ORIGINAL RESEARCH

Comparative evaluation of pain perception in young adult males with normal and increased BMI: An observational study

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ABSTRACT

Background: The present study was conducted for evaluating pain perception in young adult males with normal and increased BMI. **Materials & methods:**For the study, 50 young individuals between the ages of 12 and 25 who were underweight, normal weight, overweight, and obese were chosen as participants. Every subject's reaction to a pain stimulus was noted and monitored. After answering questions about their age, sex, education, health, and use of drugs (if any), the individuals participated in a brief interview after completing questionnaires about their performance and frequency of exercise. To prevent carry-over effects, pressure pain was administered initially, and then, in a subsequent session, cold pressor pain procedures were administered after a 10-minute rest time. Three testing orders were conceivable, and subjects were allocated at random to each one. The ratio of the subject's weight (kg) to their height (m^2) squared was used to compute their BMI (kg/m^2). **Results:**The threshold for cold pressor pain was found to vary according to BMI, with underweight subjects exhibiting the highest threshold (less pain) and obese subjects exhibiting the lowest threshold (higher pain). However, the tolerance to cold pressor pain did not exhibit statistically significant variation, despite the fact that underweight subjects had the lowest tolerance among the test groups. **Conclusion:**High BMI is related to decreased pain threshold among young population.

Key words: Pain perception, BMI

INTRODUCTION

Pain is a subjective experience with two complementary aspects: one is a localized sensation in a particular body part; the other is an unpleasant quality of varying severity commonly associated with behaviors directed at relieving or terminating the experience. Differentiating between the terms nociception and pain is worthwhile.[1, 2] Nociception refers to the detection of noxious stimuli by nociceptors, followed by transduction and transmission of the sensory nervous information from the periphery to the brain. In comparison, pain refers to the product of higher brain center processing; it entails the actual unpleasant emotional and sensory experience generated from nervous signals.

Pain and inflammation can also occur in the course of various diseases such as rheumatoid arthritis, cancer inflammatory bowel disease and polymyalgia. In majority of cases, pain is always associated with diabetic nephropathy.[3- 5] Several synthetic and natural agents possessing strong pain-relieving effects are readily available to treat such pain.[6- 8] Hence; the present study was conducted for evaluating pain perception in young adult males with normal and increased BMI.

MATERIALS & METHODS

The present study was conducted for evaluating pain perception in young adult males with normal and increased BMI.For the study, 50 young individuals between the ages of 12 and 25 who were underweight, normal weight, overweight, and obese were chosen as participants. The respondents' body weights were used to create groups. Individuals who used daily analgesics, had a problem that might affect their ability to perceive and report pain, had a history of alcohol misuse, or had any symptoms or indicators of a neurological or inflammatory disease that could affect their ability to perceive pain were excluded from the study. Every subject's reaction to a pain

stimulus was noted and monitored. After answering questions about their age, sex, education, health, and use of drugs (if any), the individuals participated in a brief interview after completing questionnaires about their performance and frequency of exercise. To prevent carry-over effects, pressure pain was administered initially, and then, in a subsequent session, cold pressor pain procedures were administered after a 10-minute rest time. Three testing orders were conceivable, and subjects were allocated at random to each one. The ratio of the subject's weight (kg) to their height (m^2) squared was used to compute their BMI (kg/m^2). The data was statistically analyzed using SPSS version 11.0 for Windows.

RESULTS

Mean age of the patients was 22.5 years. Out of 50 patients, 28 patients were males while the remaining the females. 13 patients, 12 patients, 15 patients and 10 patients were underweight, normal, overweight and obese respectively. The threshold for cold pressor pain was found to vary according to BMI, with underweight subjects exhibiting the highest threshold (less pain) and obese subjects exhibiting the lowest threshold (higher pain). However, the tolerance to cold pressor pain did not exhibit statistically significant variation, despite the fact that underweight subjects had the lowest tolerance among the test groups.

Table 1: Demographic characteristics of the subjects

Characteristics		Frequency
Sex	Male	28
	Female	22
BMI	Underweight	13
	Normal	12
	Overweight	15
	Obese	10

Table 2: Effect of BMI of cold pressor pain responses

Parameter	Underweight	Normal	Overweight	Obese
TH	10	8	8	5
TOL	9	10	11	9

TH: Threshold, TOL: Tolerance

DISCUSSION

Pain is complex and multidimensional. It includes the sensory-discriminative, affective-emotional, and cognitive-evaluative components and is the result of dynamic interactions of multiple central and peripheral neural processes. Acute pain serves to protect us from predictable harm. However, when acute pain persists into a chronic phase, it contributes to the dual public health crises of under-treatment and opioid overuse and addiction. A detailed understanding of pain mechanisms is necessary to address these healthcare issues.[9, 10]

When noxious stimuli impinge upon the body from external or internal sources, information regarding the damaging impact of these stimuli on bodily tissues is transduced through neural pathways and transmitted through the peripheral nervous system to the central and autonomic nervous systems. This form of information processing is known as nociception. Nociception is the process by which information about actual tissue damage is relayed to the brain. Nociception is mediated by specialized receptors known as nociceptors that are attached to thin myelinated Aδ and unmyelinated C fibers, which terminate in the dorsal horn of the spine. Sufficiently intense mechanical stimulation (such as stretching, cutting, or pinching), intense warming of the skin, or exposure to noxious chemicals can activate nociceptors.[9-12]Hence; the present study was conducted for evaluating pain perception in young adult males with normal and increased BMI.

In the present study, mean age of the patients was 22.5 years. Out of 50 patients, 28 patients were males while the remaining the females. 13 patients, 12 patients, 15 patients and 10 patients were underweight, normal, overweight and obese respectively. The threshold for cold pressor pain was found to vary according to BMI, with underweight subjects exhibiting the highest threshold (less pain) and obese subjects exhibiting the lowest threshold (higher pain). However, the tolerance to cold pressor pain did not exhibit statistically significant variation, despite the fact that underweight subjects had the lowest tolerance among the test groups.Saxena, I et al compared the values of body mass index (BMI) and resting blood pressure of volunteers with the normal values.The study was conducted on 83 Indian males of different age groups. The volunteers were divided into 4 groups: Children, Young Adults, Middle-Aged Adults and Old Adults; and their basal parameters (BMI, resting pulse and blood pressure) were recorded. Selected volunteers were subjected to cold pressor task (CPT). Pain sensitivity (PS) (pain threshold, tolerance and pain rating on a visual analog scale) and cardiovascular reactivity (CVR) (increase in pulse and blood pressure) were recorded.Many volunteers had abnormal values of BMI and resting blood pressure and had to be excluded from the study.

PS and CVR between different groups were compared by one-way ANOVA. Significant differences in PS were observed, with highest pain sensitivity in Children and lowest in Old Adults. No significant differences were observed in the CVR.The high numbers of volunteers with abnormal basal parameters (BMI and resting blood pressure) show an urgent need to educate the general public about the dangers and risk factors of obesity and hypertension.[13] Earlier studies showed that obese people exhibited decreased pain threshold to electrical stimuli as well as mechanical stimuli. In fibromyalgia women, BMI was significantly related to the number of positive tender points (ie, painful tender points upon palpation) as well as pain rating of the tender points. Recently, Zhang et al tested over 2,500 healthy men for pressure pain threshold at triceps and inguinal lines. Lower threshold to triceps was associated with greater BMI and waist circumference, but the relationship was not shown for the inguinal area. Others also show inconsistent results across body parts, suggesting that the reduced pain threshold may not be present for all body areas in obesity.[13- 15] Miscio et al compared the pain thresholds between nondiabetic obese people and non-obese people in response to thermal stimuli to various fingers and the big toe. Obese people were found to have significantly lower pain thresholds to fingers than non-obese people. There was no group difference in their pain response to the big toe. Okifuji et al have also found that obese fibromyalgia patients reported greater pain in response to digital pressure to tender points in the lower body areas but not upper body areas relative to non-obese patients.[15- 17]

CONCLUSION

High BMI is related to decreased pain threshold among young population.

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