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The Impact of Hot Weather on Academic Performance and Physical Health

A Case Study of Selected Third Year Nursing Students at the University of Saint Anthony, Philippines

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Abstract

This study explored the impact of hot weather on the academic performance and physical health of 3rd-year nursing students at the University of Saint Anthony. Using a descriptive quantitative method, data were collected from 82 respondents through a structured questionnaire. The majority of participants were female, aged 21–23, and experienced average classroom temperatures of 34°C and above. Findings revealed that high temperatures "often" affected students' academic performance, while the impact on physical health occurred "sometimes." Heat stress was linked to decreased concentration, fatigue, and lower information retention, posing a challenge to nursing students who face rigorous academic and clinical demands. The study underscores the need for institutional interventions to create a more conducive learning environment amid rising temperatures. An intervention plan was proposed to help mitigate the negative effects of heat exposure on nursing students.

Keywords: *Academic performance, Classroom temperature, Cognitive function, Heat mitigation, Nursing students, Physical health.*

Introduction

High temperatures can have a significant negative impact on the academic performance of 3rd-year nursing students. Several studies have found that elevated classroom temperatures are associated with reduced cognitive function, increased fatigue and sleepiness, and poorer performance on tests and school tasks [1]–[3]. Nursing students, who have a heavy workload of both theoretical and clinical components, are likely to be especially affected by heat stress. High temperatures can impair concentration, make it harder to focus during lectures and study sessions, and reduce energy levels needed for clinical rotations and skills practice [4], [5]. This could lead to poorer performance on exams, difficulty retaining information, and potentially higher rates of burnout [6].

High classroom temperatures can significantly impair the cognitive abilities and academic performance of nursing students in several ways:

a) Reduced concentration and focus: Studies have found that exposure to high temperatures above 32°C (89.6°F) is associated with decreased attention span, difficulty concentrating, and reduced cognitive function in students [7], [8]. This can make it harder for nursing students to focus during lectures, absorb information, and perform well on exams.

b) Increased fatigue and sleepiness: Elevated classroom temperatures can lead to feelings of tiredness, lethargy, and sleepiness in students [9]. This fatigue can diminish nursing students'

energy levels and motivation, hindering their ability to actively participate in clinical rotations, skills practice, and study sessions [10].

c) Impaired memory and information retention: High heat exposure has been linked to deficits in memory, information processing, and overall academic performance [11]. This can negatively impact nursing students' ability to retain the large volume of medical knowledge required in their program.

d) Physiological stress responses: Extreme heat can trigger physiological stress responses, such as increased heart rate and blood pressure, that may further impair cognitive function [12]. This physiological strain can exacerbate the mental demands already placed on nursing students [13].

Given the heavy workload and clinical components of nursing education, these cognitive impairments caused by heat stress can be especially detrimental to nursing students' academic success. Addressing high classroom temperatures through improved ventilation, air conditioning, and heat management strategies is crucial to support the learning and performance of nursing students [14].

In the Philippines, many Filipino students, mostly in public schools and even in private institutions, suffer from the high heat index during the summer season. This results in various health risks to both students and teachers [15]. Students in such overheated environments often struggle to complete their tasks due to the heat-related stress inside classrooms. These students are also more susceptible to heat-related illnesses, which may further impair their academic performance [1], [6].

The impact of environmental factors on academic performance has been a topic of interest for researchers and educators alike. While numerous studies have explored the effects of factors such as noise, lighting, and air quality on student learning, the influence of temperature and hot weather conditions has received relatively less attention [2], [11]. This is particularly relevant in the context of nursing education, where students not only attend classes but also engage in clinical rotations that may expose them to varying temperature conditions [10].

Nursing is a demanding field that requires a combination of theoretical knowledge and practical skills. Nursing students must juggle coursework, clinical placements, and often part-time employment, making them particularly susceptible to the effects of environmental stressors. Hot weather can create discomfort, fatigue, and cognitive strain, potentially impacting students' ability to concentrate, retain information, and perform at their best [3], [9], [12].

Understanding the relationship between hot weather and academic performance in nursing programs is crucial for several reasons. First, it can inform the development of strategies and interventions to mitigate the negative effects of heat exposure, ensuring that students can learn and perform optimally [13]. Second, it can contribute to the broader discussion on the impact of climate change on education, as extreme weather events become more frequent and intense [14]. Finally, it can shed light on the unique challenges faced by nursing students, who must navigate both classroom and clinical environments [5].

The researchers, as clinical instructors in the college of health education department, aim to collectively emphasize the significant impact of hot weather on the academic performance of nursing

students and highlight the need for schools and educators to take proactive measures to ensure a comfortable and healthy learning environment.

Furthermore, the study will provide valuable insights into the impact of hot weather on the academic performance of nursing students. The findings of the study can be used to develop strategies to mitigate the negative effects of hot weather on students' academic performance, particularly in nursing programs where students are required to spend long hours in classrooms.

Materials and Methods

The main focus if the study is to better understand the possible impact of hot weather on the academic performance and physical health of selected 3rd year Nursing students at University of Saint Anthony. Specifically, it sought to answers the following questions: What is the profile of the respondent in terms of: age, sex, section, average daily temperature in the classroom and what is the impact of hot weather on the selected 3rd year students along: academic performance, physical health and what intervention may be proposed to cope with the hot weather on the academic performance and physical health on the 3rd year nursing student's student. The research made use of a quantitative descriptive design as an essential; the respondents of the study were the nursing students from the College of Health Care Education Department, specifically the third year, with a total population is total of 103 for Section A-32, Section B-36, and Section C-35. Using Slovin's Formula, the total number of respondents in this study was 82 students enrolled in the second semester academic year 2023 – 2024. The principal research instrument used was the web-based survey checklist questionnaire through Google Forms.

Results

Table 1 presents the demographic and environmental profile of the 82 nursing student respondents. The majority were aged 21–23 years (75.60%), predominantly female (76.83%), and mainly from Sections 3B (35.37%) and 3C (34.15%). In terms of classroom environment, more than half of the respondents (53.66%) experienced average daily classroom temperatures of 34°C and above, indicating potential exposure to heat stress during academic activities.

Table 1. Profile of the Respondents (N = 82)

Variable	Category	Frequency (n)	Percentage (%)
Age	18–20 years old	8	9.76%
	21–23 years old	62	75.60%
	24–26 years old	10	12.20%
	30–32 years old	2	2.44%
Sex	Female	63	76.83%
	Male	19	23.17%
Section	Section 3A	25	30.48%
	Section 3B	29	35.37%
	Section 3C	28	34.15%
Average Daily Classroom Temperature	25–29°C	16	19.51%
	30–34°C	22	26.83%
	34°C and above	44	53.66%

Table 2 presents the impact of hot weather among selected 3rd-year nursing students at the University of Saint Anthony, along with academic performance. Among the indicators, ranked 1st was

experienced any difficulties in focusing or concentrating during classes due to the heat got the highest weighted mean of 4.31 interpreted as always. Academic performance has been affected by the heat has a weighted mean of 4.13 interpreted as often, and the respondents were often experienced any physical symptoms such as headaches, dizziness, or fatigue due to the heat and noticed any changes in your participation or engagement during classes due to the heat with a weighted mean of 3.95 and 3.58, respectively.

Table 2. Impact of Hot Weather along Academic Performance

Indicator	WM	Interpretation	Rank
Academic performance has been affected by the heat.	4.13	Often	2
Experienced any difficulties in focusing or concentrating during classes due to the heat	4.31	Always	1
Noticed any changes in your grades or test scores due to the heat	3.00	Sometimes	5
Experience any physical symptoms such as headaches, dizziness, or fatigue due to the heat	3.95	Often	3
Noticed any changes in your participation or engagement during classes due to the heat	3.58	Often	4
Average Weighted Mean	3.79	Often	

Lastly, the respondents sometimes noticed any changes in their grades or test scores due to the heat, with a weighted mean of 3.00. The impact of hot weather among selected 3rd-year nursing students at the University of Saint Anthony, along with academic performance, has an average weighted mean of 3.79, interpreted as often.

Discussions

The present study investigated the impact of hot weather on the academic performance and physical health of selected 3rd-year nursing students at the University of Saint Anthony. The findings provide insight into the demographic profile of the respondents, the frequency and severity of heat-related challenges, and the implications on student learning and well-being. Demographically, the majority of the respondents were female (76.83%), aged between 21–23 years (75.60%), with many belonging to Section 3B (35.37%). This aligns with existing studies showing that nursing programs tend to be female-dominated and populated by young adults in early adulthood, who are at a critical stage of professional and cognitive development [1], [2]. Importantly, over half of the respondents (53.66%) reported experiencing average daily classroom temperatures of 34°C and above, well above the thermal comfort zone for learning environments [3].

The findings of the study indicate that hot weather frequently and negatively impacts both the academic performance and physical health of 3rd-year nursing students at the University of Saint Anthony, with the majority of respondents experiencing classroom temperatures of 34°C and above. Students reported that heat often led to difficulties in concentration, increased fatigue, and the frequent occurrence of physical symptoms such as headaches and dizziness, which in turn diminished their classroom participation and overall learning efficiency. Although the effect on actual grades was less pronounced, the persistent discomfort and cognitive strain highlight the vulnerability of nursing students, who already face heavy academic and clinical workloads. These results underscore the urgent

need for targeted interventions as improved classroom ventilation, flexible uniforms, hydration access, and simulation-based training on heat-related illnesses support students' well-being and academic success in the face of rising temperatures, especially in tropical regions like the Philippines. Addressing these challenges is crucial not only for optimizing learning outcomes but also for safeguarding the health and resilience of future healthcare professionals.

In the Philippine context, Santos and Gumabay [15] reported that nursing students exposed to high temperatures frequently experienced concentration difficulties, physical symptoms, and reduced classroom participation, mirroring the results of the present study. Collectively, these studies confirm that heat stress is a critical environmental factor that undermines both the cognitive and physical well-being of students, particularly in demanding fields like nursing, and emphasize the necessity of proactive institutional interventions to mitigate these effects.

Consistent with the findings of Basagana et al. [16] and Haverinen-Shaughnessy & Shaughnessy [17], elevated indoor temperatures are strongly correlated with decreased attention span, reduced cognitive performance, and fatigue in students. This supports the observed result that students "often" experienced academic challenges due to hot weather. Heat exposure has been associated with diminished information retention and slower cognitive processing speed—two crucial abilities for nursing students who must rapidly assimilate complex medical information [18], [19].

From a physiological standpoint, heat exposure has been documented to induce stress responses such as increased heart rate, dehydration, and lethargy—all of which compromise physical endurance and overall student well-being [20], [21]. This is reflected in the present findings, where students reported that the impact of hot weather on their physical health occurred "sometimes." While less frequent than its academic impact, the physical burden of high temperatures remains a concerning issue.

The dual challenge of maintaining high academic performance and enduring physical strain during heat exposure is particularly detrimental for nursing students, whose schedules involve both theoretical and clinical obligations. Previous research by Gaiha et al. [18] and Rajagopalan & Lim [22] highlights that students under thermal stress are more prone to burnout and decreased engagement, especially in health-related programs requiring intense multitasking.

Moreover, this study is aligned with global observations on climate change and education. The IPCC [23] has projected that increasing global temperatures will disproportionately affect tropical countries like the Philippines, leading to frequent extreme weather events that may hinder academic activities. As such, environmental conditions are no longer peripheral concerns in educational planning but central factors in student success [24].

Given the findings, it is evident that interventions are necessary. These may include infrastructural improvements such as better ventilation and air-conditioning (especially in older school buildings), adjusted academic schedules to avoid peak heat hours, hydration stations, and integration of wellness breaks during extended learning sessions [14], [15]. Programs that enhance student coping strategies, such as mindfulness, rest, and health education on heat-related illnesses, could also buffer the physical and cognitive effects of heat stress.

In conclusion, the study underscores the significant influence of hot weather on both the academic performance and physical health of nursing students. Given the unique demands of nursing education, educational institutions must develop and implement robust intervention plans to mitigate these impacts and support student success holistically.

Conclusion

The findings of the study highlight the significant impact of hot weather on both the academic performance and physical well-being of nursing students. Most respondents, who experienced average classroom temperatures exceeding 34°C, reported that heat often interfered with their ability to concentrate, retain information, and perform academically. The physical effects, although reported as less frequent, still posed considerable discomfort and health risks. Given the demanding nature of nursing education, which involves a combination of theoretical coursework and clinical practice, exposure to extreme heat exacerbates the stress faced by students. It is therefore essential for educational institutions to implement proactive measures, such as improving classroom ventilation, installing air-conditioning systems, and revising academic schedules, to create an optimal learning environment. Furthermore, the proposed intervention plan offers practical solutions to support student resilience and performance in the face of climate-induced challenges.

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