a slightly higher likelihood of having good knowledge among women compared with men, although this association was not statistically significant at the conventional alpha level of 0.05. A statistically significant association was observed between specific age groups and knowledge about MBD. Respondents in the age group of 27–32 years (AOR: 1.93, 95% CI: 1.05 to 3.56, p=0.035) and those aged over 38 years (AOR: 2.334, 95% CI: 1.12 to 4.86, p=0.023) demonstrated a higher likelihood of having good knowledge regarding MBD as opposed to those with age less than 38 years (figure 1). Practitioners holding an educational qualification of MD/MS or higher were found to be more than twice as likely to possess knowledge about

Table 2 Practitioners response to questions related to Knowledge, Attitude and Practice

Domain—Knowledge	Poor knowledge	Good knowledge
Are you aware of the use of millets in diets?	40 (10.4)	346 (89.6)
Can you identify different types of millets?	202 (52.3)	184 (47.7)
Have you been informed about the commemoration of the 'IYoM2023'?	88 (22.8)	298 (77.2)
Are you aware of the description of millets in Ayurvedic texts?	42 (10.9)	344 (89.1)
Do you know any kind of side effects due to regular use of millet?	263 (68.1)	123 (31.9)
Do you have the knowledge of using millet-based recipes in disease-specific food (dietary recommendation)?	170 (44.0)	216 (56.0)
Are you aware of the properties of millets as per the classical reference in Ayurveda?	99 (25.6)	287 (74.4)
Are you aware of the properties of millets as per modern nutritional parameters?	172 (44.6)	214 (55.4)
Domain—Attitude	Negative response	Positive response
Do you feel that including millets in a regular diet can provide any health benefit?	35 (9.1)	351 (90.9)
Do you believe millets are always safe?	196 (50.8)	190 (49.2)
Are you interested in using millet-based processed foods like vermicelli, biscuits, muffins or noodles?	56 (14.5)	330 (85.5)
Do you feel that there is a limited use of millet?	37 (9.6)	349 (90.4)
Do you believe that millets should be recommended as part of a patient's diet?	17 (4.4)	369 (95.6)
Do you favour millet-based recipes for specific diseases compared with other cereal-based recipes?	108 (28.0)	278 (72.0)
Do you believe it is easy for patients to comply with a millet-based menu in their diet when it is advised?	177 (45.9)	209 (54.1)
Do you support the promotion of millets in the form of the 'International Year of Millets 2023'?	8 (2.1)	378 (97.9)
Domain—Practice	Poor practice	Good practice
Do you use millets in your regular diet?	219 (56.7)	167 (43.3)
Do you prescribe millets to patients?	62 (16.1)	327 (83.9)
Are you currently recommending millets as a disease-specific compatible food in your dietary prescriptions?	130 (33.7)	256 (66.3)
Do you advise withdrawal of millet-based recipes (as non-compatible food) in any disease-specific condition?	284 (73.6)	102 (26.4)
Do you take age and other such factors into account when recommending an MBD?	32 (8.3)	354 (91.7)
Do you prescribe millets by explicitly mentioning their names or by providing recipes?	55 (14.2)	331 (85.8)
Do you specify the frequency of millets-based diet inclusion in diet of patients as per the disease?	48 (12.4)	338 (87.6)
Do you use millet-based processed food like biscuits/noodles etc?	198 (51.3)	188 (48.7)

Values are reported as n (%), total responses=386.
IYoM2023, International Year of Millets 2023; MBD, millet-based diet.

MBD compared with graduates (AOR: 2.126, 95% CI: 1.244 to 3.632, p=0.006).

The logistic regression analysis conducted to ascertain the predictors of Attitude towards MBD among Ayurveda practitioners revealed that age, gender and education revealed no statistically significant association to positive attitude towards the prescription of MBD. Practitioners with good knowledge demonstrated a three times higher likelihood of harbouring a positive attitude towards the prescription of MBD

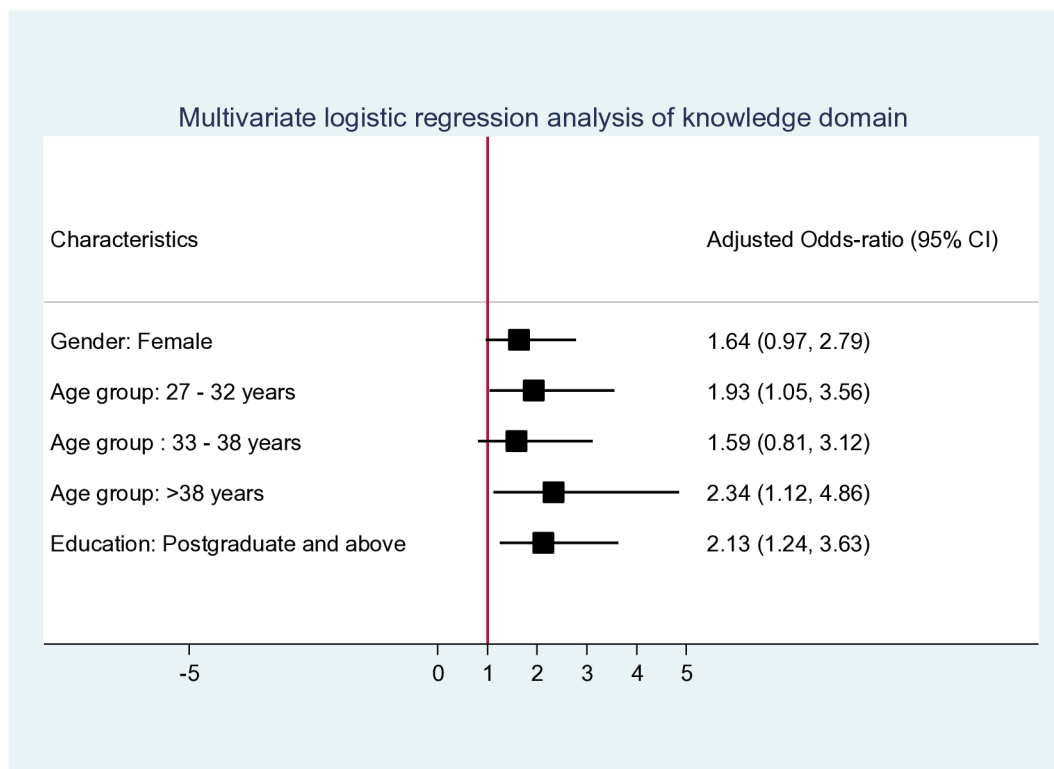
for patients (AOR: 3.04, 95% CI: 1.20 to 7.69, p=0.019) (figure 2).

The logistic regression analysis for exploring the association between gender, age, education and good practice behaviour among Ayurveda practitioners did not identify any significant relationships. However, it is important to note that the practitioners with good knowledge were eight times more likely to incorporate MBD in their practice (AOR: 8.59, 95% CI: 4.92 to 15.01, p<0.001). This significant

Table 3 Univariate logistic regression analysis of Knowledge, Attitude and Practice domains

Characteristics	Knowledge domain		Attitude domain		Practice domain	
	COR (95% CI)	P value	COR (95% CI)	P value	COR (95% CI)	P value
Gender						
Male	Reference		Reference		Reference	
Female	1.309 (0.794 to 2.159)	0.291	1.079 (0.384 to 3.033)	0.886	1.370 (0.800 to 2.344)	0.251
Age group						
<27 years	Reference		Reference		Reference	
27–32 years	2.343 (1.305 to 4.207)	0.004	0.788 (0.183 to 3.391)	0.749	0.905 (0.475 to 1.724)	0.761
33–38 years	2.386 (1.312 to 4.341)	0.004	0.438 (0.113 to 1.706)	0.234	0.982 (0.506 to 1.903)	0.956
>38 years	3.115 (1.601 to 6.060)	0.001	0.549 (0.127 to 2.377)	0.423	1.312 (0.629 to 2.739)	0.469
Education						
Graduate	Reference		Reference		Reference	
Postgraduate and above	2.516 (1.578 to 4.011)	<0.001	0.613 (0.254 to 1.480)	0.277	1.004 (0.625 to 1.614)	0.987
Knowledge						
Poor			Reference		Reference	
Good			2.453 (1.013 to 5.942)	0.047	7.452 (4.456 to 12.462)	<0.001
Attitude						
Negative					Reference	
Positive					2.027 (0.813 to 5.054)	0.130

P value is significant at 5% level of significance.
COR, crude Odds Ratio.


Figure 1 Multivariate logistic regression analysis of knowledge domain.

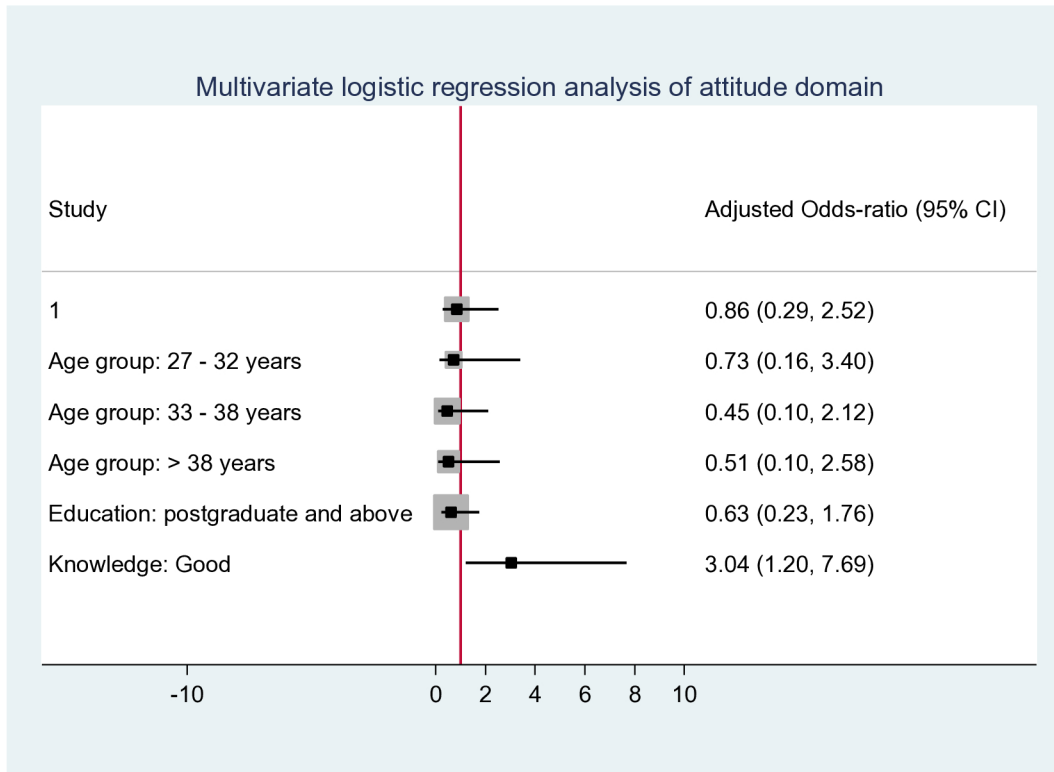


Figure 2 Multivariate logistic regression analysis of attitude domain.

association demonstrates the pivotal role of knowledge as the single most influential predictor for practice behaviour favouring the use and prescription of MBD (figure 3).

DISCUSSION

This survey is a pioneering effort, likely the first to systematically explore the KAP of Ayurvedic

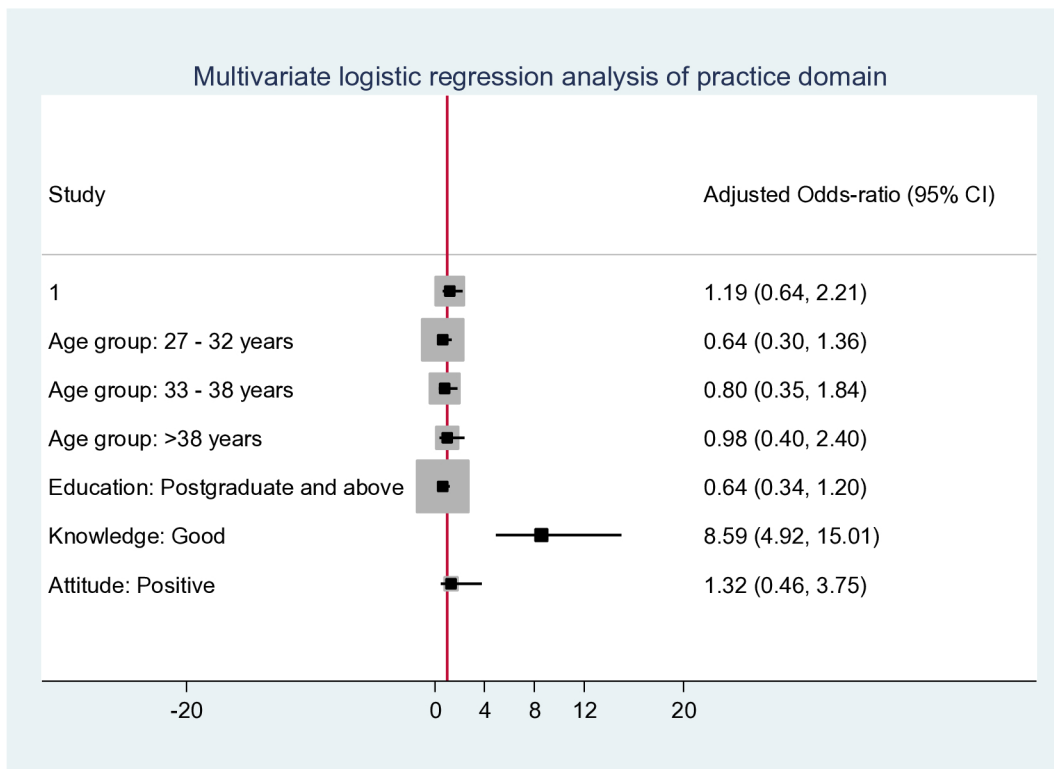


Figure 3 Multivariate logistic regression analysis of practice domain.

physicians in Kerala regarding MBD. It reveals complex behavioural patterns and guides targeted interventions.

The study portrays a commendable trend among respondents with the majority exhibiting favourable KAP towards MBD. The widespread awareness of millet usage and the significance of the 'IYoM2023' reflects the successful execution of government initiatives aimed at promoting millet integration into dietary practices. This level of awareness implies a significant stride in revitalising the inclusion of millets in diets indicative of a notable engagement of the public with such endeavours. Furthermore, the study revealed a substantial proportion of participants demonstrating familiarity with millet descriptions and properties outlined in Ayurveda treatises in alignment with Ayurveda principles and scriptural references. This highlights the practitioners' profound engagement with ancient Ayurveda wisdom, underscoring the enduring relevance of Ayurveda in contemporary healthcare practices. The observed gaps in knowledge among practitioners regarding the contemporary nutritional profile of millets with approximately half demonstrating poor knowledge highlight a significant area for improvement. Scientific research has increasingly recognised the nutritional richness of millets which are known to be abundant sources of essential nutrients including dietary fibre, vitamins, minerals and antioxidants.^{16 17} Their protein content ranges from 6% to 13% with Proso millet and Foxtail millet being the richest sources. The quantity of dietary fibre in millets is nearly double that of rice with Barnyard millet and Kodo millet being prominent sources. Millets also provide significant amounts of micronutrients including calcium (10–348 mg/100 g), iron (2.2–17.7 mg/100 g), zinc (0.4–2.8 mg/100 g) and phosphorus (189–293 mg/100 g). Additionally, they are rich in vitamins such as thiamine (0.15–0.60 mg/100 g), niacin (0.89–4.6 mg/100 g) and riboflavin (0.09–0.28 mg/100 g). The detailed nutritional profile of commonly used millets in comparison to rice and wheat are given in the online supplemental table 2.⁹ Incorporating millets into diets has been associated with numerous health benefits such as improved blood sugar control, weight management and reduced risk of chronic diseases like diabetes and heart disease.^{18–20} Inadequate awareness of these nutritional attributes among practitioners may create a barrier to prescribing MBD.

It is noteworthy that despite positive attitudes towards the inclusion of MBD in daily diets, there exists a gap between endorsement and practice, specifically for themselves, indicating the need for targeted interventions to bridge this divide. The dichotomous response among practitioners regarding the ease of incorporating MBD into routine diet underscores the complexity inherent in promoting millets as a dietary staple in contemporary contexts which may be influenced by perceptions of millet safety, cultural beliefs, personal experiences and available information in the public domain. The practitioners had also listed several barriers contributing to the

limited utilisation of millets including lack of familiarity with millets/millet recipes, restricted accessibility, high cost, limited culinary familiarity and the perception that millets may not fulfil necessary nutritional requirements compared with other food items. In the context of the divided opinion regarding the ease of inclusion of MBD, safety concerns and the barriers listed, individual practitioners' specific attitudes play a significant role which is similar to some previous findings.²¹ Attitudes are acquired characteristics of an individual representing relatively enduring beliefs organised around an object, subject or concept which predispose one to respond in some preferential manner, based entirely on the individual.^{22 23} For instance, practitioners favouring the ease of inclusion may perceive millets as versatile and adaptable to diverse culinary practices. In contrast, those perceiving it as challenging may cite factors such as limited availability or unfamiliarity with preparation methods.

Finger millet followed by Foxtail Millet and Little Millet are reported as the most frequently prescribed millet by Ayurveda practitioners in Kerala which can be attributed to the fact that they hold the status of a staple food within various communities and are extensively cultivated in specific regions of Kerala.⁶ Addressing misconceptions and raising awareness about the nutritional benefits and culinary versatility are pivotal in fostering a positive attitude towards their inclusion in the diet. Educational initiatives targeting both practitioners and the general public can play a crucial role in dispelling myths and promoting informed decision-making regarding dietary choices. Enhancing accessibility to millets and implementing cost-reduction strategies are also essential components in promoting their wider adoption as sustainable food options.

The regression analysis to explore potential predictors of good knowledge unveiled associations with certain age groups, notably younger individuals (<27 years) and older practitioners (>38 years) as well as higher education levels. Younger practitioners may possess comprehensive knowledge owing to their updated information due to recent education, participation in IYoM2023, their willingness to explore and integrate novel concepts into their practice. Conversely older practitioners owing to their extensive experience and exposure to traditional dietary practices which often include millets could contribute to their robust understanding of millets. The study revealed positive associations between practitioners' knowledge and their attitudes and practices towards MBD. Practitioners with good knowledge demonstrated a three times greater likelihood of having a positive attitude towards prescribing MBD while being eight times more likely to incorporate MBD into their practice. A thorough understanding of the nutritional value, health benefits and culinary versatility of millets along with Ayurvedic fundamental principles like the 'Concept of Guna' (physical attributes) and their influence on body constitution empowers practitioners to appreciate their maximum benefits in promoting overall health and well-being.

In the backdrop of the SDGs, particularly Goal 2 aimed at eradicating hunger, promoting food security and improving nutrition, there has been a growing emphasis on exploring sustainable and nutritious food options.²⁴ Millets, being nutrient-rich grains with ecological benefits, have gained attention as an integral component of efforts to address global food insecurity and malnutrition. However, to fully leverage the potential of millets, it is imperative to enhance knowledge and awareness among healthcare practitioners. By equipping practitioners with a comprehensive understanding and practical skills related to MBR, healthcare systems can better integrate millets into dietary recommendations, thereby contributing to the achievement of SDG 2 and fostering a more sustainable food system.

Limitations

The short data collection period and the Google survey platform may have resulted in restricted sample size and selection bias thereby affecting the representativeness of the sample. Focusing exclusively in Kerala limited the generalisability of the findings.

CONCLUSIONS

This study underscored the importance of education and awareness in shaping favourable attitudes and practices related to MBD, aligning with Ayurvedic principles. Despite demonstrating good KAP towards MBD, gaps persist in certain aspects of contemporary knowledge and limitations in translating knowledge into practice. Addressing these barriers is essential to promote the widespread adoption and prescription of MBD. Targeted campaigns aimed at enhancing practitioners' knowledge base and cultivating the ability to adopt best practices are necessary. Government-led awareness creation campaigns can also play a pivotal role in fostering a conducive environment for the integration of MBD into dietary practices.

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