ISSN. 2338-7475
E-ISSN. 2620-7869
Hearty
Jurnal Kesehatan Masyarakat
Beriman, Tulus, Sepenuh Hati,Berbesar Hati, Jujur, Sehat dan Kuat
Vol. 12 No. 4, Desember 2024, Hal. 842-848

RISK FACTORS OF NON-COMMUNICABLE DISEASES

Aisyah Sholeh Al-Anshary *, Nofi Susanti, Eva Mulyani S., Kurnia Permata Sari, Salwa Radha Hera
Fakultas Kesehatan Masyarakat, Universitas Islam Negeri Sumatera Utara
Jl. IAIN, Gaharu, Kec. Medan Tim., Kota Medan, Sumatera Utara 20232, Indonesia
Email: *aisyahsoleh623@gmail.com*

Abstract

Non-communicable diseases (NCDs) continue to be the leading cause of death and disability worldwide. This study investigates the main risk factors for NCDs by systematically reviewing the latest literature and literature studies. The main focus is on the influence of genetic factors, life behavior, socio-economic conditions and environmental factors as the main determinants of this disease. Through critical analysis of multiple data sources, including medical textbooks and peer-reviewed journal articles, this study identified that poor diet, physical inactivity, tobacco use, and exposure to environmental pollutants significantly increase the risk of NCDs. This study also emphasizes the importance of interventions at the policy and individual levels to address these risk factors. It is hoped that the results of this study can become a basis for developing more effective preventive and health promotion strategies in the future.

Keywords: Non-Communicable Diseases, Risk Factors, Public Health

Introduction

When a person suffers from an illness, pathological changes occur in their body that last for varying durations depending on the type of illness, and have different impacts. Understanding the natural history of a disease is critical to understanding the details of the disease, including considering the risk factors and contextual determinants that contribute to its occurrence. Non-communicable diseases (NCDs), such as cancer, cardiovascular disease, diabetes and chronic respiratory diseases, cannot be transmitted through physical contact and currently represent a major challenge to human health and development globally. NCDs are responsible for approximately 35 million deaths or 60% of total global deaths each year, with 80% of deaths occurring in developing countries. According to WHO, it is estimated that deaths from NCDs will rise by about 17% in the next decade. Genetic, environmental, and especially lifestyle factors such as alcohol consumption, smoking, lack of physical activity, and unhealthy diet are the main causes of these diseases. To address these issues, governments, multilateral agencies such as WHO, as well as national and international NGOs, are joining hands to focus on prevention and control strategies for diabetes, chronic respiratory diseases, cancer, and cardiovascular diseases.

Submitted: June-2024 Received: August-2024 Available online: December-2024

Method

The method we used in writing this journal is known as the qualitative method (descriptive). Then the type of research we use is library research. We conducted this study to find and collect various information such as books and journals that are accurate and related to the topic discussed, namely "Risk Factors for Non-Communicable Diseases". In collecting the data, the author reads, understands and then analyzes and outlines it in this journal.

Result

This research highlights the importance of understanding the various risk factors that contribute to non-communicable diseases (NCDs). The risk factors identified include behaviors, lifestyles, as well as environmental exposures that could be physical, biological, social, or cultural factors. In addition, inherited and genetic characteristics also play a significant role. All of these factors have been shown to have epidemiological correlations with certain health conditions, emphasizing the importance of prevention efforts.

These findings underscore the importance of a holistic approach in managing and preventing NCDs. Interventions that target behavioral and environmental risk factors, as well as improving access to health services and education, are key in reducing the burden of NCDs.

This research shows that a variety of risk factors, both modifiable and immutable, play a role in the development of non-communicable diseases. Understanding and intervening in these factors can improve overall NCD prevention and management efforts.

Discussion

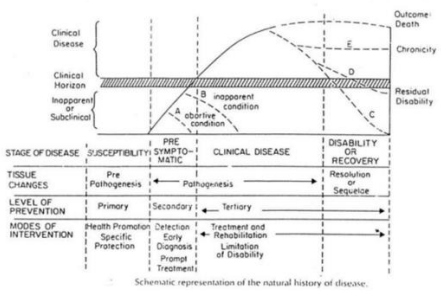
1.1 Risk And Causal Factors.

1) Risk Factor

To understand diseases in greater depth, it is important to know their natural history, which involves various risk factors. These risk factors, which are well-known concepts in the study of disease progression, include behaviors, lifestyles, as well as environmental exposures that could be physical, biological, social, or cultural factors. In addition, innate and genetic characteristics also play a role, as described by Last in Murti (2003), who pointed out that all of these factors have been shown to have epidemiological correlations with certain health conditions, thus emphasizing the importance of prevention.

The natural history of the disease is divided into four phases, namely: Susceptible, subclinical, clinical, and recovery, disability, or death phases. Understanding each of these phases helps in more effective disease management and prevention.

Gambar 1. Riwayat Alamiah Perjalanan Penyakit
(Mausner & Kramer, 1985 dalam Weber, DJ & Rutala,WA, 2001)



Schematic representation of the natural history of disease.

There are a number of factor concepts such as risk, incubation period, latency period, and prognostic factors. In these concepts, the presence of risk factors is recognized as an element that can add to the likelihood of disease onset before it reaches an irreversible stage. These risk factors use a

probability-based approach to determine disease causality, where causal inference from empirical studies often faces a lack of certainty. The incubation period, which is the time span between exposure of the pathogen to the host and the appearance of clinical symptoms, is influenced by several factors. These include the type of pathogen, the dose of pathogen received, the agent's entrance to the body, cellular defense mechanisms, and the immune response.

The incubation period is the initial period of infection and the time an affected person can transmit the disease. On the other hand, prognostic factors are associated with the likelihood that a case will develop incurable disease, regardless of whether the case recovers, remains symptomatic, worsens, becomes malformed, or dies. The term risk factor was first introduced in 1960 by Dawber et al.

2) Causal factor/causality

Cause and effect Understanding the cause of a disease in epidemiology is based on a chain of cause and effect, namely people (hosts) who have different characteristics (biological, philosophical,psychological,sociological) with conditions in the environment (environment). The balance theory states that the interaction of the three elements must remain balanced, and any imbalance between the three elements will cause certain diseases and health problems.

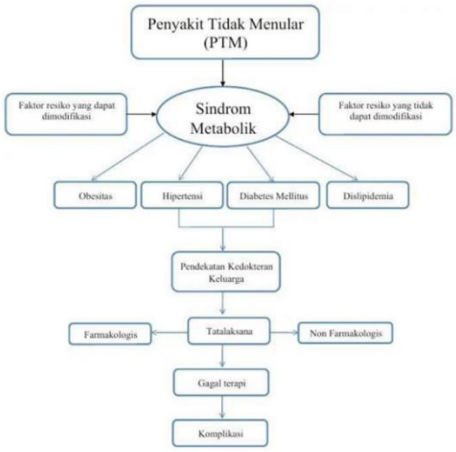
Causal factors are those that contribute directly to the occurrence of a disease or event. These are the factors that can ultimately be assessed with causality criteria. According to Bradford Hill (1897-1991), criteria were created for factors to be said to have a causal relationship. These standards consist of nine criteria.

a. Strength of association: The stronger the association, the less able it is to reflect the influence of other etiologies. This standard also requires statistical precision (random effects are minimized) and methodological rigor of existing studies against bias (selection, informational, confounding).
b. Association Specificity: There is an inherent relationship between specificity and strength. The more precisely we define a disease and its transmission, the stronger the observed and studied association. However, it is true that the same pathogen can cause different diseases.
c. Temporality: the ability to establish causal relationships that are assessed even as impacts are estimated.
d. Biological processes that evolve in tandem through modification or change and transmission of assurance, we confirm the relationship between disosis and response according to both concepts and abstracts.
e. Our reasoning is more willing to accept cases where the coherence of the relationship matches our general understanding and beliefs. Obviously there are still holes in this pattern, but logic always guides us.
f. Fitting all observations through the proposed model will yield consistent illustrations. To answer this question, consider whether the causal interpretation is consistent with what is known about natural history and disease cycles such as awareness of disease transmission in people, place and time.
g. Experimentation: the application of controlled changes to causes under experimental conditions to obtain meaningful results, which some consider crucial in drawing conclusions about causality.
h. Analogy: more readily accepting similar arguments to those previously encountered.

For example, infection with certain bacteria that results in disease, high exposure to radiation that causes cancer, or consumption of certain foods that can cause food poisoning. For example,

certain bacteria such as Salmonella are causative factors in food poisoning. High radiation exposure is a contributing factor in cancer.

1.2 Theoretical Framework Of Non-Communicable Diseases.



This theoretical framework covers a wide array of factors that contribute to the development of NCDs, including biological, environmental, behavioral and social elements.

Biological factors: This involves a person's genetic predisposition to certain diseases, such as a family history of heart disease or diabetes. In addition, biological aspects also include physical characteristics such as body mass index (BMI), cholesterol levels and blood pressure.

Environmental factors: The physical environment in which individuals live, work and play plays an important role in the development of non-communicable diseases. Air pollution, drinking water quality, access to healthy food, and green spaces are examples of environmental factors that can affect NCD risk.

Behavioral factors: Individual lifestyles such as diet, physical activity, alcohol consumption, smoking, and drug use have a significant impact on the risk of non-communicable diseases. These behaviors can often be changed through interventions and adoption of healthy lifestyles.

Social and economic factors: Social and economic aspects also play an important role in the development of non-communicable diseases. Factors such as socio-economic status, access to healthcare, education, and social inequality can affect NCD risk and access to prevention and treatment efforts.

1.3 Calculating Pr, Or, Rr

The essence of epidemiologic analysis is to make comparisons between one group and another. These comparisons can be made using a measure that describes the level of risk or compares populations exposed to the disease with those not exposed. These measures are called association measures, which serve as parameters to describe the relationship between exposure and the disease under study.

An association measure measures the relationship between exposure (cause) and disease between two groups. In epidemiology, exposure (cause) is usually considered an independent variable that serves as a determinant of health, while disease is considered a health outcome or dependent variable. Exposure can be various things such as food, mosquito bites, contact with people with sexually transmitted diseases, or exposure to toxic waste. Exposure can also include individual characteristics (such as age, race, gender), biological characteristics (such as immune status), social

status (such as marital status), activities (such as work or leisure activities), as well as economic status and access to health services.

Risk ratio and rate ratio are measures of association used in cohort studies, while prevalence ratio and prevalence odds ratio are used in cross-sectional studies. For case-control studies, the measure of association used is the odds ratio.

1) Prevalence Ratio

Prevalence ratio is the disease in the exposed group divided by the prevalence in the unexposed group, used in cross-sectional studies where exposure and condition are considered simultaneously or when the disease incidence is >10% (in most cases). The incidence ratio can be calculated using the odds ratio or hazard ratio formula, but the data used is not cumulative incidence data, but disease burden data.

$$\text{PR} = \frac{\text{Prevalence in exposed group}}{\text{Prevalence in unexposed group}}$$

Example:

A prevalence study was conducted on a population of female prisoners. This study was conducted where exposure to heavy drug use and HIV-positive disease status were carried out at the same time. The study found that out of 120 who used injecting drugs, 50 were HIV positive and out of 220 detainees who did not inject drugs, 20 were HIV positive. Injecting drugs, 20 were HIV positive. Calculate the size of the of association in the study!

Characteristic	HIV positive	HIV negative	Total
Syringe users	50 (a)	70 (b)	120
Non-syringe users	20 (c)	200(d)	220

$$\text{PR} = \frac{\text{Prevalence in exposed group}}{\text{Prevalence in unexposed group}} = \frac{\frac{50}{120}}{\frac{20}{220}}$$

$$= \frac{50 \times 220}{120 \times 20} = 4{,}58$$

This means that prisoners who use needles are at 4,58 times the risk of being HIV positive compared to prisoners who do not use needles.

2) Odds Ratio

Odds Ratio is an oretrospective case-control design. That is, the disease state is considered first, and then past risk factors are considered. Divide the odds of one group by the odds of the other group. The case rate refers to the number of exposed and unexposed cases, and the control rate refers to the number of exposed and unexposed controls.

$$\text{Odds Ratio} = \frac{\text{Odds of exposure for cases}}{\text{Odds of exposure for controls}}$$

Example:

A study was conducted to find the cause of cervical cancer. At the beginning of the study, 860 cervical cancer patients were taken and 2.400 patients who did not have cervical cancer. Then the cause was sought by asking for a history of sexual activity in the past. It was found that 800 people had cervical cancer because they often changed partners and 2000 people who did not have cervical cancer because they did not change partners. What is the odds ratio of the study?

Factor	Cervical Cancer	No Cervical Cancer	Total
Changing partners frequently	800 (a)	2000(b)	2.800
Not changing partners frequently	60 (c)	400 (d)	460
Total	860	2400	3.260

$$\text{Odds of exposure for cases} = \frac{800}{60}$$

$$\text{Odds of exposure for control} = \frac{2000}{400}$$

$$\text{Odds Ratio} = \frac{800/60}{2.000/400} = \frac{800\times400}{2.000\times60} = \frac{320.000}{120.000} = 2{,}6$$

This means that people who frequently change partners are at 2,6 times the risk of cervical cancer compared to people who do not change partners.

3) Risk Ratio/Relative Risk

Risk ratio is also called relative risk. The risk ratio is the risk (cumulative incidence, attack rate) in group 1, called the exposed group, divided by the risk of group 2, called the unexposed group. Example: smoking behavior, group 1 are smokers (exposed group) and group 2 are non-smokers (unexposed group). To calculate the risk ratio, divide the cumulative incidence of the exposed group by the cumulative incidence of the unexposed group.

$$\text{Risk Ratio} = \frac{\text{Cumulative incidence in exposed group}}{\text{Cumulative incidence in unexposed group}}$$

Example:

An incident of diabetes occurred in the Rantauprapat area. There were 300 residents studied. The risk factors studied were the latest education level of residents. SD (exposed) and S1 (not exposed) 26 residents out of 195 who have elementary education have diabetes and 6 out of 105 people with S1 education have diabetes. Calculate the risk ratio of diabetes!

Last education level	Diabetes Disease		Total
	Available	None	
SD	26 (a)	169 (b)	195
S1	6 (c)	97 (d)	105

$$\text{Cumulative Incidence} = \frac{number\ of\ new\ cases\ of\ a\ disease}{number\ of\ at{-}risk\ populations\ where\ cases\ occurred}$$

$$\text{Cumulative Incidence in the exposed group} = \frac{26}{195} = 0{,}13$$

$$\text{Cumulative incidence in unexposed group} = \frac{6}{105} = 0{,}05$$

$$\text{Risk Ratio} = \frac{\text{Cumulative incidence in exposed group}}{\text{Cumulative incidence in unexposed group}} = \frac{0{,}13}{0{,}05} = 2{,}6$$

This means that people with a primary school education are 2,6 times more likely to develop diabetes than people with a bachelor's degree.

Conclusions

There are several risk factors for non-communicable diseases, and there are also causal factors that are directly related to disease and health conditions. The theoretical framework also describes several factors that contribute to the emergence of NCDs, including biological, environmental, behavioral, and social factors. The key to epidemiologic analysis is to compare one group to another. This can include using measures that represent the magnitude of risk or comparing populations that are exposed to disease and those that are not.

References

[1] Duarsa, Artha Budi Susila. "FAKTOR RISIKO, EFEK KONTEKSTUAL DAN DETERMINAN KONTEKSTUAL PADA RIWAYAT ALAMIAH PENYAKIT." JURNAL KEDOKTERAN 1.2 (2016): 139-146.

[2] Apriadi Siregar, Putra. (2023). Buku Ajar Dasar Epidemiologi. Medan: Merdeka Kreasi Group.

[3] Budiarto, Eko & Anggraeni, Dewi. 2001. Pengantar Epidemiologi. Jakarta: EGC

[4] Bustan,M.N. 2006. Pengantar Epidemiologi Edisi Revisi.Jakarta: PT Rineka Cipta

[5] CDC. 2012. Principles of Epidemiology in Public.

[6] Ismah, Zata. "Bahan Ajar Dasar Epidemiologi." (2018).

[7] Najmah, N. (2016). Epidemiologi Penyakit Menular. Jakarta: Penerbit TIM.

[8] Pratiknya, AW. 2007. Dasar-Dasar Metodologi Penelitian Kedokteran dan Kesehatan. PT raja Grafindo Persada. Jakarta.

[9] Sidabutar, S. (2020). Buku Ajar Epidemiologi. Jawa Timur: Forum Ilmiah Kesehatan (FORIKES).

[10] Sutrisno, B. 2010. Pengantar Metode Epidemiologi. Jakarta. Dian Rakyat.