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Heat Index Levels and Heat – Related Risks in the Philippines

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Abstract:- Using a systematic literature review, this study determined and establish the Health Index Levels and Heat – Related Health Risks in the Philippines.

➢ ***Background.***

The heat index which is also called as the visible temperature is well-defined as a personalized, subjective experience of a person when comparative humidity is correlated with the temperature of the air. The incidence and intensity of life-threatening incidents especially escalated heat index are growing all around the world which ultimately poses a serious risk to the health of people.

➢ ***Aim.***

The aim of this review was to explore and deliberate the relationship between the heat index, a measure that combines air temperature and relative humidity to approximate the apparent temperature, and the risk of heat-related health issues in the Philippines from published articles between 2019 – 2024.

➢ ***Data Sources.***

A systematic search of primary articles on numerous electronic databases that included Google Scholar and other related engines. Grey literature was also connected based on the references available and bibliographies from the different articles were also included in the pooling of literature of data.

➢ ***Method.***

The article included two (2) or more of the key search terms identified: heat exhaustion, heat stroke, health related risks, heat index , and lastly published from years 2019-2024.

➢ ***Results.***

Analysis of the research articles were used to answer the effect of the heat index in the risk of heat exhaustion, the effect of the heat index in the risk of stroke and formulation of research - based recommendations on Heat Index Levels and Heat - Related Health Risks in the Philippines.

➢ ***Acknowledgment:***

The authors of this systematic literature review thanks and recognize all the writers of the variety of references that were used in this review paper. The proponents these data sources used in this paper are both cited in the text and in the reference lists.

➢ ***Disclaimer:***

The beliefs and point of view manifested in this paper are those of the authors and do necessarily indicate the official guidelines or stand of any affiliated institution, organization or agency of the authors.

➢ ***Conflict of Interest:***

The authors have not anything to proclaim. This paper is a collaborative effort of the authors mentioned above.

Keywords:- *Heat Index, Health Related Risks.*

I. INTRODUCTION

According to the National Weather Service (2024), the heat index, also known as the state of temperature, it is heated. The combination of humidity and air temperature is similar to the human body. Today, most countries in the world are worried. An increase in the heat index will harm human health, agriculture, the economy and the environment. Increasing exposure to extreme heat will increase global temperatures. The occurrence and intensity of extreme heat is increasing worldwide, affecting both the environment and people. Extreme heat events increase adverse health outcomes in the United States (US), and heat-related illnesses increase in the absence of effective adaptive measures to maintain heat. According to National Weather Service (NWS) risk statistics, heat-related illnesses are the leading cause of death in the United States. S. in 2018 from diseases related to other types of weather. Using death records from 2006 to 2010, 31 percent of weather-related deaths in the United States were attributed to extreme heat, second only to the common cold as the leading cause. Over 7,400 deaths occurred from 1999 to 2010 in the United States due to excessive sweating [6], and approximately 28,000 hospitalizations were recorded in 20 states since 2001. to 2010 (Wang, 2021). According to the European Environment Agency, the average increase in global temperature between 2013 and 2023 is between 1.19 and 1. 22 degrees Celsius is warmer than pre-industrial levels, making it the warmest decade on record. Europe's climate has increased by 2.12 to 2.19 degrees Celsius over the same period. In the summer of 2022, different types of extreme climate events occurred in East Asia and western South Asia. (Chao He et. al, 2023).

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The Asian climatology is described by moist temperature over East Asia and arid hot climate over West Asia.

The Philippines, a tropical country located near the equator, experiences high temperatures and humidity levels, especially during the dry season. These conditions can significantly increase the risk of heat-related illnesses, such as heat exhaustion and heat stroke. The Philippines usually experiences its highest temperatures from March to June, with April and May being the hottest months. Average temperatures during these months vary from 25 °C to 35 °C (77 °F to 95 °F), with humidity levels often exceeding 70 percent. To assess the risk of heat-related diseases, temperature and humidity data from different regions of the Philippines must be analyzed. By calculating the heat index, it is possible to determine the times and places of greatest risk.

The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) defined the heat index as a measure of how much humidity and extreme temperatures reduce the body's ability to cool down. himself.

The frequency and severity of extreme weather events, especially extreme heat events, are increasing worldwide, ultimately affecting human health. The purpose of this analysis is to examine the relationship between the heat index, a measure that combines air temperature and relative humidity to estimate temperature conditions, and the risk of problems heat-related health in the Philippines.

II. THEORETICAL/CONCEPTUAL FRAMEWORK

➢ *Theoretical Framework*

The theory that will be utilized in this study is Nola Pender's Health Promotion Model (HPM). It focuses on the complex interaction between individuals and their environments as they pursue health. Pender's model is particularly noted for its emphasis on the individual's motivation and behavior towards health promotion. The key components of Pender's Health promotion model are individual characteristics and experiences which includes prior related behavior or the past behaviors that influence current health promotion behaviors. Second are personal factors which include biological, psychological and socio-cultural factors. The theory also focuses on behavior specific cognitions and affect which focuses on perceived benefits of action and barriers to action. (Cardoso, et. al, 2021).

Applying the theory to this study offers a comprehensive framework for understanding and promoting health behaviors. By focusing on the dynamic interplay between individuals and the effect of heat index to health, the HPM can help design research-based interventions that motivate and support people in achieving healthier lifestyles.

➢ *Conceptual Framework*

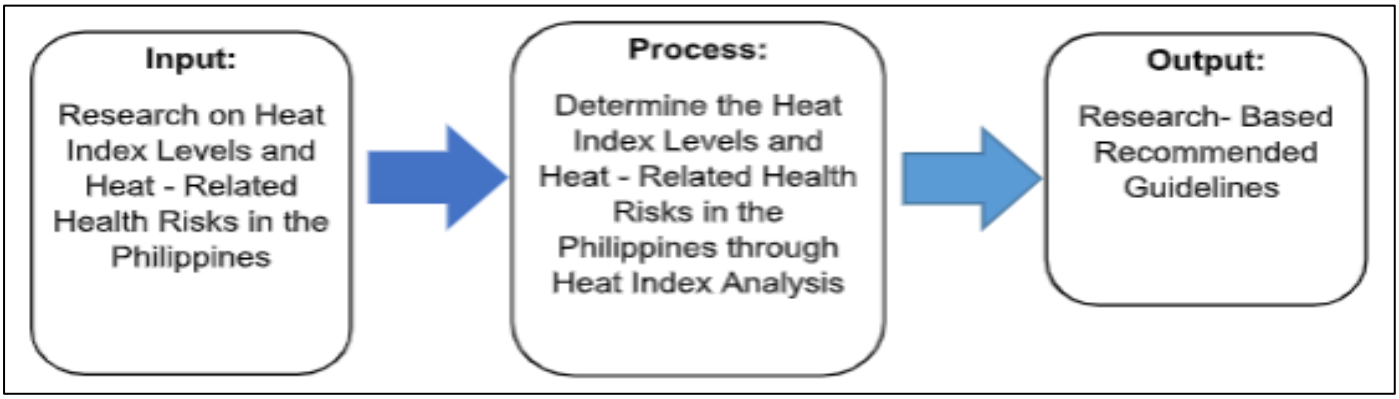

Fig 1 Conceptual Framework

➢ *Statement of the Problem*

How does Heat Index Levels contribute to Heat - Related Health Risks in the Philippines?

- *Specifically, it Aims to Answer the Following:*

✓ What is the effect of the heat index in the risk of heat exhaustion?
✓ What is the effect of the heat index in the risk of stroke?
✓ What are the research based recommended guidelines in preventing health related risks due to high heat index?

➢ *General Objectives*

To determine and establish the Heat Index Levels and Heat - Related Health Risks in the Philippines.

➢ *Specific Objectives*

- To determine the effect of the heat index in the risk of heat exhaustion?
- To determine the effect of the heat index in the risk of stroke?
- To formulate research - based recommendations on Heat Index Levels and Heat - Related Health Risks in the Philippines.

➢ *Scope and Limitation*

All articles included in this literature review used "heat index" and "related health risks" as study keywords. Therefore, it is possible that another study could be conducted with different keywords, which may have different results

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depending on the articles selected for review. Another limitation found is the current time frame for the articles in the list. This study used documents from 2019-2024 only, limiting the available data to five years. Finally, the dimensions of heat index and health-related risks are widespread, not only in nursing education, but also in other models. Results may vary once the coverage of the study will be widened.

- *Research Design*

This study used systematic review using qualitative approach to describe the determine and establish Heat Index Levels and Heat - Related Health Risks in the Philippines. The study will use systematic review to describe the effect of heat on the risk of heat exhaustion and stroke in the Philippines, to determine the compliance of the public on the government's strategies in addressing the escalating heat index, to discuss the factors that affect the public's compliance on the strategies in addressing the heat index This design will also lead to the formulation of recommendations on the prevention of heat exhaustion and stroke due to escalating heat index.

- *Participants of the Study*

The researcher will include selected literature and research studies starting from the year 2019 up to 2024 heat analysis other related references pertaining to the Heat Index Levels and Heat - Related Health Risks in the Philippines.

- *Instrumentation*

The researcher will utilize Google Scholar and related sites as a tool for gathering data on different research studies on the Heat Index Levels and Heat - Related Health Risks in the Philippines. The systematic review provides a qualitative estimate and focuses on: heat index levels and heat-related health problems in the Philippines.

III. RESULTS AND DISCUSSION

The results of this systematic review showed that:

- *What is the effect of the heat index in the risk of heat exhaustion?*

Heat exhaustion is a heat-related illness that can occur after exposure to high temperatures, particularly when combined with high humidity and strenuous physical activity. (Vishwakarma et. al, 2022). The heat index plays a crucial role in understanding and preventing heat exhaustion, as it reflects how hot it feels when relative humidity is factored in with the actual air temperature. The heat index, which combines air temperature and relative humidity to reflect perceived temperature, significantly influences the risk of heat exhaustion. High heat index values indicate hotter and more humid conditions, increasing the body's struggle to cool down, thereby elevating the risk of heat exhaustion (Sabrin et. al, 2021).

The heat index is an essential factor in assessing the risk of heat exhaustion. Higher heat index values mean greater difficulty for the body to cool itself, leading to a higher likelihood of heat-related illnesses. By understanding the impact of the heat index and taking preventive measures, individuals can reduce the risk of heat exhaustion and other heat-related health issues (Rogayan, et. al, 2024).

- *What is the effect of the Heat Index in the Risk of Heat Stroke?*

The heat index, which combines air temperature and humidity to reflect the perceived temperature, can significantly impact the risk of heat-related illnesses, including heat stroke. Heat stroke is a severe condition that occurs when the body's temperature regulation mechanisms fail, leading to dangerously high body temperatures (Capon et. al, 2021).

A high heat index significantly increases the risk of heat stroke by impairing the body's ability to cool itself through sweat evaporation, increasing physiological stress, and promoting dehydration. Understanding the relationship between the heat index and heat stroke risk is crucial for taking preventive measures, staying hydrated, limiting exposure to extreme heat, and recognizing the early signs of heat-related illnesses (Ebi et. al, 2020).

- *What are the research based recommended guidelines in preventing health related risks due to high heat index?*

Research-based guidelines for preventing health-related risks due to a high heat index focus on hydration, environment modification, activity adjustment, and community support. Nutritional management focuses on maintaining adequate hydration by drinking more than the recommended eight (8) to ten (10) glasses of water per day especially during high heat index. Second, is through electrolyte replacement especially during prolonged physical activity. Third, is to avoid alcohol and caffeine because these substances can cause dehydration by increasing urine output and reducing the body's ability to retain fluids. Fourth, is by scheduled drinking or drinking on regular intervals (Kotharkar et. Al, 2021).

Environment Modification is another key component of preventing health related risks due to high heat index (Rogayan et. al, 2024). Use of air conditioning, fans and ventilation to cool down and increase air circulation. Other stayed at public cooling centers such as malls especially if home cooling is not available. Shaded areas are also effective way to reduce direct exposure to the sun when outdoors. Another effective method is by blocking sunlight through the use of curtains, blinds or reflective window coverings to reduce indoor temperatures.

Activity adjustment or modifying outdoor activities is one way to reduce health risks during high heat index. Scheduling activities particularly strenuous ones during cooler parts of the day and taking regular breaks in cool or shaded areas prevents overheating. It is also important to wear light – colored, loose – fitting clothing to help facilitate sweat evaporation and cooling (Capon, et. al, 2021).

Health monitoring and support is another key component in the prevention of health-related risks due to high heat index. Recognizing early symptoms by being

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vigilant to early signs of heat – related illnesses, such as heavy sweating, weakness, dizziness, nausea, and muscle cramps. Regular check up is another effective health monitoring method which focuses more on vulnerable individuals like elderly, children, and those with chronic illnesses, as they are more susceptible to health – related illnesses.

Education and Awareness through public health campaigns that educate about the dangers of high heat index and preventive measures can be utilized in the community. This method will engage the community members and ensured that high- risk populations are informed and supported. The community can also focus on enhancing the policy interventions through planning. Several strategies that the community can implement could be urban design that increases green spaces and reduce heat effects. Access to public cooling facilities and adequate hydration stations in high – risk areas must be ensured as well.

The government can also play a major contribution on the prevention of health-related risks to due high heat index by providing health warning systems that provide timely information about heat index level and recommended actions. Regulations for workplaces must also be enforced ensuring safe working conditions during high heat index periods, including mandatory breaks and access to hydration (Kotharkar et. Al, 2021).

Several research – based evidence also includes hydration and stress wherein it is research which indicates that maintaining hydration significantly reduces the risk of heat-related illnesses. A study published in the Journal of Athletic Training highlighted that even mild dehydration can impair physiological function and increase the risk of heat stress. Studies have shown that cooling centers effectively reduce morbidity and mortality during heatwaves. The Centers for Disease Control and Prevention (CDC) recommends the establishment of public cooling centers as a critical intervention. Research published in Environmental Health Perspectives suggests that increasing urban green spaces and reflective surfaces can significantly lower ambient temperatures, reducing the heat index in urban areas. A study in the American Journal of Public Health found that community-based interventions, including education and behavioral modifications, effectively reduce heat-related health risks (Iwamoto, et al, 2021).

IV. CONCLUSIONS

- *Based on the Results of the Study, the Researcher Concluded that:*

Research-based guidelines emphasize a multifaceted approach to preventing health risks associated with a high heat index. This includes staying hydrated, modifying environments to stay cool, adjusting activities to avoid peak heat, monitoring health, and supporting community and policy interventions. By following these comprehensive recommendations, individuals and communities can better protect themselves from the dangers of high heat index conditions such as heat exhaustion that will eventually leads to heat stroke and other health complications when worsen. Continuous research must be implemented to further establish evidence – based guidelines.

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