Open Access Health Scientific Journal
https://oahsj.org/index.php/oahsj Vol. 7 No. 2 August 2026, pp. 309-316
Research article

Maternal Self Medication for Cough and Cold Symptoms in Children Under Five in Tosaren Indonesia: *A cross sectional study of reported frequency and exploratory correlates*

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ARTICLE INFO

Keywords:
Cough and Cold,
Indonesia,
Maternal Behaviour,
Over the Counter Medicines,
Self Medication,
Under Five Children.

ABSTRACT

Background: Caregiver-initiated medication use for childhood cough and cold symptoms warrants attention because treatment decisions involve young children. This study described self-medication frequency in a selected community sample and explored five proposed maternal correlates.

Methods: An observational cross-sectional survey was conducted in Tosaren urban village, Kediri City, Indonesia, on 2–16 June 2025. Convenience sampling recruited 102 mothers of children aged 0–59 months. The stated eligibility criteria included prior self-medication for the child's cough or cold symptoms. A structured questionnaire assessed knowledge, socioeconomic status, attitude, ease of obtaining medicines, lifestyle and self-reported medication frequency. The source analysis used Spearman correlations and an ordinal logistic model.

Results: Of 102 respondents, 87 (85.3%) selected always, 10 (9.8%) often, four (3.9%) infrequently and one (1.0%) never. Each proposed predictor had an identical reported distribution of 83 respondents in the good category and 19 in the moderate category. The source reported correlation coefficients from 0.417 to 0.513, but the coefficient–p-value pairs require verification. The regression report did not provide coefficients, effect sizes, confidence intervals or model diagnostics; independent associations therefore cannot be established from the available report.

Conclusion: Frequent self-medication was reported within this selected sample, but these proportions are not community prevalence estimates. The proposed correlates remain exploratory pending verification of measurement, eligibility and statistical output. Product-level studies are needed to assess the appropriateness and safety of the reported practices.

INTRODUCTION

Caregivers sometimes select medicines for children without a contemporaneous medical evaluation. Such decisions may draw on prior experience, family recommendations or perceived symptom severity. A survey of Mexican parents identified flu and cough among common reasons for self-medicating children, illustrating the relevance of respiratory symptoms to household medicine use (Alonso-Castro et al., 2022).

Indonesian evidence also indicates that caregiver-initiated medication use deserves attention. Ahmed et al. (2021) reported self-medication in 50 of 85 mothers of children under five in Yogyakarta. That estimate describes the outcome and sample of the cited study; it should not be treated as a national prevalence or used as a direct benchmark for a frequency scale among mothers selected for prior self-medication (Ahmed et al., 2021).

Received 15 May 2026; Accepted 19 July 2026; Published 15 August 2026
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The safety of cough and cold products depends on the ingredients and the child's age. The U.S. Food and Drug Administration (FDA, n.d.) warns against decongestant or antihistamine containing cough and cold products in children younger than two and notes manufacturers' labeling against use below four. The UK Medicines and Healthcare products Regulatory Agency (MHRA, 2014) advises against specified cough and cold ingredients below six. These are international safety references rather than statements of Indonesian regulatory requirements (FDA, n.d.; MHRA, 2014).

Potential correlates extend beyond knowledge. In China, associations involving caregiver education and access to medical institutions varied between urban and rural settings, suggesting that context matters when interpreting household medication decisions (Ge et al., 2021). A Bandung study separately documented parental misconceptions about antibiotic use and evaluated a learning module; its findings concern antibiotics and cannot be assumed to apply to every medicine used for cough and cold (Pitaloka et al., 2025).

This study aimed to describe reported self-medication frequency among participating mothers in Tosaren and to explore its relationship with knowledge, socioeconomic status, attitude, ease of obtaining medicines and lifestyle. Its contribution is local and exploratory. It does not estimate the prevalence of self-medication in all Tosaren households or determine whether individual treatments were clinically appropriate.

METHODS

Design setting and participants

An observational cross-sectional study was conducted in Tosaren urban village, Kediri City, East Java, Indonesia, from 2 to 16 June 2025. The sampling frame was described as 137 mothers of children aged 0–59 months registered in 2023–2024. Mothers residing in Tosaren who had self-medicated their child for cough or cold symptoms were eligible according to the source protocol description. Available eligible mothers who agreed to participate were recruited by convenience sampling until 102 questionnaires had been completed.

The source used $n = N/(1 + Ne^2)$, with $N = 137$ and $e = 0.05$, yielding approximately 102.05, and enrolled 102 respondents. This calculation describes how the reported target was chosen; it does not establish a probability-based 5% margin of error for convenience sampling or demonstrate adequacy for a five-predictor ordinal regression. The number approached, refusals, register updating and selection of an index child in households with multiple eligible children were not reported.

Variables and questionnaire

The outcome was maternal self-reported frequency of giving medicines for the child's cough and cold symptoms, categorized as always, often, infrequently or never. The five proposed predictors were knowledge, socioeconomic status, attitude, ease of obtaining medicines and lifestyle. Each was reported in good, moderate or low categories. Maternal age, education, occupation, monthly household income and national health insurance membership were also recorded.

The available study documentation does not specify the recall period, item wording, numerical scoring direction, category cut-offs, number of items per domain or psychometric evaluation. Consequently, good access or good lifestyle cannot be interpreted as a validated measure of favorable health behavior. Medication names, ingredients, doses, duration, purchase sources and adverse events were not recorded. Frequency therefore cannot establish the rationality or safety of medicine use.

Statistical Reporting

Counts and percentages are presented for respondent characteristics and questionnaire categories. Percentages in the revised tables were checked against the reported denominator of 102. The source reported Spearman correlations and a proportional-odds ordinal logistic regression containing all five predictors, with a nominal significance threshold of 0.05. The statistical software, missing-data approach, valid sample per test, coding and diagnostic output were not supplied.

The original correlation–p-value pairs are retained in Table 3 for transparent reporting but are explicitly unverified. Regression p values are retained in Table 4 without significance symbols. Wald statistics reconstructed from p values have been removed because they do not constitute independently available

model output. No new coefficients, confidence intervals or adjusted odds ratios have been estimated. Reporting of participant selection, effect estimates, uncertainty and limitations should be completed in accordance with the STROBE framework before submission (von Elm et al., 2007).

Ethical Clearance

The source states that participation was voluntary, written informed consent was obtained and questionnaires were anonymized. However, the ethics committee name and approval identifier were placeholders. The committee decision, identifier and date, and the stated consent procedures, must be verified from the study records before an approval statement can be finalized.

RESULTS

Participant characteristics

The source reports 102 completed questionnaires. Most respondents were aged 26–35 years (70/102, 68.6%) and had completed senior high school (69/102, 67.6%). Sixty-seven respondents were grouped as housewife/other (65.7%). Active BPJS/JKN membership was reported by 83 respondents (81.4%). These are characteristics of the recruited sample, not estimates for all mothers in Tosaren (Table 1).

Table 1. Sociodemographic characteristics of the sample

Characteristic	Category	n	%
Age (years)	17–25	9	8.8
	26–35	70	68.6
	36–45	23	22.5
Education	Elementary school (SD)	0	0.0
	Junior high school (SMP)	9	8.8
	Senior high school (SMA)	69	67.6
	College/university	24	23.5
Occupation	Housewife/other	67	65.7
	Private employee	17	16.7
	Self-employed	12	11.8
	Civil servant	6	5.9
Monthly household income	< IDR 2 million	36	35.3
	IDR 2–5 million	58	56.9
	> IDR 5 million	8	7.8
BPJS/JKN membership	Active	83	81.4
	Inactive	10	9.8
	None	9	8.8

N = 102. BPJS/JKN refers to Indonesian national health insurance membership. Percentages may not total 100 because of rounding. Source: reported study counts; no participant-level data were available.

Questionnaire distributions

All five predictor domains had the same marginal distribution: 83 respondents (81.4%) were classified as good, 19 (18.6%) as moderate and none as low. This repetition requires an audit of item scoring and

table preparation; it does not by itself prove that individual respondents had identical scores across domains. The outcome was concentrated in always (87/102, 85.3%). Always and often together accounted for 97/102 respondents (95.1%; Table 2).

Table 2. Reported predictor categories and outcome frequency

Domain	Good n (%)	Moderate n (%)	Low n (%)
Knowledge	83 (81.4)	19 (18.6)	0 (0.0)
Socioeconomic status	83 (81.4)	19 (18.6)	0 (0.0)
Attitude	83 (81.4)	19 (18.6)	0 (0.0)
Ease of obtaining medicines	83 (81.4)	19 (18.6)	0 (0.0)
Lifestyle	83 (81.4)	19 (18.6)	0 (0.0)

Self-medication frequency

Response	n	%
Always	87	85.3
Often	10	9.8
Infrequently	4	3.9
Never	1	1.0

Note. Category labels are retained from the original questionnaire report; their cut-offs have not been supplied. The never response conflicts with the stated prior-use eligibility criterion and remains unresolved. Source: reported study counts.

Exploratory association results

Reported Spearman coefficients ranged from 0.417 to 0.513. Attitude and ease of obtaining medicines had the same coefficient, 0.513, but different reported p values, 0.031 and 0.015. These pairs require reconciliation with the underlying coding, valid sample sizes and testing procedure. The available information is insufficient to confirm statistical significance or to interpret the score direction reliably (Table 3).

Table 3. Source reported Spearman results pending verification

Proposed predictor	Reported ρ	Reported p
Knowledge	.417	.008
Socioeconomic status	.458	.009
Attitude	.513	.031
Ease of obtaining medicines	.513	.015
Lifestyle	.467	.007

Note. Values are transcribed from the source manuscript, not recomputed. Reported N = 102; valid n per test is unknown. Do not interpret these p values as verified inferential evidence. No significance markers are used.

The source regression report gave p = 0.016 for ease of obtaining medicines and p = 0.023 for lifestyle. These values alone do not identify the direction or magnitude of an association and cannot establish which predictor is most important. Coefficients, standard errors, adjusted odds ratios, 95% confidence

intervals, thresholds and model diagnostics were unavailable. Only five respondents occupied the two lowest-frequency categories, raising concerns that require model-level assessment rather than assumptions about stability (Table 4).

Table 4. Incomplete source ordinal regression report

Proposed predictor	Reported p	Effect estimate and 95% CI
Knowledge	.168	Not reported
Socioeconomic status	.351	Not reported
Attitude	.991	Not reported
Ease of obtaining medicines	.016	Not reported
Lifestyle	.023	Not reported

Note. The source states that all five predictors were entered simultaneously. Proportional-odds testing, convergence, reference categories and outcome coding were not provided. No independent predictor is confirmed by this incomplete report.

DISCUSSION

Meaning of the reported frequency

In this sample, 97 of 102 mothers selected always or often when asked about self-medication for their child's cough and cold symptoms. The finding describes a common response among the women recruited, but it cannot establish how widespread the practice is in Tosaren. Eligibility was restricted to mothers with previous experience of self-medicating their children, so families who consistently sought professional care were not represented on the same basis. The single never response also needs to be reconciled with this criterion. These features make the study more informative about reported patterns among selected caregivers than about community prevalence.

This distinction matters when comparing the findings with other settings. Ahmed et al. (2021) reported self-medication in 50 of 85 mothers in Yogyakarta, whereas the present outcome records frequency categories within a sample selected for prior use. The higher percentage in Tosaren therefore does not demonstrate a higher prevalence. International comparisons also require attention to what respondents considered a medicine. In Rwanda, caregivers reported both modern medicines and traditional remedies, with paracetamol the most commonly used modern medicine (Ukwishaka et al., 2020). A single question about self-medication may bring together practices with different indications, sources and risks.

The frequency categories also leave an important clinical question unanswered: what did mothers actually give their children? Occasional use of an unsuitable combination product and frequent use of an otherwise appropriate medicine are different patterns of care. Neither can be identified from the present questionnaire summary. The high proportion of always responses should therefore prompt closer examination of treatment decisions, rather than an assumption that all participating mothers used medicines inappropriately.

Knowledge attitudes and maternal characteristics

The reported correlations suggest that maternal knowledge and attitudes warrant further study, but the inconsistencies between the correlation coefficients and p values prevent a firm interpretation. Even after those figures are checked, a positive association with frequency would not necessarily indicate better practice. A mother may know a medicine's purpose and still be uncertain about its suitability for a younger child, the correct volume to administer or whether another product contains the same ingredient. The questionnaire needs to distinguish factual knowledge from confidence in treating symptoms and from the practical ability to use a medicine correctly.

Research on parental attitudes provides a useful comparison. In a Finnish population-based study, favorable views of over-the-counter medicines were associated with children's use of those products and of complementary and alternative medicines (Siponen et al., 2013). This supports examining beliefs

about medicines as a distinct construct, although the study's age range, health system and two-day recall period differ from those relevant to Tosaren. The attitude p value of .991 in the present model should not be read as proof that parental beliefs are unimportant. Without an estimate and confidence interval, it is impossible to distinguish a small association from imprecise estimation.

Formal education should likewise not be treated as a substitute for medicine-specific knowledge. Among schoolchildren aged 7–13 years in Montenegro, maternal university education and employment in a health profession were associated with parental self-medication (Duborija-Kovacevic et al., 2020). Those findings concern older children and do not establish the same relationship in Indonesian under-fives. They do, however, caution against assuming that more education always translates into less self-medication. The predominance of senior high school graduates in Tosaren describes the sample; it does not explain the reported behavior.

Measurement is central to interpreting these relationships. Pitaloka et al. (2023) developed and evaluated a questionnaire on parents' knowledge, attitudes and practices concerning antibiotic self-medication in Bandung. Their work offers an Indonesian example of documenting instrument development and psychometric properties. It does not validate the questionnaire used here, which addresses a broader and less clearly specified group of medicines. Future adaptations should establish whether respondents understand each item as intended and whether knowledge, attitude and practice scores represent distinguishable constructs before relating those scores to medication frequency.

Access household resources and routines

Ease of obtaining medicines is a plausible influence on household treatment choices, but its role remains uncertain in this dataset. The regression p value of .016, without a coefficient or confidence interval, cannot establish the direction, size or practical importance of the association. Access itself also has several meanings. Ge et al. (2021) found that travel time to a medical institution was associated with self-medication among urban caregivers in China. Difficulty reaching clinical care is different from being able to purchase medicines easily, and a single access score may conceal that distinction.

Medicines already stored at home represent another form of access. In a survey of 9,526 parents in three Chinese provinces, keeping leftover antibiotics was associated with self-medication of children with antibiotics; leftovers came from both previous prescriptions and pharmacy purchases (Sun et al., 2019). This finding concerns antibiotics, not all cough and cold treatments, and should not be used to infer antibiotic use in Tosaren. It suggests a concrete direction for future data collection: asking which medicines are kept at home, where they came from and whether an earlier prescription is reused when similar symptoms recur.

Household income and insurance membership may affect these decisions in different ways, but neither mechanism was established here. Most respondents had active BPJS/JKN membership, yet the study did not compare medication behavior by insurance status or measure actual use of covered services. Likewise, classifying socioeconomic status as good or moderate gives little insight into consultation costs, transport, time away from work or the affordability of particular products. These dimensions should be measured separately if future research aims to distinguish financial constraints from preferences for convenient care.

Lifestyle requires similar clarification. The label is too broad to explain why a mother gives a medicine. Duborija-Kovacevic et al. (2020) examined smoking as a specific maternal characteristic, whereas the present report provides no item-level definition of lifestyle. Borrowing that interpretation would therefore be unwarranted. Questions about previous treatment experience, keeping medicines at home, seeking family advice and reusing prescriptions would produce findings that are easier to interpret and more directly relevant to pharmacy practice.

Implications for medication safety and pharmacy practice

A focus on frequency alone risks overlooking the circumstances in which harm occurs. In a multisystem surveillance study of cough and cold medicine exposures in children younger than 12 years, accidental unsupervised ingestion was the most common exposure type among cases considered at least potentially related to these medicines; medication errors were also reported (Green et al., 2017). These surveillance

cases cannot provide an estimate of harm in Tosaren. They nevertheless indicate that household storage and administration deserve attention alongside the initial decision to obtain a medicine.

Administration skills are particularly relevant when medicines are supplied as liquids. In a randomized experiment, parents made more dosing errors with cups than with oral syringes, especially for smaller doses (Yin et al., 2016). The study assessed measured doses under experimental conditions and did not test the practices of the mothers surveyed here. Its practical implication is that counseling should include the measuring device and a demonstration of the intended volume, rather than relying on verbal instructions alone. A locally evaluated counseling program could ask caregivers to demonstrate the dose after an explanation and record whether they can do so accurately.

Age and ingredient restrictions remain essential. The FDA advises against decongestant- or antihistamine-containing cough and cold products below two years of age and describes manufacturers' labeling against use below four; the MHRA advises against specified ingredients below six (FDA, n.d.; MHRA, 2014). These international recommendations should not be presented as Indonesian prescribing or dispensing rules. For local practice, counseling needs to follow applicable product information and clinical guidance, and should establish the child's age, symptoms and current medicines before discussing whether any medicine is suitable. The present findings do not justify routine use of cough and cold products in under-fives.

Education may help caregivers make more informed decisions, but knowledge gain should not be confused with safer behavior. Pitaloka et al. (2025) reported improved knowledge after a module-based intervention on antibiotic use in Bandung. That result supports evaluating structured education in a local setting, while leaving open whether it changes product choice, dosing or unnecessary treatment. For Tosaren, a pharmacy or community-based program could be assessed using observed dosing accuracy, recognition of overlapping ingredients, appropriate help-seeking and subsequent medication use. These are proposed outcomes for future evaluation, not benefits demonstrated by this survey.

Study limitations and priorities for further research

The study's value lies in drawing attention to caregiver medication decisions in a defined local setting. Its design, however, limits both the population to which the findings apply and the conclusions that can be drawn about the proposed correlates. Convenience recruitment, selection based on previous self-medication and an older registration frame may have shaped the sample. Unspecified recall periods and scoring rules make the categories difficult to interpret. Self-report introduces the possibility of recall and social desirability bias, while the absence of product, dose and adverse-event data prevents an assessment of clinical appropriateness.

There are also unresolved statistical limitations. All five predictor domains share the same marginal distribution, but this does not establish that the same mothers received the same classifications or that the predictors are strongly correlated. The outcome is highly concentrated in the always category, with only five respondents in the two lowest categories. The original records and analysis output need to be checked before interpreting an adjusted model. Coefficients, confidence intervals, coding, convergence and proportional-odds diagnostics are needed to judge its adequacy. If those checks do not support the model, the findings should be reported descriptively without naming independent predictors.

Future work should recruit mothers regardless of previous self-medication, specify a recall period and identify one index child or episode for each response. Recording the product or a photograph of its packaging would allow the reported practice to be linked to ingredients and age suitability. A prospective episode-based design could also distinguish the decision to start treatment from subsequent changes in dose or help-seeking. Clear reporting of selection, measurement, missing data and estimate precision would make such work easier to appraise and compare with other studies (von Elm et al., 2007).

CONCLUSION

Among 102 recruited mothers, 87 selected always and 10 selected often when reporting self-medication for their under-five child's cough and cold symptoms. These selected-sample frequencies do not estimate community prevalence or establish treatment appropriateness. Associations with the five proposed maternal domains remain unconfirmed pending verification of the data and statistical analyses.

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