

Effect of Weather Factors on Thermal Comfort among Residents in Central Zone of Shah Alam

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Structured Abstract

Background: The state of mind expressing satisfaction with the surrounding environment defines thermal comfort which remains essential for well-being and productivity and mental health. The three weather elements of temperature and relative humidity and wind speed impact thermal comfort in densely populated urban areas like Shah Alam in Malaysia. The urban heat island effect increases discomfort levels which threatens both resident health and lifestyle quality. The evaluation of Shah Alam resident thermal comfort and weather connections through Physiological Equivalent Temperature (PET) analysis examines subjective thermal perceptions. The research findings serve to establish basis for sustainable urban development and livable environment creation.

Methods: A cross-sectional survey gathered data from 265 residents who lived in Shah Alam's Central Zone within public areas, recreational parks and transport stations. Weather data was obtained from Subang Meteorological Station which provided measurements of temperature, relative humidity and wind speed. The Physiological Equivalent Temperature (PET) index evaluated thermal comfort by combining information about weather factors, clothing and physical activity levels using RayMan Software. The research used SPSS to perform correlation and descriptive statistics that revealed patterns linking weather elements to comfort perception of residents

Results: The temperature measurements spanned from 25.9°C to 31.1°C (mean 28.8°C) through the year's months with July having the highest readings. The relative humidity measurements ranged from 61.7% to 88.8% as temperature decreased. The area experienced low wind speed levels which averaged at 1.7 m/s. Survey participants indicated that 56.83% experienced "Warm" temperatures which indicate moderate heat stress but 43.17% reported feeling "Slightly Warm." The analysis indicated that temperature strongly influenced PET values ($r = 0.850$, $p < 0.01$) while relative humidity showed an inverse relationship ($r = -0.572$, $p < 0.001$) and wind speed did not affect PET values ($r = -0.039$).

Conclusion: Weather elements have a significant impact on comfort levels across Central Zone of Shah Alam. Residents feel most comfortable at temperatures below 35 degrees Celsius during evenings when relative humidity remains above 55 percent but discomfort increases when temperatures rise while humidity decreases.

Keywords: Thermal Comfort, Physiological Equivalent Temperature (PET), Weather Factors, Urban Planning

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