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Original Research

Effect of *Beras Kencur* Herbal Drink (*Jamu*) on General Health Resilience and Illness Frequency (Acute Respiratory Infection/Diarrhea) in Preschool Children at PG Pelangi Depok

Pengaruh Minuman Herbal Beras Kencur (Jamu) terhadap Ketahanan Kesehatan Umum dan Frekuensi Sakit (Infeksi Saluran Pernapasan Akut/Diare) pada Anak Prasekolah di PG Pelangi Depok

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Abstract: *Preschool children are vulnerable to recurrent infections, particularly acute respiratory infection (ARI) and diarrhea, which disrupt growth and learning. Beras kencur, a traditional Indonesian herbal drink made from rice and aromatic ginger (Kaempferia galanga L.), is widely given to children to maintain stamina, yet empirical evidence in early-childhood settings remains limited. This study aimed to analyze the effect of beras kencur herbal drink on health resilience and illness frequency (ARI/diarrhea) among preschool children at PG Pelangi, Depok. A quasi-experimental pretest-posttest design with a control group was conducted on 40 children aged 3-5 years (intervention group n = 20; control group n = 20) selected by purposive sampling. The intervention group received 100 mL of beras kencur herbal drink five days per week for four weeks, while the control group continued usual diet. Health resilience was measured using an observation score (range 0-20) and illness episodes were recorded through daily illness diaries. Data were analyzed using paired t-test/Wilcoxon, independent t-test/Mann-Whitney, with $p < 0.05$. After the intervention, the mean health resilience score in the intervention group increased from 11.2 to 15.6 (paired t-test, $p < 0.001$). The mean change was greater in the intervention group than in the control group (+4.4 vs. +0.6 points; between-group difference in change 3.8 points, 95% CI 2.7 to 4.9; independent t-test on change scores, $p < 0.001$). Mean ARI episodes decreased from 1.6 to 0.8 and diarrhea episodes from 0.7 to 0.3 per child per four weeks in the intervention group, compared with 1.5 to 1.4 and 0.6 to 0.6 in the control group; the between-group differences in change were −0.7 episodes for ARI (Mann-Whitney U test on change scores, $p = 0.004$) and −0.4 episodes for diarrhea ($p = 0.03$). Beras kencur herbal drink was associated with improved health resilience and fewer ARI and diarrhea episodes in preschool children. Larger randomized trials with laboratory immunological markers are recommended.*

Key word: *beras kencur, diarrhea, health resilience, preschool children, respiratory infection*

1. INTRODUCTION

Preschool children (aged 3–5 years) are in a phase of rapid growth and development, yet their immune systems are still maturing, which makes them more susceptible to recurrent infections (1). Innate and adaptive immune responses, including immunological memory, develop progressively during the first years of life as children are repeatedly exposed to new pathogens (1). Crowded playgroup and kindergarten environments, intense contact between children, and inconsistent personal hygiene habits increase the risk of transmission of infectious diseases, particularly acute respiratory infection (ARI) and diarrhea (2). A prospective birth cohort study showed

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that respiratory infection symptoms and antibiotic use rose sharply in the first months after children started center-based daycare (2).

Diarrhea is a leading cause of illness and death among children under five worldwide and is also a major cause of malnutrition in this age group (3,4). The Global Burden of Disease Study estimated that diarrhea remains one of the leading causes of morbidity and mortality among children under five, particularly in low and middle income countries (4). In Indonesia, ARI and diarrhea remain public health problems found among toddlers and preschool children, as reported in the Indonesia Demographic and Health Survey (5). Pneumonia, as a severe form of ARI, also remains an important cause of child mortality globally (6). Recurrent illness episodes not only reduce children's appetite and nutritional status but also disrupt their attendance and participation in learning activities at school.

Efforts to improve children's health resilience generally focus on balanced nutrition, immunization, and clean and healthy living behaviors (7). Adequate intake of energy, protein, and micronutrients is essential for the development and function of both innate and adaptive immunity (7). In addition, *beras kencur* is one of the most commonly consumed types of *jamu* in Indonesia and is often given to children; its popular use to maintain stamina and appetite is based largely on traditional knowledge and has not yet been well documented in the scientific literature (8). *Jamu* is an integral part of Indonesian health culture, and efforts are ongoing to support its use with scientific evidence of efficacy and safety (8). *Kencur* (Kaempferia galanga L.) contains various bioactive compounds such as terpenoids, phenolics, flavonoids, and diarylheptanoids, and pharmacological studies have reported anti-inflammatory, antioxidant, and antibacterial activities of its extracts and secondary metabolites (9,10). Ethyl-p-methoxycinnamate, one of the main constituents of the *kencur* rhizome, has been identified as an anti-inflammatory compound that inhibits cyclooxygenase-1 and cyclooxygenase-2 enzymes (11). Nevertheless, empirical evidence on the effect of consuming *beras kencur* herbal drink on health resilience and illness frequency in preschool children remains very limited; most studies are preclinical or based on traditional knowledge. To the authors' knowledge, human studies evaluating the safety or health effects of *beras kencur* are scarce, and none have specifically assessed its use in preschool children. Available safety data on Kaempferia galanga come mainly from animal toxicity studies, which generally reported low acute toxicity (9); however, these findings cannot be directly extrapolated to young children. Safety considerations when administering herbal preparations to young children include possible allergic reactions, hygiene during preparation, and added sugar content. The present study addresses this evidence gap by providing preliminary field data on the short-term administration of a freshly prepared, small-volume *beras kencur* drink to preschool children under teacher supervision, with children who had a history of allergy to its ingredients excluded.

Based on this gap, this study aimed to analyze the effect of *beras kencur* herbal drink on health resilience and illness frequency (ARI/diarrhea) among preschool children at PG Pelangi Depok. The results are expected to provide a basis for schools, parents, and health workers in considering the use of traditional functional foods to support promotive and preventive efforts in child health.

2. METHODS

Study Design, Location, and Time

This was a quantitative study with a quasi-experimental *pretest-posttest with* control group design. The study was conducted at PG Pelangi, Depok City, West Java, over eight weeks in September–October 2026, consisting of four weeks of initial recording (baseline) and four weeks of intervention.

Population and Sample

The population comprised all preschool-aged children enrolled at PG Pelangi Depok. The sample was selected using purposive sampling of 40 children, divided into an intervention group (n = 20) and a control group (n = 20). The inclusion criteria were children aged 3–5 years, regular school attendance, and parents willing to sign informed consent, and no history of allergy to the ingredients of the herbal drink. The exclusion criteria were children with chronic disease or immunological disorders, those regularly taking other supplements or herbal medicines, and those experiencing acute illness at the start of the study. Children who withdrew or did not consume the herbal drink on more than 20% of intervention days were excluded from the analysis.

Intervention

The intervention group received 100 mL of *beras kencur* herbal drink per day, five days per week (school days), for four weeks, consumed at school under teacher supervision. The herbal drink was prepared fresh every day by [the research team/a trained food handler] from rice, fresh *kencur*, palm sugar, pandan leaves, and tamarind. For each liter, the formulation consisted of 100 g rice, 50 g fresh *kencur* rhizome, 100 g palm sugar, 2 pandan leaves, 10 g tamarind, and 1,000 mL drinking water. The rice was soaked for 3 hours, and the *kencur* was washed and peeled; both were ground together with part of the water, while the remaining water was boiled with the palm sugar, pandan leaves, and tamarind. The mixture was then combined, filtered through a clean cloth, cooled to room temperature, and served. Based on the recipe, each 100 mL serving contained an estimated 10 g of sugar and 75 kcal, calculated using [the Indonesian Food Composition Table/nutrient analysis software]. To ensure consistency, the same recipe, ingredient source, and measuring tools were used throughout the study; each serving was measured with a graduated cup, and teachers recorded daily consumption (fully consumed, partially consumed, or refused) on a monitoring sheet. Adherence was defined as consuming at least 80% of the scheduled servings. The control group received no intervention and followed their usual diet. Parents in both groups were asked not to markedly change their children's diet during the study.

Variables and Instruments

The independent variable was the administration of *beras kencur* herbal drink. The dependent variables were (a) health resilience and (b) illness frequency. Health resilience was measured using a 10-item observation sheet (appetite, activity level, fitness, attendance, and recovery after illness; score 0–2 per item, total range 0–20, higher scores indicating better resilience) completed by teachers and parents. In this study, health resilience was defined operationally as the child's observed general health and functional status; because no immunological markers were assessed, the score should not be interpreted as a direct measure of immune function. The observation sheet was developed by the research team based on [source/literature], with [two] items for each of the five domains. Each item was scored as 0 (poor), 1 (moderate), or 2 (good) according to written criteria [provided in Supplementary Table

[1]. Content validity was reviewed by [number] experts in [pediatrics/child nutrition], and internal consistency reliability in a pilot test with [number] children was Cronbach's α . [Teachers rated the items observable at school (activity level, fitness, and attendance), and parents rated the items observable at home (appetite and recovery after illness); the two subtotals were summed to obtain the total score.] All raters received the same written instructions and assessed the children at the same time points. Because teachers and parents were aware of the children's group allocation, observer and assessment bias cannot be excluded. Illness frequency was the number of ARI episodes (cough, runny nose, or fever accompanied by respiratory symptoms) and diarrhea episodes (loose or watery stools ≥3 times per day) per child over four weeks, recorded in an illness diary completed by parents and confirmed by teachers.

Data Analysis and Research Ethics

Data were analyzed using SPSS version 26. Normality was tested using the Shapiro-Wilk test. Differences in scores before and after the intervention within a group were tested using the paired t-test or Wilcoxon test, while differences between groups were tested using the independent t-test or Mann-Whitney test applied to change scores (post-intervention minus baseline values). The health resilience score was analyzed with parametric tests (paired t-test and independent t-test), whereas the numbers of ARI and diarrhea episodes were analyzed with non-parametric tests (Wilcoxon signed-rank test and Mann-Whitney U test). Between-group effects are reported as differences in mean change with 95% confidence intervals (CI). Categorical characteristics were compared using the Chi-square or Fisher test. A p-value < 0.05 was considered significant.

3. RESULTS

Respondent Characteristics

A total of 40 children completed the study, comprising 20 children in the intervention group and 20 in the control group; no children were excluded from the analysis. The respondents' characteristics in the two groups were comparable ($p > 0.05$), so the two groups were suitable for comparison (Table 1).

Table 1. Respondent characteristics by group

Characteristic	Intervention (n = 20)	Control (n = 20)	p
Age (years), mean ± SD	4.2 ± 0.8	4.3 ± 0.7	0.78
Male sex, n (%)	11 (55.0)	10 (50.0)	0.75
Normal nutritional status, n (%)	17 (85.0)	16 (80.0)	0.69
History of exclusive breastfeeding, n (%)	14 (70.0)	13 (65.0)	0.74

Chi-square/Fisher test for categorical data; independent t-test for age.

Health Resilience

After four weeks, the health resilience score in the intervention group increased from 11.2 ± 2.1 to 15.6 ± 2.3 ($p < 0.001$), whereas the change in the control group was not significant (11.5 to 12.1; $p = 0.09$). Between-group comparisons were performed on change scores. The increase in score in the intervention group (+4.4 ± 1.9) was significantly greater than in the control group (+0.6 ± 1.5), with a between-group difference in mean change of 3.8 points (95% CI 2.7 to 4.9; independent t-test, $p < 0.001$) (Table 2).

Table 2. Health resilience scores before and after the intervention (mean ± SD)

Group	Before	After	Difference	p (within group)
Intervention	11.2 ± 2.1	15.6 ± 2.3	+4.4 ± 1.9	< 0.001
Control	11.5 ± 2.2	12.1 ± 2.4	+0.6 ± 1.5	0.09
p (between groups, change scores)			< 0.001	

Paired t-test (within group); independent t-test on change scores (between groups). Between-group difference in mean change: 3.8 points (95% CI 2.7 to 4.9).

Illness Frequency (ARI/Diarrhea)

The mean number of ARI episodes in the intervention group decreased from 1.6 to 0.8 episodes per child per four weeks (p = 0.002), and diarrhea episodes decreased from 0.7 to 0.3 (p = 0.01). In the control group, there were no significant changes in either illness. The reductions in ARI and diarrhea frequency in the intervention group were significantly greater than in the control group when change scores were compared using the Mann-Whitney U test. The between-group difference in mean change was −0.7 episodes per child per four weeks for ARI (−0.8 vs. −0.1; 95% CI ; p = 0.004) and −0.4 episodes for diarrhea (−0.4 vs. 0.0; 95% CI; p = 0.03) (Table 3).

Table 3. Frequency of ARI and diarrhea episodes per child per four weeks (mean ± SD)

Type of illness	Group	Baseline	Intervention	p (within group)	p (between groups)
ARI	Intervention	1.6 ± 0.8	0.8 ± 0.6	0.002	0.004
	Control	1.5 ± 0.7	1.4 ± 0.8	0.56	
Diarrhea	Intervention	0.7 ± 0.5	0.3 ± 0.4	0.01	0.03
	Control	0.6 ± 0.5	0.6 ± 0.6	0.78	

Data in the Baseline and Intervention columns each represent a four-week period. Within-group p-values: Wilcoxon signed-rank test; between-group p-values: Mann-Whitney U test comparing change scores (intervention period minus baseline) between groups.

4. DISCUSSION

This study showed that preschool children who consumed *beras kencur* herbal drink for four weeks experienced a greater increase in health resilience scores and a greater reduction in ARI and diarrhea frequency than children who received no intervention. This finding is consistent with the framework that *kencur* has anti-inflammatory, antioxidant, and antibacterial activities reported in pharmacological studies (9–11), so it is biologically plausible that regular consumption contributes to resistance against mild infections. However, most of this evidence comes from preclinical studies; the results in these children are associative and cannot be directly interpreted as causal evidence.

The increase in health resilience scores in the intervention group may partly reflect the appetite and recovery components covered by the instrument. *Beras kencur* herbal drink is traditionally associated with increased appetite, and better food intake plays an important role because malnutrition and infection form a mutually reinforcing cycle, in which diarrhea worsens nutritional status and poor nutritional status increases susceptibility to diarrhea (3,12). Undernutrition impairs immune function and increases both the risk and the severity of common childhood infections (12). However, these mechanisms remain hypothetical, because this study did not measure dietary intake, exposure to bioactive compounds, or immunological markers. The observed outcomes, namely higher observation scores and fewer reported ARI and diarrhea episodes, should therefore be distinguished from the proposed biological explanations.

Any reduction in illness episodes could reflect a direct effect of bioactive compounds, an indirect effect through improved intake, a combination of both, or non-specific factors such as increased attention and reporting differences; this study could not distinguish between these possibilities, and none of these pathways was directly investigated.

The reductions in ARI and diarrhea need to be interpreted together with environmental factors. The incidence of diarrhea is strongly influenced by safe drinking water, sanitation, and hand hygiene (3,13,14), while ARI is influenced by contact density and season. Although both groups came from the same school and had comparable baseline characteristics, the non-randomized design does not eliminate potential confounding. Differences in dietary intake, hygiene practices, parental behavior, household exposure, or other unmeasured characteristics may have influenced the outcomes, and comparable baseline characteristics are not sufficient to attribute the observed differences to the intervention. These findings should therefore be interpreted as preliminary evidence of an association rather than of a causal effect. Systematic reviews have shown that handwashing with soap substantially reduces the risk of diarrhea and respiratory illness in community settings (13,14). Nevertheless, the presence of teachers supervising the administration of the herbal drink may have increased attention to children in the intervention group (the Hawthorne effect) and influenced the observational assessments (15).

The limitations of this study include a small sample size, purposive sampling without randomization, the absence of blinding (blinding), and observation-based measurement of health resilience without laboratory immunological markers such as secretory immunoglobulin A. Because teachers and parents were aware of group allocation, the observation scores and illness diaries may have been affected by observer and reporting bias, and the validity of the observation sheet has not been established in other populations. The palm sugar content of the herbal drink also warrants attention in children, so low-sugar formulations and long-term safety need further study. The American Heart Association recommends that children consume less than 25 g (about six teaspoons) of added sugars per day (16). Future studies are advised to use randomized controlled trials with larger samples, longer follow-up, and objective immunological markers.

5. CONCLUSION

Administration of *beras kencur* herbal drink for four weeks to preschool children at PG Pelangi Depok was associated with higher observed health resilience scores and fewer reported ARI and diarrhea episodes compared with the control group. Given the small sample size, short intervention period, non-randomized design, and absence of objective immunological measurements, these findings should be regarded as preliminary and do not demonstrate an immune-enhancing effect. *Beras kencur* herbal drink should not be recommended as a substitute for primary preventive measures.

Schools and parents may consider low-sugar *beras kencur* herbal drink as a complement, while continuing to prioritize balanced nutrition, immunization, safe drinking water, and handwashing with soap. Further research in the form of randomized controlled trials with immunological markers is needed before broader recommendations are made.

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