

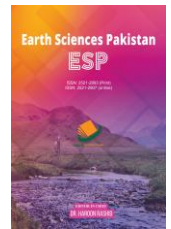


ZIBELINE INTERNATIONAL

ISSN: 2521-2893 (Print)

ISSN: 2521-2907 (online)

CODEN: ESPADC



## RESEARCH ARTICLE

# ESTIMATION OF NOISE LEVELS IN THE ROAD SIDE PARKS AND STUDY OF ITS IMPACTS ON HEALTH OF VISITORS IN FAISALABAD

Muhammad Ilyas<sup>1\*</sup>, Muhammad Azhar Ali<sup>1</sup>, Abdul Nasir Awan<sup>1</sup>, Sajjad Haider<sup>2</sup>, Adnan Shahid<sup>3</sup>

<sup>1</sup>Department of Structures and Environmental Engineering, University of Agriculture, Faisalabad, Pakistan

<sup>2</sup>Department of Stat, Government College University, Faisalabad, Pakistan

<sup>3</sup>Water Management and Research Center, University of Agriculture, Faisalabad, Pakistan

\*Corresponding Author Email: [ilyas\\_nuhd786@yahoo.com](mailto:ilyas_nuhd786@yahoo.com)

This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ARTICLE DETAILS

## ABSTRACT

## Article History:

Received 24 November 2018

Accepted 25 December 2018

Available online 29 January 2019

## ABSTRACT

Our environment is comprised of land, air and water, which shows symmetry and balance. Any kind of intervention in the constituents of the environment causes environmental pollution. Noise pollution is the result of one of these effects. It is associated with type/density of noise producing source and its distance. The present study was taken up to investigate the effect of noise pollution on the health of local community. The study was carried out to estimate the increased noise levels at two sites in Faisalabad, namely Canal Park located near the roadside (98 FT) in the form of narrow strip, and the Site-2 Gat Wala Park located (368 ft) away from the main road, and study of its impacts on health of coming visitors. It is concluded from the study that the Visitors were satisfied with the peaceful and calm environment of Site-2 Gat Wala Park while they were unsatisfied with site-1 Canal Park due to its noisy environment. Moreover, the distance of parks from the main road in addition to some other factors like, road and vehicles conditions, density of traffic etc. has adverse impact upon parks environment as well as health of visitors coming in the parks.

## KEYWORDS

Noise pollution, health, Stress, Annoyance, Traffic density

## 1. INTRODUCTION

The noise pollution has become alarming issue across the world. The noise levels were high and alarming in the areas like industrial-Cum residential, Educational, Commercial-Cum residential, Recreational, and Silence zone [1]. Noise can create annoyance and is a big factor of the environmental pollution which often affects the human health, working people or inhabitants in the urban areas have to face increased noise levels. Noise pollution as compared to other environmental issues has greatly attracted the people. During the last decade, in urban areas it has become major problem for the community and its adverse effects upon health have been reported in the form of documents [2]. As per study of World Health Organization (WHO) evaluation regarding this factor of noise about one million disability-adjusted life spans were found to be expired in the countries of the Western Europe due to noise pollution.

However, Suggestions as important part of the environmental issues and burning issues should be encouraged [3]. Green scenery has great positive impacts upon the environment as per scale of analysis Green areas have no significant change with people having exposure of 55 to 59 dB(A) and more than 70 dB(A) by Agglomeration analysis and power full relation between noise and green areas were analyzed by Geographical Weighted Regression GWR analysis and similarly urban morphology has also significant impacts on noise pollution [4]. Noise pollution and its impacts upon health can be studied through GIS techniques and the instant method was proved more effective in the areas without census. Further 40 Km/hr reductions in speed can reduce in noise level upto 30 % and If we look upon its impacts on the health of individuals, the increased noise levels

during peak time due to high traffic flow affect the people badly and further non-communicable noise has also bad impacts upon the health of patients, like irritation and headache [5-7]. Noise pollution due to increased traffic load has link with disease of cardiovascular [8]. The people found suffering from injuries affected by the Traffic load which is also responsible for polluting the environment with lead, toxicity and lung diseases and other health issues.

People financially strong and educated are well informed of impacts of noise levels on health. It was also found that noise levels have great impacts on marital status people along with its impacts upon daily routine works like rest, reading and communication disturbance etc. 85% individuals of the city responded that the noise pollution has great disturbance in their life, while 90% responded that high levels of the traffic is responsible for headache, hypertension, loss of balance and tiredness [9]. Noise pollution greatly depend upon the type of vehicles like mini buses in addition to traffic flow on congested and busy roads [10]. Bad road conditions, shapes, commercial areas, residential areas and shopping centers are the main source of alarming noise pollution in addition to loud speaker, railway, musical instruments, air traffic etc. [11].

Industrial areas have also vital role for increase of noise levels like cement plant where the noise can be controlled by source of noise along with angle, its transmission and spreading, and noise gaining individuals. From engineering point of view, noise levels can be managed by through some measures like noise reduction of effects, its absorption, and its insulation in order to gain its economical and excellent results of noise control [12]. Noise mitigation techniques and rules should be adopted, like prediction

of noise levels and its impacts on health symptoms as annoyance, sleep interference through model sound propagation [13].

The instant study also deals with impacts of increased noise levels on visitors coming in the natural parks, where they often come along with family for relax, in restful, peaceful, and undisturbed environment. It was observed that sites of some natural parks either are not properly selected for the purpose or they surrounded by the congested roads with all types of traffic. The objectives of this study were

1. To estimate and compare the noise levels in the Canal Park located at Samundri Road, and Gatt Walla Park at Sheikhpura Road, Faisalabad.
2. To study the impacts of increased noise levels on health of visitors using qualitative research method

## 2. MATERIAL AND METHODS

The present study deals with estimation of noise levels in the two local parks which are considered silence zones as per Pakistan Environmental Agency rules, some of the parks of urban areas are very close to the main road and these roads are noisy and affecting the dwelling areas like residential, parks, hospital, offices, educational circles etc.

The effects of noise levels on visitors have been studied along with estimation and comparison of noise levels in the both parks namely, Canal Park located at Samundri Road, and Gatt Walla Park at Sheikhpura Road, Faisalabad. The whole study was conducted with the help of Digital Sound Meter NA-24 and Digital Stop watch was used to measure the time taken for each level.

### 2.1 Research Methodology

The following methodology was adopted for the required task:

1. Two parks were selected for measuring the increased noise levels, one is Site-1 Canal Park located at Samundri Road which is problematic site, while second location was selected at Site-2 Gat Wala Park located at Sheikhpura road, Faisalabad respectively.
2. Two locations were selected at suitable distance from the main road to the problematic site-1 Canal Park, similarly two locations of Site-2 Gat Wala Park were also selected for measuring the noise levels of the parks. Before selecting the locations of the two sites whole parks (two sites) were surveyed so that appropriate and most affected areas and less affected areas of the park can be distinguished.

### 2.2 Sampling and Data Collection

Data was collected from 01 February 2018 to 28 February 2018 at both sites. It was collected at peak hours from 7:00 am to 9:00 am in the morning, 1:00 pm to 3:00 pm in the noon and from 4:00 pm to 7:00 pm in the evening times respectively. Traffic density was measured in addition to estimated Noise level data of the observed locations on all days of two consecutive weeks during the entire spell for one site and similarly next two weeks the study was continued for the second site. The battery as well as routine working calibration were checked before taking any reading on each observation day.

Our data sampling time was divided into three segments of one hour by taking each reading at the interval of 20 minutes. The duration of each reading was first 20 sec of each 20 minutes spell. In this manner daily readings were based on eighteen spells (6 spells / 2hours), for one location of site-1 Canal Park, similarly same sampling methods were adopted while taking readings of increased noise levels at second location of site-1 and

two locations of the site-2, Gat Wala Park. The main purpose for adopting this type of sampling techniques was to obtain the accurate and stable readings. During the whole research activity, the care was taken by keeping the meter be placed along with its microphone facing the direction of noise source (traffic passing through sampled site).

The equivalent noise levels ( $L_{eq}$ ) were measured by:

$$L_{eq} = 10 \log \sum_{i=1}^N 10^{L_i/10} \dots\dots\dots (1)$$

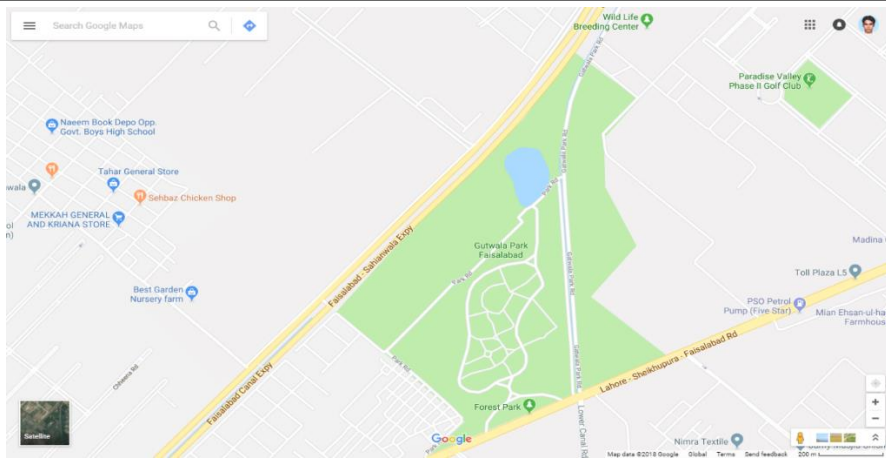
Where N is the number of recorded observations,  $L_i$  is the noise level of  $i$ th record [14].

During this research activity qualitative method was adopted to check the response of the visitors on their health due to noise pollution coming in the both parks under observations for this purpose, Interview proforma were prepared on the basis of both gender of different span of ages. Questions were asked about the impacts of increased noise levels due to traffic on main roads near to the parks like hypertension, stress, annoyance, behavior change etc. instant study was further categorized by taking 60 Samples different ages excluding immature visitors were selected at random from each park to check their general response on the said symptoms due to increased noise levels.

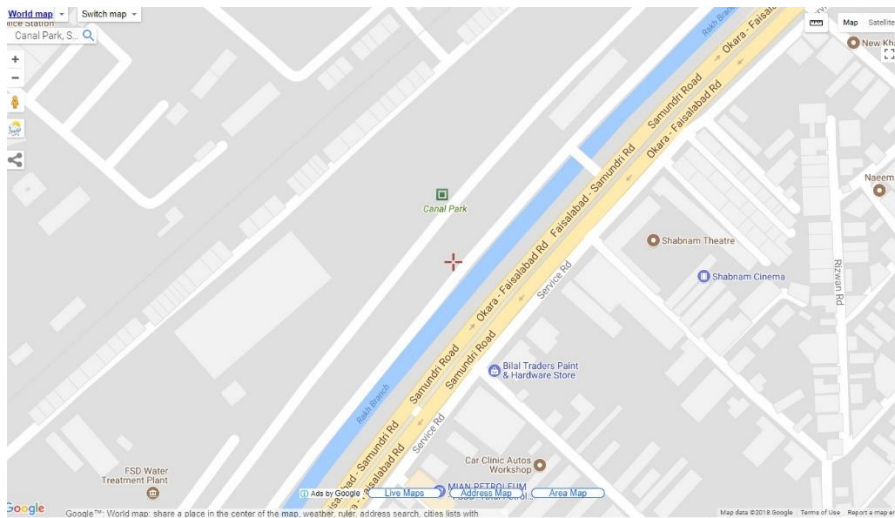
## 3. RESULTS AND DISCUSSION

The whole study was conducted for estimation of noise levels ( $L_{eq}$ ) at two local Parks namely (Site-1 Canal Park) situated at Samundri road and Site-2 Gat Wala situated at Sheikhpura road respectively in Faisalabad city. The two locations of each site were selected for estimating the noise produced by the vehicles of all types at the roads adjacent to the relevant park. Along with noise levels produced by the traffic, traffic density on the roads under observation was also calculated.

The traffic passing through this selected road comprised of buses, trucks, cars, wagons, motorbikes, auto rickshaws along with slow moving vehicles like Carts, Tongas, and Bicycles etc. The high number of traffic load consisting cars, bicycles, bikes, and school buses, and other light traffic were observed high, at peak office and school time from 7:00 am to 9:00 am and at noon from 1:00 pm to 3:00 pm and at evening from 5:00 pm to 7:00 pm. Different levels of noise variation were observed for each location of the Site-1 Canal Park for two weeks. Two locations were selected one near the road side while second in the center of the park, similarly two locations of the Site-2 Gat Wala Park were selected for the same purpose respectively. The relationship of noise levels with traffic density and time and its impacts upon the visitors coming in the park on daily or casual basis were estimated where they come expecting this quiet area for relax, and happiness. The Canal Park is situated at the location dwelling residential and industrial areas and very near to the main road noise producing source. The canal park is found suffering from issue of lack of administration, and the visitors coming in the Canal Park are not looking happy due to noisy area and many people were observed coming in the while driving their bikes, and some time groups of teen ages looking playing their Cricket and other games adding their loud noise and making environment more polluted. While this type of lapse and ignorance were not observed in the Gat Wala Park where people were found satisfactorily with the peaceful and calm environment of the park, while park administration was also looking active for maintaining the park. The most important factor which makes this park peaceful is its distance from the main road noise producing source which is about 368 ft while this distance was measured in the Site-1 Canal Park as 98 ft. This factor clearly indicates distance from the noise producing source has major role in polluting the natural environment.



**Figure 1:** Geographical position of Gatwala Park located 368 ft away from the main road



**Figure 2:** Geographical position of Canal Park, Samundri Road 98 ft away from main road

**3.1 Relationship between Noise Level (Leq) and Traffic Density**

Correlation coefficient and scatter plot were used to analyze the relationship between noise level (Leq) and traffic density between two sites (Site-1 Canal Park, Site-2 Gat Wala Park). This information was not clear reflected in the graph between two variables at two locations of same site, however larger difference in traffic density and distance from main road (traffic Producing Source) of site-2 Gat Wala Park as compared to the site-1 Canal Park has great impacts on noise level as well as health of individuals, it has established practically when we compared the traffic density and noise level results of both Sites.

The Site-1 is located at about 98 ft away from the main road (noise producing source) while The Site-2 is located at about 368 ft away from the main road respectively.

In addition to this some other factors are also responsible for increase of noise levels which are listed as follow:

1. Vehicle speed, engine speed, condition of the vehicle and its use.

2. Improper and misuse of pressure horn and its continuous use which produce high level of noise pollution.
3. Interference of slow-moving vehicles like Tongas, carts etc. in the normal flow of traffic creating often traffic Jam resulting in use of pressure horn and consequently increased noise level.
4. Road conditions also has bad impacts not only upon the vehicles, but it also causes the increased noise levels and use of pressure horn.
5. Different vehicles have different intensity of noise level, like pressure horn, engine, size of vehicles etc. and is highly responsible for creating noise level when derived improperly.

It is notable that the whole study was conducted during the winter peaks season along with ambient Temperature, while the strength of visitors coming in the parks also less due chilling days.

**Table 1:** Day time temperature in Site-2 Gata Walla Park

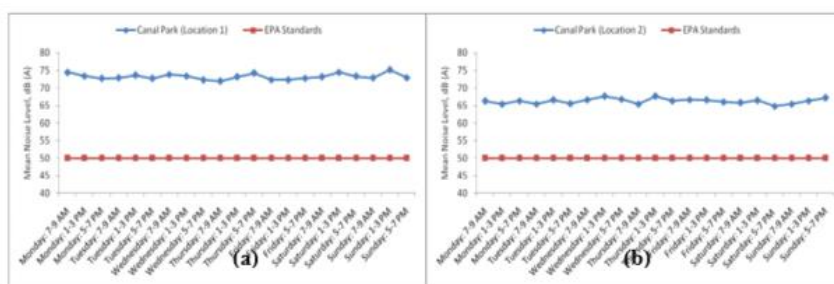
Month	Temperature (°C) at Site 1		Temperature (°C) at Site 2 Max- Temp	
	Min	Max	Min	Max
1-Feb	11	25	10	24
2-Feb	13	26	12	25
3-Feb	13	25	13	25
4-Feb	14	27	13	26

5-Feb	13	26	14	27
6-Feb	14	26	12	25
7-Feb	13	26	13	26
8-Feb	13	25	12	24
9-Feb	14	27	14	27
10-Feb	13	27	13	26
11-Feb	13	26	12	25
12-Feb	16	28	15	28
13-Feb	16	26	15	26
14-Feb	12	25	12	25
15-Feb	13	26	13	26
16-Feb	13	25	12	24
17-Feb	15	28	14	27
18-Feb	13	26	13	26
19-Feb	14	26	12	25
20-Feb	15	28	15	28
21-Feb	15	26	15	26
22-Feb	13	28	13	28
23-Feb	14	26	12	24
24-Feb	14	26	14	26
25-Feb	13	25	13	25
26-Feb	15	27	15	27
27-Feb	16	26	16	26
28-Feb	15	25	15	25

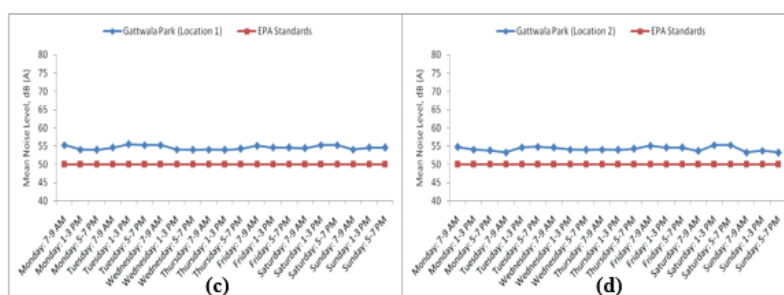
The data of behavior change due to annoyance, stress, communication problems, blood pressure were obtained by qualitative method and for this purpose proforma for demographic information and for valuable comments and response were distributed among the visitors and analyzed through statistical approach using Model for Analysis of Variance ANOVA, t-test, correlation test.

**3.2 Interpretation of Mean Noise Level with Noise Level of EPA (Environmental Protection Agency of Pakistan) Standard**

The figure 3 (a) & (b) reflects the noise levels measured at both locations of site-1 Canal Park during peak hours from 7am to 9 am (Morning), 1pm to 3 pm (Noon) and 7 to 9 pm (Evening) times, it was observed noise levels measured at both locations of the park are very high with mean of 73.2 dB (A) and 66.3 dB (A) and these noise levels are significantly high as compared to EPA standard 50 dB (A) for day time for Silence Zones and these noise levels which are significantly high are affecting the health of the visitors like stress, annoyance, hypertension etc. badly.



**Figure 3:** Comparison of Average Noise Level against PEPA Standard (Site 1)



**Figure 4:** Comparison of Average Noise Level against PEPA Standard (Site 2)

These results clearly indicate that the site-1 Canal Park is problematic site with high noise level as compare to the noise level standard fixed by the EPA. Similarly, the results in Site-2 Gat Wala Park were analyzed in Fig.4 (c) and Fig.4 (b), which shows that the results achieved at this site fall near to EPA Standard 50 dB (A) fixed for silence zone of day time. Main reasons

are obvious C-1 Canal Park is near to the main road (about 98 ft) noise producing source while the Site-2 Gat Wala Park is away from the main road (about 368 ft) noise producing source, and their combined effect can be seen in Fig.5.

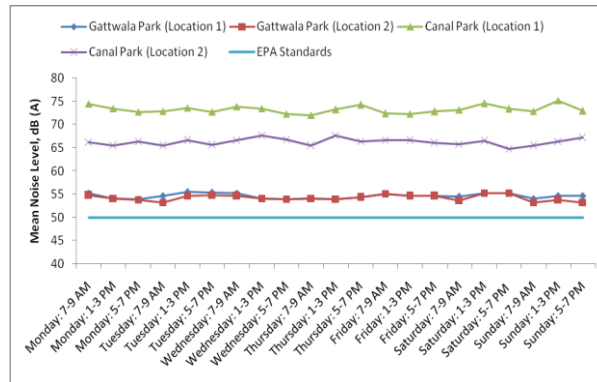


Figure 5: Comparison of Average Noise Level of both sites against EPA Standard

3.3 Effects of Traffic Density on Noise level

It is already established in Fig. 4 and 5 that the increased noise level depends upon the distance from the main road noise producing source, while in Fig.6 the effects of traffic density upon noise levels were analyzed. It is indicated in the Fig.5 that the traffic density in site-1 Canal Park is significantly high due to urban and industrial dwellings while in Site-2 Gat Wala Park the traffic density is low due to its location out of the urban areas where population density is low. The achieved results clearly indicate that the traffic density at site-1 Canal Park is more than double than traffic density measured at the site-2 Gat Wala Park with correlation effects.

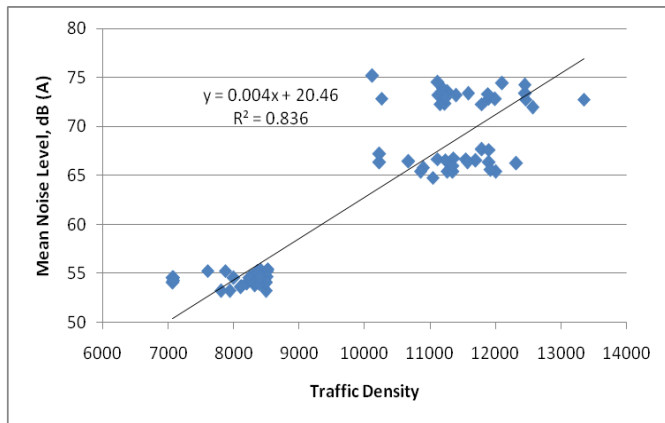


Figure 6: Correlation between traffic density and mean noise level, dB (A)

Correlation coefficient and scatter plot were used to analyze the relationship between noise level (Leq) and traffic density between two sites. Value of R2 is 0.836 which indicates that traffic density has strong and direct relationship with the noise level. This fact was established when we compared the results of traffic density measured at Site-1 Canal Park road side with results of traffic density at Site-2 Gat Wala Park respectively. This fact was also further established when we compared the distance (about 98 ft) of Site-1 Canal Park from the main road with the distance (about 368 ft) of Site-2 Gat Wala Park from the main road respectively.

3.4 Applying Modeling Approach

Following Flow chart gives a brief logic behind study.

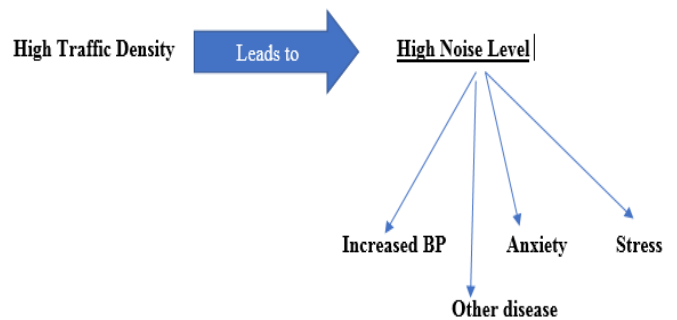


Figure 7: Effects of noise pollution

Step 1: Establishing Traffic Density being source of Noise

First, we establish that the major determinant of Noise is Traffic Density. In other words, Traffic density contributes significantly towards making/creating Noise. For establishing this we have used regression analysis. Following regression results are presented by taking Noise as dependent and Traffic Density as Independent variable.

Table 2: Traffic Density

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.551 <sup>a</sup>	.303	.302	6.91848

a. Predictors: (Constant), Tr. Density

Table 2: ANOVA Test for Average Noise Level and Traffic Density ANOVAa

ANOVA <sup>a</sup>					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	10451.713	1	10451.713	218.356	.000 <sup>b</sup>
1Residual	24028.425	502	47.865		
Total	34480.139	503			

a. Dependent Variable: Noise      b. Predictors: (Constant), Traffic Density (Tr. Density)

**Table 3:** Standardized and unstandardized coefficient Coefficients

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	55.152	.562		98.119	0.000
Tr. Density	151	.010	0.551	14.777	0.000

a. Dependent Variable: Noise

From regression results presented above, it is clear that Traffic Density is major source of Noise at both locations (i.e. Site-1 Canal Park and Site-2 Gat Wala Park)

Step 2: Establishing Traffic Density is different in both locations

For testing that whether traffic density is same at both locations or not? We have applied two-sample t-test.

**Table 4:** Comparison of traffic Density in both sites

Group Statistics				
Park	N	Mean	Std. Deviation	Std. Error Mean
Tr. Density Canal	252	63.7857	3.73336	.23518
Gatwala	252	28.0476	34.12302	2.14955

**Table 5:** Comparison of traffic Density in both sites (Site-1 Canal Park and Site-2 Gat Wala Park)

t-test for Equality of Means						
T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
16.527	257.008	0.000	35.73810	2.16238	31.47987	39.99632

Results from t-test (for equality of Traffic Density at Canal and Site-2 Gat Wala Park) shows that traffic density is significantly different at both sites. The samples show that traffic density at Site-1 Canal Park is almost double compared to Site-2 Gat Wala Park.

It means that Average traffic density is higher in Site-1 Canal Park as compare to the site-2 Canal Park. Following plot also shows same fact. Moreover, variation in traffic density is high in Site-1 Canal Park compared to variation in Site-2 Gat Wala Park.

Step 3: Establishing Noise is different in both locations

Once it is established Traffic density is significant contributor towards Noise and that Traffic density is different in both locations, now it seems logical to test that whether Noise level is different at both locations. For this again independent sample t-test is applied.

**Table 6:** Comparison of Average Noise Level between both sites (Site-1 Canal Park and Site-2 Gat Wala Park)

Group Statistics				
Park	N	Mean	Std. Deviation	Std. Error Mean
Canal Noise	252	69.7698	4.00983	0.25260
Gatwala Noise	252	54.4270	1.76684	0.11130

**Table 7:** T-test for comparison of means between both sites (Site-1 Canal Park and Site-2 Gat Wala Park)

t-test for Equality of Means						
T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
55.584	344.924	0.000	15.34286	0.27603	14.79994	15.88577

The results of t-test indicate that the noise level is significantly higher in Site-1 Canal Park as compared to Site-2 Gat Wala Park.

Step 4: Comparing levels of Blood Pressure, anxiety, Stress at two locations

Now it means we can test for average Blood pressures etc. for these two locations at step 4. If these levels are different, then keeping step-1, 2, 3 in view, it could be logically concluded that increases Traffic Density (hence Increased Noise) leads towards many health-related problems. It was observed that traffic noise levels especially for those parks located very near to the road has great impacts upon visitors' health like communication problem, stress, annoyance, hypertension etc. Normally the visitors come in the park for walk and entertainment purposes but were found complainant of affected by the road traffic noise. They were interviewed through tested instrument (proforma) circulated with Demographic Scale information and containing some important questions related to their health.

During this qualitative study visitors with sample of sixty of different ages were taken from each park and total of 120 during the instant study Symptoms listed below were investigated accordingly are as follow

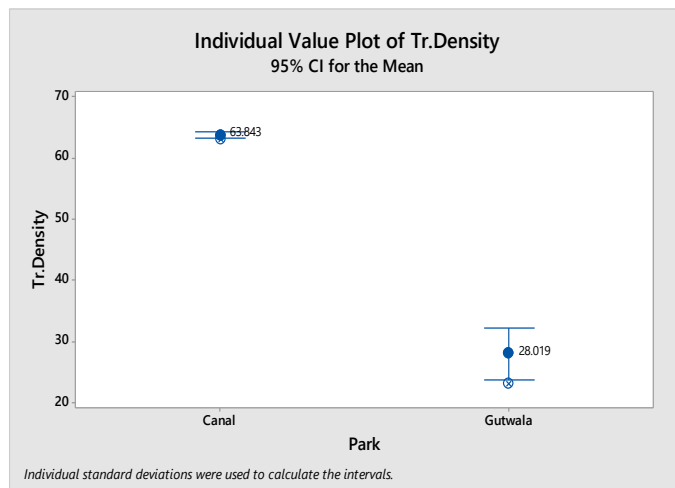
1. Stress
2. Annoyance
3. Communication Problem
4. Sleep loss
5. Blood Pressure

Sampling

Site 1: Site-1 Canal Park at Samundri Road, Faisalabad.  
 Sample: 60 participants including each span of age were taken  
 Site 2: Site-2 Gat Wala Park at Sheikhpura Road, Faisalabad.  
 Sample: 60 participants including each span of age were taken

**4. STATISTICAL RESULTS**

Following information was collected during this qualitative research study:



**Figure 8:** Difference of Average Noise Level at both sites due to larger difference of Traffic Density between both sites.

Fig. 8 shows that the traffic density has great impact upon the increased noise levels, as the noise levels in the Site-1 Canal Park are significantly high with about more than double traffic density as compared to the Site-2 Gat Wala Park.

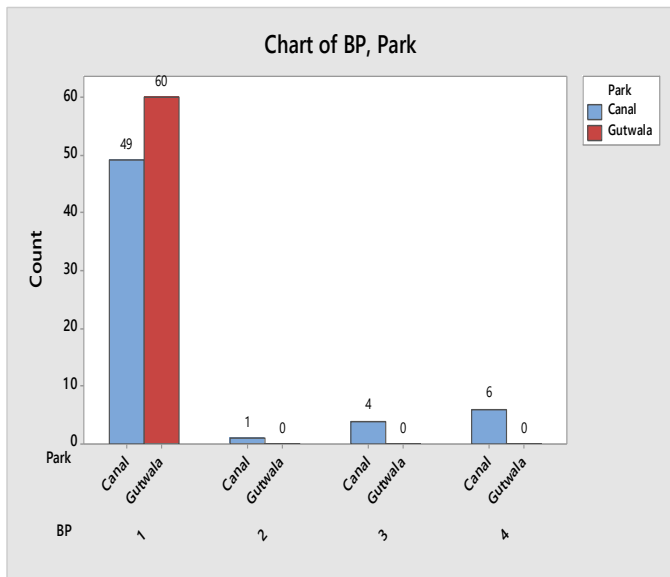


Figure 9: Bar Chart of BP in two Parks

It was observed in fig. 9 that 6 out of 60 visitors responded highly affected by the blood pressure due to noise pollution while 4 out of 60 showed mild and 1 out of 60 showed low response in the site-1 Canal Park, contrarily, all sampled 60 visitors in the Site-2 Gat Wala Park did not show any symptom of stress due to noise pollution, which mean the mostly response observed in this regard was nil (Blood Pressure) and confirming that the environment of the Gat Wala Park is peaceful and calm while environment of the Canal Park is noisy and affecting health of the visitors and similarly other symptoms were investigated through this study.

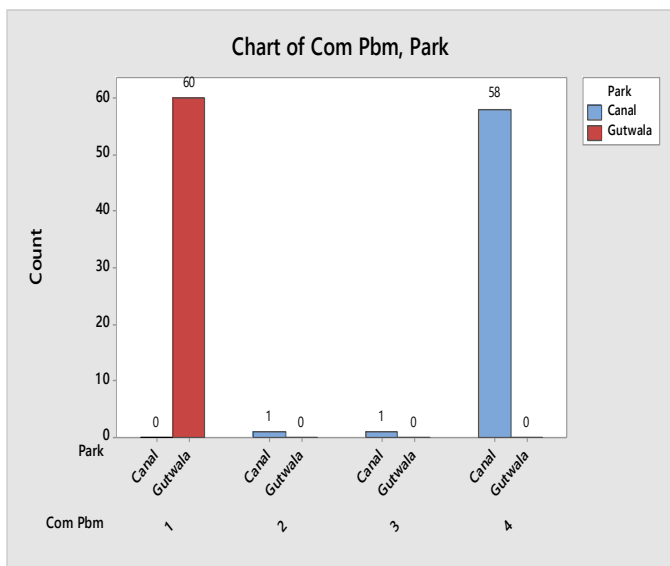


Figure 10: Bar Chart of Communication problem between both sites

It is clearly indicated in the fig.10 that 58 out of 60 visitors responded highly affected by the communication problem (interference) due to noise pollution while 2 showed mild and low response in the site-1 Canal Park, contrarily, all sampled 60 visitors in the Site-2 Gat Wala Park did not show any interference due to noise pollution, which mean mostly response observed in this regard was nil (communication Problem).

Figure 11: Bar Chart of Stress problem between both sites  
 5 out of 60 visitors responded highly affected by the stress due to noise pollution 16 out 60 showed mild response 29 out of 60 showed low

response in the site-1 Canal Park, contrarily, all sampled 60 visitors in the Site-2 Gat Wala Park did not show any response for symptom of stress due to noise pollution, which mean mostly response observed in this regard was nil (Stress).

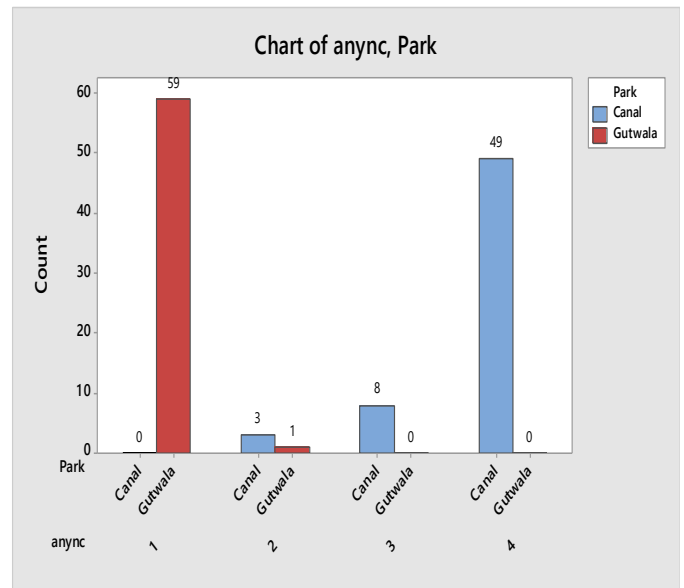


Figure 12: Bar Chart of Annoyance problem between both sites

Similarly, for annoyance depicted in fig. 12 showed that 49 out of 60 visitors responded highly affected by the annoyance due to noise pollution 8 out 60 showed mild and 3 out of 60 showed low response in the site-1 Canal Park, contrarily, 59 out of 60 visitors in the Site-2 Gat Wala Park did not show any symptom of annoyance due to noise pollution while 1 out of 60 showed low response, which mean the mostly response observed in this regard was nil (Annoyance) and confirming that the environment of the Gat Wala Park is peaceful and calm while environment of the Canal Park is noisy and affecting health of the visitors.

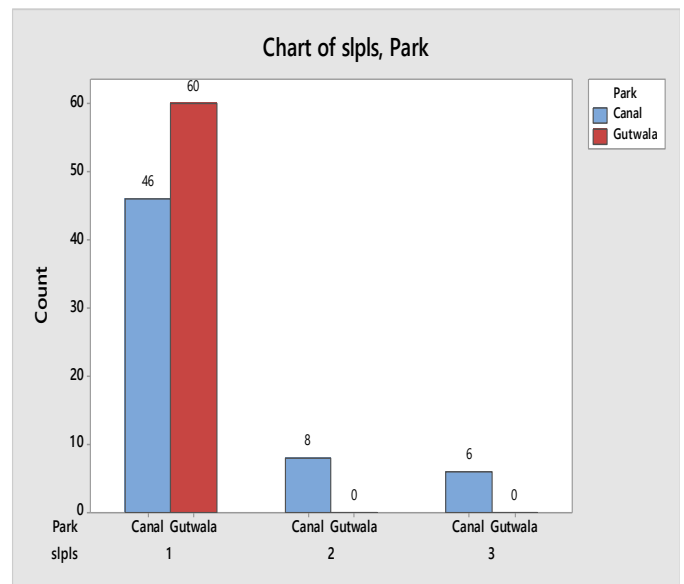


Figure 13: Bar Chart of Sleep Loss problem between both sites

Graphical representation of the visitors affected by the noise levels in both sites for sleep loss showed that 6 out of 60 visitors responded highly affected by the sleep loss due to noise pollution and 8 out 60 showed mild and 46 out of 60 showed low response in the site-1 Canal Park, contrarily, all sampled 60 visitors in the Site-2 Gat Wala Park did not show any symptom of sleep loss due to noise pollution, It was observed during the instant qualitative results that Gat Wala Park is peaceful and calm while environment of the Canal Park is noisy and affecting health of the visitors.

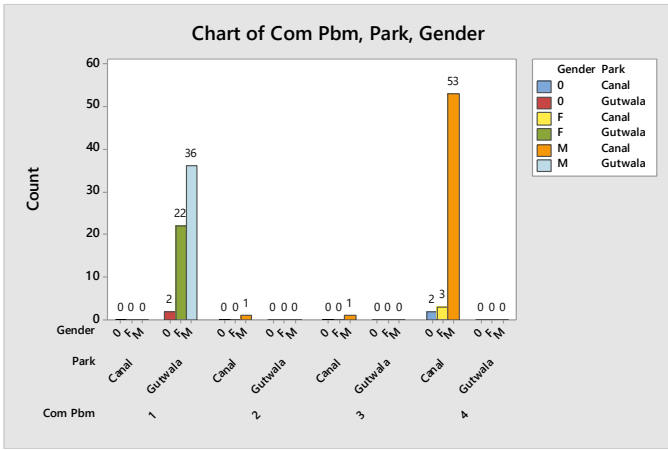


Figure 14: Bar Chart of Blood Pressure problem between both sites

5 males out of 60 visitors responded highly affected by the Blood Pressure due to noise pollution depicted in fig.13 while 3 out of 60 showed mild and 1 out of 60 showed low response out of 60 did not show any response in the site-1 Canal Park, contrarily, all sampled 60 except 1 visitors including both male and female in the Site-2 Gat Wala Park did not show any symptom of Blood Pressure due to noise pollution, Results showed that mostly observed response in this regard was nil.

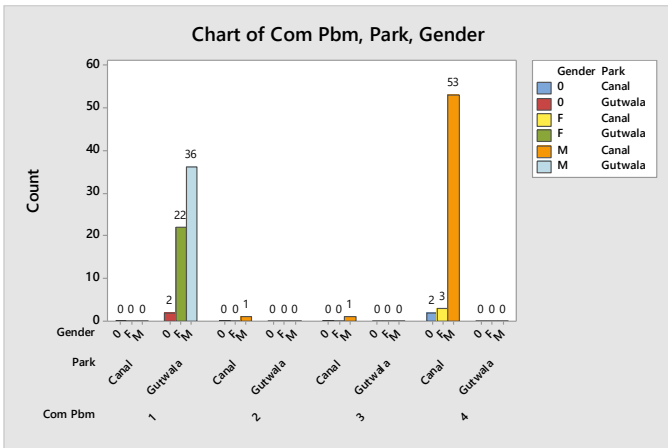


Figure 15: Bar Chart of Communication problem between both sites

Graphical representation in fig. 14 represents 53 male and 3 female out of 60 visitors responded highly affected by the communication problem due to noise pollution while 1 female out of 60 showed mild and 1 out of 60 showed low response and 2 did not show any response in the site-1 Canal Park, contrarily, all sampled 60 visitors including both male and female except 2 visitors in the Site-2 Gat Wala Park did not show any symptom of communication problem due to noise pollution.

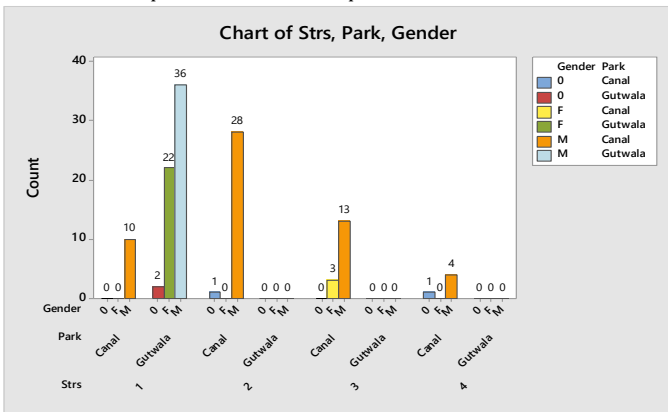


Figure 16: Bar Chart of Stress problem between both sites

4 males out of 60 visitors responded highly affected by the stress problem

due to noise pollution depicted by the fig. 15 while 13 male and 3 females out of 60 showed mild, 28 males out of 60 showed low. 10 males out of 60 and 1 out of 60 did not show any response in the site-1 Canal Park, contrarily, all sampled 60 visitors including both male and female except 2 visitors in the Site-2 Gat Wala Park did not show any symptom of Stress due to noise pollution [15].

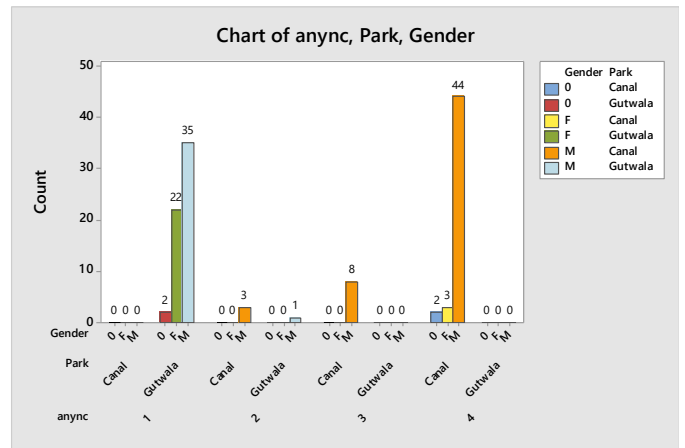


Figure 17: Bar Chart of annoyance between both sites

44 male and 3 female out of 60 visitors responded highly affected by the annoyance problem due to noise pollution by the fig.16 while 8 male out of 60 showed mild, 3 male out of 60 showed low and 2 out of 60 did not show any response in the site-1 Canal Park, Contrarily, all sampled 60 visitors including both male and female except 2 visitors in the Site-2 Gat Wala Park did not show any symptom of Annoyance due to noise pollution, which mean the mostly response observed in this regard was nil (Annoyance).

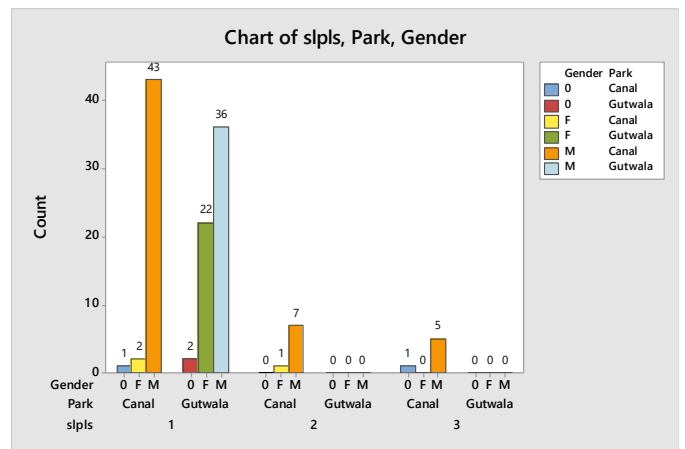


Figure 18: Bar Chart of Sleep Loss problem between both sites

Graphical representation in fig.18 clearly indicates that 5 male and 3 female out of 60 visitors responded highly affected by the sleep loss problem due to noise pollution while 7 male and 1 female out of 60 showed mild, no one out of 60 showed low, and 2 female showed nil and 2 out of 60 did not show any response in the site-1 Canal Park, contrarily, all sampled 60 visitors including both male and female except 2 visitors in the Site-2 Gat Wala Park did not show any symptom of Sleep Loss due to noise pollution.

5. CONCLUSIONS

In the present research activity noise pollution and its impacts on the health of individuals were studied, in two sites, namely Site-1 Canal Park and Site-2 Gat Wala Site of Faisalabad city. The observed noise levels in the Site-1 Canal Park Site-1 is very high i.e Mean 73.2 dB (A) at locatrion-1 and Mean 63.4 dB(A) at location-2. The observed noise levels at Site-2 Gatwala Park were i.e 54.4 dB(A) and 54.2 dB(A) at location-1 and location-2 respectively. The results then compared with standard fixed by PEPA for



noise levels in silence zone (Parks) at day time. The results obtained at site-1 both locations were high as compare to this safe limit of noise levels fixed by the EPA while noise levels measured at both locations of Gat Wala Park Site-2 were found close the noise level fixed by the EPA for silence zone day time (Parks). The high noise levels at site-1 Canal Park located in the center of the city dwelling congested residential, industrial, and offices areas is found due to close distance (98 ft) of the park from the main road and traffic density which is more than the Site-2 Gat Wala Park which is located at about 368 ft from the main road and this park is also calm and peaceful due its location outside the city. Further the qualitative study was performed and estimation of noise levels with statistical analysis and plotting of the data was performed. Proformas were prepared and distributed among the visitors of the different ages in order to study the impacts on noise levels on their health like Communication Problem, Stress, Blood Pressure, Annoyance, sleep loss. The results were statically studied through bar Charts. The said results clearly reflects that visitors highly responded as high and medium in about all symptoms except hypertension in Site-1 Canal Park while in Site-2 Gat Wala Park, the visitors responded as nil and low factor through this qualitative survey, and these results were compared with the standards set by the EPA as 50 dB(A) for day time for silence zone, which shows that the Site-2 Gat Wala Park Site-2 is near to silence zone, while Site-1 Canal Park is found more problematic site with high noise levels above the safe limits for silence zone. The above study concluded that the Site-1 Canal Park Site-1 is problematic site and people are not looking happy and the strength of the visitors coming with family and food in Gat Wala Park Site-2 is more due to peaceful and quiet environment as compare to the Cana Park Site-1.

#### REFERENCES

- [1] Mehta, R., Zhu, R., Cheema, A. 2012. Is noise always bad? Exploring the effects of ambient noise on creative cognition. *Journal of Consumer Research*, 39(4), 784-799.
- [2] Moudon, A.V. 2009. Real noise from the urban environment: how ambient community noise affects health and what can be done about it. *American journal of preventive medicine*, 37(2), 167-171.
- [3] Ozer, S., Yilmaz, H., Yesil, M., Yesil, P. 2009. Evaluation of noise pollution caused by vehicles in the city of Tokat, Turkey. *Scientific Research and Essay*, 4(11), 1205-1212.
- [4] Bouzir, T.A.K., Zemmouri, N. 2017. Effect of urban morphology on road noise distribution. *Energy Procedia*, 119, 376-385.
- [5] Dintrans, A., Prendez, M. 2013. A method of assessing measures to reduce raod traffic noise: A case study in Santiago, Chile. *Applied Acoustics*, 74, 1486-1491.
- [6] Mehdi, M.R., Kim, M., Seong, J.C., Arsalan, M.H. 2011. Spatio-temporal patterns of road traffic noise pollution in Karachi, Pakistan. *Environment international*, 37(1), 97-104.
- [7] Khaiwal, R., Singh, T., Tripathy, J.P., Mor, S., Munjal, S., Patro, B., Panda, N. 2016. Assessment of noise pollution in and around a sensitive zone in North India and its non-auditory impacts. *Science of the Total Environment*, 566, 981-987.
- [8] Sobotova, L., Jurkovicova, J., Stenfanikova, Z., Sevcikova, L., Aghova, L. 2010. Community response to environmental noise and the impact on cardiovascular risk score. *Science of the Total Environment*, 408, 1264-1270.
- [9] Pathak, V., Tripathi, B., Kumar Mishra, V. 2008. Evaluation of traffic noise pollution and attitudes of exposed individuals in working place. *Atmospheric Environment*, 42(16), 3892-3898.
- [10] Zubair, A., Seema, L., Siddiqui, N. 2011. Status of Noise Pollution- A case study of Gulshan-e-Iqbal Town, Karachi, *Indus Journal of Management & Social Sciences*, 5, 100-105.
- [11] Mishra, R.K., Rangneker, S., Parida, M. 2009. Survey on noise pollution and its management, Center for Transportatiton System (CTRANS), Indian Institute of Technology, Roorkee, 247667.
- [12] Canfeng, Z., Shujie, Y., Dong, L. 2012. Comprehensive control of the noise occupational hazard in cement plant. *Procedia Engineering*, 43, 186-190.
- [13] Kim, M., Chang, S.I., Seong, J.C., Holt, J.B., Park, T.H., J.H.K., Croft, J. B. 2012. Road Traffic Noise Annoyance, Sleep Disturbance, and Public Health Implications. *American Journal of Preventive Medicinde*, 43(4), 353-360.
- [14] Anwar, M., Yousuf Hussain, M., Ghaffar, A. 1996. Noise: A Need to Control, *Proceeding of the National Seminar on, Statistical Applications in Agriculture and Imdustry*, University of Agriculture, Faisalabad. September 24-25.
- [15] Sygna, K., Aasvang, G.M., Aamodt, G., Oftedal, B., Krog, N.H. 2014. Road traffic noise, sleep and mental health. *Environmental Research*, 131, 17-24.