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Knowledge and Questionnaire Defined Trust in Herbal Medicine Among Residents of Toyado Village in a Cross Sectional Study

Dwi Debi Tampa'i[1], Nur Hijriah[2], and Moh Wafri Matorang[3]

[123]Program Studi S1 Keperawatan, STIKES Husada Mandiri Poso, Indonesia

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Corresponding author

Dwi Debi Tampa'i*
STIKES Husada Mandiri Poso
Jl. Pulau Batam, Kel. Moengko Lama, Kec. Poso Kota, Sulawesi Tengah
Phone : 085395419394
Email: debbytampai123@gmail.com

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Abstract

Background: Herbal medicine remains part of community health practice, but factual knowledge and endorsement of statements about safety, use, and social experience are distinct constructs. Examining how the recorded scores co-occur may inform cautious, culturally appropriate communication.
Objective: To examine the association between knowledge and questionnaire-defined trust in herbal medicine among surveyed residents of Toyado Village.
Methods: This analytic cross-sectional survey was conducted in Toyado Village, Lage District, Poso Regency, on June 13, 2026. Ninety-three participants were recruited by purposive, nonprobability sampling. Knowledge and questionnaire-defined trust were recorded using eight-item and six-item dichotomous scores, respectively. The primary analysis used a two-tailed Spearman rank correlation of total scores; exploratory partial rank correlations adjusted for age, education, and ethnicity. Precision was summarized with 95% bias-corrected and accelerated bootstrap confidence intervals.
Results: The median knowledge score was 7 (Q1–Q3: 6–8) and the median questionnaire-defined trust score was 4 (Q1–Q3: 2–5). Knowledge was categorized as good in 54 participants (58.1%), moderately good in 33 (35.5%), and poor in six (6.5%); corresponding trust categories were 45 (48.4%), 10 (10.8%), and 38 (40.9%). The total scores showed a positive association (Spearman's $\rho = 0.456$; 95% CI: 0.267–0.614; $p < 0.001$). The exploratory adjusted partial rank correlation was 0.360 (95% CI: 0.160–0.571; $p < 0.001$). Forty participants (43.0%) reached the maximum knowledge score, indicating a potential ceiling effect.
Conclusion: Knowledge and questionnaire-defined trust scores were positively associated within this nonprobability sample, but the cross-sectional design does not establish temporal order or causality. Purposive recruitment, a ceiling effect for knowledge, limited documented reliability, and the heterogeneous trust items constrain population inference and construct interpretation.

Keywords: Community nursing; cross-sectional study; herbal medicine; knowledge; questionnaire-defined trust.

INTRODUCTION

Traditional medicine remains part of community health practices. The use of medicinal plants and herbal preparations is passed down through family experience and local traditions. However, acceptance of a treatment should be accompanied by adequate information about its benefits, safety, and quality. The World Health Organization (WHO) Global Traditional Medicine Strategy 2025–2034 identifies stronger scientific evidence and safety as the foundations for integrating traditional medicine into health systems (1). The WHO global report published in

2025 also documents policies, regulation, education, and traditional medicine services across member states, highlighting the need to evaluate their implementation within a framework of healthcare quality (2).

Evidence from Indonesia shows that traditional medicine is used for a range of health needs. In an analysis of 4,901 people with chronic diseases, Pradipta and colleagues found that 27.1% used traditional medicine (3). Harfiani and colleagues documented herbal-medicine use and associated factors during the COVID-19 pandemic in Indonesia (4). A national survey by Wikara and colleagues identified gaps in understanding product registration numbers and the risks of pharmaceutical substances in traditional products (5). These findings suggest that knowledge about use should be accompanied by an understanding of product safety.

Knowledge and trust are distinct constructs. In this study, knowledge was operationalized as correct responses about herbal medicine types, uses, dosing, concurrent use, product identification, and safety. The questionnaire-defined trust score represented endorsement of statements about comparative safety, intended use, recommendation, continued use despite side effects, and family or peer experience. Because these domains combine beliefs, social experience, and behavioral intentions, the score should not be interpreted as a validated unidimensional measure of trust. Prior Indonesian research linked knowledge and health beliefs with herbal medicine use (6). The present study therefore examined whether the two recorded scores were associated, without assuming that knowledge determines trust.

Agustini and colleagues reported a mean knowledge score of 77% in Bindu Tourism Village; 51 of 104 respondents (49%) were classified as having good knowledge (7). A study in Sarikemuning Village also examined knowledge and traditional medicine use for self-medication, indicating the need to consider community understanding of these treatments (8). Meanwhile, Maharianingsih reported an association of knowledge and attitudes with patterns of traditional medicine use for self-medication in Denpasar (9). These findings provide a basis for examining the association between knowledge and trust in rural communities, while considering differences in study instruments and participant characteristics.

Treatment choices are also shaped by family, culture, and access to information. In a qualitative study in North Sulawesi, participants described perceptions, social considerations, and information sources in relation to preferences for traditional or modern medicine (10). Febriyanti and colleagues in West Java found that trust, access, cost, and proximity to services were associated with use of different medical systems (11). Understanding the relationship between knowledge and questionnaire-defined trust may therefore help community nurses develop communication that reflects local practices and invites family involvement without assuming a causal pathway.

Studies in Central Sulawesi have documented local knowledge of medicinal plants (12-14). However, inventories of plant species do not directly establish an association between knowledge and trust in traditional medicine. Related Indonesian findings also differ: Maharianingsih reported associations between knowledge and patterns of traditional medicine use, whereas Hasbi and Surahman found no significant association between knowledge and attitudes or actions regarding self-medication (9,15). These outcomes provide indirect comparisons because treatment use, attitudes, actions, and trust are distinct constructs. Interpretation therefore requires attention to questionnaire content, scoring procedures, and the available evidence of measurement validity. Potential confounding by age, education, previous treatment experiences, and access to health information should also be considered when interpreting a knowledge–trust association.

Toyado Village, the study setting, has a population of 1,333 residents across four hamlets. Preliminary exploratory interviews with 11 residents were conducted on May 2, 2026. Interviewees were recruited from residents encountered at the study location. Open-ended questions were adapted from the study's knowledge and trust questionnaires to explore residents' understanding of traditional medicine and their reasons for trusting or using it. Interviewees described family experiences, practices passed down through generations, and distance to the primary health center as considerations related to traditional medicine use. They also reported using locally available

medicinal plants. These accounts provide exploratory background only and should not be interpreted as representative evidence of beliefs or practices throughout Toyado Village. The reference to distance to the primary health center also introduces healthcare access as a contextual consideration when discussing traditional medicine use.

At the regional level, Wahidin and colleagues documented disruptions to resources, services, and healthcare access at 36 primary health centers in Palu, Sigi, and Donggala following an earthquake, tsunami, and liquefaction (16). These findings provide regional background but do not establish disaster exposure or healthcare disruption among participants in Toyado Village. The present study did not assess individual disaster exposure, the timing or severity of disaster impacts, facility damage, or disaster-related barriers to healthcare. Its analysis is therefore limited to the association between knowledge and trust among the surveyed respondents and does not estimate the influence of disasters on either variable.

This study aimed to describe knowledge and questionnaire-defined trust regarding herbal medicine and to examine their association among surveyed residents of Toyado Village, Lage District, Poso Regency. The research question was whether the recorded knowledge total was associated with the questionnaire-defined trust total. It was hypothesized that the scores would be positively associated.

METHODS

Study design and setting

This analytic cross-sectional survey examined the association between knowledge and questionnaire-defined trust regarding herbal medicine. Both scores were measured during the same data-collection period, so temporal order could not be determined. The study was conducted in Toyado Village, Lage District, Poso Regency, on June 13, 2026. The village comprises four hamlets and is located along the Trans Poso–Ampana route. Individual disaster exposure, damage to healthcare facilities, and disaster-related interruptions to healthcare access were not measured as study variables.

Study population and participants

The study population comprised 1,333 residents from 401 households in Toyado Village. The original sample-size calculation used a 10% error parameter and yielded approximately 93 participants. Because recruitment used purposive sampling, this parameter should not be interpreted as a probability-based margin of error. A sample-size calculation based on the expected correlation and statistical power was not documented.

The final sample comprised 93 participants selected through purposive, nonprobability sampling. Population-based allocations across hamlets I, II, III, and IV were 37, 11, 12, and 33 participants, respectively. These allocations did not involve random selection of individual residents. Eligibility required residence in Toyado Village, willingness to participate, and the ability to communicate and answer the study questions in Indonesian. The stated exclusion criteria were unwillingness to participate and the presence of a mental or psychiatric disorder. The procedure used to assess the latter criterion was not documented. The numbers approached and declining participation were unavailable; therefore, a response rate could not be calculated.

Study variables and instruments

The principal variables were knowledge of herbal medicine and questionnaire-defined trust in herbal medicine. Respondent characteristics included age, sex, highest educational attainment, occupation, religion, and ethnicity. Both Indonesian-language questionnaires were based on instruments used by Lestari (17). Formal documentation of permission to reuse the items, item-by-item local adaptation, expert content-validity review, or pilot testing in Toyado was not available for this revision. Although earlier manuscript wording used the broader term "traditional medicine," the questionnaire items primarily addressed herbal medicines; the revised manuscript therefore uses "herbal medicine" when describing the measured constructs.

The knowledge questionnaire contained eight statements with true or false responses. Its content covered herbal medicine classifications and examples, uses of selected plants, concurrent use with conventional medicines, dosing, pharmaceutical ingredients, and recognition of a herbal product logo. The stated scoring procedure assigned 1 point to a correct response and 0 to an incorrect response, producing a total score of 0–8. Higher scores

indicated greater knowledge according to the questionnaire.

The trust questionnaire contained six yes-or-no items addressing perceived comparative safety, intention to use herbal medicines, willingness to recommend them to relatives, perceived comparative side effects, willingness to continue use despite side effects, and trust based on the experiences of family or friends. Each "yes" response received 1 point and each "no" response received 0, producing a total score of 0–6. All items were scored toward greater endorsement; no reverse scoring was applied. The questions concerned herbal medicines in general rather than a specific product.

The trust score combined beliefs, intentions, and reported willingness to use herbal medicines. Its interpretation as a single underlying trust construct was not established through factor analysis. The uniformly affirmative scoring also introduced potential acquiescence and social desirability bias. Higher scores therefore represented greater endorsement of the questionnaire statements and did not establish the clinical safety or effectiveness of herbal medicines.

Percentage scores were calculated by dividing each total by the maximum possible score and multiplying by 100%. For descriptive reporting, classifications attributed to the source instrument were retained: good (76–100%), moderately good (56–75%), and poor (<56%).[17] These corresponded to knowledge totals of 7–8, 5–6, and 0–4, and trust totals of 5–6, 4, and 0–3, respectively. The thresholds were used only for descriptive summaries; local validation of the cutoffs for the Toyado population was not documented.

Data collection procedures

Study permission was obtained through the nursing program and the Toyado Village government. Prospective participants received an explanation of the study objectives and were asked to provide written consent before completing the demographic form and questionnaires.

The researcher administered the questionnaires in Indonesian and provided oral explanations when participants had difficulty understanding individual statements. A standardized assistance script, separate enumerator-training record, and documentation of private response conditions were not available; researcher assistance was therefore considered a possible source of interviewer influence. Completed questionnaires were checked for completeness, and unanswered items were returned to participants for completion before coding, scoring, and tabulation. Participant codes and initials were used in the study records; no missing total scores were reported for the association analyses.

Data analysis

Initial data processing was performed using SPSS. Participant characteristics and descriptive categories of knowledge and questionnaire-defined trust were summarized using frequencies and percentages. Total scores were summarized using medians, first and third quartiles (Q1–Q3), and observed ranges. Floor and ceiling effects were described as the percentages of participants scoring at the theoretical minimum and maximum of each instrument, respectively. Percentages were calculated using the denominator for the corresponding analysis and rounded to one decimal place.

The primary association analysis used a two-tailed Spearman rank correlation between total knowledge scores (0–8) and total questionnaire-defined trust scores (0–6), rather than the three-category classifications. This rank-based analysis was selected because both scores were discrete and had many ties; tied values were assigned average ranks. A jitter plot illustrated overlapping score pairs, but jitter was used only for display and did not alter analyzed values. Statistical significance was evaluated at $\alpha = 0.01$, consistent with the threshold in the original analysis description; it was not a formal multiple-testing adjustment. Coefficients and 95% confidence intervals were reported without assigning clinical importance from the p value alone.

The primary correlation analysis was unadjusted. Exploratory partial rank correlations were additionally used to assess the association after controlling for age, education, and ethnicity. Knowledge scores, trust scores, and age were transformed to average ranks. Ranked knowledge and ranked trust were separately regressed on an intercept, ranked age, four education indicators, and four ethnicity indicators. The residuals from the two models were then correlated. Primary school and Bugis were the reference categories. Previous or

current traditional medicine use was not included because a separate measure of actual use was unavailable. Future-use intention measured in the trust questionnaire was not treated as a substitute for actual use.

For both unadjusted and adjusted correlations, 95% confidence intervals were estimated using the bias-corrected and accelerated (BCa) bootstrap method with 5,000 respondent-level resamples. Each respondent's complete set of observations was retained together during resampling, and ranks and adjusted models were recalculated in each resample. Approximate two-tailed p values were calculated using t distributions, with residual degrees of freedom for partial rank correlations. An adult-only sensitivity analysis excluded participants aged <18 years. Kendall's tau-b was used as an additional analysis to account for tied scores. These adjustment and sensitivity analyses were conducted during manuscript revision and were considered exploratory rather than prespecified.

Internal consistency was reported only to the extent supported by the available study records. The sole documented numerical estimate was coefficient alpha = 0.644 for the knowledge questionnaire; the sample used to obtain that estimate was not clearly identified. For dichotomous items scored 0 or 1, coefficient alpha is algebraically equivalent to KR-20 under the same assumptions. No numerical reliability estimate, confidence interval, corrected item–total correlation, or factor-analysis result was available for the six-item trust score. Individual item-level data were not included in the manuscript package, so undocumented values were not reconstructed. Correlation analyses used the recorded total knowledge and trust scores for all 93 participants, and no total-score imputation was reported.

Ethical considerations

Formal review or approval by a research ethics committee was not obtained. Administrative permission to conduct the study was provided through letter number 375/STIKES-HM/PS/VI/2026 addressed to the Head of Toyado Village; this letter was not treated as ethics approval. Before data collection, participants received an explanation of the study objectives and were asked to sign a consent form. Participation was voluntary, identifiers were replaced by codes, and results were reported in aggregate. The sample included four participants younger than 18 years, but the available records did not document a separate parental or guardian permission process or an assent procedure for these minors.

RESULTS

Data from 93 participants were analyzed. Participant characteristics, score distributions, descriptive categories, and association estimates are presented in Tables 1–4 and Figure 1.

The largest age group was 36–45 years, comprising 22 respondents (23.7%). Most respondents were female (65.6%). Primary school education and farming were the largest education and occupation categories, accounting for 43.0% and 45.2%, respectively. Most respondents were Muslim (87.1%) and of Bugis ethnicity (53.8%).

Table 2 presents the score distributions among 93 participants. The median knowledge score was 7 (Q1–Q3: 6–8; IQR = 2), with observed scores ranging from 3 to 8. Forty participants (43.0%) achieved the maximum knowledge score of 8. The median questionnaire-defined trust score was 4 (Q1–Q3: 2–5; IQR = 3), with observed scores ranging from 1 to 6. Nine participants (9.7%) achieved the maximum trust score of 6. No participant scored at the theoretical minimum on either instrument. The substantial proportion reaching the maximum knowledge score suggests a potential ceiling effect, whereas maximum trust scores were less frequent.

Table 3 shows that knowledge was classified as good in 54 participants (58.1%), moderately good in 33 (35.5%), and poor in six (6.5%). Questionnaire-defined trust was classified as good in 45 participants (48.4%), poor in 38 (40.9%), and moderately good in 10 (10.8%). These classifications are descriptive because local validation of the category cutoffs was not documented.

reanalysis of ungrouped knowledge (0–8) and questionnaire-defined trust (0–6) total scores. Unadjusted coefficients are Spearman's ρ; adjusted coefficients are partial rank correlations controlling for ranked age, categorical education, and categorical ethnicity. CIs are 95% BCa paired bootstrap intervals from 5,000 resamples. p values are approximate and two-tailed; α = 0.01. Adult-only analyses exclude four participants aged <18 years. Prior or

current herbal-medicine use was not available as a separate covariate and was not adjusted for.

Knowledge and questionnaire-defined trust showed a positive association (ρ = 0.456; 95% CI: 0.267–0.614; p < 0.001). After exploratory adjustment for age, education, and ethnicity, the coefficient was smaller but remained statistically significant (partial rank correlation = 0.360; 95% CI: 0.160–0.571; p < 0.001). In adults aged ≥18 years (n = 89), the unadjusted coefficient was 0.444 (95% CI: 0.246–0.605; p < 0.001) and the adjusted coefficient was 0.349 (95% CI: 0.136–0.559; p = 0.0015). Kendall's tau-b was also positive (τb = 0.383; 95% CI: 0.211–0.523; p < 0.001). These sensitivity analyses were exploratory and do not correct the nonprobability sampling design.

The documented coefficient alpha for the knowledge questionnaire was 0.644. A numerical internal-consistency estimate for the questionnaire-defined trust score was not available in the study records; consequently, reliability of that score could not be established from this manuscript package.

Table 1. Participant Characteristics in Toyado Village in 2026 (n = 93)

Characteristic	Category	n	%
Age	12–16 years	3	3.2
	17 years	1	1.1
	18–25 years	16	17.2
	26–35 years	13	14.0
	36–45 years	22	23.7
	46–55 years	19	20.4
	56–65 years	12	12.9
	>65 years	7	7.5
Sex	Male	32	34.4
	Female	61	65.6
Highest education	Primary school	40	43.0
	Junior secondary school	22	23.7
	Senior secondary school	20	21.5
	Diploma	3	3.2
	Bachelor's degree	8	8.6
Occupation	Not employed	4	4.3
	Student	8	8.6
	Homemaker	31	33.3
	Farmer	42	45.2
	Civil servant	6	6.5
	Self-employed	2	2.2
Religion	Islam	81	87.1
	Christianity	12	12.9
Ethnicity	Kaili	10	10.8
	Pamona	23	24.7
	Javanese	2	2.2
	Gorontalo	8	8.6
	Bugis	50	53.8

Source: primary data, 2026.

Table 2. Distribution of Knowledge and Questionnaire-defined Trust Total Scores Regarding Herbal Medicine (n = 93)

Variable	n	Median (Q1–Q3)	IQR	Observed min–max	Floor n (%)	Maximum score, n (%)
Knowledge	93	7 (6–8)	2	3–8	0(0.0)	40 (43.0)
Trust score	93	4 (2–5)	3	1–6	0(0.0)	9 (9.7)

Source: primary data, 2026.

Table 3. Descriptive, Nonvalidated Categories of Knowledge and Questionnaire-defined Trust Scores (n = 93)

Variable	Category	Raw score	n	%
Knowledge	Good	7–8	54	58.1
	Moderately good	5–6	33	35.5
	Poor	0–4	6	6.5
Trust score	Good	5–6	45	48.4
	Moderately good	4	10	10.8
	Poor	0–3	38	40.9

Source: primary data, 2026.

Table 4. Association between Knowledge and Questionnaire-defined Trust Total Scores

Analysis	n	Correlation coefficient	95% CI	*p value*
Full sample, unadjusted	93	0.456	0.267–0.614	<0.001
Full sample, adjusted	93	0.360	0.160–0.571	<0.001
Adults aged ≥18 years, unadjusted	89	0.444	0.246–0.605	<0.001
Adults aged ≥18 years, adjusted	89	0.349	0.136–0.559	0.0015

Source: primary data, 2026;

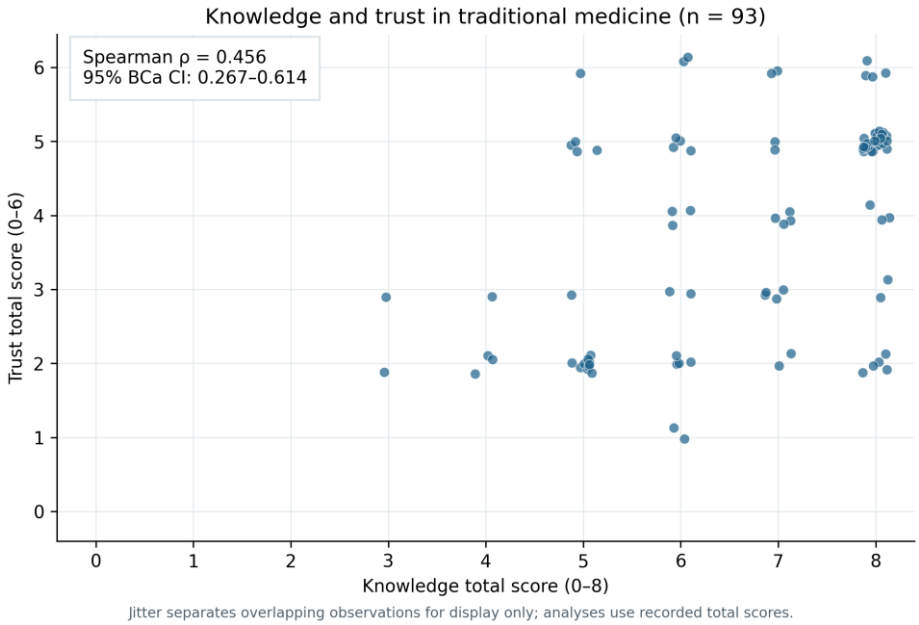


Figure 1. Knowledge and questionnaire-defined trust total scores in 93 Toyado participants. Jitter separates overlapping observations for display only; all analyses used recorded, unjittered scores.

DISCUSSION

Association between Knowledge and Trust

This study found a positive association between recorded knowledge and questionnaire-defined trust scores in the surveyed Toyado sample (ρ = 0.456). The coefficient was smaller after exploratory adjustment for age, education, and ethnicity (partial rank correlation = 0.360), but this change does not show that the measured demographic characteristics caused the association. Because both scores were collected

by dichotomous self-report questionnaires during the same session, common-method covariance may have increased their apparent relationship. The cross-sectional design also cannot determine whether knowledge preceded trust, trust influenced information seeking, or both reflected prior treatment experiences or other unmeasured factors. Adult-only estimates were similar in direction, but all estimates remain constrained by sampling and measurement limitations.

The direction of this association can be considered alongside the findings of Kristianto and colleagues, who reported associations of knowledge and health beliefs with herbal medicine use (6). Among Indonesian patients with type 2 diabetes mellitus, Sari and colleagues also found that complementary medicine users had more positive knowledge and attitudes than nonusers (18). However, those studies measured treatment use or attitudes, whereas the Toyado study measured trust. Their findings can therefore inform comparison of the direction of associations, but effect sizes and score categories cannot be directly equated.

Studies in other communities show that these relationships are not always consistent. Hasbi and Surahman in Pademangan Barat did not find significant associations of knowledge with attitudes and actions in selecting self-medication, although most respondents had good knowledge and positive attitudes (15). In contrast, Madania and colleagues in Tontulow Village reported associations of knowledge and attitudes with medicine selection for self-medication (19). Differences in constructs, populations, and service contexts may contribute to this variation. The positive association in Toyado should therefore be understood as a finding within this sample, without treating knowledge as the sole basis of trust.

Questionnaire knowledge does not necessarily establish the ability to assess evidence quality or recognize all treatment risks. In this study, several knowledge statements used broad wording and the item-specific answer key was not independently verified. The questionnaire-defined trust score combined safety beliefs with intentions and endorsement, including willingness to continue use despite side effects. A higher score therefore cannot be interpreted as better clinical decision-making or evidence that a preparation is safe or effective. Ekasari and colleagues reported limited understanding of the safety of some medicinal plants in Lombok Praya, while Wikara and colleagues found uneven understanding of pharmaceutical-substance risks in traditional products (5,20), These findings support assessing safety knowledge separately from treatment confidence.

Community Knowledge and Trust

In this study, 58.1% of participants were classified as having good knowledge. However, 43.0% attained the maximum knowledge score, indicating substantial concentration at the upper bound and possible limited discrimination among participants with higher scores. Agustini and colleagues reported that 49% of respondents in Bindu had good knowledge, with a mean score of 77% (7), These proportions cannot be equated without considering item content and cutoffs. Izzati and colleagues reported good knowledge and attitudes with moderately good practices in Pringgabaya, while Apsari and Wintariani found generally moderate knowledge and positive attitudes in Kintamani (21,22) Comparisons should distinguish knowledge, attitudes, practices, and trust rather than treating them as interchangeable outcomes.

Maharianingsih in Denpasar reported associations of knowledge and attitudes with patterns of traditional medicine use (9) Hidayatul and Suryantoto in Sarikemuning also examined knowledge and traditional medicine use for self-medication (8) Variation in knowledge across communities highlights the importance of assessing information needs in each setting. Preliminary interviews in Toyado indicated that family experience was an important source informing traditional medicine use. This explanation reflects the local context and was not tested as an associated factor in the study analysis.

Demographic characteristics are relevant to both assessment and interpretation. Ningsih and colleagues found associations of age, education, occupation, and income with knowledge and traditional medicine use behaviors, while Pradipta and colleagues identified user characteristics related to age, education, residence, perceived health, and treatment adherence (3,23). The Toyado reanalysis adjusted the knowledge–trust association for age, education, and ethnicity, but did not

estimate causal effects of these characteristics. The adjusted result also does not establish that any education or ethnic group has higher trust. Experiences of use, income, information sources, and healthcare access remained unmeasured in the adjustment.

Questionnaire-defined trust was classified as good in 48.4% of participants and poor in 40.9%, reflecting variation in endorsement within the sample. The median score was 4, and 9.7% reached the maximum score. The six items covered several domains rather than a validated single construct, and no numerical internal-consistency estimate for this score was available. Community nurses can use the findings to guide questions about residents' beliefs and experiences while avoiding the assumption that high endorsement indicates safer or more appropriate medicine use.

The residual positive association may reflect shared experiences or beliefs beyond the demographic factors included in the exploratory adjustment. Wiyono and colleagues described family considerations, perceptions, and information sources in treatment preferences, while Febriyanti and colleagues reported associations of psychosocial factors and service access with use of different medical systems.[10,11] These are possible explanations for further study, not mechanisms measured in Toyado. Future work should assess actual prior or current herbal-medicine use separately from hypothetical intentions, together with information sources, economic conditions, and healthcare access.

Implications for Community Nursing

The sample characteristics provide preliminary information for selecting educational approaches. Primary school education was the largest education category, and some respondents had difficulty understanding questionnaire statements. Community nurses can use simple language, examples familiar to residents, and opportunities for participants to explain the information back in their own words. Family involvement is also relevant because treatment practices in the study setting were reported to develop through experience passed down across generations.

Education should address how to obtain reliable information, assess product quality, and disclose traditional medicine use to healthcare professionals. These messages can respect community practices while explaining that trust does not establish evidence of safety and effectiveness. This approach is consistent with the WHO strategy, which emphasizes stronger evidence and safety in traditional medicine (1). Findings of limited safety knowledge in Lombok Praya and gaps in understanding the risks of pharmaceutical substances in a national survey support including information about risks, adherence to instructions, and checking product information in educational activities (5,20).

Communication about traditional medicine use should be open. Sari and colleagues reported that most complementary medicine users among patients with diabetes did not disclose their use to healthcare professionals (18). In a study of breastfeeding mothers in Jogonalan, Sayuti and Atikah also emphasized the need for consultation and professional guidance on herbal medicine use (24). Although these populations differ from the Toyado sample, their findings can inform community nursing assessments that ask about preparations used, reasons for use, and symptoms experienced after use.

Community guidance also requires support for healthcare professionals' knowledge. Purwono and colleagues identified limited knowledge and scientific evidence on herbal products as important issues in Indonesian physicians' perceptions of prescribing them (25). These findings support including traceable scientific information and coordination among nurses, physicians, and pharmacy professionals in educational services. Discussions of local practices should be accompanied by an assessment of the evidence quality for each product or preparation.

Accessible written materials can reinforce face-to-face explanations. Dewi and colleagues found differences in changes in knowledge scores between participants who received a leaflet and a control group (26). These findings provide a basis for considering educational materials, although leaflet effectiveness in Toyado still requires evaluation through an intervention study. Language and illustrations should be adapted to residents' literacy levels and communication practices.

Nurwahita, Moh. Wafri Matorang, and Juwita reported a community service activity in South Konja Hamlet that used leaflets, discussions, and demonstrations of herbal drink preparation to provide health education to 26 participants.

Understanding was evaluated through questions and answers and verbal reflection (27). This approach may be considered when designing traditional medicine education in Toyado. The qualitative evaluation in that report did not measure changes in trust or the clinical effectiveness of the preparation. Its application in Toyado should therefore include educational outcome measures aligned with program objectives.

Regional reports of disrupted primary healthcare services emphasize the need to assess access barriers directly when planning community services (16). The Toyado findings provide information about recorded knowledge and trust scores in this sample, but do not identify disaster-related health needs or explain treatment choices after an event. Any disaster-focused service assessment in Toyado would require event history, individual exposure, facility damage, and measured interruptions to care.

Study Limitations

The cross-sectional design cannot establish temporal order or causality. Purposive sampling in one village limits population inference, and neither confidence intervals nor demographic adjustment correct nonprobability selection bias. No a priori correlation-specific power calculation or recruitment denominator was documented. The exploratory adjustment included age, education, and ethnicity, but residual confounding by actual medicine use, information sources, income, and healthcare access remains possible. Some demographic groups were small, limiting stability of the adjusted estimates. Household identifiers were unavailable, so within-household dependence could not be evaluated.

Measurement limitations are substantial. The documented coefficient alpha of 0.644 indicates that the knowledge score should be interpreted cautiously, and the sample used for that estimate was not clearly identified. No numerical reliability estimate or item-level diagnostic was available for the questionnaire-defined trust score. The knowledge answer key was not independently verified, while the trust index combined safety beliefs, social experience, and behavioral intentions; content validity, age comparability, and a unidimensional structure were not established. The high proportion at the maximum knowledge score may also restrict discrimination. Because individual item-level data were not included in the manuscript package, additional reliability or factor analyses could not be verified during revision.

Some participants had difficulty understanding Indonesian questionnaire statements. Oral assistance without a documented standard script and undocumented response privacy may have introduced interviewer, acquiescence, or social-desirability effects. Four participants were younger than 18 years. The adult-only sensitivity analysis addresses the robustness of the statistical association but does not remedy the absence of documented parental or guardian permission and assent procedures. Disaster exposure, event dates, facility damage, and disaster-related access interruptions were not measured, so disaster effects cannot be inferred.

CONCLUSION

Knowledge and questionnaire-defined trust scores were positively associated among the 93 surveyed Toyado participants (Spearman's ρ = 0.456; 95% CI: 0.267–0.614; $p < 0.001$). The association was smaller after exploratory adjustment for age, education, and ethnicity (partial rank correlation = 0.360; 95% CI: 0.160–0.571; $p < 0.001$), with similar adult-only estimates. Good-category scores were observed in 58.1% for knowledge and 48.4% for questionnaire-defined trust, but the category cutoffs were descriptive and not validated locally. Purposive sampling, limited documented reliability, common-method bias, and heterogeneous trust items constrain interpretation. The findings apply to this nonprobability sample and do not establish causal or disaster-related explanations.

Community nursing assessments can explore residents' information needs, treatment beliefs, and actual herbal medicine use while providing understandable information on evidence, product quality, interactions, and safety. Educational approaches should be evaluated prospectively rather than assumed to increase trust. Future research should use culturally adapted and validated instruments, document scoring keys and reliability, recruit probability-based or clearly defined consecutive samples when feasible, measure treatment experience and healthcare access, and obtain prospective ethics approval with age-appropriate parental permission and assent procedures where minors are included.

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none

Conflict of Interest

The authors declare that they have no financial, personal, or professional conflicts of interest related to this study.

Author Contribution

DDT contributed to the study conceptualization, research design, methodology, data collection, data analysis, and manuscript drafting. NH contributed to methodological development, data analysis, interpretation of findings, and manuscript review. MWM contributed to research supervision, data interpretation, and critical revision of the manuscript for important intellectual content. All authors reviewed and approved the final version of the manuscript.

REFERENCES

1. World Health Organization. Global traditional medicine strategy 2025–2034. Geneva: World Health Organization; 2025. Available from: https://www.who.int/publications/i/item/9789240113176.
2. World Health Organization. WHO global report on traditional, complementary and integrative medicine 2024. Geneva: World Health Organization; 2025. Available from: https://www.who.int/publications/i/item/9789240111387.
3. Pradipta IS, Aprilio K, Febriyanti RM, Ningsih YF, Pratama MAA, Indradi RB, et al. Traditional medicine users in a treated chronic disease population: a cross-sectional study in Indonesia. BMC Complement Med Ther. 2023;23:120. doi:10.1186/s12906-023-03947-4.
4. Harfiani E, Puspita R, Prabarini IRS. Herbal medicine usage during the COVID-19 pandemic in Indonesia: trends and determinants. ScientificWorldJournal. 2025;2025:1639500. doi:10.1155/tswj/1639500.
5. Wikara T, Astuti S, Nurhayati S, Simanjuntak RUC, Sari ER, Dhewi OR. Public knowledge of safety of traditional medicines and the risk of chemical drug substances in Indonesia. Jurnal Farmasi Indonesia. 2026;18(2):323–331. doi:10.35617/jfionline.v18i2.791.
6. Kristianto H, Pramesona BA, Rosyad YS, Andriani L, Putri TARK, Rias YA. The effects of beliefs, knowledge, and attitude on herbal medicine use during the COVID-19 pandemic: a cross-sectional survey in Indonesia (version 3; peer review: 2 approved). F1000Research. 2022;11:483. doi:10.12688/f1000research.116496.3.
7. Agustini NPD, Megawati F, Juliadi D, Widiari NNS. Tingkat pengetahuan penggunaan tanaman obat tradisional sebagai alternatif pengobatan pada masyarakat Desa Wisata Bindu. Usadha. 2023;2(3):9–14. doi:10.36733/usadha.v2i3.7145.
8. Hidayatul N, Suryantoto B. Tingkat pengetahuan dan penggunaan obat tradisional sebagai upaya pengobatan mandiri masyarakat Desa Sarikemuning Kabupaten Lumajang. Jurnal Ilmiah Farmasi Akademi Farmasi Jember. 2024;7(1):19–28. doi:10.53864/jifakfar.v7i1.87.
9. Maharianingsih NM. Hubungan pengetahuan dan sikap terhadap pola penggunaan obat tradisional untuk swamedikasi di masyarakat Kota Denpasar. Indones J Pharm Educ. 2023;3(1):51–62. doi:10.37311/ijpe.v3i1.18886.
10. Wiyono WI, Lolo WA, Yamlean PVY. Traditional vs. modern medicine: community preferences and health anthropology in North Sulawesi. Borneo J Pharm. 2026;9(2):235–245. doi:10.33084/bjop.v9i2.11186.
11. Febriyanti RM, Saefullah K, Susanti RD, Lestari K. Knowledge, attitude, and utilization of traditional medicine within the plural medical system in West Java, Indonesia. BMC Complement Med Ther. 2024;24:64. doi:10.1186/s12906-024-04368-7.
12. Haruna MF, Kenta AM, Herawati. Medicinal plants used by the community of Lipulalongo Village, Banggai Laut District, Central Sulawesi, Indonesia. Asian J Ethnobiol. 2022;5(1):62–68. doi:10.13057/asianjethnobiol/y050107.

13. Pitopang R, Asrun, Banilai PAS, Sangadji MN, Mertosono S. Traditional medicinal plants used by To Bungku Ethnic in Morowali District, Central Sulawesi, Indonesia. Asian J For. 2025;9(1):45–52. doi:10.13057/asianjfor/r090105.
14. Hapid A, Ariyanti A, Erniwati E, Suena NMDS, Adrianta KA, Yuniarti K, et al. Diversity of types of medicinal plants and local wisdom of the Kaili Tribe in processing medicinal plants around the forest areas of Central Sulawesi, Indonesia. Pharmacogn J. 2023;15(4):535–540. doi:10.5530/pj.2023.15.115.
15. Hasbi F, Surahman S. Pengetahuan, sikap, dan tindakan dalam memilih swamedikasi antara obat konvensional dan herbal selama tahun 2021 sampai 2022 di Kelurahan Pademangan Barat. Indones J Pharm Sci Technol. 2024;Suppl 6(2):68–77. doi:10.24198/ijpst.v6i2.52644.
16. Wahidin M, Pane M, Purnama TB, Maemun S, Egawa S. Health system disruption at the primary health center level affected by earthquake, tsunami, and liquefaction in 3 districts of Central Sulawesi, Indonesia. Disaster Med Public Health Prep. 2023;17:e95. doi:10.1017/dmp.2021.368.
17. Lestari DA. Gambaran pengetahuan, kepercayaan masyarakat dan efek samping penggunaan obat herbal di Kabupaten Lampung Timur (undergraduate thesis). Jakarta: UIN Syarif Hidayatullah Jakarta; 2020. Available from: https://repository.uinjkt.ac.id/dspace/handle/123456789/64505.
18. Sari Y, Anam A, Sumeru A, Sutrisna E. The knowledge, attitude, practice and predictors of complementary and alternative medicine use among type 2 diabetes mellitus patients in Indonesia. J Integr Med. 2021;19(4):347–353. doi:10.1016/j.joim.2021.04.001.
19. Madania, Pakaya MS, Papeo P. Hubungan pengetahuan dan sikap terhadap tindakan pemilihan obat untuk swamedikasi. Indones J Pharm Educ. 2021;1(1):20–29. doi:10.37311/ijpe.v1i1.9948.
20. Ekasari W, Hardjono S, Sugijanto, Ekowati J, Wijaya IN, Widiandani T. The knowledge of Lombok Praya-Indonesia regional community on the safety use of medicinal plants. Berkala Kedokteran. 2021;17(2):113–124. doi:10.20527/jbk.v17i2.11671.
21. Izzati BDW, Nurbaety B, Nopitasari BL, Suprianto A. Tingkat pengetahuan, sikap, dan tindakan dalam pemanfaatan tanaman sebagai obat tradisional oleh masyarakat di Desa Pringgabaya Kabupaten Lombok Timur. Lumbung Farmasi: Jurnal Ilmu Kefarmasian. 2022;3(1):29–33. doi:10.31764/lf.v3i1.6357.
22. Apsari DP, Wintariani NP. Pengetahuan, sikap dan praktik masyarakat Kecamatan Kintamani terhadap penggunaan obat tradisional. MEDFARM: Jurnal Farmasi dan Kesehatan. 2022;11(2):193–203. doi:10.48191/medfarm.v11i2.95.
23. Ningsih NPMA, Wintariani NP, Setiawan PYB, Putri DWB. Determinan sosiodemografi terhadap pengetahuan dan perilaku penggunaan obat tradisional pada masyarakat. Widya Kesehatan. 2026;8(1):22–30. Available from: https://ejournal.unhi.ac.id/index.php/widyakesehatan/article/view/4319.
24. Sayuti NA, Atikah N. The pattern of herbal medicines use for breastfeeding mother in Jogonalan, Klaten, Indonesia: a mini survey. BMC Complement Med Ther. 2023;23:399. doi:10.1186/s12906-023-04235-x.
25. Purwono S, Nisa U, Astana PRW, Wijayaningsih RA, Wicaksono AJ, Wahyuningsih MSH, et al. Factors affecting the perception of Indonesian medical doctors on herbal medicine prescription in healthcare facilities: qualitative and quantitative studies. J Herb Med. 2023;42:100747. doi:10.1016/j.hermed.2023.100747.
26. Dewi RS, Aryani F, Hidayani Y. Pengaruh pemberian leaflet terhadap pengetahuan masyarakat tentang obat tradisional. Jurnal Manajemen dan Pelayanan Farmasi. 2021;11(2):114–121. doi:10.22146/jmpf.60889.
27. Nurwahita, Matorang MW, Juwita H. Edukasi dan Demonstrasi Pemanfaatan Serai Sebagai Terapi Komplementer Pencegahan Hipertensi di Dusun Konja Selatan. Omni Pengabdian Masyarakat. 2025;2(4):107–115. doi:10.65277/opm.v2i4.1