ACTA SCIENTIFIC PHARMACEUTICAL SCIENCES (ISSN: 2581-5423)

Volume 3 Issue 5 May 2019

Short Communication

An Editorial Note on: The Children's School Micro Climate's Wear at Different Humidity Conditions Pressure

A Tahan*

Faculty of Applied Arts, Garments Technology Department, Damietta University, Egypt

***Corresponding Author:** A Tahan, Faculty of Applied Arts, Garments Technology Department, Damietta University, Egypt.

Received: March 29, 2019; **Published:** April 26, 2019

Schools bioclimatology inspected the physiological influences of the building climate on the children health and the thermal comfort demands. In schools environments, climate parameters are hottest compared to the rural areas and even macro scale climatic conditions change rapidly which have large impact on the thermal sensations and thermal stress levels of the students. The climatic aspects of an area substantially define the behavioral reactions as well as the subjective judgments of the teachers and instructors related to the schools area design, and eventually schools usage.

Indoor environmental quality obviously influences on school children performance and productivity, particularly thermal comfort levels. At the present time, very few researches have dealt with the pressure of the skin microclimate in connection with the relative humidity at primary schools children as this is perceived as more comfortable between the ambient external condition and the clothes next to the skin internal condition.

One of the most important properties of garments from the side of the approaching real comfort is fabric permeability. The air and moisture permeability are substantial property of fabrics, for a woven fabric depends directly on the weft and warp density determined by their structure and construction.

Many studies concentrated on the thermal effects of schools external microenvironments based on different methods. Several studies analyse the thermal environment-dependent area employment and the spontaneous human reactions (mainly the clothing and solar exposure of students) exited by these environments based on observations. However, the researcher rarely ask How microclimate factors and their interactions with physical/mechanical parameters e.g. friction, influence skin tolerance levels at the loaded interface .on the other hand, the skin conditions caused by excess moisture e.g. ulcer due friction associated Dermatitis. The main objective of this research is to identify the effect of skin microclimatic with various thermal stress levels as different metabolism, different ambient temperatures and different ambient humidity in cooperative with garment next to skin. In this situation. It was also analysed the thermal stress at the absence of the skin microclimate conditions.

Methodology and Materials

One of the most important fundamental factors is the Fabric specification. Egyptian Three cotton fabric contractures with weft and warp count of 16s single yarn, twist factor 3.8 Z. accomplished different fabric with 100% cotton warp and 150/2 denier wefts polyester yarns. Types of designs have the same repeat by 4x4 (picks x ends). The fabric construction has been used as plain1/1, twill 2/2, twill 1/3 and satin 4.

Thermal exchange of body with environment

Heat dissipated to the atmosphere due to the metabolic heat production with the useful rate of working in accordance to the applied equation of heat transfer as follows:

$$Q_m = Q_E v \pm Q_R \pm Q_C \pm Q_{Cd}$$

The heat transfer by evaporation Q_{Ev}

Q_{Ev} = Heat transfer by Evaporation

The evaporation heat transfer is always positive; it depends on the vapor pressure difference between the skin surface (microclimate) and the surrounding area, at still air equal 0.17 m/s.

The body surface area of the toddler equal $1.3m^2$ For 6 years and $1.5m^2$ for 12 years old. Ps = vapor pressure at skin temperature and the vapor pressure at ambient temperature (TA) which is essentially independent of metabolic rate up to four or five times setting-resting level but for clothed subjects the skin temperature(Ts) could follow the equation : Ts= 25.8 + 0.267 TA

The Heat Transfer by Radiation QR.

Q_R = Heat transfer gained by radiation.

The quantity the body transferred energy depends on the absolute temperature of the body and the surface radiant properties and is defined in terms of its emissive power. This power is proportional to fourth power of the absolute temperate TA and Ts where is given by Stefan- Boltzmann Law.

These values would be expected between 0.6 to 1 Clo. i.e. = $0.19038\ K.m^2 / w$.

Q_{Co} = Heat transfer gained by convection

The rate of transfer by convection Q_{Cv} is determined from Newton's law of cooling

Q_{Cd} = Heat transfer by conduction

The equation could be expressed as relationship between the ambient air temperature, skin temperature, and surface area of garment.

Figure 1 is showing a schematic diagram of the four mechanisms of heat transfer between the body skin, microclimate an clothes whilst the total equation at figure 2.

Figure 1

Figure 2

Nude body

The child when he is nude, the two physical processes account for heat loss at uncovered skin (nude body) will be as at figure 3. as it shows human skin with the absence of the microclimate region. Figure 3 is showing a schematic diagram of the two mechanisms of heat transfer.

Figure 3

The equation of heat transfer will be only convection and radiation as in figure 4.

Figure 4

With the absence of the internal microclimate region, the environment's vapour pressure (the external macroclimate) will be dissipated directly the vapour sweat to the ambient whilst limits the ability of evaporation from the body though the garment to be cool down.

With the absence of the microclimate region, the higher humidity prevents rapid evaporation of liquid water on the skin and gives the body the sensation of heat and eventually triggered the sweating in the first place. Not only that but also at ambient temperature more than 36, the macroclimate will tend to inject temperature to the nude body with unpleasant effects, as shown at figure 5.

Figure 5

It is fairly to conclude, the maximum sweat evaporation of the human body is limited to the surrounding vapour pressure. On other words, the heat transfer mainly depends on the pressure difference between the internal microclimate and the external macroclimate. Once the partial vapour pressure of the clothing is known, the difference between the saturated vapour pressure on the skin's surface (assuming the skin being completely sweat covered) and the partial vapour pressure of the air/clothing determines the maximum evaporative heat loss with comfortable sensation.

The study found out the influence of pressure difference (PD) on Children clothing cooling effect and thermal comfort under different skin microclimate conditions. The research was including the phase changing materials and relative humidity (RH) of clothing involving the ambient external macroclimate condition. The influence of applied different fabric materials structure and construction were studied. The theoretical analysis simulation based on the physical properties measurements indicates that the fabric material contains hydrophilicphobic groups is more important as well as the matrix of the structure and design of the fabric. At three different phases of fabric as dry, moisture and wet fabrics to elaborate the four mechanisms of heat transfer as evaporation, conduction, radiation, and convection heat transfer through the fabrics next to skin. The research has investigated the body heat transfer at nude skin as well. The research found that whenever the pressure difference going high between the microclimate as internal condition and the external ambient macroclimate condition, the heat transfer positively going high whilst the Comfortability achieved.

In conclusion, maintaining adequate students' Comfortability and thermal comfort in classrooms especially at hot climate, the students should have the adequate next to skin garment, where it could significantly improve their academic implementation.

Volume 3 Issue 5 May 2019