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EVALUATING THE SOUND VOLUME AND LUMINANCE INTENSITY IN MALE STUDENTS RESIDING AT THE DORMITORIES OF KERMANSHAH UNIVERSITY OF MEDICAL SCIENCES, IRAN

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Abstract

If there is poor lighting, even person having healthy eyes and good vision causes diverse problems such as eyestrain, headache, impaired vision, glare, physical fatigue and also psychological effects. The aim of this study was to evaluate the sound volume and light intensity in male students residing at the dormitories of Kermanshah University of Medical Science. The present study was conducted by cross-sectional method in two male dormitories of Kermanshah University of Medical Science which 120 light stations and 105sound stations in dormitories room and 2 stations in study hall was assessed. luminance intensity measurement was done by network method took in center of each station.

In order to measure luminance intensity, the lux meter of HAGNER model was used at the height of 60 cm from baseline. sound pressure level measurement was performed using Cell-231. At the end, obtained results were entered to software and compared with standard of Iran. The results showed that 7.1% (2 stations) of measured points were in the standard range of 300 to 500 lux, 25.9% (7 stations) were at lower than 300 lux and 66.7% (18 stations) were in higher than 500 lux. The illuminance in dormitories rooms in 31.2% (29 stations) were in the standard range of 150 to 300 lux, 8.6% (8 stations) were lower than 150 lux and 60.2% (56 stations) were higher than 300 lux. The average sound pressure level in 100% (24 stations) measured stations in study halls was higher than standard of Iran. Also sound volume in the dormitory rooms in 11.1% (9 stations) was less than 35 dB and in 88.9% (72 stations) was

higher than 35 dB (standard of Iran). Due to the inappropriate illuminance and sound at dormitory it is recommended by taking measures such as appropriate illuminance design, periodic cleaning and dusting of lamps,regularly switching burned lamps, using study desks with proper luminance and the use of double-glazing windows and acoustic ceiling correct the situation.

Keyword: Sound, Luminance intensity, Dormitory, Kermanshah.

Introduction: Today, visual sense is the most important and vital sense and human obtains their most findings and information with the help of visual sense from environment (1, 2).A mature person uses his/her eyes about 16 hours daily (3). Good vision needs sufficient lighting and its insufficiency or excessive can cause various symptoms such as eyestrain, headache, impaired vision, glaring, Physical fatigue and mental effects, as well as lighting has an enormous impact on people such as consciousness, body temperature and sleep patterns (1). In addition to positive effect of optimal lighting on the health, well-being, consciousness, and even workers' sleep quality; it causes increasing work speed, error reduction, accident reduction and absenteeism and eventually lead to improvement productivity (4). The results of many studies have shown that visual fatigue and discomfort in the body's upper limbs links together. Additional force to match the visual system during jobs which require precision for a long time, increases the tension in the upper extremity muscles (3). needed Lighting to perform a task depends on various factors such as precision of task, the nature of work and size of object (5),dormitory is a place which usually students relax and study for a long time (at room or study hall),existing a good lighting and its optimal distribution in such environments can delay eye fatigue and accuracy reduction and impatience (6) in aninappropriate lighting system, even if students have healthy eyes and good vision, they suffer from mentioned complications, according to the importance of lighting as an important physical and reform able factor in workplace, which has the role in human health maintenance and prevention of accidents and improving operational efficiency and boosting the country's economy, and more attention and research in this field is seen (7). Illumination standard on study table is 538 lux (8) and in Iran is at least 300 lux and maximum 500 lux. Also, voice or unwanted sound, as one of the most important physical factors creates many problems for people (3).One of the causes of many complaints about sound is that the sound is a physical, objective and clear phenomena and human sense it easily (9) .in a study carried out by Zamanian and colleagues in order to evaluate the effect of sound volume and luminance intensity on students' body during study at the University of Shiraz, the results showed that luminance intensity was acquired (433.8 ± 114.8) and sound pressure level was acquired (49.59 ± 4.64). The results also indicated that there is notsignificant relationship between sound pressure

level with student's posture, but there is significant relationship between luminance intensity students' posture (3). In a study which carried out by Nadri and colleagues aimed to measure the general luminance intensity in Qazvin University of Medical Science student dormitories, the results were showed that74.8% of the bedrooms had less luminance intensity than the country minimum level (150 lux) and 100% of the study halls had luminance intensity less than the minimum country level (300 lux) (10). Also in a study which carried out by Javan and colleagues aimed to evaluate the luminance intensity of Isfahan University of Medical Science dormitories' study halls, the results showed that average general, natural and artificial luminance intensity in 21, 9 and 2 halls of 24 surveyed halls is more than 300 lux standard (IESNA) (11). According to the mentioned topics ,the aim of this study was to evaluate the sound volume and luminance intensity in male students Residing at the Dormitories of Kermanshah University of Medical Science.

Material and Method

The present study was conducted by cross-sectional method in two male dormitories of Kermanshah University of Medical Science which 120 light stations and 105 sound stations in dormitories room and 2 stations in study hall was assessed. In order to measure the illuminance, after providing a simple map of rooms and dormitory's study halls and measuring the length, width and height, in order to measure natural and artificial and overall lighting, network approach was used. In order to measure luminance intensity, the lux meter of HAGNER model was used in order to measure luminance intensity, the sensor of photometer device in accordance with IESNA recommendation place at a height of 24 inches (60 cm) from the floor and at the center of the station (11). For sound level meter, Cell-231 device was used. At the end, the collected data after entering to statistical software spss-16 were compared with standard of Iran.

Results:

Mean ± SD of sound and lighting is provided in Tables 1 and 2.luminance intensity in the study halls was only in 7.1% (2 stations) of measured points in the standard range of 300 to 500 lux ,also in 25.9% (7 stations) was lower than 300 lux and in 66.7% (18 stations) was higher than 500 lux. the luminance intensity indormitories rooms in 31.2% (29 stations) was in the standard range of 150 to 300 lux , 8.6% (8 stations)was lower than 150 lux and 60.2% (56 stations) was higher than 300 lux .the sound volume of 100% (24 stations) measured stations in study halls were higher than standard of Iran. Also the sound intensity in the dormitory rooms in 11.1% (9 stations) was less than 35 dB and in 88.9% (72 stations) was higher than 35 dB (standard of IRAN).

Table-1: Luminance intensity in dormitories.

Luminance	Mean	SD	Minimum	Maximum	Standard of Iran
Dormitory(1) Study hall	174.2	102.4	83	380	**Study hall:** 300-500lux **Restroom:** 150-300lux
Dormitory (1) room	263.38	184.5	45	724	
Dormitory (2) Study hall	922.1	250.24	546	1244	
Dormitory (2) room	438.27	183.7	115	908	

Table-2: Sound pressure level in dormitories.

Sound	Mean	SD	Minimum	Maximum	Standard of Iran
Dormitory (1) Study hall	47.13	3.68	44	54	**Restroom:** 35db **Study hall:** 25-30db
Dormitory (1)room	43.2	4.5	38	50	
Dormitory (2) Study hall	39.55	2.32	31.7	43.1	
Dormitory (2) room	41.02	6.02	23	62	

Discussion

nowadays, the issue of light providingin places where human spend most of their days there have paid by many authors, correct lightsituation improves working condition and is important as a health factor to supply the natural condition and best implementation practice and psychological state of person (Majidi) the lighting intensity in study halls in 7.1% (2 stations) ofmeasured points was in the standard range between 300 to 500 luxand also in 25.9% (7 stations)was lower than 300 lux and in 66.7% (18 stations) was higher than 500 lux. In a study by Charness and colleagues which as carried out at the University of Costa Rica it was found that all the libraries measured pointeshad inappropriate lighting (12)Majidi and colleagues measured the luminance intensity in Zanjan libraries in a study and the results indicate the fact that the overall, natural and artificial luminance intensity were 51, 80 and 99% respectively of the all studied libraries and were less than 300 lux (IESNA standard) (6).In the present study mean and standard deviation of illumination in studyhall acquired 174.2 (174.2 ± 102.4) and dormitory room No. 1 (263.38 ± 184.5) was less than 300 lux and the lighting mean and standard deviation of dormitory room No. 2 (183.7 ± 438.27) was less than 500 lux and the mean and standard deviation ofdormitory study hall No. 2 (252.24 ±922.1) was higher than 500 lux.The lighting in the dormitory rooms in 31.2% (29 stations) wasat standard range of 150 to 300 lux, 8.6% (8 stations) was lower than 150 lux and 60.2% (56 stations) was higher than 300 lux.In a study which carried out by Nadri and colleagues aimed to measure the general luminance intensity in Qazvin University of Medical Sciences student dormitories, the results showed that 74.8% of the bedrooms had less luminance intensity than the country minimum level and 100% of the study halls had luminance intensity less than the minimum country

level (300 lux) and IESNA.ghotbee and colleagues in a study entitled "Evaluating luminance intensityand ultraviolet radiation in the library of Kerman University of Medical Sciences" showed that the overall, natural and artificial luminance intensity were 28.57, 100 and 71.4% of study halls less than the country standard (1).In the present study, themeasured sound pressure level was higher than the standard level at all points in the study hallsand the volume in the dormitory rooms in 11.1% (9 stations) was less than 35 dB and in 88.9% (72) was higher than 35 dB (standard of IRAN).results of Zamanian and colleagues study showed that the sound pressure level in all study halls ofShiraz University of Medical Sciences is higher than standard (3).The results of Ghanbari et al study which carried outin Shiraz University of Medical Sciences Librariesrevealed where average sound levelin 100 percent libraries isabove standard (13). Among the sources of sound in the study halls, it can be noted to adjacent spaces, the sound of car traffic, student's commuter, ventilation systems, noise from chairs moving. In general, based on the results of the evaluations made, sound pressure level in all study halls in studied dormitoriesis higher than standard(3). Finally, with regard to the obtained results it can be said that the inappropriate lighting in mentioned dormitories was mainly due to lack and poor lamping layout, because when measuring the luminance intensity, it was observed at designated stations ,in some of the stations luminance intensity is higher than standard recommendations (10)according to the obtained results, with respect to the amount of lighting in study halls, only 7.1% of measured points were at the standard range of300 to 500 lux.As well as the luminance amount of the dormitories rooms in 31.2% the was at standard range of 150 to 300 lux and the sound volume in 100 percent of measured stations in study halls was higher than standard of Iran. Also the sound volume in the dormitories rooms in 88.9% was higher than 35 dB (standard of IRAN) and to improve the study halls condition and increase lighting level and reduce disruptive noise, corrective recommendations revised to reduce these adverse factors:

Illuminance:

1. In order to design the lighting system, using general lighting is more suitable than local lighting.
2. Not using a variety of lamps in study halls
3. keeping fit and clean the artificial lighting and timely replacement of burned lamps is essential
4. Use of bright colors for painting the ceiling, floor and walls. Proper alignment of study desks with respect to the location of windows and lighting resources layout. It should be noted that to provide proper lighting in the study halls, just attention to the ambient lighting for visual work is not sufficient, but the directionof light and brightness of the surrounding objects should be considered. (Reflection coefficient levels and etc. (3)

Sound:

1. The use of acoustic tile for roofing materials
2. The use of double glass window in study hall windows
3. Use of special tires at the end of chairs' foot of study halls to reduce the effect of noise wen moved by students.
4. The use of carpet as coverage of the study halls 'floor. Timely and appropriate repair and maintenance of electronic equipment (ventilation systems, etc.) (3).

Conclusion

Due to the inappropriate illuminance and sound at dormitory it is recommended by taking measures such as appropriate illuminance design, periodic cleaning and dusting of lamps, regularly switching burned lamps, using study desks with proper luminance and the use of double-glazing windows and acoustic ceiling correct the situation.

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