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The Impact of Noise Pollution on Some School Students in Maysan Governorate

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Abstract

Noise pollution is the presence of undesired or irritating sounds that unfairly invade and disrupt our regular activities. Environmental noise has a significant impact on the development of learning, especially in relation to speech, language, and reading. The disappearance of the ideal favorable educational setting can be attributed to ongoing advancements, inadequate infrastructure, a rise in the number of automobiles, and the absence of a suitable learning environment. The presence of noise in and around schools has resulted in a more prevalent issue concerning children's learning behavior. Noise not only poses a risk to children's cognitive ability, but also to their entire welfare. This study aims to assess the effects of noise on students in a densely populated area of schools in Maysan Governorate, specifically in Sayed Ahmed Al-Rifai district, Al-Salam district, and the City Center of Al-Amarah. The main objective is to investigate and evaluate the negative impacts of noise on students and teachers in order to gain a deeper understanding of how and why sound affects students' learning abilities. All results exceeded the pain threshold, which is the standard level of sound according to the World Health Organization's report. The only exception is Warqa Bin Nawfal School, which has the lowest noise level due to its tiny student population. The school is situated in a secluded village, well off from any sources of noise. Additionally, we discovered that the sound intensity prior to the students' arrival and after their departure from the school varied from 62 to 54 decibels. This range falls within the normal limit as defined by the World Health Organization. It may be inferred that the noise levels in all schools exceed the permissible threshold and significantly affect student learning.

Keywords: Noise Pollution; Maysan Governorate; Sayed Ahmed Al-Rifai District; Al-Salam District; City Center of Al-Amarah

تأثير التلوث الضوضائي على بعض طلبة المدارس في محافظة ميسان

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الملخص

التلوث الضوضائي هو وجود أصوات غير مرغوب فيها أو مزعجة تغزو وتعيق أنشطتنا العادية بشكل غير عادل. للضوضاء البيئية تأثير كبير على تطور التعلم، وخاصة فيما يتعلق بالكلام واللغة والقراءة. يمكن أن يعزى اختفاء البيئة التعليمية المثالية المواتية إلى التطورات المستمرة والبنية التحتية غير الكافية وارتفاع عدد السيارات وغياب بيئة تعليمية مناسبة. أدى وجود الضوضاء في المدارس وحولها إلى مشكلة أكثر انتشارًا تتعلق بسلوك التعلم لدى الأطفال. لا تشكل الضوضاء خطرًا على القدرة المعرفية

للأطفال فحسب، بل أيضًا على رفاهيتهم بالكامل. تهدف هذه الدراسة إلى تقييم تأثيرات الضوضاء على الطلاب في منطقة ذات كثافة سكانية عالية من المدارس في محافظة ميسان، وتحديداً في قضاء سيد أحمد الرفاعي، قضاء السلام، ومركز مدينة العمارة. والهدف الرئيسي هو التحقيق وتقييم التأثيرات السلبية للضوضاء على الطلاب والمعلمين من أجل اكتساب فهم أعمق لكيفية ولماذا يؤثر الصوت على قدرات التعلم لدى الطلاب. وقد تجاوزت جميع النتائج عتبة الألم، وهي المستوى القياسي للصوت وفقًا لتقرير منظمة الصحة العالمية. والاستثناء الوحيد هو مدرسة ورقاء بن نوفل، التي لديها أقل مستوى ضوضاء بسبب قلة عدد طلابها. وتقع المدرسة في قرية منعزلة، بعيدة عن أي مصادر للضوضاء. بالإضافة إلى ذلك، اكتشفنا أن شدة الصوت قبل وصول الطلاب وبعد مغادرتهم للمدرسة تتراوح من 62 إلى 54 ديسيبل. ويقع هذا النطاق ضمن الحد الطبيعي كما حددته منظمة الصحة العالمية. ويمكن الاستدلال على أن مستويات الضوضاء في جميع المدارس تتجاوز العتبة المسموح بها وتؤثر بشكل كبير على تعلم الطلاب.
الكلمات المفتاحية: التلوث الضوضائي؛ محافظة ميسان؛ منطقة السيد أحمد الرفاعي؛ حي السلام؛ مركز مدينة العمارة

1. Introduction

The concept of noise pollution is called audio pollution or sound pollution, and it is defined as any sound that exists in the environmental environment, as it is considered an undesirable element [1]. It should be noted that the presence of these sounds at a high frequency negatively reflects on the health of the individual and causes harm to him. According to the World Health Organization, the Centers for Disease Control and Prevention, and the US Environmental Protection Agency, noise pollution is one of the ever-increasing health problems resulting from development in our current era, as it results in a lot of damage [2]. The individual is likely to suffer from hearing loss, headaches, fatigue, high blood pressure, sleep disturbances, and confusion when speaking as words overlap with each other, in addition to causing health problems for the mind. Which puts his life at risk and thus affects productivity and quality of life in general. Methods of measuring noise pollution: Noise is one of the pollutants that have many negative effects on the individual and society. Noise consists of sound waves transmitted through the air or any other medium. These waves are measured using sound level measurement, as it relies on measuring sound waves in order to determine the level of sound intensity. While the unit for measuring the level of noise or sound can be expressed, it is measured in decibels [3]. It is worth noting that the human ear tolerates sound at a rate ranging between (0 - 140) decibels, and sounds whose frequency is within a rate ranging between (120 - 140) decibels lead to severe pain in humans. This includes road noise, aircraft noise, industrial noise, as well as high-intensity sonar. It is considered one of the dangerous types of pollution, especially in major cities, as it leads to fatigue, stress, and sleep disorders. The Nazis and Zionists used noise pollution on prisoners to They are deprived of sleep, which results in psychological and nervous collapse [4].

✓ Noise also causes health effects on humans, the most important of which are the following

✓ Psychological effects: such as rapid fatigue, nervous exhaustion, nerve irritation, and others
✓ Damage to the hearing aids: its effect is on the sensory hairs of the ear
✓ Biological reactions: including rapid pulse, arterial constriction, hearing loss, and others.

Table No. 1: The noise level affects human health (especially children) according to the points shown in the following table [5].

Noise level	Health effects and repercussions
40-50 decibels	Stress and anxiety in children
60-80 decibels	Bad effects appear on the nervous system and severe pain in the head
90-110 decibels	Decrease in the severity of hearing and disorders of the nervous system and heart
More than 120	Pain in the auditory system and damage to the cardiovascular system

1.1. Classroom Noise Management

A substandard physical school environment had adverse consequences on students' learning and behavior. An ideal learning environment relies on several physical amenities, such as effective noise control, as identified by Helen (1985). The provision of noise control not only improves the learning process but also enables teachers to optimize their teaching approaches. Excessive noise can lead to hearing loss, disrupt communication, disrupt sleep patterns, decrease performance, and alter social behavior. The research undertaken by the World Health Organization Guideline (1999) indicates that noise might have a negative impact on reading, attentiveness, problem solving, and memory. In order to mitigate the societal consequences of environmental noise, it is imperative to maintain the noise levels below the permissible range recommended by the World Health Organization (WHO). According to Shield and Dockrell (2008), noise has negative impacts on children's performance, leading to decreased memory, motivation, and concentration [6]. According to Bradley (2005), noise can disrupt student learning and have negative effects on their reading, motivation, language and speech development, and memory [4]. One of the most challenging aspects of studying for students is listening, which can lead to detrimental impacts on their behavior and attitude towards school. Elevated levels of noise diminish the focus and concentration of both teachers and students. The noise levels in classrooms frequently surpass the prescribed thresholds, which hinders children's ability to study (Prudence, 2004). In their study, Godson, Shendell, Brown, and Srindhar (2009) conducted research to determine methods for promoting improved learning environments for children, with the goal of enhancing the performance and health of both students and teachers. Research indicates that prolonged and frequent exposure to noise in

the school setting may lead to difficulties in focus and fatigue [6]. The students are experiencing annoyance due to the excessive noise. Consequently, the children' capacity to learn is negatively impacted. Noise has a detrimental impact on the concentration of professors while delivering lectures and can also disrupt communication between teachers and students (Abel, 2002). Hence, noise has an impact on the cognitive capacity and overall efficiency of children in relation to their academic achievements [3].

1.2. Acoustics in the Classroom

Inadequate classroom acoustics significantly hinder the education of children with hearing or speech impairments, as well as students whose native language is different from the language of instruction. In a study conducted by Wetherill (2002), the effects of noise on classroom acoustics were examined, taking into account several factors such as design, form, size, noise level, and the materials used for walls, doors, windows, and floors. The findings indicate that a classroom with a low ceiling and a low coefficient of reverberation is considered acoustically favorable, while a classroom lacking these characteristics is considered acoustically unfavorable. Prior research indicates that ambient noise and reverberation have a negative impact on the cognitive ability of young children. Reverberation can be managed by utilizing easily accessible sound-absorbing materials for walls and ceilings that meet building code regulations [7]. Apparel offers supplementary sound insulation. High noise levels in acoustically inadequate classrooms lead to a reduction in students' ability to understand speech, especially when they are far away from the teacher. This issue can be addressed by implementing acoustical treatment in the classroom and optimizing the layout of the space (Kryter, 1996). An optimal student-to-class ratio, together with appropriately sized classrooms, can improve pupils' speech intelligibility. In 2002, the American National Standards Institute (ANSI) released the Standard of Acoustics, which established new criteria, requirements, and guidelines for the acoustical performance of both new and renovated classrooms. The goal of these standards is to ensure a high level of speech intelligibility in learning spaces. Optimal classroom acoustics can be attained by reducing the reverberation duration, which has a beneficial impact on students' learning and teachers' focus (Lubman, 2001). This is particularly important for youngsters, as they are more susceptible to the effects of reverberation due to their less developed listening experience [8].

1.3. Measures to Reduce Noise

Sound exposure can be reduced by implementing route control techniques, such as establishing fixed or moveable noise barriers to block the passage of sound. Well-designed barriers have the potential to reduce sound levels by up to 20-25 dB. The shield receptor is the superior choice in terms of effectiveness. The predominant form of receptor shielding consists of headphones and earplugs.

Sound masking is frequently employed to mitigate noise irritation caused by continuous white or pink noise generated by air conditioners, fans, and electrical equipment, in order to hide obtrusive sounds. According to the Construction Noise Handbook, released by the United States Department of Transportation in 2010, there are several mitigation measures that can be used to reduce noise intensity and enhance environmental conditions [9].

1.4. Noise Pollution Guidelines

While the World Health Organization (WHO) does not have the jurisdiction to set noise restrictions, it does provide recommendations for tolerable noise levels that member nations can consider as guidance. The guideline values for a given environment are determined at the level of the lowest adverse health effect when numerous adverse health effects are discovered (World Health Organization Guideline, 1999). The World Health Organization (WHO) has designated the fourth Wednesday in April as International Noise Awareness Day (INAD) to promote public awareness. On this day, all member countries are encouraged to observe a period of 60 seconds, from 2:15 to 2:16 pm, during which no noise is made. Regrettably, a significant portion of the population in Pakistan is uninformed about effective strategies for mitigating noise pollution. Typically, individuals lack awareness regarding the detrimental consequences of noise pollution. The Pakistan Environmental Protection Agency (Pak-EPA) is responsible for regulating environmental noise pollution. However, due to the lack of a particular "Noise Pollution Act," it is currently not possible to effectively reduce the increasing levels of noise pollution to appropriate limits. The Pak-EPA is the appropriate platform to organize the development of the draft Noise Pollution Act and obtain approval from the National Assembly. Presently, there is a lack of comprehensive laws to regulate noise pollution, with the exception of Pakistan National Environmental Quality Standards. These standards solely address noise emissions from motor vehicles and set a maximum allowable level of 85 dB (A). However, there is currently no established protocol for addressing the issue of noise generated by industrial, commercial, and residential operations [10].

2. Literature Review

Hamoud and AL-Hakkak [11] assessed the levels of noise pollution in hospitals and its effects on the health of their workers. The researcher determined different noise levels in different periods of time using a noise measuring device. He recommended reducing the noise level in the hospitals of the city of Kufa in accordance with the standard levels accepted by the World Health Organization and the necessity of periodically measuring blood pressure and heart rate rates among hospital workers. Similar study performed in the city of Baqubah which exposed to a background noise of (85.88 db) as a result of its exposure to (11 noise sources). It also concluded that the highest background

noise recorded was the noise source of electrical generators, which amounted to (104.53 db, while the city's health and education services sites were exposed to a background noise of 0000000 (78.2(74.5 db), respectively, according to noise measurements in 2014. With these noise backgrounds, they exceeded all international noise standards. Rather, they reached the threshold of pain, which is 80 db.

Al-Saad [12] studied noise pollution levels and health impacts in selected schools in the city of Basra, southern Iraq. Noise levels were measured during 2012 using a calibrated sound level meter, Lutron model SL-4013, in classrooms, playgrounds and surrounding areas in 12 selected schools to assess the effects of environmental noise on their health and learning outcomes. The researcher concluded that the measured noise levels, both indoors and outdoors of the schools studied, were higher than levels recommended by the World Health Organization, and that the majority of participants reported a variety of medical disturbances, such as fatigue, lack of concentration, and headaches. Discomfort and even hearing loss. This may be due to the effects of environmental noise emanating from sources such as vehicle traffic, industrial workshops, and most importantly the voices of students within the selected schools. This study recommended the need for more rigorous research to improve the health of learning environments.

Qzar, Azeez [13] conducted study on the impact of noise pollution on school students in the city of basra, iraq: a health study, that the average noise level inside the classrooms, in the school corridors, and outdoors next to the streets during active teaching was 72.41 decibels, and 75. 50 decibels and 63.33 decibels, respectively, all of which are higher than the percentages recommended by the Scientific Health Organization in educational sites and recommending the necessity of working to reduce noise in the areas surrounding schools.

2.1. The Aim of the Research

The aim of this study is to know the sound levels in a group of primary schools and to know the average effect of school locations, whether they are located in the countryside or the city, the effect of the number of students on the sound level, whether they are males or females or mixed schools, the average effect of the proximity of schools to main roads, and the effect of transportation means and construction works.

3. Materials and Methods

3.1. Geographic Description of the Study Area

The study was conducted in different schools in Maysan Governorate. The study included Al-Salam district - Sayed Ahmed Al-Rifai district - Al-Amarah

city center. The work on the study continued for six weeks at a rate of one visit per week to each school during the daily working hours from eight in the morning until twelve noon and included the following primary schools:

3.2. Al-Salam District:

A- Al-Hadar School for Boys: This school is located in Maysan Governorate, Al-Salam District, as shown in Figure (1-A). The number of its students is (360) and it is located near the main street.

B- Al-Fawatim Girls School: This school is located in Maysan Governorate, Al-Salam district, near residential homes, as shown in Figure (1-B). The number of its students is (351) and it is located in a residential area.

3.3. Al-Amara District:

A- Creative Girls School: This school is located in Maysan Governorate, Amara District, near some schools, as in Figure (2-A). The number of its students is 350, and it is located in the middle of a residential area near the schools.

B- Al-Zahraa Mixed School: This school is located in Maysan Governorate, Amara District, near Al-Batira Street, as shown in Figure (2-B). The number of its students is (500) and it is located near the main Al-Batira Street.

3.4. Sayed Ahmed Al-Rifai District:

A. Warqa Bin Nofal Mixed School: This school is located in Maysan Governorate, Sayyid Ahmed Al-Rifai district, near the village of Al-Khalifa, and its number of students is 71 students in a remote and remote area.

B. Al-Rifai Mixed School: This school is located in Maysan Governorate in Sayed Ahmed Al-Rifai district in the village of Khalifa. The number of its students is 250 students. One of the factors affecting this school is its location in the middle of the village.

3.5. The Device used: Curconsa Sound Level Meter

Widely used the decibel meter is an instrument used to measure ambient sound levels. It can be used in homes, factories, workshops, schools, residential areas, offices, streets, hotels, hospitals, laboratories, theaters and sound systems. The scope of application is very wide and an indispensable tool in life.

High accuracy the decibel meter measuring range is 30dB to 130dB with fast response speed and stable and reliable performance. This product is a high-precision decibel meter with accuracy of ±2.0 dB. Real-time monitoring can give you accurate data on the sound level in the area and the device is made in Germany.

Figure No. 1 Device used to record the noise

3.6. The Method of Work

The study was conducted for all the above-mentioned schools for a period of six weeks for the year February 25, 2024, at a rate of one visit per week to each of these schools during the daily working hours from eight in the morning until twelve in the afternoon, where the sound level was measured in each of the school halls during lessons, during opportunities, at the beginning of work, and at The students left school at the end of the day using the curconsa device in the diesel unit, and the results were read, which we will present in the third semester.

Figure No. 2: Geographical description of the study area

4. Results

The presence of excessive noise in educational areas can have a detrimental impact on the academic performance of both students and teachers (Bradley, 2005). The investigation revealed that the noise levels inside classrooms and outside in playgrounds throughout schools exceeded the permitted levels set by the World Health Organization (WHO). The WHO guidelines state that background noise up to 45 dB is acceptable, however, all of these schools have noise levels exceeding 62 dB. The American National Standards Institute (ANSI) establishes guidelines for both ambient noise levels and reverberation times. As per the specified guidelines, the acceptable noise level in the school vicinity should be approximately 35 dB (A) within classrooms, 45 dB (A) in the playground. The highest sound pressure level (SPL) was measured in the school compound at 62 dB (A). However, according to the World Health Organization (WHO) recommendations, the permissible noise level inside the school should be 55 dB (A). Additionally, the acceptable noise level in the classroom for a conducive learning environment is 45 dB (A). It is worth noting that all four schools have noise levels exceeding 55 dB (A). The poll clearly indicates that high classroom noise has a negative impact on characteristics such as reading ability, learning capacity, speech intelligibility, and student behavior. Research has revealed that excessive ambient noise significantly impairs students' academic performance. Respondents from a comparative standpoint indicated a deficiency in concentration and a decline in listening capability, which aligns with percentages of 75% and 71% respectively. The acquired results and their variations can be attributed to the proximity of most schools to important roads, which makes them susceptible to noise pollution from vehicle engines. The degree of impact varies depending on the distance of each school from the road. Excessive noise and reverberation disrupt speech intelligibility, leading to diminished comprehension and thus hindered learning. They experience greater difficulty in perceiving distinct sounds, particularly throughout the process of acquiring literacy skills such as reading and spelling. Additionally, their ability to concentrate is also impaired. The importance of optimal classroom acoustics and the strategies for achieving them have been recognized for many years. However, this valuable knowledge has not been easily accessible to architects, school planners, administrators, teachers, and parents.

The study was conducted in six schools for a period of six weeks on February 25, 2024, at a rate of one visit to each school per week. Six studies were recorded in the six weeks. We performed several mathematical operations and statistics for the studies for each school separately and for each class in order to know the sound level and noise ratio for each study stage and the difference between... Schools, the extent of the effect of their locations on the sound level, and the factors affecting each school. A rate was chosen for each class according to graphical Figures, and all of the following were noted.

4.1. First Grade:

We notice in Figure No. 3, a variation in the sound level for the first grade of primary school for all points of the study. We found that the Creative Girls School is the loudest during reading in the lesson, while during opportunity; we found that Al-Zahraa Mixed School is the highest in sound level. We may notice that Waraqa Bin Nofal School It is the lowest volume level in both readings. This level is considered not good for students during the lesson because it is considered higher than the pain threshold (62 decibels

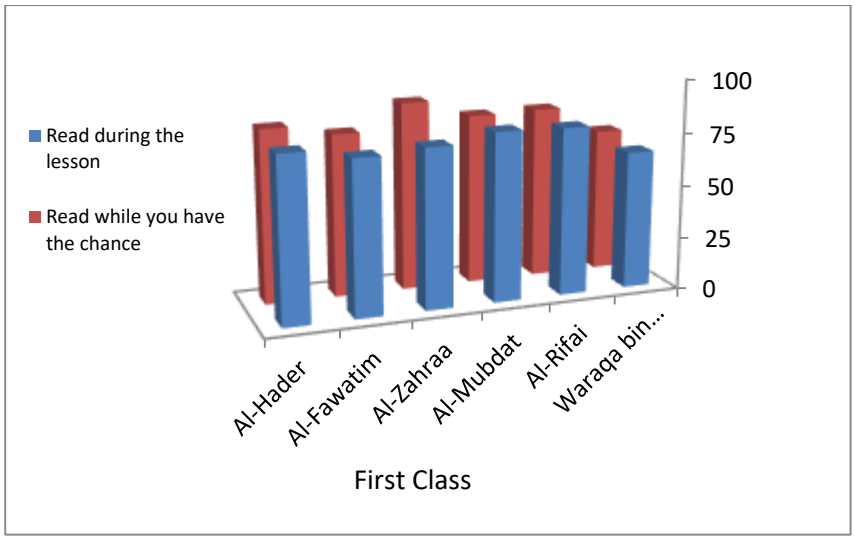

Figure No. 3: Sound level for the first grade

4.2. Second Grade:

In Figure No. 4, which is for the second grade of primary school, we note that Al-Zahraa Mixed School and Al-Hadar Boys' School have the highest points in the study in terms of the level of poor sound during the lesson or reading during the opportunity 0. The lowest sound level in both readings is worse during the lesson or reading during opportunity in Waraqa Bin Nawfal School. This sound level is considered higher than the normal sound level (62 decibels), the pain threshold, which is not suitable for students and causes them psychological and health damage.

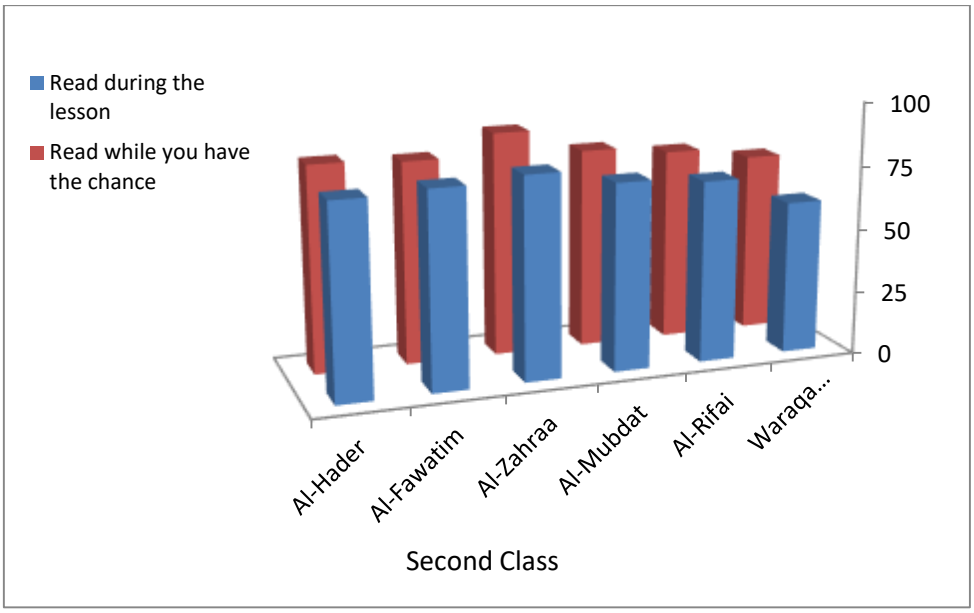

Figure No. 4: sound level for the second row

4.3. Third Grade:

As for Figure No. 5, which includes the third grade of primary school, we notice that the sound level in Al-Zahraa Mixed School is the highest among the rest of the study points in reading audio during the lesson. However, during the opportunity, we may notice a convergence in the sound level between two schools, namely Al-Hadhar School for Boys and Al-Zahraa Mixed School. This volume level is considered inappropriate for students during the lesson because it causes interference in learning and the information does not reach the students in a good manner.

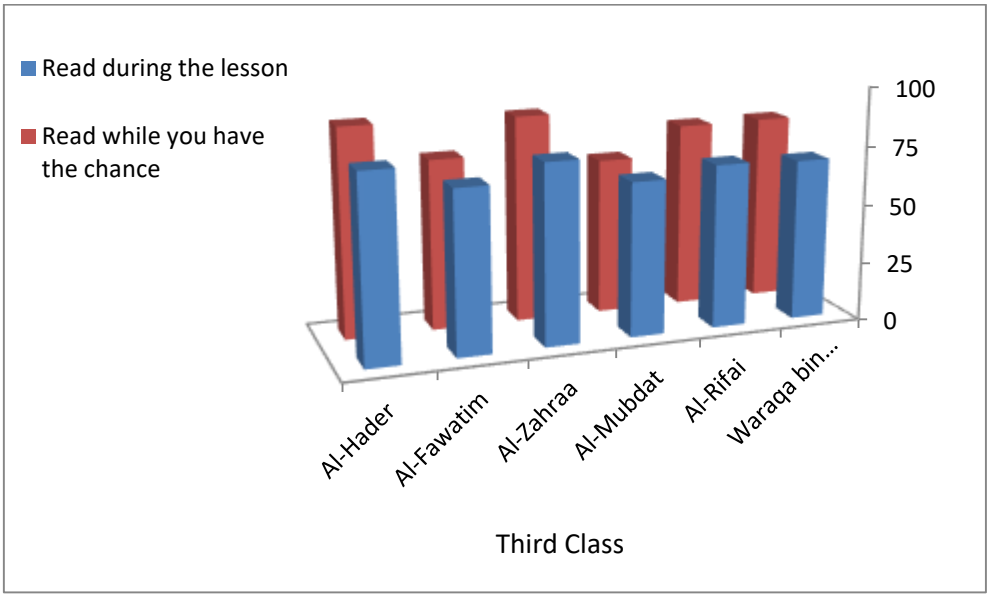

Figure No. 5: Sound level for the third row

4.4. Fourth Grade:

As for Figure No. 6, which includes the fourth grade of primary school for all study points, we notice that the highest level of sound during reading in the lesson is in Al-Hadhar School, and during the opportunity, we found it to be different between two schools, Al-Hadhar School for Boys and Al-Mubadat School for Girls, and we noticed that the lowest level of sound in the study points is Waraqa Bin Nofal School. This sound level is considered higher than the normal sound level (62 decibels), the pain threshold, which is not suitable for students and causes them psychological and health damage.

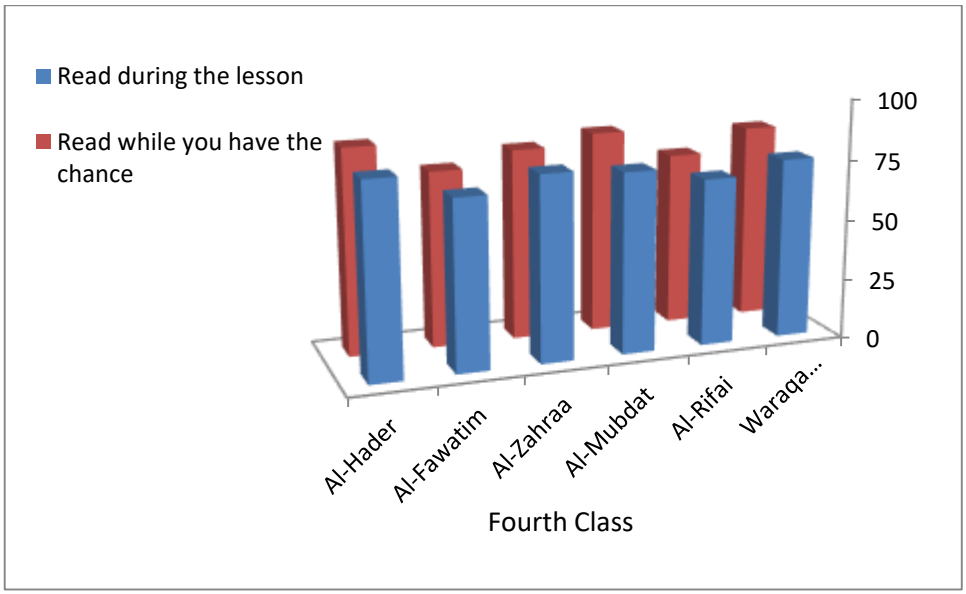

Figure No. 6: Sound level for fourth grade

4.5. Fifth Grade

As for Figure No. 7, which includes the fifth grade of primary school for all study points, we note that the sound level in Al-Zahraa Mixed School is higher than the rest of the study points during reading in the lesson and during the opportunity. This level is considered not good for the students during the lesson because it is considered higher than the pain threshold (62) decibels.

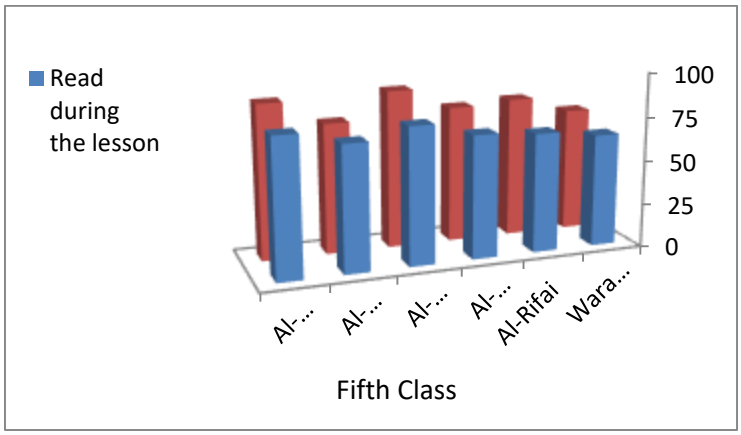

Figure No. 7: Sound level for fifth grade

4.6. Sixth Grade

As for the last Figure No. 8, it includes all study points for the sixth grade of primary school, where we notice that the sound level is similar in all study points during reading in the lesson. As for reading during the opportunity, we may notice that Waraqa Bin Nawfal School has the highest sound level and that this sound level is considered It is not suitable for students during the lesson because it causes confusion in education and the information does not reach the students in a good manner

Figure No. 8: Sound level for sixth grade

5. Discussion

The study was carried out in the schools mentioned in the third chapter by us under the supervision of the research professor, using a decibel measuring device (curconsa sound level meter) to measure sound levels. The study was conducted over a period of six weeks at a rate of one visit to each school per week .We mentioned in the results that the highest level was for the first grade of primary school in the Creative Girls School during the lesson, because the primary grades depend on rote learning during teaching. As for reading during the opportunity, we noticed that Al-Zahraa Mixed School is the highest, due to the number of its students and its proximity to the main street.

As for the second grade of primary school, the highest sound level was recorded in Al-Zahraa Mixed School and Al-Hadhar School for Boys during reading in the lesson and opportunity, despite the fact that the location of both schools is different, as Al-Zahraa School is located in the center of Al-Amarah city and Al-Hadhar School is in Al-Salam district. The reason for reading the high sound level is due to The location of both schools near the main street and the large number of students .We note the results in the third grade of primary school that

the highest sound level was in Al-Zahraa School during reading in the lesson, due to the teacher's reliance on repeating words for memorization. As for reading during the opportunity, it was in Al-Hadhar School for Boys, due to cars passing through the main street near the school.

In the fourth grade of primary school, Al-Hadhar School for Boys had the highest percentage of volume level due to the students repeating some of the lessons by recitation. As for reading during the opportunity, the Creative Girls School had the highest percentage of volume level due to the students' ages and their love of play and curiosity. This is what we observed in the fifth grade of primary school. Al-Zahraa School has the highest sound level during class and opportunity, and this is due to the fact that the study was conducted among boys who are more active and mobile than girls.

As for the sixth grade of primary school, we found through the study that the percentages of all sixth grades for all study points are close. This is due to the large ages of the students and their awareness of study and its importance, as well as the fact that education in these grades is by listening to the teacher's voice only most of the time. As for the opportunity, the Al-Hadar School for Boys was the highest sound level is due to the fact that its male students are characterized by movement and play, while the females are characterized by gentleness and calm. As for Al-Rifai Mixed School, which was among the study points, we noticed that the sound level in it is lower than the rest of the study points (Al-Hadhar - Al-Zahraa - Al-Mubadaat), despite the fact that the number of its students is 250 students, but The reason for the low sound level is that the school was located in a village and its distance from any source of sound and noise. As for Waraqa Bin Nawfal School, it is also among the study points and is considered to have the lowest percentage of sound level of all the study points, due to the small number of its students (71) students and its proximity to Remote village.

The sound level was measured for all study points after the schools were empty of students. We recorded the highest sound level of 62 and the lowest sound level of 54 decibels. This is considered within the normal level of sound (WHO) according to the opinion of the World Health Organization (ABOUTWHO 2017), where this sound level is called (62). Pain Threshold: Through this study, we conclude that schools with the smallest number of students, their distance from the city, and their proximity to a village or residential area have the lowest sound level, while schools with a large number of students, or schools for boys, and their proximity to a main street or a location in the city center have the highest sound level for sound and noise

6. Conclusions:

The research findings indicate that the noise level in the sampled schools is significantly high, exceeding 55 dB (A), which above the recommended

allowed noise level of 45 dB (A) set by the World Health Organization (WHO). The current noise levels are unsuitable for students' learning activities, resulting in decreased speech intelligibility and learning ability, as well as fatigue that hampers both students' and teachers' focus. The American National Standards Institute (ANSI) recommends that the noise level in school areas should be approximately 35 dB (A) within classrooms, 45 dB (A) in the playground, while the World Health Organization (WHO) suggests that the allowed noise level inside schools should be 62 dB (A). The highest sound pressure level (SPL) recorded in the school compound is 72.2 dB (A), surpassing both requirements. Consequently, it is advised that school buildings should be meticulously built to provide optimal learning opportunities. Schools should reassess the student-to-classroom ratio to ensure it does not beyond the approved noise threshold. To enhance the current state of the school, it is revealed that to implement sound insulation measures on doors and windows, as well as apply sound absorption materials on all surfaces. In order to minimize the noise pollution caused by traffic on the main road, it is advisable to have a significant amount of greenery within the school premises. It is advisable to regularly evaluate the physical state of schools as well as the noise levels both inside and outside the school.

7. Recommendations:

From what we discussed previously, some recommendations can be made, which are as follows:

1. School locations must be well chosen to maintain the quality of the sound educational environment that is far from sources of noise such as roads, railways, etc.
2. When designing schools, it must be taken into consideration to choose school furniture such as chairs, tables, and school trips that do not cause noise, and to use soundproof materials. However, this does not protect external spaces such as the courtyard or when opening classroom windows, so schools must be completely isolated from noise sources.
3. Maintaining idle devices and fans in schools to reduce noise during the lesson.
4. It was also recommended to conduct a study on the impact of noise on the health and psychological status of students, as well as to conduct a study on middle and high schools and compare them with primary schools.

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