

## Research Article

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# Effects of nightlife noise in a city center

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**Abstract:** The term *Movida* takes its name from the evening and night life of the city for their liveliness and animation. During the *Movida*, noise is one of the problems in the city centers due to the negative effects on the resident population. This paper reports the effects of noise due to the *Movida* phenomenon within the city center in southern Italy. Along the roads affected by the *Movida* phenomenon, the values of sound levels in dBA were measured both with fixed stations with a sound level meter and with mobile stations by wearing a noise dosimeter a participant of *Movida*. The measured noise levels are between 85 dBA to 90 dBA. The noise levels show that the *Movida* phenomenon generates disturbing conditions on the resident population with consequent conflict between club managers, patrons and residents.

**Keywords:** noise, *movida*, acoustic measurements, dBA, sound pressure level, nightlife, annoyance, young people, leisure noise, city of Aversa

## 1 Introduction

The *Movida* phenomenon is one of the most important problems in the city centers during the nightlife, due to traffic, public order and above all the effects of noise on the resident population generated by *Movida* visitors.

The word *Movida* comes in the classic definition of the vocabulary «move», therefore «movement». The word *Movida* is associated with a fashion born in Spain, in the 80s of the twentieth century, following the social and cultural climate which returned to life after the end of the Franco regime. The *Movida* represents one of the most popular cultural phenomena in our recent society history [1, 2]. So the term *Movida* took on the name of the nightlife of the cities, with specific reference to that of the Spanish cities,

known for their liveliness and animation at night [3, 4]. In Italy, according to statistics, there are over 29 million Italians who go out every now and then in the evening, more than 22 million who frequent the historic centers. Moreover, every week at least once 15.6 million people go out in the evening and of these 4.3 million go to the places of the *Movida*. In Italy, the turnover generated by commercial activities, bars, restaurants and clubs exceeds 70 billion euros and employs approximately 1.5 million people and is the only sector where the prevalence of employees are young people. In economic terms, the volume of business produced by *Movida* is equal to that produced by agriculture. In recent years, there has been increasing talk of the problem of nightlife noise, even if some areas are a seasonal phenomenon that creates a widespread economy, but not in the city centers where there are many people who attend nightlife throughout the year [5]. The majority of citizens associate a positive opinion with the *Movida* phenomenon, while people who live in areas where the *Movida* insists express a negative opinion due to the effects of noise and traffic [6–8]. In addition, the average age of people who frequent the *Movida* places is between 15-35 years. But the *Movida* phenomenon also brings negative effects, from opportunity to problem. The sale of alcohol, failure to comply with the closing times of the premises contribute to transforming the places of the *Movida* from an opportunity for fun and entertainment to an occasion of tension, with problems of managing public order. The press reports that due to the unwanted effects of the *Movida*, the anger of the residents results in the throwing of objects from the windows on the shops below, with requests for intervention by the police. Furthermore, in October 2017 “due to the man-made noise caused by the din of the patrons of some places on public land”, the Municipality of a city in Northern Italy was sentenced to compensate two of its citizens with a sum of 50,000 euros [9]. Therefore, the out-of-control noise generated by the people who frequent the *Movida* can cause problems of a judicial nature for city municipality [10, 11]. Thus, some municipality have tried to limit the negative effects of *Movida* by introducing bans on the sale of alcohol, blocking authorizations for the opening of new premises and the introduction of restricted traffic areas [12]. For example, in some cities, itinerant trade and the consumption of alcohol along the streets is prohibited,

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with the limitation of the opening hours of the premises and with the request to establish a security service to avoid the effects of gathering outside the premises. thus, reducing unwanted noise on the resident population.

In Italy there is a national law on noise pollution (Law n. 447 year 1995) [13] and some municipalities have adopted noise regulations based on summer tourism activities and the required quality of life of the resident population.

Some municipalities require an acoustic monitoring service when opening new premises to assess the effects of noise due to the presence of a new activity and if the noise limits were to be exceeded, take mitigation measures. In other cities, the local police have been equipped with sound level meters to assess the acoustic climate in real time, or with economic sensors installed on smartphones, fixed noise control units have been created [14–20]. Furthermore World Health Organization recently published specific environmental noise guidelines for Europe, where leisure noise is considered a health threat for European citizens that should be reduced [21]. The recommendations are day-time road traffic noise levels should be reduced to below 53 dB Lden; night-time road traffic noise levels should be reduced to below 45 dB. While for leisure noise exposure recommends reducing the yearly average from all the noise sources combined not over to 70 dB LAeq,24h, there is no risk for permanent hearing impairment below this exposure level.

## 2 Case study of the Movida

The City of Aversa (Province of Caserta, southern Italy) has 55,000 inhabitants. It is located a few kilometers from the City of Naples and the center of the “*Agro-Aversano*” with a population of about 350 thousand inhabitants [22]. The center of the city of Aversa has a plan with concentric circles being built during the medieval period. In the city center on weekends, in a restricted area, the phenomenon of Movida is concentrated, frequented by young people who gather after 11pm. Young people entertain themselves in the area, accompanied by the music emitted by the sound diffusion systems of the premises public that sell drinks. Initially, the Movida was concentrated only in commercial activities scattered throughout the city. But over the years commercial activities have been opened in the historic center along the “*via dei baretti*”, in this way all the Movida activities have been concentrated in one place. In the evening, the Movida area is frequented by people of the medium-young age group. So, in recent times the city nightlife has become a problem for the residents of the city center, who complain

of excessive noise and therefore disturbance to the public peace, complaining of the right to rest in the evening and night hours. The complaints resulted in incessant requests to law enforcement agencies, with interventions in the media complaining of the absence of controls, excessive noise and negative effects on the health of residents. To meet the complaints, the municipality of Aversa has issued strict rules to make the Movida and citizens coexist peacefully, but these rules are not always respected. The noise is generated not only by the music emitted by the sound reinforcement systems, but also by the shouting of the patrons near the premises, the stop of the patrons goes well beyond the closing time of the premises, even until 4:00 in the morning.

## 3 Materials and methods

To understand the effects of unwanted noise generated by Movida, a series of sound level measurements were carried out in the area of interest during the weekends in the spring season in the absence of wind and atmospheric precipitation. The stretch of road concerned has a length of about 400 meters, with a width of about 4.0 meters and the buildings have an average height of about 13 meters (ground floor and two superimposed floors). The road is made of asphalt, while the walls of the buildings are plastered. Figure 1 shows the aerial view of the route where the Movida takes place with an indication of the type of activity: church, shops, bars, pubs, restaurants. To better understand the effects of the Movida, the area has been divided into three areas, a first section, a central zone and a second section. Figure 2 shows the view of the subdivision of the area affected by Movida.

In fact, during the day the road is almost deserted, with few commercial activities (mostly some historical ones such as tailors or pastry shops) with limited traffic zone not active, the flow of people is reduced to the inhabitants of the street. In night period the road is totally transformed: with a lot of people that are not being able to walk smoothly. All commercial activities such as bars, pubs and nightclubs are open and entertain people with loud music (sometimes even live music, up to times that often go beyond what is allowed by the municipal regulation); and the limited traffic zone is active from 8:00 pm to 2:00 am.

The municipality of Aversa has regulated the territory in acoustically homogeneous zones. The nightlife area is classified as: area of intense human activity. this class includes urban areas affected by intense vehicular traffic, with a high population density, with a high presence of





Figure 1: Aerial view of the route where the Movida takes place with an indication of the type of activity: church, shops, bars, pubs, restaurants

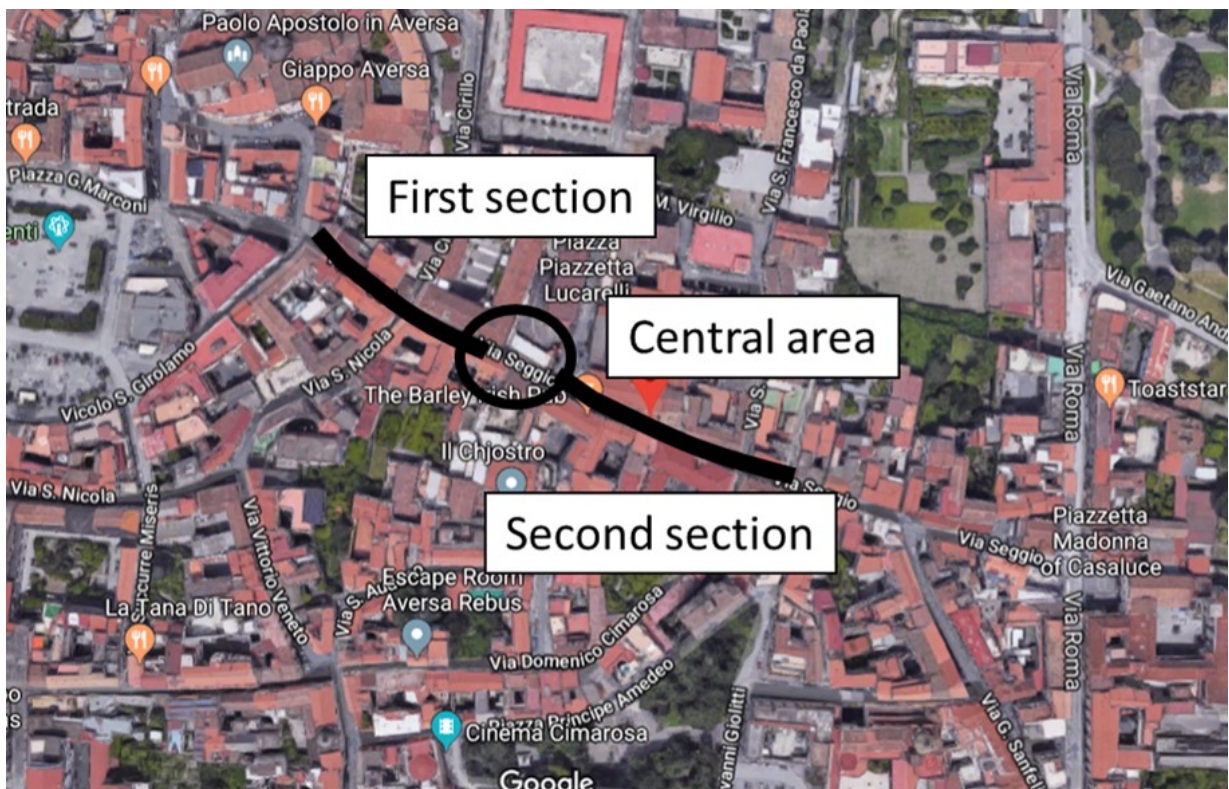


Figure 2: View of the subdivision of the area affected by Movida

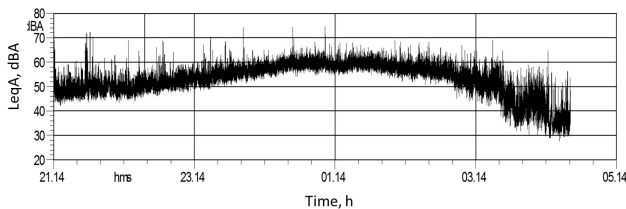


commercial activities and offices, with the presence of craft activities. The emission sound limits are equal to 65 dBA in the daytime period, while in the nighttime period are equal to 55 dBA

## 4 Results

A first acoustic measurement was performed at a fixed point throughout the night period, placing a sound level meter inside a house close to the area of interest. Acoustic measurements were carried out in a room located on the second floor of the building, in the most acoustically unfavorable condition, that is with the windows open. The dimensions of the room were width, length 4.0 m, height 3.0 m. The window was 1.2 m wide and 1.2 m high. The sound level meter was on a tripod at a height of 1.6 m from the floor, and at a distance of 1.0 m from the window. During the acoustic measurements the wind was absent.

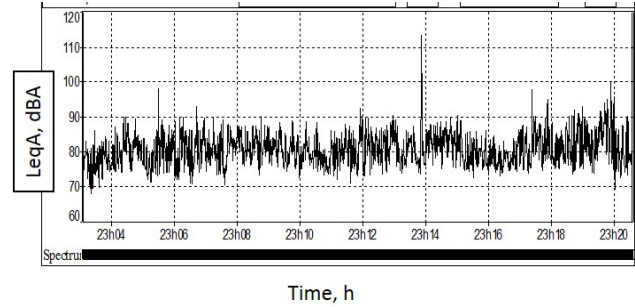
Figure 3 shows the time history of the sound level for this fixed position [23]. Registration starts at 9:00 pm and ends at 4:00 am the next day. Already at 9:00 pm the sound levels are equal to 50 dBA and then increase, until reaching the maximum of 60 dBA around 01:30 am in the morning. The sound levels then slowly tend to decrease, the sound phenomenon is reduced after 3:30 am.



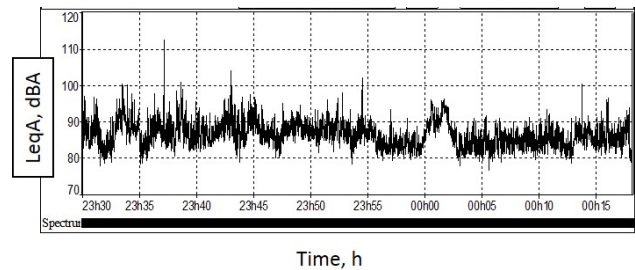
**Figure 3:** Time history of the sound level measured on the second floor of a house close to the nightlife area

Subsequently, to better understand the noisy phenomenon, acoustic measurements were carried out in the street where the nightlife takes place. The first series of measurements was performed with an integrating sound level meter, used in the field by a person who attended the Movida. The integrating sound level meter in use is a 01 dB, so it is possible to obtain the time history and equivalent sound levels in dBA [24–28]. The duration of the acoustic measurements is approximately two hours, starting at 11:00 pm and ending at 01:10 am.

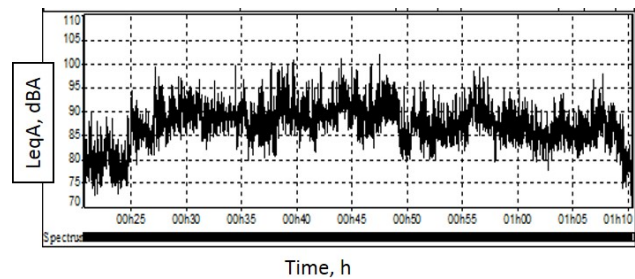
Figure 4 shows the time history of the sound pressure level in dBA, corresponds to the first acoustic measurement



**Figure 4:** Time history of the sound pressure level in dBA, measured in the first section (11:00 pm – 11:20 pm)



**Figure 5:** Time history of the sound pressure level in dBA, measured in the central area (11:20 pm – 00:16 am)



**Figure 6:** Time history of the sound pressure level in dBA, measured in the second section (00:20 am – 01:10 am)

along the first 200 meters of road, the person moved the sound level meter slowly along this stretch.

Figure 5 shows the time history of the sound pressure level in dBA, it is the second acoustic measurement corresponds to the central area of the road itself, the sound level was in a fixed position.

While Figure 6 shows the time history of the sound pressure level in dBA, it is the third acoustic measurement corresponds to the second stretch of the road of the next 200 meters, also in this case the person moved the sound level meter slowly along this stretch.

Table 1 shows the summary of the acoustic measurements, times and equivalent sound pressure level (dBA) measured. In the first (Figure 4) and in the second measurement (Figure 5) the sound levels measured are constant. In the second section (Figure 5) the sound level measured



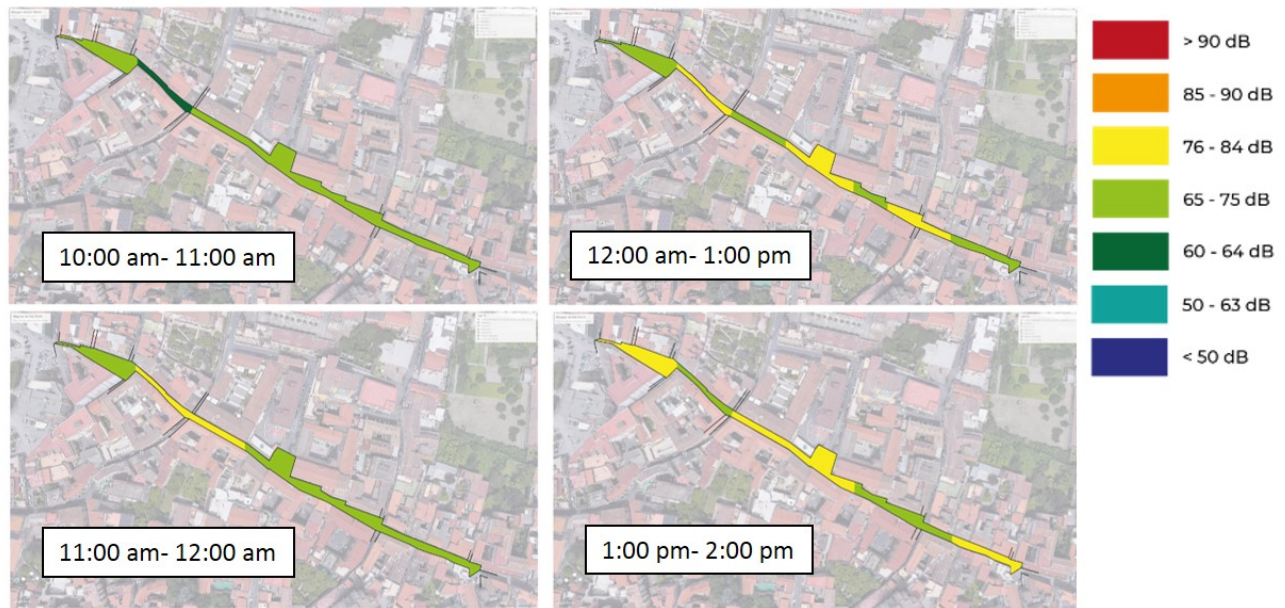


Figure 7: Map of the distribution of the sound level in dBA along the affected stretch of road as a function of the measurement time

Table 1: Summary of the acoustic measurements, times and equivalent sound pressure level (dBA) measured

Acoustic measurements	Hours	Equivalent sound pressure level (dBA)
first section	11:00 pm – 11:20 pm	86.0
central area	11:20 pm – 00:16 am	88.0
second section	00:20 am – 01:10 am	89.0

tends to increase; in this case the increase of the sound levels are due to the constant shouting of the patrons and the music spread by the sound system. The first and second section are influenced by the continuous shouting of the patrons, while in the third section (Figure 6) the sound levels are influenced by the music emitted by the loudspeakers installed outside the shops.

From Table 1 it can be seen that between 11:00 pm and 1:00 am the sound level measurements report the equivalent sound levels measured are between 86 and 89 dBA. A third set of measurements were performed by a person who attended the Movidia wears a noise dosimeter. The noise dosimeter is a particular sound level meter dedicated to measuring and evaluating exposure to noise in the workplace. Noise dosimeter measure and store sound pressure levels (in dBA) over time and provide a cumulative reading

Table 2: Summary of measurements performed with dosimeter in the daytime period

Hours	Maximum sound pressure level values, dBA	Minimum sound pressure level values, dBA
10:00 am – 11:00 am	72.0	64.0
11:00 am – 12:00 am	80.0	65.0
12:00 am – 1:00 pm	77.0	70.0
1:00 pm – 2:00 pm	78.0	72.0

of noise exposure for a given period of time. The acquisitions were carried out along the entire stretch of road where the Movidia phenomenon takes place [27, 28]. The acoustic measurements were performed in different time. The acquisitions were made every hour and with a distance of about 50 meters between one point and another. A first acoustic measurement was performed in the morning from 10:00 am to 2:00 pm (from the opening hours of the commercial activities until closing time) in this way the possible contribution to the noise of the Movidia was assessed of anthropogenic sound sources typical of the area in question. Figure 7 shows the map of the sound level distribution in dBA along the affected stretch of road as a function of the measurement time [29–31]. The sound levels in the time slot



Figure 8: Some phases of Movida with the presence of numerous young people along the roads of interest

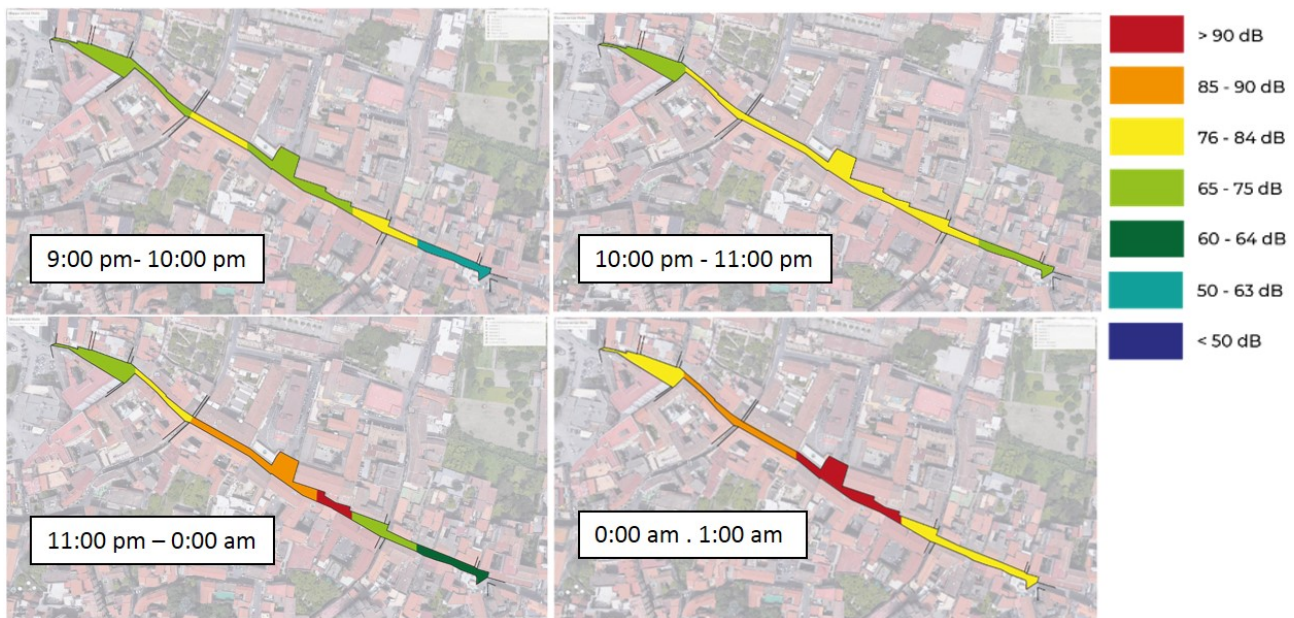


Figure 9: Map of the distribution of the sound level in dBA along the affected stretch of road as a function of the measurement time

between 10:00 am and 11:00 am are in the order of 65 dBA and then increase during the morning due to the increase in vehicular traffic and the loading and unloading of goods. Since the area is purely commercial, the noise is due to vehicular traffic, and in any case does not exceed the values of 80 dBA during the unloading of goods due to the presence of heavy means of transport. The acoustic measurements performed with the dosimeter can be summarized as shown in Table 2.

A second set of measurements was performed from 9:00 pm to 01:00 am. During this time slot the area is closed to vehicular traffic, but the typical Movida activities begin with the emission of music and the presence of numerous customers along the road. The acoustic measurements performed with the dosimeter can be summarized as shown

in Table 3. Figure 8 shows some phases of Movida with the presence of numerous young people along the roads of interest. While Figure 9 shows map of the distribution of the sound level in dBA along the affected stretch of road as a function of the measurement time.

From 9:00 pm to 11:00 pm the road is closed, and the traffic leads to a reduction in noise levels in the traffic area, but the Movida phenomenon has not yet started. The sound levels at the beginning and end of the stretch of road are always in the order of 65 dBA. While in the central area there is a slight increase due to the start of commercial activities related to the distribution of food and drinks. From 11:00 pm to midnight there is a significant increase in sound levels in the central area with an increase of 90 dBA. In the time slot 0000 am – 1:00 am the area affected by the increase in



levels of about 90 dBA only expands the entrance areas of the Movidia area, the levels drop to 75 dBA. In the central area for about 2 hours the measured sound levels are about 90 dBA.

**Table 3:** Summary of noise dosimeter measurements in the daytime period

Hours	Maximum sound pressure level, dBA	Minimum sound pressure level, dBA
9:00 pm – 10:00 pm	70.0	65.0
10:00 pm – 11:00 pm	70.0	65.0
11:00 pm – 00:00 am	90.0	70.0
00:00 am – 1:00 am	90.0	75.0

## 5 Conclusion

The sound levels measured within the city center in Southern Italy, due to the Movidia phenomenon, reach values of the order of 90 dBA for an interval of about two hours. These levels are due to the music played through speakers and the shouting of the patrons. From an acoustic point of view, this condition generates conditions of disturbance to sleep and tranquility on the part of the residents, with consequent conflicts between club managers, customers and residents. Therefore, it would be advisable to adopt suitable ordinances for the limitation of the noise emitted by the sound amplification systems and to avoid that the patrons stay after the closure of the premises in the adjacent areas. The sale of alcoholic beverages beyond a certain time should be prohibited. The solutions should be shared with the managers of the premises and residents and advertised in a simple and effective way with the help of information campaigns on social network.

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