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An Empirical Study on Consumer Behaviour toward Herbal Toothpaste as an Oral Care Product Choice in Himachal Pradesh

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ABSTRACT

Purpose: In this exploratory study, consumer perception of health culture is examined in relation to the niche market for herbal oral care products. To narrow down the purpose of the study, we have focused on 'herbal toothpaste' as the primary practice for maintaining oral hygiene. Toothpaste is termed as part of primary care, a tool for self-care interventions. In recent years, a great hike in the demand for herbal oral care products has been documented in the market. However, this study explored how different factors and variables influence people's views about herbal toothpaste.

Design/Methodology/Approach: The nature of the study is primary and adopted a quantitative, cross-sectional research design. The data was collected using a structured questionnaire administered to a sample of 331 respondents in Himachal Pradesh. The questionnaire was focused on various perception-related items that were specific to the perceived usages, functions, and potential risks associated with herbal toothpaste. The data were analysed using Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modelling (SEM) to identify the underlying structure and assess the relationship among variables and their factor constructs.

Findings: The findings suggest that consumers are aware of the benefits associated with herbal toothpaste, but they ignore the segment of oral-care education and their expert advice. The study concludes that the valuable proposition of positivity and credibility with herbal names can be leveraged to enhance the herbal oral care market, but herbal brands must also address underlying risk perceptions to build greater confidence and informed usage.

Paper Type: Empirical Research Paper

KEYWORDS: Herbal Toothpaste | Health | Perceived Benefits | Perceived Risks | Structure

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Introduction

Recently, there has been a growing emphasis on promoting the utilitarian value of traditional or indigenous knowledge in health-related products across multiple categories of Fast-Moving Consumer Goods (Fortune Business Insight, 2025; First Traditional Medicine Summit, 2023; Tresca et. al., 2020; Smith et. al., 2020). In this article, consumer perception of health culture is examined in relation to the niche market for herbal oral care products.

Oral care/dental health is the practice of keeping your mouth clean and healthy. It's a significant part of human well-being. According to Maruoka et. al., 2022, Oral care is not merely about cleaning teeth, oral cavities, germs prevention and dentures but also the maintenance of oral functions like prevention from bad breathe, taste, chewing and digestion, swallowing, speech. The main purpose of oral care is to prevent and reduce the bacterial load of cavities and other mouth diseases.

To narrow down the purpose of the study, we have focused on herbal toothpaste as a primary practice for maintaining oral hygiene. In recent years, a great hike in the demand for herbal oral care products has been documented in the market (Mehta et al. 2024). The notion behind this growing interest is that certain plant extracts contain anti-inflammatory, anti-bacterial, anti-microbial and ayurvedic therapeutic potential to keep teeth and gum healthy and have no side effects.

This herb-based oral care system prioritizes the conservation of natural resources and sustainable industrial utilization of herbs and plants for the use of consumers, which is a part of self-care intervention. According to the AYUSH Ministry of GOI, about 80-90 percent of the Indian population in India uses Ayurveda and the Traditional health care system as a self-care tool for their primary health well-being.

This study explored how different factors influence people's views about herbal toothpaste, as this product category is gaining popularity for its perceived natural health benefits. After analyzing the secondary information about various ingredients mentioned on the packaging of different herbal tubes of toothpaste available at the targeted research location, the most frequent herbal or botanical components observed were Neem, Aloe vera, Tulsi leaves, Triphala, False black pepper, Pomegranate, Babool, Meswak, Clove, Clove oil, Cardamom, Cinnamon. Mint, Fennel, Menthol, Turmeric, Vajradanti (Barleria Prionitis), Vidang (Embelia Ribes), Apricot, Tomar/Tumbru (Xanthoxylum Alatum), Jaeyfal (Myristica fragrance), Banna & Gandla (curry leaves), Eucalyptus globulus, Bakool, Mulethi, Ginger, & Harad[1]. And majority of the respondents showed a familiarity with the name of these herb-based ingredients for their oral care and well-being.

Reviewed Literature and Need for the Study

In India and other Southeast Asian Countries, the role of alternative health care with plant alternatives (herbs) has been studied and practiced since the Vedic period (N.V. & Mishra, 2019; Ministry of AYUSH, 2023; Choudhary & Rafei, 2001). Knowledge related to the use of indigenous herbs, medicinal crops, and plant-based remedies has been transmitted across generations as a self-care tool at a primary level of health care.

In recent years, particularly following the COVID-19 pandemic, consumers have increasingly turned toward natural and plant-based alternatives in personal care, where demand for herbal products, particularly in oral hygiene, has seen notable growth. Fast-Moving Consumer Goods (FMCG) brands are leveraging this shift by introducing a range of herbal toothpaste products that promise health benefits rooted in traditional and indigenous knowledge (First Traditional Medicine Summit, 2023). However, despite their commercial availability and cultural relevance, consumer perceptions regarding the effectiveness, safety, and credibility of herbal toothpaste remain underexplored in academic literature.

Most existing studies have focused on either general herbal product usage or the marketing of organic and green products, with little attention to consumer perception within the specific category of herbal oral care. In regions like Himachal Pradesh, where traditional health beliefs influence day-to-day practices, it becomes vital to understand how individuals evaluate such products, not just for their claimed benefits but also in terms of perceived risks and trustworthiness. Therefore, there is a clear need to examine how consumers perceive herbal toothpaste focusing on its associated attributes and potential usage risks which can provide assistances to consumers in making informed selection, purchase, and use of herbal toothpastes.

Research Objective

The primary purpose of this study is to explore and examine consumer perceptions related to the use of herbal toothpaste as a component of personal health and oral hygiene. Specifically, the study aims to:

1. Identify the underlying latent factors that shape consumer perception toward herbal toothpaste.

2. Examine the structural relationships among the latent dimensions using Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM).

[1] This information generated through secondary information available on different herbal toothpaste labels available in Himachal Pradesh.

Theoretical Rationale and Hypothesis Statement

To support the theoretical framework of current study, Health Belief Model (Rosenstock, 1974) and Risk-Benefit Framework (Slovic, 1987) suggest that when consumers perceive high benefits, such as well-being, healthy lifestyle, life preservation, fewer side effects, and familiarity, they exhibit a greater tendency to minimize potential usage risks associated with that particular product. In this context, perceived benefits (e.g., freshness, satisfaction, cure, medicinal value, naturalness, and effectiveness) may reduce perceived usage risks (e.g., lack of expert advice or uncertainty about side effects, no confidence), shaping overall acceptance and trust in the product.

However, based on the conceptual framework and review of relevant literature, the study proposes that-

H1: There is a significant inverse relationship between perceived benefits and potential usage risks in using herbal toothpaste.

Research Methodology: To examine the consumer perception of herbal toothpaste, this study employs a quantitative, cross-sectional research design with emphasis on perceived attributes and associated usage risks. A structured questionnaire was developed using research insights from literature and expert guidance to ensure inclusion of relevant herbal toothpastes' perceptual variables complementing to the theoretical foundation.

Data Collection: Out of 500 people, a total of 331 respondents positively participated in the survey through offline mode who were residing in Himachal Pradesh, India, using a multi-stage purposive sampling method. The respondents were adult consumers (above 18 years old) who had experience using or were aware of herbal toothpaste. The survey was conducted through the offline method, ensuring a mix of urban and semi-urban participants.

Instrument Design: The questionnaire was made up of Likert-scale items (ranging from 1 = Strongly Disagree to 5 = Strongly Agree), which assessed dimensions such as perceived physical and psychological benefits and concerns or risks related to usage (e.g., lack of expert advice, possible side effects) of herbal toothpaste.

Analysis Techniques: After data collection the analysis was carried out using factor analysis technique which includes:

- Exploratory Factor Analysis (EFA) to find the underlying latent constructs.
- Confirmatory Factor Analysis (CFA) to verify and validate the model.
- Structural Equation Modelling (SEM) applied to examine the hypothesized relationship between latent dimensions.

Analysis & Results

Table 1. Descriptive Statistics of Socio-Demographic Profiling of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	172	51.96
	Female	159	48.04
Age	25-34	95	28.7
	45-54	85	25.68
	35-44	66	19.94
	55-64	36	10.88
	18-24	33	9.97
	above 65	16	4.83
Educational Qualification	Senior Secondary	110	33.23
	Graduate	96	29
	High School	58	17.52
	Post Graduate	47	14.2
	Higher Education	11	3.32
	Illiterate	7	2.11
	Primary	2	0.6

Marital status	Married	154	46.53
	Unmarried	136	41.09
	Others	41	12.39
Family Type	Joint	183	55.29
	Nuclear	148	44.71
Employment Status	Employed	107	32.33
	Not Employed	52	15.71
	Own Business	42	12.69
	Daily Wages	36	10.88
	Student	36	10.88
	Agriculture	31	9.37
	Retired	27	8.16
Household Monthly Income	15001-20000	86	25.98
	ABOVE 20000	80	24.17
	10001-15000	65	19.64
	1000-5000	50	15.11
	5001-10000	50	15.11

Table 2. Descriptive Statistics of Consumer Perception

	Characteristics	Mean	SD	min	25 %	50 %	75%	max
1	teeth healthy	3.13	0.77	0.0	3.0	3.0	4.0	4.0
2	prevention germs	3.00	0.79	0.0	3.0	3.0	4.0	4.0
3	medicinal properties	2.78	0.75	0.0	2.0	3.0	3.0	4.0
4	satisfaction	3.09	0.72	1.0	3.0	3.0	4.0	4.0
5	freshness	3.22	0.79	1.0	3.0	3.0	4.0	4.0
6	control	2.50	0.88	0.0	2.0	3.0	3.0	4.0
7	herbal side effects	0.92	1.07	0.0	0.0	1.0	2.0	4.0
8	oral with advice	1.04	1.25	0.0	0.0	1.0	2.0	4.0
9	no confidence	1.23	1.10	0.0	0.0	1.0	2.0	4.0

Scale: from 0 (Strongly Disagree) to 4 (Strongly Agree)

Mean: The mean represents the average response to a particular statement according to the above-mentioned index.

Standard Deviation (SD): The standard deviation measures the spread or variability of responses around the mean according to the above-mentioned index. Low SD Indicates that the responses are clustered closely around the mean and vice-versa.

The questions about 'Effects', 'Advice', and 'Confidence' were negatively framed, meaning that lower mean scores indicate stronger agreement with the negative statement.

Exploratory Factor Analysis

Exploratory factor analysis (EFA) was applied on a set of nine statements. This method helped us to identify the unobserved latent constructs that explain the observed correlations among the variables and understand the underlying structure of consumer perceptions of herbal toothpaste. It is a multivariate analysis technique (Asparouhov & Bengt, 2009). This analysis allows us to identify groups of variables that are highly correlated with each other, suggesting they measure a common underlying construct.

However, to identify the latent constructs, we utilized the factor_analyzer package in Python. Then we applied Principal Axis Factoring (PAF) with Varimax rotation to obtain the factor loadings, factor variance, and their proportional and cumulative variances.

Table 3 Correlation Matrix

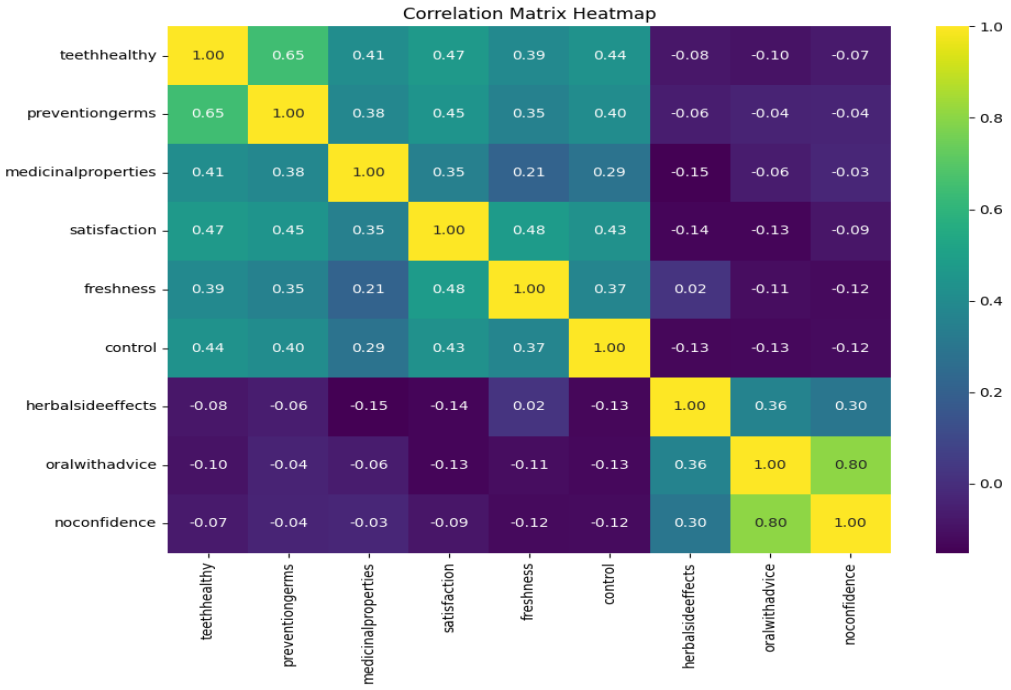
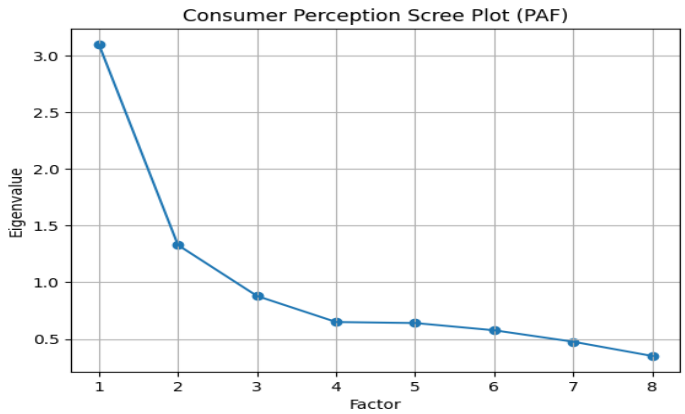


Table 4 Adequacy Test

Bartlett's Test Chi-square value P-value	= 975.153 = 0.00	Barlett's test is highly significant ($p < 0.001$), indicating that the correlation matrix is not an identity matrix and significant relationships exist between the variables. This suggests that the data is suitable for factor analysis.
KMO Test Overall KMO	 = 0.744	The KMO value is 0.744. The value is considered good (values above 0.6 are generally acceptable, and values above 0.8 articulated very good). This indicates that sample size is adequate to run EFA and that the variables are adequately interrelated to make factors.

Table 5 Eigenvalues & their Scree Plot

Eigenvalues: **[3.15979151, 1.91806525, 0.93960252, 0.7249576, 0.64755868, 0.59281655, 0.47643689, 0.35142448, 0.18934653]**



Based on the Kaiser criterion (eigenvalues > 1), we should retain two factors (3.159 and 1.91). The scree plot would visually confirm this by showing a distinct elbow after the second factor[2].

[2] Initially, a 3-factor solution was considered for EFA, but the third factor accounted for a low unit of variance with only one strong loading on 'freshness'. And the deletion of this 3rd construct with one item was giving poor cumulative variance (49.82%) and did not offer meaningful conceptual distinction. Therefore, a 2-factor solution was retained for parsimony, good reliability, and conceptual clarity.

Table 6 Factor Loadings

	Items/Characteristics/Variables	*Communalities*	Factor 1	Factor 2
1	teethhealthy	*0.650*	**0.805**	-0.037
2	preventiongerms	*0.611*	**0.782**	0.019
3	medicinalproperties	*0.457*	**0.596**	-0.044
4	satisfaction	*0.559*	**0.739**	-0.112
5	freshness	*0.411*	**0.637**	-0.073
6	control	*0.469*	**0.671**	-0.137
7	herbalsideeffects	*0.452*	-0.089	**0.586**
8	oralwithadvice	*0.853*	-0.051	**0.922**
9	noconfidence	*0.816*	-0.023	**0.903**

Table 7 Variance Explained

	Factor	Variance	Proportional Variance	Cumulative Variance
1	Factor 1	3.03	0.3365	0.3365
2	Factor 2	2.04	0.2287	0.5652

Table 8 Reliability Analysis

	Factor	Factor 1	Factor 2
1	Cronbach's Alpha	0.80	0.74
2	Mean Inter-Item Correlation	0.40	0.49

-**A mean inter-item correlation** ranging from 0.15 and 0.50 is generally acceptable for measuring internal consistency between latent constructs. (Piedmont and Loyala, 2014; Taber, 2018)

- **Cronbach's Alpha**: The accepted value of Cronbach's alpha is 0.7; however, values above 0.6 deemed to be accepted specially in the case of EFA and number of items in the scale. (Griethuijsen et al., 2015; Taber, 2018).

Cronbach's Alpha is sensitive to the number of items; since more items will provide a count of higher value of Cronbach's Alpha. In this current exploratory study, these alpha values are acceptable

Discussion

Principal Axis Factoring (PAF) with varimax (an orthogonal rotation method) was applied to obtain factor loadings. However, Bartlett's test values ($p < 0.001$) and KMO value (0.744), shown in Table 4, suggest that the data as well as the sample size were suitable for factor analysis.

Based on the Kaiser criterion (eigenvalues > 1, Table 5), we have finalized two factors. Table 6 shows factor loadings for nine statements. **Factor 1** had strong positive loadings with the first six items (teethhealthy, preventiongerms, medicinalproperties, satisfaction, freshness, and control). However, these items/variables suggest that they represent the perceived positive effects consumers have experienced with herbal toothpaste. In other words, these variables reflect the positive aspects people associate with herbal oral care toothpaste, and they perceive that herbal toothpaste offers significant advantages to their health and oral well-being. Therefore, **Factor 1** is named **'Perceived Benefits'**.

Variables under **Factor 2** highlighted the potential usage risks associated with the use of herbal toothpaste, including health risks, ineffectiveness, and the perceived likelihood of negative experiences. Therefore, **Factor 2** is named **'Potential Usage Risks or Perceived Risks'.** In this case, Perceived Risk is specifically about the use of herbal oral care products, and it reflects the respondents' concerns regarding confidence, side effects, and the need for professional guidance when using such products.

Structural Equation of Latent Constructs

1. Perceived Benefits = teethhealthy (0.805) + preventiongerms (0.782) + medicinalproperties (0.596) + satisfaction (0.739) + freshness (0.637) + control (0.671)

2. Potential Usage Risks = herbalsideeffects (0.586) + oralwithadvice (0.922) + noconfidence (0.903)

Table 7 shows the proportion of variance explained by each latent factor. This helped us to know how the factors represent the underlying structure. The variance explained by each factor indicated that Factor 1 reported for 33.65% of the variance in the data, while Factor 2 explained 22.77%, resulting in a cumulative variance explanation of 56.42%. This acclaims that the model explains a substantial portion of the variability in the observed data, with Perceived Benefits having a slightly stronger contribution than Potential Usage Risks or Perceived Risks.

Table 8 provides information about the consistency and reliability of the factors extracted in the analysis. Factor 1 showed good reliability (Cronbach's Alpha = 0.80) and a moderate inter-item correlation (0.40), showing that the items in Factor 1 are well-related and consistently measure the same thing. Factor 2 also has acceptable reliability (Cronbach's Alpha = 0.74) with a slightly stronger inter-item correlation (0.49), suggesting that the items are a bit more consistent in measuring Factor 2.

Confirmatory Factor Analysis

After conducting Exploratory Factor Analysis (EFA) and identifying two latent constructs, Confirmatory Factor Analysis (CFA) was performed to confirm the latent factor structure and test validity of these constructs. CFA is a statistical method utilized to evaluate whether data fit the proposed model developed from the results of the EFA.

Model Specification

The hypothesized measurement model assumes that each set of observed variables loads on their respective latent factors, and we tested this structure to determine how well the data supports the theoretical framework. The hypothesized model was the outcome of EFA results, where Perceived Benefits and Perceived Risk were defined as two distinct latent constructs.

Measurement Model

The measurement model was tested to determine if the observed variables load significantly on their respective latent factors. Each observed variable (indicator) was expected to load onto the corresponding latent construct (Perceived Benefits or Perceived Risk). The measurement model was specified as follows:

Measurement Model

Perceived Benefits =~ teethhealthy + preventiongerms + satisfaction + freshness + control + medicinalproperties

Potential Usage Risks =~ oralwithadvice + noconfidence + herbalsideeffects

Model Fit Evaluation

To measure the fit of the measurement model, we examined some commonly used fit indices. These indices helped us to determine how well the hypothesized model represents the data.

Table 9 Model Fit

	Fit Index	Obtained Value	Threshold	Interpretation
1	**CFI (Comparative Fit Index)**	0.965	> 0.90 (ideal > 0.95)	Excellent Fit
2	**RMSEA (Root Mean Square Error of Approximation)**	0.062	< 0.08 (ideal < 0.05)	Good Fit
3	**TLI (Tucker-Lewis Index)**	0.952	> 0.90	Excellent Fit
4	**GFI (Goodness of Fit Index)**	0.940	> 0.90	Good Fit
5	**AGFI (Adjusted Goodness of Fit Index)**	0.918	> 0.90	Good Fit
6	**NFI (Normed Fit Index)**	0.940	> 0.90	Good Fit

Validity

We assessed both convergent validity and discriminant validity for the measurement model.

- **Convergent Validity**: Convergent validity refers to that how well different items/variables are effectively measuring the same underlying concept (Hair et al., 2010). One of the methods used to assess convergent validity was the Average Variance Extracted (AVE).

Table 10 Average Variance Extracted (AVE)

Factor 1	.503	Indicates good convergent validity (AVE > 0.50)
Factor 2	.660	Indicates good convergent validity (AVE > 0.50)

- **Discriminant Validity**: Discriminant validity refers to the how well two different latent constructs are distinct from each other. In other words, it ensures that the constructs we are measuring are not highly correlated and are conceptually different. One generally accepted method for calculating discriminant validity is the **Heterotrait-Monotrait Ratio (HTMT)**. According to the **Fornell-Larcker criterion** (Hamid, Sami, and Sidek, 2017), a value of HTMT greater than 0.85 (or sometimes 0.90, depending on the context) suggests a lack of discriminant validity, as it indicates that the constructs are too closely related.

Table 11 Heterotrait-Monotrait Ratio (HTMT)

HTMT Factor1 - Factor2	0.203	HTMT<0.85

The HTMT value is lower the threshold of 0.85, suggesting that the latent factors in this model exhibit good discriminant validity. Also, the items for Factor 1 (highlighting the benefits) and Factor 2 (highlighting the potential usage risk) show low correlations (e.g., negative values like -0.037 or -0.112 for cross-loadings). This indicates good discriminant validity, meaning Perceived Benefits and Perceived Risk are not highly correlated and represent separate concepts.

Discussion

The results of the CFA supported the hypothesized factor structure, confirming that 'Perceived Benefits' and 'Potential Usage Risks' are distinct and valid constructs. The results of analysis indicated that model fits the data well, with satisfactory fit indices and strong evidence of convergent and discriminant validity.

Structural Relationship Between Perceived Benefits and Potential Usage Risks

This section investigates the structural association between Perceived Benefits (Factor 1) and Potential Usage Risks (Factor 2) within the context of herbal oral care products. Two types of relationships are examined: a non-directional correlation and a hypothesized directional path.

1. **Correlation/Covariance between constructs (Factor1 ~~ Factor2)**

At this point, we examine the correlation between Perceived Benefits (Factor 1) and Potential Usage Risks (Factor 2). This relationship is represented by a bidirectional arrow (~~) in the SEM model, indicating that these two factors are related to each other. This relationship does not imply a causal relationship between a two-factor model.

2. **Hypothesized Directional Path (Factor2 ~ Factor1)**

Next, we include a hypothetical path where Perceived Benefits have a significant negative effect on Potential Usage Risks associated with the use of herbal toothpaste. This is represented by a unidirectional arrow (~), indicating that Factor 1 (Perceived Benefits) influences or affects Factor 2 (Potential Usage Risks). Therefore, this hypothetical assumption and its path reflect a theoretical assumption that when consumers recognize more benefits in herbal oral care products, their sense of associated risk is likely to reduce.

Standardized estimates:
Table 12

Dependent Variable	op	Independent Variable	Estimate	Standardized Estimates	Standard Error	z-value	p-value
Factor2	~	Factor1	-0.273	-0.138	**0.121**	**-2.254**	**0.024**
teethhealthy	~	Factor1	1.000	0.790	-	-	-
preventiongerms	~	Factor1	0.974	0.747	0.077	12.602	0.000
satisfaction	~	Factor1	0.773	0.648	0.070	11.028	0.000
freshness	~	Factor1	0.709	0.538	0.078	9.112	0.000
control	~	Factor1	0.852	0.583	0.086	9.907	0.000
medicinalproperties	~	Factor1	0.635	0.503	0.075	8.512	0.000
oralwithadvice	~	Factor2	1.000	0.983	-	-	-
noconfidence	~	Factor2	0.751	0.818	0.077	9.711	0.000
herbalsideeffects	~	Factor2	0.193	0.371	0.032	6.025	0.000
Factor1	**~~**	**Factor2**	**-0.100**	**-0.138**	**0.045**	**-2.228**	**0.026**
Factor1	~~	Factor1	0.366	1.000	0.047	7.828	0.000
Factor2	~~	Factor2	1.441	1.000	0.179	8.031	0.000

Discussion

Table 12 presents the standardized estimates from the structural equation model (SEM), summarizing the strength and direction of the relationships between latent constructs and their observed indicators, as well as between the latent constructs themselves. All standardized loadings are statistically significant ($p < 0.001$), confirming that each item contributes meaningfully to its respective factor.

1. Factor Covariance: Bidirectional Relationship (Factor1 ~~ Factor2)

The results from Table 12 show that significant negative covariance was observed between Perceived Benefits and Perceived Risk (*Estimate* = –0.100, *Standardized* = –0.138, z = –2.228, p = 0.026), further confirming that these constructs are inversely related beyond the structural path.

This suggests that participants who perceive more benefits from herbal products are likely to perceive lower associated risks, and vice versa. Although this correlation does not imply causation, it supports the idea that the two constructs are meaningfully linked in the consumer mindset.

2. Hypothesized Structural Path: Unidirectional Influence (Factor2 ~ Factor1)

The hypothesized structural path from Perceived Benefits (Factor 1) to Potential Usage Risk (Factor 2) was found to be negative and statistically significant (*Estimate* = –0.273, *Standardized Estimate* = –0.138, z = –2.254, p = 0.024). This suggests that greater perceived benefits are associated with reduced perceived risks in the context of herbal oral care products.

The model reveals a significant negative relationship between perceived benefits and perceived risks. Both the correlational and structural path results provide empirical support for the hypothesis that highlighting the benefits of herbal oral care products can effectively reduce consumers' perception of risk. Both constructs are well-measured and empirically distinct, with reliable loadings and consistent patterns of variance. This has practical implications for herbal brands: by strengthening communication around product safety, efficacy, and health-related benefits, companies can mitigate consumer concerns and enhance product acceptance.

Conclusion & Implications

The present study validated a 2-factor model that predicts the negative effects of perceived benefits on potential usage risks with the use of herbal products among consumers of Himachal Pradesh. With the statistical implications of Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM), a significant inverse relationship was found between perceived benefits and perceived risk. This indicates that when consumers recognize more benefits, such as health, freshness, medicinal properties, or emotional reassurance, their concerns about product safety or potential side effects tend to decrease.

The overall findings indicate a strong and shared belief in the efficacy, safety, and naturalness of herbal toothpaste. There is also a very low indication of substantial skepticism or disagreement has been noted with the benefits claimed by herbal toothpaste for the oral care of the mouth. Additionally, the consistency of perceptions across demographics suggests a uniform consumer outlook, strengthening the validity of the findings.

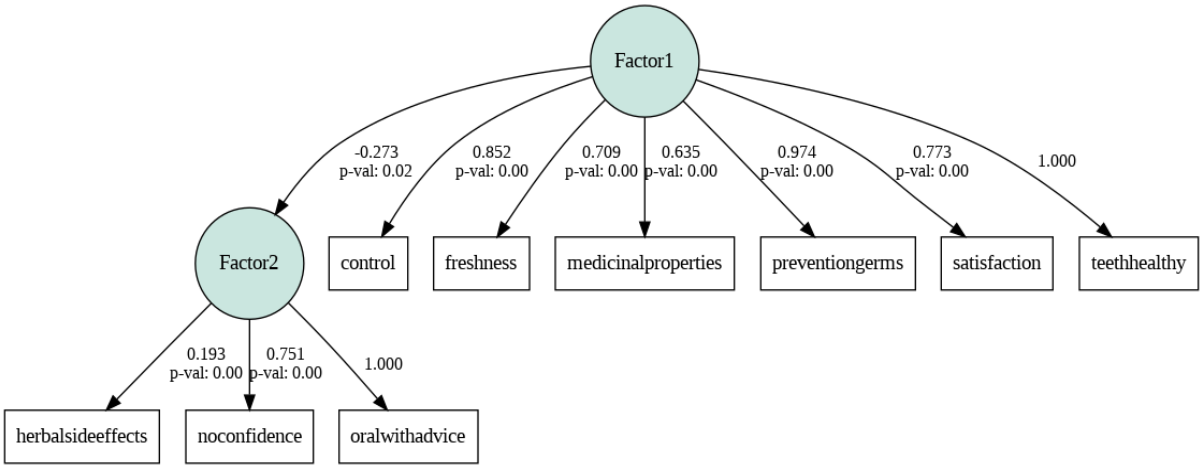


Figure 1 Oral Care Perception (By Kumar, Jyoti, and Singh, 2025)

However, this valuable proposition of positivity can be leveraged to enhance the herbal market. This could be due to positive word of mouth, traditional scientific knowledge, better pricing, availability, and other unique brand propositions. To shift the neutral perception of people, scientific evidence-based studies are required for product development.

Though people are positive about using herbal toothpaste for their oral care at the primary level, they ignore the segment of oral-care education and their expert advice. Therefore, the involvement of expert opinions and regular oral care check-ups should be emphasized to provide adequate education and professional consultation to consumers to ensure that herbal toothpaste is used as part of a holistic approach to oral health. Health campaigns and marketing materials (like Patanjali wellness centre, AYUSH-based retail sector) should emphasize the need for consumers to regularly consult with dentists on specific issues, and to complement their treatments with scientifically validated herbal toothpaste products. While demographic differences are minimal with the perception of herbal toothpaste, segmenting audiences by experience with herbal products or health-consciousness may help tailor educational and promotional messages more effectively.

The herbal oral care category presents an opportunity to merge traditional wellness values with modern consumer demands. By integrating scientific validation, targeted education, and expert-backed messaging, brands can deepen consumer trust, address lingering uncertainties, and position herbal toothpaste as a credible and effective solution within the expanding market for natural personal care products.

Future Scope of the Study

This study offers a foundational understanding of consumer perceptions toward herbal toothpaste, limited to the theoretical construct of benefits and potential usage risks associated with herbal toothpastes. However, several areas remain open for future exploration. Expanding the demographic scope to include variations in age, education, income, and cultural background could offer deeper insights. Additionally, cross-cultural studies may reveal how perceptions differ across different locations with varying levels of exposure to herbal remedies. Future studies could also consider the role of herbal brand credibility, packaging reminders, and pricing strategies in influencing perceived benefits and risks. Finally, comparative studies between herbal and conventional toothpastes could highlight the positioning of herbal products in the competitive oral care market.

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Annexure 16.4.1

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Reviewers Memorandum

Reviewer's Comment 1: Reviewer's Comment 1: The manuscript offers a compelling and timely examination of consumer behavior toward herbal toothpaste, particularly within the context of Himachal Pradesh where traditional health practices remain influential. The authors have done a commendable job of grounding the study in theoretical frameworks such as the Health Belief Model and Risk-Benefit Theory, which adds intellectual depth to the analysis. The methodology, which includes Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modelling (SEM), is rigorous and well-executed, showcasing a clear understanding of advanced statistical techniques.

Reviewer's Comment 2: This study makes a valuable contribution to the under-researched area of consumer perceptions of herbal oral care products. The demographic profiling of respondents is well-detailed and contributes to the robustness of the findings. One area where the manuscript could be strengthened is in more explicitly linking these theoretical models to the development of the survey instrument. A clearer explanation of how specific items were derived from the conceptual framework would help enhance theoretical transparency.

Reviewer's Comment 3: The authors are to be appreciated for their detailed statistical validation and thoughtful interpretation of consumer attitudes. The two-factor structure 'Perceived Benefits' and 'Potential Usage Risks' is intuitive and backed by solid empirical evidence. The use of the HTMT ratio for discriminant validity is a particularly strong methodological choice. One potential area of enhancement is the discussion of study limitations. While the paper mentions a few contextual factors, a more explicit reflection on limitations such as geographic confinement to Himachal Pradesh, possible respondent bias in self-reporting, and the exclusion of demographic moderators would be helpful.

Citation

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Editorial Excerpt

The article has 06% of plagiarism which is the accepted percentage as per the norms and standards of the journal for publication. As per the editorial board's observations and blind reviewers' remarks the paper had some minor revisions which were communicated on a timely basis to the authors (Sarvesh, Jyoti and Bhagwan), and accordingly, all the corrections had been incorporated as and when directed and required to do so. The comments related to this manuscript are noticeably related to the theme "An Empirical Study on Consumer Behaviour toward Herbal Toothpaste as an Oral Care Product Choice in Himachal Pradesh" both subject-wise and research-wise. This manuscript presents a well-executed and relevant study that aligns with contemporary shifts in consumer preferences toward natural and sustainable products. The empirical analysis is sound, the theoretical framing is appropriate, and the findings are clearly articulated. The authors successfully bridge traditional health culture with modern consumer behavior analysis, which is both innovative and necessary in today's market-driven healthcare environment. After comprehensive reviews and the editorial board's remarks, the manuscript has been categorized and decided to publish under the "**Empirical Research Paper**" category.

Acknowledgement

The acknowledgment section is an essential part of all academic research papers. It provides appropriate recognition to all contributors for their hard work and effort taken while writing a paper. The data presented and analyzed in this paper by (Sarvesh, Jyoti and Bhagwan) were collected first handily and wherever it has been taken the proper acknowledgment and endorsement depicts. The authors are highly indebted to others who facilitated accomplishing the research. Last but not least, endorse all reviewers and editors of GJEIS in publishing in the present issue.

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