RESEARCH PAPER

Traditional Medicine Health Literacy and Preventive Practice Adoption Among Adolescents in Varanasi, India: A School-Based Quantitative Analysis

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ABSTRACT

Traditional medicine is widely practiced in India, yet there is limited empirical evidence on adolescents' health literacy related to these systems. Understanding how literacy influences preventive health behavior is essential in culturally significant settings such as Varanasi. This study examined the association between Traditional Medicine Health Literacy (TMHL), attitudinal orientation, and preventive practice adoption among senior secondary school adolescents. A school-based cross-sectional quantitative study was conducted among 800 students. Structured questionnaires assessed TMHL, attitude, and preventive practices. Reliability and validity were confirmed (Cronbach's $\alpha = 0.846$ and 0.792; KMO = 0.872; Bartlett's test $p < 0.001$). Exploratory factor analysis identified three literacy dimensions (knowledge, comprehension, application) explaining 55.8% variance and two attitude dimensions explaining 58.3% variance. Pearson's correlation and multivariable regression analyses were performed. Health literacy showed significant positive correlations with attitude ($r = 0.52$, $p < 0.001$) and preventive practice ($r = 0.47$, $p < 0.001$). Logistic regression revealed that higher literacy (AOR = 1.78; 95% CI: 1.52–2.09) and positive attitude (AOR = 1.42; 95% CI: 1.21–1.67) significantly predicted high preventive practice adoption. The model demonstrated good fit (Nagelkerke $R^2 = 0.34$; AUC = 0.78). Strengthening traditional medicine health literacy may enhance informed preventive health behaviors among adolescents in India.

Keywords: health literacy, traditional medicine, preventive practice adoption, adolescents, school-based study.

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Introduction

Traditional medicine remains a significant component of health systems across the world(Verma et al., 2024). In many low- and middle-income countries, it complements biomedical services and supports culturally embedded health practices(Dalamagka, 2024). Traditional systems such as Ayurveda are gaining recognition for their role in preventive health, particularly among populations experiencing both communicable and non-communicable diseases amid lifestyle changes and limited access to quality care(Al-Worafi, 2023; Che et al., 2024). As per the World Health Organization (WHO) health literacy refers to the personal knowledge and skills developed through daily life and social interactions that enable individuals to access, understand, evaluate, and use health information and services to maintain their own

and others' well-being. Reports from the United Nations, particularly the World Health Organization, conceptualize health literacy as a multidimensional capacity rather than merely individual knowledge, emphasizing that it is shaped by education systems, communication environments, and broader social determinants of health(WHO, 2026b).

Health encompasses a condition of overall physical, mental, and social well-being, extending beyond the mere absence of illness or disability(WHO, 2026a). Adolescent health literacy influences informed health decision-making, effective use of health information, and engagement in preventive behaviors, and is consistently linked to improved health outcomes across diverse contexts(Estrela et al., 2023). Health literacy is closely linked to broader social determinants such as education, income, neighborhood disadvantage, and healthcare access, all of which play a critical role in advancing equitable disease prevention and control efforts(Coughlin et al., 2021; Garcia-codina et al., 2019). Traditional health literacy includes knowledge of herbal remedies, dietary principles, and culturally grounded preventive practices. It is shaped by family transmission, community norms, and local healers.(Chali et al., 2021). Traditional medicine extends beyond a system of treatment, encompassing a historically evolved body of knowledge informed by longstanding cultural traditions, ecological contexts, and collective community practices(Kuruvilla et al., 2025).

The Shanghai Declaration on Promoting Health in the 2030 Agenda for Sustainable Development recognizes the expanding role and potential contributions of traditional medicine in advancing well-being in alignment with the Sustainable Development Goals(WHO, 2016). Furthermore, the WHO Traditional Medicine Strategy 2025-2034 provides a structured framework to guide the integration, regulation, and oversight of traditional and complementary medicine within national health systems(WHO, 2025). Traditional medicine in India constitutes a pluralistic and formally institutionalized system of knowledge that operates alongside biomedicine within the national health framework(Saxena et al., 2024). In contrast to settings where traditional medicine functions largely in informal domains, India has established statutory regulatory bodies, formalized educational curricula, and specialized institutions to govern and deliver these systems. Moreover, Indian traditional medicine places strong emphasis on preventive care, promoting dietary regulation, seasonal health practices, and individualized approaches based on constitutional typologies(Balakrishnan et al., 2023).

In India, the government has increasingly integrated traditional systems such as Ayurveda, Yoga, Unani, Siddha, and Homoeopathy (AYUSH) into national health policies and primary care initiatives to strengthen preventive and promotive services, while advancing culturally responsive health literacy within community health frameworks(Nesari et al., 2025). Despite growing policy support, the translation of traditional medicine knowledge into actionable health literacy among adolescents remains underexplored, particularly in cities with a strong traditional heritage such as Varanasi, where long-standing exposure to traditional medical narratives may influence contemporary health perceptions. The present study aims to examine the level of traditional medicine health literacy and its association with the adoption of preventive health practices among adolescents in Varanasi, India. The study assesses adolescents' knowledge, interpretive capacity, and application of traditional health concepts in everyday behaviors. It further evaluates the socio-demographic determinants shaping literacy levels and preventive engagement, thereby generating empirical evidence to inform culturally responsive health promotion strategies within educational settings

Material and methods

Study design

A school-based cross-sectional quantitative study was conducted to examine traditional medicine health literacy and its association with preventive practice adoption among adolescents. The cross-sectional design enabled the assessment of literacy levels and behavioral outcomes within a defined population at a specific time point, while allowing for determinant-based statistical analysis. The study was carried out in Varanasi, Uttar Pradesh, India, a historically significant center of traditional knowledge systems including Ayurveda. The setting was considered appropriate given its cultural embeddedness in traditional medical practices and the coexistence of diverse educational institutions.

Data were collected between July 2025 and December 2025 from secondary and senior secondary schools. A total of 828 school-going adolescents participated in the survey. The structured questionnaire was administered in classroom settings following institutional approval and informed consent procedures, ensuring standardized data collection and response validity.

Study population and sample size

The study population comprised school-going adolescents enrolled in secondary and senior secondary classes in Varanasi, India. Participants were recruited from both government and private schools to ensure socio-economic and institutional diversity. A total of 828 students completed the survey; however, after data screening for completeness and consistency, 800 valid responses were retained for the final analysis. The large sample size enhanced statistical power and enabled robust multivariable modeling to examine the determinants of traditional medicine health literacy and preventive practice adoption. Inclusion criteria included students who were enrolled, present on the day of data collection, and who provided informed assent along with institutional approval.

Data collection

Data were collected using a structured, self-administered questionnaire designed to evaluate traditional medicine health literacy and preventive practice adoption among adolescents. The instrument included sections covering socio-demographic characteristics, knowledge of traditional medicine with specific reference to Ayurveda-related concepts, attitudes toward its use, and preventive health behaviors. The questionnaire was developed through a review of relevant literature and consultation with subject experts to ensure content validity, clarity, and contextual appropriateness. The survey was administered in classroom settings during regular school hours after obtaining formal permission from school authorities. Prior to participation, students were informed about the purpose of the study, the voluntary nature of participation, and the confidentiality of their responses. Informed assent was obtained before distributing the questionnaire. The data collection process was supervised by trained investigators to maintain uniform administration procedures and reduce potential response bias.

Data analysis

Descriptive statistics were first computed to summarize socio-demographic characteristics and key study variables. Continuous variables were presented as means with standard deviations, while categorical variables were summarized using frequencies and percentages. To ensure measurement reliability, internal consistency of the traditional medicine health literacy, attitude, and preventive practice scales was assessed using Cronbach's alpha coefficients. Exploratory factor analysis (EFA) with principal component extraction and varimax rotation was conducted to examine the underlying factor structure of the literacy items. Sampling adequacy was evaluated using the Kaiser–Meyer–Olkin (KMO) statistic, and Bartlett's test of sphericity was applied to confirm factorability of the correlation matrix.

Composite indices for traditional medicine health literacy and preventive practice adoption were generated by summing standardized item scores. These indices were treated both as continuous variables and categorized into tertiles (low, moderate, high) for comparative analysis. Bivariate associations between socio-demographic variables and literacy or practice levels were examined using independent t-tests, one-way ANOVA, and chi-square tests as appropriate. Pearson's correlation analysis was performed to assess the strength and direction of association between health literacy and preventive practice scores.

To identify determinants of traditional medicine health literacy, multiple linear regression analysis was performed, adjusting for age, gender, class level, academic stream, and school type. Standardized beta coefficients, 95% confidence intervals, and adjusted R^2 values were reported. Multicollinearity was assessed using variance inflation factors. To examine predictors of preventive practice adoption, multivariable logistic regression analysis was conducted. High preventive practice adoption (upper tertile) was treated as the dependent variable. Independent variables included health literacy score, attitude score, and socio-demographic covariates. Adjusted odds ratios (AORs) with 95% confidence intervals were reported. Model fit was assessed using the Hosmer–Lemeshow goodness-of-fit test and the area under the receiver operating characteristic (ROC) curve.

Results

Table 1: Socio-demographic profile of the respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	381	47.62
	Female	417	52.12
	Others / Prefer not to say	2	0.25
Age Group (Years)	16-17	641	80.12
	18-19	126	15.75

	20-21	33	04.12
Educational Level	Class 11	445	55.62
	Class 12	383	47.87
Education Stream	Science (PCM + PCB)	356	44.50
	Humanities / Arts	261	32.62
	Commerce	101	12.62
	Others / Mixed	82	10.25
	Total	**800**	**100.0**

Sources: primary survey conducted by authors

The table presents the socio-demographic and educational profile of the 800 adolescent participants included in the study. In terms of gender distribution, the sample is relatively balanced, with females (52.12%) slightly outnumbering males (47.62%), while a very small proportion (0.25%) identified as others or preferred not to disclose their gender. The age composition indicates that the majority of respondents were between 16–17 years (80.12%), followed by those aged 18–19 years (15.75%), and a smaller proportion aged 20–21 years (4.12%). This suggests that the sample predominantly represents mid-adolescents enrolled in higher secondary education.

Regarding educational level, more than half of the participants were studying in Class 11 (55.62%), while 47.87% were in Class 12, indicating representation from both senior secondary grades. With respect to academic stream, Science (PCM and PCB combined) constituted the largest group (44.50%), followed by Humanities/Arts (32.62%), Commerce (12.62%), and other or mixed streams (10.25%). Overall, the distribution reflects a diverse academic background, with a greater concentration of students from the science stream.

Table 2 Reliability Statistics – Health Literacy Scale

Indicator	Value
Number of items	12
Cronbach's Alpha (α)	0.846
Mean Inter-Item Correlation	0.39
Range of Corrected Item–Total Correlation	0.46 – 0.72
Alpha if Item Deleted (Range)	0.831 – 0.858

Sources: computed by authors

The table presents the internal consistency reliability statistics for the 12-item scale. The Cronbach's Alpha (α) value of 0.846 indicates a high level of internal consistency, suggesting that the items collectively measure a coherent underlying construct.The mean inter-item correlation of 0.39 falls within the acceptable range, reflecting a moderate degree of association among the items without indicating redundancy. Furthermore, the corrected item–total correlation values range from 0.46 to 0.72, demonstrating that each item shows a satisfactory to strong correlation with the overall scale score, thereby contributing meaningfully to the construct measurement. The "alpha if item deleted" values range between 0.831 and 0.858, showing minimal fluctuation from the overall alpha. This suggests that no single item disproportionately weakens the scale, and the instrument maintains stable reliability across items. Overall, the findings confirm that the scale demonstrates strong internal consistency and is suitable for further analysis.

Table 3 Attitude toward traditional medicine scale

Indicator	Value
Number of items	8
Cronbach's Alpha (α)	0.792
Mean Inter-Item Correlation	0.36
Range of Corrected Item–Total Correlation	0.41 – 0.65
Alpha if Item Deleted (Range)	0.771 – 0.806

Sources: computed by authors

The table summarizes the internal consistency statistics for the 8-item scale. The Cronbach's Alpha (α) value of 0.792 indicates acceptable reliability, suggesting that the items demonstrate a satisfactory level of internal coherence in measuring the intended construct.The mean inter-item correlation of 0.36 reflects a moderate association among the items, indicating conceptual relatedness without excessive overlap. The corrected item–total correlation values range from 0.41 to 0.65,

demonstrating that each item contributes adequately to the overall scale and maintains meaningful alignment with the total score.The "alpha if item deleted" values vary between 0.771 and 0.806, showing only slight changes compared to the overall alpha coefficient. This pattern suggests that no individual item substantially undermines the reliability of the instrument. Overall, the findings confirm that the scale possesses acceptable internal consistency and is appropriate for subsequent statistical analysis.

Table 4 KMO and Bartlett's Test

Test	Value
Kaiser–Meyer–Olkin (KMO)	0.872
Bartlett's Test of Sphericity	$\chi^2 = 2864.51$
Degrees of Freedom	231
p-value	< 0.001

Table 5 Total variance explained – Health literacy scale

Factor	Eigenvalue	% Variance	Cumulative %
Factor 1 (Knowledge)	4.91	29.1%	29.1%
Factor 2 (Comprehension)	2.63	15.6%	44.7%
Factor 3 (Application)	1.87	11.1%	55.8%

Table 6 Total variance explained – Attitude Scale

Factor	Eigenvalue	% Variance	Cumulative %
Factor 1 (Positive Orientation)	3.14	39.3%	39.3%
Factor 2 (Perceived Effectiveness)	1.52	19.0%	58.3%

Sources: computed by authors

The exploratory factor analysis (EFA) findings substantiate the structural validity and dimensional coherence of the study instruments. As presented in Table 4, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.872, indicating a meritorious level of adequacy and confirming that the inter-item correlations were sufficiently compact to yield reliable and distinct factors. Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 2864.51$, df = 231, $p < 0.001$), demonstrating that the correlation matrix was not an identity matrix and that the variables were meaningfully interrelated, thereby supporting the suitability of the dataset for factor analysis.

Table 5 summarizes the factor extraction results for the Health Literacy Scale, revealing a three-factor structure. Factor 1, labeled Knowledge, yielded an eigenvalue of 4.91 and accounted for 29.1% of the total variance, representing the most dominant dimension of the construct. Factor 2, identified as Comprehension, had an eigenvalue of 2.63 and explained 15.6% of the variance, indicating a distinct and substantive dimension. Factor 3, termed Application, produced an eigenvalue of 1.87 and contributed 11.1% of the variance. Although comparatively smaller, this factor exceeded the conventional eigenvalue threshold of 1, confirming its statistical and conceptual relevance. Table 6 presents the total variance explained for the Attitude Scale, which demonstrated a two-factor solution. Factor 1, labeled Positive Orientation, had an eigenvalue of 3.14 and explained 39.3% of the total variance, indicating that favorable attitudinal tendencies constitute the principal dimension of the scale. Factor 2, designated as Perceived Effectiveness, yielded an eigenvalue of 1.52 and accounted for an additional 19.0% of the variance. Despite contributing a smaller proportion of variance, this factor remained statistically meaningful, as its eigenvalue exceeded the accepted threshold of 1.

Table 6 Pearson's Correlation Matrix (N = 828)

Variables	1	2	3
1. Health Literacy Score	1		
2. Attitude Score	0.52***	1	
3. Preventive Practice Score	0.47***	0.44***	1

*** = $p < 0.001$ (very highly significant)

Sources: computed by authors

Pearson's correlation analysis was performed to assess the relationships among Traditional Medicine Health Literacy, Attitude, and Preventive Practice scores (N = 828). The results demonstrate statistically significant positive associations among all three variables (p <

0.001).Health literacy exhibited a moderate positive correlation with preventive practice adoption (r = 0.47), indicating that adolescents with higher levels of traditional medicine literacy were more likely to engage in preventive health behaviors. In addition, health literacy showed a stronger positive relationship with attitude (r = 0.52), suggesting that greater knowledge and understanding of traditional medicine are associated with more favorable perceptions and beliefs.

Attitude was also moderately correlated with preventive practice (r = 0.44), implying that adolescents who hold positive views toward traditional medicine are more inclined to adopt related preventive measures. Overall, the findings highlight a consistent and meaningful association between literacy, attitudinal orientation, and behavioral practice. The pattern suggests that improved health literacy may foster positive attitudes, which in turn may contribute to greater adoption of preventive health practices among adolescents.

Table 7 multiple linear regression predicting health literacy

Predictor	Standardized β	95% CI	p-value
Age	0.12	(0.05, 0.19)	0.002
Female (vs Male)	0.15	(0.08, 0.22)	<0.001
Class 12 (vs 11)	0.18	(0.10, 0.26)	<0.001
Science Stream	0.21	(0.13, 0.29)	<0.001
Schools	0.09	(0.02, 0.16)	0.014
Adjusted R^2 = 0.28			
F-statistics = 64.32			
P- value = <0.001			

Sources: computed by authors

A multiple linear regression analysis was conducted to identify significant predictors of the outcome variable. The overall model was statistically significant (F = 64.32, p < 0.001) and explained 28% of the variance in the dependent variable (Adjusted R^2 = 0.28), indicating a moderate level of explanatory power. Age emerged as a significant positive predictor (β = 0.12, 95% CI: 0.05–0.19, p = 0.002), suggesting that older adolescents demonstrated higher scores on the outcome measure. Gender was also significant, with females scoring higher than males (β = 0.15, 95% CI: 0.08–0.22, p < 0.001). Students in Class 12 showed significantly higher scores compared to those in Class 11 (β = 0.18, 95% CI: 0.10–0.26, p < 0.001). Similarly, belonging to the science stream was associated with higher scores (β = 0.21, 95% CI: 0.13–0.29, p < 0.001), representing the strongest predictor in the model. The school variable also demonstrated a positive and statistically significant effect (β = 0.09, 95% CI: 0.02–0.16, p = 0.014). Overall, the findings indicate that demographic and academic characteristics significantly influence the outcome, with academic stream and educational level showing comparatively stronger associations.

Table 8 Multivariable logistic regression predicting high preventive practice adoption

Predictor	Adjusted Odds Ratio (AOR)	95% CI	p-value
Health Literacy Score	1.78	(1.52–2.09)	<0.001
Attitude Score	1.42	(1.21–1.67)	<0.001
Female	1.26	(1.02–1.55)	0.031
Science Stream	1.39	(1.11–1.73)	0.004
Age	1.04	(0.99–1.09)	0.082
Hosmer- Lemeshow Test = p= 0.04			
Nagelkerke R^2 = 0.38			
Area under ROC curve (AUC) = 0.78			

Sources: computed by authors

A multivariable logistic regression model was conducted to identify significant predictors of high preventive practice adoption, defined as belonging to the upper tertile of preventive practice scores. The model demonstrated satisfactory fit and explanatory strength. The Hosmer–Lemeshow test was non-significant (p = 0.41), indicating good calibration between observed and predicted outcomes. The Nagelkerke R^2 value of 0.34 suggests that approximately 34% of the variability in high adoption status was explained by the included predictors. Furthermore, the Area Under the ROC Curve (AUC = 0.78) reflects good discriminatory ability of the model.

Health literacy score emerged as the strongest predictor (AOR = 1.78, 95% CI: 1.52–2.09, $p < 0.001$). This indicates that with each unit increase in literacy score, the odds of high preventive practice adoption increased by 78%, holding other variables constant. Attitude score was also a significant predictor (AOR = 1.42, 95% CI: 1.21–1.67, $p < 0.001$), suggesting that more favorable attitudes substantially increased the likelihood of adopting preventive practices. Among demographic variables, females were more likely than males to report high adoption (AOR = 1.26, 95% CI: 1.02–1.55, $p = 0.031$). Students from the science stream also had higher odds of high preventive practice adoption compared to their counterparts (AOR = 1.39, 95% CI: 1.11–1.73, $p = 0.004$). Age showed a positive but non-significant association (AOR = 1.04, $p = 0.082$), indicating that after adjustment, age did not independently predict high adoption.

Nagelkerke R^2 value of 0.38 indicates that approximately 38% of the variance in preventive practice adoption was explained by health literacy and attitude variables. The Hosmer–Lemeshow test was non-significant ($p > 0.05$), indicating good model fit. The model correctly classified 78.6% of cases, suggesting satisfactory predictive strength.Overall, the analysis demonstrates that both cognitive (health literacy) and attitudinal factors play a central role in influencing preventive health behavior, with academic background and gender also contributing meaningfully to higher adoption levels.

Discussion

This school-based quantitative investigation assessed the association between traditional medicine health literacy and the adoption of preventive health practices among adolescents in Varanasi. The findings demonstrate that higher levels of literacy concerning traditional medicine concepts are significantly linked to greater engagement in preventive health behaviors. These results underscore the important interface between culturally embedded health knowledge systems and health-related behavioral practices during adolescence.

In alignment with global health literacy literature, adolescents exhibiting higher levels of traditional medicine health literacy showed significantly greater engagement in preventive health practices, including dietary regulation, personal hygiene maintenance, symptom awareness, and adherence to seasonal health regimens. This association remained statistically significant after adjusting for potential confounders such as age, gender, socio-educational status, and parental education. These findings highlight the independent and substantive influence of culturally contextualized health knowledge in shaping preventive health behaviors among adolescents.

Evidence shows that AYUSH (including Ayurveda and Yoga) is widely recognized and used for chronic illness management and prevention in India, especially where satisfaction with conventional medical care is variable (Malik & Basu, 2025). Editorial and policy overviews emphasize how evidence-based traditional medicine approaches such as integrating Ayurveda and other indigenous practices can contribute to holistic health and disease prevention (Patwardhan et al., 2025). A systematic review of school-based health literacy and related interventions reported improvements in adolescents' healthy behaviors, including diet and physical activity outcomes, following literacy-focused programs(Smith et al., 2021). Health education interventions targeting knowledge, attitudes, and practices among adolescents have been shown to significantly improve health behaviors such as nutrition and hygiene(Chatterjee & Nirgude, 2024).

A study conducted by Debnath (2017) among older adults with diabetes in India reported relatively low levels of health literacy related to Ayurvedic management. The authors observed that knowledge scores were significantly associated with practice scores ($p < .01$), indicating that individuals with better understanding were more likely to adopt recommended practices (Debnath et al., 2017). A study conducted by Hazra (2025), based on a systematic review of knowledge, attitudes, perceptions, and satisfaction related to Ayurveda, highlighted a critical gap between cultural familiarity and comprehensive understanding. The review indicated that although Ayurveda is widely recognized and often preferred, particularly for managing chronic conditions, in-depth knowledge and safe usage practices remain limited(Hazra et al., 2025). A national survey based on the National Sample Survey (2022–23) revealed that Awareness of AYUSH (including Ayurveda) is extremely high (>95 %) in India, but meaningful utilization is lower, and self-medication is common, suggesting awareness does not always translate into informed health behavior and appropriate practice(Rana et al., 2025).

Policy implication

The findings of the present study hold substantial relevance for public health and educational policy in the Indian context. The observed association between

traditional medicine health literacy, favorable attitudinal orientation, and preventive practice adoption among adolescents underscores the need to strengthen structured, evidence-based health education at the secondary school level. Institutionalizing such interventions may promote informed health decision-making and responsible engagement with traditional systems of medicine.

The integration of traditional medicine literacy into existing national educational and health frameworks is strongly recommended. The Ayushman Bharat School Health and Wellness Programme provide an established platform through which age-appropriate modules on Ayurveda, Yoga, and other AYUSH systems can be systematically incorporated. Educational content should emphasize scientific evidence, safety considerations, appropriate use, and preventive relevance to ensure a balanced and well-informed understanding among adolescents.

Furthermore, alignment with the initiatives of the Ministry of AYUSH is essential to ensure policy coherence and technical accuracy. In culturally significant settings such as Varanasi, structured school-based awareness programmes, standardized learning materials, and engagement with trained AYUSH practitioners may help bridge the gap between cultural familiarity and comprehensive, evidence-informed knowledge. The scope of the Rashtriya Kishor Swasthya Karyakram (RKSK) may also be expanded to incorporate traditional medicine literacy within its broader adolescent health promotion strategy. As RKSK addresses critical domains such as nutrition, mental health, and preventive care, integrating informed perspectives on traditional medicine would support a more holistic and culturally contextualized approach to adolescent well-being.

Collaboration with the National Council of Educational Research and Training (NCERT) is further warranted to facilitate curriculum-level integration across academic streams, thereby ensuring equitable access to health literacy content. Capacity-building initiatives for educators are essential to maintain scientific rigor, pedagogical consistency, and safeguard against misinformation. Finally, policy implementation should incorporate systematic monitoring and evaluation mechanisms to assess improvements in health literacy, attitudinal orientation, and preventive behavioral outcomes over time. Embedding traditional medicine health literacy within established national health and education frameworks has the potential to promote safer preventive practices, strengthen informed health choices, and contribute to the responsible integration of India's pluralistic healthcare system.

Conclusion

The present study provides empirical evidence that traditional medicine health literacy is a significant determinant of preventive practice adoption among adolescents in Varanasi. The findings demonstrate that higher levels of literacy are positively associated with favorable attitudes and increased engagement in preventive health behaviors. The multidimensional structure of health literacy—encompassing knowledge, comprehension, and application—was statistically validated, and both cognitive and attitudinal factors emerged as strong predictors of high preventive practice adoption. Notably, health literacy remained an independent predictor even after adjusting for age, gender, academic stream, and class level, underscoring its substantive role in shaping adolescent health behavior. These results hold broader implications for adolescent health promotion within India's pluralistic healthcare framework. While traditional systems such as Ayurveda are culturally embedded and widely recognized, this study highlights that meaningful literacy not mere awareness drives responsible and preventive engagement. Strengthening structured, school-based health education that integrates evidence-informed traditional medicine concepts may enhance informed decision-making and long-term preventive outcomes. By situating traditional medicine literacy within formal educational and public health strategies, policymakers can foster culturally responsive, scientifically grounded health behaviors among young populations, thereby contributing to sustainable preventive healthcare development.

Statement and Declaration

Author's contributions: GH: research concept, collected, processed and interprets the field data, design methodology, writing original draft, formal analysis. **HS:** supervise, design methodology, analyses the data, review and editing. **AKM**: analyzed and interpret the data, review and editing. **PKG:** review and editing

Conflict of interest: The authors declare that they have no competing interests related to this study.

Data availability: The data supporting the findings of this study will be made available upon reasonable request.

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