PERCEIVED EFFECTS OF WEATHER ON PEOPLE'S PHYSIOLOGICAL COMFORT IN IBADAN NORTH LOCAL GOVERNMENT AREA OYO STATE, NIGERIA

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ABSTRACT

The functioning of human body often times react to the changing climate. Human `physical vigour is often times influenced by temperature, humidity and wind. This study investigated perception towards weather variability and physiological comfort in Ibadan North Local Government Area of Ibadan. Primary data were collected through administration of questionnaires. Data were analysed through descriptive and Pearson chi-square method. The study found out that respondents cope well under warm and humid weather and also cold and dry weather. The study further reveals that majority (61.5%) of the respondents are most comfortable (physiologically) and therefore prefer the rainy season as against harmattan, which is regarded as the least (16.0%) comfortable and therefore the least preferred season. Majority of the respondents noted that cold (68%), catarrh (68%) and shivering (61%) are major discomforts associated with harmattan season. The perceived effect of heat on body includes sweat (60.4%) and headache (51.8%). The chi-square test revealed there is no significant association between age and preferred season of physiological comfort (p<0.05) as well as occupation and preferred season of physiological comfort (p<0.05). This study concludes that warm and humid (rainy) season is the most comfortable season of the year. Eco-friendly practices such as good ventilation, landscaping and tree planting should always be put into building construction so as make provision for fresh air during the hot season while nose cover should be used to reduce the effect of dust during harmattan.

Keywords: Climate change, Dry season, Rainy season, Harmattan, Weather

Introduction

Adaptation and mitigation are the two major response of man to changing seasons and climate. Local weather condition is instrumental to body comfort or discomfort. Sewell *et al.*(1968) confirmed that at a minimum level, man changes his clothing to adjust to daily changes in weather. At a more permanent level, he insulates his home and installs a furnace or air conditioning to adjust to seasonal fluctuations; he builds storm proof structures to resist high winds; he develops weather-resistant crop varieties to withstand droughts or floods. Human beings are exposed to climate change through changing weather patterns (temperature, precipitation, sea-level rise and more frequent extreme events) and indirectly through changes in

water, air and food quality and changes in ecosystems, agriculture, industry, livelihoods, infrastructure, settlements and the economy (Confalonieri *et al.,*2007).

Concern about the potential health effects of climate change began in the mid-1980s, with indications that emission of greenhouse gases from human activities could influence the climate system and result in intensification of the greenhouse effect (Slave and Carmen, 2012). Health includes physical, social and psychological wellbeing (Confalonieri *et al.,* 2007). One major factor that defines human state of health is the climate. Gulyasa *et al.* (2006) indicated that human beings are subjected to various kinds of stress in the urban environment, and that the most important ones are the meso- and microclimatic conditions, which differ significantly from one area to the other. Man's state of health and physiological comfort are subjective to weather conditions. There have been concerns for the effects of the environment on man and his livelihood.

These have translated into research, such that many researchers have attempted to understand the views, severity and implications of these effects as well as seeking to understand how people cope with them (White-Newsome *et al.*, 2011). Developing countries in the tropics, including Nigeria, deserve to be studied. This is more important when studies (Jonhson 2007, Guneralp, et al., 2017 and Satterthwaite, 2017) have argued that the accelerated growth of urbanisation in African countries in recent decades could cause diverse environmental problems, including transport and industrial pollution that may be associated with local climate change, and the consequent effect on health (Eludoyin and Adelekan, 2012). In

fact, human activities are defined by weather conditions. The approach of coping with the uncomfortable weather is also largely influenced by the socio-economic status of the people, and strategies; including dressing mode, clothing materials and use of air conditioners and fan (Eludoyin and Adelekan, 2012). It is important to study what season/weather condition affects people and their physiological wellbeing. This study will establish preferred season of physiological comfort in Ibadan North Local Government Area, Ibadan.

Materials and Method

Ibadan is the capital of Oyo State and has been an important administrative centre since colonial time. The city was founded in the 1820's (Mabogunje, 1968) and lies between longitude 3° 56' 23.2296" East of the Greenwich meridian and 7° 22' 36.2496" North of the equator. In terms of geographical expansion, Ibadan has almost doubled in spatial size over nine years, 1982 to 1991, from 130.5 square kilometres to 240 square kilometres (Egbinola and Amobichukwu, 2013). By the year 2000, it was estimated that Ibadan covered an area 400 km^2. The growth of the built-up area during the second half of the 20th century (from 40 km^2 in the 1950s to 250 km^2 in the 1990s) shows clearly that there has been an underestimation of the total growth of the city, and its location advantage has given it the prominence as a favourable centre for political, commercial, educational, industrial and social activities.

The climate of Ibadan is tropical with distinct wet and dry seasons and a mean minimum annual temperature of 21^{0}C (68.8^{0}F) but in consonance with seasonal variations in radiation, sunshine and cloud cover, the mean annual temperature, could change. Between

March and October, the prevalent winds in the city is the moist maritime South-west monsoon which blows inland from the Atlantic Ocean, this is the period of rainy season. November to February is the period of dry season when the dry dust laden winds blow from the Sahara desert. The mean annual rainfall of about 1,205 mm, falling in approximately 109days with two rainfall peaks in June and September (Egbinola and Amobichukwu, 2013). Akinbobola *et al*., (2018), reported that higher monthly mean rainfall amount is mostly observed in June (105mm) and September (115 mm) however, peak monthly mean rainfall amount of (380mm) was experienced in June 2002 with annual mean monthly rainfall of 235mm in the year.

Ibadan North local government area (LGA) was selected for this study, being one of the five LGAs in Ibadan, the capital of the state of Oyo. The Yoruba's is preponderant in the area however other local and foreign ethnic groups such as Hausa/Fulani, Igbos, Edos, Igbiras, Urbohos, Nupes, Ijaws, Indians, the Lebanese etc, are also commonly found around in the LGA. With a population of 379,729 (NBS, 2012), it has the highest level of urbanisation (85%) in the state. It also enjoys the presence of prominent educational institutions such as the Polytechnic and the University of Ibadan, and the Oyo State Government Secretariat. This administrative area is characterised by a diversity of residential density areas. Like the whole city itself, it has a dual structure: a poorly-planned traditional region and a relatively well-laid-out modern sector (Osayomi, and Orhiere, 2017). Data for the study were obtained from primary sources. Ibadan North local Government was created from the defunct Ibadan municipal Government on the 27th of

August, 1991. It has a land area of 36.82 square kilometre and twelve delineated ward boundaries it represents 4.66% of the total land area of the metropolitan city. The Local Government is surrounded by Akinyele Local Government in the North; Ido, Ibadan North West and South West Local Government in the West; Egbeda, Lagelu and Ibadan North East Local Governments in the East and Ibadan South East Local Government in the South. According to the 1991 census, Ibadan North Local Government Area had a population of 300,939, the city doubled in population over thirty years, from 627,379 in 1963 to 1,222,570. The projected population of the area in 2010 is put at 379,729 (NBS, 2012).

This is estimated to be 389,412 at a growth rate of 2.55% in 2021. Data were collected from questionnaires administered to residents of the study area. Simple random sampling was used to collect data from the respondents around these land uses; industrial, commercial and residential area of Ibadan North Local Government Area. 25% of the respondents were randomly selected from residential area while the remaining 75% were selected from both industrial and commercial area of the city. This is due to the fact that majority of people will be in their work places as data were collected in the data during normal work hours. A total of 200 questionnaires administered for the purpose of the study. The female (106) constitutes a slight majority of 53% while the male (94) is 47% of the respondents. This is uncommon as the female constitutes a slight majority according to NBS (2012). Both descriptive and inferential statistics were used for this study. Descriptive statistics used simple frequency and percentages while chi square analysis was the inferential statistics employed for test of

association between socio economic characteristics and preferred season of physiological comfort @ 5% level of significance.

Results and Discussion

Respondents perceived responses to weather condition

Result in Table 1 presents statements on how well respondents body function with changing weather condition. From the table, 16.5% of the total respondents strongly agree and another 63% agree that their body function and cope well under warm and humid weather. The majority here agree that warm and humid weather is more suitable for their

body functioning. This is not surprising as the temperature is neither extremely low nor high during this period. Clothing are moderate as there is no need for cardigan, sweater. The warm and humid climate is referred to as the tropical rainforest climate or the equatorial monsoon. This climate is influenced by the South Atlantic Ocean monsoons brought into the country by the air mass of the maritime tropical (MT), a warm moist sea with the seasonal wind of the surface. The warmth and high humidity give it a strong tendency to ascend and produce a large amount of rainfall, which is a result of the condensation of water vapor in the rapidly rising air (Mobolade and Pourvahidi, 2020).

Table 1: General body responses of respondents to weather conditions

Statement (My body functions and copes well under….)	Strongly agree	Agree	Strongly disagree	Disagree	undecided	Weighted average
Warm and humid weather (rainy season)	33(16.5)	126(63)	12(6)	18(9)	11(5.5)	2.9
Hot and dry weather (dry season)	15(7.5)	69(34.5)	46(23)	60(30)	10(5)	2.5
Cold and dry weather (harmattan)	39(19.5)	110(55)	12(6)	29(14.5)	10(5)	2.7

Also, 19.5% strongly agree and another 55% agree that their body function and cope well under cold and dry weather. This weather is associated with cold and dry harmattan wind, hot afternoon high-temperature range, and intense sunshine and cold nights, but not as much as the hot-dry climate. Temperature is characterized by high temperatures in the day with a drop at night. There are no severe changes in temperature like the hot-dry climate (Mobolade and Pourvahidi, 2020). Table 1 show that the respondents agree that their body function and cope well under warm and humid weather and also cold and dry weather. The hot and dry weather is the least

preferred as 23% strongly disagreed and about one third (30%) also disagreed that their body cope and function well under hot and dry weather. The weighted score also confirm this submission as warm and humid weather had the highest value (2.9). In essence, hot and dry weather is discomforting. The hot-dry season is characterized by high temperatures during the day with a sharp drop at night. Humidity is low, especially in the summer, which causes rapid evaporation and low rainfall (Mobolade and Pourvahidi, 2020).

The result from Table 2 further corroborates Table 1 as it reveals that majority (61.5%) of

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the respondents are most comfortable (physiologically) and therefore prefer the rainy season. However, harmattan is the least (16.0%) comfortable and therefore the least preferred season according to the table.

Table 2: Distribution of respondents by preferred season

Season	Frequency	Percent
Harmattan (Dec-Jan)	32	16.0
Rainy season (Mar-Oct)	123	61.5
Dry season (Nov-Feb)	45	22.5
Total	200	100

The study further revealed that feeling of coldness and catarrh is the two major body discomforts that people sometimes experience during low temperature seasons (harmattan). Majority of the respondents noted that cold (68%), catarrh (68%) and shivering (61%) are major discomforts associated with harmattan season (Table 3). The table shows shivering is the commonest (3.23) body reaction associated with low temperature season.

Table 3: Body reaction during the low temperature seasons

Body discomfort	Always	Sometimes	Rarely	Never	Don't know	Weighted score
Cold	17.0	58.0	16.0	8.5	0.5	3.06
Shivering	3.0.	61.0	17.0	18.5	0.5	3.23
Catarrh	14.0	68.0	12.0	16.0	0.0	1.10

Respondents' perceived effect of heat on body

The perceived effect of heat on body (Table 4) includes sweat and headache. Respondents indicated that they always (60.4%) sweat as a result of heat. Further results from the table shows that heat sometimes (51.8%) gives rise to headache but never (70.7%) causes panting. Eludoyin and Adelekan, (2012) discovered weather-related sicknesses to include heat rash, severe cold, and dry throat. Headaches on the other hand topped the concerns in both dry and rainy seasons, and dry skin in the Harmattan.

Table 4: Effect of heat on the body

Body discomfort	Always	Sometimes	Rarely	Never	Don't know
Headache	12.6	51.8	18.3	16.2	1.0
High body temperature	15.2	45.1	20.1	16.8	2.7
Fatigue (tiredness)	14.8	43.7	23.0	16.4	2.2
Lassitude (feeling like doing nothing)	17.3	34.1	25.9	21.6	1.1
Fever	3.7	29.4	25.7	39.0	2.1
Dizziness	3.7	29.4	25.7	39.0	2.1
Panting (unable to breath)	1.1	8.2	13.6	70.7	6.5
Sweating	60.4	31.6	5.3	2.1	0.5

Pearson chi-square test was used to establish the relationship between socio economic characteristics of respondents and the season of physiological comfort. The test revealed that there is no significant difference between the ages of respondents and their perceived season of physiological comfort (χ^2 value = 12.634, df=16, and P-value of 0.699 which is greater than 0.05). This shows that age of the respondents does not have anything to do with their perceived season of physiological comfort

Table 5: Pearson Chi Square Test of association between age and season of physiological comfort

Statistics	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.634[a]	16	.699
Likelihood Ratio	14.407	16	.568
Linear-by-Linear Association	.290	1	.590
N of Valid Cases	200		

Result in Table 6 reveals that there is no significant difference between season of physiological comfort and occupation of respondents (χ^2 = 0.413, df=4 and P-value =0.981, which is greater than 0.05). This is contrary to the submission of Stewart and Oke, (2010). They argued that outdoor workers tolerate higher temperatures than sedentary workers while older individuals tend to prefer warmer conditions than younger individuals. However, this study has established that there is no association between age, occupation and preferred season of physiological comfort.

Table 6: Pearson Chi Square Test of association between occupation and season of physiological comfort

Statistics	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.413[a]	4	.981
Likelihood Ratio	.416	4	.981
Linear-by-Linear Association	.320	1	.571
N of Valid Cases	168		

The coping strategies against thermal discomfort in Nigeria are related to the seasonal nature of the climate. They are limited to changing clothing materials, wears adjustment and for few that can afford it, the indoor use of fan or air conditioner.

Conclusion and Recommendation

This study concludes that warm and humid (rainy) season is the most comfortable season of the year. But age and occupation does not influence the preferred season of psychological comfort. Therefore, adaptation and coping mechanisms are recommended to reduce the effect of uncomfortable seasons. Eco-friendly practices such as good ventilation, landscaping and tree planting should always be put into building construction so as make provision for fresh air during the hot season while nose cover should be used to reduce the effect of dust during harmattan.

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