

Musical Sound Levels and the unknown Hazard: The Case of Christian Religious worship in Ghana

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Abstract: Music making during religious events in Ghana is very common and acceptable convention. However, the levels at which music is produce during religious sessions is hardly controlled. A situation which could cause health hazard to congregants if care is not taken. The study explored the sound levels during Christian worship in some areas in two regions of Ghana; as well as evaluated the implications of sound levels on the congregants. The study adopted a mixed method approach of gathering data from Twenty participants who were selected through purposive and random sampling techniques. The study revealed that religious activities that are done in the study areas are conducted above acceptable sound levels in Ghana. The study recorded higher sound levels with the highest being 118db and the lowest being 103db; figures that are unsafe for humans according to World Health Organization standards. The study also made it clear that, congregants are irritated and also have hearing challenges during performance of high volume level of music making. It is therefore recommended that, instrumentalists should be trained professionally to be able to control their sound level. Also, sound meters should be procured by the religious bodies so that sound could be easily and efficiently monitored to avoid hazards that associate with music performance at higher decibel levels.

Keywords: Hazard, Musical Sound, Noise, Noise level, Christian worship,

I. Background to the Study

Music making especially during religious worship is peculiar with many faith- based congregants in Ghana. During worship sessions, music is made through the use of many musical instruments (Aniadze et al., 2023). Because of the euphoria and the enthusiasm of the worshipers, the intensity of the tone colour is hardly controlled. Because is all about music making in honour of Jesus Christ, little is noted about some of the dangers that music making at higher sound levels have on the individual congregants.

Because of technological advancement in the current era, one could have observed a worshiping space which is comparatively smaller in a way that normal human voice could well operate; yet musical gadgets are set up with uncontrolled sound during worship periods.

It is the expectation of the investigator that, care must be taken so that in trying to express the free will to worship, sickness must not be contracted unknowingly through the uncontrolled sound system that are always employed in the church and worship setting.

According to the 2020 population census report of Ghana, the country has been identified as a Christian nation that proffers Christianity through worship during church services amidst music making through instruments. As a result of that, during programmes and church services, music making dominates the activities that are carried out during the service. In as much as the congregants are free to worship with the musical devices, care must be taken so that the music making would not turn into hazards on the worshipers.

The intention of this study therefore is to investigate some sound levels that are mostly recorded during worship and also to evaluate the implications of sound levels to the individual during music making at church services.

Objectives of the study

The objectives of the study are to:

1. Investigate level of sounds during worship in selected areas in Ghana.
2. Evaluate the implications of sound levels on the congregants.

II. Review of Related Literature

Concept of Musical Sounds

The dynamism in the production of sound could be referred to as sound level. According to Launay (2015), sound is the movement of waves to either high or low direction. He clarifies that, sound changes to noise when it has fallen outside the acceptable sound limit in society. Comunale and Wood (2026) as well explain sound as a form of energy that moves through particles of matter. They contend that, musical sound is produced by regular, periodic vibrations that are harmonious with clear pitch. Some of the unique features of musical sounds according to the scholars are; the vibrations are regular and periodic and also the sound has definite pitch as well as producing harmony and rhythm. They also share some of the characteristics of musical sounds as Pitch; which they discuss as depending on frequency. at higher pitch. They as well identify loudness which they opine depends on amplitude and determine how soft or loud a sound is. They equally identify timbre and add that, it defines the uniqueness of sounds that result from many instruments that perform together. They listed duration also as a characteristics of sound and they describe that, when musical sounds are stable and sustained overtime, they create rhythm.

According to Tunez (2026), musical sound is produced by regular, periodic vibrations that create a pleasant and harmonious effect with a clear pitch. He as well identifies some key features of musical sound as having regular and periodic vibrations, having definite pitch as well as producing harmony and rhythm.

Differences between Musical Sounds and Noise

According to Reybrouck et al., (2019) there are differences between musical sound and noise. They clarify the differences below:

Musical sound has smooth and regular wave patterns whilst noise has irregular and unpredicted wave forms. Furthermore, musical sound is more accommodating and soothing but that of noise is associated with disturbance or irritability. They add that, musical sound has a precise and stable pitch whilst noise has random frequencies with no fixed pitch. In addition, musical sound creates harmony and emotional attachments but noise creates discomfort or distraction.

Malki (2022) equally contend that, sound is produced by a shaking of a stretch phenomenon which is transmitted to the ambient medium for the receiver. He explains a noise also as a non- periodic sound vibration which is regarded as the infinite sum of all audible frequencies.

Acceptable musical sound level in Ghana

According to Accra Metropolitan Assembly (AMA) report of (2020), the Environmental Protection Agency (EPA) in Ghana has pegged permissible ambient noise levels in residential areas at 55 decibels (db) during the day and 48 decibels at night. The report makes it clear that, for the educational and health establishments, the figures are 55 db during the day and 50db during the night. Ndah (2022) as well confirms the stance of the AMA report (2020) by re affirming that, the acceptable noise limits in Ghana are 55db during the day and 48db during the night. He warns that, anything above such figures posse danger to the individual's health.

Ghanaweb news 2nd May, 2026 edition reported the chief executive officer of the EPA complaining of noise pollution that emanate from the churches, mosques and the night clubs. She explains that, her outfit has put in place monitoring team to check for the level of noise and their compliance. She therefore advises that, churches, mosques, night clubs and other commercial establishments should bring their noise level to barest minimum to conform to the acceptable sound levels.

Musical Sound Levels and their implication on the individual

Scholars have argued that, musical sounds affect the individuals' ether positively or negatively. According to Ndah (2022) with reference to the World Health Organization report (1991), exposure to sounds at higher decibels could damage one's eardrum resulting to hearing impairment. He substantiates the various sound exposures with their related impairment below on a tabular form:

Table 1: Sound level and their associated impairment

Sound Level	Level of impairment
25db and below	No or very little hearing problem
26 – 40 db	Little problem such as individual asking for repetition of words.
41 – 60 db	Moderate impairment; hearing only repeated words at raised voice
61 – 80 db	Severe impairment; individuals hear only through shouting at close range
81db and above	Serious impairment; dumbness and deafness rendering

an individual unable to hear even with a shout
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He therefore advises that, organizations such as churches should train their sound engineers about checking of and management of sound levels so as to avoid hearing and health related issues that might arise from music making in the church.

Basquiat (2026) as well clarifies that, there are levels of sounds that are suitable for the humans and that when the sound levels have gone too high then they become noise in the ears of the listener; and such noise could be dangerous to the individuals. He explains further that, the sounds and their levels of influence on the individuals are:

0 – 30db: sounds within this range pose no danger to the listener. Such sounds relate to those that are not so audible and can make the individual have a good relaxation.

30db – 40db: the sound range is relatively quiet and poses no health issues to the individual.

40db – 50db: The sound within this range could relate to identifiable sounds that can become disruptive at times depending on the setting of the listener. sounds within this range could cause sleeping disorders and when one is exposed to such level of sounds for long, it may lead to headaches as well as irritability. Continuous exposure to sounds levels above this range could equally lead to impairment in cognitive abilities especially in children.

50 – 60: individuals who are always exposed to sounds in this range are likely to develop cardiovascular diseases because of stress hormones which are triggered during sounds within this range. The stress hormones however increase blood pressure, blood sugar and also enhances the constrictions of the blood vessels.

60 – 70db: sounds within this range are not supposed to be exposed to the listeners for more than 8hrs. If one is exposed to such sounds for more than 8hrs, it may lead to cardiovascular issues.

70 – 80 db: sound within this range are at high risk as prolong sound of this nature would make one uncomfortable and also damage individual's hearing abilities.

80 – 90db: Sounds within this range are very harmful and exposure such levels for 8hrs should be avoided. pregnant women are equally advised to stay away from these sound ranges.

90 – 100db: exposure to sound at this level for an hour can cause hearing impairment. These sounds can lead individuals to manifesting aggressive and violent behavior which are likely to cause mental health issues

100 – 150db: these sounds are very dangerous and could cause harm especially hearing impairment within 15 minutes. Sound levels within this range could lead to ruptured eardrum with its associated dizziness, ear drainage, earache and hearing loss.

According to World Health Organization (WHO) report (2019) on Global Standard for Safe Listening Devices and System, sounds above 85db can easily damage the hearing system. Prolong sound at this level for more than 8hrs can cause hearing loss.

The report further clarifies that, sound levels within the range of 150db, 140db, 120db and 120db are considered unsafe sound levels. Those within the ranges of 112db, 106db, 100db and 90db are regarded as dangerous sound levels. Those within 70, 60, 50 and 40db are considered safe for any time periods. The report therefore recommended that, a total of 40 hours of weekly exposure to a sound level of not higher than 80db for adults and 75db for children on personal listening media.

Inferring from the authorities above, it could therefore be said that musical sounds have to do with regular sound waves and when the sounds waves become irregular, the sound then becomes unwanted hence describe as noise. And that there are acceptable and unacceptable sounds levels that operate in Ghana. And that the Environmental Protection Agency through the Metropolitan and District assemblies are responsible for the enforcement of the acceptable sound levels by institutions.

III. Methodology

Research Design

The study adopted the mixed method approach to solicit data from the participants for the study.

Population

The accessible hence the total population of the study stood at Twenty (20) participants drawn from various churches within selected areas of the Eastern and the Ashanti Regions of Ghana. The population consisted of the congregants, elderly in the church, instrumentalists and church administrators.

Sampling

Purposive and random sampling techniques were employed to select participants from both charismatic and orthodox churches within the study areas.

Research Tools

Questionnaire, interview as well as observations were employed to collect data for the study.

Data collection Procedure

Ten (10) participants responded to a questionnaire and the other Ten were also interviewed. The researcher through participant observation attended the church sessions and recorded the sound levels of musical activities with the help of a sound measuring meter for a period of five months thus from October 2025 to February, 2026.

Data analysis Procedure

The responses from the questionnaire were manually collated and figures represented on statistical tables whilst the interviews were as well analyzed using thematic content analysis approach.

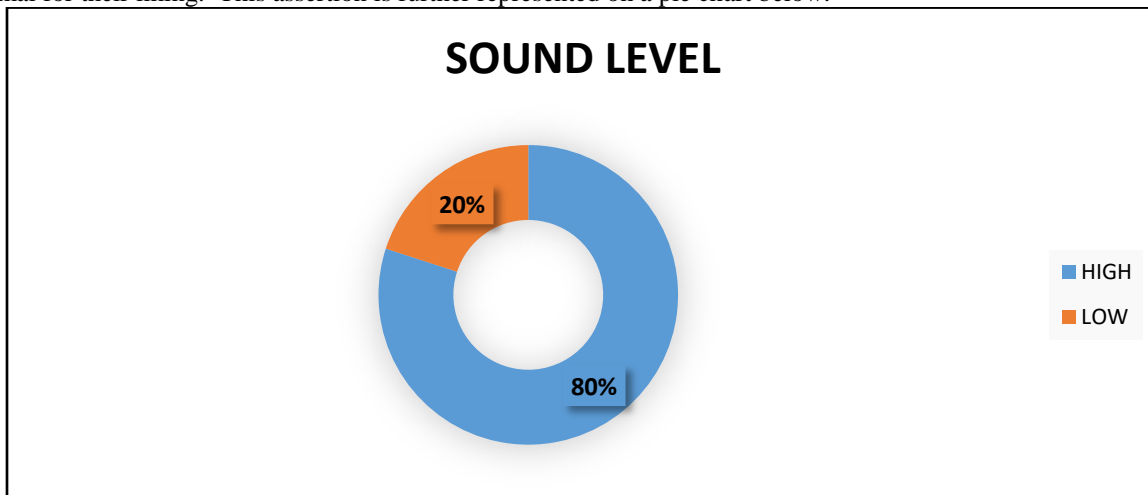
The observations made with the recorded figures were equally analyzed and conclusions drawn from the recordings.

IV. Analysis of Data

Responses from the Questionnaire (Ten respondents)

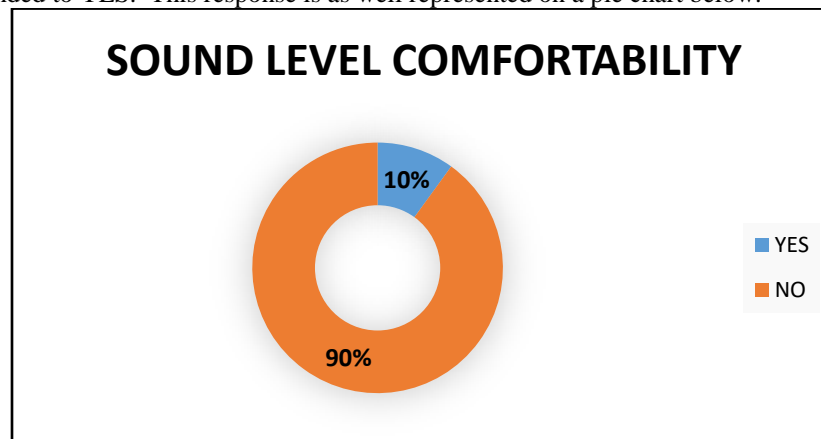
All the participants acknowledged the fact that sound devices are used during church sessions in their various places of worship.

On the description of sound levels during the praises and worship time, Eight (8) out of Ten (10) respondents representing 80% responded that, sound is loud whilst the remaining participants describe the sound level as normal for their liking. This assertion is further represented on a pie chart below:



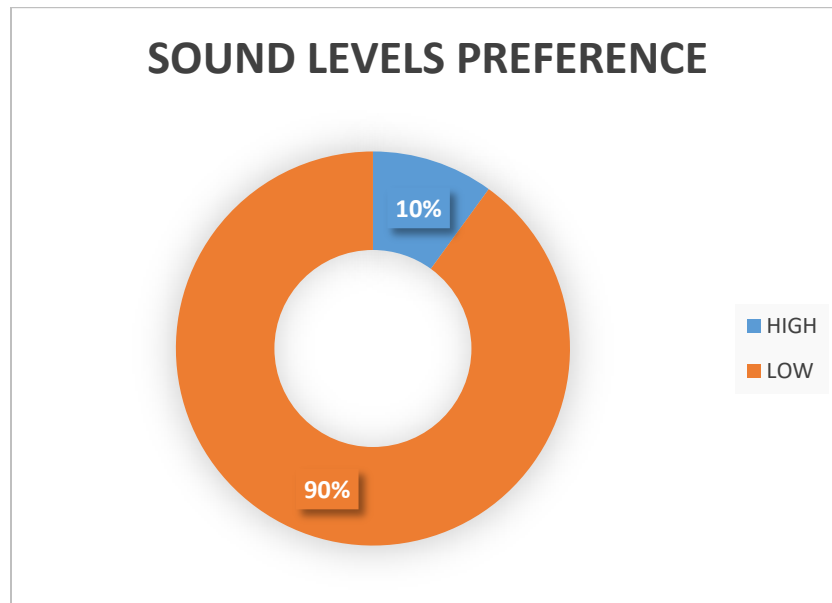
Source: The researcher

As to whether they are comfortable with the sound levels during performance by bands' men, 90% answered to NO whilst 10% responded to YES. This response is as well represented on a pie chart below:



Source: The researcher

As to whether music should be performed at low or high level, nine (9) respondents thus 90% responded to low and the remaining participant as well responded to high. This response is also represented on a pie chart below:



Source: The researcher

Responses from the Interviewees (Ten participants)

Ten participants were interviewed and their responses are discussed herein:

On how to describe music making during praise and worship in the church, six (6) participants representing 60 % describe music during such periods as always very high in terms of sound volumes.

Two (respondents) thus 20 % also state that, the musical instruments always overshadow the words of the songs that are rendered making it difficult for them to comprehend the lyrics in the songs.

The remaining respondents also state that the total performance during that session in the worship is always noisy.

As to whether the musical performances affect hearing of the congregants, seventy (70 %) explained that, musical performance during praise and worship session are always high to the extent that is hard to hear when a congregant talks to another person during such times.

20 % of the participants equally state that, the sound level during such time is very high to the extent that the ear finds it difficult to contain the sound.

One participant (10 %) however shared that, nothing happens to the hearing abilities during such periods

Asked how they would describe musical sound during praise and worship period, Eight (8) of them thus 80 % explained that, the instrumentalists open the volume of the devices so high and as a result, the whole performance is done at higher volumes. One respondents remarked “Those *band’s men* always play their instruments at higher volumes without considering the effects it has on the church members “.

The rest of the participants also explained that, the whole place become noisy during praise and worship time in church as a result of the instruments playing loud.

On what their suggestions should be in relation to the sound levels, 50 % suggested that, bands’ men should be taken through professional training where they would be educated on the dangers of performing music at higher sound levels.

Two (2) of the participants thus 20 % also propounded that, sound measuring devices should be acquired to help monitor sound levels during performances so as to conform to acceptable sound levels.

The remaining respondents also suggested that, instrumentalist should be advised to keep their sound at moderate volumes so that the words of the songs would be properly heard.

Observation by the Researcher

The observation and the sound recordings of the researcher is also discussed below:

Table 2: Data on Sound level recordings

Date	Figure(Decibels) db.
26 th October, 2025	116 db
9 th November, 2025	118 db
16 th November, 2025	107db
30 th November, 2025	109 db
7 th December, 2025	103 db
14 th December, 2025	116db
21 December, 2025	114db
25 December, 2025	118db
26 December, 2025	118db
28 th December, 2025	112db
31 st December, 2025	113db
1st January, 2026	111db
4 th January, 2026	115db
10 th January, 2026	113db
1 st February, 2026	116db

Source: The researcher (2026)

It can therefore be seen from the recordings that, the highest sound level recorded was 118db which is a figure considered very dangerous per the World Health Organization (WHO) 2019 Report and also according to the assertion of Ndah (2022). According to Basquiat (2026) as well, sound within the range of 100 – 150db are very dangerous and could cause hearing impairment within 15minutes of being exposed to such sound levels.

The lowest sound level recorded was 103db which falls within the dangerous listening decibel levels according to the Global Standard for Safe Listening Devices and System report by WHO (2019). It could be deduced from the recordings that; the average sound level for the period therefore stands at 113db which is equally regarded as unsafe sound level per the WHO (2019) report.

Presentation of Findings

The study therefore revealed that, music making during church services within the selected areas in the Eastern and Ashanti Regions of Ghana are extremely above the acceptable sound level in Ghana which are pegged at 55db and 48db during the day and night respectively. This confirms the Ghanaweb news on 2nd May, 2026, which reported the Environmental Protection Agency (EPA) Boss complaining of high volumes of sounds during church services in Ghana.

The study recorded the highest sound level as 118db and that of the lowest as 103 at the study areas. The average sound level therefore recorded was established at 113db.

The study made it clear that, such high volume musical performances could lead to health implications such as hearing loss, rupture of the eardrum, emotional discomfort, increase in high blood pressure, dizziness, cardio

vascular issues as well as mental health challenges. The finding above equally confirms the stance of WHO report (1991), Ndah (2022) and Basquiat (2026).

The study also made it clear that, performances with high sound levels make it difficult for congregants to hear the words of the songs that are sung; and as a result, they could not reflect on the songs for spiritual revival.

It came out that, performance at such high volumes make the worship Centre so noisy. This assertion also confirms the Ghanaweb news on 2nd May, 2026.

The study further revealed that, during performance of music at such higher levels, the hearing orientations of the congregants are mostly disturbed; especially those who sit closer to outlet speakers.

V. Conclusion

The study concluded that, music performance during church sessions at the study centres are very high and above the acceptable sound level sanction by WHO and EPA. The highest sound level recorded was 118db and the lowest was 103; with the average sound level in the study areas being 113db.

The high sound level of music production affects negatively the congregants as they complain of the sound levels over shadowing the words of the songs and also the auditoriums become so noisy hence cause discomfort to them. The study established that, higher volumes of sounds are detrimental to the health of the congregants.

Recommendations

1. Religious bodies in the study areas should educate their members on the dangers of performance of music at high sound levels.
2. Environmental Protection Agency (EPA) should organized periodic workshops for the religious institutions on the position of the law on production of music in the environment.
3. Church management should procure sound meters so as to monitor and keep in check the sound levels of the instrumentalists.
4. Professional musicians should be employed in the various churches in the area so that, performance would go with professionalism.
5. Bands' men should be educated on the dangers of playing music at higher volumes; a phenomenon that would help them produce music at moderate volumes.

Suggestions for further studies

It is suggested that, future researchers should target other regions of Ghana and also open up similar studies to cover other institutions apart from the places of religious worship.

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