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[ESHR] Submission Acknowledgement

1 pesan

Sulistyawati <sulistyawati.suyanto@ikm.uad.ac.id> 4 Januari 2023 pukul 15.47
Kepada: "Dr. Sitti Nur Djannah" <sitti.nurdjannah@ikm.uad.ac.id>

Dr. Sitti Nur Djannah:

Thank you for submitting the manuscript, "Tuberculosis in Adolescents: Based on the Results of RISKESDAS DIY Province" to Epidemiology and Society Health Review (ESHR). With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

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If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.

Sulistyawati

Best Regards,

Sulistyawati, S.Si., MPH., PhD.

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[ESHR] Editor Decision

1 pesan

Sulistyawati Sulistyawati <sulistyawatisuyanto@gmail.com> 16 Januari 2023 pukul 10.13
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Luthfi Nur Rachman, Sitti Nur Djannah, Lina Handayani, Muhammad Syamsu Hidayat, Intan Wahyuni Tukiyo:

We have reached a decision regarding your submission to Epidemiology and Society Health Review (ESHR), "Tuberculosis in Adolescents: Based on the Results of RISKESDAS DIY Province".

Our decision is: Revisions Required

Best Regards,

Sulistyawati, S.Si., MPH., PhD.

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2 lampiran

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[ESHR] Editor Decision

1 pesan

Sulistyawati Sulistyawati <sulistyawatisuyanto@gmail.com> 2 Februari 2023 pukul 08.40
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Luthfi Nur Rachman, Sitti Nur Djannah, Lina Handayani, Muhammad Syamsu Hidayat, Intan Wahyuni Tukiyo:

We have reached a decision regarding your submission to Epidemiology and Society Health Review (ESHR), "Tuberculosis in Adolescents: Based on the Results of RISKESDAS DIY Province".

Our decision is to: Accept Submission

Best Regards,

Sulistyawati, S.Si., MPH., PhD.

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Research Article

Tuberculosis in Adolescents: Based on The Results of RISKESDAS DIY Province

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ABSTRACT

Background: Tuberculosis is still a disease with an increasing incidence every year. Based on a survey in the community through Riskesdas about tuberculosis and health behavioral factors, there are still fluctuations in cases. So that this research aims to look incidence of tuberculosis from the results of the Riskesdas in 2007, 2013, and 2018 in adolescents aged 15-24 years which are then reviewed from behavioral health factors**.**

Method: This research is a quantitative analytical descriptive study using secondary data from the results of Riskesdas on adolescents aged 15-24 years. This study was conducted to provide an overview of the incidence of tuberculosis and health behavior in DI Yogyakarta Province.

Results: The results of this study were then analyzed and presented descriptively in graphs and narratives. The results showed that there was an increase in the incidence of tuberculosis according to the diagnosis of health workers but not too significant, and the results of the 2007 RISKESDAS showed that as many as 59.7% of the people of the DIY province still lacked physical activity, while in 2013 the highest percentage was the lack of fruit and vegetable consumption. The community by 74.35%, then in 2018, it showed that the people of the DIY province still lacked the habit of washing their hands with soap with a percentage of 45.01%.

Conclusion: It can be concluded that there was an increase in cases but not too significant in the results of the Riskesdas in 2007, 2013, and 2018 related to PHBS behavior and personal hygiene. Therefore, improving health behavior is necessary to prevent and control adolescent tuberculosis.

Keywords: DIY Province, Health Behavior, RISKESDAS, Tuberculosis

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INTRODUCTION

Tuberculosis is a chronic infectious disease caused by the bacterium Mycobacterium tuberculosis. These bacteria are rod-shaped and acid-fast, often called Acid-Resistant Bacilli (BTA). Most TB germs are usually found to infect the lung parenchyma and cause pulmonary TB, but these bacteria can also infect other body organs (extra-pulmonary TB) such as the pleura, lymph nodes, bones, and other extra-pulmonary organs[1]. Tuberculosis is still a public health problem in Indonesia and internationally, so it has become a sustainable health development goal (SDGs). Based on WHO data in 2020, the tuberculosis morbidity rate reached 9.9 million people worldwide, and 1.5 million died. Globally, TB incidence rates fell by 11% between 2015 and 2020 (from 142 to 127 new cases per 100,000 population), including a 1.9% decrease compared to 2019[2].

Meanwhile, Indonesia still ranks third as the country that contributes the most tuberculosis in the world after India and China. According to the Global Tuberculosis Report 2021, in 2020, the TB incidence rate in Indonesia was 301 per 100,000 population with a total of 824,000 cases, a decrease when compared to the TB incidence rate in 2019, which was 312 per 100,000 population. Meanwhile, the TB mortality rate in 2019 and 2020 is still the same, namely 34 per 100,000 population with a total of 15,186 cases. Thus, to reduce morbidity, the rate requires the role of various parties[3,4].

Tuberculosis attacks mainly adults at the most productive ages. However, all age groups remain at risk. More than 95% of cases and deaths occur in developing countries. The risk of active TB is also higher in people with other conditions that impair the immune system. People who are malnourished, are three times more at risk. Globally in 2020, there will be 1.9 million new TB cases due to malnutrition. Alcohol use disorders increased the risk of TB disease by 3.3 times, while smoking increased the risk by 1.6 times. In 2020, 0.74 million new TB cases were due to alcohol use disorders, and 0.73 million were due to smoking[5].

The Ministry of Health in Sumarmi (2014) said that as many as 80-90% of the population had been infected with this tuberculosis germ. This exposure can be obtained from childhood or at the age of teenagers or adults with the position of dormant germs in the body and when the body's immune system decreases due to a lot of activity and activity. High mobility without paying attention to the condition of the body that lacks good nutritional intake, these germs will be active again, so they become sick. This makes the prevalence of this disease higher in the productive age, which is 77.4%[6].

Previous research said that the incidence of TB in participants aged 15 years and over was influenced by several factors such as age, gender, area of residence, education, and region, besides that it was also influenced by other factors, such as a history of having lived with a TB patient, having been diagnosed with TB. Pulmonary TB by health workers, having been diagnosed with DM by a doctor, and smoking[7]. Then an unhealthy lifestyle is also a factor that can affect the incidence of pulmonary TB in adolescents and adults, such as smoking, the habit of consuming liquor (alcohol), and going out at night, which can reduce the body's immunity so that it is more susceptible to pulmonary TB disease[8–10].

Disease data in Indonesia is obtained from several sources such as facility data (facility-based), namely recording in every administrative sector such as health service units, districts/cities, provinces to the center (Depkes), and data obtained directly from the

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community (community-based) obtained from national-scale surveys such as basic health research (Riskesdas). According to the national guidelines for tuberculosis control, it is stated that TB report data from facilities do not yet contain data on TB risk factors, so to analyze TB risk factors related to the incidence of pulmonary TB in Indonesia, data from research in the community on a national scale is needed. Factors that affect a person's likelihood of becoming a TB patient are low immunity[11,12]. Based on the description above, the researcher is interested in looking at the incidence of tuberculosis from the results of the Riskesdas in 2007, 2013, and 2018 in adolescents aged 15-24 years which is then reviewed from health behavior factors.

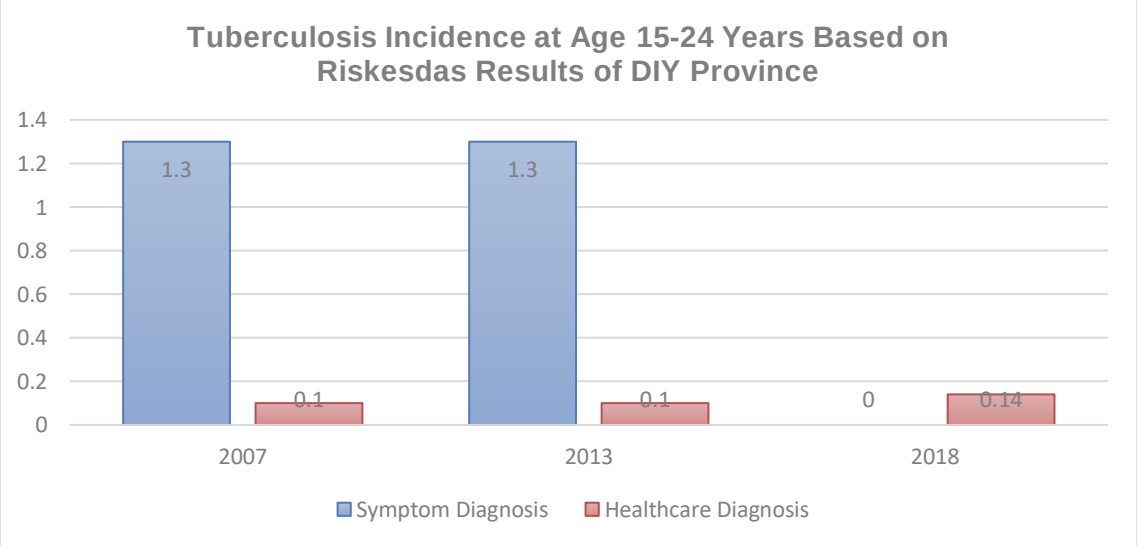
METHOD

This research is a quantitative descriptive study using secondary data. The data used for analysis were Riskesdas 2007, 2013 and 2018 data. This study was conducted to provide an overview of the incidence of tuberculosis and risk factors for health behaviors that trigger tuberculosis. The criteria for this study were adolescents aged 15-24 years and having behaviors/habits: smoking habits (passive and active) both daily and occasionally, consuming less than 5 servings of fruit and vegetables, history of consuming alcohol in the last 1 month, history of physical activity for less than 1 week and the habit of washing hands before and after eating and urinating / defecating. The data that has been selected from the Riskesdas results are then analyzed according to the research objectives and presented in the form of graphs and narratives.

RESULTS

The results of Figure 1 show an increase in tuberculosis incidence according to the health workers' diagnosis. This increase in incidence is not too significant but can significantly impact disease problems in adolescents aged 15-24 years.

Figure 1. Overview of Tuberculosis Incidence at the Age of 15-24 Years Based on the Results of Riskesdas 2007, 2013, and 2018 in DI Yogyakarta Province



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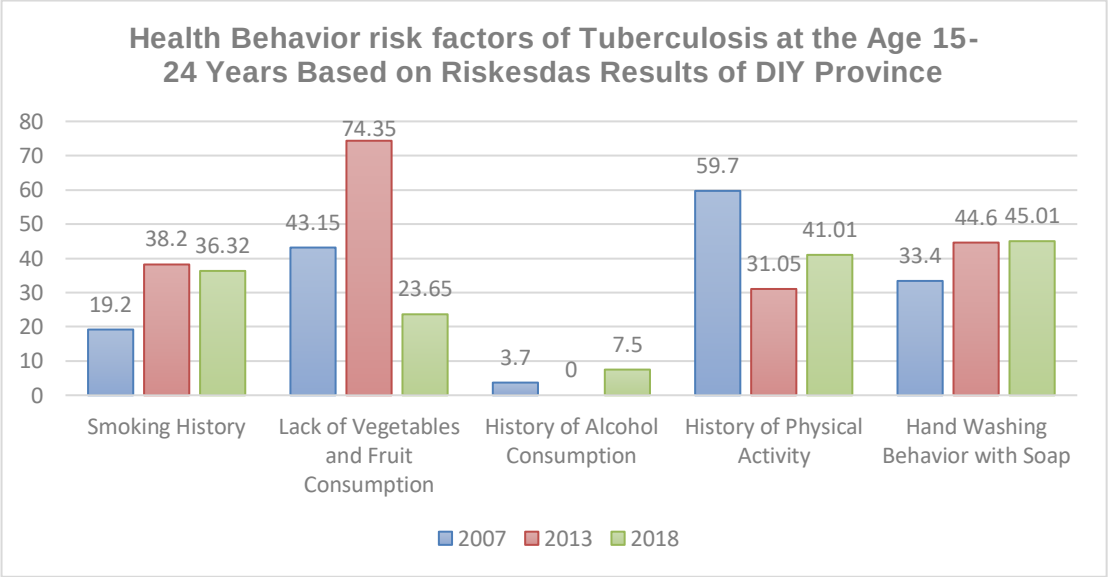
Based on Figure 2 shows that the health behavior risk factors based on the results of the Riskesdas show that there are still significant fluctuations. Indirectly, this behavior can be a factor in the incidence of tuberculosis in the community, including among adolescents. The 2007 Riskesdas results showed that as many as 59.7% of the people of the DIY province still lacked physical activity, while in 2013, the highest percentage of the community's lack of fruit and vegetable consumption was 74.35%, then in 2018, it showed that the people of the DIY province still not applying the habit of washing hands using soap with a percentage of 45.01%.

Figure 2. Description of health behavior risk factors on the incidence of tuberculosis at the age of 15-24 years based on the results of Riskesdas 2007, 2013, and 2018 in DI Yogyakarta Province



DISCUSSION

Tuberculosis is still an infectious disease that is often found in the community. Many factors, including clean and healthy living behavior and personal hygiene, can cause the increasing incidence of tuberculosis in the community. The results of this study indicate an increase in cases that is not too visible, based on riskesdas data carried out in the society dominated by patients suffering from TB with a diagnosis by health workers. This is in line with previous research conducted based on SPTB data from 2013-2014, which stated that the most dominant factor influencing the occurrence of TB at the age of 15 years and over was having been diagnosed with TB by health workers. Participants who have been diagnosed with TB by health workers are at risk[7].

According to the Indonesian Ministry of Health in 2019, the flow immunity, generally due to poor nutrition and unhealthy living behavior, can influence a person to become a TB patients ease is included in the priority of disease control because it has a broad impact on the quality of life, and the economy is and the number 3 cause of death in children and adults.

Meanwhile, according to other studies, it is said that having a history of smoking or currently having a smoking habit in tuberculosis patients is one of the factors that triggers

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someone to contract tuberculosis[13]. This is in line with the research of Kusumo (2011) and Susilawati and Therik (2022), which said that there was a relationship between the habit of applying PHBS in daily life to the incidence of pulmonary TB, with the application of PHBS followed by personal hygiene being an essential factor as a cause of TB lungs diseases[14]. The Indonesian Ministry of Health (2020) states that the risk factor for tuberculosis will be higher for the group of smokers and people who consume alcohol in high levels/amounts. In addition, personal hygiene risk factors such as lack of awareness to wash hands with soap and poor nutritional status, including the behavior of consuming less fruit and vegetables and lack of physical activity aimed at keeping the body fit/healthy, can trigger a person to suffer from tuberculosis.

TB disease is closely related to a person's immune system; to maintain the immune system, it is necessary to fulfill nutrition/nutrition. Nutritional status is one factor determining the function of all body systems, including the immune system. Humans need the immune system to protect the body, especially by preventing infections caused by microorganisms. When the immune system is low, pulmonary TB germs will quickly enter the body. These germs will gather in the lungs and then multiply. However, people infected with pulmonary TB germs do not necessarily suffer from pulmonary TB. This depends on the person's immune system. If the immune system is robust, the germs will continue to sleep in the body (dormant) and will not develop into a disease, but if the immune system is weak, TB germs will grow into an infection. Pulmonary TB disease is more dominant in people with low nutritional status due to a weak immune system, making it easier for TB germs to enter and multiply[15].

Factors Affecting the Nutritional Status of Adolescents, according to Dewi et al. (2013), are: Heredity Factors, Lifestyle Factors, and Environmental Factors such as the habit of drinking alcoholic beverages can cause liver disorders (hepatology and even cirrhosis), smoking habits can cause chronic ARI and even pulmonary TB or Lung cancer, the tradition of staying up late every night can cause the body's immune system to decrease so that it is susceptible to infection. Pulmonary TB patients often experience a reduced nutritional status and can even become malnourished if not balanced with the proper diet. Several factors related to the nutritional status of pulmonary TB patients are the level of energy and protein adequacy, the patient's behavior towards food and health, the length of time suffering from pulmonary TB, and the patient's per capita income[16,17].

This is in line with previous studies that there is a relationship between the incidence of pulmonary TB with nutritional status and TB patients with poor nutritional status have a 2.101 times greater risk of developing TB than those with good nutrition. In other words, more pulmonary tuberculosis patients with poor nutritional quality. overnutrition and undernutrition) and poor dietary status will increase the risk of pulmonary tuberculosis[11,16,18].

One of the other factors that influence the incidence of tuberculosis is health behavior. According to Notoatmodjo (2007), healthy living behaviors are behaviors related to a person's efforts or activities to maintain and improve their health or a healthy lifestyle. These behaviors include, among others: (a) Eating a balanced menu (containing nutrients the body needs), and the amount is sufficient to meet the body's needs. (b) Regular exercise also includes quality (movement) and quantity in terms of the frequency and time used for sports or physical activities other than sports. (c) No smoking. (d) Do not drink alcohol or drugs[19].

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According to the Regulation of the Minister of Health of the Republic of Indonesia Number 67 of 2016 concerning tuberculosis control, to prevent the spread and transmission of TB in the community, it is necessary to control risk factors, one of which is by implementing a culture of clean and healthy living behavior and increasing body resistance[20]. The Riskesdas stated that the Indonesian people are still lacking in consuming fruits and vegetables and doing physical activity, which can weaken the immune system and increase the transmission of TB that may occur from one person to another.

Previous research has stated that smoking has a relationship with the incidence of tuberculosis. This is related to tuberculosis patients dominated by men who smoke more than women. Active smokers have a higher risk than passive smokers and non-smokers [21–24]. Smoking tobacco and drinking alcohol are essential factors that can lower the body's immune system, making it more susceptible to disease. Cigarette smoke has pro-inflammatory and immunosuppressive effects on the respiratory tract immune system. In addition, smoking can increase the risk of Mycobacterium tuberculosis infection, disease progression, and death in TB patients[25,26].

A person is more likely to be stressed, often stay up late, and lack rest due to the many physical activities carried out both inside and outside the home, which causes a weakening of the immune system so that they are easily exposed to other TB sufferers both in the work environment and the environment around their residence. An adult tends to have high activity and mobility, stress, and lack of rest after doing much physical activity, making it easy to re-expose to TB germs[27]. Then personal hygiene is also a form of prevention and control of TB disease by applying hand washing with soap. In line with previous research, which said that washing hands before and after activities had been well used for TB patients to prevent transmission, knowledge about tuberculosis, personal hygiene, and the relationship between personal hygiene and the occurrence of tuberculosis was still lacking[28].

So it is necessary to provide more education about tuberculosis and how to prevent and control it, one of which is by conducting counseling and peer group-based discussions by conveying to the public and youth about prevention efforts so as not to transmit TB to others[29,30].

CONCLUSION

Based on the results and discussion above, it can be concluded that there was an increase in cases but not too significant in the results of Riskesdas in 2007, 2013, and 2018 related to Health/PHBS behavior and personal hygiene. So it is necessary to prevent and control tuberculosis in adolescents by improving health behavior. This increase in cases is the result of a survey in the community but does not include the number of cases in health services, as well as risk factors for health behavior that also determine a person's ability to contract TB, especially at a young age. So, it can be suggested that health workers or policymakers make tools such as educational media related to TB transmission and how to control it at a young age.

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Declarations

Authors' contribution

L.N.R., S.N.D., & I.W.T. conceived of the presented idea of this study. L.N.R., & S.N.D., developed the theory and designed the method. L.N.R., was collecting the data and S.N.D.,& I.W.T verified the analytical methods. L.H. and M.S.H reviewed, revised the manuscript, edited the manuscripts and publications. All authors have agreed on the manuscript's final draft before submitting it for publication.

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Conflict of interest

There is no conflict of interest in this research.

REFERENCES

1. Kemenkes RI. Pedoman Nasional Pelayanan Kedokteran Tata Laksana Tuberkulosis. Kementerian Kesehatan Republik Indonesia. Jakarta, Indonesia; 2020.
2. WHO. Global Tuberculosis Report 2020. World Health Organization. 2020.
3. TB Indonesia. Situasi TB di Indonesia [Internet]. https://tbindonesia.or.id. 2022 [cited 2022 Oct 24]. Available from: https://tbindonesia.or.id/pustaka-tbc/dashboard-tb/#tab-63568e3bcff0e-2
4. Kemenkes RI. Profil Kesehatan Indonesia 2021. Jakarta, Indonesia: Kementerian Kesehatan RI; 2022. Kementrian Kesehatan Republik Indonesia.
5. WHO. Fact Sheets Tuberkulosis (TB day 2022) [Internet]. World Health Organization. 2022 [cited 2022 Oct 24]. Available from: https://www.who.int/indonesia/news/campaign/tb-day-2022/fact-sheets
6. Sumarmi, Duarsa ABS. The Analysis Correlation Physical between House Condition with Pulmonary TB BTA Positive in The Working Area Kotabumi II, Bukit Tinggi and Ulak Rengas Health Center North Lampung District 2012. J Kedokt Yars [Internet]. 2014;22(2):82–101. Available from: https://media.neliti.com/media/publications/4906-ID-hubungan-antara-perilaku-ibu-dan-lingkungan-fisik-rumah-dengan-kejadian-tuberkul.pdf
7. Pangaribuan L, Kristina K, Perwitasari D, Tejayanti T, Lolong DB. Faktor-Faktor yang Mempengaruhi Kejadian Tuberkulosis pada Umur 15 Tahun ke Atas di Indonesia. Bul Penelit Sist Kesehat. 2020;23(1):10–7.
8. Setiawan G, Juniarti N, Yani DI. Correlation between lifestyle and incidence of pulmonary tuberculosis in adolescents: a systematic literature review. J Keperawatan Komprehensif (Comprehensive Nurs Journal). 2019;5(1):10–7.

10.26555/eshr.v3i1.3629

9. Damayati DS, Susilawat A, Maqfirah. Risiko Kejadian TB Paru di Wilayah Kerja Puskesmas Liukang Tupabbiring Kabupaten Pangkep. Hig J Kesehat Lingkung. 2018;4(2):121–30.
10. Rohayu N, Yusran S, Ibrahim K. Analisis Faktor Risiko Kejadian Tb Paru Bta Positif Pada Masyarakat Pesisir Di Wilayah Kerja Puskesmas Kadatua Kabupaten Buton Selatan Tahun 2016. Dr Diss Haluoleo Univ. 2016;
11. Rukmini, Chatarina U. Kejadian TB Paru Dewasa di Indonesia (Analisis Data Riset Kesehatan Dasar Tahun 2010). Bul Penelit Sist Kesehat. 2011;14(4):320–31.
12. Kemenkes RI. Pedoman Nasional Penanggulangan Tuberkulosis. 2nd ed. Jakarta, Indonesia: Kementerian Kesehatan RI; 2007.
13. Molalign S, Wencheko E. Risk factors of mortality in patients with multi-drug resistant TB. Ethiop J Heal Dev. 2015;29(2):82–8.
14. Susilawati NM, Therik BA. Faktor-Faktor Yang Mempengaruhi Kejadian TB Paru Di Kelurahan Naibonat Kabupaten Kupang Tahun 2022. Oehonis J Environ Heal Res. 2022;5(1):62–6.
15. Manalu HSP. Faktor-faktor yang mempengaruhi kejadian TB paru dan upaya penanggulangannya. J Ekol Kesehat. 2010;9(4):1340–6.
16. Siregar S, Sari Tampubolon V. Gambaran Status Gizi Terhadap Kejadian Tb Paru Di Rumah Sakit Imelda Medan Tahun 2018. J Ilm Keperawatan Imelda. 2018;4(2):111–5.
17. Bakri F, Hengky HK, Umar F. Pemetaan Faktor Risiko Kejadian Tuberkulosis Di Kota Parepare. J Ilm Mns dan Kesehat. 2021;4(2):266–78.
18. Tubalawony SL, Maelissa SR. Faktor yang Berhubungan dengan kejadian TB Paru Dewasa Pada Penderita Rawat Jalan RSUD Tulehu. Moluccas Heal J. 2019;1(3):50–6.
19. Notoatmodjo S. Promosi kesehatan dan ilmu perilaku. Jakarta: Rineka Cipta; 2007.
20. Menteri Kesehatan Republik Indonesia. Permenkes RI Nomor 67 Tahun 2016 tentang penanggulangan tuberkulosis. Kementerian Kesehatan RI Indonesia; 2016.
21. Andi Mauliyana, Hadrikaselma E. Risk Factors of Pulmonary Tuberculosis in the Working Area of Perumnas Public Health Center Kendari City. MIRACLE J Public Heal. 2021;4(2):202–13.
22. Anggraini I, Hutabarat B. Pengaruh Karakteristik dan Perilaku terhadap Kejadian Penyakit TB Paru di Pondok Pesantren Al-Hidayah Kecamatan Kejuruan Muda Kabupaten Aceh Tamiang Provinsi Aceh Tahun 2019. J Penyakit Dalam Indones. 2021;8(3):119–24.
23. Prihanti GS, Sulistiyawati, Rahmawati I. Analisa Faktor Kejadian Tuberkulosis Paru. Saintika Med. 2015;11(2):127–31.
24. Katiandagho D, Fione VR, Sambuaga J. Hubungan Merokok Dengan Kejadian TB Paru Di Wilayah Kerja Puskesmas Tatelu Kecamatan Dimembe. Pros Semin Nas Tahun 2018. 2018;1(3):582–93.

 10.26555/eshr.v3i1.3629

25. Gulo A, Warouw SP, Brahmana NEB. Analisis Faktor Risiko Kejadian Penyakit Tuberkulosis Paru Di Wilayah Kerja Upt Puskesmas Padang Bulan Kota Medan Tahun 2020. J Healthc Technol Med. 2021;7(1):128–37.
26. Wijaya I. Tuberkulosis Paru pada Penderita Diabetes Melitus. Cermin Dunia Kedokt. 2015;42(6):412–7.
27. Saraswati F, Murfat Kz, Rasfayanah, Wiriansya EP, Akib MN. Karakteristik Penderita Tuberkulosis Paru Yang Relaps Di RS Ibnu Sina Makassar. Fakumi Med J J Mhs Kedokt. 2022;2(5):109–15.
28. Caesar DL, Hakim AR. Perilaku Personal Hygiene Penderita Penyakit Tuberkulosis Di Wilayah Kerja Puskesmas Gondosari. J Kesehat Masy STIKES Cendekia Utama Kudus. 2019;7(1):144–75.
29. Purba R, Ferabetty Y. Pengaruh Penyuluhan Kesehatan Model Peer Group Terhadap Pengetahuan Dan Sikap Remaja Tentang Tuberkulosis Paru. J Penelit Keperawatan Med. 2018;1(1):32–6.
30. Friskarini K, Manalu HS. Pengetahuan Dan Sikap Tentang Penyakit Tb Paru Pada Remaja Di Kabupaten Tangerang Tahun 2009. Bul Penelit Kesehat. 2014;42(1):37–45.

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Research Article

Tuberculosis in Adolescents at Yogyakarta Province: Analysis of Basic Health Research Survey

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ABSTRACT

Background: Tuberculosis is still a disease with an increasing incidence every year. Based on a survey in the community through Riskesdas about tuberculosis and health behavioural factors, there are still fluctuations in cases, so this research aims to look incidence of tuberculosis from the results of the Riskesdas in 2007, 2013 and 2018 in adolescents aged 15-24 years which are then reviewed from behavioural health factors**.**

Method: This research is a quantitative analytical descriptive study using secondary data from basic health research (Riskesdas) on adolescents aged 15-24 years. This study was conducted to provide an overview of the incidence of tuberculosis and health behaviour in Yogyakarta Province. Data were analyzed and presented descriptively in graphs and narratives

Results: The results showed an increase in tuberculosis incidence according to the diagnosis of health workers but not too significant. The 2007 RISKESDAS showed that as many as 59.7% of the people of the Yogyakarta province still lacked physical activity, while in 2013, the highest percentage was the lack of fruit and vegetable consumption. The community by 74.35%, then in 2018, it showed that the people of the Yogyakarta province still lacked the habit of washing their hands with soap with a percentage of 45.01%.

Conclusion: There was an increase in cases but not too significant in the results of the Riskesdas in 2007, 2013, and 2018 related to clean and healthy lifestyle behaviour and personal hygiene. Therefore, improving health behaviour is necessary to prevent and control adolescent tuberculosis.

Keywords: DIY Province, Health Behavior, RISKESDAS, Tuberculosis

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INTRODUCTION

Tuberculosis is a chronic infectious disease caused by the bacterium Mycobacterium tuberculosis. These bacteria are rod-shaped and acid-fast, often called Acid-Resistant Bacilli (BTA). Most TB germs are usually found to infect the lung parenchyma and cause pulmonary TB. Still, these bacteria can infect other body organs (extra-pulmonary TB), such as the pleura, lymph nodes, bones, and other extra-pulmonary organs[1]. Based on WHO data in 2020, the tuberculosis morbidity rate reached 9.9 million people worldwide, and 1.5 million died. Globally, TB incidence rates fell by 11% between 2015 and 2020 (from 142 to 127 new cases per 100,000 population), including a 1.9% decrease compared to 2019[2].

Tuberculosis is still a public health problem in Indonesia and in the world, so it has become a sustainable health development goal (SDGs). Meanwhile, Indonesia still ranks third as the country that contributes the most tuberculosis in the world after India and China. The Global Tuberculosis Report 2021, in 2020, the TB incidence rate in Indonesia was 301 per 100,000 population with a total of 824,000 cases, a decrease when compared to the TB incidence rate in 2019, which was 312 per 100,000 population. Meanwhile, the TB mortality rate in 2019 and 2020 is still the same, namely 34 per 100,000 population with a total of 15,186 cases. Thus, to reduce morbidity, the rate requires the role of various parties[3,4].

Eventhough, tuberculosis attacks mainly adults at the most productive ages, it does not mean that other age groups does not at risk. Geographically, more than 95% of cases and deaths occur in developing countries because xxxx. The risk of active TB is also higher in people with other conditions that impair the immune system. People who are malnourished are three times more at risk. Globally in 2020, there will be 1.9 million new TB cases due to malnutrition. Alcohol use disorders increased the risk of TB disease by 3.3 times, while smoking increased the risk by 1.6 times. In 2020, 0.74 million new TB cases were due to alcohol use disorders, and 0.73 million were due to smoking[5].

The Ministry of Health in Sumarmi (2014) said that as many as 80-90% of the population had been infected with this tuberculosis germ. This exposure can be obtained from childhood or at the age of teenagers or adults with the position of dormant germs in the body and when the body's immune system decreases due to a lot of activity and activity. High mobility without paying attention to the condition of the body that lacks good nutritional intake, these germs will be active again, so they become sick. This makes the prevalence of this disease higher in the productive age, which is 77.4%[6].

Pulmonary TB by health workers, having been diagnosed with DM by a doctor, and smoking7. Previous research said that the incidence of TB in participants aged 15 years and over was influenced by several factors such as age, gender, area of residence, education, and region, besides that it was also influenced by other factors, such as a history of having lived with a TB patient, having been diagnosed with TB. Then an unhealthy lifestyle is also a factor that can affect the incidence of pulmonary TB in adolescents and adults, such as smoking, the habit of consuming liquor (alcohol), and going out at night, which can reduce the body's immunity so that it is more susceptible to pulmonary TB disease[8–10].

Disease data in Indonesia is obtained from several sources such as facility data (facility-based), namely recording in every administrative sector such as health service units, districts/cities, provinces to the center (Ministry of Health), and data obtained directly from the community (community-based) obtained from national-scale surveys such as basic

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health research (Riskesdas). According to the national guidelines for tuberculosis control, it is stated that TB report data from facilities do not yet contain data on TB risk factors, so to analyze TB risk factors related to the incidence of pulmonary TB in Indonesia, data from research in the community on a national scale is needed. Factors that affect a person's likelihood of becoming a TB patient are low immunity[11,12]. Based on some consideratiosn, the researcher interested in looking at the incidence of tuberculosis from the results of the Riskesdas in 2007, 2013, and 2018 in adolescents aged 15-24 years which is then reviewed from health behaviour factors.

METHOD

This research is a quantitative descriptive study using secondary data. We used Riskesdas dta with year 2007, 2013 and 2018. This study was conducted to provide an overview of the incidence of tuberculosis and risk factors for health behaviours that trigger tuberculosis. The criteria for this study were adolescents aged 15-24 years and having behaviours/habits: smoking habits (passive and active) both daily and occasionally, consuming less than five servings of fruit and vegetables, history of drinking alcohol in the last month, history of physical activity for less than one week and the habit of washing hands before and after eating and urinating/defecating. The data presented using graphs and narratives.

RESULTS

Figure 1 show an increase in tuberculosis incidence according to the health workers' diagnosis. This increase in incidence is not significant but can significantly impact disease problems in adolescents aged 15-24.

Figure 1. Overview of Tuberculosis Incidence at the Age of 15-24 Years Based on the Results of Riskesdas 2007, 2013, and 2018 in DI Yogyakarta Province

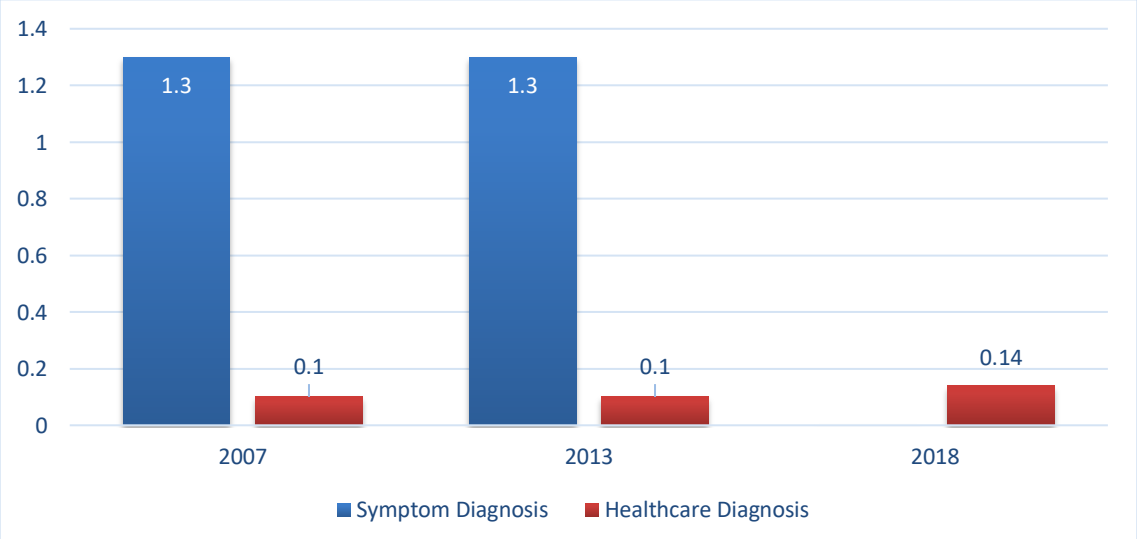

Figure 2 shows that the health behaviour risk factors based on the results of the Riskesdas show that there are still significant fluctuations. The 2007 Riskesdas results

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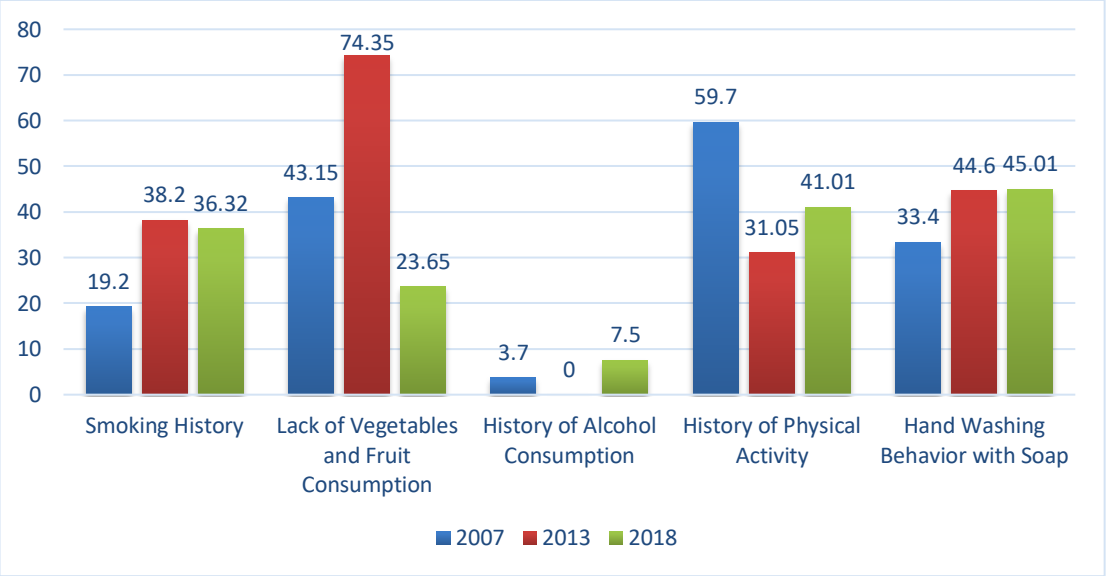
showed that as many as 59.7% of the people of the DIY province still lacked physical activity, while in 2013, the highest percentage of the community's lack of fruit and vegetable consumption was 74.35%. In 2018, it showed that the people of the DIY province still not applying the habit of washing their hands using soap, a percentage of 45.01%. Indirectly, this behaviour can be a factor in the incidence of tuberculosis in the community, including among adolescents.

Figure 2. Description of health behaviour risk factors on the incidence of tuberculosis at the age of 15-24 years based on the results of Riskesdas 2007, 2013, and 2018 in DI Yogyakarta Province



DISCUSSION

Tuberculosis is still an infectious disease that is often found in the community. Many factors, including clean and healthy living behaviour and personal hygiene be a cause the increasing incidence of tuberculosis in the community. The results of this study indicate an increase in cases that is not too visible, based on RISKESDAS data carried out in the society dominated by patients suffering from TB with a diagnosis by health workers. This is in line with previous research conducted based on SPTB data from 2013-2014, which stated that the most dominant factor influencing the occurrence of TB at the age of 15 years and over was having been diagnosed with TB by health workers. Participants who have been diagnosed with TB by health workers are at risk[7].

According to the Indonesian Ministry of Health in 2019, flow immunity, generally due to poor nutrition and unhealthy living behaviour, can influence a person to become a TB patients ease is included in the priority of disease control because it has a broad impact on the quality of life, and the economy is and the number 3 cause of death in children and adults. Meanwhile, according to other studies, it is said that having a history of smoking or currently having a smoking habit in tuberculosis patients is one of the factors that triggers someone to contract tuberculosis[13]. This is in line with the research of Kusumo (2011) and Susilawati and Therik (2022), which said that there was a relationship between the habit of applying PHBS in daily life to the incidence of pulmonary TB, with the application of PHBS followed by personal

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hygiene being an essential factor as a cause of TB lungs diseases[14]. The Indonesian Ministry of Health (2020) states that the risk factor for tuberculosis will be higher for the group of smokers and people who consume alcohol in high levels/amounts. In addition, personal hygiene risk factors such as lack of awareness to wash hands with soap and poor nutritional status, including the behaviour of consuming less fruit and vegetables and lack of physical activity aimed at keeping the body fit/healthy, can trigger a person to suffer from tuberculosis.

TB disease is closely related to a person's immune system; to maintain the immune system, it is necessary to fulfil nutrition/nutrition. Nutritional status is one factor determining the function of all body systems, including the immune system. Humans need the immune system to protect the body, especially by preventing infections caused by microorganisms. When the immune system is low, pulmonary TB germs will quickly enter the body. These germs will gather in the lungs and then multiply. However, people infected with pulmonary TB germs do not necessarily suffer from pulmonary TB. This depends on the person's immune system. If the immune system is robust, the germs will continue to sleep in the body (dormant) and will not develop into a disease, but if the immune system is weak, TB germs will grow into an infection. Pulmonary TB disease is more dominant in people with low nutritional status due to a weak immune system, making it easier for TB germs to enter and multiply[15].

Factors Affecting the Nutritional Status of Adolescents, according to Dewi et al. (2013), are: Heredity Factors, Lifestyle Factors, and Environmental Factors such as the habit of drinking alcoholic beverages can cause liver disorders (hepatology and even cirrhosis), smoking habits can cause chronic ARI and even pulmonary TB or Lung cancer, the tradition of staying up late every night can cause the body's immune system to decrease so that it is susceptible to infection. Pulmonary TB patients often experience a reduced nutritional status and can even become malnourished if not balanced with the proper diet. Several factors related to the nutritional status of pulmonary TB patients are the level of energy and protein adequacy, the patient's behaviour towards food and health, the length of time suffering from pulmonary TB, and the patient's per capita income[16,17].

This is in line with previous studies that there is a relationship between the incidence of pulmonary TB with nutritional status and TB patients with poor nutritional status have a 2.101 times greater risk of developing TB than those with good nutrition. In other words, more pulmonary tuberculosis patients with poor nutritional quality. overnutrition and undernutrition) and poor dietary status will increase the risk of pulmonary tuberculosis[11,16,18].

One of the other factors that influence the incidence of tuberculosis is health behaviour. According to Notoatmodjo (2007), healthy living behaviours are behaviours related to a person's efforts or activities to maintain and improve their health or a healthy lifestyle. These behaviours include, among others: (a) Eating a balanced menu (containing nutrients the body needs), and the amount is sufficient to meet the body's needs. (b) Regular exercise also includes quality (movement) and quantity in terms of the frequency and time used for sports or physical activities other than sports. (c) No smoking. (d) Do not drink alcohol or drugs[19].

According to the Regulation of the Minister of Health of the Republic of Indonesia Number 67 of 2016 concerning tuberculosis control, to prevent the spread and transmission of TB in the community, it is necessary to control risk factors, one of which is by implementing a culture of clean and healthy living behaviour and increasing body resistance[20]. The Riskesdas stated that the Indonesian people are still lacking in consuming fruits and

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vegetables and doing physical activity, which can weaken the immune system and increase the transmission of TB that may occur from one person to another.

Previous research has stated that smoking has a relationship with the incidence of tuberculosis. This is related to tuberculosis patients dominated by men who smoke more than women. Active smokers have a higher risk than passive smokers and non-smokers [21–24]. Smoking tobacco and drinking alcohol are essential factors that can lower the body's immune system, making it more susceptible to disease. Cigarette smoke has pro-inflammatory and immunosuppressive effects on the respiratory tract immune system. In addition, smoking can increase the risk of Mycobacterium tuberculosis infection, disease progression, and death in TB patients[25,26].

A person is more likely to be stressed, often stay up late, and lack rest due to the many physical activities carried out both inside and outside the home, which causes a weakening of the immune system so that they are easily exposed to other TB sufferers both in the work environment and the environment around their residence. An adult tends to have high activity and mobility, stress, and lack of rest after doing much physical activity, making it easy to re-expose to TB germs[27]. Then personal hygiene is also a form of prevention and control of TB by applying hand washing with soap. In line with previous research, which said that washing hands before and after activities had been well used for TB patients to prevent transmission, knowledge about tuberculosis, personal hygiene, and the relationship between personal hygiene and the occurrence of tuberculosis was still lacking[28].

So it is necessary to provide more education about tuberculosis and how to prevent and control it, one of which is by conducting counselling and peer group-based discussions by conveying to the public and youth about prevention efforts so as not to transmit TB to others[29,30].

CONCLUSION

Based on the results and discussion above, it can be concluded that there was an increase in cases but not too significant in the results of Riskesdas in 2007, 2013, and 2018 related to Health/PHBS behaviour and personal hygiene. So, preventing and controlling tuberculosis in adolescents is necessary by improving health behaviour. This increase in cases is the result of a survey in the community. Still, it does not include the number of cases in health services or risk factors for health behaviour that also determine a person's ability to contract TB, especially at a young age. So, it can be suggested that health workers or policymakers make tools such as educational media related to TB transmission and how to control it at a young age.

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Declarations

Authors' contribution

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L.N.R., S.N.D., & I.W.T. conceived of the presented idea of this study. L.N.R., & S.N.D., developed the theory and designed the method. L.N.R. collected the data and S.N.D. & I.W.T verified the analytical methods. L.H. and M.S.H. reviewed and revised the manuscript and edited the manuscripts and publications. All authors have agreed on the manuscript's final draft before submitting it for publication.

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Conflict of interest

There is no conflict of interest in this research.

REFERENCES

1. Kemenkes RI. Pedoman Nasional Pelayanan Kedokteran Tata Laksana Tuberkulosis. Kementerian Kesehatan Republik Indonesia. Jakarta, Indonesia; 2020.
2. WHO. Global Tuberculosis Report 2020. World Health Organization. 2020.
3. TB Indonesia. Situasi TB di Indonesia [Internet]. https://tbindonesia.or.id. 2022 [cited 2022 Oct 24]. Available from: https://tbindonesia.or.id/pustaka-tbc/dashboard-tb/#tab-63568e3bcff0e-2
4. Kemenkes RI. Profil Kesehatan Indonesia 2021. Jakarta, Indonesia: Kementerian Kesehatan RI; 2022. Kementrian Kesehatan Republik Indonesia.
5. WHO. Fact Sheets Tuberkulosis (TB day 2022) [Internet]. World Health Organization. 2022 [cited 2022 Oct 24]. Available from: https://www.who.int/indonesia/news/campaign/tb-day-2022/fact-sheets
6. Sumarmi, Duarsa ABS. The Analysis Correlation Physical between House Condition with Pulmonary TB BTA Positive in The Working Area Kotabumi II, Bukit Tinggi and Ulak Rengas Health Center North Lampung District 2012. J Kedokt Yars [Internet]. 2014;22(2):82–101. Available from: https://media.neliti.com/media/publications/4906-ID-hubungan-antara-perilaku-ibu-dan-lingkungan-fisik-rumah-dengan-kejadian-tuberkul.pdf
7. Pangaribuan L, Kristina K, Perwitasari D, Tejayanti T, Lolong DB. Faktor-Faktor yang Mempengaruhi Kejadian Tuberkulosis pada Umur 15 Tahun ke Atas di Indonesia. Bul Penelit Sist Kesehat. 2020;23(1):10–7.
8. Setiawan G, Juniarti N, Yani DI. Correlation between lifestyle and incidence of pulmonary tuberculosis in adolescents: a systematic literature review. J Keperawatan Komprehensif (Comprehensive Nurs Journal). 2019;5(1):10–7.
9. Damayati DS, Susilawat A, Maqfirah. Risiko Kejadian TB Paru di Wilayah Kerja Puskesmas Liukang Tupabbiring Kabupaten Pangkep. Hig J Kesehat Lingkung. 2018;4(2):121–30.

 10.26555/eshr.v3i1.3629

10. Rohayu N, Yusran S, Ibrahim K. Analisis Faktor Risiko Kejadian Tb Paru Bta Positif Pada Masyarakat Pesisir Di Wilayah Kerja Puskesmas Kadatua Kabupaten Buton Selatan Tahun 2016. Dr Diss Haluoleo Univ. 2016;
11. Rukmini, Chatarina U. Kejadian TB Paru Dewasa di Indonesia (Analisis Data Riset Kesehatan Dasar Tahun 2010). Bul Penelit Sist Kesehat. 2011;14(4):320–31.
12. Kemenkes RI. Pedoman Nasional Penanggulangan Tuberkulosis. 2nd ed. Jakarta, Indonesia: Kementerian Kesehatan RI; 2007.
13. Molalign S, Wencheko E. Risk factors of mortality in patients with multi-drug resistant TB. Ethiop J Heal Dev. 2015;29(2):82–8.
14. Susilawati NM, Therik BA. Faktor-Faktor Yang Mempengaruhi Kejadian TB Paru Di Kelurahan Naibonat Kabupaten Kupang Tahun 2022. Oehonis J Environ Heal Res. 2022;5(1):62–6.
15. Manalu HSP. Faktor-faktor yang mempengaruhi kejadian TB paru dan upaya penanggulangannya. J Ekol Kesehat. 2010;9(4):1340–6.
16. Siregar S, Sari Tampubolon V. Gambaran Status Gizi Terhadap Kejadian Tb Paru Di Rumah Sakit Imelda Medan Tahun 2018. J Ilm Keperawatan Imelda. 2018;4(2):111–5.
17. Bakri F, Hengky HK, Umar F. Pemetaan Faktor Risiko Kejadian Tuberkulosis Di Kota Parepare. J Ilm Mns dan Kesehat. 2021;4(2):266–78.
18. Tubalawony SL, Maelissa SR. Faktor yang Berhubungan dengan kejadian TB Paru Dewasa Pada Penderita Rawat Jalan RSUD Tulehu. Moluccas Heal J. 2019;1(3):50–6.
19. Notoatmodjo S. Promosi kesehatan dan ilmu perilaku. Jakarta: Rineka Cipta; 2007.
20. Menteri Kesehatan Republik Indonesia. Permenkes RI Nomor 67 Tahun 2016 tentang penanggulangan tuberkulosis. Kementerian Kesehatan RI Indonesia; 2016.
21. Andi Mauliyana, Hadrikaselma E. Risk Factors of Pulmonary Tuberculosis in the Working Area of Perumnas Public Health Center Kendari City. MIRACLE J Public Heal. 2021;4(2):202–13.
22. Anggraini I, Hutabarat B. Pengaruh Karakteristik dan Perilaku terhadap Kejadian Penyakit TB Paru di Pondok Pesantren Al-Hidayah Kecamatan Kejuruan Muda Kabupaten Aceh Tamiang Provinsi Aceh Tahun 2019. J Penyakit Dalam Indones. 2021;8(3):119–24.
23. Prihanti GS, Sulistiyawati, Rahmawati I. Analisa Faktor Kejadian Tuberkulosis Paru. Saintika Med. 2015;11(2):127–31.
24. Katiandagho D, Fione VR, Sambuaga J. Hubungan Merokok Dengan Kejadian TB Paru Di Wilayah Kerja Puskesmas Tatelu Kecamatan Dimembe. Pros Semin Nas Tahun 2018. 2018;1(3):582–93.
25. Gulo A, Warouw SP, Brahmana NEB. Analisis Faktor Risiko Kejadian Penyakit Tuberkulosis Paru Di Wilayah Kerja Upt Puskesmas Padang Bulan Kota Medan Tahun 2020. J Healthc Technol Med. 2021;7(1):128–37.

 10.26555/eshr.v3i1.3629

26. Wijaya I. Tuberkulosis Paru pada Penderita Diabetes Melitus. Cermin Dunia Kedokt. 2015;42(6):412–7.
27. Saraswati F, Murfat Kz, Rasfayanah, Wiriansya EP, Akib MN. Karakteristik Penderita Tuberkulosis Paru Yang Relaps Di RS Ibnu Sina Makassar. Fakumi Med J J Mhs Kedokt. 2022;2(5):109–15.
28. Caesar DL, Hakim AR. Perilaku Personal Hygiene Penderita Penyakit Tuberkulosis Di Wilayah Kerja Puskesmas Gondosari. J Kesehat Masy STIKES Cendekia Utama Kudus. 2019;7(1):144–75.
29. Purba R, Ferabetty Y. Pengaruh Penyuluhan Kesehatan Model Peer Group Terhadap Pengetahuan Dan Sikap Remaja Tentang Tuberkulosis Paru. J Penelit Keperawatan Med. 2018;1(1):32–6.
30. Friskarini K, Manalu HS. Pengetahuan Dan Sikap Tentang Penyakit Tb Paru Pada Remaja Di Kabupaten Tangerang Tahun 2009. Bul Penelit Kesehat. 2014;42(1):37–45.

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Research Articles

Study of Adolescent Health Behavior Towards Non-Communicable Disease Risk Factors: Based on RISKESDAS Special Region of Yogyakarta Province

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ABSTRACT

Backgrounds: Non-Communicable Diseases (NCD) are still one of the causes of high incidence and death rates in people of various age groups. One of the risk factors for the emergence of NCD is an unhealthy lifestyle and poor daily health behavior. Adolescents are an age group that is vulnerable to risk factors for NCDs due to a modern lifestyle and lack of awareness to prevent NCD from an early age. The purpose of this study was to analyze the health behavior of adolescents aged 15-24 years towards the risk factors for non-communicable disease behavior based on the RISKESDAS results from the Special Province of Yogyakarta.

Methods: This research is a quantitative descriptive study using secondary data to analyze the health behavior of adolescents aged 15-24 years towards risk factors for non-communicable disease behavior based on data that has been collected from RISKESDAS data for the Province of the Special Region of Yogyakarta in 2007, 2013 and 2018. The behavioral risk factors examined in this study were smoking habits (passive and active) both daily and occasionally, consuming less than five servings of fruit and vegetables, history of drinking alcohol in the last month, history of physical activity for less than one week. Data analysis was carried out descriptively for each risk factor and presented in the form of a percentage chart.

Results: Based on the results of the research, it shows that the risk factors for smoking every day and occasionally have decreased from 2007 to 2018, then, there has been an increase in the number of awareness in consuming fruits and vegetables. Meanwhile, there was an increase in alcohol consumption in 2018 and a decrease in doing sufficient physical activity for 1 week in adolescents aged 15-24 years in the province of the Special Region of Yogyakarta.

Conclusion: It can be concluded that risk factors for health behavior related to non-communicable diseases in adolescents aged 15-24 years in the Special Region of Yogyakarta are still caused by a lack of physical activity and the large number of adolescents who consume alcohol.

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Keywords: Special Region of Yogyakarta Province, Health Behavior, Non-Communicable Disease, RISKESDAS

INTRODUCTION

Non-communicable diseases (NCD) kill 41 million people each year, equivalent to 74% of all deaths globally. Each year, 17 million people die from NCD before age 70; 86% of these premature deaths occur in low- and middle-income countries. Of all NCD deaths, 77% are in low- and middle-income countries. Cardiovascular disease is the most common cause of NCD death, or 17.9 million people each year, followed by cancer (9.3 million), chronic respiratory disease (4.1 million) and diabetes (2.0 million including deaths from chronic kidney disease). Tobacco use, physical activity, harmful alcohol use, and unhealthy eating patterns all increase the risk of death from NCDs. Over 80% of NCD deaths occur from these four disease groups. Detection, screening and treatment of NCDs, as well as palliative care, are key components of prevention and treatment of NCDs(1).

People with degenerative diseases (diseases caused by decreased organ function) are increasing as a consequence of modern lifestyles, which include eating patterns, smoking, drinking, and using drugs(2). An unhealthy diet, lack of physical activity, exposure to tobacco smoke, or harmful alcohol use are all risk factors that contribute to NCDs in children, adults, and the elderly(1) .

Basic Health Research 2013 shows the trend of non-communicable diseases as a cause of death is increasing, from 49.9% (2001) to 59.5% (2007). These non-communicable diseases include hypertension (25.8%), obesity (15.4%), stroke (12.1‰), diabetes mellitus (6.9%), coronary heart disease (1.5%), and chronic kidney failure (0.2%)(3). The disease is driven by forces that include unplanned rapid urbanization, globalization of unhealthy lifestyles, and population aging. Unhealthy eating patterns and lack of physical activity can appear in people as increased blood pressure, increased blood glucose, increased blood lipids, and obesity. In terms of premature mortality, cardiovascular disease is the most common NCD caused by metabolic risk factors(1).

The prevalence of hypertension in the Special Region of Yogyakarta according to the 2018 Riskesdas is 11.01% or higher when compared to the national figure (8.8%). These prevalence placesSpecial Region of Yogyakartain 4th place as a province with high cases of hypertension. Hypertension has always been included in the top 10 diseases as well as the top 10 causes of death inSpecial Region of Yogyakartafor the last few years based on Integrated Disease Surveillance Health Center and Integrated Disease Surveillance Hospital. In 2020, based on the Integrated Hospital Disease Surveillance Report in DI Yogyakarta, 6,171 new cases of hypertension and 33,507 were recorded. The total estimated number of hypertension sufferers aged ≥ 15 years is 210,112 cases. In 2020, the estimated number of hypertension sufferers aged ≥ 15 years who have received health services is 69.6%. Number of Diabetes mellitus cases inSpecial Region of Yogyakarta(4).

Non-communicable diseases are diseases that are not caused by bacterial or viral infections. Non-communicable diseases that are often encountered include hypertension, diabetes mellitus, asthma, cardiovascular disease, mental disorders, and accidents. Modernization, improved economic status, and changes in lifestyle have led to an increase in the prevalence of non-communicable diseases. In the Special Region of Yogyakarta in 2021 it is estimated that there are 251,100 cases of hypertension sufferers aged ≥ 15 years. Those who have received health services are 129,420 cases or 51.5%. Cases of diabetes mellitus in 2021 are 83,568 cases and those who receive standard health services are 50,530 cases (60.5%)(2,5). .

Looking at lifestyles that are increasingly modern and the impact of diseases caused both internationally and nationally, it can also be described in the behavior of adolescents

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that lead to risk factors for non-communicable diseases in the current era. Changes in lifestyle which are risk factors for NCDs can also be described in the behavior of adolescents at this time. The prevalence of risk factors are characteristics, signs, symptoms of individuals that are statistically associated with an increased incidence of disease in the future. An unhealthy lifestyle is often associated with teenagers because of their numerous activities and bad eating habits(6–8).. In another study, risky alcohol use, drug use, smoking, poor sleep, overweight/underweight, sedentary behavior, high media use, and truancy were linked to a range of poor mental health outcomes, including depression, anxiety, and suicide among them. Adolescents (mean age 14.9 years). Risky alcohol use, drug use, smoking, unprotected sex, and sleep were all highly clustered lifestyle risk factors, while BMI was not. A risk index consisting of risky alcohol use, drug use, unprotected sex and sleep duration predicted the disease burden outcomes with the greatest precision. 31.9% of the sample reported one or more of these behaviors. The risk index does not include energy balance risk behaviors, but BMI is used as a proxy for these behaviors. Physical inactivity, eating patterns, and sedentary behavior were found to coexist in adolescents(9–11).

Previous studies have shown that risk factors for NCD that are at risk in adolescents are less consumption of vegetables and fruit and consumption of fast food(12). In addition, adolescents are also prone to risky behavior that has not been routinely carried out, namely blood pressure checks, physical activity, exercise, lack of consumption of fruits and vegetables, the habit of consuming fast food and smoking habits. Early smoking is a risk factor for NCDs, such as hypertension, heart disease, stroke and cancer(6).

Non-communicable diseases themselves occur due to various factors, such as smoking habits, unhealthy diets or eating patterns, minimal physical activity, and consumption of alcoholic beverages. In addition, family health history can also be a trigger for non-communicable diseases. Diseases that are usually experienced by this elderly group, are now being experienced by many productive age groups. This condition is a threat that cannot be ignored. How could it not be, the productive age group is expected to become the next generation that will bring Indonesia to face global competition(13,14).

According to previous studies, the signs and symptoms generally do not appear during childhood and adolescence, making it difficult to detect during this period. Nonetheless, the prevalence shows that the majority of hypertension is lower in children or adolescents(15). Based on this description, the purpose of this study was to analyze the health behavior of adolescents aged 15-24 years towards the risk factors for non-communicable disease behavior based on the RISKESDAS results from the Special Province of Yogyakarta.

METHODS

This research is a quantitative descriptive study using secondary data to analyze the health behavior of adolescents aged 15-24 years towards risk factors for non-communicable disease behavior based on data that has been collected from RISKESDAS data for the Province of the Special Region of Yogyakarta in 2007, 2013 and 2018. The criteria for this study were adolescents aged 15-24 years old and having behaviors/habits: smoking habits (passive and active) both daily and occasionally, consuming less than five servings of fruit and vegetables, history of drinking alcohol in the last month, history of physical activity for less than one week. Data analysis was carried out descriptively for each risk factor and presented in the form of a percentage chart.

RESULTS

Based on the results of an analysis of health behavior risk factors in adolescents aged 15-24 years related to smoking habits, alcohol consumption habits, daily fruit and vegetable

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consumption and a history of doing physical activity for at least 30 minutes a day, the results are as shown in figure below. The history of smoking behavior in adolescents is shown in Figure 1.

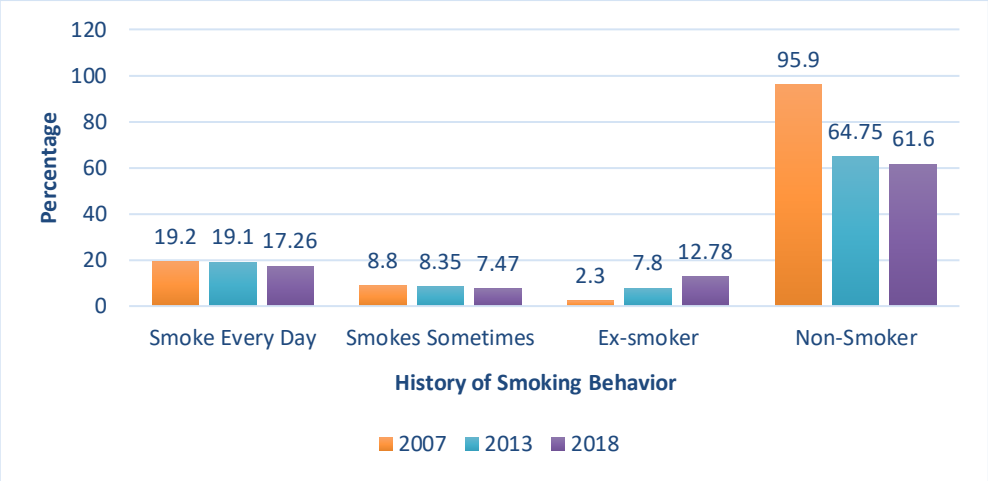

Figure 1. Percentage of history of smoking behavior in adolescents at the age of 15-24 years based on the results of Riskesdas 2007, 2013, and 2018 in the Special Region of Yogyakarta

The of Alcohol consumption in the last 1 month in adolescents is shown in Figure 2.

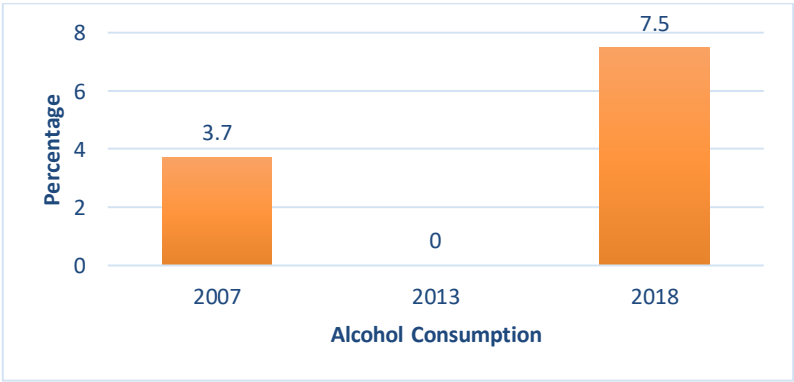

Figure 2. Percentage of Alcohol consumption in the last 1 month at the age of 15-24 years based on the results of Riskesdas 2007, 2013, and 2018 in the Special Region of Yogyakarta

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Behavioral risk factors of lack of fruits and vegetables consumption in adolescents are shown in Figure 3.

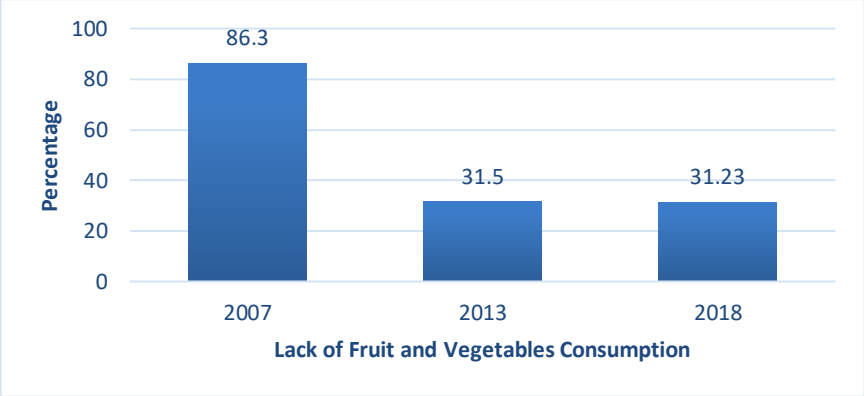

Figure 3. Percentage of Lack of fruits and vegetables consumption (<5 servings/week) the age of 15-24 years based on the results of Riskesdas 2007, 2013, and 2018 in Special Region of Yogyakarta

Therefore, the behavioral risk factors in adolescents by physical activity are shown in Figure 4 below.

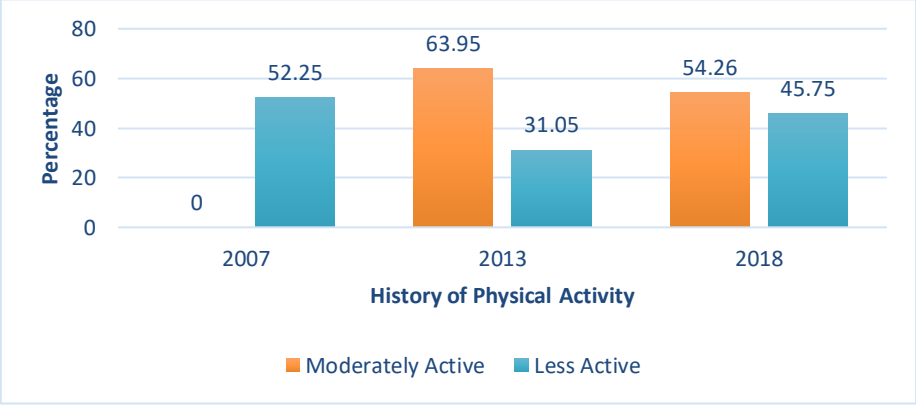

Figure 4. Percentage of physical activity (30 minutes/day) of the age of 15-24 years based on the results of Riskesdas 2007, 2013 and 2018 in the Special Region of Yogyakarta

The history of smoking habits in adolescents aged 15-24 years is dominated by non-smoking adolescents in 2007, 2013 and 2018 but experienced a significant decrease every year, then the daily history of smoking in adolescents showed a decrease in 2007 by 19.2% to 17.26% in 2018. Likewise, smokers sometimes also show a decrease to reach 7.47% in 2018 compared to 2007 (8.8%) and 2013 (8.35%), supported by an increase in ex-smokers in 2018 of 12.78% which was a far increase compared to 2007 of only 2.3% (Figure 1). The history of consuming alcohol in adolescents aged 15-24 years in the last 1 month has increased by 7.5% in 2018 compared to 2007 of only 3.7%. Whereas in 2013 reports of a history of consuming alcohol were not reported (Figure 2).

Based on Figure 3, it shows that the lack of fruit and vegetable consumption in adolescents aged 15-24 years as much as 5 portions in 7 days has decreased significantly from 2007 of 86.3% to 2018 of 31.23%. This shows that awareness in consuming fruits and

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vegetables among adolescents in Yogyakarta Province has increased regarding one of the risk factors that trigger the emergence of non-communicable diseases in adolescents. On Figure 4, it shows that the physical activity carried out by adolescents is still fluctuating, adolescents who did less physical activity for at least 30 minutes per day decreased in 2013 by 31.05%, while adolescents who did enough physical activity decreased from 2013 by 63, 95% to 54.26% in 2018.

DISCUSSION

According to Notoatmodjo (2007), healthy living behaviors are behaviors related to a person's efforts or activities to maintain and improve their health or a healthy lifestyle. These behaviors include, among others: (a) Eating a balanced menu (containing nutrients the body needs), and the amount is sufficient to meet the body's needs. (b) Regular exercise also includes quality (movement) and quantity in terms of the frequency and time used for sports or physical activities other than sports. (c) No smoking. (d) Do not drink alcohol or drugs(16).

Based on RISKESDAS results, it is shown that adolescents aged 15-24 years still have a lack of awareness to consume fruits and vegetables and exercise for at least 30 minutes per day, and the declining number of non-smokers is one of the focus factors for non-communicable diseases. Smoking is one of the risk factors for non-communicable diseases that are common in society, but according to RISKESDAS results there is a decrease in smoking habits among people aged 15-24 years. Health impacts that can arise from smoking behavior in adolescents such as high blood pressure and heart problems caused by the influence of chemicals contained in cigarettes such as nicotine and tar. In addition, it causes a decrease in the sensitivity of the sense of smell and taste for smokers(17).The results of research in developing countries show that smoking habits and diet quality, such as low fruit and vegetable consumption, are significantly higher in groups with low socioeconomic status. Residents with low education are associated with low awareness of healthy living behaviors and low access to health care facilities, thereby increasing the risk of unhealthy lifestyles(18,19). Based on previous studies, it was found that smoking behavior has a significant relationship with the incidence of hypertension in adolescents, not only smoking hypertension also has a close relationship with the incidence of severe stress in adolescents(20–22). Smoking by adolescents is a risk factor for dietary mistakes, poor oral health, and more dynamic damage to teeth, which may result in pain and tooth loss(23).

The results showed that there was an increase in alcohol consumption in 2018 compared to 2007, but a history of alcohol consumption in 2013 was not recorded. The biggest factor for people consuming alcohol is due to environmental factors and friendships that influence a person's behavior. Therefore self-awareness and self-principles are highly prioritized to make oneself avoid disease(24). Alcohol consumption, smoking habits and excessive stress levels will have an impact on health in the long term, one of which is an increase in blood pressure. Alcohol has the same effect as carbon monoxide which causes blood acidity to increase and blood pressure to rise(25).

Previous research conducted on high school adolescents showed consistent results, namely that there were risk factors for high school students to experience infectious diseases due to smoking, consuming alcohol regularly, eating less vegetables and fruit, less physical activity and blood pressure above normal and BMI above the normal limit(26). Similar to research conducted at the Anak Dalam Tribe in Nyogan Village, dietary patterns include fruit and vegetable consumption and risky foods such as sweets and foods containing seasonings,

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and physical activity are risk factors for hypertension and type II diabetes mellitus. The Anak Dalam tribe who have a bad diet have a risk of suffering 11.23 times from DM compared to Suku Anak Dalam (SAD) who have a good diet, seen from the lack of diversity and energy intake in one week(22).

In contrast to alcohol consumption, adolescent awareness to consume fruit and vegetables has increased, this is indicated by the decrease in the number of adolescents who consume less fruits and vegetables, at least 5 servings per week. This is in line with the research by Warganegara and Nur (2016) which said that residents who have poor diets and lack of fruit and vegetable consumption increase the incidence of non-communicable diseases and even death. The habit of consuming foods that are high in calories can cause obesity, grade 1 hypertension to heart disease(2,27). In contrast to the study in Dusun Modinan, the risk factors for NCDs in the community in Dusun Modinan are that most of the male families like their husbands smoke, and consumption of fruit and vegetables is still lacking, when compared to Indonesia which is an agriculture country and guidelines for balanced nutrition, consumption of fruit and vegetables 5 times a day is still a challenge due to the influence of age, place of residence, social and culture(28,29).

The lack of consumption of fruit and vegetables is caused by the fact that fruits and vegetables are still considered a complement to food, not a priority that must be in every diet, a lack of understanding and skills of mothers and parents in getting children to consume fruits and vegetables from an early age and a lack of variety in serving fruit. and vegetables, high mobility and people's perception of high fruit prices(30,31). Increasing awareness of consuming fruits and vegetables can be increased with regular and continuous education as a strategy to prevent non-communicable diseases(32).

In line with consumption of fruits and vegetables as a risk factor for non-communicable diseases, risk factors for non-communicable diseases also experience a decrease in physical activity for 30 minutes per day. It can be said that the awareness of adolescents to carry out physical activities in order to prevent the occurrence of non-communicable diseases is still not implemented in everyday life. Lack of physical activity, namely all body movements that burn calories, can be a risk factor for non-communicable diseases, one of which is cardiovascular disease, obesity and even diabetes mellitus(2,13,14,26).

According to the Ministry of Health Republic of Indonesian said thatNCD is caused by an unhealthy lifestyle, one of which is a lack of physical activity. Dense activities and high mobility make people allocate less time for exercise. In addition, advanced technology makes it easier for people to meet their needs, so activities that require body movement are decreasing. Lack of physical activity has also caused the trend of NCD to change, which initially only affected the elderly age group, but now it has been found in the young age group (0-15 years) and the productive age group (15-65 years)(33)..

Previous research conducted at the School of HPER at Indiana University found that out of four risky behavior patterns it was found that as many as 22% of women and 34% of men were included in a high-risk class characterized by poor eating patterns, lack of physical activity and levels of substance use. Female students in the “low substance use but other poor health behaviors” class were associated with racial/ethnic minority status and lower levels of parental education(34). Research by Richardo et al showed that the accumulation of non-communicable disease risk factors was higher in girls, older adolescents, those who did not live with both parents, children of less-educated mothers, students attending public schools, and residents of cities in more developed urban areas of the country.(35). supported by other studies which state that being a boy, increasing age and the presence of parental support reduce the likelihood of having risk factors for non-communicable disease behavior(36).

Based on research conducted by Yuningrum (2021) explains that the lifestyle of today's youth is at risk of non-communicable diseases as indicated by the consumption of vegetables and fruit, most of which are in the bad category(12). Research conducted by other studies also showed an unhealthy lifestyle with unhealthy lifestyles such as consumption of soft drinks, smoking, alcohol, and also lack of physical activity which causes a high risk of

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non-communicable diseases(37,38).. The number of teenagers who rarely do physical activity and have a low level of physical activity in order to maintain body fitness is quite a lot, as a result there will be risks to the health of teenagers because their body's metabolism is not properly stimulated as they get older. This condition is very worrying because the lack of physical activity will put you at risk for various degenerative diseases, and even accelerate the onset of these diseases.(7).

Non-communicable diseases that arise as a result of poor health behavior are also based on supporting factors, namely socioeconomic status, income, gender to body mass index which has an impact on adolescent obesity, especially in rural areas(39). Supported by other studies which also state that heart disease globally contributes up to 7.2-7.6% of deaths due to lack of physical activity, especially in developing countries depending on the number of population in the country(40).

The vulnerability of the incidence of non-communicable diseases in adolescents needs to be controlled and prevented related to health behavior and a healthier lifestyle. One of them is by conducting non-communicable disease screening through the Integrated Development Post or Posbindu NCD for adolescents which is very useful for early detection of symptoms of non-communicable diseases, monitoring and providing health education to increase youth understanding and knowledge regarding risk factors for non-communicable diseases among adolescents who are assisted by cadres or health center staff, also several strategies with policy-level implications which could be used to reduce smoking, improve nutrition, and increase physical activity (28,31,32,41).

The Germas program must continue to be encouraged to increase public awareness of adopting a healthy lifestyle. Prevention efforts are far better than treatment when you have contracted the disease. The increasing incidence of NCD, it is necessary to provide education and assistance to the community to carry out early detection or screening of NCD, especially in at-risk groups besides that program the beneficial effects of physical activity and cardiorespiratory fitness for the prevention of chronic non-communicable diseases. Society should always be invited to recognize the disease. It is important to carry out community services regarding screening and assistance for the prevention of Non-Communicable Diseases in the community (2,42).

CONCLUSION

Based on the results and discussion above, it can be concluded thatthere was a fluctuation of health behavior risk factors of RISKESDAS in 2007, 2013, and 2018 related to non-communicable disease. It can be caused by bad lifestyle and unhealthy behavior such as smoking, alcohol consumption, lack of fruit and vegetables and less physical activity. Based on the results of this study, it is necessary to prevent and control non-communicable disease risk factors, one of which is by conducting routine screening together with health center cadres/officers through the Integrated Development Post (POSBINDU) NCD for adolescents.

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Declarations

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Author's contribution

LNR, SND, & IWT contained the presented idea of this study. SND and IWT, developed the theory and designed the method. LNR collected the data and SND & IWT verified the analytical methods. LH and MSH reviewed and revised the manuscripts and edited the manuscripts and publications. All authors have agreed on the manuscript's final draft before submitting it to publication.

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Conflict of interests

There is no conflict of interest in this research.

REFERENCES

1. WHO. Non Communicable Disease Fact Sheets [Internet]. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases. 2022 [cited 2023 Jan 14]. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
2. Warganegara E, Nur Nida Nabilah. Behavioral Risk Factors for Non-Communicable Diseases. Majority [Internet]. 2016;5(2):88–94. Available from: http://juke.kedokteran.unila.ac.id/index.php/majority/article/view/1082
3. Ministry of Health. RISKESDAS 2013. AGENCY OF HEALTH RESEARCH AND DEVELOPMENT MINISTRY OF HEALTH RI. 2013.
4. DIY Health Service. DI Yogyakarta Health Profile 2020 [Internet]. In Yogyakarta; 2020. Available from: http://www.dinkes.jogjaprov.go.id/download/download/27.
5. DIY Health Service. DI Yogyakarta Health Profile 2021. DI Yogyakarta; 2022.
6. Siswanto Y, Lestari IP. Knowledge of Non-Communicable Diseases and Behavioral Risk Factors in Adolescents. Pro Heal J Health Sciences. 2020;2(1):1–6.
7. Permatasari A. Diet and Physical Activity as Risk Factors for PTM Hypertension, DM, Stroke and Heart in Students at SMK N 6 Sukoharjo: Descriptive Study. Publ Manuscript. 2022; November.
8. Irwan. Epidemiology of Non-Communicable Diseases. Yogyakarta: Deepublish; 2016.
9. Mewton L, Champion K, Kay-Lambkin F, Sunderland M, Thornton L, Teesson M. Lifestyle risk indices in adolescence and their relationships to adolescent disease burden: Findings from an Australian national survey. BMC Public Health. 2019;19(1):1–11.
10. Carli V, Hoven CW, Wasserman C, Chiesa F, Guffanti G, Sarchiapone M, et al. A newly identified group of adolescents at “invisible” risk for psychopathology and suicidal behavior: Findings from the SEYLE study. World Psychiatry. 2014;13(1):78–86.
11. Pearson N, Biddle SJH, Griffiths P, Johnston JP, Haycraft E. Clustering and correlates of screen-time and eating behaviors among young children. BMC Public Health. 2018;18(1):1–9.
12. Yuningrum H, Trisnowati H, Rosdewi NN. Risk Factors for Non-Communicable Diseases (NCD) in Adolescents: Case Studies at Public and Private High Schools in the City of Yogyakarta. J Formil (Scientific Forum) Respati Public Health. 2021;6(1):41.
13. Widyasari N. Relationship of Respondent's Characteristic with The Risk of Diabetes Mellitus and Dyslipidemia at Tanah Kalikedinding. J Berk Epidemiol. 2017;5(1):130–41.
14. Amelia R, Taiyeb AM, Idris IS. Relationship between Diet and Physical Activity on Blood Glucose Levels of Diabetes Mellitus Patients in the Working Area of the Sabbangparu

Health Center, Wajo Regency Relationship between Diet and Physical Activity on Blood Glucose Levels of Diabetes Mellitus Patients in. Pros Semin Nas Biol VI. 2019;620–30.
15. Kumar P, Kumar D, Ranjan A, Singh CM, Pandey S, Agarwal N. Prevalence of hypertension and its risk factors among school going adolescents of Patna, India. J Clin Diagnostic Res. 2017;11(1):SC01–4.
16. Notoatmodjo S. Health promotion and behavioral science. Jakarta: Rineka Cipta; 2007.
17. Khairunniza, Susanto E, Nugraha A. The Relationship between Smoking Habits and Non-Communicable Diseases. Pros Seminar Nas. 2019;105–8.
18. Musfirah M, Masriadi. Analysis of Risk Factor Relation With Hypertension Occurrence At Work Area of Takalala. J Health Global. 2019;2(2):93–102.
19. Diffa Putra Surya, Anindita A, Fahrudina C, Amalia R, Renny. Risk Factors for Hypertension in Adolescents. J Health Community [Internet]. 2022;3(2):10–5. Available from: http://ojs.unud.ac.id/index.php/eum/article/view/13101
20. Bawuna N, Rottie J, Onibala F. The relationship between stress levels and smoking behavior in students of the Faculty of Engineering, University of Sam Ratulangi. J Nursing UNSRAT. 2017;5(2):107578.
21. Competitive JH. Hypertension in Adolescents. Sari Pediatr. 2016;6(4):159.
22. Kalsum U, Lesmana O, Pertiwi DR. Patterns of Non-Communicable Diseases and Their Risk Factors in the Anak Dalam Tribe in Nyogan Village, Jambi Province. Indonesian Mass Health Media. 2019;15(4):338.
23. Olczak-Kowalczyk D, Tomczyk J, Gozdowski D, Kaczmarek U. Cigarette smoking as an oral health risk behavior in adolescents: A cross-sectional study among Polish youths. Anthropol Rev. 2020;83(1):53–64.
24. Sekarrini R, Kurniawan RE, Makrifatullah NA, Rosar N, Triana Y, Kunci K. Description of Non-communicable Disease Risk Factors in Umban Sari Village, Rumbai District, Pekanbaru Using the Stepwise Who Approach. J Indonesian Multi-Discipline Science [Internet]. 2022;1(8):163–73. Available from: https://katadata.co.id/berita/2020/01/06/baru-83-peserta-bpjs-kesehatan-per-akhir-2019-
25. Sukma EP, Yuliawati S, Hestiningsih R, Ginandjar P. Relationship of alcohol consumption, smoking habits, and stress levels with the incidence of hypertension in productive age. J Public Health. 2019;7(3):122–8.
26. Girsang VI, Purba IE, Harianja ES. Examination of Risk Factors for Non-Communicable Diseases in High School Students. J Adimas Mutiara. 2021;2(1):128–32.
27. Kurniati AM, Tamzil NS, Dalilah D, Prasasty GD, Suciati T, Muhammad F, et al. Consumption of vegetables and fruit in an effort to prevent non-communicable diseases. J Community Service Humanit Med. 2022;3(2):105–15.
28. Trisnowati H. Community Empowerment for the Prevention of Risk Factors for Non-Communicable Diseases (Study in Rural Areas in Yogyakarta). J MKMI [Internet]. 2018;14(1):17–25. Available from: https://media.neliti.com/media/publications/238453-pemberdayaan- Masyarakat-untuk-penjuangan-66673211.pdf
29. Hermina H, S P. Description of Fruit and Vegetable Consumption in Indonesia in the Context of Balanced Nutrition: Advanced Analysis of the 2014 Individual Food Consumption Survey (SKMI). Bulk of Health Researcher. 2016;44(3):4–10.
30. P2PTM RI. Prevent Non-Communicable Diseases by Diligently Eating Fruits and Vegetables in commemoration of World Fruit Day 2017 [Internet]. https://p2ptm.kemkes.go.id/activities-p2ptm/subbagian-tata-usaha/prevent-Jadian-ntak-menular-dengan-rajin-makan-fruit-dan-sayur-dalam-rangka-memperingati-hari-fruit-world-2017. 2017 [cited 2023 Jan 18]. Available from: https://p2ptm.kemkes.go.id/activities-p2ptm/subbagian-tata-usaha/prevent-dinding-not-menular-dengan-rajin-makan-fruit-dan-sayur-dalam-rangka-memperingati -world-fruit-day-2017
31. Rostinah R, Nelly N. The Effect of Parental Role and Accessibility of Fruits and

 10.26555/eshr. v3i1.3629

Vegetables on Low Consumption of Fruits and Vegetables in Pre-School Children in Bima City, West Nusa Tenggara. J Health Management Indonesia. 2022;10(1):1–6.
32. Mahmudah U, Yuliati E. Education on Fruit and Vegetable Consumption as a Strategy in the Prevention of Non-Communicable Diseases in Elementary School Children. War LPM. 2021;24(1):11–9.
33. P2PTM RI. Routine Physical Activity, Families Avoid PTM [Internet]. https://p2ptm.kemkes.go.id/activity-p2ptm/subbagian-tata-usaha/rutin-activity-physical-family-tereva-ptm. 2017 [cited 2023 Jan 18]. Available from: https://p2ptm.kemkes.go.id/activity-p2ptm/subbagian-tata-usaha/rutin-activity-physical-keluarga-tereva-ptm
34. Luo J, Agley J, Hendryx M, Gassman R, Lohrmann D. Risk Patterns Among College Youth: Identification and Implications for Prevention and Treatment. Health Promot Practice. 2015;16(1):132–41.
35. Ricardo CZ, Azeredo CM, de Rezende LFM, Levy RB. Co-occurrence and clustering of the four major non-communicable disease risk factors in Brazilian adolescents: Analysis of a national school-based survey. PLoS One. 2019;14(7):1–14.
36. Pengpid S, Peltzer K. Behavioral risk factors of non-communicable diseases among a nationally representative sample of school-going adolescents in Indonesia. Int J Gen Med. 2019;12:387–94.
37. Chakma, Gupta S. Lifestyle practice and associated risk factors of non-communicable diseases among students of Delhi University. Int J Heal Allied Sci [Internet]. 2017;6(1):20. Available from: http://www.ijhas.in/article.asp?issn=2278-344X;year=2017;volume=6;issue=1;spage=20;epage=25;aulast=Chakma
38. Olawuyi AT, Adeoye IA. The prevalence and associated factors of non-communicable disease risk factors among civil servants in Ibadan, Nigeria. PLoS One [Internet]. 2018;13(9):1–20. Available from: http://dx.doi.org/10.1371/journal.pone.0203587
39. Ahmad A, Zulaily N, Shahril MR, Syed Abdullah EFH, Ahmed A. Association between socioeconomic status and obesity among 12-year-old Malaysian adolescents. PLoS One [Internet]. 2018;13(7):1–12. Available from: http://dx.doi.org/10.1371/journal.pone.0200577
40. Katzmarzyk PT, Friedenreich C, Shiroma EJ, Lee IM. Physical inactivity and non-communicable disease burden in low-income, middle-income and high-income countries. Br J Sports Med. 2022;56(2):101–6.
41. Blaga OM, Vasilescu L, Chereches RM. Use and effectiveness of behavioral economics in interventions for lifestyle risk factors of non-communicable diseases: a systematic review with policy implications. Perspective Public Health. 2018;138(2):100–10.
42. Lavie CJ, Ozemek C, Carbone S, Katzmarzyk PT, Blair SN. Sedentary Behavior, Exercise, and Cardiovascular Health. Circ Res. 2019;124(5):799–815.

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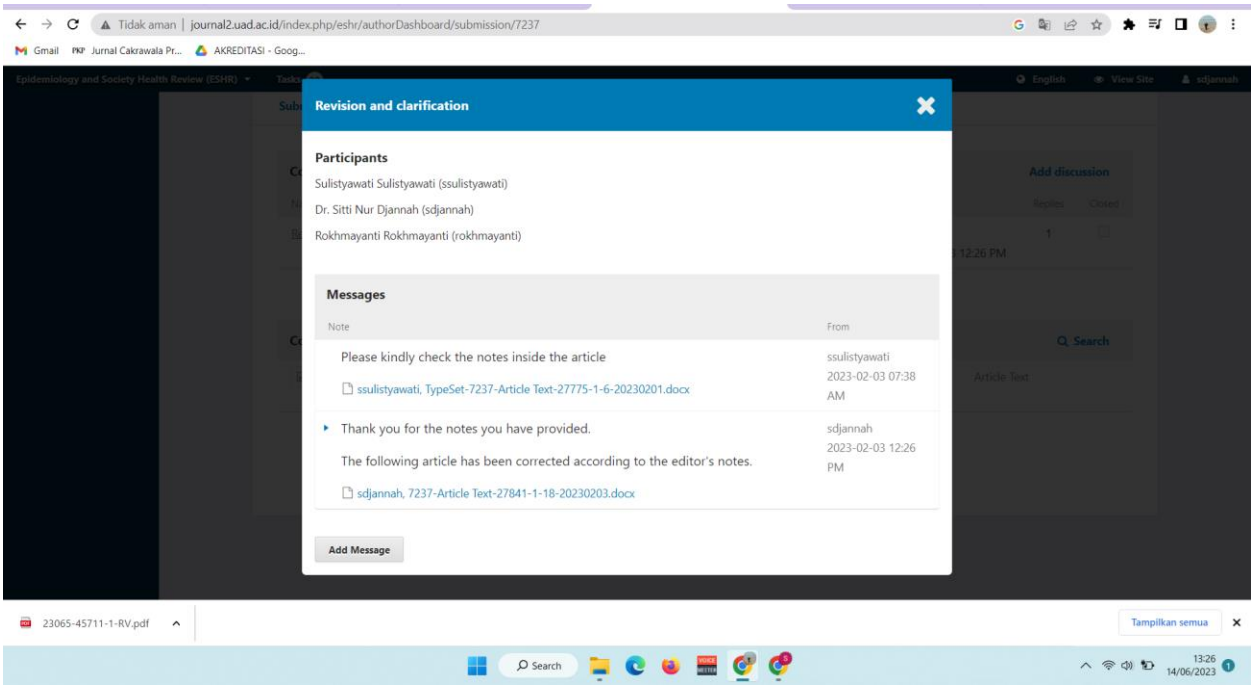
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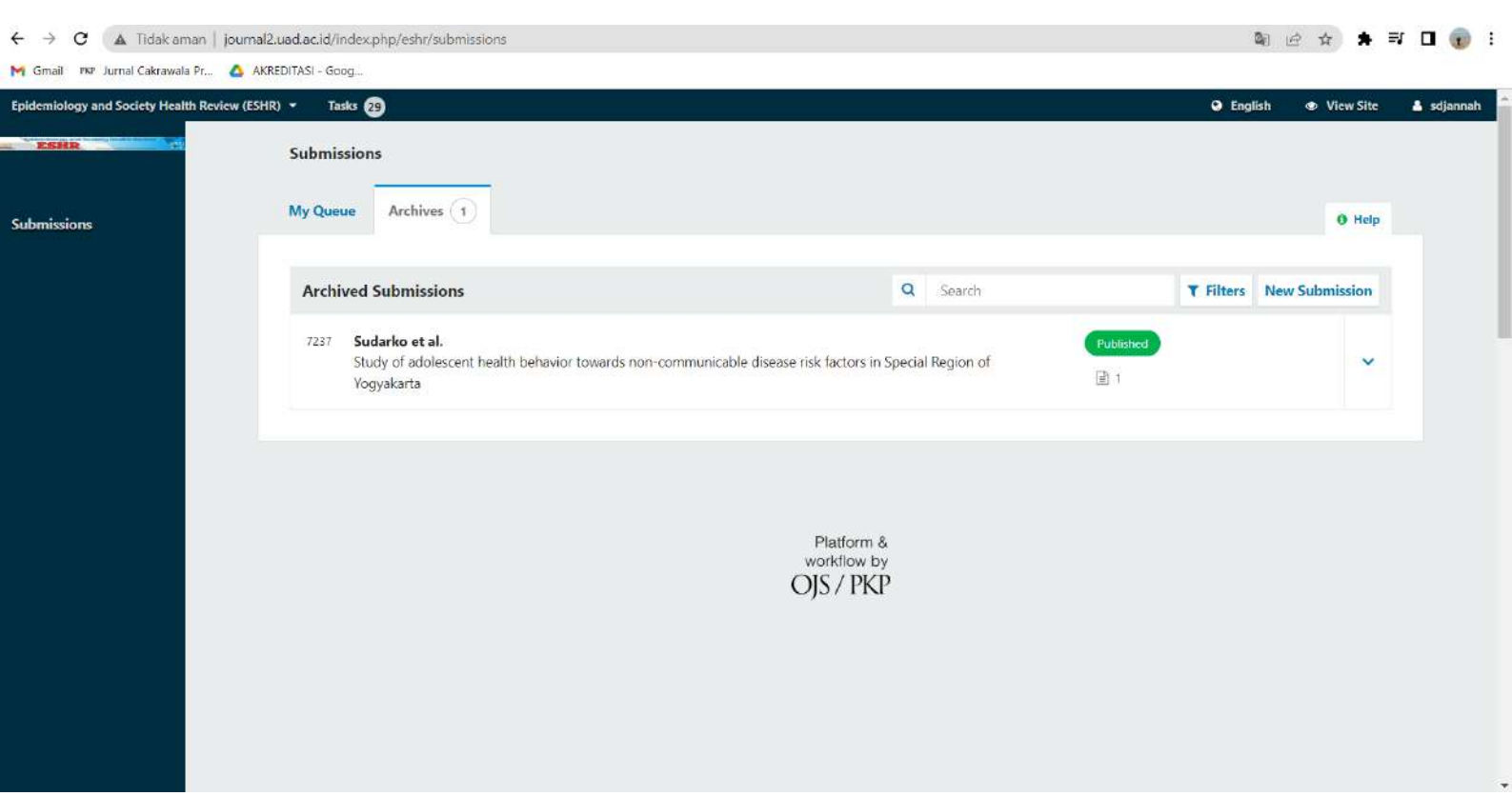
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