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DESCRIPTIVE RESULTS OF THE PRELIMINARY DESIGN APPROACH OF THE SURVEY ON HEAT STRESS AMONG PRIMARY SCHOOL STUDENTS IN CAMBODIA

[1]Mengly Morn, [2*]Kinnaleth Vongchanh, [3]Sarin Chan

[1]Master of Engineering Student, [2]Lecturer-Researcher, and Head of Thermal Laboratory, [3]Assistance Professor, and Head of Department of Industrial and Mechanical Engineering
[1,2,3]Thermal Laboratory, Department of Industrial and Mechanical Engineering,
[1,2,3]Institute of Technology of Cambodia, Phnom Penh, Cambodia
[2]Energy Technology and Management Research Unit, Research, and Innovation Centre,
[2]Institute of Technology of Cambodia, Phnom Penh, Cambodia

Abstract: Climate change is expected to raise global mean temperatures and increase the frequency of hot days. This study addresses the growing concern of heat stress and its implications for primary school students in Cambodia in the context of increasing global temperatures due to climate change. The research aimed to establish an effective heat effect survey method and present the descriptive outcomes of the survey, focusing on heat-related issues in schools. Using a case study approach, a paper-based survey involving 500 participants (11-14 years old) from two primary schools in Phnom Penh, Cambodia was conducted. The survey covered eight key aspects, including interviewer information, personal details of the interviewees, thermal comfort, and sensation, learning preferences, heat stress impacts, health effects, clothing influences, and coping strategies. Key findings revealed a preference for morning study sessions (63.29%), with students feeling comfortable at a mean Wet Bulb Globe Temperature (WBGT) of 28.15℃ (±0.73), and discomfort setting in a mean WBGT of 28.88℃ (±0.48). Heat stress symptoms, including headaches, dizziness, weakness, and sweating, affected students, impacting their attention levels. Mitigation strategies, such as hand-fans and water consumption, were commonly employed. This research sheds light on the challenges of heat stress in the Cambodian primary school setting, emphasizing the importance of implementing effective strategies to mitigate its effects on students' well-being.

***Index Terms* – Heat stress, Heat-related illness, Primary school students, Thermal comfort, Thermal sensation.**

I. INTRODUCTION

Climate change is projected to result in increased global mean temperatures and an increase in the frequency of hot days (IPCC, 2018, 2019). In Cambodia, the majority of the year, temperatures are stable across the nation, averaging 25℃ to 27℃, with an average annual high temperature of 38℃ in April and an average annual low temperature of 17℃ in January. Climate trends since 1960, temperatures have risen by around 0.18℃ per ten years; during the dry season (November to April), temperatures rose at a rate of 0.20℃ to 0.23℃ per decade; May through October saw an increase in wet season temperatures of 0.13℃ to 0.16℃ each decade; and the number of "hot days" rose by 46 days annually. By 2030 and 2050, average annual temperatures are expected to rise by 0.8℃ to 1.6℃ and 1.0℃ to 2.6℃, respectively; by 2060, it is expected that there will be an increase in the number of "hot days" by 14 to 49 per cent and an increase in the number of "hot nights" by 24 to 68 per cent; according to forecasts, "cold" days and nights will occur less frequently in the future (USAID, 2019).

Heat Stress is the net heat load to which a person is subjected as a result of the combined contributions of metabolic heat, ambient conditions, and clothes worn, resulting in an increase in heat storage in the body, Heat strain is the physiological reaction of a person to a heat load (external or internal), in which the body strives to enhance heat loss to the environment to maintain a constant body temperature (Jacklitsch et al., 2016). An ideal heat-stress assessment method considers body heat generation, exchange pathways, and human heat balance, ensuring comprehensive evaluation (Havenith, 1999). A heat stress index is a numerical composite measure that combines one or more of the thermal, physical, and human elements that affect heat transmission between a person and the environment into a single number (Beshir & Ramsey, 1988). Managing heat stress is popular using the Wet Bulb Globe Temperature (WBGT) and it has been well-tested under a variety of climate conditions (Havenith & Fiala, 2016; Lemke & Kjellstrom, 2012). Self-report heat stress using a survey questionnaire is the most commonly used approach in empirical studies of heat stress (Schuster et al., 2017), previous research on self-reported heat stress has been

conducted using a population survey questionnaire (Arifwidodo & Chandrasiri, 2020; Bidassey-Manilal et al., 2016, 2020; De Dear et al., 2015).

Most public schools in underdeveloped countries are likely to employ natural ventilation (nv) for cooling when the ambient temperature is high (Liang et al., 2012). Windows and doors may be kept open, and some schools (though presumably few) may have ceiling fans, but air conditioning at government schools is quite unlikely moreover, the class sizes are frequently rather big (35-40 pupils), resulting in congestion and a rise in interior classroom temperature due to body heat (Bidassey-Manilal et al., 2016). Existing research shows that increasing temperature and low ventilation rates within classrooms have a direct impact on students' schoolwork and health (Sheffield & Landrigan, 2011; Teli et al., 2012). According to Bidassey-Manilal et al. (2016), students felt weary, drowsy, and asleep, with strong associations between 32°C indoor temperatures and exhaustion and difficulty breathing. Indoor thermal comfort has a significant impact on the well-being and learning ability of pupils who spend lengthy amounts of time inside the classroom (Haddad et al., 2012). High classroom temperatures impact students' learning, health, well-being, and academic performance, as they spend significant time in these environments (Bidassey-Manilal et al., 2020). Low classroom ventilation has a detrimental influence on students' attention, alertness, memory, and focus, which has an impact on teaching and learning (Bakó-Biró et al., 2012).

Despite the progress on heat-impacted related literature, few studies have been undertaken in primary schools, and the literature available solely covers thermal comfort, with the majority of them imposed to assess thermal comfort during the winter (Bidassey-Manilal et al., 2020). This paper addresses the specific research questions based on a larger self-report survey, addressing: (1) Are there any suitable survey methods for primary school students in the Cambodian context? (2) What are the preliminary survey design results on the influence of heat in primary schools?

This study is the primary study of heat stress impacts on primary school students in Cambodia, two objectives have been proposed. The objectives include: (1) To conduct the preliminary design approach of the survey from primary school students in the Cambodian context. (2) To demonstrate the survey's descriptive results for heat-related illness.

II. Research Methodology

2.1 Ethical Consideration

A submission for ethics clearance for the research was submitted on 20th May 2022. Ethical clearance No 156-NECHR was approved on 31st May 2022 by the National Ethics Committee for Health Research (NECHR). This approval is valid for twelve months after the approval date. Permission to work in the schools was received from the Department of Education, Youth and Sport, Phnom Penh, and approved by the Ministry of Education, Youth and Sport (MoEYS), Cambodia.

The required documents to be submitted to the NECHR were a cover letter, application form, summary protocol, detailed proposal of the research, informed consent (both for the students and teachers), questionnaire form, resume of the researcher, attestation from the Institute of Technology of Cambodia (ITC) to clarify that the researcher must be from the ITC, and the approved letter to work in the schools from the Department of Education, Youth and Sport, Phnom Penh under MoEYS, Cambodia.

Participants in this study received detailed information and explanations about the research and consent forms from the survey team. Participants were invited to a written survey on the research was voluntary. They can refuse to take part in the research or exit the survey at any time without penalty. Participated students were free to decline to answer any particular questions they did not wish to answer for any reason. Participants will receive no direct benefits from participating in this research study. However, their responses may help the research team to learn more about the impact of heat stress on students. Plus, there are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life or there is just the risk that the students may find some questions to be sensitive. The survey answers were written on paper, and data will be stored in a protected electronic format. In the survey, they were asked if they were interested in participating in an additional interview (by phone, or in person). However, no names or identifying information would be included in any publications or presentations based on these data, and their survey responses remained confidential.

2.2 Sample Size

The sample size for the primary school students – large enough to be representative and offer statistically significant results – was defined as following Cochran's (1968) formula, the sample size for the proportion of the infinite population can be estimated by:

$$N = \frac{Z_{\alpha/2}^2 P(1-P)}{d^2} \qquad (1)$$

where $Z_{\alpha/2}$ is the standard error corresponding to the 95% confidence interval (1.96), P is the assumed percentage of the primary indicator (0.5), d is the desired $\frac{1}{2}$ confidence interval (0.05).

$$N = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2} = 385$$

The sample size has been increased to $N = 500$ for the target group (primary school students) to strengthen the results and to compensate for the expected refusal rate.

2.3 Participants Selection

Previous research has shown that pupils spend most of their study time and the second most time at school (De Giuli et al., 2012). The interior environment quality of classrooms has a considerable impact on students' learning capacities, psychosocial development, well-being, safety, and health (Balaras et al., 2007; Ebi et al., 2021; Korsavi et al., 2021). Primary school students are highly exposed to heat compared to adults and their physiology and cognitive ability are also different (Lala & Hagishima, 2022; Ma et al., 2020). According to the thermoregulatory system is age dependent, children are more exposed to heat stress than secondary school and adults as the result of pupils acquire thinner skin, higher breathing rates, and higher metabolic rates (Lala &

Hagishima, 2022; Tsuzuki-Hayakawa et al., 1995). Primary school students (aged 6-11 years) have the greatest impact on the classroom environment and heat stress of any student group due to their limited cognitive skills to adjust to the heat and stay comfortable (Lala & Hagishima, 2022; Wargocki & Wyon, 2007).

In Cambodia, three levels for the class under a diploma degree are primary school (from grade 1 to grade 6), secondary school (from grade 7 to grade 9), and high school (from grade 10 to grade 12). To select the participants for this study the research team from the Institute of Technology of Cambodia (ITC) and the members of the Department of Curriculum Development (DCD) of the Ministry of Education, Youth and Sports, have discussed and identified the students from primary school to be the participants in this study. The pupils were allowed to take their official learning starting from grade 1 to be correct at the age of 6 years old. In this study, the grade 6 students were the most appropriate participants compared to grade 1 to grade 5 because they have more knowledge, and the ability to read and possibly understand and respond to the questions. They can feel and understand the atmospheric conditions; hot, cool, warm, feeling comfortable or uncomfortable, etc. More importantly, this could be an opportunity to provide knowledge related to heat stress, heat strain, self-coping mechanisms, etc. to the students.

2.4 Study Site Selection

Temperatures in Cambodia are generally consistent across the country, averaging 25℃ to 27℃ for the majority of the year, with an average annual high temperature of 38℃ in April and an average annual low temperature of 17℃ January (USAID, 2019). Phnom Penh is the central capital city of Cambodia which carried an estimated population of over 2 million in 2015 (World Bank, 2018). In Phnom Penh, which has the highest population density, the number of children in each public school is higher compared to other provinces with lower population density. The number of students in grade 6 is sufficient for a sample size of 250 in each primary school and 500 for two primary schools. This is a preliminary study, and Phnom Penh was chosen as the location for the assessment of heat stress in Cambodian primary schools.

In the year 2020-2021, Cambodia has 7304 public primary schools including around six thousand classrooms and the number of primary school students is approximately two million (almost half of the primary students are girls) (MoEYS, 2021). The source of information from the Department of Curriculum Development (DCD) of the Ministry of Education, Youth and Sports, Cambodia reported that; in the year 2022 there were 166 public primary schools located in seven different districts in Phnom Penh. The research team selected three primary schools in each district from a list of 166 public schools, based on online overviews and location-based information. They then selected five suitable schools to ensure the study was conducted at the appropriate sites.

The five primary schools were named by the research team in a proposed letter to the Department of Curriculum Development (DCD) of the Ministry of Education, Youth and Sports, Cambodia to get approval for the school's visit. Later, received the approval, from the 23rd until the 25th of May of 2022; five primary schools were visited by the research team and DCD's members to identify the final decision on site selection. Details of the five primary schools are described in Table 1.

After the final site selection process, two primary schools were chosen: Phnom Penh Tmey primary school in the Sen Sok district and Pochentong primary school in the Pochentong district. Both primary schools were checked and compared in detail among five visited schools, and these two selected schools contained the most suitable criteria for the study, detailed in Table 1. The total number of grade 6 students in both selected schools is more than 250 students each school which is enough for the sample size of N = 500 students. The average number of students in a grade 6 class is between 45 and 65 students, the building of the grade 6 class is located at the Phnom Penh Tmey primary school built in 2007 and Pochentong primary school were built in 2001, in Phnom Penh Tmey primary school used the fan for the ventilation but Pochentong primary school used only natural ventilation, another information of both schools is Phnom Penh Tmey's building for grade 6 classes was built parallel to the sun direction and school's area plant greener (for the ecosystem purpose) in Phnom Penh Tmey than Pochentong primary school.

Table 1. Criteria and evaluation score for school's selection

Criteria/ schools	**Bak Tuok**	**Toul Kork**	**PP Tmey**	**H.S Pochentong**	**Pong Tuek**
1. Total number of grade 6 students	433 (*4*)	374 (*3*)	438 (*4*)	370 (*3*)	76 (*1*)
2. Number of students in each grade 6 class	30 (*3*)	30 (*3*)	62 (*6*)	46 (*4*)	35 (*3*)
3. Year of building for grade 6	2005 (2)	2005 (*2*)	2007 (*1*)	2001 (*2*)	1993 (*4*)
4. Ventilation type for school	nv (*1*)	nv (*1*)	Fan (*0*)	nv (*1*)	Fan (*0*)
5. Lamping used for school	Yes (*0*)	Yes (*0*)	Yes (*0*)	No (*1*)	Yes (*0*)
6. Building direction to the sun for grade 6	Parallel (*0*)	Cross (*1*)	Parallel (*0*)	Cross (*1*)	Parallel (*0*)
7. Overall school's environment	More trees (*0*)	More trees (*0*)	More trees (*0*)	Less tree (*1*)	More trees (*0*)
Total score	*(10)*	*(10)*	***(11)***	***(13)***	*(8)*

(*n*) evaluation score

2.5 Questionnaire Design

This survey aims to investigate the indoor heat impact targeting primary school students (focused on grade 6 students). This survey was paper-based, the interviewers were trained before conducting face-to-face surveys with the students.

The questionnaire was framed into eight different parts. (1) The information of the interviewer: the interviewer first provides the interviewer's code number, interview date, and name of the interviewer. (2) Personal status of the interviewees: participants first provide their agreement to participate in the survey, name, age, height, weight, gender, health condition, and exercise. (3) Thermal sensation and thermal comfort: the interviewer noted the temperature and relative humidity which was recorded by the T&D Thermo hydro datalogger TR-72wf for measuring indoor temperature and relative humidity of air which is placed inside the survey room. The students rated the thermal sensation vote (TSV) on seven scales (hot, warm, slightly warm, neutral, slightly cool, cool, and cold), and the thermal comfort vote (TCV) on four scales (comfortable, slightly uncomfortable, uncomfortable, and very uncomfortable). (4) Type of learning: the participants completed their study time, duration studied in their school, school ventilation type, their experience in the control environment room (air conditioner room), activities during break time, the place they sit (near the window or not) including the reason of sitting there. (5) The heat stress impacts on school: the students provide

answers about the feeling of air temperature inside their regular classroom, the feeling of the humidity level, and their feeling of flowing air inside the classroom. (6) The impacts of heat on health: the heat-health related while they are learning caused by heat includes sleep, sweating, fatigue, thirst, suffering, and symptoms (mild headache, dizziness, weakness, muscle pain, and lower concentration). (7) The impacts of clothing on heat stress: the perception of the school uniform, the additional clothes and their feelings about it, preferable sleeves and pants/skirt type, and the number of layers (of clothes) they wore to school. (8) Coping mechanisms: Several mitigation strategies that the students used to cope with the heat both separately at school and home, the amount of water intake per day, and the student's feelings of losing concentration when the classroom was hot.

2.6 Data Collection Procedure

In Cambodia, the time shifts for the class are divided by the Ministry of Education, Youth, and Sport (MoEYS) into two time shifts; the morning shift (7:00 am to 11:00 am) and the afternoon shift (1:00 pm to 5:00 pm). This time shift will be switched every single month (For instance, the first-month morning class student will continue their studies in the second month's afternoon class.). In this case, the students were selected from the morning shift and afternoon shift until the number of 250 participants in each school from both Phnom Penh Tmey primary school and Pochentong primary school.

The morning session of the surveys started at 7:30 a.m. and finished at 10:30 a.m. The afternoon session of the questionnaire surveys started at 1:30 p.m. and finished at 4:30 p.m. The reason for choosing this time is because this time shift is the regular class hour (morning class: 7:00 a.m. to 11:00 a.m., afternoon class: 1:00 p.m. to 5:00 p.m.) and delay of 30 minutes before starting and finishing the surveys owing to the time that allows the student to fully participate in class, time to rest and unwind after travelling from home, and time for the teachers and students to get ready after leaving the school.

The students were randomly called by their classroom teacher to participate in the survey. The interviewer team required them to measure their height and weight before entering the interview room to record their personal data (the survey includes a section where students' personal information is requested). The student was asked to stand next to the scale-marked wall while the research team measured the student's height using a standard meter instrument with a 1-centimetre precision. Following the assessment, a little sticker with the student's weight and height was presented.

The students were allowed to the survey room continuously. Before the previous students finished the survey, the research team reported to the teacher to call the next students to join the survey, their weight and height were measured. This process was repeated until the end of the time shifts (morning and afternoon shifts).

The student can enter the survey room once they have finished all of the measurements (weight and height). The student was asked by the interviewer to read the consent letter within the explanation from the trained interviewer. The interviewer then began with a brief introduction of the research, stating what are the questions inside the survey papers after having the student sign the consent form. The interviewer went through all the questions with, the questions consist of personal information about the student, thermal sensation and thermal comfort vote, type of the student's learning, heat stress impact on the school, heat impact on health, impacts of clothing on heat stress, and student's coping mechanisms.

The study team requested the classroom instructor to sign a further consent form after bringing the pupils back to class (to follow the research ethic, the age of the student is under 18 years old; the classroom teacher must sign the consent letter along with the students) and collected teacher's consent letter attached with student's consent letter.

III. Result and Discussion

3.1 Demographics

Descriptive statistics results in Table 2 show the final sample consisted of 493 students, out of which (48.28%) were male students and (51.72%) were female students. The mean age of the respondents was 12.35 years old (±0.75) and all of them were from grade 6. Their mean Body-Mass Index was 18.34 kg/m^2 (±3.49). Those who were categorized as from the morning shift and afternoon shift were (47.46%) and (52.54%), respectively. The percentage of the respondents whose classes were equipped with mechanical ventilation was (49.49%) (fan). Exercise is good for health and strengthens the body. Students who never exercise (18.28%), moderately exercise (66.39%) and highly exercise (15.34%), respectively. Figure 1 shows all the types of exercises that the student did. The frequency students do exercise, mostly they do exercise 2-3 times per week (51.49%), for those who do the exercise every day (32.09%), every weekend (7.46%), and for those who do the exercise depending on the opportunity (8.96%).

Table 2. Demographics table

Participants	$N = 493$
Gender	
Female	255 (51.72%)
Male	238 (48.28%)
Age	
Mean (SD)	12.354 (0.75)
Range	11, 14
BMI	
Mean (SD)	18.336 (3.49)
Range	9.649, 32.882
Study time	
Morning time	234 (47.46%)
Afternoon time	259 (52.54%)
Participants from their class use fans	
nv (natural ventilation)	249 (50.51%)
Fan	244 (49.49%)
Health condition	
Poor (always sick)	4 (0.82%)
Fair (occasionally sick)	218 (44.49%)
Good (rarely sick)	268 (54.69%)
Do exercise	
Never	87 (18.28%)
Moderate	316 (66.39%)
High	73 (15.34%)

mean (SD), n (%)

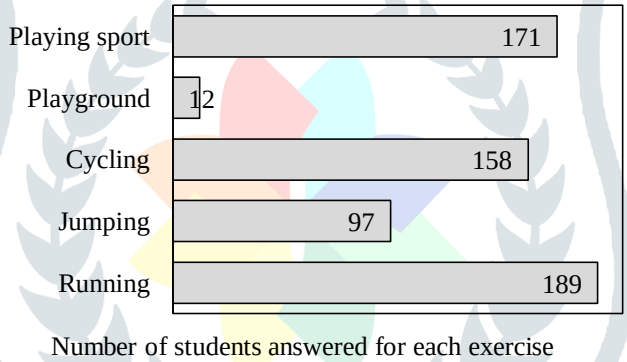

Figure 1. Describe different kinds of exercise

3.2 Thermal Sensation and Thermal Comfort Vote

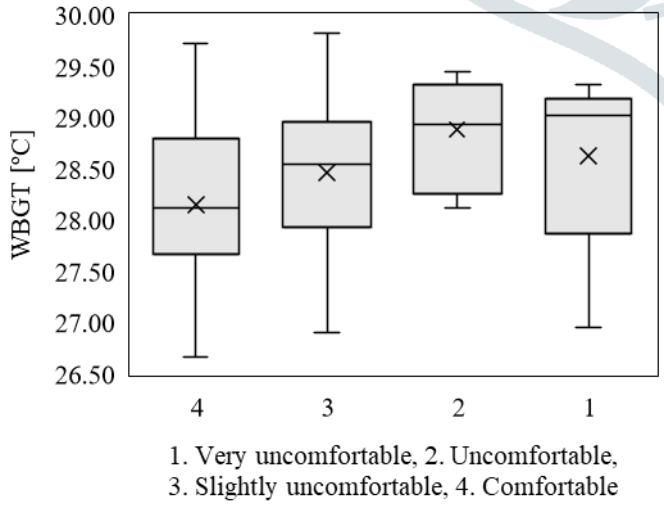

Figure 2. Thermal comfort vote in WBGT index

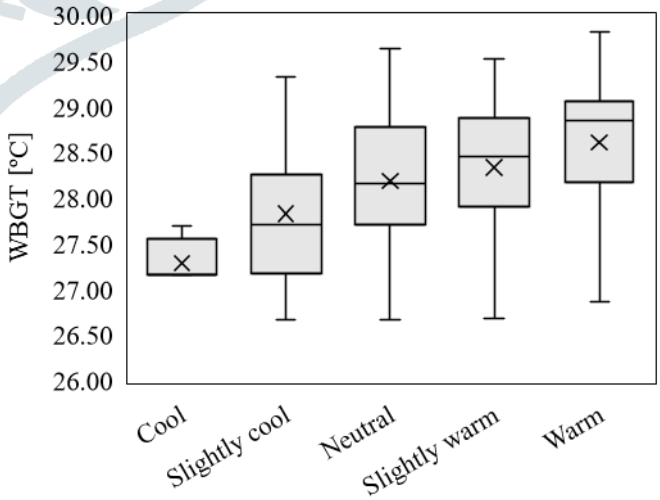

Figure 3. Thermal sensation vote in WBGT index

Figure 2 shows the mean WBGT that the students feel comfortable is 28.15 ℃ (±0.73), they start to feel slightly uncomfortable at the mean WBGT of 28.46℃ (±0.69), feel uncomfortable at the mean WBGT of 28.88℃ (±0.48), surprising some students found that they feel very uncomfortable even at the mean WBGT of 28.62℃ (±0.95).

Figure 3 shows the students felt cool in the mean WBGT of 27.28℃ (±0.27), felt slightly cool in the mean WBGT of 27.83℃ (±0.77), they felt normal in the mean WBGT of 28.19℃ (±0.69), and they start to feel slightly warm in the mean WBGT of 28.33℃ (±0.71), feeling exactly warm in the mean WBGT of 28.59℃ (±0.73).

3.3 Type of Learning

Students prefer to study in the morning (63.29%) of the time and in the afternoon (36.71%) of the time. Figure 4 shows the average length of attendance at the institution is 55.08 months (±24.33). Students who previously attended another school responded that their present school is cooler than their prior school, (82.81%) and (17.19%), respectively. solely (22.7%) of students used to study in the air conditioning room, and they preferred to study in the air conditioning (44.64%), inside the natural ventilation room (55,36%) because the room used solely for natural ventilation may make them more attentive while studying (75.89%) compared to the room used for air conditioner (24.11%). During break time, Figure 5 shows the majority of students chitchat (52.8%), run outdoors (23.6%), continue their academic activities (23.3%), and just (0.30%) slumber. According to the kids' responses, (45.38%) of them sit near the window and (54.62%) do not. The majority (96.30%) said that sitting near the window was to get fresh air from outdoors.

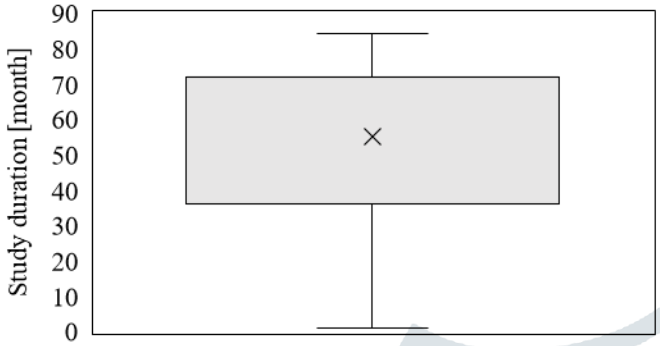

Figure 4. Student's study duration

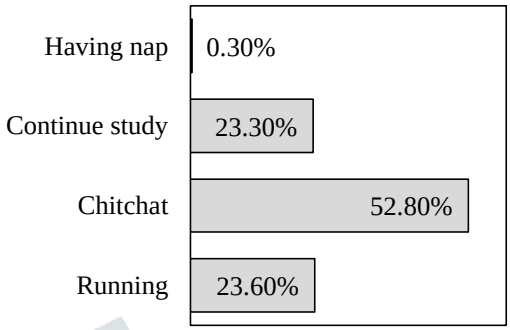

Figure 5. Student's activities during the break time

3.4 Heat Stress Impacts in School

The feelings of the students about their classroom air temperature are cool (2.24%), slightly cool (14.26%), normal (57.43%), slightly warm (17.92%), warm (7.54%) and hot (0.61%) respectively as shown in Figure 6. Figure 7 shows the humidity level in their classroom is usually adequate and desired (60.69%), wet skin (15.07%), perspiration loss from the skin surface (13.44%), dry (a sense of dryness in the mouth and throat) (9.37%), garments adhering to the skin surface (1.02%), and their skin completely wet (0.41%). The presence of cold weather circulation (57.26%), the presence of cold weather current (24.13%), a gentle stream of pleasing air (9%), a sense of stability in the gentle flow of air or warm air (7.77%), the moderate flow of warm air (1.64%), and the presence of extremely hot weather current (0.20%) as shown in Figure 8.

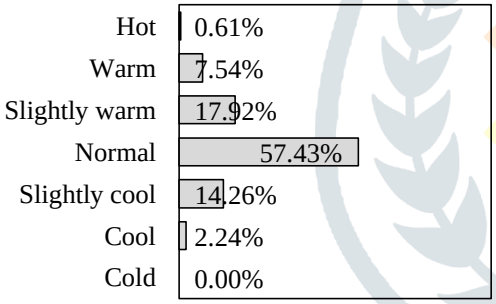

Figure 6. Feelings of air temperature inside the classroom

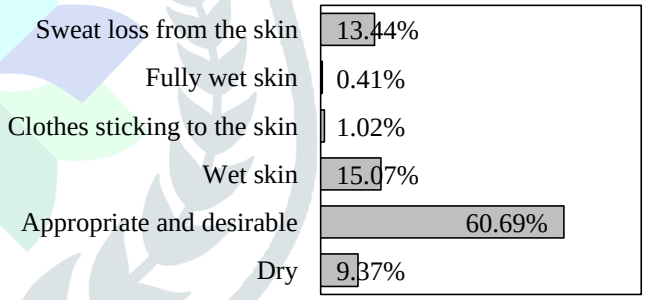

Figure 7. Feelings of humidity level

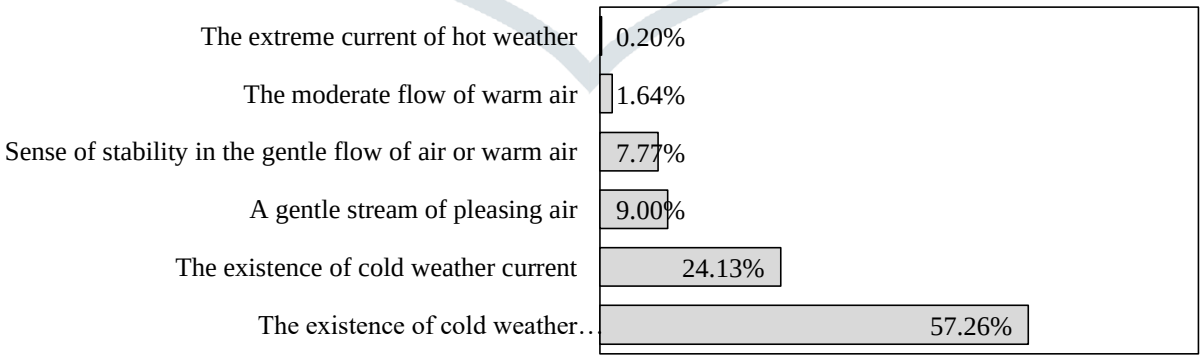

Figure 8. Feelings of airflow inside the classroom

3.5 The Impact of Heat on Health

According to descriptive statistics from the survey in this study, (32.95%) of all participants reported heat stress symptoms while studying. Mild headache (21.12%), dizziness (5.43%), weakness (3.29%), muscle discomfort (0.39%), and decreased focus (2.71%) are some of the symptoms. This study also discovered that students who felt sleepy during study time (23.67%) were impacted by the classroom being too hot (16.67%) and by the weather being too hot and humid (6.14%) as shown in Figure 9. Furthermore, because of the time change, those pupils felt drowsy in the afternoon session (24.35%) and the morning class (18.26%) as shown in Figure 10. The survey contained four more questions, and the data revealed that students sweated during study time (75.31%), were weary during class (32.65%), were thirsty (84.58%), and reported suffering from heat in the classroom (57.61%).

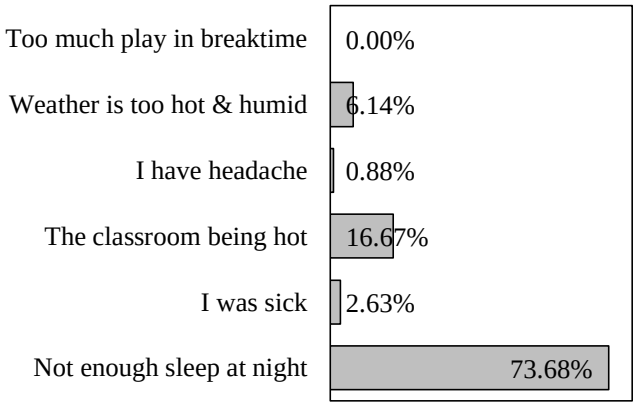

Figure 9. Reason of student's feeling sleepy

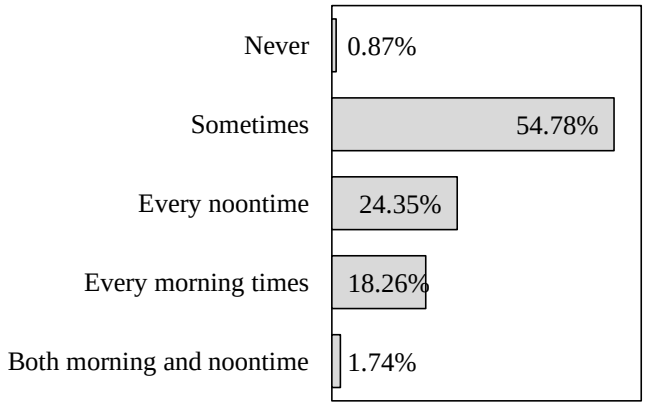

Figure 10. The frequency of students feeling sleepy

3.6 The Impacts of Clothing on Heat Stress

The students' assessment of their uniform (school uniform) is that they feel comfortable (90.22%) of the time, fairly comfortable (8.96%) of the time, and unpleasant (0.81%) of the time. The majority of pupils (80.57%) did not wear an additional add-on uniform. Those who wear them feel comfortable (68.83%) of the time, chilly (19.48%) of the time, and heated (11.69%) of the time. Long sleeves are preferred by (69.25%) of students, while short sleeves are preferred by (30.75%). Female students chose long skirts over short skirts by (96.68%) to (7.32%), respectively. Male students favour long pants (95.1%) of the time and short pants (4.9%) of the time. The majority of students (92.67%) choose one-layer clothing, whereas (6.92%) prefer two-layer clothing and (0.41%) prefer heavy clothing. With their uniform, the kids felt (88.89%) less hot, and their dress material did not enhance heat stress by (96.06%).

3.7 Students Mitigation Strategies

Figure 11 shows the following measures were used by the participants to control heat stress at school: hand fan (38.65%), drinking regular water (20.77%), drinking cold water (13.72%), and drinking extra water (12.37%). Figure 12 shows the following measures were used by the participants to manage heat stress at home: showering (32.5%), relaxing in front of the fan (30.29%), increasing the amount of water consumed after returning from school (10.74%), and resting in the shade (9.34%). The majority of kids in the class drank water (99.59%), and the average amount of water consumed per day was 1.78 litres (±0.91). Furthermore, when the classroom is heated, kids lose (51.46%) of their concentration during the study.

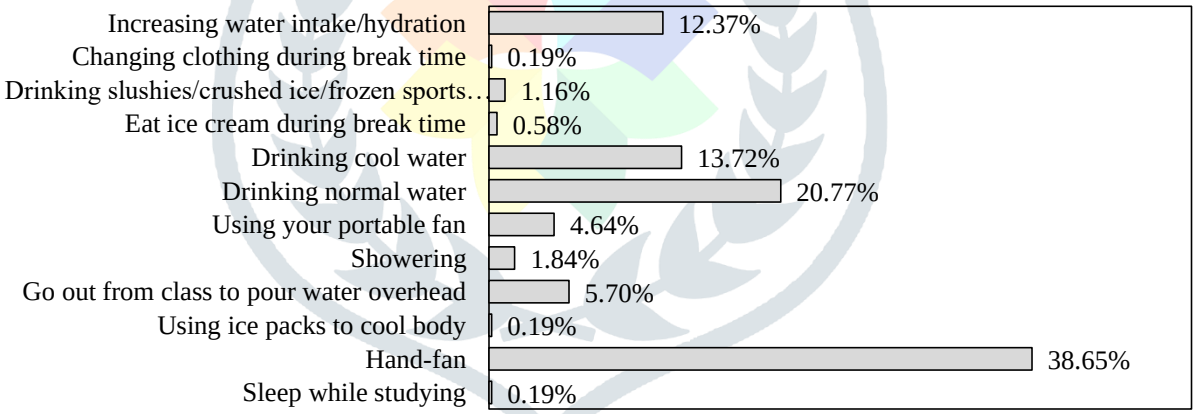

Figure 11. Mitigation strategies at school

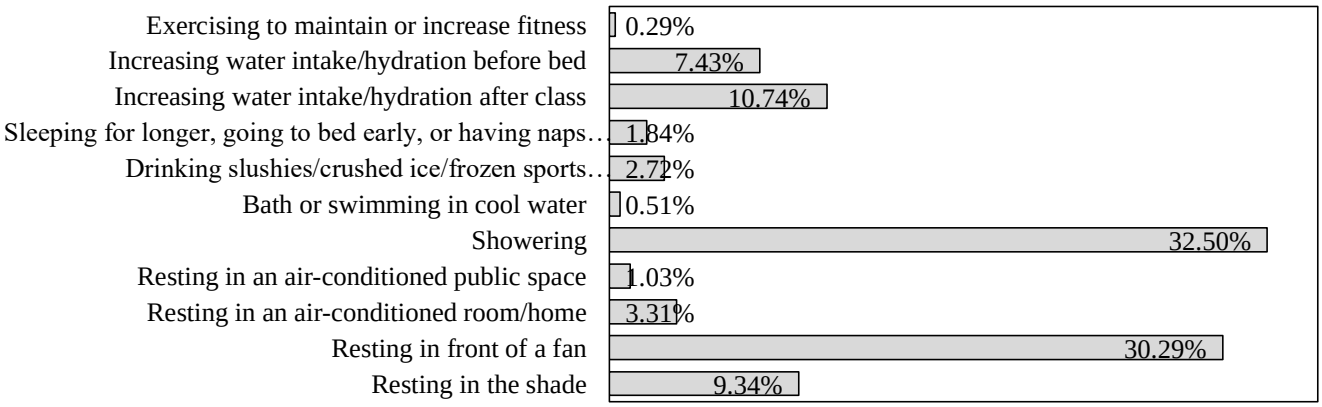

Figure 12. Mitigation strategies at home

IV. Conclusion

Heat-related health effects and perceived health symptoms are potentially an issue, particularly in public schools with inadequate resources (Bidassey-Manilal et al., 2016). This study highlighted crucial aspects of heat stress experienced by primary school students. A substantial majority of (63.29%) favors morning study sessions due to the increasing heat in the afternoon.

Students exhibit a strong preference for natural ventilation (55.36%) over air-conditioned rooms (44.64%), citing enhanced concentrations (75.89%) as a key factor. The comfort of students is significantly influenced by the Wet Bulb Globe Temperature (WBGT), with comfort at 28.15℃ and discomfort at 28.88℃.

The research reveals the adverse impact of heat stress symptoms on students' attention levels, including issues like headaches (21.12%), dizziness (5.43%), and exhaustion (32.65%). Uniform preferences are evident, with 90.22% expressing contentment with their current attire.

Mitigation strategies, such as hand-fans (38.65%) at school and cooling methods at home, like showering (32.5%), are essential for helping students cope with heat stress. This research underscores the immediate need to address heat-related challenges in schools to enhance students' well-being and academic performance in a world experiencing rising temperatures.

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