Harnessing traditional wisdom: factors influencing jamu adoption as an infectious disease supplement among young generation

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Abstract. Traditional remedies like jamu are increasingly recognized as a potential supplementary method for boosting infectious disease recovery. This study investigates the key factors influencing young people's intention to use jamu. A survey of 720 respondents was conducted using Likert-scale questions to assess various dimensions of jamu adoption. The relationships between latent variables were analyzed using partial least squares path modelling. The results revealed that attitude ($\beta = 0.12$), perceived benefits ($\beta = 0.12$), health consciousness ($\beta = 0.09$), and convenience and accessibility ($\beta = 0.16$) all had significant positive impacts on the intention to use jamu, with p-values below 0.001. These findings suggest that young people are more likely to use jamu when they view it as beneficial for their health, convenient, and in line with modern wellness trends. In contrast, perceived behavioural control, knowledge, and awareness had weaker or insignificant direct effects, implying that convenience, social norms, and cultural identity may play a more substantial role in shaping intentions. The reliability and validity of the constructs were robust, ranging from 71% to 85%, with explained variance variables accounting for 76% ($r^2 = 0.76$).

1 Introduction

Indonesia faces a significant burden from various infectious diseases, with the top five contributors being tuberculosis (TB), lower respiratory infections, diarrheal diseases, neonatal conditions, and dengue fever [1-5]. This combination of infectious diseases underscores the dual burden Indonesia faces as it transitions towards addressing non-communicable diseases while still grappling with significant infectious disease challenges [3, 5].

Jamu, a traditional herbal medicine deeply rooted in Indonesian culture, plays a significant role as an alternative medicine, offering a range of therapeutic benefits. Historically, jamu has been utilized for centuries to treat various ailments and promote overall health, making it an integral part of Indonesian heritage [6, 7]. The formulation of jamu typically involves a combination of medicinal plants, with over 5,000 documented recipes, showcasing its diversity and adaptability in addressing health issues [6, 8]. Recent studies have highlighted the efficacy of jamu in managing chronic conditions such as hypertension

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and diabetes, demonstrating its potential as a complementary treatment alongside conventional medicine [9-11]. Furthermore, the increasing interest in natural remedies, particularly during the COVID-19 pandemic, has led to a resurgence in the consumption of jamu, as it is perceived as a safe and cost-effective alternative to modern pharmaceuticals [12, 13]. The bioactive compounds in jamu, such as flavonoids and antioxidants, contribute to its health benefits, reinforcing its status as a viable option for preventive and even rehabilitative healthcare [8, 14-16]. As Indonesia continues to embrace integrative medicine, jamu stands out as a culturally significant and scientifically promising alternative that warrants further research and validation within the healthcare system [17, 18].

The "Indonesia Emas 2045" initiative envisions a prosperous and sustainable future for Indonesia, and the role of the younger generation in preserving and promoting jamu as alternative medicine is pivotal to achieving this goal. This generational shift is crucial, as the youth are not only embracing traditional practices but are also integrating modern technology and scientific research to enhance the efficacy and accessibility of jamu [19]. By leveraging digital platforms and social media, they can raise awareness about the health benefits of jamu, thus fostering a renewed interest in herbal medicine among their peers and the broader community [20]. Furthermore, the younger generation's commitment to sustainability aligns with the principles of jamu, which emphasizes natural ingredients and holistic health approaches [8]. This synergy between tradition and innovation can lead to the development of new jamu products that cater to contemporary health needs, thereby ensuring the relevance of this traditional medicine in modern society [7]. Ultimately, the active participation of youth in promoting and scientific validation of jamu will preserve Indonesia's rich cultural heritage and contribute to the nation's health resilience and economic growth as envisioned in the "Indonesia Emas 2045" framework. Thus, this study aims to investigate the factors related to the adoption of jamu in the young generation. The study seeks to address the following research questions: I) How effective is our model in explaining the intention of the young generation to use jamu as alternative medicine? II) What are the potential factors that can predict the intention of the young generation to use jamu?

2 Materials and methods

2.1 Study design and setting

This study used a cross-sectional quantitative design to examine factors influencing the intention to use Jamu among the young generation. The research was conducted between January 1 and August 31, 2024, across multiple universities in Indonesia. The study targeted the bachelor level to ensure a diverse representation of students from various regions. The focus was primarily on medical and health-related programs, as these students will likely have greater exposure to health information. However, students from other fields were also included to provide a broader understanding of Jamu adoption across different academic disciplines.

2.2 Study participants, sample size, and sampling procedures

The study recruited 720 participants, with 210 indicating positive intentions toward Jamu adoption and 510 reporting neutral or negative intentions. Participants were recruited using online snowball sampling methods via a questionnaire link. The sample included medical, health-related, and non-health program students, covering a wide age range, gender, and ethnic diversity. Eligible participants were university students, and informed consent was obtained before completing the questionnaire. Recruitment was facilitated through online

platforms, university networks, and social media, ensuring broad access to the student population.

2.3 Measurement instrument

Data were collected through a structured, self-administered online questionnaire. The questionnaire was designed to capture information on sociodemographic characteristics (age, gender, ethnicity, academic program) and psychological and behavioural factors influencing Jamu adoption. Key constructs measured included attitude, perceived benefits, health consciousness, convenience, knowledge/awareness, etc, in Table 1. Each construct was assessed using a Likert scale (1 = strongly disagree to 5 = strongly agree). The questionnaire also included items to measure participants' intentions to use Jamu, specifically in health maintenance and disease prevention/rehabilitation. The survey underwent pre-testing for clarity and reliability, and revisions were made based on participant feedback before the final version was distributed.

Table 1. Construct and indicators (Final Build-in).

Constructs	Indicators	Items	References
Attitude	Jamu is effective for maintaining health Jamu is a natural and safe option for healing I have positive feelings about using Jamu Jamu is a trusted remedy in my family and community I believe Jamu can complement modern medicine Using Jamu aligns with my values	6	[21-23]
Perceived Benefits	Jamu helps to boost my immune system Jamu effectively relieves minor health issues (e.g., colds and headaches) Jamu provides long-term health benefits Jamu helps in maintaining a balanced lifestyle Jamu improves my overall well-being Consuming Jamu reduces the need for conventional medicine	6	[24, 25]
Subjective Norms	My family supports the use of Jamu My friends think I should consume Jamu regularly Influential people in my community promote Jamu I see Jamu being promoted by social media influencers I follow Health professionals in my area recommend Jamu	5	[26]
Perceived Behavioral	Jamu is easy to access (e.g., markets, local stores) I know how to prepare or use Jamu Jamu is affordable for regular consumption I can easily find information about Jamu's benefits and usage I feel confident about the quality and safety of Jamu	5	[22]
Health Consciousness	I often seek out natural remedies for health problems I am aware of the importance of taking care of my health I prefer natural products over pharmaceutical drugs I regularly check the ingredients of what I consume I actively avoid harmful chemicals or additives in my diet	5	[21-24, 27]
Cultural Identity	Consuming Jamu is part of my cultural heritage I take pride in using traditional Indonesian remedies	5	[8, 28]

Constructs	Indicators	Items	References
	Jamu makes me connected to traditions My family has a long history of Jamu consumption Jamu is crucial for traditional ceremonies		
Knowledge and Awareness	I am familiar with the Jamu types I understand the health benefits I know where to purchase I have researched the medicinal properties of ingredients I am aware of potential side effects or contraindications I am knowledgeable about the historical and cultural significance	6	[21, 29, 30]
Perceived Risks	I am concerned about the potential side effects I worry about the quality control in the market There is a lack of scientific evidence to support the use I am still determining the correct dosage or preparation Jamu may not be effective for severe medical conditions I am cautious about the long-term use of Jamu	6	[31]
Convenience and Accessibility	Jamu is easy to find in stores or markets near me I can conveniently purchase Jamu online It is easy to prepare and consume Jamu regularly I can find pre-prepared Jamu that fits my lifestyle Jamu is available in accessible forms (e.g., powder, capsules, liquid) I can access reliable information about Jamu's use and benefits.	6	[32-35]
Influence of Modern Trends	People my age are using Jamu as part of a wellness trend Jamu being featured in modern health and wellness discussions Lifestyle brands and influencers increasingly promote Jamu Social media influence me Modern Jamu (e.g., ready-to-drink, flavored versions) appeals to me Jamu helps me participate in holistic health practices	6	[36]
Jamu Intention	I intend to use Jamu for infectious disease supplementary I intend to share Jamu's information for disease supplementation I intend to get Jamu to family members for routine I intend to promote jamu for supplementation to the public	4	Variable of interest

2.4 Statistical analysis

Data were analyzed using descriptive and inferential statistics in R-studio with respective packages [37, 38]. Descriptive statistics, such as means and percentages, were used to summarize the participants' sociodemographic characteristics and responses to the survey questions. To examine differences between groups with positive and negative intentions toward Jamu adoption, Chi-square tests, and Mann-Whitney U tests were employed for

categorical and non-parametric data, respectively. Multivariate regression analysis PLS-SEM was used to identify factors significantly associated with Jamu's intentions. The results were reported with p-values to determine statistical significance, with $p < 0.05$ considered statistically significant. Cronbach's alpha and rho composite were calculated to assess the reliability, while the Internal Variance Deflation Factor (Int. VDF), Discriminant Validity (Discr. FL), and Construct Factor Analysis (Const. FA) were used to assess the validity.

3 Result and discussion

3.1 Sociodemographic characteristics

Table 2 provides an overview of the sociodemographic characteristics of participants categorized by their intentions and associated p-values indicating the significance of group differences. The data suggest a notable difference between the two groups in the Student category, where a much higher proportion of participants with positive adoption intentions (72%) are Medical/Health students compared to those with negative intentions (24%), which is statistically significant ($p < 0.001$). This raises questions about whether medical and health education influence students' perspectives on adoption, potentially due to their exposure to health-related information or societal expectations within their fields. Conversely, no significant differences were observed in the rest variables, indicating that these factors do not strongly influence adoption intentions in this population. This could suggest that perspectives on adoption are relatively stable across different age ranges, genders, ethnicities, and even religions in this sample, which merits further exploration regarding the underlying social or cultural reasons contributing to this stability.

The strong association between educational background and intention calls for further discussion. It would be helpful to investigate how curriculum content, cultural attitudes in medical/health fields, and exposure to social issues through education influence opinions about adoption. One study highlighted that students with a solid educational foundation exhibit higher intentions than those without such exposure [39]. This is supported by another study, which highlights that education programs can effectively shape students' intentions to engage in activities by enhancing their motivation and self-efficacy [40]. Furthermore, it could be valuable to explore whether similar patterns exist in other fields of study or regions of Indonesia to understand better how professional training and cultural background intersect in shaping individuals' views on family and adoption [41].

Table 2. Sociodemographic characteristics of participants' intention.

Variable	N	Intention- N = 510[1]	Intention+ N = 210[1]	p-value[2]
AGE	720	20 (19, 22)	20 (18, 23)	0.2
GENDER	720			0.8
Female		362 (71%)	151 (72%)	
Male		148 (29%)	59 (28%)	
STUDENT	720			<0.001***
Medical/Health Student		120 (24%)	151 (72%)	
Others		390 (76%)	59 (28%)	
ETHNICITY	720			0.2
Eastern Indonesia		47 (9.2%)	24 (11%)	
Javanese-Sundanese		314 (62%)	116 (55%)	
Others		39 (7.6%)	25 (12%)	
Western Indonesia		110 (22%)	45 (21%)	
RELIGION	720			>0.9

Variable	N	Intention- N = 510[1]	Intention+ N = 210[1]	p-value[2]
Buddhism		56 (11%)	19 (9.0%)	
Catholicism		34 (6.7%)	11 (5.2%)	
Hinduism		36 (7.1%)	15 (7.1%)	
Islam		293 (57%)	125 (60%)	
Others		53 (10%)	23 (11%)	
Protestantism		38 (7.5%)	17 (8.1%)	

[1]Median (Q1, Q3); n (%)

[2]*p<0.05; **p<0.01; ***p<0.001

Fig. 1(left) shows medium overall support and positive attitudes toward Jamu, with most respondents believing in its health benefits, cultural significance, and ease of access. People view it as a natural and trusted alternative with benefits for immunity and overall well-being. Social and cultural factors, including family influence and modern trends, significantly shape these perceptions.

3.2 Jamu intention's analysis

Fig. 2(right) revealed that attitude ($\beta = 0.12$), Perceived Benefits ($\beta = 0.12$), Health Consciousness ($\beta = 0.09$), and Convenience and Accessibility ($\beta = 0.16$) all had significant positive impacts on the intention to use Jamu, with p-values below 0.001. These findings suggest that young people are more likely to use Jamu when they view it as beneficial for their health, convenient, and in line with modern wellness trends. In contrast, Perceived Behavioral Control and Knowledge and Awareness had weaker or insignificant direct effects, implying that convenience, social norms, and cultural identity may play a more substantial role in shaping intentions.

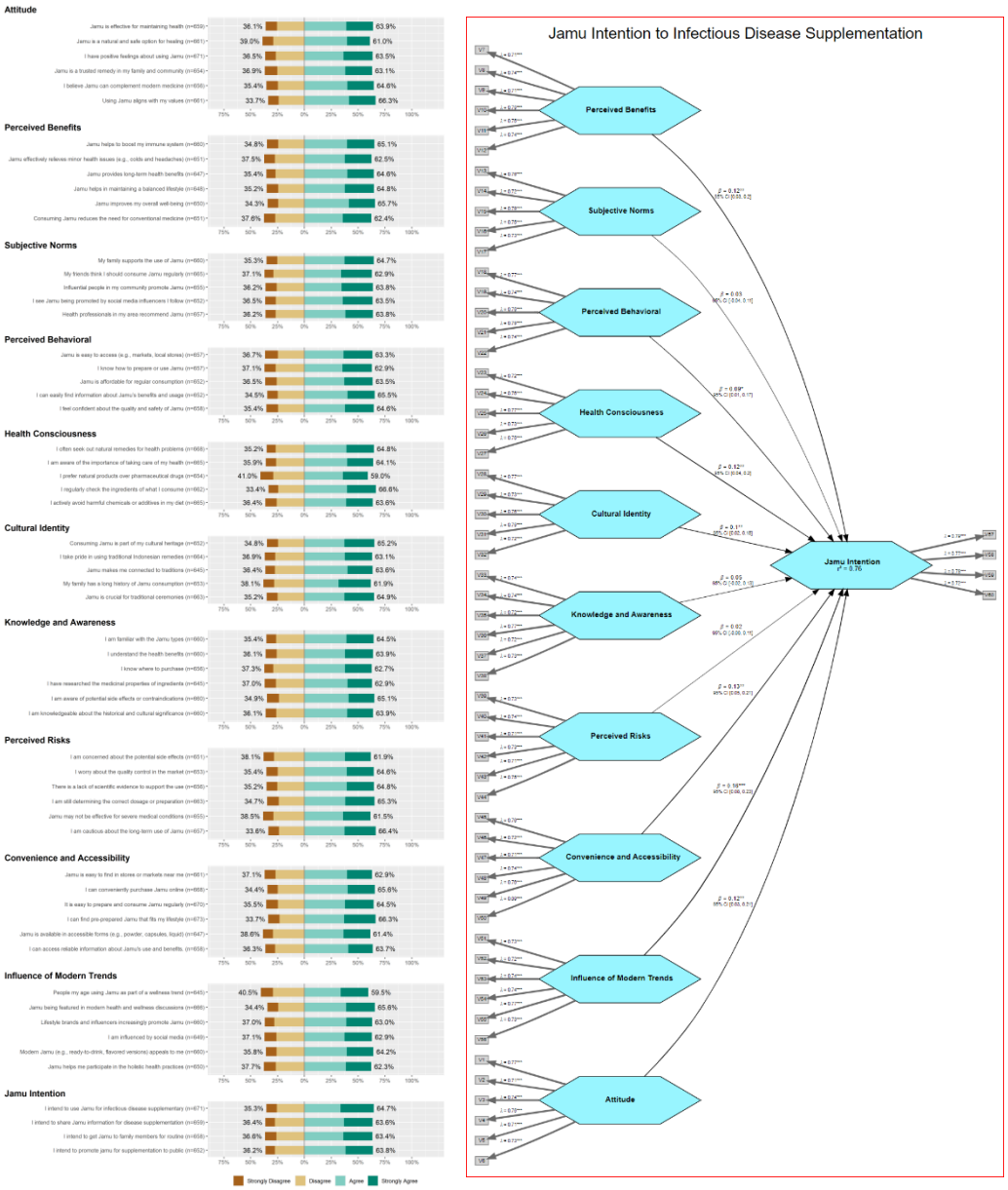

Fig. 1. Likert distribution of all variables (left) and latent modelling to intention (right).

It's important to highlight how this solid cultural and social endorsement can influence health policy and public health initiatives. The strong cultural and social endorsement of jamu as an alternative medicine in Indonesia can significantly affect health policy and public health initiatives. As traditional herbal medicine gains recognition for its therapeutic benefits, policymakers are increasingly motivated to integrate jamu into the national healthcare framework, enhancing its legitimacy and accessibility [28, 42]. This cultural endorsement fosters a sense of community ownership over health practices, encouraging local populations to engage with traditional medicine as a viable complement to modern healthcare [43].

Furthermore, the widespread acceptance of jamu among the Indonesian populace can increase funding and resources for research and development, ensuring that traditional practices are scientifically validated and standardized [44, 45]. By acknowledging the cultural significance of jamu, health authorities can craft policies that respect traditional practices and promote their use in public health campaigns, particularly in rural areas where access to modern healthcare may be limited [46]. This alignment of cultural values with health policy can enhance public trust in health initiatives, ultimately leading to improved health outcomes and a more holistic approach to healthcare that embraces both traditional and modern practices [47].

The belief in Jamu's natural benefits and safety suggests an opportunity to integrate it more formally into wellness programs alongside conventional medicine. The integration of jamu into conventional healthcare practices is supported by a growing body of evidence highlighting its therapeutic benefits and cultural significance. For instance, a study analyzing the patterns of herbal medicine prescribed by medical doctors in Indonesia found that jamu is frequently used alongside conventional treatments for various health problems, indicating a trend toward integrative healthcare approaches [48]. This collaboration can be particularly beneficial for patients with comorbidities, who often seek complementary therapies to manage their conditions more holistically [48]. Moreover, the World Health Organization has emphasized the importance of integrating traditional herbal medicines into national health systems, advocating for systematic assessments and quality control measures to ensure safety and efficacy [49]. This aligns with the increasing recognition of jamu's potential in addressing health issues, as it is derived from natural ingredients that have been used for generations in Indonesian culture [50]. Research has shown that certain jamu formulations possess bioactive compounds that can complement conventional treatments, enhancing their effectiveness and potentially reducing side effects [6].

Furthermore, the establishment of databases and research initiatives focused on traditional herbal medicines, including jamu, facilitates the exploration of their pharmacological properties and supports evidence-based practices [45]. By fostering collaboration between traditional healers and healthcare professionals, a more comprehensive healthcare model can be developed that respects cultural practices while ensuring patient safety and scientific validation. This integrative approach not only honors Indonesia's rich medicinal heritage but also promotes a more inclusive and effective healthcare system that can address the diverse needs of the population [51].

However, the concerns around side effects and evidence-based usage need addressing to ensure informed consumption. For instance, a study highlighted that some jamu products contained dexamethasone, a corticosteroid, which can cause severe side effects when consumed chronically without medical supervision [52]. This underscores the dangers associated with the unregulated production of jamu, where questionable manufacturing practices may introduce harmful substances that compromise patient safety. Moreover, the presence of other pharmaceutical agents, such as sildenafil and tadalafil, in "jamu kuat" (herbal products aimed at enhancing male vitality) raises ethical and health concerns [53]. While effective for their intended purposes, these substances can have adverse effects without proper medical guidance. Similarly, the illegal addition of acetaminophen and diclofenac to jamu formulations has been documented, further complicating the safety profile of these herbal remedies [54, 55]. Such practices violate health regulations and mislead consumers who believe they use safe, natural products. Additionally, the perception of jamu as inherently safe due to its natural origins can lead to a tendency for self-medication, where individuals may rely on these products without consulting healthcare professionals [56]. This reliance can result in untreated underlying health conditions and potential drug interactions, particularly for those who are also using conventional medicines. The increasing demand for alternative therapies, driven by a mistrust of conventional medicine, further complicates the

landscape, as consumers may prioritize herbal remedies over evidence-based treatments [56]. To address these controversies, there is a pressing need for stricter regulations and quality control measures in the production of jamu. Implementing a science-based development program for jamu, as initiated by the Indonesian government, could help standardize formulations and ensure consumer safety [57]. Furthermore, public education campaigns are essential to inform consumers about the potential risks associated with unregulated herbal products and to promote informed decision-making regarding their health choices.

Our study suggests that any health promotion involving Jamu should leverage cultural identity and modern wellness trends to enhance its acceptance, particularly among younger populations. By incorporating traditional practices, such as the use of jamu in Indonesia, health programs can align with the cultural values and beliefs of the population, fostering greater acceptance and participation. Jamu, as a time-honoured herbal medicine, embodies the rich cultural heritage of Indonesia and is widely recognized for its perceived safety and natural benefits [51]. Integrating jamu into health promotion strategies not only validates the cultural identity of the community but also empowers individuals to take ownership of their health through familiar and trusted practices [17]. Moreover, promoting health through culturally relevant frameworks can facilitate a more holistic approach to wellness, addressing physical and mental health needs. This is particularly important in regions where conventional healthcare may be met with scepticism due to historical mistrust or accessibility issues [50]. By respecting and incorporating local knowledge systems, health initiatives can create a more inclusive environment that encourages dialogue between traditional and modern medical practices, ultimately leading to improved health outcomes [58]. Furthermore, as traditional herbal medicine gains recognition for its role in public health, leveraging cultural identity can help bridge the gap between conventional and alternative medicine, fostering a collaborative approach that respects and utilizes the strengths of both systems [59]. Thus, health promotion that embraces enhances community engagement and contributes to health interventions' sustainability and effectiveness.

Our model helps understand the psychological and sociocultural factors driving the intention to use Jamu for health purposes, specifically for infectious disease prevention or supplementation. The relationship between attitude and intention is critical to understanding the young generation's behaviour. Numerous studies have demonstrated that a positive attitude significantly influences individuals' intentions to engage in health-promoting behaviours, such as purchasing organic foods or nutritional supplements. For instance, a study found that attitude is the strongest predictor of the intention to buy vitamins and dietary supplements, highlighting the direct impact of favorable attitudes on consumer intentions [23]. Similarly, another study illustrated that health consciousness indirectly affects purchase intentions through perceived knowledge, indicating that a positive attitude toward health can enhance consumers' willingness to buy health-related products [21]. Moreover, the Theory of Planned Behavior (TPB) provides a robust framework for understanding this relationship, as it posits that attitudes, alongside subjective norms and perceived behavioral control, collectively shape intentions [22]. In the context of Jamu adoption, for example, research has shown that consumers' attitudes toward health and environmental benefits significantly predict their purchase intentions, reinforcing that positive attitudes can drive consumer behaviour [60]. Additionally, studies have indicated that health consciousness mediates the relationship between attitudes and purchase intentions, further emphasizing the importance of fostering positive health-related attitudes to encourage healthier consumer choices [61].

The relationship between perceived benefits and intention is crucial in understanding consumer behaviour, particularly in health-related contexts. Perceived benefits refer to an individual's belief in the positive outcomes of a specific behaviour or product, significantly influencing their intention to engage in that behaviour. For instance, research has shown that perceived benefits are a primary determinant of consumers' intentions to purchase synthetic

functional foods, where individuals are more likely to buy products they believe will enhance their health or well-being [25]. This aligns with the Health Belief Model (HBM), which posits that individuals are motivated to take health-related actions when they perceive significant benefits from those actions [25]. Moreover, studies have demonstrated that perceived benefits play a vital role in vaccination intentions, where individuals who recognize the advantages of vaccination—such as protection against disease—are more likely to intend to get vaccinated [62]. Similarly, in health checkups, perceived benefits and other health beliefs significantly influence young adults' intentions to undergo routine examinations [24]. This relationship underscores the importance of effectively communicating the benefits of health interventions to enhance individuals' intentions to adopt healthier behaviours.

The relationship between health consciousness and intention is a significant area of research, particularly in the context of consumer behaviour regarding health-related products. Health consciousness refers to an individual's awareness and concern for their health, which has been shown to positively influence their intentions to engage in health-promoting behaviours. Numerous studies have established that higher levels of health consciousness correlate with a greater intention to purchase organic foods and other health-oriented products. For instance, research indicates that health-conscious consumers are more likely to seek out organic options, as they perceive these products to offer superior health benefits compared to conventional alternatives [63]. Furthermore, health consciousness has been identified as a strong predictor of purchase intentions for environmentally sustainable products, suggesting that consumers who prioritize their health are also inclined to consider the health implications of their purchases on the environment [64]. This relationship is further supported by findings that demonstrate a direct positive impact of health consciousness on the intention to use health-related applications, where more health-conscious individuals are more likely to adopt technologies that facilitate health management [24]. Additionally, studies have shown that health consciousness influences direct purchase intentions and attitudes toward products, shaping intention. For example, consumers with higher health consciousness exhibit more favourable attitudes toward organic foods, leading to increased purchase intentions [27]. This indicates that health consciousness is a foundational element that drives consumers to make healthier choices and engage in behaviours that align with their health values.

The relationship between convenience and accessibility with intention is a well-documented phenomenon in consumer behaviour research. Convenience, defined as the ease with which consumers can access and utilize products or services, significantly influences their intentions to purchase. For instance, a study demonstrated that perceived convenience in online shopping positively correlates with consumers' behavioral intentions to continue shopping at a particular retailer [32]. This finding suggests that when consumers perceive a shopping experience as convenient, they are more likely to intend to repeat that experience, highlighting the critical role of convenience in shaping purchase intentions. Similarly, research has shown that access convenience, which refers to the ease of obtaining a product or service, is a crucial factor affecting consumers' intentions to adopt mobile banking services [35]. The study indicated that when consumers find it easy to access banking services through mobile platforms, their intention to use them increases. This relationship is further supported by findings, which revealed that access and search convenience significantly impact consumers' web rooming intentions, with perceived hedonic value mediating this relationship [34]. Moreover, the accessibility of products or services can enhance consumer satisfaction, influencing their intentions. For example, in online shopping, the convenience of access, search, evaluation, and transaction processes has directly impacted customer satisfaction and repurchase intentions [33]. This indicates that when consumers find it easy to navigate and utilize online platforms, their satisfaction increases, leading to a higher likelihood of future purchases.

The values and relationships provide insights into which areas, such as Perceived Risks or Knowledge and Awareness, might require focus in public health messaging to promote Jamu use. We expect that constructs positively correlate with intention; surprisingly, it departs from our hypothesis. The relationship between knowledge and intention can sometimes be negatively correlated, particularly in contexts where increased knowledge leads to confusion or over-analysis, resulting in decreased intention to act. For instance, a study found that higher levels of education and learning about farmed fish were negatively correlated with purchasing such products [21]. This suggests that as consumers become more informed about the complexities and potential issues surrounding farmed fish, their intention to buy may diminish due to concerns about quality, sustainability, or ethical considerations. Similarly, research indicates that while subjective knowledge can influence attitudes toward purchasing fish, it does not necessarily translate into a solid intention to buy farmed fish, highlighting a nuanced relationship where increased knowledge may not always lead to increased purchasing intentions [29]. This phenomenon can be attributed to the idea that consumers may become more critical and discerning as they gain more information, leading to hesitation in their purchasing decisions. Moreover, the findings from the study emphasize that while knowledge generally enhances consumer decision-making, it can also create a paradox where too much information leads to confusion, thereby negatively impacting purchase intentions [30]. This aligns with the notion that consumers may feel overwhelmed by the available information, leading to decision paralysis rather than informed action.

3.3 Validity and reliability

Fig 2. demonstrates the reliability and validity of various constructs related to attitudes toward Jamu. Most constructs show high internal consistency, with Cronbach's Alpha and Composite Reliability values consistently above 80%, indicating that the survey items effectively measure their respective constructs. For example, constructs such as Attitude, Perceived Benefits, Knowledge and Awareness, and Influence of Modern Trends all show strong reliability, scoring around 83%. Additionally, the constructs exhibit good validity, with the Internal Variance Deflation Factor (Int. VDF) and Discriminant Fornell-Lacker (Discr. FL) values typically falling within the high 70% and 80% range, suggesting that these constructs are well-defined and distinct from each other. One point to note is that the Jamu Intention construct shows slightly lower reliability, with a Cronbach's Alpha of 77%, which may indicate that the items measuring intention could benefit from refinement. Nonetheless, its composite reliability is still sufficient at 85%, showing that it is reasonably consistent. Overall, the solid and consistent scores across most constructs indicate that the survey data is robust and valid, providing a reliable foundation for analyzing public attitudes and behaviours toward Jamu. However, refining the measurement of constructs like Jamu Intention could improve future studies, especially in predicting actual usage behaviour.

Fig. 2. Quality assessment of construct

3.4 Limitations and future research directions

One limitation of this study is its reliance on self-reported data, which may introduce bias due to social desirability or inaccurate recall. Participants may have exaggerated their positive intentions toward Jamu use due to cultural expectations or a desire to align with socially acceptable practices. Additionally, the sample was heavily skewed toward medical and health students, limiting the generalizability of the findings to other student populations or demographics. The study needed a more detailed exploration of regional variations, which could have provided more nuanced insights into how different cultural and socioeconomic factors across Indonesia influence Jamu adoption. Another limitation is the cross-sectional design, which simultaneously captures participants' attitudes and intentions. This approach needs to account for potential changes in behaviour or attitudes over time, especially as participants' exposure to Jamu or health education evolves. Finally, while the study identified significant relationships between factors like attitude, perceived benefits, and intention, it did not delve into potential mediators or moderators, such as peer influence or access to healthcare, that might further explain the dynamics of Jamu adoption.

Future research should address this study's limitations by incorporating a more diverse sample, including individuals from different educational backgrounds and regions within Indonesia. This would help explore how socioeconomic, geographic, and cultural factors affect Jamu adoption, offering a broader understanding of its role in public health. Longitudinal studies could also be valuable in tracking changes in individuals' attitudes and behaviours over time, particularly as they gain more exposure to health education or face new health challenges. Further investigation into the impact of peer and societal influence on Jamu adoption could provide deeper insights into the social dynamics surrounding traditional medicine. Additionally, research could explore the potential of Jamu in specific healthcare settings, such as its role in managing chronic diseases or complementing conventional treatments. Lastly, there is a need for more rigorous studies focused on the safety, efficacy, and regulatory aspects of Jamu, which could inform the development of standardized formulations and policies for its integration into the healthcare system.

4 Conclusion

The study reveals key insights into the sociodemographic factors and psychological drivers behind young people's intentions toward adopting Jamu (a traditional herbal medicine).

Medical and health students show significantly higher adoption intentions than others, indicating that education shapes views on traditional medicine. This suggests that health-related curricula influence students' openness to alternative therapies. Regarding psychological drivers, factors like positive attitudes, perceived benefits, and convenience play significant roles in shaping the intention to use Jamu. Young people are more likely to adopt Jamu when it aligns with modern wellness trends, is perceived as beneficial to health, and is easily accessible. Interestingly, knowledge and awareness had weaker effects on intention, indicating that practical benefits and social factors may outweigh mere information in shaping behaviours. The cultural significance of Jamu also underscores its potential for integration into public health initiatives in Indonesia. As Jamu is widely accepted due to its natural and safe reputation, it represents an opportunity for promoting health in both modern and traditional contexts. However, concerns over the unregulated production of Jamu, which sometimes includes harmful substances, highlight the need for stricter quality control and education to ensure consumer safety. In conclusion, the study demonstrates the importance of aligning health promotions with cultural values and convenience factors. For Jamu, leveraging its cultural identity and perceived benefits can drive acceptance, especially among younger populations. However, ensuring safety through regulation and addressing knowledge gaps will be key to sustaining its integration into broader healthcare strategies.

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