

Community knowledge of family medicinal plants by age and education in Pusu Village Residents

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ABSTRACT

Family Medicinal Plants (*Tanaman Obat Keluarga*, TOGA) constitute an important component of local knowledge that supports family health. However, evidence regarding the relationship between demographic characteristics and community knowledge of TOGA utilization and cultivation among indigenous communities in peri-urban transitional areas remains limited. This study aimed to analyze community knowledge of TOGA utilization and cultivation and to examine its relationship with age and educational level among the Dawan (Amanuban) sub-ethnic community in Pusu Village, South Central Timor Regency, Indonesia. A quantitative study employing a descriptive-analytical design was conducted. A total of 53 respondents were selected using purposive sampling. Data were collected through a structured questionnaire and analyzed using descriptive statistics and Spearman's rank correlation test at a 5% significance level. The results showed that most respondents had a low level of knowledge regarding the utilization (73.6%) and cultivation (71.7%) of TOGA. Correlation analysis revealed that age was not significantly associated with knowledge of TOGA utilization ($p = 0.172$, $p = 0.219$) or cultivation ($p = 0.031$, $p = 0.823$). Similarly, educational level was not significantly associated with knowledge of TOGA utilization ($p = 0.268$, $p = 0.052$) or cultivation ($p = -0.003$, $p = 0.984$). These findings indicate that the distribution of TOGA-related knowledge among the Dawan (Amanuban) community is not significantly influenced by age or formal educational attainment. Therefore, community-based educational programs that engage all demographic groups are needed to promote the preservation and sustainable utilization of TOGA.

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INTRODUCTION

Family Medicinal Plants (*Tanaman Obat Keluarga*, TOGA) represent an important form of biodiversity utilization that has long been integrated into Indonesia's local knowledge systems to support family healthcare. From an ethnobotanical perspective, TOGA is not merely regarded as a source of traditional medicine but also reflects the dynamic relationship between local communities and plant resources, shaped through accumulated experience, daily practices, and intergenerational knowledge transmission (Jadid et al., 2020; Aqidah et al., 2025). The utilization of medicinal plants

has continued to evolve, ranging from the preparation of traditional herbal remedies to the development of standardized herbal medicines and phytopharmaceutical products. Consequently, community knowledge regarding plant identification, medicinal uses, processing methods, and cultivation techniques is essential to ensuring the safe, effective, and sustainable utilization of medicinal plants ([Jadid et al., 2020](#); [Agize et al., 2022](#)). Therefore, the sustainability of TOGA utilization depends not only on the availability of plant resources but also on the community's capacity to preserve and transmit this knowledge across generations.

Despite the strategic role of TOGA in supporting family healthcare, community knowledge regarding its utilization and cultivation remains highly variable. Many community members are familiar with medicinal plants only at a basic level and still lack adequate knowledge concerning their medicinal properties, processing methods, and cultivation practices ([Sari & Astuti, 2020](#); [Puspitasari et al., 2021](#)). At the same time, modernization, changing lifestyles, increasing access to modern healthcare services, and advances in information technology have influenced the transmission of local knowledge, which was traditionally maintained through direct experience and intergenerational communication ([Santhyami et al., 2023](#)). These changes may reduce the intensity of knowledge transmission related to TOGA, thereby increasing the vulnerability of its continued utilization as an integral component of family healthcare systems. This situation highlights the continuing need to strengthen community knowledge regarding the utilization and cultivation of TOGA in order to preserve local knowledge while enhancing community health self-reliance ([Wardani et al., 2023](#); [Rudini et al., 2024](#)).

Strengthening community knowledge regarding the utilization and cultivation of TOGA represents an important strategy for preserving local knowledge while promoting the sustainable use of medicinal plant resources. Adequate knowledge enables communities not only to recognize and utilize medicinal plants appropriately but also to cultivate them sustainably, thereby supporting the availability of medicinal plant resources for future generations ([Wahidah et al., 2025](#)). Furthermore, improving community capacity in the management of TOGA contributes to promoting preventive and promotive healthcare, in line with efforts to enhance community health self-reliance. Therefore, educational and community empowerment programs that are tailored to local social and demographic characteristics are needed to optimize the utilization and cultivation of TOGA as part of a sustainable family healthcare system.

Previous studies have demonstrated that multiple factors, including individual characteristics and educational interventions influence community knowledge of Family Medicinal Plants (TOGA). [Jadid et al. \(2020\)](#) emphasized that the use of medicinal plants in Indonesia is an important component of the country's ethnobotanical heritage and should be supported by adequate community knowledge of plant identification, medicinal uses, processing methods, and cultivation techniques to ensure their safe and sustainable use. Other studies have reported considerable variation in community knowledge of TOGA, indicating that many individuals recognize medicinal plants only at a basic level without possessing a comprehensive understanding of their utilization or cultivation practices ([Sari & Astuti, 2020](#); [Puspitasari et al., 2021](#)). Furthermore, educational and training programs have been shown to significantly improve community knowledge regarding the

utilization and processing of TOGA, highlighting community capacity building as an essential strategy for promoting community-based TOGA development (Octavia et al., 2021).

Several studies have also examined the relationship between demographic characteristics and community knowledge or utilization of TOGA; however, their findings remain inconsistent. Kusuma and Maida (2022) reported that age and gender were significantly associated with community knowledge regarding the utilization of TOGA. In contrast, Jannah et al. (2022) found that although age was significantly associated with TOGA utilization, educational level showed no significant relationship. Meanwhile, social transformation, modernization, and improved access to education and healthcare services have also influenced the transmission of traditional medicinal plant knowledge, making the distribution of local knowledge increasingly dynamic (Santhyami et al., 2023). These findings suggest that community knowledge of TOGA is shaped not only by demographic characteristics but also by social conditions and learning processes that evolve within each community.

Although numerous studies have investigated community knowledge and the utilization of Family Medicinal Plants (TOGA) in Indonesia, most have focused on medicinal plant inventories, levels of community knowledge, or factors influencing the utilization of TOGA within specific communities (Jadid et al., 2020; Jannah et al., 2022). Studies examining the relationship between demographic characteristics and knowledge of TOGA have also produced inconsistent findings, particularly regarding the influence of age and educational level on community knowledge of both the utilization and cultivation of medicinal plants. Moreover, published research specifically investigating the relationship between age, educational level, and knowledge of TOGA utilization and cultivation among the Dawan (*Amanuban*) community living in a transitional (*peri-urban*) area remains very limited. This is noteworthy because the characteristics of transitional areas, which are experiencing social transformation accompanied by improved access to education, healthcare services, and modern information, may influence the acquisition, distribution, and transmission of medicinal plant knowledge. These limitations highlight the need for empirical research that examines the relationship between demographic characteristics and TOGA knowledge within the context of local communities undergoing social change.

Pusu Village, Amanuban Barat District, South Central Timor Regency, was selected as the study site because its characteristics are highly relevant to the objectives of this research. In addition to its rich biodiversity that supports the development of Family Medicinal Plants (TOGA), Pusu Village is a transitional (*peri-urban*) area currently undergoing social transformation. This transformation is reflected in improved access to education, healthcare services, information technology, and social mobility, all of which may influence how communities acquire, maintain, and transmit medicinal plant knowledge. From an ethnobotanical perspective, these changes suggest that traditional knowledge is no longer acquired exclusively through direct experience and intergenerational transmission but also through formal education, healthcare professionals, and various modern information sources (Hassan et al., 2024). Furthermore, Pusu Village is inhabited by people from several ethnic groups originating from Timor Island and other regions of Indonesia, including the Amanuban, Amanatun, Mollo, Sabu, Rote, Alor, Flores, Javanese, and Bugis communities. Nevertheless, this study focuses specifically on the Dawan (*Amanuban*) community

because they continue to preserve the tradition of utilizing TOGA through intergenerational knowledge transmission and have previously been the focus of ethnobotanical research (Tefu & Sabat, 2022). These characteristics make Pusu Village an appropriate setting for investigating the relationship between age, educational level, and community knowledge regarding the utilization and cultivation of TOGA within the context of social transformation in a transitional (*peri-urban*) area.

The novelty of this study lies not only in examining the relationship between age, educational level, and community knowledge regarding the utilization and cultivation of Family Medicinal Plants (TOGA), but also in situating this analysis within the context of the Dawan (*Amanuban*) community living in a transitional (*peri-urban*) area. This approach enables the identification of the distribution of ethnobotanical knowledge across two key dimensions of TOGA, namely utilization and cultivation, within a community experiencing ongoing social transformation. Consequently, this study enriches the ethnobotanical literature on the dynamics of medicinal plant knowledge transmission in local communities undergoing social change while providing a scientific basis for developing more context-specific educational and community empowerment strategies.

Based on the research background, previous studies, and the identified research gap, this study aims to analyze the level of community knowledge regarding the utilization and cultivation of Family Medicinal Plants (TOGA) and to examine the relationships between age, educational level, and such knowledge among the Dawan (*Amanuban*) community in Pusu Village, Amanuban Barat District, South Central Timor Regency. The findings are expected to provide empirical evidence on the relationships between demographic characteristics and community knowledge of TOGA within a transitional (*peri-urban*) setting, thereby serving as a scientific basis for developing educational and community empowerment strategies based on local potential to support the preservation of ethnobotanical knowledge and the sustainable utilization of TOGA.

This study is expected to contribute both theoretically and practically to the advancement of ethnobotanical research. From a theoretical perspective, it provides empirical evidence regarding the relationships between demographic characteristics and community knowledge of the utilization and cultivation of Family Medicinal Plants (TOGA) among the Dawan (*Amanuban*) community living in a transitional (*peri-urban*) area, thereby enriching the understanding of ethnobotanical knowledge distribution and the dynamics of medicinal plant knowledge transmission in local communities undergoing social transformation. From a practical perspective, the findings are expected to provide a scientific basis for local governments, healthcare professionals, educational institutions, and other stakeholders in designing educational and community empowerment programs that are responsive to local social and cultural characteristics. In addition, the findings are expected to support the preservation of local medicinal plant knowledge while promoting the optimal and sustainable utilization and cultivation of TOGA as part of strengthening community health self-reliance.

METHOD

This study employed a quantitative approach using a descriptive-analytical design to describe the level of community knowledge regarding the utilization and cultivation of Family Medicinal Plants (TOGA) and to examine its relationship with age and educational level. This approach was

selected because it enables the objective presentation of numerical data and facilitates statistical analysis of the relationships between age, educational level, and community knowledge of TOGA (Sugiyono, 2019). The study was conducted in Pusu Village, South Central Timor Regency, a transitional (peri-urban) area characterized by social conditions that lie between rural and urban communities.

The study population comprised all residents of Pusu Village, totaling 2,387 individuals, based on the village administrative records for the study year. However, in accordance with the study objectives, the target population was limited to the Dawan (Amanuban) community, as this research represents a continuation of previous studies focusing on this ethnic group. Pusu Village is a multiethnic community inhabited by several ethnic and sub-ethnic groups, including Amanuban, Amanatun, Mollo, Sabu, Rote, Alor, Flores, Javanese, and Bugis communities.

Data were collected from five neighborhood units (*Rukun Tetangga*, RTs) out of a total of 13 RTs in Pusu Village. These five RTs were selected based on village administrative records and information provided by village officials, indicating that they had the highest concentration of Dawan (Amanuban) residents compared with the remaining RTs. This selection ensured that the respondents were representative of the target population and that the information obtained was relevant to the study objectives.

Respondents were subsequently selected using purposive sampling based on the following inclusion criteria: (1) belonging to the Dawan (Amanuban) community; (2) being 18 years of age or older; (3) possessing knowledge or experience related to the utilization of Family Medicinal Plants (TOGA); and (4) providing informed willingness to participate in the study. A total of 53 respondents met all inclusion criteria and were included in the study. This number represented all eligible individuals identified within the five selected RTs during the study period.

In purposive sampling, the sample size is determined by the extent to which respondents possess characteristics that are relevant to the research objectives rather than by the proportion of the overall population (Palinkas et al., 2015). Accordingly, this study did not perform a statistical power analysis prior to sampling because all individuals who met the inclusion criteria within the selected study area were included. Therefore, the findings should be interpreted with caution, particularly with respect to their generalizability.

The research instrument consisted of a structured questionnaire developed based on the indicators of the study variables. The questionnaire comprised two main sections. The first section collected respondents' demographic characteristics, including age (one item) and educational level (one item). The second section assessed respondents' knowledge of Family Medicinal Plants (TOGA) through 11 questionnaire items.

The knowledge instrument covered two dimensions: knowledge of the medicinal benefits of TOGA (five items) and knowledge of TOGA cultivation (six items). Each knowledge item was scored using a dichotomous scoring system, in which a correct answer received a score of 1, whereas an incorrect answer received a score of 0 (Pramestutie et al., 2021). The total knowledge score was calculated by summing the correct responses and then converted into a percentage using the following formula: $(\text{total score obtained} / \text{maximum possible score}) \times 100\%$.

Knowledge levels were subsequently classified into three categories: poor (<60%), moderate (60–79%), and good ($\geq 80\%$). The total knowledge score was used for inferential statistical analyses of the relationships among the study variables, whereas the knowledge categories were used to present the findings descriptively.

Prior to data collection, the questionnaire was tested for validity and reliability using 35 respondents with characteristics similar to those of the target population but not included in the final study sample.

Instrument validity was evaluated using the Pearson Product–Moment correlation, which assessed the correlation between the score of each questionnaire item and the total instrument score. The results showed that all 11 questionnaire items had calculated correlation coefficients (r-values) exceeding the critical r-value (0.334) at the 5% significance level, indicating that all items were valid.

Instrument reliability was subsequently assessed using Cronbach's Alpha, yielding a coefficient of 0.736, which indicates good internal consistency. Therefore, the questionnaire was considered sufficiently reliable for use as the data collection instrument.

Before completing the questionnaire, all respondents received an explanation of the study objectives and were asked to provide informed consent as part of the research ethics procedure. This process ensured that participation was voluntary and conducted in accordance with the ethical principles governing social research.

The collected data were analyzed using both descriptive and inferential statistical analyses. Descriptive analysis was performed to summarize the respondents' characteristics and their level of knowledge regarding the medicinal benefits and cultivation of Family Medicinal Plants (TOGA). The results were presented as frequency distributions, percentages, and knowledge scores.

Inferential analysis was conducted using Spearman's rank correlation test to examine the relationships between age, educational level, and respondents' knowledge scores regarding the medicinal benefits and cultivation of TOGA. Spearman's rank correlation was selected because it is appropriate for assessing associations involving ordinal and numerical variables, particularly when the knowledge scores do not meet the assumptions of normal distribution or expected cell frequencies required for the Chi-square test. All statistical analyses were performed using a 5% significance level ($\alpha = 0.05$).

RESULTS AND DISCUSSION

To describe the level of community knowledge regarding the medicinal benefits of TOGA, a descriptive analysis was performed based on respondents' knowledge scores. The distribution of community knowledge levels is presented in Table 1.

Table 1. Community knowledge levels regarding the medicinal benefits of TOGA

Knowledge Level	Frequency	Percentage (%)
Poor	39	73.6
Moderate	12	22.6
Good	2	3.8
Total	53	100

The majority of respondents demonstrated a poor level of knowledge regarding the medicinal benefits of TOGA (73.6%), indicating that the Dawan (*Amanuban*) community in Pusu Village has a

relatively limited understanding of the medicinal uses of various plant species. This finding suggests that the household utilization of medicinal plants is not yet fully supported by adequate knowledge of plant identification, medicinal properties, and their appropriate use. Furthermore, it indicates that knowledge of medicinal plants is unevenly distributed within the community, highlighting the need for efforts to strengthen community understanding of the medicinal benefits of a wider range of medicinal plant species.

These findings are consistent with those reported by [Sujarwo et al. \(2016\)](#) and [Febriyanti et al. \(2026\)](#), who found that community knowledge of medicinal plants is generally limited to the species most frequently used within households or local communities. From an ethnobotanical perspective, knowledge of medicinal plants constitutes a component of Local Ecological Knowledge (LEK), which develops through continuous interactions between communities and their environment and is transmitted across generations through everyday experiences and practices. Consequently, differences in knowledge levels among community members may reflect variations in knowledge transmission processes, experience using medicinal plants, and the intensity of interactions with the surrounding environment.

These findings underscore the importance of documenting and preserving medicinal plant knowledge as an essential component of ethnobotanical research, particularly in communities undergoing social transformation. Limited knowledge of the medicinal benefits of TOGA may reduce the optimal utilization of local biological resources if efforts to preserve and transmit this knowledge to future generations are not maintained. Therefore, the present study provides empirical evidence regarding the current state of medicinal plant knowledge among the Dawan (*Amanuban*) community, which may serve as a basis for future research investigating the factors influencing the distribution of medicinal plant knowledge within local communities.

To determine the level of community knowledge regarding the cultivation of Family Medicinal Plants (TOGA), a descriptive analysis was conducted based on respondents' knowledge scores, which were subsequently classified into three categories: poor, moderate, and good. The results of the analysis are presented in Table 2.

Table 2. Community knowledge levels regarding TOGA cultivation

Knowledge Level	Frequency	Percentage (%)
Poor	38	71.7
Moderate	8	15.1
Good	7	13.2
Total	53	100

The majority of respondents demonstrated a poor level of knowledge regarding TOGA cultivation (71.7%). This finding indicates that the Dawan (*Amanuban*) community in Pusu Village still has limited knowledge of the basic techniques required for cultivating medicinal plants, including seedling selection, planting, plant maintenance, and crop management to ensure their sustainable use. Although some community members are familiar with the utilization of medicinal

plants, their knowledge of cultivation practices has not yet developed optimally. This finding suggests that the sustainability of medicinal plant utilization depends not only on knowledge of the medicinal properties of plants but also on the community's capacity to cultivate them effectively.

These findings are consistent with those reported by [Yani and Susilawati \(2022\)](#), who found that the successful household utilization of TOGA is strongly influenced by the community's ability to cultivate medicinal plants. Similarly, [Octavia et al. \(2021\)](#) and [Pala et al. \(2019\)](#) demonstrated that training programs on TOGA cultivation and processing significantly improved community knowledge by providing participatory learning experiences. From an ethnobotanical perspective, the cultivation of medicinal plants serves not only to maintain the availability of biological resources but also as an important mechanism for preserving local knowledge through continuous practice within households and local communities.

These findings indicate that limited knowledge of TOGA cultivation may adversely affect the sustainability of medicinal plant utilization at the household level. When communities possess limited cultivation knowledge, the availability of medicinal plants in home gardens may decline, thereby reducing opportunities to utilize them as an alternative approach to maintaining family health. Therefore, the present study provides empirical evidence regarding the current state of TOGA cultivation knowledge among the Dawan (*Amanuban*) community, which may serve as a foundation for future research aimed at identifying the factors influencing the successful cultivation of medicinal plants within local communities.

To examine the relationships between age, educational level, and community knowledge scores regarding the medicinal benefits and cultivation of Family Medicinal Plants (TOGA), an inferential analysis was conducted using Spearman's rank correlation test. This test was employed to determine the strength and direction of the relationships between respondents' demographic characteristics and their TOGA knowledge scores. The results of analysis are presented in Table 3.

Table 3. Relationships between age, educational level, and community knowledge scores of TOGA

Variable	Spearman's rho (ρ)	p-value	Interpretation
Age – Knowledge of the Medicinal Benefits of TOGA	0.172	0.219	Not significant
Age – Knowledge of TOGA Cultivation	0.031	0.823	Not significant
Educational Level – Knowledge of the Medicinal Benefits of TOGA	0.268	0.052	Not significant (Weak positive relationship)
Educational Level – Knowledge of TOGA Cultivation	-0.003	0.984	Not significant

The analysis showed that age was not significantly associated with community knowledge regarding either the medicinal benefits of TOGA ($\rho = 0.172$; $p = 0.219$) or TOGA cultivation ($\rho = 0.031$; $p = 0.823$). These findings indicate that, among the Dawan (*Amanuban*) community in Pusu Village, increasing age is not necessarily accompanied by greater knowledge of medicinal plants. Therefore, the distribution of TOGA knowledge within the study community does not appear to be determined solely by age but is likely influenced by other factors that were not examined in the present study.

These findings are consistent with those reported by [Albuquerque et al. \(2021\)](#) and [Tamene et al. \(2024\)](#), who explained that ethnobotanical knowledge does not necessarily increase with age but

is shaped by individual experience, the intensity of interactions with the surrounding environment, and social learning processes within the community. Accordingly, age should not be regarded as the sole indicator explaining variations in medicinal plant knowledge, particularly in communities undergoing social transformation, such as Pusu Village.

In contrast to age, educational level showed a positive trend in its relationship with knowledge of the medicinal benefits of TOGA ($\rho = 0.268$; $p = 0.052$), although this relationship was not statistically significant. Conversely, educational level showed virtually no relationship with knowledge of TOGA cultivation ($\rho = -0.003$; $p = 0.984$). These findings suggest that formal education alone does not adequately explain variations in community knowledge of TOGA. Knowledge of medicinal plants is likely acquired through multiple learning pathways, including personal experience, social interactions, and the transmission of knowledge within families and local communities.

The findings of the present study differ from those reported by [Peltzer and Pengpid \(2019\)](#) and [Oktarlina et al. \(2018\)](#), who found that educational level was associated with the utilization of traditional medicine in Indonesia. This discrepancy suggests that the relationship between education and medicinal plant knowledge is strongly influenced by the socio-cultural characteristics of the community being studied. Within the Dawan (*Amanuban*) community, knowledge of medicinal plants is likely transmitted primarily through cultural inheritance rather than through formal education. However, because this study did not collect data on respondents' sources of knowledge, this interpretation should be considered tentative and requires further investigation in future studies.

Overall, the findings indicate that variations in community knowledge regarding the medicinal benefits and cultivation of TOGA among the Dawan (*Amanuban*) community cannot be adequately explained by either age or formal educational level. These results reinforce the view that the distribution of ethnobotanical knowledge is a complex phenomenon shaped by multiple social, cultural, and experiential factors. Therefore, future studies on medicinal plant knowledge should also consider other potential determinants, such as the frequency of medicinal plant use, involvement in traditional healing practices, access to health-related information, and the mechanisms through which local knowledge is transmitted.

The findings of this study have important practical implications for various stakeholders involved in the development of Family Medicinal Plants (TOGA) within local communities. Local and village governments may use these findings as a basis for designing community empowerment programs that integrate the cultivation and utilization of TOGA into community-based health initiatives. Community health centers (*Puskesmas*) and local health authorities may develop continuous educational programs, cultivation training, and technical assistance to promote the sustainable utilization of TOGA as part of preventive health promotion efforts. In addition, schools and higher education institutions may utilize TOGA gardens as local wisdom-based learning resources to enhance health literacy while preserving ethnobotanical knowledge among younger generations. Collaboration among these stakeholders is expected to support the sustainable utilization of TOGA while strengthening the preservation of the local knowledge of the Dawan (*Amanuban*) community.

This study has several limitations that should be considered when interpreting the findings. The number of respondents was relatively limited, as the study included only members of the Dawan (*Amanuban*) community who met the inclusion criteria across five selected neighborhood units (RTs) in Pusu Village. Furthermore, the use of purposive sampling limits the generalizability of the findings to the entire population of Pusu Village or to other Dawan communities. In addition, no statistical power analysis was conducted prior to sampling because the sample consisted of all individuals who met the inclusion criteria within the study area. Therefore, future studies are recommended to include a larger sample size, employ more representative sampling techniques whenever feasible, and investigate additional factors that may influence community knowledge regarding TOGA.

CONCLUSION

This study found that the Dawan (*Amanuban*) sub-ethnic community in Pusu Village has relatively low levels of knowledge regarding both the utilization and cultivation of Family Medicinal Plants (TOGA). Furthermore, age and formal educational level were not significantly associated with community knowledge of TOGA, indicating that demographic characteristics alone do not explain variations in medicinal plant knowledge.

This study contributes to the ethnobotanical literature by providing empirical evidence that the distribution of TOGA-related knowledge within a transitional (*peri-urban*) indigenous community is shaped by factors beyond age and formal education. These findings highlight the importance of participatory and community-based educational strategies that integrate local knowledge with practical learning to support the preservation and sustainable utilization of TOGA. Future studies should involve larger sample sizes and examine additional determinants of medicinal plant knowledge, including traditional knowledge transmission, personal experience, and access to health information.

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