




# Characteristics associated of family member's perception regarding the importance of the Inmetro Noise Seal for children's toys

Características associadas à percepção de familiares quanto à importância do Selo Ruído do Inmetro para brinquedos infantis

Características asociadas a la percepción de los familiares sobre la importancia del Sello Ruido Inmetro para los juguetes de los niños

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## Abstract

**Introduction:** Exposure to high sound pressure levels is a problem in modern society, especially among children. **Purpose:** To analyze the characteristics associated with family members' perception of the importance of the Inmetro Noise Seal for children's toys. **Methods:** Descriptive cross-sectional study with non-probabilistic convenience sampling. Data were collected through a questionnaire answered by parents and/or guardians of children between zero and five years of age. **Results:** The highest prevalence of individuals who knew the importance of the Inmetro Noise Seal was among guardians (66.7%), males (36.4%), aged 18 to 29 (37.5%), black (60.0%) and with up to one child (29.2%). The characteristic considered when buying a toy, which was most mentioned by participants, was the skill that the toy stimulates (92.3%). There was greater awareness of the importance of the Noise Seal among those who:

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### Authors' contributions:

MVF: study design, donor collection, and draft of the article.

DH: method and statistical analysis.

ZM: critical review and supervision.

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considered the child's hearing health when purchasing a toy (46.2%), considered Inmetro certification when purchasing a toy (41.7%), knew what hearing loss was (29.2%), had their children playing with noise-producing toys three to four days a week (40%) and did not buy toys without the seal (31.8%). The reported volume of toys obtained a median of five points, ranging from one to 10. **Conclusion:** Family members who knew the importance of the Inmetro Noise Seal took into account the child's hearing health and Inmetro certification when purchasing a toy, when compared to others.

**Keywords:** Hearing Loss, Noise-Induced; Games and toys; Hearing; Child.

## Resumo

**Introdução:** A exposição a níveis de pressão sonora elevados é um problema da sociedade moderna, especialmente na população infantil. **Objetivo:** Analisar as características associadas à percepção de familiares quanto à importância do Selo Ruído do Inmetro para brinquedos infantis. **Métodos:** Estudo descritivo de delineamento transversal, com amostragem não probabilística, por conveniência. Os dados foram coletados por meio de questionário respondido por pais e/ou responsáveis de crianças entre zero e cinco anos. **Resultados:** A maior prevalência de indivíduos que conheciam a importância do Selo Ruído do Inmetro foi entre os responsáveis (66,7%), pessoas do gênero masculino (36,4%), entre 18 a 29 anos de idade (37,5%), de cor/raça preta (60,0%) e com até um filho (29,2%). A característica considerada ao comprar um brinquedo, que foi mais referida pelos participantes, foi a habilidade que o brinquedo estimula (92,3%). Houve maior conhecimento da importância do Selo Ruído entre aqueles que: consideravam a saúde auditiva da criança na compra do brinquedo (46,2%), consideravam a certificação do Inmetro na compra do brinquedo (41,7%), sabiam o que era perda auditiva (29,2%), os filhos brincavam com brinquedos sonoros de três a quatro dias por semana (40%) e que não compram brinquedos sem o selo (31,8%). O volume referido dos brinquedos obteve mediana de cinco pontos, variando de um a 10. **Conclusão:** Os familiares que conheciam a importância do Selo Ruído do Inmetro levaram em consideração a saúde auditiva da criança e a certificação do Inmetro na compra de um brinquedo quando comparado aos demais.

**Palavras-chave:** Perda auditiva provocada por ruído; Jogos e brinquedos; Audição; Criança.

## Resumen

**Introducción:** La exposición a altos niveles de presión sonora es un problema en la sociedad moderna, especialmente entre los niños. **Objetivo:** Analizar las características asociadas a la percepción de los familiares sobre la importancia del Sello de Ruido Inmetro para los juguetes de los niños. **Métodos:** Estudio descriptivo con diseño transversal, con muestreo no probabilístico, por conveniencia. Los datos fueron recolectados a través de cuestionario respondido por padres y/o tutores de niños entre cero y cinco años. **Resultados:** La mayor prevalencia de individuos que conocían la importancia del Sello de Ruido del Inmetro se presentó entre los responsables (66,7%), personas del sexo masculino (36,4%), entre 18 y 29 años (37,5%), de color/raza negra (60,0%) y con hasta un hijo (29,2%). La característica considerada a la hora de comprar un juguete fue la habilidad que estimula (92,3%). Hubo mayor conciencia sobre la importancia del Sello de Ruido entre quienes: consideraron la salud auditiva del niño al comprar el juguete (46,2%), la certificación del Inmetro al comprar el juguete (41,7%), sabían qué pérdida era la audición (29,2%), los niños jugaban con juguetes sonoros tres o cuatro días a la semana (40%) y no compraban juguetes sin sello (31,8%). El volumen reportado de los juguetes tuvo una mediana de cinco puntos, que van del uno al 10. **Conclusión:** Los familiares que conocían la importancia del Sello de Ruido de Inmetro tomaron en cuenta la salud auditiva del niño y la certificación de Inmetro al comprar un juguete en comparación con los demás.

**Palabras clave:** Pérdida Auditiva Provocada por Ruido; Juego y Implementos de Juego; Audición; Niño.

## Introduction

Exposure to high sound pressure levels associated with occupational, environmental, and recreational activities has been a problem in modern society. For children, this exposure comes hand-in-hand with sound toys and communication devices (smartphones, tablets, etc.), not to mention the high sound pressure levels in the school environment<sup>1,2</sup>.

In the child population, indiscriminate exposure to high sound pressure levels can cause, in the long term, behavioral, educational, and professional impacts, cognitive impairment, sleep disorders, risk of hearing loss, psychological changes, and changes in vegetative functions. Children are more vulnerable to exposure to high sound pressure levels because they are in a sensitive period of development<sup>1,3</sup>.

Even though we know the damage caused by exposure to high sound pressure levels to hearing, there are still no specific criteria for determining the safe limits of this exposure for children<sup>4,5</sup>. According to the World Health Organization (WHO)<sup>6</sup>, the maximum recommended time for the child population to be exposed to an intensity of 87 dB(A) is 2.5 hours per week.

On the other hand, the auditory experiences lived in the first years of children's lives are essential for the learning process and acquisition of oral language, as it is through auditory feedback that basic notions are created for language structuring<sup>7,8</sup>. Sound toys are part of children's ludic universe, keeping them entertained and stimulating their auditory sensory pathways. However, it is necessary to be attentive to exposure to these toys, as they can generate high sound pressure levels, posing risks to hearing health<sup>7</sup>.

Toys sold in Brazil require certification by the National Institute of Metrology, Standardization and Industrial Quality (Inmetro), in compliance with ordinance n. 563/2016, which determines that toys should not have a sound pressure level greater than 110 dB(A). Those toys must carry a warning that misuse may cause hearing problems<sup>9</sup>. Ordinance n. 302, of July 12, 2021, requires that sound toys be manufactured in such a way that it prevents the risk of damage to hearing health<sup>10</sup>. Recommendations from the Ministry of Labor, through ordinance n. 3.214/78, of June 8, 1978, indicate that the greater the intensity of the sound

we are exposed to, the shorter the exposure time to it should be<sup>11</sup>.

Earlier studies<sup>7,12</sup> have proposed an acoustic analysis of children's toys and concluded that toys without the Inmetro noise seal have a higher sound pressure level than toys with the seal. Toys certified by Inmetro presented<sup>12</sup> a sound intensity between 61.5 and 91.55 dB (A) at a distance of 2.5 cm, while toys without the noise seal presented an intensity between 67.45 and 94.3 dB (A) at the same distance. Another study<sup>7</sup> analyzing only children's toys without Inmetro certification revealed that sound intensities of around 102 dB(A) were identified at a distance of 10 cm from the sound source, with most toys tested presenting sound pressure levels above 85 dB(A). Those high sound pressure levels can cause irreversible damage to children's hearing, such as hearing loss and tinnitus<sup>7,12,13</sup>.

From a prevention perspective, certain precautions can be taken, such as researching the sound intensity of the toy and choosing those with the lowest sound pressure level emitted, more effectively demanding that regulatory bodies be held accountable, and raising awareness among parents and educators about the harm that exposure to high sound pressure levels can cause to children's hearing health<sup>7,12</sup>.

As prevention is the best way to avoid damage caused by high sound pressure levels emitted by children's toys, this study aimed to analyze the characteristics associated with family members' perception of the importance of the Inmetro noise seal for those toys.

## Methods

This research is a cross-sectional study approved by the Human Research Ethics Committee of the Federal University of Santa Catarina, under opinion number 5.915.270. All individuals signed the Free and Informed Consent Form (FICF) to begin data collection.

The research was characterized by a non-probabilistic, convenience sample whose inclusion criterion was being a father, mother and/or guardian of children between zero and five years old. Participants who did not respond fully to the proposed data collection instrument were excluded from the sample. In total, 52 parents and/or guardians participated in the research.

Participants were recruited through the researchers' social media, the official communication channels of the Federal University of Santa Catarina, and groups of public and private schools. Participants received an electronic invitation to respond to a questionnaire prepared by the researchers and hosted on the Google Forms platform. Only after reading the IFCF and signaling consent did the platform enable the completion of this form. The research participant was offered the right to access the content of the instrument (topics that will be covered) to make an informed decision before answering the questions.

Data were collected continuously between March and May 2023 through a structured online questionnaire comprised of 17 questions (six on sociodemographic profile and 11 specific ones) distributed as follows: seven questions requiring dichotomous answers, six with single answers, two with multiple-choice answers, one open question, and one with a scale response.

### Variables

The following sociodemographic variables were collected: kinship (mother; father; guardian), gender of guardian (female; male), age group (18 to 29; 30 to 39;  $\geq 40$ ), race/color (white; black; brown; yellow; indigenous), education (no education/elementary education; incomplete/complete high school; higher education/postgraduate studies) and number of children (zero to one; two to three; more than three children). Participants also indicated aspects they consider when buying a toy, such as price, skill that the toy stimulates, Inmetro certification, toy safety, and the child's hearing health. In addition, they were asked about their knowledge of the possible harm caused by exposure to loud sounds (headache, sleep disorders, hearing loss, increased blood pressure, anxiety, stress, and irritation).

The sample's knowledge about hearing loss, exposure to loud sounds, and children's contact with sound toys was also assessed through the following questions: Do you know what hearing loss is? (no; yes); Do you believe that hearing loss can be prevented? (no; yes; I don't know); Do you believe exposure to high-intensity (loud) sounds can damage a child's hearing? (no; yes); Does the child have sound toys? (no; yes); How many hours a day is the child exposed to sound toys? (zero to

one hour; two to five hours; more than five hours); How often does the child usually play with sound toys? (one to two days a week; three to four days a week; more than five days a week); Do you buy toys without the Inmetro noise seal? (no; yes); Do you know the importance of the Inmetro noise seal for toys that emit sound? (no; yes). Finally, participants should indicate, using a scale, their perception of the volume of their child(ren)'s toys, with 1 being a low volume and 10 being a high volume (considering sound toys in general).

### Data analysis

Data were represented using absolute (n) and relative (%) frequencies for categorical variables. The numerical variables were described using the following measures of central tendency and dispersion: median, minimum, and maximum value. Pearson's Chi-square test was used to assess the relationship between the variable "Importance of the Inmetro noise seal" and the other qualitative variables of the study. Fisher's exact test was used when the assumptions were not met.

The data were stored in Microsoft Excel spreadsheets and exported for statistical analysis in Stata software version 14. The level of significance considered in this study was  $p \leq 0.05$ .

### Results

The sample consisted of 52 parents or guardians. Regarding kinship, most were mothers (75.0%), followed by fathers (19.2%). In general, there was a higher prevalence of female respondents (78.8%) in the age group of 30 to 39 years (69.2%) of white race/color (76.5%) and individuals with higher education/postgraduate studies (67.3%). Notably, more than half of the sample has two to three children (53.8%). Fourteen participants (26.9%) reported knowing the importance of the seal (Table 1).

There was a higher prevalence of individuals who knew the importance of the Inmetro noise seal among those responsible (66.7%) and those of the male gender (36.4%). The percentage of people who recognized the importance of the Inmetro noise seal was also higher among those aged 18 to 29 (37.5%), black (60.0%), and people with up to one child (29.2%), although not statistically significant (Table 1).

**Table 1.** Description of the sociodemographic characteristics of the sample, Florianópolis, 2023 (n=52)

Variable	Total		Knows about the importance of the Inmetro noise seal		p-value
			No (n=38)	Yes (n=14)	
	n	%	n (%)	n (%)	
<b>Kinship (n=52)</b>					0.218 <sup>a</sup>
Mother	39	75.0	30 (76.9)	9 (23.1)	
Father	10	19.2	7 (70.0)	3 (30.0)	
Guardian	3	5.8	1 (33.3)	2 (66.7)	
<b>Gender of the guardian (n=52)</b>					0.460 <sup>a</sup>
Female	41	78.8	31 (75.6)	10 (24.4)	
Male	11	21.2	7 (63.6)	4 (36.4)	
<b>Age Range (n=52)</b>					0.887 <sup>a</sup>
18 to 29	8	15.4	5 (62.5)	3 (37.5)	
30 to 39	36	69.2	27 (75.0)	9 (25.0)	
≥ 40	8	15,4	6 (75,0)	2 (25,0)	
<b>Race/color (n=51)</b>					0.265 <sup>a</sup>
White	39	76.5	30 (76.9)	9 (23.1)	
Black	5	9.8	2 (40.0)	3 (60.0)	
Pardo	5	9.8	4 (80.0)	1 (20.0)	
Asian	2	3.9	1 (50.0)	1 (50.0)	
Indigenous	-	-	-	-	
<b>Education* (n=52)</b>					0.306 <sup>a</sup>
No schooling / elementary education	4	7.7	2 (50.0)	2 (50.0)	
High school	13	25.0	11 (84.6)	2 (15.4)	
Higher education / postgraduation	35	67.3	25 (71.4)	10 (28.6)	
<b>Number of children (n=52)</b>					0.736 <sup>b</sup>
0 to 1	24	46.2	17 (70.8)	7 (29.2)	
2 to 3	28	53.8	21 (75.0)	7 (25.0)	
More than 3 children	-	-	-	-	

\* Complete or incomplete education.

<sup>a</sup> Fisher's Exact Test.

<sup>b</sup> Pearson's Chi-square Test.

When buying a toy, the participants' most frequently considered characteristic was the skills the toy stimulates (92.3%), followed by the safety of the toy, mentioned by 65.4% of the sample. It

is worth noting that 25% of participants reported considering the child's hearing health, and 23.1% mentioned Inmetro certification when purchasing the toy (Table 2).

**Table 2.** Description of the aspects taken into consideration when purchasing a toy. Florianópolis, 2023 (n=52)

Variable	Total		Knows about the importance of the Inmetro noise seal		p-value
			No (n=38)	Yes (n=14)	
	n	%	n (%)	n (%)	
<b>Price</b>					0.344 <sup>a</sup>
No	22	42.3	18 (81.8)	4 (18.2)	
Yes	30	57.7	20 (66.7)	10 (33.3)	
<b>Skills that the toy stimulates</b>					0.564 <sup>a</sup>
No	4	7.7	4 (100.0)	-	
Yes	48	92.3	34 (70.8)	14 (29.2)	
<b>Inmetro certification</b>					0.267 <sup>a</sup>
No	40	76.9	31 (77.5)	9 (22.5)	
Yes	12	23.1	7 (58.3)	5 (41.7)	
<b>Toy safety</b>					1.000 <sup>a</sup>
No	18	34.6	13 (72.2)	5 (27.8)	
Yes	34	65.4	25 (73.5)	9 (26.5)	
<b>Children's hearing health</b>					0.071 <sup>b</sup>
No	39	75.0	31 (79.5)	8 (20.5)	
Yes	13	25.0	7 (53.8)	6 (46.2)	

<sup>a</sup> Fisher's Exact Test.<sup>b</sup> Pearson's Chi-square Test.

There was a higher frequency of knowledge of the importance of the Inmetro noise seal among those who considered the child's hearing health (46.2%) when purchasing the toy compared to those who did not (20.5%). However, there was no significant difference ( $p=0.071$ ). Likewise, the prevalence of knowledge of the importance of the Inmetro noise seal was higher among those who considered Inmetro certification when purchasing a toy (41.7%) when compared to those who did not (22.5%), although without statistical difference ( $p=0.267$ ). There was no difference in the percentages of knowledge of the importance of the Inmetro noise seal among those who considered the price ( $p=0.344$ ), the skills that the toy stimulates ( $p=0.564$ ), and the safety of the toy ( $p=1.000$ ) when purchasing a toy.

When assessing knowledge about hearing loss, there was a higher frequency of knowledge of the importance of the Inmetro noise seal among those who knew what hearing loss was (29.2%) ( $p=0.564$ ). The prevalence of knowledge of the importance of the Inmetro noise seal was also higher among those whose children played with noise-making toys three to four days a week ( $p=0.474$ ), but there was no significant difference. Of the sample, 73.1% mentioned that their children play with sound toys for up to one hour a day, and only 28.5% of them responded that they knew the importance of the Inmetro noise seal. Furthermore, there was a higher prevalence of knowledge of the importance of the Inmetro noise seal among those who do not buy toys without the seal (31.8%) ( $p=0.899$ ) (Table 3).

**Table 3.** Description of the sample's knowledge about hearing loss, exposure to loud sounds and children's contact with sound toys. Florianopolis, 2023 (n=52)

Variable	Total		Knows about the importance of the Inmetro noise seal		p-value
	n	%	No (n=38) n (%)	Yes (n=14) n (%)	
<b>Do you know what hearing loss is?</b>					0.564 <sup>a</sup>
No	4	7.7	4 (100.0)	-	
Yes	48	92.3	34 (70.8)	14 (29.2)	
<b>Do you believe that hearing loss can be prevented?</b>					0.750 <sup>a</sup>
No	1	1.9	1 (100.0)	-	
Yes	44	84.6	31 (70.5)	13 (29.5)	
I don't know	7	13.5	6 (85.7)	1 (14.3)	
<b>Do you believe that exposure to high-intensity (loud) sounds can damage a child's hearing?</b>					-
No	-	-	-	-	
Yes	52	100.0	38 (73.1)	14 (26.9)	
<b>Does the child have sound toys?</b>					0.169 <sup>a</sup>
No	7	13.5	7 (100.0)	-	
Yes	45	86.5	31 (68.9)	14 (31.1)	
<b>How many hours a day is the child exposed to sound toys?</b>					1.000 <sup>a</sup>
0 to 1 hour	38	73.1	27 (71.5)	11 (28.9%)	
2 to 5 hours	13	25.0	10 (76.9)	3 (23.1)	
More than 5 hours	1	1.9	1 (100.0)	-	
<b>How often does the child usually play with sound toys?</b>					0.474 <sup>a</sup>
1 to 2 days a week	34	65.4	25 (73.5)	9 (26.5)	
3 to 4 days a week	10	19.2	6 (60.0)	4 (40.0)	
More than 5 days a week	8	15.4	7 (87.5)	1 (12.5)	
<b>Do you buy toys without the Inmetro noise seal?</b>					0.899 <sup>b</sup>
No	22	52.4	15 (68.2)	7 (31.8)	
Yes	20	47.6	14 (70.0)	6 (30.0)	

<sup>a</sup> Fisher's Exact Test.  
<sup>b</sup> Pearson's Chi-square Test.

Regarding the symptoms related to hearing loss that participants reported knowing, there was a higher frequency of reports of hearing loss (84.3%), followed by stress (78.4%) and headache (76.7%).

No participant mentioned irritation as a symptom (Figure 1).

Regarding the perception of the volume of children's toys, the median was 5 points, ranging from 1 to 10 (Figure 2).



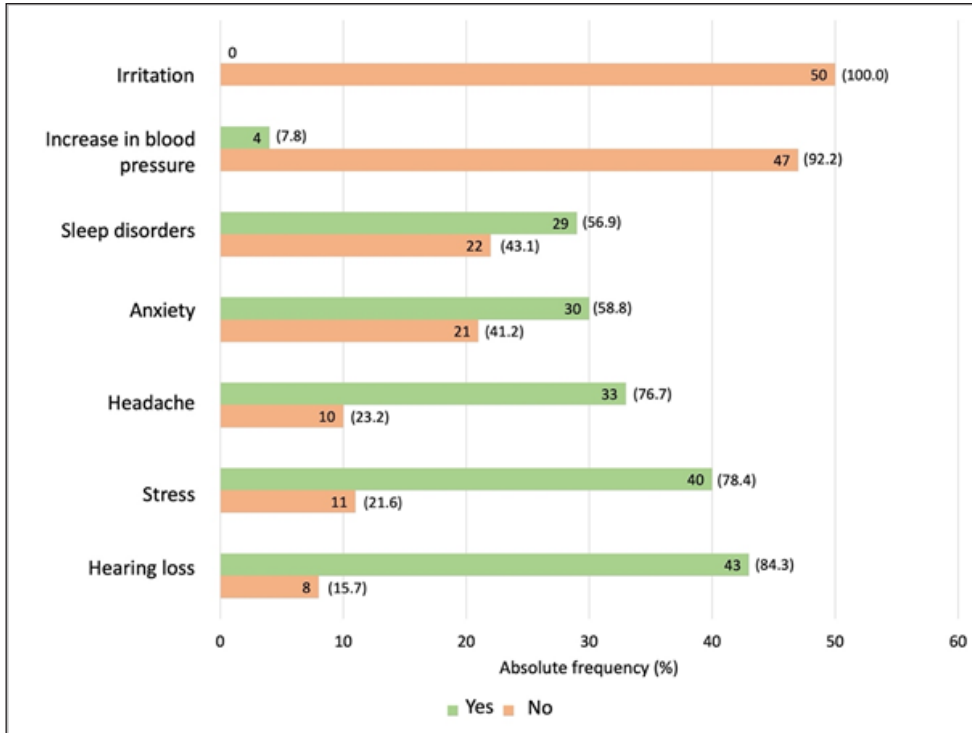


Figure 1. Occurrence of symptoms related to hearing loss known to participants. Florianópolis, 2023

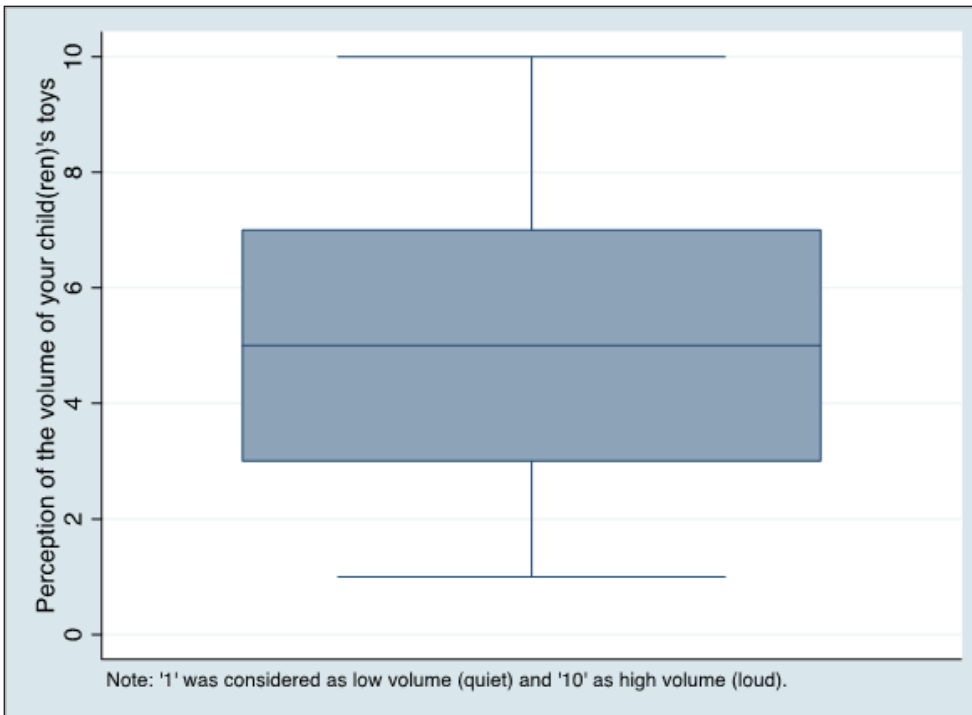


Figure 2. Perception of the intensity of the sound emitted by children's toys. Florianópolis, 2023 (n=52)



## Discussion

In Brazil, all toys sold must present an Inmetro certification, determining that toys with a sound pressure level above 110 dB(A) must present a warning that misuse can cause hearing problems<sup>9</sup>. Therefore, sound toys must be manufactured so that the risk of damage to hearing health is reduced<sup>10</sup>. The greater the intensity of the sound we are exposed to, the shorter the time we should be exposed to it<sup>11</sup>. Thus, considering the permitted eight hours of exposure to an intensity of 85 dB(A), the safe exposure time to 110 dB(A) must be up to 15 minutes<sup>14</sup>.

In the present study, most participants who reported knowing the importance of the Inmetro noise seal were the children's guardians, male, black, aged between 18 and 29, and had up to one child. According to the authors<sup>15</sup>, the knowledge index of the Inmetro noise seal is still minimal (23.08%). The study, which verified the perception and knowledge of the adult population of the Metropolitan Region of Campinas about the impacts of noise on human health, observed that the seal was better known by people who had completed high school and people between the ages of 35 and 59<sup>15</sup>.

Among the most frequently cited characteristics considered when buying a toy stand out: the skills it stimulates, its safety, the child's hearing health, and, finally, the Inmetro certification. The skills stimulated by toys and a child's auditory experiences in the first years of life are crucial for their development, learning, and acquisition of oral language<sup>7,8,12</sup>. However, special attention should be given to Inmetro certification since toys without the Inmetro noise seal have a high level of sound pressure<sup>7,12</sup>; therefore, exposure to high-intensity sounds, in addition to causing extra-auditory damage, increases the risk of hearing loss, especially in children<sup>12</sup>. A study<sup>15</sup> analyzing the perception and knowledge of the adult population of the Metropolitan Region of Campinas about the impacts of noise on human health found that most participants did not consider the sound pressure level emitted by household appliances at the time of purchase, although the authors did identify a willingness among consumers to pay a higher price for quieter products.

There was no statistically significant difference in the percentages of knowledge about the importance of the Inmetro noise seal among those who

considered the price, the skills a toy stimulates, and its safety when buying it. Toys without the Inmetro noise seal may be cheaper and are found in informal and black market stores. However, toys that are not certified can pose risks to children's hearing health by emitting higher sound pressure levels than those that have the Inmetro noise seal<sup>14</sup>. Furthermore, toys certified by Inmetro must be manufactured, imported, distributed, and marketed to ensure children's safety<sup>16</sup>.

When assessing hearing loss, a higher frequency of knowledge of the importance of the Inmetro noise seal was seen among those who knew what hearing loss was. Thus, several authors consider the possibility of health professionals acting as mediators for children's parents and/or guardians regarding the risks to hearing health due to exposure to noise from sound toys, promoting knowledge about children's hearing health<sup>17,18</sup>.

The prevalence of knowledge about the importance of the Inmetro noise seal was also higher among those whose children played with noise-making toys three to four days a week. A study<sup>19</sup> assessing hearing and exposure to high leisure sound pressure levels by age groups identified that children between six and 11 years old who had cumulative exposure to such pressure for 40 hours or more had higher average hearing thresholds and a higher prevalence of hearing loss at 6 kHz compared to those in whom exposure occurred less than 40 hours per week.

Those who considered children's hearing health and the Inmetro certification and those who do not buy toys without the Inmetro noise seal stated that they recognized the importance of the Inmetro noise seal. The purpose of the seal is precisely to inform the consumer about the sound pressure level emitted by the devices, enabling the consumer to choose the quietest product. The issuance of the Inmetro noise seal encourages the production of machines, equipment, and other devices with lower sound pressure levels<sup>20</sup>. As previously mentioned, some authors<sup>15</sup> identified a certain willingness on the part of consumers to pay a slightly higher price for quieter products.

Regarding the symptoms related to hearing-related harm, participants reported hearing loss was the most frequent, followed by stress and headache. A study<sup>15</sup> assessed the perception and knowledge of an adult population through a questionnaire addressing the harm caused by exposure to high sound

pressure levels on human health. Most participants demonstrated knowledge of only auditory-related symptoms, such as hearing loss and tinnitus, and extra-auditory symptoms, such as stress. Exposure to high sound pressure levels can damage the outer hair cells of the cochlea, posing a risk of hearing loss and tinnitus<sup>18,21</sup> and extra-auditory impairments such as stress, sleep disorders, anxiety, difficulties in acquiring oral language, and learning disorders, among others<sup>14,23</sup>. The child population is more vulnerable to noise-induced hearing loss (NIHL) and other adverse systemic effects of exposure to high sound pressure levels. In this population, the main sources of exposure to high sound pressure levels are traffic noise and recreational activities, such as noise-making toys and headphones<sup>12,21,22</sup>.

Regarding the perception of the intensity emitted by the children's toys, the median was 5 points. From an occupational point of view, national legislation indicates that the greater the intensity of the sound to which we are exposed, the shorter the exposure time to it<sup>11</sup> should be, as already mentioned. This recommendation applies to the children's exposure to sound toys that emit high sound pressure levels<sup>12</sup>.

Some aspects of this research should be mentioned. Using a non-probabilistic convenience sample may have influenced some findings, meaning that the results cannot be generalized, as they are limited to this sample. Also, the lack of research investigating the topic may have impacted the discussion on some of the studied aspects. Despite this, the issue deserves attention because auditory and extra-auditory effects have increased among children. Sound pressure levels emitted by toys are a potential risk factor for children's hearing health. According to this study, family members' knowledge of the Inmetro noise seal for children's toys is considered low, demonstrating the relevance of the topic. Scientific dissemination associated with health promotion actions must be established to raise awareness among family members and those responsible for children about the importance of Inmetro toy certification and the damage that high sound pressure levels can cause to children's hearing health.

Pediatric health professionals must raise families' awareness about the certification of sound toys, aiming to reduce children's exposure to high sound pressure levels. Prevention and hearing health promotion measures can be taken in schools, basic

health units, and through digital means to make children's parents/guardians conscious of the risks of exposure to high sound pressure levels, the importance of Inmetro certification for sound toys, and studies that indicate higher sound pressure levels in toys without the Inmetro noise seal.

## Conclusion

This research revealed that knowledge of the importance of the noise seal was greater among those who took into consideration the child's hearing health and the Inmetro certification when purchasing the toy, in addition to those who knew what hearing loss was, whose children played with sound toys three to four days a week and who did not buy toys without the seal. However, these data did not present statistical significance. Although preliminary, these findings highlight the importance and need to explore the topic further, contemplating the real impacts that exposure to high sound pressure levels can have on children's hearing health.

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