Improving Health Awareness and Preventive Care for Metabolic Disease among Indonesian Women Migrant Workers in Malaysia

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ABSTRACT

This community service program aimed to improve health awareness and preventive care for metabolic diseases among Indonesian women migrant workers in Malaysia through a comprehensive nutrition education intervention. Women migrant workers are particularly vulnerable to obesity, hypertension, type 2 diabetes mellitus, and cardiovascular diseases because of occupational demands, irregular eating patterns, limited physical activity, and restricted access to preventive healthcare services. The program was conducted from 23–25 January 2025 and involved 35 participants recruited through Indonesian migrant community networks. The intervention combined interactive health education, discussions, demonstrations, anthropometric measurements, and practical training on balanced meal planning based on the Indonesian Balanced Nutrition Guidelines (*Pedoman Gizi Seimbang*) and the *Isi Piringku* (My Plate) approach. Program effectiveness was evaluated using pre- and post-intervention knowledge assessments, direct observation of participants' practical competencies, and participant reflections. The findings indicated substantial improvements in participants' knowledge of balanced nutrition, understanding of metabolic disease prevention, and awareness of healthy lifestyle practices. Participants also demonstrated enhanced competencies in measuring body weight and height, calculating body mass index, interpreting nutritional status, and developing nutritionally balanced daily meal plans appropriate to their working conditions in Malaysia. Furthermore, the participatory educational approach increased participants' confidence, self-efficacy, and readiness to adopt healthier dietary behaviors while encouraging peer learning and community empowerment. The integration of theoretical knowledge with experiential learning enabled participants to translate health information into practical self-management skills that support long-term disease prevention. Overall, the program demonstrates that community-based nutrition education represents an effective strategy for strengthening health literacy, promoting preventive health behaviors, and empowering Indonesian women migrant workers to reduce the risk of metabolic diseases. Expanding similar interventions through collaboration among universities, community organizations, employers, and health institutions may contribute to sustainable health promotion and improved well-being among migrant worker populations.

Keywords: community health promotion; health literacy; Indonesian women migrant workers; metabolic

disease prevention; balanced nutrition

INTRODUCTION

Metabolic Disease Risks among Indonesian Women Migrant Workers

The global rise in metabolic diseases has become a significant public health concern, particularly among vulnerable populations such as migrant workers. Non-communicable diseases (NCDs), including obesity, hypertension, type 2 diabetes mellitus, and cardiovascular diseases, account for a substantial proportion of premature mortality worldwide. Indonesian women migrant workers represent a population exposed to multiple health risks because migration often involves major lifestyle transitions, demanding workloads, irregular eating schedules, and limited access to preventive healthcare services. Recent community-based evidence among female migrant workers in Malaysia similarly highlights lifestyle choices, eating patterns, and work-related stress as important issues in metabolic disease prevention (Pertiwi et al., 2026). Many domestic workers and service-sector employees work long hours with minimal opportunities for physical activity while relying on inexpensive, energy-dense foods that are high in sugar, sodium, and saturated fats. Furthermore, separation from family support systems, psychological stress, inadequate sleep, and restricted healthcare utilization may amplify metabolic risk factors over time (Ilhamalimy et al., 2025). Evidence consistently demonstrates that migrants frequently experience disparities in chronic disease prevention because structural, occupational, and socioeconomic barriers reduce opportunities for health promotion and early detection. Consequently, preventive interventions targeting migrant communities are increasingly recognized as an important public health priority that addresses health inequities while promoting healthier lifestyles before metabolic disorders become clinically significant (Oktavianus et al., 2026; Siti et al., 2026).

Occupational environments also influence dietary behavior and long-term nutritional health among Indonesian women migrant workers in Malaysia. Domestic workers commonly have limited autonomy over meal choices because food availability often depends on employers, work schedules, and economic constraints. Such conditions may encourage excessive consumption of processed foods while reducing intake of vegetables, fruits, whole grains, and quality protein sources. These dietary patterns increase the likelihood of overweight, insulin resistance, dyslipidemia, and hypertension. Therefore, policy and practice innovation should emphasize preventive nutrition education rather than relying solely on clinical treatment after disease develops. Community-based health promotion offers a practical mechanism for improving awareness of balanced nutrition, encouraging routine self-monitoring of body weight and nutritional status, and strengthening healthy decision-making despite workplace limitations. Educational programs that integrate culturally appropriate learning materials with practical demonstrations have shown considerable potential for improving health literacy and preventive behaviors among Indonesian migrant communities. Such initiatives align with the broader objective of reducing preventable metabolic diseases through early intervention, community empowerment, and sustainable behavioral change (Arifah & Pribadi, 2025; Mulyani et al., 2025).

Health Literacy and Balanced Nutrition as Preventive Strategies

Health literacy is increasingly recognized as a cornerstone of effective disease prevention because it enables individuals to obtain, understand, evaluate, and apply health information in everyday decision-making. Among migrant populations, health literacy is particularly important because language barriers, cultural adaptation, limited healthcare access, and demanding occupational conditions frequently reduce opportunities to receive accurate nutrition information. Women migrant workers often prioritize employment responsibilities over preventive healthcare, resulting in delayed recognition of metabolic risk factors such as excessive body weight, elevated blood pressure, or unhealthy dietary habits. Strengthening health awareness through community education can therefore improve individual capacity to make informed food choices, recognize early warning signs of chronic disease, and adopt healthier behaviors before complications occur. Evidence suggests that health literacy interventions contribute to improvements in preventive practices, self-efficacy, and engagement with health services, making them valuable components of community-based strategies for reducing the burden of non-communicable diseases among migrant populations (Oktavianus et al., 2026).

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Indonesia's Balanced Nutrition Guidelines (Pedoman Gizi Seimbang) provide a practical framework for promoting healthy dietary behavior throughout the life course. The guidelines emphasize dietary diversity, adequate fruit and vegetable consumption, regular physical activity, hygiene practices, sufficient water intake, and routine body-weight monitoring, while the Isi Piringku (My Plate) approach translates these recommendations into simple meal-planning guidance suitable for everyday use. For Indonesian women migrant workers living abroad, these principles remain highly relevant because they encourage flexible dietary adaptation without abandoning healthy nutritional standards. Community service programs that combine lectures with practical nutritional status assessment and balanced menu planning allow participants to transform theoretical knowledge into practical self-management skills. Educational innovations emphasizing participatory learning, demonstrations, and problem-solving activities have demonstrated positive effects on nutrition knowledge and healthy eating practices. Such approaches support long-term behavioral change by empowering participants to independently monitor nutritional status and prepare balanced meals within the constraints of their working environment (Briawan et al., 2024; Irnani & Sinaga, 2017).

Objectives of the Community Service Program

The community service program was designed to strengthen preventive healthcare among Indonesian women migrant workers in Malaysia through practical nutrition education and community empowerment. The primary objective was to improve participants' knowledge of balanced nutrition and its role in preventing metabolic diseases, including obesity, hypertension, diabetes mellitus, and cardiovascular disorders. Educational activities focused on introducing the principles of the Indonesian Balanced Nutrition Guidelines, explaining the relationship between dietary behavior and chronic disease risk, and increasing awareness of healthy lifestyle practices that can be maintained despite occupational constraints. Beyond theoretical understanding, the intervention sought to encourage participants to recognize the importance of preventive action through regular nutritional monitoring and informed food choices. Community-based education offers an accessible strategy for reaching populations with limited opportunities to participate in formal healthcare programs while simultaneously reducing inequalities in health information and preventive services (Mulyani et al., 2025; Arifah & Pribadi, 2025).

A second objective was to develop participants' practical competencies through hands-on learning experiences involving nutritional status assessment and healthy menu planning. Participants received training in measuring anthropometric indicators, interpreting nutritional status independently, and applying the *Isi Piringku* concept to prepare nutritionally balanced daily meals appropriate to their living conditions in Malaysia. These activities were intended to transform health knowledge into sustainable self-management skills that support long-term disease prevention rather than short-term behavioral change alone. Practical learning methods, including demonstrations, guided practice, and collaborative menu development, were incorporated to improve confidence and encourage active participation. Ultimately, the program sought to establish a foundation for healthier dietary behavior, strengthen personal responsibility for preventive health, and empower migrant women to become advocates of balanced nutrition within their social networks. Such objectives reflect contemporary approaches to community health promotion that integrate education, empowerment, and practical capacity building to reduce the growing burden of metabolic diseases among migrant communities (Briawan et al., 2024; Mulyani et al., 2025).

COMMUNITY SERVICE METHODS

Participants and Community Setting

The community service program was conducted in Malaysia from 23–25 January 2025, targeting Indonesian women migrant workers as a vulnerable population with limited access to preventive nutrition services. A total of 35 participants voluntarily joined the program after being informed about its objectives through local migrant community networks and community coordinators. The participants primarily worked in domestic, caregiving, and service-related occupations, where long working hours, irregular meal schedules, and restricted opportunities for physical activity potentially increased their susceptibility to metabolic disorders. Prior to program implementation, a simple needs assessment was undertaken through informal discussions with migrant community representatives and preliminary observations to identify participants' health concerns,

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nutritional practices, and educational needs. The assessment indicated limited understanding of balanced nutrition principles, inadequate awareness of nutritional status monitoring, and difficulties in planning healthy meals while living and working abroad. These findings guided the development of educational materials that were culturally relevant and tailored to the daily experiences of Indonesian migrant workers in Malaysia. Community-based participatory approaches are widely recognized as effective strategies for designing health promotion programs because they encourage stakeholder engagement while ensuring that interventions address the actual needs and priorities of target populations (Israel et al., 2017; O'Mara-Eves et al., 2015).

Participant recruitment emphasized inclusiveness and voluntary participation while maintaining ethical standards throughout the activity. Community leaders assisted in disseminating information regarding the program schedule, objectives, and expected outcomes, allowing interested migrant workers to register without discrimination regarding age, educational background, or employment sector. The intervention was delivered in the Indonesian language to facilitate effective communication and maximize participant engagement during interactive learning activities. Educational sessions were organized in a community-friendly environment that encouraged open discussion, peer learning, and collaborative problem-solving. Such participatory and context-sensitive training approaches can strengthen engagement and practical capacity among Indonesian female migrant workers in Malaysia (Merina et al., 2026). By combining contextual needs assessment with active community participation, the program established a supportive learning environment that enabled participants to develop practical nutrition competencies while strengthening community ownership of preventive health initiatives. This methodological approach reflects current recommendations for implementing community-based health promotion programs among underserved populations through culturally appropriate and participatory educational strategies (Wallerstein et al., 2020; Cargo & Mercer, 2008).

Educational and Practical Intervention

The educational intervention was designed to improve participants' knowledge of balanced nutrition and preventive care for metabolic diseases through interactive health counseling sessions. Educational materials included nutritional status assessment, the Ten General Guidelines for Balanced Nutrition (Pedoman Umum Gizi Seimbang), healthy lifestyle practices based on balanced dietary patterns, and the Isi Piringku (My Plate) model as a practical guide for daily meal composition. Health counseling combined lectures with question-and-answer discussions, visual learning materials, and practical examples to facilitate participant understanding regardless of educational background. Interactive educational methods have consistently demonstrated greater effectiveness than passive information delivery because they encourage participant engagement, improve knowledge retention, and strengthen confidence in adopting healthier dietary behaviors. The educational sessions emphasized the relationship between balanced nutrition, body weight management, blood glucose regulation, cardiovascular health, and long-term prevention of metabolic diseases, thereby enabling participants to understand the practical significance of healthy eating in their occupational context (Contento, 2016; Murimi et al., 2017).

Following the educational sessions, participants engaged in practical activities involving anthropometric measurements and healthy menu planning. Facilitators demonstrated how to measure body weight and height accurately, calculate body mass index, interpret nutritional status categories, and recognize potential nutritional risks independently. Participants then practiced these procedures under facilitator supervision to ensure proper technique and improve self-monitoring skills. Subsequently, participants worked collaboratively to design balanced daily meal plans using the Isi Piringku approach while considering food accessibility, affordability, and workplace conditions commonly experienced by Indonesian migrant workers in Malaysia. Experiential learning through demonstration and guided practice enables participants to transform theoretical nutrition knowledge into practical competencies applicable to everyday life. Such skill-based interventions are particularly valuable for preventive health promotion because they encourage sustained behavioral change, increase self-efficacy, and strengthen participants' ability to make healthier dietary decisions independently after the completion of community education programs (Kolb, 2015; Bandura, 2004).

Evaluation of Community Outcomes

Program evaluation was conducted to determine the effectiveness of the educational intervention in improving

participants' nutrition knowledge and practical competencies related to metabolic disease prevention. Knowledge assessment was performed using structured questionnaires administered before and after the educational sessions to measure participants' understanding of balanced nutrition principles, nutritional status assessment, healthy lifestyle practices, and balanced meal planning. Comparison of pre- and post-intervention responses enabled facilitators to identify changes in participants' cognitive understanding following the community service activities. In addition to knowledge assessment, facilitators systematically observed participant engagement during educational discussions and practical sessions to evaluate learning participation, communication, and application of newly acquired information. Educational evaluation frameworks recommend combining quantitative and qualitative assessment methods because they provide comprehensive evidence regarding learning effectiveness and behavioral outcomes following community health interventions (Kirkpatrick & Kirkpatrick, 2016; Moore et al., 2009).

The evaluation also emphasized participants' acquisition of practical skills through direct observation of nutritional status measurement procedures and balanced menu preparation exercises. Facilitators assessed participants' ability to perform anthropometric measurements correctly, interpret nutritional status independently, and develop daily meal plans according to the Isi Piringku recommendations. Participant feedback was collected through reflective discussions and informal interviews to document perceptions regarding program relevance, educational quality, and applicability of the acquired knowledge within their working environment. Program documentation, including attendance records, photographs, facilitator notes, and participant reflections, was compiled to support accountability and future program improvement. Combining knowledge assessment, practical performance evaluation, and participant feedback provides a holistic understanding of community intervention effectiveness while identifying opportunities for sustaining preventive nutrition education among migrant worker populations. Such multidimensional evaluation approaches are widely recommended in community health promotion because they capture both immediate learning outcomes and participant experiences that influence long-term behavioral adoption (Glanz et al., 2015; Nutbeam, 2000).

RESULTS AND DISCUSSION

Increased Knowledge of Balanced Nutrition

The educational intervention demonstrated a substantial improvement in participants' understanding of balanced nutrition concepts and their relationship to metabolic disease prevention. Following the health education sessions, participants showed greater familiarity with the Ten General Guidelines for Balanced Nutrition (Pedoman Umum Gizi Seimbang), including the importance of consuming diverse foods, increasing fruit and vegetable intake, limiting sugar, salt, and fat consumption, engaging in regular physical activity, maintaining personal hygiene, drinking sufficient water, and routinely monitoring body weight. During group discussions, participants were able to explain how unhealthy dietary patterns contribute to obesity, hypertension, type 2 diabetes mellitus, and cardiovascular disease. These findings indicate that community-based nutrition education successfully translated scientific recommendations into practical knowledge that participants could understand and relate to their daily lives. Previous research has demonstrated that nutrition education significantly enhances knowledge acquisition and serves as a critical determinant of dietary behavior change, particularly when educational materials are culturally appropriate and supported by interactive learning activities (Crowley et al., 2020).

In addition to improved understanding of nutritional guidelines, participants demonstrated increased awareness of the importance of preventive health behaviors for reducing metabolic disease risk. Many participants reported recognizing the relationship between dietary quality, body weight management, and chronic disease prevention for the first time. They also expressed greater confidence in identifying unhealthy eating habits and acknowledged the need to adopt healthier lifestyles despite occupational challenges. The interactive counseling sessions encouraged participants to actively discuss barriers to healthy eating in Malaysia and collaboratively identify realistic strategies for improving daily food choices within existing workplace limitations. Such improvements illustrate that knowledge enhancement extends beyond cognitive learning to include greater motivation and readiness for behavioral change. Studies have consistently reported that improved nutrition literacy contributes to healthier dietary practices and supports long-term prevention of non-communicable

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diseases by strengthening individual capacity to make informed health decisions (Velardo, 2015; Zoellner et al., 2011).

Improved Skills in Nutritional Status Assessment

Practical training sessions significantly improved participants' ability to independently assess their nutritional status using simple anthropometric techniques. Under facilitator guidance, participants learned how to accurately measure body weight and height, calculate body mass index (BMI), and classify nutritional status according to internationally accepted criteria. Most participants successfully completed these procedures independently during the practical sessions, demonstrating an improved understanding of how nutritional indicators can be used to identify potential health risks associated with overweight and obesity. Practical demonstrations enabled participants to develop procedural competence while simultaneously strengthening their understanding of the relationship between body composition and metabolic disease prevention. Experiential learning approaches are widely recognized for improving psychomotor skills because participants actively practice new competencies rather than merely receiving theoretical information. Such educational strategies are particularly valuable in community health promotion because they increase confidence and encourage sustained application of newly acquired health skills (Baker et al., 2018).

Participants also demonstrated greater confidence in interpreting nutritional assessment results and using these findings to monitor their own health. During reflective discussions, many participants indicated that they had never previously measured their nutritional status independently and considered the acquired skills useful for preventing future health problems. Facilitators observed that participants were able to explain BMI categories correctly, identify whether additional lifestyle modification was necessary, and discuss appropriate dietary adjustments based on individual nutritional conditions. Increased self-monitoring capacity is particularly important for migrant workers because routine access to healthcare services may be limited by occupational responsibilities or socioeconomic constraints. Developing simple monitoring skills empowers individuals to recognize early signs of nutritional imbalance and encourages timely preventive action before metabolic disorders become clinically significant. Previous studies have shown that self-monitoring represents an effective behavioral strategy for improving health outcomes because it enhances personal responsibility, self-regulation, and long-term adherence to healthy lifestyle practices (Burke et al., 2011; Michie et al., 2009).

Enhanced Ability to Plan Healthy Meals

Another important outcome of the community service program was the participants' improved ability to develop balanced daily meal plans based on the **Isi Piringku (My Plate)** concept and the Indonesian Balanced Nutrition Guidelines. During collaborative learning activities, participants practiced organizing meal portions that included staple foods, vegetables, fruits, and protein sources while considering food availability and affordability within the Malaysian environment. Participants gradually shifted from focusing primarily on meal quantity toward considering nutritional quality and dietary diversity. Facilitators observed that participants became more capable of identifying healthier alternatives to highly processed foods commonly consumed because of convenience or workplace constraints. Practical menu planning exercises encouraged participants to apply nutritional principles directly to realistic eating situations, thereby bridging the gap between theoretical knowledge and everyday dietary decision-making. Nutrition education programs that incorporate meal-planning activities have consistently demonstrated greater effectiveness in promoting healthy food selection and improving long-term dietary behavior than education based solely on lectures (Reicks et al., 2014; Slater et al., 2018).

The relevance of these practical competencies is particularly significant for Indonesian women migrant workers because occupational demands often restrict opportunities for healthy eating. Participants discussed strategies for preparing balanced meals using locally available ingredients, selecting healthier packaged foods, reducing excessive sugar and sodium intake, and adapting traditional Indonesian dietary practices to the Malaysian food environment. These discussions reflected participants' growing confidence in making informed food choices despite financial and workplace limitations. Improved meal-planning skills represent an important component of preventive healthcare because consistent healthy dietary behavior contributes to weight management, improved metabolic health, and reduced risk of non-communicable diseases.

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Community-based interventions emphasizing practical food preparation and individualized dietary planning therefore provide sustainable approaches for promoting health among migrant populations who face unique environmental and occupational challenges. The integration of nutrition knowledge with practical meal-planning competence ultimately supports long-term adoption of healthier lifestyles and strengthens community resilience against the increasing burden of metabolic diseases (Ronto et al., 2017; Spronk et al., 2014).

IMPLICATIONS FOR COMMUNITY HEALTH PROMOTION

Strengthening Preventive Health Behavior

The outcomes of this community service program suggest that nutrition education can serve as an effective strategy for strengthening preventive health behavior among Indonesian women migrant workers in Malaysia. Increased knowledge of balanced nutrition, practical experience in nutritional status assessment, and improved meal-planning skills collectively encourage participants to adopt healthier dietary practices that can be sustained beyond the intervention period. Sustainable dietary behavior requires individuals not only to understand nutritional recommendations but also to develop the motivation and confidence necessary to apply them consistently in everyday life. For migrant workers, whose occupational responsibilities often limit opportunities for healthy eating, preventive education provides practical guidance for making healthier food choices within existing environmental and financial constraints. Encouraging gradual behavioral modification, rather than imposing unrealistic dietary restrictions, increases the likelihood of long-term adherence to balanced nutrition principles. Behavioral nutrition research has consistently demonstrated that sustained lifestyle improvements are more likely when interventions emphasize self-efficacy, personal goal setting, and practical problem-solving strategies that accommodate participants' daily living conditions (Greaves et al., 2011; Kwasnicka et al., 2016).

Beyond dietary improvement, preventive health promotion should encourage migrant workers to practice self-care through routine monitoring of body weight, healthy eating habits, physical activity, and early recognition of metabolic disease risk factors. The ability to independently monitor nutritional status empowers individuals to take greater responsibility for their own health while reducing dependence on episodic healthcare services. Developing long-term health awareness is particularly important among migrant populations because occupational mobility, irregular working hours, and limited healthcare access often delay preventive screening and disease detection. Community-based educational interventions therefore contribute not only to immediate knowledge acquisition but also to the development of lifelong preventive health behaviors that reduce chronic disease risk. Integrating nutrition education with self-monitoring practices, behavioral reinforcement, and continuous access to reliable health information supports the establishment of sustainable preventive lifestyles capable of reducing the future burden of obesity, hypertension, diabetes mellitus, and cardiovascular disease among migrant communities (Lally et al., 2010; Schwarzer, 2008).

Community Empowerment through Nutrition Education

Nutrition education extends beyond individual knowledge improvement by functioning as a mechanism for community empowerment among women migrant workers. Empowerment occurs when participants acquire the knowledge, practical skills, and confidence needed to make informed health decisions independently while simultaneously influencing the health behaviors of those around them. Through active participation in health counseling, nutritional assessment, and meal-planning exercises, participants become better equipped to address everyday nutritional challenges encountered within their workplace and living environments. Capacity-building initiatives that strengthen health literacy and practical competencies enable migrant workers to transition from passive recipients of health information to active agents capable of promoting preventive health within their communities. Such empowerment contributes to greater resilience against chronic disease risk while encouraging sustainable adoption of healthier lifestyles despite occupational constraints. Evidence suggests that community empowerment approaches improve both individual health outcomes and collective capacity to address shared public health challenges through collaborative learning and local participation (Laverack, 2006; Wiggins, 2012).

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Peer support represents another important mechanism through which nutrition education can generate broader community impact. Participants who gain practical nutrition knowledge frequently share information with co-workers, family members, and fellow migrant workers, thereby extending the benefits of educational interventions beyond the original participants. Informal knowledge dissemination encourages collective learning and creates supportive social environments in which healthy dietary behaviors become more socially acceptable and easier to maintain. Community participation further strengthens program sustainability by fostering local ownership, increasing trust in health promotion activities, and encouraging collaborative problem-solving regarding nutrition-related challenges. Community members who actively contribute to planning, implementation, and dissemination are more likely to sustain preventive health initiatives after external facilitators have completed their activities. Consequently, integrating participatory education with peer learning networks provides a scalable approach for improving nutrition literacy and strengthening preventive healthcare capacity among migrant worker communities (Campbell & Jovchelovitch, 2000; South et al., 2013).

Recommendations for Future Community Programs

Future community health promotion initiatives should expand the implementation of nutrition education programs to reach broader groups of Indonesian migrant workers across different employment sectors and geographic locations. Although the present intervention demonstrated positive outcomes among women migrant workers in Malaysia, similar preventive health challenges are experienced by migrant populations in manufacturing, construction, plantation, and hospitality industries. Expanding community-based nutrition education would increase access to preventive healthcare information among underserved populations while reducing disparities in nutrition literacy and chronic disease prevention. Future programs should also adopt flexible delivery models, including hybrid educational approaches, digital learning platforms, and multilingual educational resources to accommodate varying work schedules and accessibility constraints (Sihotang, Suhud, & Wibowo, 2025). Broadening program coverage through collaboration with Indonesian community organizations, embassies, employers, and local health institutions may substantially increase participation and long-term sustainability. Scaling preventive nutrition education using evidence-based community health promotion strategies has considerable potential to improve public health outcomes among migrant populations internationally (Glasgow et al., 2019; Aarons et al., 2011; Bresca et al., 2026).

Future interventions should additionally integrate nutrition education into workplace health promotion initiatives while establishing continuous monitoring and follow-up education to reinforce behavioral maintenance. Employers, community organizations, and healthcare providers can collaborate to create supportive workplace environments that facilitate healthier food choices, regular health screening, and opportunities for physical activity. Periodic follow-up education, refresher training, and digital communication platforms may help participants maintain healthy behaviors while addressing new nutritional challenges that emerge over time. Continuous monitoring through routine nutritional assessment and participant feedback also enables program coordinators to evaluate long-term effectiveness and refine educational strategies according to participants' evolving needs (Sihotang, Suhud, & Rizan, 2025). Such integrated approaches reflect contemporary public health recommendations emphasizing sustainable health promotion through multi-sector collaboration, continuous evaluation, and ongoing community engagement rather than one-time educational activities. These recommendations provide a practical framework for strengthening preventive healthcare policies targeting migrant workers and other vulnerable populations at increased risk of metabolic diseases (Proctor et al., 2011).

CONCLUSION

Summary of Program Achievements

The community service program successfully achieved its primary objective of improving health awareness and preventive care for metabolic diseases among Indonesian women migrant workers in Malaysia through a comprehensive nutrition education intervention. Participants demonstrated substantial improvements in their understanding of balanced nutrition principles, the Ten General Guidelines for Balanced Nutrition, nutritional status assessment, and healthy meal planning using the *Isi Piringku* concept. Interactive counseling sessions,

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practical demonstrations, and collaborative learning activities enabled participants to connect theoretical nutrition knowledge with their daily dietary practices despite occupational and environmental challenges. The educational approach also increased participants' awareness of the relationship between unhealthy eating patterns and the development of obesity, hypertension, diabetes mellitus, and cardiovascular diseases. Overall, the program strengthened participants' health literacy while enhancing their capacity to make informed dietary decisions that support long-term metabolic health (Suhud et al., 2025a; Suhud et al., 2025b).

Beyond cognitive improvement, the program strengthened participants' practical competencies related to nutritional self-management and healthy living. Participants successfully acquired hands-on skills in measuring anthropometric indicators, interpreting nutritional status, and preparing balanced daily meal plans appropriate for their living conditions in Malaysia. These practical competencies increased participants' confidence in independently monitoring their nutritional health and encouraged greater readiness to adopt preventive lifestyle behaviors after completion of the intervention (Suhud et al., 2026a; Suhud et al., 2026b; Suhud et al., 2026c; Suhud et al., 2026d). The combination of education and experiential learning promoted active participation, collaborative problem-solving, and greater self-efficacy regarding healthy dietary choices. Strengthening both knowledge and practical competencies provides a solid foundation for sustainable behavioral change and better preparedness for healthier living among migrant worker populations.

Community Health Contributions

The findings of this community service program demonstrate meaningful contributions to community health promotion through preventive nutrition education and health literacy enhancement. By improving participants' understanding of balanced nutrition and metabolic disease prevention, the intervention addressed modifiable behavioral risk factors associated with chronic non-communicable diseases.

Increased awareness of healthy eating, body weight monitoring, and balanced meal planning equips participants with practical tools to reduce future risks of obesity, diabetes mellitus, hypertension, and cardiovascular disease. Preventive nutrition education is particularly valuable for migrant worker populations because occupational constraints frequently limit access to routine healthcare services and health promotion opportunities. As a result, strengthening nutrition literacy serves as an effective strategy for encouraging healthier behaviors and reducing long-term health risks.

Another important contribution of the program lies in its emphasis on community empowerment through nutrition literacy and participatory learning. Participants developed the confidence and practical capacity to independently monitor nutritional status, prepare healthier meals, and share nutrition knowledge with peers within their migrant communities.

This empowerment strengthens community resilience by encouraging collective responsibility for health promotion while facilitating the wider dissemination of preventive health information. Furthermore, the participatory educational approach enhanced community engagement, fostered participant ownership of the learning process, and increased the likelihood that healthy behaviors would be maintained beyond the duration of the intervention.

Future Directions

Future community health promotion initiatives should focus on expanding preventive nutrition interventions to reach larger populations of Indonesian migrant workers across multiple regions and occupational sectors. Scaling community-based nutrition education through partnerships with migrant associations, Indonesian diplomatic missions, employers, and local healthcare providers would substantially increase access to preventive health services for vulnerable populations.

Future programs should also incorporate digital technologies, including mobile health applications, online educational platforms, and social media communication, to overcome geographical barriers and accommodate participants' varying work schedules. These innovations would improve program accessibility while supporting continuous learning and reinforcing healthy behaviors beyond face-to-face educational activities.

Long-term sustainability of health promotion activities will require strong cross-sector collaboration and continuous evaluation of program outcomes. Government agencies, healthcare institutions, universities, employers, and community organizations should work together to establish integrated health promotion systems that combine nutrition education, regular health screening, workplace wellness initiatives, and ongoing participant support.

Future programs should also include periodic follow-up education and more comprehensive evaluations to assess long-term behavioral changes and health outcomes. Through sustained collaboration, continuous monitoring, and community engagement, nutrition education initiatives can evolve into comprehensive public health strategies that contribute to reducing the burden of metabolic diseases and improving the overall well-being of Indonesian migrant workers.

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