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MEASUREMENTS AND ANALYSIS OF AIRCRAFT NOISE AND ITS IMPACT ON PEOPLE AROUND SOME NIGERIAN AIRPORTS.

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ABSTRACT

Acoustical and social measurements as to ascertain how aircraft noise affects people near Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports were made. The noise pollution level (L_{NP}), day-night level (L_{dn}) and noise exposure forecast (NEF) which were the main noise indices used in this study were found to be higher than recommended doses respectively. Again, maximum noise level (L_{max}), A-weighted noise level (L_A) and deafening noise level far exceeded the recommended levels. The correlation coefficient r, between objective and subjective measurements for Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports were + 0.80, + 0.54, and + 0.36, respectively. Based on these results residents near Nigerian airports and exposed to intense aircraft noise do suffer some serious psychological, physiological and social danger.

KEYWORDS: Aircraft noise, acoustical measurements, social measurements, noise levels.

INTRODUCTION

Noise generally, is described as unwanted sound. As unwanted or unpleasant sound it can annoy although this depends both on its quality and the attitude of individual to it. It can damage and destroy depending on its level. (Osada, 1991) states that aircraft noise, especially noise from jet aircraft, has given rise to serious social problems around many airports because of its impulsiveness, high sound pressure level and sudden occurrence.

Aircraft noise can be described as the noise generated by aircraft during take-offs, landings, run-up tests and maintenance and flight, which causes a great distress and disturbance to people around the airports. It is found out that aircraft noise and noise from other sources affect human beings. These effects include hearing impairment, sleeplessness, annoyance, irritation of the body, mental fatigue and communication disturbance, among other effects (Brooker and Davies, 1984). In this study a number of variables from the questionnaire data were used in the analysis. These include annoyance, speech interference, listening to radio, television, telephone conversation, verbal conversation interferences, hearing impairment, rest/relaxation interference, ear irritation, body fatigue and headache.

A number of researchers have conducted studies on the effects of aircraft noise on the people residing near airports. Yamamoto *et al* (1999) under the supervision of the Research Study Committee of Aircraft Noise Influences to Health which consisted of eighteen medical doctors, medical scientists, epidemiologists, and environmental engineers undertook a study survey on the state of noise exposure and the possible adverse effects of aircraft noise on the health of residents near Kadena, Okinawa and Futenma airfields from 1995 to 1999. Their findings reveal that aircraft noise around the airfields could be described as "Murderous"

Obisung (2002) carrying out a study on the measurements and analysis of aircraft noise and community reactions in parts of Southern Nigeria, discovered that aircraft noise causes serious damage to health of people living or doing business around Nigerian airports, and that the damage affects social, psychological, physiological and economic life of the people exposed to this noise.

NOISE INDICES AND LEVELS

The main noise indices used in this study were noise pollution level, day-night level and noise exposure forecast.

NOISE POLLUTION LEVEL (L_{NP})

Noise pollution level (L_{NP}) according to Magrab (1975) is expressed as shown in equation 1.

$$L_{NP} = L_{eq} + (L_{10} - L_{90}) \qquad (1)$$

where L_{eq} = Energy mean of the A-weighted level over specific period of time.

$$L_{eq} = 10 \log_{10} \left(\sum_{i=1}^{N} f_i \, 10^{\left(L_i / 10 \right)} \right)$$

where f_i = fraction of time spent in L_i

L_i = A-weighted sound level at a particular interval of time.

L_{10} = A-weighted sound pressure level exceeded for 10% of the observation period.

L_{90} = A-weighted sound pressure level exceeded for 90% of the observation period.

The U. S. Federal Environmental Pollution Agency (FEPA) according to Magrab (1975) recommends that: $L_{NP} > 88$ (dBA) is clearly unacceptable,

$74 < L_{NP} < 88$ (dBA) is normally unacceptable,

$62 < L_{NP} < 74$ (dBA) is normally acceptable, $L_{NP} < 62$ (dBA) is clearly acceptable.

DAY- NIGHT LEVEL (L_{dn}):

L_{dn}, according to Cunniff (1977), is expressed as shown in equation 2.

$$L_{dn} = 10 \log_{10} \frac{1}{24} \left(\sum_{i=1}^{N} f_i \, 10^{\left(L_i / 10 \right)} \right) \qquad (2)$$

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Table 1: Summary of measurement locations and number of people interviewed.

Airport	Code	Measurement locations/sites	Age distribution (years)				Number of people interviewed	Total	% Return Rate
			15-29	30-39	49-49	50 & above			
Margaret Ekpo,	C1	FAAN Nur./Pri./Sec. Schools	70	31	14	6	121	389	70.73
	C2	FAAN Staff Quarters	15	19	7	4	45		
	C3	Fed. Govt. Girls College	45	16	12	6	79		
	C4	MCC Road area	12	20	15	3	50		
	C5	IBB Way/Marian Road area	11	25	13	6	55		
	C6	Airport Premises	10	13	12	4	39		
Port Harcourt	PH1	FAAN Staff Quarters I	6	9	7	2	24	203	67.67
	PH2	FAAN Staff Quarters II	5	16	8	1	30		
	PH3	FAAN Staff Quarters II	3	12	7	3	25		
	PH4	Mile 2	8	17	6	4	35		
	PH5	Frontage of some residences near the airport	5	25	16	3	49		
	PH6	Airport premises	7	16	14	3	40		
Murtala Muhammed, Lagos	L1	Ikeja area	18	22	14	8	62	294	73.50
	L2	Agege area	11	34	19	5	69		
	L3	Nigerian Police College area	15	21	14	6	56		
	L4	Frontage of Nigeria Airways building	6	27	12	7	52		
	L5	Airport premises	8	31	11	5	55		
Total								886	70.63

The U. S. Federal Environmental Pollution Agency (FEPA) according to Cunniff (1977) recommends that: $L_{nd} > 70$ (dBA) can cause serious temporary or permanent hearing loss with time, $55 < L_{dn} < 70$ (dBA) can cause sentence intelligibility, community complaints and annoyance, and $L_{nd} = 55$ (dBA) is desirable outdoor noise level for residential neighbourhoods.

NOISE EXPOSURE FORECAST (NEF)

NEF according to Cunniff (1977) is expressed as shown in equation 3.

$$NEF = L_{dn} - 35 \pm 3 \qquad (3)$$

Where L_{dn} = day-night level

Magrab (1975) and Cunniff (1977) report that NEF < 24 causes no complaints by individuals in residential, commercial and industrial establishments, hostels, offices, schools, hospitals, and churches; 24 < NEF < 30 causes some complaints by people in the schools, churches and hospitals; 30 < NEF < 40 is normally not acceptable by some people; and NEF > 40 is very high and therefore, clearly unacceptable by all.

Table 2: Summary of noise indices obtained by acoustical measurements at Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports.

Airport	Noise indices		
	L_{dn} dB(A)	NEF	L_{NP} dB(A)
Margaret Ekpo, Calabar	77.0	45.0	91.0
	78.0	46.0	91.5
	78.0	46.0	95.0
	77.0	45.0	89.5
Mean	77.5	45.5	91.8
Port Harcourt	77.0	45	86.0
	78.0	46	88.8
	77.0	45	88.5
	78.0	46	88.3
Mean	77.5	45.5	87.9
Murtala Muhammed Lagos	79	47.0	106.5
	79	47.0	93.0
	78	46.0	91.5
	79	47.0	93.8
Mean	78.8	46.8	96.2

These noise levels were found to be higher than the recommended doses.

Table 3: Summary of daily aircraft noise levels at different locations around Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports.

Airport	Measurement Locations	L_{min} ± 5 dB(A)	L_{max} ± 5 dB(A)	Deafening level ± 5 dB(A)	A-weighted BPL. ± 5 dB(A)
Margaret Ekpo, Calabar	C1	107	110	86.5	101
	C2	103	105	87.5	102
	C3	112	115	87.5	102
	C4	104	108	82.5	97
	C5	113	116	81.5	96
	C6	109	112	86.5	101
Port Harcourt	PH1	108	110	94.5	109
	PH2	104	108	91.5	106
	PH3	103	110	91.5	106
	PH4	106	112	94.5	109
	PH5	110	114	93.5	108
	PH6	112	116	98.5	113
Murtala Muhammed, Lagos	L1	106	110	93.5	108
	L2	110	116	98.5	113
	L3	104	108	86.5	101
	L4	110	113	96.5	111
	L5	112	114	97.5	112

MATERIALS AND METHODS

Materials

For acoustical (objective) measurements, the instrument used was a precision sound level meter Bruel and Kjaer (B&K type 2203) calibrated with B&K pistonphone type 4220 with its associated octave band filter (B&K type 1613). The meter was set on slow response and A-weighting network. For social (subjective) measurements the instrument used was questionnaire. The questionnaire contained standard questions to elicit community reactions about aircraft noise.

Methods

A number of measurements of noise levels (acoustical surveys) were made in and around Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports. The distance between the noise source and point of measurement was taken to be 30 metres. The sound level meter was held at arms' length and about 1.5 metres high corresponding to the average ear level of respondents. Measurements were made during aircraft engine tuning as well as aircraft landings and takeoffs. Readings were taken every 30 minutes with the use of a stopwatch for a period of about 15 to 24 hours during daytime (7.00 a.m. – 10.00 p.m.) and nighttime (10.00 p.m. – 7.00 a.m.). These measurements were made within the time periods that aircraft engine was tuning but not all through the night. This was done in order to obtain day-night level (L_{dn}). Questionnaire was used for the social survey. It consisted of standard questions aimed at eliciting information about the effects of aircraft noise on human beings working in and living around the vicinity of the airports under study. The questionnaire was designed to have five degrees of response 5, 4, 3, 2, 1 representing Extremely Severe (ES), Very Severe (VS), Severe (S), Not Very Severe (NVS), Little or No Effect (L), respectively. Copies of the questionnaire were distributed

randomly to people who live or work around the measurements locations (Table 1) who were aged fifteen (15) years and above, who could also read and write. A total of eight hundred and eighty six (886) copies of the questionnaire out of one thousand two hundred and fifty (1250) were returned, representing a return rate of about 71%.

RESULTS

Table 2 shows noise indices obtained by acoustical measurements at Margaret Ekpo, Port Harcourt, Murtala Muhammed international airports. From this Table the mean L_{dn}, NEF and L_{NP} obtained for Margaret Ekpo international airport were 78 dB(A), 46 and 92 dB(A); for Port Harcourt international airport were 78 dB(A), 46 and 88 dB(A) and for Murtala Muhammed international airport were 79 dB(A), 47 and 96 dB(A), respectively. Table 3 indicates summary of daily aircraft noise levels at Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports. From the Table, maximum noise level (L_{max}), deafening levels and A-weighted levels far exceed the recommended levels of 85 – 90 (dBA) for 8 hours exposure time, 60 – 65 (dBA) and 70 (dBA) respectively (EPA, 1974 and U.S. Air Force, 1982).

From the questionnaire data obtained from social survey presented in Table 4 summarizes the statistics of responses (in percentages, %) on some of the effects of aircraft noise on

Table 4: Statistics of responses on effects of aircraft noise on community residents around Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports.

S/N	Noise Effects	Responses (in percentage, %)														
		Margaret Ekpo					Port Harcourt					Murtala Muhammed				
		5 ES	4 VS	3 S	2 NVS	1 L	5 ES	4 VS	3 S	2 NVS	1 L	5 ES	4 VS	3 S	2 NVS	1 L
1.	Annoyance	39.1	34.4	19.5	5.4	1.6	30.5	29.6	19.7	14.3	5.9	29.6	28.6	22.1	13.6	6.1
2.	Speech interference	29.8	28.2	24.2	14.4	3.6	33.0	28.1	19.2	13.8	3.6	34.0	32.0	17.0	8.8	7.8
3.	Listening to radio/television interference	37.8	26.2	21.6	12.6	1.8	35.5	24.6	19.7	12.8	7.4	33.3	30.0	17.7	10.2	8.8
4.	Telephone conversation interference	32.4	26.7	23.6	14.7	2.6	39.4	26.1	19.2	10.4	4.9	32.0	27.6	22.1	11.6	6.8
5.	Verbal conversation interference	41.6	28.0	18.3	8.5	3.6	37.4	24.1	20.2	14.8	3.5	35.4	26.9	17.3	11.2	9.2
6.	Hearing impairment (temporary)	47.8	31.9	15.9	3.9	0.5	40.0	25.6	16.7	11.3	9.4	33.7	30.6	13.9	12.2	9.5
7.	Rest/relaxation interference	49.9	24.9	13.1	6.7	5.4	42.4	36.5	19.2	6.4	4.9	10.2	10.9	29.5	25.2	27.2
8.	Ear irritation	30.1	23.7	20.8	20.1	5.4	40.0	34.0	16.7	7.4	2.0	26.5	22.8	21.1	19.4	10.2
9.	Body fatique	29.6	26.5	24.2	15.2	4.6	43.8	35.5	9.9	7.9	4.6	36.4	32.7	17.0	8.8	5.1
10.	Headache	34.7	26.0	25.2	18.7	4.4	44.8	30.5	15.3	4.9	4.4	28.9	25.9	17.3	16.3	11.6

KEY:

ES = Extremely Severe = 5; VS = Very Severe = 4; S = Severe = 3;

NVS = Not Very Severe = 2; L = Little or No Effect = 1

Table 5a: Statistics of aircraft noise rating on annoyance for Margaret Ekpo international airport, Calabar.

Measurement locations (sites)	Noise ratings (X)					Responses (n)	Weighting Rating (nx)	Mean weighting (nx/n)
	5 ES	4 VS	3 S	2 NVS	1 L			
C1	51	44	18	7	1	121	500	4.1
C2	15	20	6	3	1	45	180	4.0
C3	36	22	16	3	2	79	324	4.1
C4	15	27	5	1	2	50	202	4.0
C5	16	12	25	2	0	55	207	3.8
C6	19	9	6	5	0	39	159	4.1
Total	152	134	76	21	6	389	1572	24.1

Table 5b: Correlation between objective and sub-objective responses for Margaret Ekpo international airport, Calabar.

Measurement sites	X	Y	XY	X^2	Y^2	r
C1	101	4.1	414.1	10201	16.81	
C2	102	4.0	408.0	10404	16.00	
C3	102	4.1	418.2	10404	16.18	+ 0.80
C4	97	4.0	388.0	9409	16.00	
C5	96	3.8	364.8	9216	14.44	
C6	101	4.1	414.1	10201	16.81	
Total	599	24.1	2407.2	59835	96.87	

Table 6a: Statistics of aircraft noise rating on annoyance for Port Harcourt international airport, Port Harcourt.

Measurement locations	Noise ratings (x)					Responses (n)	Weighting rating (nx)	Mean rating (nx/n)
	5 ES	4 VS	3 S	2 NVS	1 L			
PH1	11	6	4	2	1	24	96	4.0
PH2	9	7	6	5	3	30	104	3.5
PH3	7	6	5	4	3	25	85	3.4
PH4	11	10	8	5	1	35	130	3.7
PH5	16	10	9	10	4	49	171	3.5
PH6	10	14	12	2	2	40	148	3.7
Total	64	53	44	28	14	203	734	21.8

Table 6b: Correlation between objective and subjective responses on annoyance for Port Harcourt international airport.

Measurement sites	X	Y	XY	X^2	Y^2	r
PH1	109	4.0	436.0	11881	16.00	
PH2	106	3.5	371.0	11236	12.25	
PH3	106	3.4	360.4	11236	11.56	
PH4	109	3.7	403.3	11881	13.60	
PH5	108	3.5	378.0	11664	12.25	+ 0.54
PH6	113	3.7	418.1	12769	13.69	
Total	651	21.8	2366.8	70667	79.44	

Table 7a: Statistics of aircraft noise rating on annoyance for Murtala Muhammed international airport, Lagos.

Measurement sites	Noise Rating (x)					Response (n)	Weighting Rating (nx)	Mean weighting Rating ($^{nx}/n$)
	5 ES	4 VS	3 S	2 NVS	1 L			
L1	18	17	17	5	5	62	225	3.6
L2	22	20	12	11	4	69	238	3.7
L3	20	11	15	7	3	56	206	3.7
L4	20	18	9	8	4	52	191	3.7
L5	28	14	6	6	1	55	227	4.1
Total	108	73	59	37	17	294	1087	18.8

community residents around Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports. The people interviewed in this survey, in addition to the general annoyance with aircraft noise, also reported interference with speech, listening to radio/television, telephone conversation, verbal conversation, hearing, rest/relaxation as well as ear irritation, body fatigue, and headache, among other effects. The correlation coefficient r, between objective and subjective responses on annoyance for Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports was computed using standard statistical formula to be + 0.80, + 0.54 and + 0.36, respectively as shown in Tables 5 (a and b), 6 (a and b) and 7 (a and b). The total noise response (n) was obtained by adding the various noise ratings at each measurement location (site) together, while the weighting rating (nx) was obtained by multiplying noise response at each measurement site by its corresponding degree of response and adding the products together, as indicated in Tables 5a, 6a and 7a.

Table 7b: Correlation between objective and subjective responses on annoyance for Murtala Muhammed international airport, Lagos.

Measurement sites	X	Y	XY	X^2	Y^2	r
L1	108	3.6	388.8	11664	12.96	
L2	113	3.7	418.1	12769	13.69	
L3	101	3.7	373.7	10201	13.69	+ 0.36
L4	111	3.7	410.7	12321	13.69	
L5	112	4.1	459.2	12544	16.8	
Total	545	18.8	2060.6	59499	70.82	

DISCUSSION

From Table 2, we can observe that the noise indices obtained at Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports clearly exceed the recommended levels of 74 (dBA), 55 (dBA), and 24 for noise pollution level (L_{NP}), day-night level (L_{dn}) and noise exposure forecast (NEF) respectively (Magrab, 1975 and Cunniff, 1977). The implication of these results is that people living or doing business in or around the airports could suffer from intense annoyance and from hearing loss, among other effects. From Table 3 people at all measurement sites are exposed to higher L_{max}, deafening level, and A-weighted noise level, respectively. What all these mean is that people at these measurement locations are exposed to intense aircraft noise and so are likely to suffer from psychological, physiological and social problem (Obisung, 2002). Aircraft noise causes annoyance, interference to speech, listening to radio/television, telephone conversation, verbal conversation, hearing, rest/relaxation, as well as ear irritation, body fatique and headache. Studies have shown that attitudinal differences and personality are factors that affect individual annoyance to noise, and that the higher the sound level the louder and more annoying a noise is likely to be (Harris, 1979; Osada, 1991).
The correlation coefficient between objective and subjective responses for Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports, as shown in Tables 5b, 6b and 7b, respectively shows a positive relationship which therefore, implies that respondents around the airports generally hate noise, and this may be one of the reasons they intensely react to any noise level increase.

CONCLUSION

The results of this study show that people living or doing business around the airports do suffer a lot of psycho-social and physiological problems which include annoyance, speech, radio/television and verbal conversation as well as body fatique, among others. These results agree with findings of other previous researchers. In order to protect these people from effect of excessive aircraft noise it is necessary that Federal Government of Nigeria should faithfully implement existing anti-noise laws and ordinances. Also the enlightened and concerned members of the public should organize enlightenment campaigns against excessive noise especially aircraft and industrial noise, since such campaigns are helpful in making the public understand the extent of danger excessive noise causes the people expose to it.

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Table 5b: Correlation between objective and sub-objective responses for Margaret Ekpo international airport, Calabar.

Measurement sites	X	Y	XY	X^2	Y^2	r
C1	101	4.1	414.1	10201	16.81	
C2	102	4.0	408.0	10404	16.00	
C3	102	4.1	418.2	10404	16.18	+ 0.80
C4	97	4.0	388.0	9409	16.00	
C5	96	3.8	364.8	9216	14.44	
C6	101	4.1	414.1	10201	16.81	
Total	599	24.1	2407.2	59835	96.87	

Table 6a: Statistics of aircraft noise rating on annoyance for Port Harcourt international airport, Port Harcourt.

Measurement locations	Noise ratings (x)					Responses (n)	Weighting rating (nx)	Mean rating (nx/n)
	5 ES	4 VS	3 S	2 NVS	1 L			
PH1	11	6	4	2	1	24	96	4.0
PH2	9	7	6	5	3	30	104	3.5
PH3	7	6	5	4	3	25	85	3.4
PH4	11	10	8	5	1	35	130	3.7
PH5	16	10	9	10	4	49	171	3.5
PH6	10	14	12	2	2	40	148	3.7
Total	64	53	44	28	14	203	734	21.8

Table 6b: Correlation between objective and subjective responses on annoyance for Port Harcourt international airport.

Measurement sites	X	Y	XY	X^2	Y^2	r
PH1	109	4.0	436.0	11881	16.00	
PH2	106	3.5	371.0	11236	12.25	
PH3	106	3.4	360.4	11236	11.56	
PH4	109	3.7	403.3	11881	13.60	
PH5	108	3.5	378.0	11664	12.25	+ 0.54
PH6	113	3.7	418.1	12769	13.69	
Total	651	21.8	2366.8	70667	79.44	

Table 7a: Statistics of aircraft noise rating on annoyance for Murtala Muhammed international airport, Lagos.

Measurement sites	Noise Rating (x)					Response (n)	Weighting Rating (nx)	Mean weighting Rating ($^{nx}/n$)
	5 ES	4 VS	3 S	2 NVS	1 L			
L1	18	17	17	5	5	62	225	3.6
L2	22	20	12	11	4	69	238	3.7
L3	20	11	15	7	3	56	206	3.7
L4	20	18	9	8	4	52	191	3.7
L5	28	14	6	6	1	55	227	4.1
Total	108	73	59	37	17	294	1087	18.8

community residents around Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports. The people interviewed in this survey, in addition to the general annoyance with aircraft noise, also reported interference with speech, listening to radio/television, telephone conversation, verbal conversation, hearing, rest/relaxation as well as ear irritation, body fatigue, and headache, among other effects. The correlation coefficient r, between objective and subjective responses on annoyance for Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports was computed using standard statistical formula to be + 0.80, + 0.54 and + 0.36, respectively as shown in Tables 5 (a and b), 6 (a and b) and 7 (a and b). The total noise response (n) was obtained by adding the various noise ratings at each measurement location (site) together, while the weighting rating (nx) was obtained by multiplying noise response at each measurement site by its corresponding degree of response and adding the products together, as indicated in Tables 5a, 6a and 7a.

Table 7b: Correlation between objective and subjective responses on annoyance for Murtala Muhammed international airport, Lagos.

Measurement sites	X	Y	XY	X^2	Y^2	r
L1	108	3.6	388.8	11664	12.96	
L2	113	3.7	418.1	12769	13.69	
L3	101	3.7	373.7	10201	13.69	+ 0.36
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L5	112	4.1	459.2	12544	16.8	
Total	545	18.8	2060.6	59499	70.82	

DISCUSSION

From Table 2, we can observe that the noise indices obtained at Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports clearly exceed the recommended levels of 74 (dBA), 55 (dBA), and 24 for noise pollution level (L_{NP}), day-night level (L_{dn}) and noise exposure forecast (NEF) respectively (Magrab, 1975 and Cunniff, 1977). The implication of these results is that people living or doing business in or around the airports could suffer from intense annoyance and from hearing loss, among other effects. From Table 3 people at all measurement sites are exposed to higher L_{max}, deafening level, and A-weighted noise level, respectively. What all these mean is that people at these measurement locations are exposed to intense aircraft noise and so are likely to suffer from psychological, physiological and social problem (Obisung, 2002). Aircraft noise causes annoyance, interference to speech, listening to radio/television, telephone conversation, verbal conversation, hearing, rest/relaxation, as well as ear irritation, body fatique and headache. Studies have shown that attitudinal differences and personality are factors that affect individual annoyance to noise, and that the higher the sound level the louder and more annoying a noise is likely to be (Harris, 1979; Osada, 1991).
The correlation coefficient between objective and subjective responses for Margaret Ekpo, Port Harcourt and Murtala Muhammed international airports, as shown in Tables 5b, 6b and 7b, respectively shows a positive relationship which therefore, implies that respondents around the airports generally hate noise, and this may be one of the reasons they intensely react to any noise level increase.

CONCLUSION

The results of this study show that people living or doing business around the airports do suffer a lot of psycho-social and physiological problems which include annoyance, speech, radio/television and verbal conversation as well as body fatique, among others. These results agree with findings of other previous researchers. In order to protect these people from effect of excessive aircraft noise it is necessary that Federal Government of Nigeria should faithfully implement existing anti-noise laws and ordinances. Also the enlightened and concerned members of the public should organize enlightenment campaigns against excessive noise especially aircraft and industrial noise, since such campaigns are helpful in making the public understand the extent of danger excessive noise causes the people expose to it.

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