

Analysis of Impact and Sustainability in Chronic Diseases Prevention Program in XXX Highschool Balikpapan (Systematic Review)

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ABSTRACT

A healthy lifestyle requires discipline. It's not easy, particularly adolescent who feel free and are looking for their existence. Its implementaiton needs to be applied to adolescent due to many cases of chronic diseases developing among them, following their lifestyle. Sedentary/lazy to move, smoking, alcohol, lack of rest and not being able to manage mental health. Generally, adolesecent at the educational level of Junior and Senior High School. The objective of this study is to analyze aspects of the impact and sustainability of chronic disease prevention programs for adolescents. This study is a systematic review using the PRISMA (Preferred Reporting Items for Systematic Reviews & Meta Analyses) method combined with open-source search engine. The database used for searching data and information is PubMed. The keywords used during the search process are "Prevention of Chronic Disease" AND "Chronic Disease" OR "Non-communicable Disease" OR "Infectious Disease" AND "Impact of Chronic Diseases" AND "Teenagers" OR "Adolescents" AND "School". The most variable aspects of disease prevention are more information related to chronic diseases, knowledge, attitudes and stakeholder support. The CERDIK program provides knowledge, education and information among adolescents. These factors must be taken into consideration to improve lifestyle, maintain health so that you are not vulnerable to health problems during the teenage period

Keywords: Adolescent lifestyle, CERDIK program, chronic disease, chronic disease prevention.

INTRODUCTION

Adolescence is a period of human growth. Changes occur both physiologically and psychologically (Damon et al., 2019). On the other hand, vulnerability can occur due to food intake and lifestyle (Dagnino-Subiabre, 2021). Life activities, eating patterns, social interactions and inner maturity are still unstable (Dalessandro, 2019). These factors can make some teenagers, if they are unable to control their lifestyle, they will become vulnerable to health problems or potential health hazards. Chronic diseases are health problems that have lasted more than a year and require continued treatment (Members et al., 2023). A continuous program of treatment is needed. Chronic diseases that are often found among teenagers these days include bipolar disorder, autoimmune disorders, diabetes, asthma, migraines and other non-communicable diseases (Kumar et al., 2021). The CERDIK program can help manage teenagers' lifestyles. To prevent this condition, a healthy lifestyle and regular health checks need to be implemented (Lestari

et al., 2024).

Living a clean and healthy lifestyle is not easy. It requires strong discipline, high motivation (Hamidi & Marpuah, 2024). Great desire and will. And if you already have commitment and confidence or change your attitude to improve a healthier lifestyle, it will be easy to implement (Picard et al., 2020).

Adolescence is still under the supervision of parents where teenagers are still dependent on their parents (Shah et al., 2023). So, parents certainly have a role in shaping their lifestyle and can encourage their children together to adopt a clean and healthy lifestyle from when they are teenagers (Livingstone & Blum-Ross, 2020).

The Ministry of Health's program through the CERDIK awareness initiative is designed to encourage people to adopt a healthy lifestyle to prevent chronic conditions, particularly among adolescents (Aldila & Handari, 2021). The CERDIK Awareness Program includes several key components. First, it emphasizes the importance of regular health checks, which include monitoring weight, height, blood sugar, cholesterol, and blood pressure levels. These routine health checks should begin at age 15 and be conducted annually to facilitate early detection of chronic condition risks. Second, the program advocates for eliminating cigarette smoke and quitting smoking entirely. Third, it promotes regular physical activity, recommending at least 30 minutes of exercise daily. Fourth, it underscores the need for a balanced diet, encouraging the consumption of healthy foods, sufficient fruits and vegetables, and the avoidance of excessive sweet foods and carbonated drinks. Additionally, ensuring adequate rest is crucial, with a recommendation for children to sleep at least 7 to 8 hours per day. Lastly, the program highlights the importance of managing stress effectively (Basri et al., 2021).

By following these principles, the CERDIK awareness program aims to minimize or even prevent the development of chronic conditions during adolescence. Meanwhile, chronic diseases in adolescents are long-term health conditions that require ongoing treatment and care. Of course, treatment requires several aspects, namely a combination of medical treatment, lifestyle changes and emotional support. It will be important for teenagers who suffer from chronic illnesses to get positive attitudes and sufficient support from family, friends, the environment and medical personnel to help manage the health conditions and lifestyle they experience in order to maintain a good quality of life. The important thing in the process of treating chronic diseases in adolescents is that educational programs are needed about chronic conditions and how to manage these conditions.

RESEARCH METHODS

This study used the PRISMA (Preferred Reporting Items for Systematic Reviews & Meta-Analysis) by WHO as a search strategy to identify relevant studies. The method which was carried out systematically by following the research stages correctly. Through the PRISMA method, data search uses a flowchart based on a checklist consisting of identifying articles through a database, screening articles by title and abstract, assessing full text for eligibility, and analyzing articles that have qualified inclusion criteria. A search for research articles relevant to this research topic was carried out using collaborative keywords: associated factors, influencing factors, CERDIK program, Impact of chronic diseases, Adolescent chronic diseases, Prevention of chronic diseases from PubMed

(<https://pubmed.ncbi.nlm.nih.gov/>). As for the inclusion criteria in systematic reviews, researchers use original studies related to topics that are not systematic reviews, with qualitative/quantitative study analysis using various kinds of previous literature, international studies, published in 2016-2024, and open access studies. Researchers found 15 related studies that could be selected again using the PRISMA method.

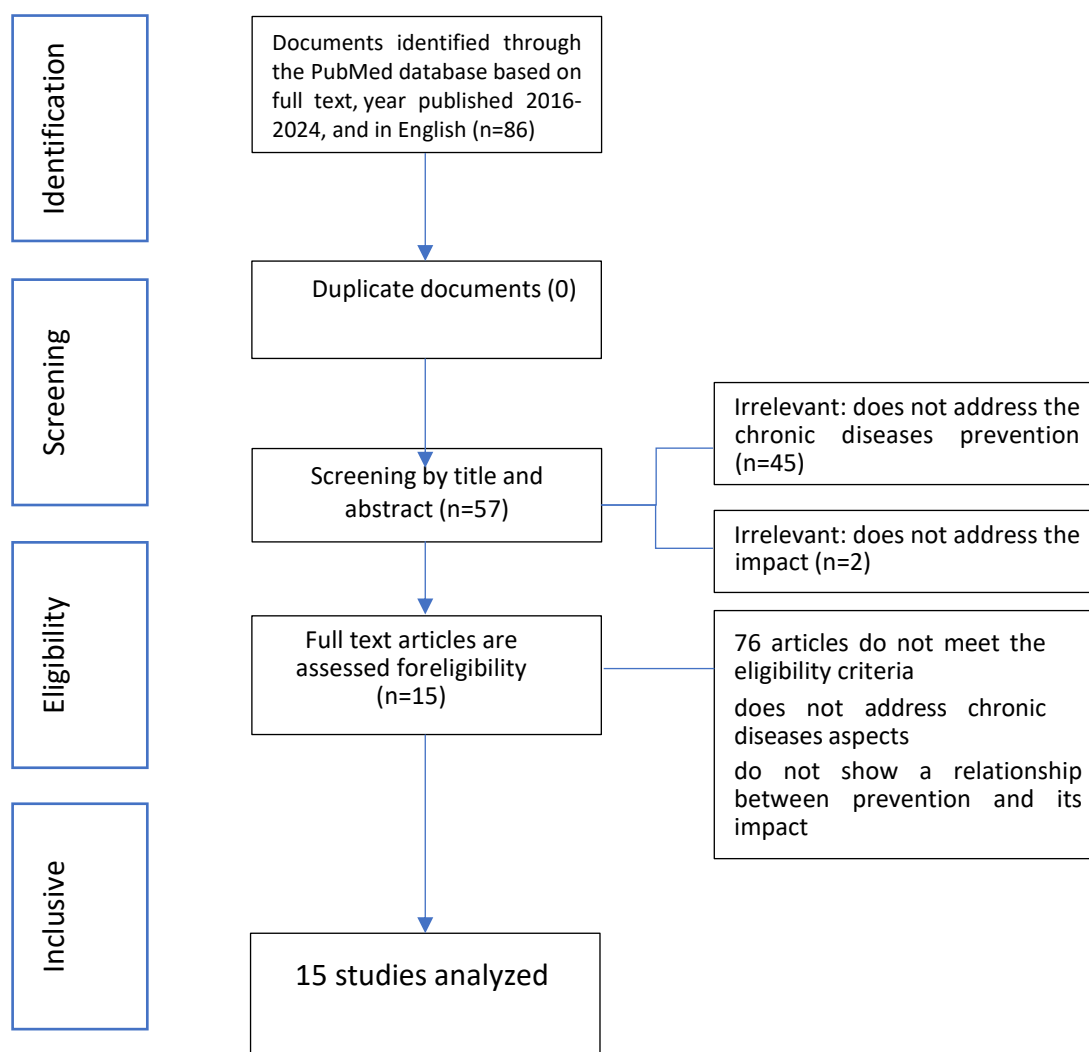


Figure 1. The literature search process using the PRISMA method

RESULTS AND DISCUSSION

Based on the literature search process using the PRISMA method, 86 documents were found published in 2016-2024 with specified inclusion criteria, full text and using English. After the title and abstract screening process, there was no double document, 47 irrelevant documents because they did not discuss factors related to the chronic disease's prevention, and 57 relevant ones. The results of the full-text study found 76 papers that did not discuss factors related to psychosocial aspects and the results of the study did not show a relationship between adolescent lifestyle and thchronic diseases prevention at school. So, the number of documents to be analyzed is 15 studies. The results of the systematicreview are shown in table 1

Table 1. Characteristics of Studies

Author, Year, Title	Health Risk Factors in adolescent (Causes of unhealthy condition)
Shackleton, N., dkk (2016) School-Based Interventions Going Beyond Health Education to Promote Adolescent Health: Systematic Review of Reviews	In adequate health education Lack of school involvement Lack of Parental monitoring
Filho, V.C.B, dkk (2016) Promoting Physical Activity for Children and Adolescents in Low and Middle-Income Countries: An Umbrella Systematic Review: A Review on Promoting Physical Activity in LMIC	Less physical activity
Singh, A. dkk (2017), Impact of School Policies on Non-Communicable Disease Risk Factors - a Systematic Review	Health promotion Unhealthy diet Sedentary Smoke Alcohol Lack of regulation
Anderson, E., & Durstine, J. L. (2019). Physical activity, exercise, and chronic diseases: A brief review.	Country Group Physical activities Age Group
Hudzaifa, T. N., Putri, S. A., & Mirajiani, M. (2023). Penerapan Program Penyuluhan Perilaku Hidup Bersih Dan Sehat Dalam Meningkatkan Derajat Kesehatan Siswa Di Sekolah Dasar Negeri Kadumaneuh Kabupaten Pandeglang	Healthy lifestyle behaviour Physical activities Age Group Attitude Value Lack of health education
Jin, M., An, Q., & Wang, L. (2017). Chronic conditions in adolescents	Age Group Gender Low intensity physical activities
Kartika, J., Sari, S. N., Sari, I. P. R., Romadhona, S. B., & Putri, N. C. M. (2024). Edukasi Pentingnya Pencegahan Penyakit Tidak Menular (PTM) Pada Siswa-Siswi Man 1 Muara Enim	Lifestyle Age Group Education Lack of knowledge
Lerch, M. F., & Thrane, S. E. (2019). Adolescents with chronic illness and the transition to self-management: A systematic review	Age group Parent monitoring Adolescent self-efficacy
Meiriana, A., Trisnantoro, L., & Padmawati, R. S. (2019). Implementasi program pengelolaan penyakit kronis	Sport Education

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(PROLANIS) pada penyakit hipertensi di Puskesmas Jetis Kota Yogyakarta	Hipertension/Blood pressure
Ngale, G. F. S. T. (2023). Gambaran Pengetahuan Dan Perilaku Keluarga Terhadap Tekanan Darah Di Desa Karawana	Knowledge family support Blood pressure
Soeroso, S. (2016). Masalah kesehatan remaja	Anemia physical fitness sosial culture value budaya. mental health drug smoke Family support
Rahman, H., Ramli, R., La Patilaiya, H., Djafar, M. H., & Musiana, M. (2021). Promosi Kesehatan untuk Meningkatkan Peran Aktif Masyarakat dalam Pencegahan Penyakit Tidak Menular	Hipertension Unhealthy lifestyle Physical Fitness Smoke alcohol
Rosdiana, A. I., Raharjo, B. B., & Indarjo, S. (2017). Implementasi program pengelolaan penyakit kronis (Prolanis).	Lack of regulation Synergy Hipertension Diabetes Mellitus
Latifah, I., & Maryati, H. (2018). Analisis Pelaksanaan Program Pengelolaan Penyakit Kronis (Prolanis) BPJS Kesehatan pada Pasien Hipertensi di UPTD Puskesmas Tegal Gundil Kota Bogor	Sustainable education program
Kadang, Y., Ngale, G. F. S. T., & Cahyadi, N. (2023). Sosialisasi Pencegahan Dan Pengendalian Penyakit Tidak Menular Di Desa Porame	Blood pressure, sugar index body mass index/obesity Unhealthy food sedentary smoke

Table 2. The most frequently found variables

Variables	The total of articles
Health education/information	4
Environment aspects	1
Family support	4
Sedentary/Physical fitness	9
Food	2
Smoke	4

Alcohol	2
Regulation	2
Country Gorup	1
Age Group	5
Drug	1
Mental Health	1
Value	3
Healthy lifestyle behavior	4
Blood pressure	3
Knowledge	3

Based on Table 2, the variables most often associated with healthy risk factors of chronic disease prevention are healthy lifestyle behavior, age group, health education, smoking, and family support. This is followed by confidence in the information source of chronic diseases, trust in information, the existence of sustainable programs, trust in science and scientists/medical personnel, and sufficient regulation of family members infected. Besides that, several variables will be discussed in the discussion section.

Sustainable Diseases Prevention Program

Chronic diseases, also known as non-communicable diseases (NCDs), are a group of long-term medical conditions that tend to develop slowly and are persistent. Examples of chronic diseases include heart disease, type 2 diabetes, hypertension, obesity, and cancer. According to the World Health Organization (WHO), chronic diseases account for approximately 71% of total global deaths each year. These diseases are generally not transmitted from one individual to another and include a wide range of medical conditions involving various organs and systems in the body. Chronic diseases can have a significant impact on a person's quality of life, require long-term management, and, in some cases, can be a major cause of death (Cahya & Sambas, 2023).

Chronic diseases such as diabetes, hypertension, and heart disease are increasingly common in Indonesia, even among teenagers. According to information from the Tojo Una-Una District Health Service, in 2023, there will be 9,775 people suffering from diabetes, but only around 4,248 people will receive medical treatment. This indicates that there are still many diabetes sufferers who have not received adequate treatment, and it is feared that their health conditions will get worse (Rokom, 2024).

According to data from Riskesdas 2018, the prevalence of hypertension in Indonesia in the population aged ≥ 18 years reached 34.1%. This figure varies in various regions, with the highest prevalence recorded in South Kalimantan at 44.1%, while the lowest prevalence occurred in Papua at 22.2%. The estimated number of hypertension cases in Indonesia reaches 63,309,620 people, with the death rate due to hypertension reaching 427,218 cases in Indonesia (Linggariyana et al., 2023). Meanwhile, heart and

blood vessel disease remain the main cause of death throughout the world. According to WHO, every year more than 17.8 million people die from cardiovascular disease. In Indonesia, based on data from the Indonesian Ministry of Health in 2023, the death rate due to cardiovascular disease reaches 650,000 people every year (Ananda et al., 2023).

Chronic diseases among teenagers are often caused by their intensive growth and development. At this age, teenagers tend to be vulnerable to being influenced by an unhealthy lifestyle. Factors such as unbalanced eating habits, lack of physical activity, and exposure to stress and emotional distress can contribute to an increased risk of developing chronic diseases such as type 2 diabetes, obesity, and hypertension. In addition, hormonal changes and smoking habits or alcohol consumption can also affect their health negatively. Therefore, it is important to provide education about healthy lifestyles and facilitate an environment that supports healthy life decisions for teenagers, in order to reduce the risk of developing chronic diseases in their future adulthood.

Education about healthy lifestyles and facilitating an environment that supports healthy life decisions for teenagers is implemented in the form of a chronic disease (prolaxis) prevention program. Prolaxis is an initiative designed to reduce the prevalence of chronic diseases in certain populations by promoting healthy lifestyles, providing early detection, and providing appropriate interventions to individuals at high risk. Prolaxis involves a series of activities such as education about the importance of healthy eating patterns and physical activity, routine health checks for early detection of chronic diseases, as well as providing counseling or therapy services to modify risky behavior.

Previous research by Latifah (2018) found that the implementation of the prolaxis program at the Tegal Gundil Community Health Center, Bogor City was quite good, although there were still obstacles, such as the biggest obstacle being the lack of building facilities and tools for implementing prolaxis participant club activities, lack of coordination between prolaxis teams. and indicators of success still look at the ratio of the number of participants to the arrival/activity of prolaxis participants. The recommendation that is needed is to improve coordination between the prolaxis team at the community health center.

Another study by Cahyaningrum (2024) shows that the implementation of the chronic disease management program (Prolaxis) at the Halmahera Community Health Center has not reached the 75% indicator. Communication in implementing Prolaxis at the Halmahera Community Health Center is still less than optimal. Resources, including human resources, funds and facilities for implementing Prolaxis at the Halmahera Community Health Center, are available, but there is no special training for Prolaxis implementers. Even though the puskesmas facilities, such as rooms, medical equipment and supporting media for Prolaxis activities, are sufficient, the place for carrying out activities is still inadequate.

The results of this research can be used by schools to improve and develop chronic disease prevention programs that are more effective and sustainable. This research can add to the academic literature on the effectiveness of chronic disease prevention programs in school settings, providing empirical evidence that can be used to develop more comprehensive theories of health education. The aim of this research is to analyze the impact of the program and the sustainability of chronic disease prevention in SMA XXX Balikpapan students.

Discussion

The adolescent phase is the largest age group in the population structure, making it an important and strategic focus for interventions in human resource development (Muthmainnah et al., 2023). Intervention at this age is considered strategic because of its major impact on the future of individuals and society. Adolescence is often described in terms of “storm” and “stress,” reflecting intense emotional and psychological changes. The surrounding environment experiences significant changes during adolescence and often acts as a risk factor for adolescent health (Soeroso et al., 2016). Furthermore, according to Soeroso, during adolescence there is an increased risk for several health problems, including chronic diseases, reproductive health problems related to physiological development and the beginning of sexual relations, as well as mental health.

One aspect of concern is the increasing prevalence of chronic diseases among teenagers. According to the World Health Organization (WHO), defines adolescence as the age of 10 to 19 years, which is a period of rapid development that is often asynchronous in physical, psychosocial, cognitive and emotional aspects (Lerch & Thrane, 2019). Chronic diseases are diseases that are not contagious, have a long duration, develop slowly, and are usually caused by genetic, environmental or poor lifestyle factors. Chronic diseases are the leading cause of death worldwide and their prevalence continues to increase across all age, gender and ethnic groups. Most deaths from chronic diseases occur in lower-middle income countries, although they are also a significant health problem in developed countries. Currently, various chronic diseases not only affect adults but also children and adolescents (Anderson et al., 2019).

The prevalence rate of chronic diseases in adolescents is estimated to be around 15-20%. Some of these conditions require daily and lifelong medical care. Other conditions can cause social problems, preventing teens from exploring life, while some teens with chronic conditions engage in risky behavior. Data shows that adolescents with chronic conditions participate in health risk behaviors at similar or even higher rates than healthy adolescents. Additionally, risky behaviors tend to cluster, so that youth with chronic conditions face multiple disadvantages during their teenage years. Adolescents with disabilities are also less exposed to protective factors and experience bullying more often, have less contact with peers, and face more emotional problems compared to healthy adolescents. A study also showed that there was an association between chronic conditions in children with lower family socioeconomic status compared to healthy peers (Jin et al., 2023).

In addition, the impact of the increase in non-communicable chronic diseases is a decrease in the productivity of human resources and the quality of the nation's young generation. This increases the burden on the government because treating non-communicable diseases requires large costs. Overall, these health problems can greatly affect a country's social and economic development. Population of productive age, who should contribute greatly to the country's development, can have their health threatened due to chronic diseases which are often accompanied by unhealthy behavior (Kadang et al., 2023).

To deal with these impacts and reduce the devastating impact of the increase in chronic diseases in adolescents, it is important to take preventive measures from an

early age. This includes providing appropriate education to teenagers about chronic diseases and healthy lifestyles to prevent them. Data regarding the current level of knowledge and lifestyle of adolescents is an important basis for the health and education sectors to design programs that are effective and appropriate to their needs, especially in the school environment (Kartika, 2024). It is hoped that implementing this program in schools will provide significant benefits in improving adolescent health and reducing the risk of chronic diseases in the future.

An approach through schools as a source of education is a strategy that can be effective in preventing chronic diseases among students. One of the high schools in Balikpapan, namely SMAN XXX Balikpapan, has initiated preventive steps to overcome this problem by implementing a chronic disease prevention program. A chronic disease prevention program is a system that combines health service management and communication for a group of participants with certain disease conditions, with the aim of managing the disease independently (Kartika, 2024). Initially, this program was designed with a proactive approach involving participants, health facilities, and BPJS Health to prevent complications from chronic diseases that could develop. Although chronic disease prevention programs have been implemented in various health facilities in Indonesia, they are now also being extended to schools such as SMAN XXX Balikpapan to cover the adolescent population which is very important in efforts to prevent chronic diseases. The chronic disease prevention program at SMAN XXX Balikpapan includes various active activities as follows:

Health Education

This activity aims to provide information to students about chronic diseases, the risk factors that cause them, and prevention strategies that can be implemented. Health education is carried out in the form of lectures or seminars involving medical personnel and health experts.

Healthy lifestyle intervention

This program focuses on changing student behavior to adopt a healthier lifestyle. This includes promoting healthy eating patterns, increasing physical activity, reducing smoking or alcohol consumption, and managing stress effectively.

Medical consultation activities

Students can access consultations with medical personnel or health educators to discuss their health concerns privately. These consultations are important to provide further information, get advice, or manage existing health conditions.

Reminder (Pop-up)

Reminder activities are carried out periodically to remind students about the importance of maintaining health and following the preventive practices they have learned. These reminders can take the form of text messages, announcements at school, or use of social media to reach students effectively.

Club Activities

SMAN XXX Balikpapan involves students in various clubs that focus on health, such as sports clubs, healthy food clubs, or other activity clubs that support a healthy lifestyle. This club helps students participate in positive activities and supports chronic disease prevention.

Health status monitoring

This program includes activities to routinely monitor students' health status. This can include regular health checks, evaluation of health parameters such as blood pressure, blood sugar, or body mass index, as well as early identification of potential health risks that need to be addressed further.

The chronic disease prevention program at SMAN XXX Balikpapan shows the school's strong determination to increase students' understanding and awareness of the importance of health and encourage them to adopt a healthy lifestyle. Through interviews, students who are active in this program show an increased understanding of key aspects related to chronic diseases such as definitions, risk factors and complications. Students involved in this program gain a deeper understanding of the essence of chronic disease, which is a medical condition that persists over a long period of time and requires ongoing treatment to manage symptoms and minimize its impact.

They also become more aware of various factors that can increase their risk of developing chronic diseases, such as unhealthy eating habits, lack of physical activity, and other lifestyle factors that have the potential to be detrimental to health. This understanding helps students to recognize behavioral patterns that need to be changed or avoided in order to reduce the risk of developing chronic diseases in the future. Furthermore, students also understand the possible consequences of uncontrolled chronic conditions, such as the potential for serious complications that can affect their quality of life.

These results are in line with findings which show that through health promotion, the aim is to empower individuals and communities to be actively involved in adopting a healthy lifestyle. Health promotion also aims to create change by reducing risk factors that cause an increase in chronic diseases (Rahman et al., 2022). Meanwhile, other findings show that socialization about the prevention and control of non-communicable diseases in Porame Dusun II Village is effective, as proven by the results of the pre-test and post-test. This shows a significant increase in community knowledge from poor to good levels of knowledge. With this increase in knowledge, it is hoped that society can take more effective preventive steps in dealing with non-communicable diseases (Kadang et al., 2023).

In addition, the impact of students' understanding of chronic diseases not only influences their level of knowledge but also has a positive impact on students' healthy behavior and lifestyle. The theory put forward by Notoatmodjo states that good knowledge can influence behavior in a better direction, while insufficient knowledge can influence behavior in a less good direction (Ngale, 2022). Students who engage in chronic disease prevention programs tend to adopt healthier lifestyles. They more often consume healthy foods that support long-term health, such as fruit, vegetables and balanced protein sources. Apart from that, they are also more active in exercising regularly, which helps maintain physical fitness and reduce the risk of chronic disease. Such as changing diet and exercise routines, students who take part in this program also tend to avoid smoking and alcohol consumption.

This means that this program not only provides students with a better understanding but also encourages them to take real action in maintaining their own health. According to Kartika et al., (2024), targeting health education at adolescents has the added benefit of reducing lifelong health care costs by addressing behaviors that

have the potential to affect health from an early age. By encouraging a healthy lifestyle, it is hoped that students can avoid chronic diseases in the future and improve their quality of life. Health promotion encourages individuals to take control over the determinants of their health, thereby improving overall health. This program focuses on preventing disease and maintaining individual health, as well as initiating community participation and empowering them to achieve optimal health (Rahman Amin, 2021). Ultimately, this chronic disease prevention program not only has the potential to improve student health and productivity, but can also reduce the incidence of chronic disease among adolescents as a whole.

To maintain the positive impact of the chronic disease prevention program, ongoing efforts are needed so that this program can continue to develop. The importance of commitment and support from schools, teachers and parents cannot be ignored, as they play a crucial role in ensuring the sustainability and effectiveness of this program. This is in line with the principle that to support the implementation of outreach programs in schools, active involvement from various parties such as teachers, parents, medical personnel and the community around the school is needed. This cross-sectoral collaboration is very important so that the program can be implemented comprehensively and provide maximum impact (Hudzaifa et al., 2023). Continuous support from all relevant parties is needed so that this program can continue to provide long-term benefits for student health.

There are several steps that can be taken by all parties to ensure the sustainability of the chronic disease prevention program at SMAN XXX Balikpapan. First, actively involving students in planning and implementing the program so as to increase student involvement and strengthen understanding of the importance of a healthy lifestyle. Second, providing ongoing training and education for teachers and school staff to ensure that they continue to develop knowledge about chronic diseases and ways to encourage healthy lifestyles in schools. Third, working with parents to support healthy living habits at home will create a consistent environment between school and home, so that messages about health can be implemented holistically. Fourth, leveraging technology and social media to spread information about chronic diseases and healthy lifestyles will help reach a wider audience and younger generations who are more likely to be connected to technology.

Finally, carry out regular monitoring and evaluation of the program to identify program successes and areas that need improvement, so that the program can be adjusted to achieve more effective and sustainable results. So by implementing these steps, it is hoped that the chronic disease prevention program at SMAN XXX Balikpapan can continue in a sustainable manner and provide great benefits for students' health. Thus, it becomes a comprehensive effort to reduce the prevalence of chronic diseases in adolescents, which is an important contribution in preparing a healthier future generation for the nation.

CONCLUSION

However, this literature review does not show all the factors that influence The chronic disease prevention program for SMAN XXX Balikpapan students has a positive impact on students' knowledge and awareness of chronic diseases. Students who

participate in this program have a better understanding of the definitions, risk factors, and complications associated with chronic diseases. Apart from that, this program also has a positive impact on students' healthy behavior and lifestyle. Those who take part in the program tend to eat healthy foods more often, exercise regularly, and avoid smoking and alcohol consumption. However, the sustainability of this chronic disease prevention program still needs to be improved. Commitment and support from schools, teachers and parents is very important to ensure the program can run effectively and sustainably. Continuous support from all relevant parties is needed so that this program can continue to provide long-term benefits for students' health.

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