

RELATIONSHIP BETWEEN EMPLOYEES KNOWLEDGE AND ATTITUDES TOWARD GOOD MANUFACTURING PRACTICES FOR TRADITIONAL MEDICINES IN A SMALL-SCALE TRADITIONAL MEDICINE ENTERPRISE

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ABSTRACT

Background: Small traditional medicine enterprises must implement Good Manufacturing Practice for Traditional Medicines (GMP-TM) to ensure that the resulting products meet established safety, quality, and efficacy requirements. The successful implementation of GMP-TM must be supported by the competence of the human resources involved. Adequate knowledge is expected to foster more good attitudes toward work standards or policies. However, research specifically examining this matter remains lacking. **Objective:** To determine the relationship between employees' knowledge and attitudes regarding GMP-TM at a small-scale traditional medicine enterprise. **Methods:** An analytical observational study using a cross-sectional design involving 30 participants (total sampling). The instrument used was a questionnaire, and data analysis was performed using Spearman's test. **Results:** All respondents had a good level of knowledge regarding the topic under study, namely 30 respondents (100%). A total of 28 respondents also demonstrated a very good attitude (93.33%), while 2 respondents (6.67%) had a good attitude. The Spearman correlation test yielded a p-value of 0.006 ($p < 0.05$) and an r-value of 0.492. **Conclusion:** There is a significant relationship between the respondents' level of knowledge and attitudes, with a moderate strength of relationship and a positive direction.

Keywords: Knowledge; Attitude; Good Manufacturing Practice; Small Traditional Medicine Enterprise

INTRODUCTION

Indonesia is a country with an abundance of biodiversity and great potential for the development of natural medicines. The use of natural medicinal plants has been practiced for generations and continues to be widely used today as a means of maintaining good health^[1]. This has contributed to the development of the natural-based medicine

industry, including small traditional medicine enterprises, which play an important role in producing traditional medicine products for the community^[2]. Small-scale traditional medicine enterprises are required to fulfill product quality requirements in accordance with the Good Manufacturing Practice for Traditional Medicines (GMP-TM) guidelines. GMP-TM regulates all aspects of

production, encompassing the quality management system, personnel, premises and facilities, equipment, sanitation and hygiene, documentation, production, quality control, and self-inspection. The implementation of GMP-TM aims to ensure that products are consistently produced in compliance with established safety, quality, and efficacy standards^[3].

Small-scale traditional medicine enterprises generally exhibit different characteristics from large traditional medicine enterprises, particularly in terms of production capacity, availability of facilities and equipment, organization structure and human resource management. These differences may influence the implementation of GMP-TM, particularly in the aspects of compliance with standard operating procedures. Therefore, understanding employee-related factors in small-scale enterprises is important, as the finding may provide specific insights into the challenges and opportunities of GMP-TM implementation^[4].

The successful implementation of GMP-TM is determined not only by adequate facilities and equipment but also by the competence of the human resources involved in the production process. Employees working in natural-based medicine production facilities must possess a good understanding of GMP-TM principles to carry out their work in accordance with established procedures. Such knowledge enables employees to comprehend the importance of sanitation, documentation, and process control, as well as the prevention of deviations that could compromise product quality^[5].

Beyond knowledge, attitude is equally important in shaping how employees behave at work. When employees have a positive attitude toward GMP-TM, they are more likely to commit to following standard operating procedures. On the other hand, a

negative attitude can lead to poor compliance, even if they know the procedures well. Ultimately, this lack of compliance can lower product quality and put consumer safety at risk^[6]. Therefore, knowledge and attitude are closely linked in shaping workplace behavior, including how well employees actually comply with GMP-TM.

The relation between knowledge and attitude has been widely studied across health and industrial settings. For instance, a study by Artati et al. (2025) found that employees' knowledge and attitude levels are directly linked to better workplace safety practices^[7]. Similarly, research by Prabawati et al. (2019) found that higher levels of knowledge can help improve individual compliance with established procedures^[8]. These findings suggest that adequate knowledge can help build a more positive attitude toward work standards and policies. Despite this, research specifically examining the relationship between employees' knowledge and attitudes toward GMP-TM implementation in small traditional medicine enterprises is still quite limited.

Based on this background, this study was conducted in a small-scale traditional medicine enterprise to analyze the relationship between employees' knowledge and attitudes toward GMP-TM implementation at the production facility. The findings are expected to provide valuable information for evaluating and improving human resource quality, as well as strengthening quality system implementation in natural-based medicine production.

METHODS

1. Research Design and Population

This quantitative study used an analytic observational design with a cross-sectional approach to analyze the relationship between employees' knowledge and attitudes toward GMP-TM in small traditional medicine

enterprises in Bali Province. The study was conducted in May 2026.

The study site was classified as a Small Traditional Medicine Enterprise (UKOT) in accordance with the applicable BPOM regulations. The total number of employees at the enterprise was 30, all of whom met the eligibility criteria and were invited to participate in the study. A total sampling method was used, meaning all eligible employees were included as respondents. Employees were included if they were actively working during the study, willing to participate, and completed the questionnaire fully. A total of 30 employees completed the questionnaire, resulting in a response rate of 100%.

2. Research Instruments and Data Collection

The research instrument was a structured questionnaire adapted from the GMP-TM guidelines issued by the National Agency of Drug and Food Control of the Republic of Indonesia (BPOM RI). The questionnaire consisted of three sections: respondent characteristics, knowledge, and attitude.

Prior to the study, the questionnaire was tested for validity using the Pearson Product-Moment correlation and for reliability using Cronbach's alpha. Only items that met the validity and reliability criteria were included in the study.

The knowledge questionnaire consisted of 20 true-or-false questions. Each correct answer was scored 1, and each incorrect answer 0. The total score was then converted into a percentage and categorized as good (76–100%), moderate (56–75%), or poor ($\leq 55\%$) knowledge.

The attitude questionnaire consisted of 10 statements measured using a five-point Likert scale: strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). Negative statements were reverse-

scored. The total attitude score was calculated by summing all item scores, then converted into a percentage and categorized as very good (81–100%), good (61–80%), moderate (41–60%), poor (21–40%), and very poor ($\leq 20\%$).

Data were collected online using Google Forms. The questionnaire link was distributed to all eligible employees through the Pharmacist in Charge. The collected data were then exported to Microsoft Excel for completeness checks, coding, and verification before analysis. Participation was entirely voluntary. Employees were informed that they had the right to decline participation or withdraw from the study at any time without any consequences to their employment status.

3. Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 27.0. Descriptive analysis was used to present respondent characteristics, as well as the distribution of knowledge and attitude levels in terms of frequencies and percentages.

The normality of the distribution of knowledge and attitude scores was tested using the Shapiro–Wilk test because the sample size was < 50 . Since neither variable was normally distributed ($p < 0.05$), the relationship between knowledge and attitude levels was analyzed using the Spearman Rank correlation test (Spearman's rho). The correlation coefficient (r) was used to describe the direction and strength of the relationship, while a p -value < 0.05 was set as the threshold for statistical significance at a 95% confidence level.

4. Ethical Considerations

The study was conducted after obtaining permission from the management of the study site. All respondents were provided with information regarding the purpose, benefits, and procedures of the

study, as well as assurances regarding data confidentiality. All respondent data was kept confidential and used solely for research purposes.

RESULTS AND DISCUSSION

1. Respondent Characteristics

The respondents in this study were employees at a small traditional medicine enterprise. The results showed that the majority were between 22 and 44 years old, accounting for 20 respondents (66.67%). This is likely because the company requires young, productive-age workers who are assumed to have optimal physical abilities, such as being fast, agile, and strong, as well as a strong memory for their work^[9-10-11]. Most of the respondents were female, totaling 23 people (76.67%), while only 7 were male (23.33%). This gender distribution is likely shaped by the available workforce and the specific needs of the company^[12].

The educational level of the respondents was predominantly high school/vocational high school, with 20 respondents (66.67%). This is consistent with the study by Banafsaj et al. (2023), which states that the high proportion of respondents with a high school/vocational high school education may be due to companies' need for workers who are deemed to already possess technical skills and are capable of carrying out operational processes in accordance with established standards^[5]. In addition, educational level may influence an individual's ability to receive and understand information^[13].

2. The Relationship Between Knowledge Level and GMP-TM

Data were collected from 35 workers, of whom 30 met the inclusion criteria and were invited to participate. All 30 eligible employees completed the questionnaire, and

no responses were excluded because of incomplete questionnaires. A solid understanding of GMP-TM is essential for all employees.

Table 1. Respondent Characteristics

Respondent Characteristics	Number (n)	Percentage
Age		
20-29 years	13	43.33%
30-39 years	5	16.67%
40-49 years	7	23.33%
≥50 years	5	16.67%
Gender		
Male	7	23.33%
Female	23	76.67%
Education Level		
Junior High School	2	6.67%
Senior High School	20	66.67%
Diploma	2	6.67%
Bachelor's Degree	4	13.33%
Professional Degree	2	6.67%

As shown in Table 2, all respondents (100%) demonstrated excellent knowledge of GMP-TM. This finding aligns with a study by Mengesha et al. (2023), which notes that characteristics such as educational background and work experience can positively influence employees' knowledge levels^[14]. Although the majority of respondents had a high school or vocational high school education, according to a study conducted by Banafsaj et al. (2023), knowledge of CPOTB is acquired not only through formal education but also through training, outreach, and ongoing work experience^[5].

Table 2. Respondents' Level of Knowledge

Variable	Number (n)	Percentage
Good	30	100%

3. The Relationship Between Attitude and GMP-TM

The results showed that most employees had a good attitude toward GMP-TM implementation. Specifically, 28 respondents (93.33%) had a very good attitude, whereas the remaining 2 (6.67%) had a good attitude. This finding aligns with a study by Haqqoni et al. (2026), which noted that most respondents already hold positive views toward implementing practices or rules they consider important. In this context, it reflects the employees' recognition of the importance of applying GMP-TM in traditional medicine production^[15]. This positive attitude is essential for maintaining consistent GMP-TM implementation, as it motivates employees to carry out their tasks and responsibilities with greater discipline and in line with company regulations^[16-17]. This, in turn, supports the company's efforts to maintain the quality, safety, and efficacy of the traditional medicines produced^[4].

Table 3. Respondents' Attitude Levels

Variable	Number (n)	Percentage
Very Good	28	93.33%
Good	2	6.67%

4. The Relationship Between Knowledge and Attitude Toward GMP-TM

The Spearman analysis showed a significant relationship between employees' knowledge and attitudes at a small traditional medicine enterprise ($p = 0.006$). It also found a moderate, positive correlation between the two variables ($r = 0.492$). This finding may be explained by the fact that knowledge plays a fundamental role in shaping attitudes. When employees have a comprehensive understanding the importance of GMP-TM, they become more aware of the need to follow regulations to ensure the final product meets quality standards^[18]. This positive relation also indicates that the higher a

person's level of knowledge, the more positive their attitude will be^[19]. This is consistent with the theory that knowledge is the primary foundation for the formation of attitudes^[20].

These findings are also consistent with previous research conducted by Rastika et al. (2022), which states that knowledge is crucial in shaping a person's behavior; therefore, increasing knowledge will lead to a reduction in the problems that occur^[21]. Likewise, Maria et al. (2022) emphasize that knowledge influences a person's attitude when making a decision regarding the problem at hand^[22].

Table 4. Correlation Between Employees' Knowledge and Attitude Toward GMP-TM Implementation

		Knowledge	Attitude
Knowledge	Correlation coefficient	1.000	0.492
	Sig. (2-tailed)		0.006
	N	30	30
Attitude	Correlation coefficient	0.492	1.000
	Sig. (2-tailed)	0.006	
	N	30	30

CONCLUSION

Based on the findings, we can conclude that all 30 respondents (100%) had good knowledge of the topic. Most of them also showed a very good attitude (28 respondents or 93.33%), while the remaining 2 (6.67%) had a good attitude. The Spearman correlation test also confirmed a significant relationship between knowledge and attitude ($p = 0.006$; $p < 0.05$). With a moderate and positive correlation ($r = 0.492$), this result indicates that employees with higher knowledge levels tended to have more positive attitudes toward GMP-TM. However, because this study employed a cross-sectional design, the findings indicate an association rather than a causal relationship. It is also possible that other factors, such as training, educational

background, work experience, and job position, contribute to developing employees' knowledge and positive attitudes.

To improve future research, we recommend that studies using longitudinal or interventional designs be conducted to further explore the direction of this relationship and to evaluate the influence of other factors, such as training, educational background, work experience, and job position, on employees' knowledge and attitudes toward GMP-TM.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

ACKNOWLEDGEMENT

The authors would like to express gratitude to the supervising lecturer and staff in the pharmacy department of Udayana University who have provided guidance in the completion of this research article.

REFERENCES

1. Cahya A, Kartika Wardhana C SS. Penelitian Pembangunan Pabrik Obat Tradisional PT . ABC dengan Kesesuaian Terhadap Peraturan CPOTB BPOM RI. 2025;5(25):830–9.
2. Safitri RA, Husni P. Implementasi Regulasi BPOM pada Industri Bahan Alam di Jawa Barat : Upaya Menjamin Mutu , Keamanan , dan Efikasi Produk Herbal. J Abdimas Indones [Internet]. 2025;5(4):3502–11. Available from: <https://dmi-journals.org/jai/article/download/2676/1898>
3. BPOM RI. Peraturan BPOM No 25 TAHUN 2021 Tentang Penerapan Cara Pembuatan Obat Tradisional Yang Baik. Bpom Ri. 2021;1–220.
4. Tistiyanto PD, Sukrasno S, Budiastuti B, Prima L. Kajian Penerapan Cara Pembuatan Obat Tradisional yang Baik pada Industri Ekstrak Bahan Alam di Indonesia. Pharm Biomed Sci J. 2023;5(1):23–34.
5. Banafsaj ZI, Dwinta E, Emelda E, Sarwadhamana RJ. Hubungan Riwayat Kerja Terhadap Pengetahuan Validasi Dan Kualifikasi Berdasarkan Cpotb Di Usaha Kecil Obat Tradisional Pt. X Di Daerah Istimewa Yogyakarta. J Insa Farm Indones. 2024;6(3):153–64.
6. Suwarni S, Handayani SA, Toyo EM. Penerapan CPOTB pada Usaha Kecil Obat Tradisional (UKOT) dan Usaha Menengah Obat Tradisional (UMOT) di Jawa Tengah Application of CPOTB in Traditional Medicine Small Businesses and Traditional Medicine Medium Enterprises in Central Java. Formosa J Sci Technol. 2022;1(4):393–410.
7. Yuni Artati , Lisneni Dewi IH. Hubungan Pengetahuan, Sikap dan Pengawasan Dengan Perilaku Tidak Aman di Bagian Produksi. 2025;17(2):138–50.
8. Prabawati DI, Prasetyo DB. Kepatuhan Pekerja Ketinggian dalam Melaksanakan Standard Operasional Procedure. 2019;14(November):29–34.
9. Attaqi LF. Analisis Pengaruh Tingkat Pendidikan, Upah, Usia, Pengalaman Kerja Dan Jam Kerja Terhadap Produktivitas Tenaga Kerja Pada Tenun Ikat Toraja. J Dev Econ Soc Stud. 2022;1Attaqi, L(1):123–41.
10. Ria Ambarwani, Nurlaila Hanum, Safuridar NS, Ria. 122-Article Text-872-2-10-20230617. 2026;4(1):21–7.
11. Shelomita Putri Amelia, Aurelya Putri Alzahrah, Dewi Safira. Pengaruh Persyaratan Usia Terhadap Peluang Kerja Bagi Tenaga Kerja Di Indonesia. Terang J Kaji Ilmu Sos Polit dan Huk. 2024;1(3):66–75.
12. Hidayat H, Ash Shidiqie JS. Faktor yang

- mempengaruhi penyerapan tenaga kerja perempuan di Indonesia tahun 2015 – 2021. *J Kebijak Ekon dan Keuang*. 2024;2(2):215–22.
13. Paskalina A Rumbewas, Antyo Pracoyo, Enny Haryanti RBB. Produktivitas Kerja Karyawan Pada PT . Bank Pembangunan Daerah Papua perubahan signifikan dalam dunia kerja yang berlangsung secara cepat dan berkelanjutan . output yang optimal dari segi kuantitas dan kualitas , tetapi juga mencerminkan tingkat. 2026;4(4):231–44.
 14. Mengesha Y, Dagnew Z, Aderaw Z, Telayneh AT, Temesgen T, Tegegne E, et al. Factors associated with the level of Knowledge and self-reported Practice toward safety precautions among Factory Workers in East Gojjam Zone, Northwest Ethiopia. *SAGE Open Med*. 2023;11.
 15. Habib Fatih Haqqoni, Triani Rahmadewi SA. ISSN 28079094 (Print) ISSN 28078489 (Online). 2025;5(2):108–20.
 16. Lukman L, Latif IN, Wongso R. Pengaruh Keselamatan Dan Kesehatan Kerja (K3) Dan Komitmen Organisasi Terhadap Kinerja Dengan Disiplin Kerja Sebagai Variabel Intervening. *Parad J Ilmu Ekon [Internet]*. 2025;8(3):125–42. Available from: <https://jurnal.feb-umi.id/index.php/PARADOKS/article/view/1363%0Ahttps://jurnal.feb-umi.id/index.php/PARADOKS/article/download/1363/981>
 17. Prasetyani D, Sari R, Pamulang U. Pengaruh Lingkungan Kerja dan Disiplin Kerja terhadap Kinerja Karyawan PT ISS Indonesia : Studi pada Divisi Cleaning Service Menara Astra Jakarta. 2026;6(2):866–75.
 18. Dedi Hanwar, Zakky Cholisoh, Heppy Purbasari, Muhammad Rifki Saufi, Yoeri Rafiqi Al Hanafi, Aliya Ullly Nihaya MA. Abdimas galuh. Abdimas Galuh. 2024;6(2):2225–31.
 19. Sunandar wati D, Sutiarsih E, Dwi Astutik N, Luhung M. Hubungan Pengetahuan Tentang Hipertensi Dengan sikap Pencegahan Terjadinya Komplikasi Hipertensi Di Puskesmas Janti Kota Malang. *J Keperawatan Dirgahayu*. 2023;5(2):16–24.
 20. Herlina M, Istiawati NF, Lailiya I. Analisis Korelasi Pengetahuan Lingkungan Terhadap Sikap Peduli Lingkungan. *Edu Soc J Pendidikan, Ilmu Sos Dan Pengabdian Kpd Masy*. 2025;5(1):954–60.
 21. Rastika Dewi NKD, Satriani NLA, Pranata GKAW. Hubungan Pengetahuan Dan Sikap Terhadap Perilaku Pencegahan Demam Berdarah Dengue Pada Masyarakat Di Kabupaten Buleleng. *J Ris Kesehat Nas*. 2022;6(1):67–73.
 22. Maria I, Wardhani A, Rusdi R. Hubungan Tingkat Pengetahuan Dan Sikap Keluarga Dalam Pertolongan Pertama Kegawatdaruratan Di Desa Sungai Alat Kecamatan Astambul. *J Keperawatan Suaka Insa*. 2022;7(2):195–9.