

Visual strategies for preventing iodine deficiency disorders in rural Indonesia: Poster-based health education for housewives

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ABSTRACT

Iodine deficiency disorders (IDD) remain a significant public health challenge in Indonesia, particularly in rural areas where access to health information is limited. Despite various interventions, there is a lack of sustained and accessible educational strategies tailored to rural communities. This study aimed to evaluate the effectiveness of door-to-door education using poster-based media in increasing housewives' knowledge about iodized salt consumption in Tokka Hamlet, Rumbia District, Jeneponto Regency. A pre-test and post-test study design was implemented, with three assessment points: before the intervention, immediately after, and six months post-intervention. A total of 30 participants received the educational intervention accompanied by visual poster materials. Knowledge scores were analyzed using the Friedman test to determine significant changes over time. Results revealed an initial increase in median knowledge scores from 47.00 (pre-test) to 86.00 (post-test I), followed by a decline to 57.00 at post-test II. The Friedman test showed a significant difference across time points ($p = 0.000$), indicating that the educational intervention had a short-term impact. However, the decline in scores suggests limited long-term retention, likely due to the absence of follow-up measures and restricted access to continuous information. These findings highlight the importance of sustained educational reinforcement and accessible communication channels for health interventions in rural populations.

ABSTRAK

Gangguan Akibat Kekurangan Yodium (GAKY) masih menjadi tantangan kesehatan masyarakat yang signifikan di Indonesia, terutama di daerah pedesaan di mana akses terhadap informasi kesehatan masih terbatas. Meskipun telah dilakukan berbagai intervensi, namun strategi edukasi yang berkelanjutan dan mudah diakses oleh masyarakat pedesaan masih kurang. Penelitian ini bertujuan untuk mengevaluasi efektivitas edukasi dari rumah ke rumah dengan menggunakan media poster dalam meningkatkan pengetahuan ibu rumah tangga tentang konsumsi garam beryodium di Dusun Tokka, Kecamatan Rumbia, Kabupaten Jeneponto. Desain penelitian pre-test dan post-test dilaksanakan, dengan tiga titik penilaian: sebelum intervensi, segera setelah intervensi, dan enam bulan setelah intervensi. Sebanyak 30 peserta menerima intervensi edukasi yang disertai dengan materi poster visual. Skor pengetahuan dianalisis menggunakan uji Friedman untuk menentukan perubahan yang signifikan dari waktu ke waktu. Hasil penelitian menunjukkan adanya peningkatan skor pengetahuan rata-rata dari 47,00 (pre-test) menjadi 86,00 (post-test I), diikuti dengan penurunan menjadi 57,00 pada post-test II. Uji Friedman menunjukkan perbedaan yang signifikan di seluruh titik waktu ($p = 0,000$), yang mengindikasikan bahwa intervensi edukasi memiliki dampak jangka pendek. Namun, penurunan skor menunjukkan retensi jangka panjang yang terbatas, kemungkinan disebabkan oleh tidak adanya tindak lanjut dan terbatasnya akses ke informasi yang berkelanjutan. Temuan ini menyoroti pentingnya penguatan edukasi yang berkelanjutan dan saluran komunikasi yang dapat diakses untuk intervensi kesehatan di populasi pedesaan.

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INTRODUCTION

Health is a fundamental aspect of human life, often prioritized above economic, financial, and even religious concerns in certain contexts. Without good health, individuals are unable to perform daily activities effectively. In Indonesia, people are often willing to sacrifice their wealth and other resources to restore or maintain their physical well-being (Yumarma, 2024). One critical component of maintaining health is the adequate intake of micronutrients, particularly iodine. Iodized salt, fortified according to Indonesian National Standards (SNI 01-3556-1994), is a key dietary source of iodine and is especially essential for children and pregnant women due to its role in supporting cognitive development and overall health (Akbar et al., 2021). Iodine plays a vital role in the synthesis of thyroid hormones, which regulate metabolism, growth, and development, including brain development in infants (Sihombing, 2020).

Iodine deficiency can lead to iodine deficiency disorders (IDD), which manifest in various health complications such as goiter, cognitive and intellectual impairments, and developmental delays (Mutalazimah et al., 2021). Preventive efforts focus on promoting the correct use and storage of iodized salt to maintain iodine levels. The recommended iodine content in salt is between 30 and 80 ppm (SNI 3556:2010), and the daily intake should be 100–150 micrograms per person to meet thyroid hormone requirements and prevent IDD (Ariana et al., 2022). According to the 2018 Basic Health Research (Riskesdas), only 77.1% of Indonesian households consumed adequately iodized salt, falling short of the Universal Salt Iodization (USI) target of 90%. In South Sulawesi, iodized salt usage reached just 77.4% (PSG, 2014), with Tokka Hamlet reporting that approximately 90% of households still consumed non-iodized salt (Karini et al., 2023).

Despite national interventions, a substantial proportion of rural households, particularly in Tokka Hamlet, continue to consume non-iodized salt due to limited awareness and access to nutritional information. Most housewives in these areas lack sufficient knowledge regarding the health benefits of iodized salt in preventing IDD, which is concerning given their central role in managing household food intake (Lempao et al., 2024). Addressing this issue requires targeted educational interventions to raise awareness and change behavior through accessible and context-specific strategies.

Various studies emphasize the effectiveness of health education in improving community knowledge and practices regarding iodine intake. Visual media, particularly posters, have been widely used in health promotion due to their simplicity, accessibility, and ability to convey essential messages to low-literacy populations. Research shows that educational posters, when combined with interpersonal communication strategies such as door-to-door counseling, significantly enhance knowledge retention and behavioral change (Rohim et al., 2020; Wulandari et al., 2022). Visual materials are particularly beneficial in rural settings where digital access may be limited, and health literacy remains low.

Moreover, the door-to-door approach enables direct engagement with target populations, allowing for personalized education and immediate feedback. It fosters trust and ensures that information is delivered in a culturally relevant manner. Previous studies have demonstrated that door-to-door interventions are effective in increasing knowledge about iodized salt and improving household salt consumption practices (Putri & Raharjo, 2021; Saputra et al., 2022). These findings support the need for integrated visual and interpersonal strategies in rural health promotion programs.

Despite these insights, there remains a gap in the literature regarding the long-term effectiveness of poster-based educational interventions combined with door-to-door counseling in sustaining knowledge and behavior change related to iodized salt consumption. Most existing studies focus only on immediate post-intervention outcomes without assessing retention over extended periods. This limits understanding of how durable the impacts of such interventions are, particularly in rural communities with limited access to follow-up information and resources (Karini et al., 2023).

This study seeks to address that gap by evaluating the effectiveness of a door-to-door, poster-based educational intervention at three time points: before the intervention, immediately after, and six months later. The objective is to assess changes in knowledge among housewives in Tokka Hamlet

regarding the importance of consuming iodized salt for the prevention of IDD. The novelty of this research lies in its longitudinal design and its focus on evaluating the retention of knowledge post-intervention, providing valuable insights for sustainable rural health education strategies.

Figure 1
Process of iodized salt counseling poster activities



METHODS

This study employed a quantitative pre-experimental design with a one-group pre-test and post-test approach, aimed at assessing changes in knowledge levels among housewives following an educational intervention. The study was conducted in Tokka Hamlet, Rumbia District, Jeneponto Regency, South Sulawesi Province, Indonesia. The intervention served as a form of community service aimed at enhancing awareness of iodized salt consumption. The program was implemented in April 2025, with a focus on evaluating knowledge improvement over time.

The target population comprised housewives residing in Tokka Hamlet, selected due to their strategic role in managing household nutrition. A total of 30 participants were recruited using purposive sampling based on inclusion criteria: being the primary meal preparer in the household, residing in the study location, and providing informed consent. Exclusion criteria included participants who were not present during the full duration of the intervention and evaluation phases.

The intervention consisted of three stages: planning, implementation, and evaluation. In the planning phase, primary data were collected through field observations and informal interviews to identify community-specific health concerns, particularly iodine intake and the use of iodized salt. During the implementation phase, door-to-door educational sessions were conducted using visual poster media. The posters provided information on the health benefits of iodine, the importance of using iodized salt, and the risks associated with iodine deficiency, such as goiter and developmental disorders in children.

The evaluation phase measured the effectiveness of the intervention through three data collection points: pre-test (prior to the educational session), post-test 1 (immediately after the session), and post-test 2 (six months post-intervention). A structured multiple-choice questionnaire containing 15 validated items was used as the assessment instrument. Questions covered basic knowledge of iodine, its health functions, and the identification and selection of iodized salt. The questionnaire underwent content validation by public health experts.

Data were analyzed quantitatively using the Friedman test, a non-parametric statistical method suitable for comparing three related samples that do not follow a normal distribution. This analysis was employed to determine whether there were statistically significant differences in knowledge levels across the three measurement points. The use of the Friedman test provided robust insights into the short-term and long-term effectiveness of door-to-door education supported by poster-based media in increasing knowledge about iodized salt consumption among rural housewives. Ethical considerations were upheld throughout the study, with participants providing informed consent prior to their involvement.

Figure 2

Filling in the evaluation instrument



RESULTS AND DISCUSSION

The iodized salt counseling intervention was conducted in Dusun Tokka through a door-to-door approach from 8–9 October 2024, targeting housewives as the primary food processors in their households. The process is illustrated in Figure 1, with depicting the informative poster used during the counseling. A total of 30 respondents participated, each completing pre-test and post-test questionnaires to measure knowledge changes. The educational activity was designed to enhance understanding of the importance of iodized salt consumption for health.

The immediate effect of the counseling was significant, as evidenced by the increase in median knowledge scores from 47.00 (pre-test) to 86.00 (post-test I), suggesting a substantial short-term improvement. This result aligns with findings from Nurhayati et al. (2021), who reported a statistically significant rise in knowledge and practice regarding iodized salt use post-intervention ($p = 0.001$). Compared to previous studies, this research reaffirms the effectiveness of door-to-door counseling in improving public health awareness within rural settings.

Table 1

Results of questionnaire completion

Knowledge Score	N	Min	Max	Median	Significance Value (Friedman)
Pre-Test	30	5	81	47	0.000
Post-Test I	30	54	100	86	
Post-Test II	30	14	93	57	

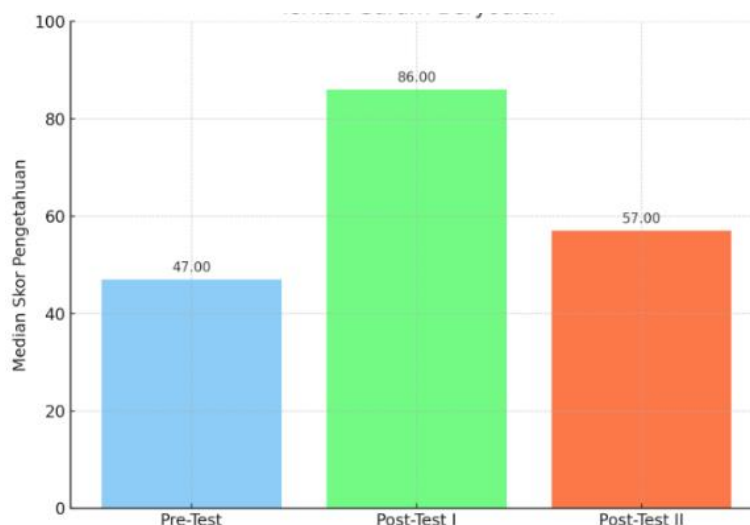
The Table 1 shows the results of knowledge scores from a questionnaire administered at three stages: before (Pre-Test), immediately after (Post-Test I), and some time after (Post-Test II) an intervention. A total of 30 participants were involved. The median score significantly increased from 47.00 in the Pre-Test to 86.00 in Post-Test I, indicating a substantial gain in knowledge following the intervention. However, the score decreased to 57.00 in Post-Test II, suggesting some decline in knowledge retention over time. The Friedman test resulted in a significance value of 0.000, which indicates that the differences in median scores across the three time points are statistically significant.

These findings indicate that community-based educational efforts can rapidly enhance health knowledge, especially when personalized and conducted within the household. Such interventions are vital for addressing micronutrient deficiencies prevalent in rural communities. The structured engagement, as illustrated in Figure 2, demonstrates a practical model that can be replicated in similar settings.

An evaluation was conducted on 26–28 April 2025 as a follow-up to assess the retention of knowledge gained from the initial intervention. This involved administering the same 15-item multiple-choice questionnaire (illustrated in Figure 3) to the original 30 respondents. The evaluation aimed to

capture post-test II scores and compare them with pre-test and post-test I results, as detailed in Table 1. The comparison of median scores is visualized in Figure 3, showing a decline from post-test I (86.00) to post-test II (57.00).

Figure 3
Comparison of median knowledge score



The Friedman test yielded a significance value of 0.000, confirming statistically significant differences between the three measurement points. The decrease in knowledge retention over time suggests a limitation in the sustainability of single-session counseling. Similar patterns are reported in Jaya & Pauzi (2018), who emphasized the necessity of repeated exposure and follow-up in health education to maintain behavioral change. This study contributes by highlighting the crucial need for reinforcement strategies post-intervention.

The reduction in knowledge six months post-counseling underscores the need for ongoing education and improved access to information. The results suggest that while initial awareness can be effectively raised, long-term knowledge retention requires systematic reinforcement, community engagement, and perhaps the incorporation of reminder mechanisms. The implication for public health programming is the necessity of designing continuous intervention models rather than one-time efforts.

Table 1
Process of Health Examination Activities

CONCLUSION

The door-to-door educational intervention on the importance of iodized salt consumption effectively enhanced the short-term knowledge of housewives in Tokka Hamlet. The statistically significant improvement in post-intervention knowledge scores demonstrates the efficacy of personalized, face-to-face health education using visual media. However, the observed decline in knowledge retention six months after the intervention highlights the critical need for sustained educational reinforcement.

To ensure the long-term effectiveness and sustainability of iodized salt promotion programs, it is imperative to adopt a community-based approach. This includes involving and training local cadres, particularly housewives or respected community figures, to serve as ongoing educational agents. Additionally, integrating iodized salt education into existing community health activities, such as routine Posyandu or women's group (PKK) meetings, will enhance message consistency and reach.

Furthermore, the adaptation of educational posters into more accessible household visual

media—such as wall calendars or stickers on salt containers—will serve as daily reminders. Dissemination of short, digestible educational messages through community bulletin boards and WhatsApp groups can also strengthen message retention and encourage behavioral change.

This study contributes to the growing body of evidence supporting the importance of culturally adapted, locally implemented, and continuously reinforced health education strategies in rural settings. Future research should explore the impact of community-based reinforcement mechanisms and digital platforms on long-term knowledge retention and behavioral outcomes related to micronutrient deficiencies.

REFERENCES

- Akbar, H., Nur, N. H., Sarman, & Paundanan, M. (2021). Pengetahuan Ibu Berkaitan dengan Penggunaan Garam Beryodium di Tingkat Rumah Tangga di Desa Muntoi Kecamatan Passi Barat. *Jurnal Info Kesehatan*, 11(2), 389–393.
- Ariana, D., Kunsah, B., Sari, Y. E. S., Septiyandari, A., & Kartikorini, N. (2022). Bijak dalam Menyimpan Garam dengan Baik. *Seminar Nasional Pengabdian Kepada Masyarakat 2021*, 1(1), 989–995. <https://doi.org/10.33086/snpm.v1i1.903>
- Ida Mariana Sihombing. (2020). Pengetahuan Ibu Rumah Tangga Terhadap Garam Beryodium. *Jurnal Ilmiah Cerebral Medika*, 2(1), 2. <https://doi.org/10.53475/jicm.v2i1.18>
- Jaya, I. K. S., & Pauzi, I. (2018). *Administration of Iodized Salt, Counseling about Food Sources of Iodine and Goitrogenic, to Mothers who have Children in Primary School, Affect the Excretion of Urine Iodine*. 2(10), 1095–1097.
- Karini, T. A., Syahrir, S., Rezki, S. S., Lestari, N. K., Mardiah, A., Nuriyah, I., Jannah, M., Nur, S. A., Baharuddin, N. A., Ariyani, F., & Ayudia, I. (2023). Penyuluhan Sebagai Upaya Meningkatkan Pengetahuan Masyarakat Tentang Garam Beryodium. *Sociality: Journal of Public Health Service*, 2, 44–50. <https://doi.org/10.24252/sociality.v2i1.35456>
- Lempao, N. M., Guampe, F. A., Balo, M. J., Kolompo, S. A., Kayupa, O. O., Hengkeng, J., Eka, I., Toii, W., & Kawani, F. B. (2024). *Pelayanan Unggulan: Jurnal Pengabdian Masyarakat Terapan Sosialisasi Pengelolaan Pendapatan Rumah Tangga untuk Pencegahan Stunting di Desa Wera Kecamatan Pamona Puselemba Kabupaten Poso Socialization of Household Income Management for Stunting Prevention*.
- Mutalazimah, M., Isnaeni, F. N., Mardiyati, L., Pujjani, K. N., Bella, S., Prodi, P., Gizi, I., & Kesehatan, I. (2021). Edukasi Pencegahan Gangguan Akibat Kekurangan Yodium (GAKY) Berbasis Media Pembelajaran Flipchart Article Info. *Jurnal Warta LPM*, 24(4), 753–754. <http://journals.ums.ac.id/index.php/warta>
- Nurhayati, N., Irwan, I., & Miko, A. (2021). Penyuluhan garam beryodium terhadap perubahan pengetahuan ibu rumah tangga dalam penggunaan garam yodium. *Jurnal SAGO Gizi Dan Kesehatan*, 2(2), 178. <https://doi.org/10.30867/gikes.v2i2.490>
- Sulistiawati, I., Rahayu, N. L., Falah, M., & Endris, W. M. (2022). Konsumsi Garam Beryodium Sebagai Upaya Preventif Penyakit Gaky Di Masyarakat. *Jurnal Pemantik*, 1(1), 14–25. <https://doi.org/10.56587/pemantik.v1i1.5>
- Yumarna, A. (2024). Kesehatan Dalam Perspektif Filsafat Antropologis. *Jurnal Kesehatan Tambusai*, 5(1), 1185–1200.