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The Influence of Laughter and Humour on Pain Perception among Male Adolescents

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Abstract: *Laughter and Humour are unique evolved human characteristics with neurobehavioral influences. Pain was induced among 25 Male adolescent subjects by cold pressor test during which pain appraisal and pain threshold were recorded for 3 consecutive trials as before, during, after watching a humorous video. Smiling efficiency and VAS (visual pain analogue scale) which reflects the pain experience was noted. Sense of humour score was assessed and the data was analyzed using SPSS software 15.0.*
The Mean pain appraisal duration before, during and after watching the video showed statistically significant p value among each group. Independent sample't' test, paired't' test showed difference in values for mean duration of pain tolerance during the test. Results among group I, group II and group III were found to be statistically highly significant (p<0.000). Percentage of pain scores were mild (48%), moderate (48%), and severe (4%). Smile efficiency showed that "Cheerfulness" was present in 60%; "Exhilaration" in 35%; and "Humor production" in just 4% only. Pain appraisal duration and pain tolerance duration increased while watching the humorous video.

Keywords: *cold pressor test, humour, pain appraisal, pain tolerance.*

I. Introduction

Humour is a complex, dynamic phenomenon that primarily occurs in social situations between two or more people[3]. Cognitive psychological techniques including distraction can increase pain tolerance. Theoretically, explanations for it include the release of endorphins, the lowering of tension, the distraction which results from humour. The medical profession has utilized relief humour as a means to reduce physical and emotional stress among patients. Laughter is a complex body movement designed to decrease muscle tension, clear pulmonary ventilation and mucus plugs and increase oxygen and nutrients to tissues, which helps fight infection [4]. Cousin et al believed that ten minutes of laughing provides two hours of pain-free sleep and that inflammation in the affected tissues were reduced after these laughing sessions.

II. Material And Methods

After obtaining the Institutional Ethics committee approval, among the study subjects who have signed the informed consent, a carefully structured questionnaire was administered and the following details were obtained from adolescent male subjects aged between 18 – 20 years. Subjects with neurological disorders were excluded from the study. The subjects were asked to immerse one hand (should be using the same hand for all the trails) in the cold water which was maintained at 10ºC to induce pain. The test was done to assess the impact of distraction by humorous video on pain perception in adolescents. Pain appraisal is the pain threshold at which the participant begins to feel the pain sensation[1]. Pain tolerance is the maximum level of pain that a person will be able to tolerate[1]

Each subject was instructed to submerge and retain his hand in the cold water until the immersion became intolerable. Trial 1(before watching a humorous video); Trial 2 (during watching a humorous video); Trial 3 (after watching a humorous video). Incidents of laughter and the duration of time the hand was submerged in the cold water were observed and recorded. During each trial the subject was instructed to inform the time taken for the onset of pain appraisal and pain intolerance. The subjects were allowed to immerse the hand in the cold water for a maximum of 3 minutes. For more than 3 minutes of immersion leads to an increase in sympathetic activity and to a reduction in the blood flow to the limb muscle. For all the three trials, the subjects were using the same hand. The duration of immersion was recorded in seconds, and the subjects were asked to point out on the VAS (visual pain analogue scale) how much painful the experience in cold water had been. During the recovery period for about 5-minutes the hand was dried and wrapped in a warm towel, before the start of the next trial. Given the uninformed three minutes sealing for hand submersion, the length of the humorous video session was never more than three minutes[2].

III. Results

In this cross sectional study, 25 male subjects were included, and humour score was analyzed by study questionnaire and pain scores were assessed by visual analogue scale. Mean humour score was found to be 47.5

Table 1: Smiling Efficiency (n=25)

	n	Percentage %
Cheerfulness	15	60
Exhilaration	9	35
Humour production	1	4

The assessments of the smiling efficiency of subjects were categorized into three categories. (1) Got into a cheerful mood without smiling or laughing ("Cheerfulness") were 60%. (2) Smile and laugh extensively ("Exhilaration") were 35%. (3) Made a humorous commentary about the film ("Humor production") were 4%.

Graph 1: Smiling Efficiency

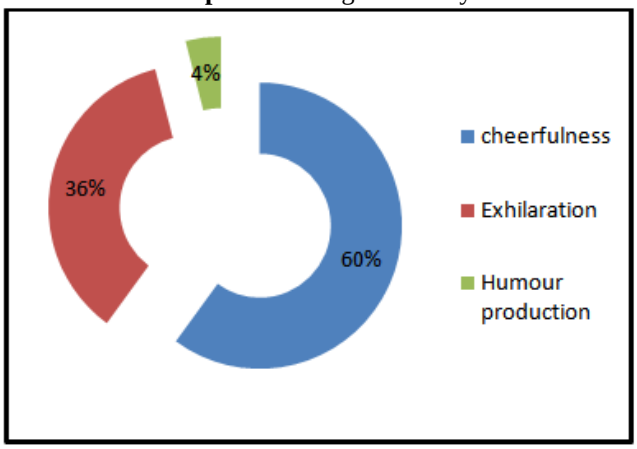


Table 2: Pain score (n=50)

	n	Percentage %
Mild	12	48
Moderate	12	48
Severe	1	4

The data showed that the percentage of pain score assumed as mild was 48%, moderate was 48%, severe was only 4%.

Graph 2: Pain score

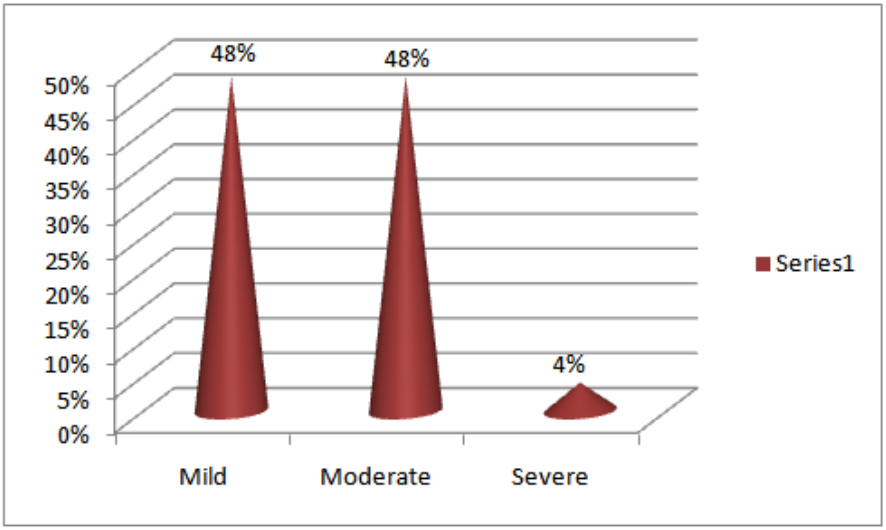


Table 3: Paired 't' test for pain appraisal – Before, during, after video viewing (n=25)

Group	combination	Mean (sec) ± SD	p value
I	Before video During video	52.88 ±28.68 66.24 ±33.62	0.001**
II	Before video After video	52.88 ±28.68 60.28 ±30.24	0.042**
III	During video After video	66.24 ±33.62 60.28 ±30.24	0.000***

*** Statistically highly significant; ** statistically significant

Graph 3: Paired 't' test for pain appraisal – Before, during, after video viewing

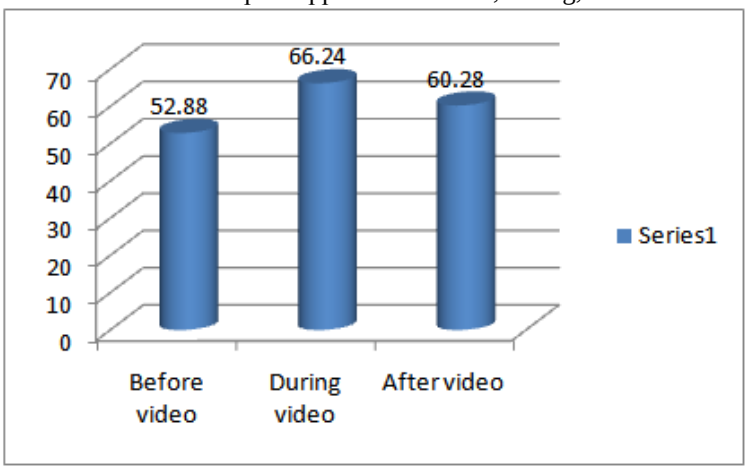
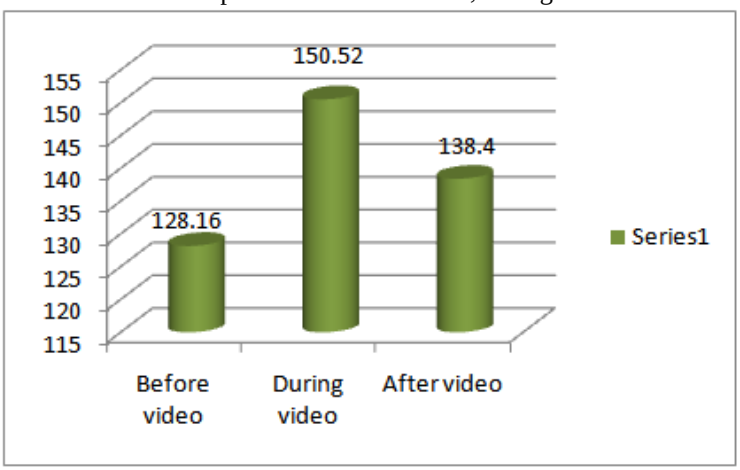


Table 4: Paired't' test for pain tolerance – Before,during and after video viewing (n=25)

Group	comparison	Mean (sec)	p value
I	Before video During video	128.16±48.00 150.52±46.52	0.000***
II	Before video After video	128.16±48.00 138.4±50.71	0.000***
III	During video After video	150.52±46.52 138.4±50.71	0.000***

***Statistically highly significant.

Graph 4: Paired't' test for pain tolerance – Before, during and after video viewing



In the study we were able to observe that, the independent sample 't' test for difference in the values of mean pain appraisal duration before watching the video was **52.88 sec**, during watching the video was **66.24 sec**, after watching the video was **60.28 sec.** Group I comparison was statistically significant ($p<0.1$), group II comparison was also statistically significant ($p<0.042$) and group III comparison was statistically highly significant ($p<0.000$).

This paired 't' test showed that the mean duration of pain tolerance for before watching the video was **128.16 sec**, during watching the video was **150.52 sec**, after watching the video was **138.4 sec**. Group I, group II and group III are statistically highly significant ($p<0.000$). The percentage of the pain score assumed as mild were 48%, moderate were 48%, severe were 4%. Assessment of smile efficiency of subjects was categorized

into three. 1. Got into a cheerful mood without smiling or laughing ("Cheerfulness") were 60%. 2. Smile and laugh extensively ("Exhilaration") were 35%. 3. Made a humorous commentary to the film ("Humor production") were 4%

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IV. Discussion

To study the influence of laughter and humour on pain perception among male adolescents, 25 male adolescents were selected and pain was induced through cold pressor test before, during and after viewing the humorous video. During the procedure of cold pressor test, most of the subjects felt the pain as a mild to moderate stimulus only. While watching the humorous video most of the subject experienced a cheerful mood without smiling or laughing (cheerfulness). Similar to our results Margeret stuber et al (2007)[2] were also able to observe that the mean pain tolerance during not viewing the video was 52.26 sec, during watching the humorous video was 80.42 sec, and after watching the humorous video was 58.74 sec. From this study we were able to observe that the pain tolerance was increased while viewing the humorous video when compared to not viewing the video and after viewing the humorous video.

The neural circuits related to laughter and smiling involves the anterior cingulate gyrus, which provides emotional consciousness to an individual's experience and is partially under the control of the frontal cortex. The caudal hypothalamus acts as the center to coordinate emotional changes, and the amygdala provides the emotional alignment to humor. Laughter expression depends on two partially independent neuronal pathways, including the 'involuntary' system involving the amygdala, thalamic, hypothalamic and subthalamic areas, and the dorsal brain stem as well as the 'voluntary' system that originates in the premotor opercular areas, leading through the motor cortex and the pyramidal tract to the ventral brain stem[7].

When a humorous stimulus such as a joke is processed by brain, the set-up gives rise to an expectation that there will be a particular ending, so a neural unit (or units) corresponding to that expected ending were activated[4]. Heath Phillips et al (2010)[8] observed that males had longer tolerance time than females. Males who report greater affective empathy are less likely to use humour aggressively; there is also a marginally significant sex difference in reported use of Self-Defeating Humour, which is in favor of males[5].

V. Conclusion

Thus we conclude that laughter and humor could alter the neurobiological processes in favor of pain reduction and this could well be extrapolated to provide valuable insights to the architects involved in designing hospital wards in the future.

Acknowledgement:

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