

THE EFFECTIVENESS OF HEALTH PROMOTION PROGRAMS IN PREVENTING CHRONIC DISEASES: A META-ANALYSIS

EFEKTIVITAS PROGRAM PROMOSI KESEHATAN DALAM PENCEGAHAN PENYAKIT KRONIS: META-ANALISIS

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ABSTRACT

Chronic diseases are a major global health challenge with significant economic and social burden. This study aims to identify the types of health promotion programs that are most effective in preventing chronic diseases and evaluate their effectiveness in various population groups. By using a systematic literature review approach based on PRISMA guidelines, this study analyzed 27 peer-reviewed articles published in the last 12 years. Results show that community and technology (e-health)-based programs have high effectiveness, especially when tailored to the characteristics of the target population. These findings provide important recommendations for policy development and implementation of evidence-based health interventions.

Keywords: chronic disease, health promotion, systematic literature review, program effectiveness, target population

ABSTRAK

Penyakit kronis menjadi tantangan kesehatan global utama dengan beban ekonomi dan sosial yang signifikan. Penelitian ini bertujuan untuk mengidentifikasi jenis program promosi kesehatan yang paling efektif dalam mencegah penyakit kronis dan mengevaluasi efektivitasnya pada berbagai kelompok populasi. Dengan menggunakan pendekatan *systematic literature review* berdasarkan panduan PRISMA, studi ini menganalisis 27 artikel *peer-reviewed* yang dipublikasikan dalam 12 tahun terakhir. Hasil menunjukkan bahwa program berbasis komunitas dan teknologi (e-health) memiliki efektivitas tinggi, terutama ketika disesuaikan dengan karakteristik populasi target. Temuan ini memberikan rekomendasi penting untuk pengembangan kebijakan dan pelaksanaan intervensi kesehatan yang berbasis bukti.

Kata Kunci: penyakit kronis, promosi kesehatan, *systematic literature review*, efektivitas program, populasi target

1. INTRODUCTION

Chronic diseases, such as diabetes mellitus, hypertension, heart disease, and cancer, represent a major challenge to public health worldwide. These diseases contribute to high morbidity and mortality rates. According to a World Health Organization (WHO) report, approximately 41 million deaths each year—which accounts for 71% of total global deaths—are caused by non-communicable diseases (NCDs) (Bloom et al., 2020). This burden is especially felt disproportionately in low- and middle-income countries.

The increasing prevalence of chronic diseases is often associated with preventable risk factors, such as poor diet, lack of physical activity, smoking habits, and excessive alcohol consumption (Abashidze-Gabaidze, 2023). These factors not only trigger the occurrence of chronic diseases, but also cause significant direct costs for medical care and indirect costs due to lost productivity (Abashidze-Gabaidze, 2023). In the face of these challenges, community-based interventions are emerging as a promising strategy to reduce these risks by encouraging healthier lifestyle choices (Abashidze-Gabaidze, 2023; Powers et al., 2019). These interventions can take the form of health education campaigns, physical activity programs, and

initiatives targeted at specific settings such as schools or workplaces (Abashidze-Gabaidze, 2023; Powers et al., 2019).

Health promotion programs play an important role in addressing the chronic disease epidemic by encouraging behavioral change at both individual and community levels. Evidence shows that community involvement in health promotion significantly increases the effectiveness of interventions, particularly in disadvantaged population groups (O'Mara-Eves et al., 2015). For example, community-based participatory research (CBPR) approaches have been proven to be able to empower communities, improve health outcomes, and reduce health disparities by involving community members in the design and implementation of health initiatives (Rhodes et al., 2012). The success of these programs depends largely on their suitability to the specific needs and context of the target population (O'Mara-Eves et al., 2015).

In conclusion, the increasing burden of chronic disease requires a multifaceted approach that includes health promotion strategies tailored to community needs. By leveraging community engagement and participatory research methods, public health initiatives can effectively address the underlying risk factors for chronic disease. This will ultimately result in improved public health outcomes and reduced economic burden.

Although many health promotion programs have been implemented, their effectiveness often varies among different populations. Some programs have been successful in reducing chronic disease risk factors in certain groups, but have not had the same impact on other populations. This highlights the need for a tailored approach to optimize health outcomes.

However, the lack of an integrated understanding of the types of programs that are most effective for each population is an obstacle to the development of evidence-based policies. For example, technology-based interventions may be more effective for younger populations, while community-based approaches may be more relevant for older groups. Without systematic analysis, it is difficult to determine which type of intervention is most appropriate for each demographic group.

Previous research has largely focused on evaluating individual health promotion programs, without integrating the findings in a broader context. As a result, there is a gap in the literature linking program effectiveness to the specific needs of various population groups. Additionally, only a few systematic reviews cover a wide range of interventions, from health education to technology-based approaches, in the context of chronic disease.

This lack of systematic reviews not only hinders the development of targeted policies but also limits opportunities to replicate programs that have proven successful in various contexts. Therefore, comprehensive research is needed to fill this gap by highlighting the most effective types of health promotion programs based on scientific evidence.

The aim of this study was to identify the types of health promotion programs that are most effective in preventing chronic disease and evaluate their effectiveness in various populations. This research aims to:

1. Describe the main characteristics of a successful health promotion program.
2. Identifying populations that would benefit most from a particular intervention.
3. Provide evidence-based recommendations for the development of better health promotion policies and practices.

Through a systematic literature review approach, it is hoped that this research can make a significant contribution to academic literature and help policy makers design health promotion programs that are more effective, efficient and sustainable.

2. METHODS

2.1. Study Design

This research uses a systematic literature review (SLR) approach with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure

transparency, accuracy and replicability of the process used. This approach allows identification, selection, evaluation and synthesis of relevant literature to answer research questions in a systematic and structured manner.

2.2. Search Strategy

To obtain relevant literature, searches were carried out in various leading databases, vizu PubMed, Scopus, Web of Science, ProQuest, and Google Scholar. VoterThis database aims to cover a wide range of scientific disciplines that contribute to the topic of health promotion and chronic disease prevention.

The search strategy involves the following keyword combinations:

- "health promotion programs"
- "chronic disease prevention"
- "effectiveness"
- "target populations"

These keywords are used in the form of Boolean logic to increase the specificity of search results. Operators like AND, OR, and NOT are applied, for example:

- "health promotion programs AND chronic disease prevention"
- "effectiveness OR efficacy AND target populations"

The search period is limited between 2012-2024 innto ensure the relevance of the data to the latest developments in the field of health promotion.

2.3. Inclusion Criteria

Studies included in this analysis had to meet the following inclusion criteria:

1. Evaluation of the effectiveness of health promotion programs: Studies should have empirical measurements or analyzes of the outcomes of health interventions related to chronic disease prevention.
2. Specific population: Studies should focus on specific demographic groups such as by age, gender, socioeconomic status, or geographic conditions.
3. Peer-reviewed publications in English: Articles published in scientific journals with a peer-review process to ensure research quality.

2.4. Exclusion Criteria

Articles excluded from analysis included:

1. Non-human populations: Studies using animal models or laboratory experiments with no direct link to humans.
2. Non-empirical report: Opinion article, editorial, or narrative without relevant quantitative or qualitative data.
3. Reports without full access: Articles with the full text not available or presenting only the abstract without detailed information.

2.5. Data Extraction and Analysis

Data taken from each article includes:

1. Program type: Description of the health promotion program, including community-based, technology, or health education approaches.
2. Target population: Characteristics of the population targeted by the intervention, such as age range, gender, or socioeconomic conditions.
3. Intervention method: Details of the program implementation method, such as duration, frequency, and media used.
4. Outcomes (effectiveness): Measurement of a program's success in reducing chronic disease risk factors or increasing healthy behavior.

5. Implementation context: Geographic location, sociocultural setting, or economic conditions that influence program implementation.

The analytical approach is done by mail through narrative synthesis, in mThe findings are categorized based on:

- Type of program (e.g., community-based promotion, digital intervention, or mass campaign).
 - Target population (for example, young adults, seniors, or low socioeconomic groups).
- The results of this analysis are presented thematically to identify general patterns, specific successes, and gaps in the literature.

With this approach, research aims to generate an in-depth understanding of the relationship between health promotion programs, target populations, and the effectiveness of interventions in chronic disease prevention.

3. RESULTS

3.1. Search Results

The systematic search yielded a number of articles that met the inclusion and exclusion criteria:

1. Initial number of articles found: 148 articles from five databases (PubMed, Scopus, Web of Science, ProQuest, and Google Scholar).
2. Articles after duplication removed: 51 articles.
3. Articles filtered based on abstract and title: 27 articles met topic relevance.
4. Articles reviewed full text: 27 articles.
5. Articles included in the final analysis: 27 articles.

Information this provides an overview of transparent and replicable literature selection.

3.2. Types of Programs Identified

The analysis identified various types of health promotion programs used to prevent chronic disease, including:

1. Community based programs:
 - Example: Physical activity promotion campaign in the local environment.
 - Effectiveness: The program demonstrated success in increasing health awareness and adoption of healthy lifestyles through social interactions.
2. Technology-based interventions (e-health):
 - Example: Mobile application for tracking eating and exercise habits.
 - Effectiveness: Very suitable for young, tech-savvy populations, although less effective for seniors due to limited access or digital literacy.
3. Programs at work:
 - Example: Sports and health education programs in companies.
 - Effectiveness: This program has succeeded in reducing risk factors for chronic diseases such as obesity and stress, especially in workers of productive age.
4. Health education in schools:
 - Example: Integrating healthy lifestyle material in the curriculum.
 - Effectiveness: Effective in forming healthy habits from an early age, although it requires support from family and the environment.

3.3. Effectiveness by Target Population

1. Children:
 - School-based programs, such as providing healthy food in canteens and introducing physical activity, are effective in preventing childhood obesity.
2. Teenagers:

- Technology-based interventions have shown success in reducing smoking habits and increasing awareness about the importance of healthy eating patterns.
- 3. Mature:
 - Workplace programs are more effective because they integrate interventions into daily routines.
- 4. Elderly:
 - Community-based interventions, such as sports clubs or social support groups, are more successful in increasing physical activity and mental health.
- 5. Specific at-risk populations:
 - Obesity sufferers: Multidisciplinary interventions (diet, exercise, psychological counseling) provide significant results.
 - Smokers: Community-based smoking cessation campaigns are effective, especially when accompanied by incentives.
 - Genetically predisposed individuals: Health education programs about chronic disease risks help increase adherence to a healthy lifestyle.

3.4. Key Success Factors

Some key factors that support the success of health promotion programs include:

1. Community support: Community-based programs involving local leaders tend to be more effective due to higher trust and engagement.
2. Culture-based approach: Interventions tailored to local cultural norms and values increase program participation and sustainability.
3. Program sustainability: Long-term programs with stable funding produce greater impacts than short-term interventions.
4. Multi-sectoral collaboration: Cross-sector support (government, private and community) strengthens program implementation and increases target population coverage.

3.5. Challenges and Barriers

Despite many successes, the implementation of health promotion programs often faces various challenges, such as:

1. Limited funding: Long-term programs require ongoing funding that is often difficult to meet.
2. Low participation: Some populations, such as older age groups or people in remote areas, are less involved in the program due to limited accessibility.
3. Logistical constraints: Distribution of resources, such as educational materials or sports facilities, is often uneven, especially in rural areas.
4. Cultural resistance: Some interventions are unsuccessful because they conflict with local beliefs or norms.

4. DISCUSSIONS

4.1. Interpretation of Findings

Community-based programs, technology-based interventions, and workplace health initiatives are three types of effective health promotion programs that have attracted attention for their potential to improve health outcomes. Each type of program uses a unique approach to engage participants and encourage healthier lifestyles.

4.1.1. Community Based Program

Community-based programs are very effective because they emphasize direct community involvement in their design and implementation. For example, initiatives such as the "Let's Move!" in the United States has succeeded in mobilizing various community sectors,

including schools, local governments, and families, to jointly address childhood obesity (Bjerke, 2022). These programs often utilize in-person counseling and group exercise sessions, which have been shown to increase awareness and adoption of healthy behaviors among participants (Altman et al., 2023). This participatory approach creates a sense of ownership and responsibility that can increase long-term engagement and produce positive health impacts (Zwanikken et al., 2013).

4.1.2. Technology-Based Interventions

Technology-based interventions, especially e-health solutions, have emerged as powerful tools in health promotion. Programs that use habit tracking apps or telemedicine platforms enable personalized interventions based on individual user data, thereby increasing engagement, especially among younger generations (Ott-Holland et al., 2019). These digital tools facilitate ongoing monitoring and feedback, which is important for maintaining motivation and adherence to health goals (Marsh et al., 2018). Research shows that interventions tailored to users' needs and preferences can result in significant improvements in health behaviors and outcomes (Laing et al., 2012).

4.1.3. Workplace Wellness Initiative

Workplace health programs are also an important part of health promotion strategies, especially for the working age population. This program has been shown to be effective in reducing stress and other health risk factors by providing easily accessible resources, such as yoga classes and exercise facilities in the work environment (Goetzel et al., 2014). Research shows that organizations that make wellness part of the company culture, rather than just an added benefit, tend to have higher participation rates and greater health improvements among employees (Linnan et al., 2019). Additionally, workplace wellness initiatives can reduce healthcare costs and absenteeism, providing clear benefits for employers (Mochida et al., 2022). Comprehensive wellness programs, covering physical, mental, and financial aspects, have proven to be very successful in creating a healthier workforce (Tringali & Aldridge, 2021).

Community-based programs, technology-based interventions, and workplace wellness initiatives each play an important role in the promotion of health and well-being. By leveraging community engagement, personalized digital tools, and supportive work environments, these programs can significantly improve health outcomes and encourage healthier lifestyles across diverse population groups.

4.2. The Relevance of Program Effectiveness to Various Population Groups

The effectiveness of health promotion programs varies significantly among different population groups, especially among children, older adults, and high-risk populations. Each demographic group has unique needs and challenges that influence the design and implementation of these interventions.

4.2.1. School Based Programs for Children

For children, school-based programs are particularly relevant because they provide a structured environment that supports the formation of healthy habits. Research shows that interventions targeting pediatric obesity, such as those using electronic medical records to support clinical decisions, show positive results in improving management and outcomes for overweight children. Shaikh et al. found that such systems can improve preventive practices, thereby encouraging healthier lifestyle choices among children (Shaikh et al., 2014). Additionally, lifestyle counseling is more frequently reported in obese children, emphasizing the importance of structured support in educational settings (Oreskovic et al., 2014). These findings emphasize the crucial role of schools in promoting children's health, because schools can effectively integrate health education into their curriculum.

4.2.2 Community-Based Interventions for Older Adults

In contrast, older adults benefit more from community-based interventions that emphasize social support and group interactions. Programs designed to increase social

connectedness have been shown to significantly improve mental health outcomes in this group. For example, Agarwal and Brydges highlight the importance of addressing social factors such as loneliness and social isolation in older adults, which are often overlooked in health promotion efforts (Agarwal & Brydges, 2018). Similarly, Pendergrast et al. noted that state and territorial health agencies are well suited to support initiatives that promote healthy aging through community engagement (Pendergrast et al., 2023). The role of social support is increasingly emphasized by research showing that community networks and family support are critical to improving quality of life among older adults (Peralta et al., 2018; Yodmai et al., 2021). Furthermore, interventions that provide opportunities for social interaction, such as group activities or volunteer programs, have been shown to reduce feelings of loneliness and improve overall well-being (Sampoon et al., 2019; Leo, 2023).

4.2.3. Multidisciplinary Approaches for High-Risk Populations

High-risk populations, particularly those dealing with obesity or smoking, require multidisciplinary interventions that combine multiple forms of support, including counseling and physical activity. Research shows that a comprehensive approach that integrates psychological and physical health strategies provides significant improvements in health outcomes for these individuals. For example, interventions that combine lifestyle counseling with physical activity have been shown to be effective in treating obesity in adolescents (Gentile et al., 2016; Patel et al., 2010). Additionally, studies show that programs tailored to the specific needs of high-risk groups can result in substantial improvements in health behaviors and outcomes (Kim et al., 2020; Li et al., 2022).

Overall, the effectiveness of health promotion programs depends largely on the specific characteristics and needs of different population groups. School-based programs are critical for instilling healthy habits in children, while community-based interventions are crucial for supporting older adults. High-risk populations benefit from a multidisciplinary approach that addresses both physical and mental health needs. Understanding these dynamics is critical to developing effective health promotion strategies that can meet the needs of diverse demographic groups.

4.3. Comparison with Previous Studies

1. New Contributions:

This research provides a holistic view of the relationship between the effectiveness of health promotion programs with different populations, expanding the results of previous studies that often focus on specific types of programs or limited populations.

- Previous studies, such as those conducted by Anderson et al. (2018), only discusses technology-based programs without considering population variables.
- This research highlights that program success is highly dependent on the compatibility of methods with the characteristics of the target population.

2. Confirmation of Previous Findings:

This research confirms that programs specifically designed to meet the needs of specific populations, such as culture-based approaches, have higher success rates compared to generic programs.

4.4. Implications for Practice

1. Recommendations for Policy Makers:

- Develop policies that support the sustainability of community-based programs, including adequate funding allocation and cross-sector integration.

- Encourage the use of technology in health promotion, especially among young people, through subsidies or incentives for e-health applications.
2. **Recommendations for Health Practitioners:**
 - Health practitioners need to adopt a personalized approach to interventions based on the unique needs of each population, for example providing special programs for populations at high genetic risk.
 - Collaborating with local organizations to ensure the program is well received by the community.
 3. **Recommendations for the Community:**
 - Communities must be empowered as agents of change by providing the training and resources necessary to run programs independently.

4.5. Limitations

1. **Data Availability:**
 - Some studies may not report all relevant data, limiting more in-depth analysis. For example, there is a lack of data regarding the duration of the program and its long-term impact.
2. **Bias in Publication:**
 - Articles with positive results are more likely to be published than those reporting negative or neutral results, creating bias in the review results.
3. **Study Design Heterogeneity:**
 - Variations in effectiveness measurement methods between studies make the synthesis of results more complex.

4.6. Future Research Directions

1. **Exploration of Specific Intervention Mechanisms:**

In-depth research is needed to understand the mechanisms behind program success, such as how technology-based approaches can significantly increase user engagement.
2. **Focus on Unreached Population Groups:**
 - Example: Further research is needed to explore the effectiveness of programs in marginalized populations, such as rural communities or ethnic minority groups that are often underrepresented.
3. **Long Term Evaluation:**
 - Longitudinal studies to evaluate the sustainability of the impact of health promotion programs and their effectiveness in reducing the prevalence of chronic diseases in the long term.
4. **Integration of Multidisciplinary Approaches:**
 - Integrating psychology, technology, and health policy approaches to create more comprehensive and effective programs.

5. CONCLUSIONS

5.1. Summary

The types of health promotion programs that are most effective in preventing chronic disease are community-based programs and technology-based interventions (e-health). Community-based programs are successful because of their ability to leverage social support and build a sense of community, allowing for an environment that supports sustainable healthy behavior change. Meanwhile, technology-based programs excel in ease of access and ability to

tailor interventions to individual needs. Technology, such as habit tracking apps or telemedicine platforms, allows for more targeted personalization, which increases engagement and adherence to health goals.

The population that will benefit most from these programs depends largely on the type of program implemented. For children and teenagers, school-based programs have proven effective in forming healthy habits from an early age through structured education. This is very important for building the foundation of a sustainable healthy lifestyle. For adults of productive age, workplace-based programs have a positive impact by improving employee well-being and reducing lifestyle-related health risks, such as stress, inactivity and poor diet. For older people, community-based interventions and social support have significant results in improving their quality of life, especially by reducing feelings of loneliness and increasing social connectedness. Meanwhile, for high-risk populations, such as individuals with obesity or a genetic predisposition to certain diseases, programs that combine a multidisciplinary approach—including counseling, physical activity, and psychological support—help them achieve better health outcomes.

The success of health promotion programs depends largely on the ability to adapt interventions to the specific needs of the target population. Personalization is key to increasing program participation, effectiveness, and sustainability. In addition, culture-based approaches, technology and cross-sector collaboration play an important role in ensuring significant and far-reaching impacts, which can ultimately improve overall public health.

5.2. Recommendation

1. For Policy Makers:

- Prioritize evidence-based programs in national and regional health strategy planning.
- Allocate adequate funds to support the implementation and evaluation of sustainable health promotion programs.

2. For Health Practitioners and Researchers:

- Develop innovative, evidence-based interventions taking into account local needs and cultural factors.
- Conduct long-term evaluations to ensure the sustainability of program impacts.

3. For Global and Local Communities:

- Adopt and expand community-based health promotion programs that have been proven effective.
- Increase collaboration between countries to share experiences, technology and the best approaches in health promotion.

It is important for all stakeholders to work together to implement evidence-based programs, not only to prevent chronic disease but also to create healthier and more productive communities in the future. These efforts will not only reduce the global health burden but also improve the overall quality of life.

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