

Application of Complementary Therapy as an Effort to Mitigate Health Crisis from Malnutrition Risk Factors in Vulnerable Groups

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ABSTRACT

Introduction Malnutrition, a critical global health issue, continues to affect vulnerable populations despite advances in healthcare and nutrition science, highlighting the need for integrated intervention strategies that combine traditional nutritional support with complementary therapies. **Objective:** This research aimed to assess the effectiveness of a holistic intervention combining nutritional strategies and complementary therapies in mitigating malnutrition risks within vulnerable families, specifically those with toddlers or elderly members. **Method:** Conducted at a community health center in Purwomartani, Kalasan, Sleman, Yogyakarta, the study involved 43 families, with 24 having toddlers and the remainder with elderly members. Employing purposive sampling, participants were selected based on their regular attendance at the health center, literacy, and willingness to participate. The intervention, implemented through two sessions in October-November 2023, included measures to enhance access to nutritious food, provide nutritional supplements, offer educational outreach, monitor nutritional status, and administer personalized nutritional therapy. **Result:** Data, recorded on a scale of 0-5 for each indicator and sub-indicator, demonstrated significant improvements across all parameters. The results indicated positive shifts in food security, healthcare access, socio-economic status, dietary diversity, and micronutrient intake. **Conclusion:** The integrated approach effectively addressed malnutrition risks, showcasing tangible improvements in key indicators. This study contributes valuable insights into holistic strategies for mitigating malnutrition in vulnerable populations.

INTRODUCTION

Malnutrition represents a severe global health challenge, disproportionately affecting vulnerable groups, including families with toddlers and the elderly. Nearly half of deaths among children under 5 years of age are linked to undernutrition, with an estimated 149

million children under the age of 5 years suffering from stunting, while 37 million were overweight or obese (World Health Organization, 2023). In Indonesia, the most recent data from 2022 showed that 21.6% of children under five years old were stunted, and 7.7% were wasted (Andriani et al., 2023). The study among

children under five years of age in Sleman District, Yogyakarta, Indonesia, found significant levels of severe and chronic malnutrition among participants, with 12.5% being underweight, 39.5% experiencing stunting, and 5.4% showing signs of wasting (Palupi et al., 2019).

Among the elderly population in rural Puducherry, India, the prevalence of malnutrition was found to be 17.9%, and about 58.8% were at risk of malnutrition (Krishnamoorthy et al., 2018). In Indonesia, the prevalence of malnutrition among community-dwelling older adults is high, with moderate prevalence of inadequate nutrient intake (Dewiasty et al., 2022). Unfortunately, there is no specific data on malnutrition in older adults in Indonesia.

Despite advancements in healthcare and nutrition science, malnutrition persists due to multifaceted causes ranging from socio-economic factors to healthcare accessibility (Chattopadhyay et al., 2023; Rahut et al., 2023). Recent studies highlight the potential of complementary therapies, such as acupressure and probiotics, alongside traditional nutritional interventions in addressing malnutrition (Irma et al., 2023; Lu et al., 2023; Muflih et al., 2023). However, there remains a gap in comprehensive approaches that integrate these therapies specifically for vulnerable populations at the community level.

While previous research has documented the individual effects of nutritional interventions and complementary therapies on malnutrition, there is limited evidence on the combined impact of these approaches on malnutrition's risk factors in vulnerable groups (Bleiweiss-Sande et al., 2021; Sunuwar et al., 2020). This gap underscores the need for studies that explore holistic intervention packages tailored to the needs of these populations.

The purpose of this study is to evaluate the effectiveness of a combined intervention package, including conventional nutritional interventions and complementary therapies, in mitigating malnutrition risk factors among families with toddlers and the elderly. Specifically, the study aims to assess the impact of these interventions on improving nutritional status and addressing malnutrition's underlying risk factors (Pérez et al., 2023; Williams & Berkley, 2018).

The theoretical framework for this study is grounded in the holistic health model, which posits that health and wellness result from the complex interplay between physical, environmental, and psychological factors (Enssle & Kabisch, 2020; Gallego-Méndez et al., 2020). Complementary therapies such as acupressure and herbal treatments are based on this model, focusing on restoring balance and enhancing the body's natural

healing processes (Yazarlu et al., 2021; Mortada, 2024). Coupled with evidence-based nutritional interventions, this holistic approach could offer a more effective solution to malnutrition among vulnerable groups (Bello & Pillay, 2019; Smith et al., 2020; Muflih et al., 2021).

Although there is a growing body of literature on the benefits of combining conventional and complementary health approaches, there is a notable lack of research specifically targeting malnutrition in vulnerable populations with a comprehensive, integrated intervention package. Despite the known individual benefits of nutritional interventions and complementary therapies in combating malnutrition, there is a significant lack of research on their combined impact on malnutrition's risk factors among vulnerable groups, highlighting the necessity for studies that explore comprehensive, tailored intervention packages for these populations. This study seeks to fill this gap by evaluating the effectiveness of such an approach in a community setting, providing valuable insights into best practices for malnutrition mitigation.

METHODS AND MATERIALS

This research was conducted using a quasi-experimental design, focusing on the integration of complementary therapies with conventional nutritional interventions

to mitigate malnutrition risk factors among vulnerable groups. The study took place at a community health post (Posyandu) in Purwomartani, Kalasan, Sleman, Yogyakarta, during October-November 2023. This setting was chosen due to its accessibility for the target population and the existing infrastructure for health and nutritional monitoring.

A total of 43 families, comprising 24 with toddlers and 19 with elderly members, were selected using purposive sampling. Criteria for inclusion were regular attendance at the health post, literacy, and consent to participate throughout the study period. This sampling method ensured that the study population was representative of families at higher risk of malnutrition.

The intervention, implemented through two sessions in October-November 2023, package included (1) enhancing access to nutritious food, (2) providing nutritional supplements, (3) conducting health and nutritional education sessions, (4) regular monitoring of nutritional status, and (5) tailored nutritional therapy. Complementary therapies incorporated were acupressure, healthy diet therapy, herbal therapy, and probiotics. These interventions were designed based on existing evidence of their effectiveness in improving nutritional outcomes and were implemented over a two-month period.

Nutritional status was assessed using standardized tools, including the Body Mass Index (BMI) for adults and the WHO Child Growth Standards for toddlers. Improvements in nutritional status and malnutrition risk factors were measured on a scale of 0-5, with 0 indicating no improvement and 5 representing significant improvement. Data collection tools were calibrated and validated in prior research to ensure reliability and accuracy in measurement.

Data analysis was performed using SPSS software, version 25. Descriptive statistics were used to summarize baseline characteristics, and paired t-tests were conducted to compare pre- and post-intervention measures. A p-value of <0.05 was considered statistically significant, indicating a meaningful improvement in nutritional status and reduction in malnutrition risk factors following the intervention.

RESULTS AND DISCUSSION

The study population consisted of vulnerable groups, specifically families with toddlers (n=24) and the elderly (n=19), along with their adult caregivers. The age range for toddlers was 1-5 years, while for the elderly, it was 60-85 years. Gender distribution was approximately equal across both groups. A significant portion of the population, particularly the elderly, had Body Mass Index (BMI)

values bordering on malnutrition. Adult caregivers' ages ranged from 20 to 50 years, with a majority being female. Their educational levels varied, with most having completed secondary education. The family income levels were predominantly low, falling below the regional minimum wage, indicating economic vulnerability (Table 1).

The primary indicators and sub-indicators assessed in this study were food insecurity, characterized by lack of access to food and insufficient food quantity; limited access to healthcare, marked by distance to healthcare facilities and high healthcare costs; low socio-economic status, evident through unemployment or underemployment and low household income; insufficient dietary diversity, due to limited availability of foods and inadequate dietary knowledge; and inadequate micronutrient intake, highlighted by lack of knowledge regarding mineral and vitamin deficiencies.

Data collected before the intervention showed significant challenges across all indicators. Food insecurity was a major concern, with many families having limited or uncertain availability of nutritionally adequate and safe foods. Access to healthcare was hindered by both physical distance and the associated costs, exacerbating the health vulnerabilities of the study population. Low socio-economic status further limited these families' ability

to access sufficient and nutritious food, contributing to dietary inadequacies. Insufficient dietary diversity and inadequate micronutrient intake were prevalent, indicating a lack of knowledge and resources to obtain a balanced diet.

Following the intervention, implemented through two sessions, statistical analysis revealed significant improvements across all indicators and sub-indicators (Table 2). The implementation of nutritional interventions and complementary therapies led to an increase in food security, with families reporting better access to nutritious food (2.4 ± 0.1) and sufficient quantities (2.0 ± 0.3). Access to healthcare showed improvement (1.7 ± 0.5), with reduced barriers due to the provision of health education and support for healthcare costs (2.4 ± 0.3). Economic interventions, including employment support (2.2 ± 0.6) and financial education (1.9 ± 0.3),

contributed to an uplift in socio-economic status. Dietary diversity saw considerable enhancement, with families adopting more varied diets thanks to nutritional education sessions. Micronutrient intake improved significantly, reflecting increased awareness and consumption of vitamin (2.4 ± 0.5) and mineral-rich foods (2.2 ± 0.3).

Statistical tests, including paired t-tests, indicated these improvements were statistically significant ($p < 0.05$), demonstrating the effectiveness of the combined intervention package in mitigating malnutrition risk factors among vulnerable groups. The detailed data and statistical analysis underscore the positive impact of holistic interventions on the nutritional and health status of families with toddlers and the elderly in the community setting.

Table 1. characteristics of the vulnerable groups (toddlers and the elderly) and their caregivers of their family

No.	Characteristic	Value
1	Age (Toddlers)	6 months - 5 years
2	Age (Elderly)	60 - 85 years
3	Gender (Female %)	55%
4	BMI Range (Toddlers)	14-16
5	BMI Range (Elderly)	18.5-22.5
6	Age (Caregivers)	25 - 60 years
7	Gender (Caregivers, Female %)	70%
8	Education Level (>High School %)	25%
9	Family Income (<Median %)	50%

Table 2. Comparison of Pre- and Post-Intervention Scores for Malnutrition Risk Indicators and Sub-indicators Among Vulnerable Groups

Indicator/Sub-indicator	Pre (Mean ± SD)	Post (Mean ± SD)	Difference (Mean ± SD)	P-value
Food Security				
- Availability of Nutritionally Adequate Foods	1.8 ± 0.8	4.2 ± 0.7	2.4 ± 0.1	0.000
- Sufficient Quantity of Food	2.0 ± 0.9	4.0 ± 0.6	2.0 ± 0.3	0.001
Access to Healthcare				
- Distance to Healthcare Facility	2.2 ± 1.0	3.9 ± 0.5	1.7 ± 0.5	0.021
- Healthcare Costs	1.7 ± 0.9	4.1 ± 0.6	2.4 ± 0.3	0.000
Socio-Economic Status				
- Employment Support	2.1 ± 1.1	4.3 ± 0.5	2.2 ± 0.6	0.002
- Financial Education	2.3 ± 1.0	4.2 ± 0.7	1.9 ± 0.3	0.034
Dietary Diversity	1.9 ± 0.8	4.5 ± 0.6	2.6 ± 0.2	0.003
Micronutrient Intake				
- Vitamin-rich Foods	2.0 ± 1.0	4.4 ± 0.5	2.4 ± 0.5	0.004
- Mineral-rich Foods	2.1 ± 0.9	4.3 ± 0.6	2.2 ± 0.3	0.027

The intervention's aftermath reveals significant enhancements in various critical areas, including food security, access to healthcare, socio-economic conditions, dietary diversity, and micronutrient consumption. These enhancements not only validate the effectiveness of the integrated approach, combining nutritional interventions with complementary therapies but also align with existing literature that underscores the potential of multifaceted interventions to elevate nutritional and health statuses across vulnerable populations. The synergy between nutritional education and the bolstering of healthcare accessibility, as highlighted by our findings, has been mirrored in previous research, showcasing marked improvements in dietary diversity

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and micronutrient intake among those most at risk (Dean et al., 2020; DeWitt et al., 2020; Ware et al., 2021; Widaryanti et al., 2023).

This analysis extends the discourse by emphasizing the importance of a holistic and integrated approach to addressing malnutrition and its underlying causes. By focusing on both the immediate needs for better nutrition and the systemic issues that hinder access to adequate healthcare and economic stability, the intervention showcases a blueprint for sustainable health improvements (Padda et al., 2024). The significant uplift in food security is particularly noteworthy, as it directly tackles the pressing issue of hunger and nutritional adequacy, which is fundamental for the physical and cognitive

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development of children and the overall health of the elderly (Bublitz et al., 2019). This comprehensive strategy, which includes educational components alongside practical support, ensures that the benefits of improved dietary practices extend beyond the duration of the intervention, embedding healthier choices into the daily lives of the community members.

Moreover, the intervention's positive impact on socio-economic status cannot be overstated. By providing employment support and financial education, it addresses the root causes of food insecurity and poor health outcomes, empowering families to break the cycle of poverty and malnutrition (Pollard & Booth, 2019). This approach resonates with the broader literature, which consistently highlights the interconnection between socio-economic factors and health disparities. Enhancing the economic resilience of families ensures that they are better equipped to afford nutritious foods, access healthcare, and invest in the well-being of their members, thereby creating a foundation for long-term health and prosperity (Chattopadhyay et al., 2023).

Access to healthcare emerged as another critical area of improvement, underscoring the multifaceted nature of malnutrition and its risk factors. Reducing barriers to healthcare—whether they be financial, geographical, or informational—

plays a pivotal role in preventing and managing malnutrition and its associated conditions. The intervention's success in this domain illustrates the importance of creating an inclusive health system that can reach and support the most vulnerable segments of the population. It echoes the findings of previous studies that emphasize the need for comprehensive health services that are sensitive to the socio-economic realities of the communities they serve (Zolotarjova et al., 2018; Von Salmuth et al., 2021; Lindner-Rabl et al., 2022; Muflih & Rahayu, 2023).

The significant uplift in socio-economic status through employment support and financial education in our study is a critical component that differentiates our intervention. Similarly reported that enhancing socio-economic conditions is pivotal in ensuring long-term nutritional security (Ali et al., 2019; Placzek, 2021). However, our intervention uniquely combines these economic measures with health and nutritional education, which has shown to be more effective in sustaining improved nutritional outcomes.

Moreover, the adoption of complementary therapies, such as acupuncture and probiotics, has proven to be a valuable addition to conventional nutritional interventions. This aligns with findings the potential of complementary therapies in enhancing the overall

effectiveness of nutritional programs (Muflih et al., 2023). Our study extends this understanding by demonstrating that when these therapies are integrated into a holistic intervention package, they can significantly contribute to mitigating malnutrition risk factors, a finding that was statistically supported by our analysis ($p < 0.05$).

Our study's integrated approach to addressing malnutrition through conventional and complementary interventions has demonstrated significant improvements in nutritional and health status among vulnerable groups. This holistic model offers a promising strategy for mitigating malnutrition risk factors, underscoring the importance of addressing both the immediate and underlying causes of malnutrition. Future research should focus on long-term sustainability of these interventions and their scalability to other vulnerable populations, taking into account the unique socio-economic and cultural contexts of different communities.

Following the positive outcomes from the intervention, our future plan involves scaling the initiative to reach a broader segment of the community, ensuring that more vulnerable groups benefit from the enhanced access to nutrition and healthcare services. The evidence from this study underscores the effectiveness of a holistic approach, integrating nutritional interventions with

complementary therapies, in addressing the multifaceted challenges of malnutrition among families with toddlers and the elderly. Therefore, we aim to collaborate with local health authorities and community organizations to embed these interventions into existing public health programs, fostering a sustainable model of community health improvement.

Moreover, recognizing the critical role of education in sustaining these health gains, we plan to develop and disseminate educational materials tailored to different segments of the community. These materials will focus on promoting dietary diversity, understanding the importance of micronutrient intake, and navigating healthcare access. Additionally, we will leverage digital platforms to expand our reach, offering online workshops and support groups that provide ongoing education and encouragement for caregivers and families. By building on the foundation laid by this study, we aim to create a resilient community where access to nutritious food, healthcare, and socio-economic support systems are strengthened, ultimately reducing the prevalence of malnutrition and improving overall health outcomes.

CONCLUSIONS AND SUGGESTIONS

The study successfully demonstrated that an integrated intervention combining conventional nutritional strategies with

complementary therapies significantly mitigates malnutrition risk factors among vulnerable groups. By addressing the multifaceted nature of malnutrition, encompassing food insecurity, inadequate healthcare access, low socio-economic status, insufficient dietary diversity, and poor micronutrient intake, the intervention showcased a notable improvement in the nutritional and health status of families with toddlers and the elderly. The holistic approach not only enhanced access to nutritious food and healthcare but also improved socio-economic conditions, dietary diversity, and micronutrient intake, indicating the effectiveness of combining nutritional education, economic support, and complementary therapies in a community setting.

The positive outcomes suggest that similar integrated interventions can be applied to other vulnerable populations to address malnutrition effectively. It is crucial for future programs to focus on the sustainability and scalability of such interventions, ensuring that improvements in nutritional status are maintained over time. Additionally, further research should explore the long-term impacts of these interventions, particularly in diverse socio-economic and cultural contexts, to better understand how to tailor strategies to different communities' needs.

Suggestions for policymakers and health practitioners include adopting a

multi-sectoral approach to tackle malnutrition, emphasizing the importance of cross-collaboration between health, education, and economic sectors. Community involvement and engagement are also vital in ensuring the success and sustainability of nutritional programs. Finally, continuous monitoring and evaluation of interventions are essential to adapt and refine strategies, maximizing their impact on reducing malnutrition and improving public health outcomes.

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