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Association of Emotional Intelligence and Aggression with Physical Activity Among Undergraduate Medical Students

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ABSTRACT

Emotional intelligence and physical activity, have a strong impact on students' well-being and health. Aggressive tendencies may interfere with a student's potential to acquire knowledge and become a good professional later on. **Objectives:** To determine the association of emotional intelligence and aggression with physical activity among undergraduate medical students. **Methods:** The analytical cross-sectional study was conducted on a sample of 267 students from five private medical colleges and universities offering allied health sciences courses after ethical approval in four months using Non-Probability Convenience sampling. Emotional intelligence, aggression and physical activity were measured using the Emotional Intelligence Questionnaire, Buss Perry aggression Questionnaire and short form of the International Physical Activity Questionnaire respectively. Correlation tests were applied to find the association ($p \leq 0.05$ as significant). **Results:** A positive association between Physical Activity Questionnaire and Aggression was found in male with ($p=0.020$) and a negative association in female with ($p=0.894$). Emotional intelligence had a negative association in both male and female undergraduate medical students except motivating oneself in males which had a positive association in males ($p=0.019$). **Conclusions:** It was concluded that the study highlights the strong relationship between emotional intelligence, physical activity and aggression among undergraduate medical students. Male exhibit aggressive behaviour more often than female do. Male showed a positive relation between emotional intelligence and physical activity.

INTRODUCTION

The term "emotional intelligence" refers to the ability to manage one's thoughts and feelings as well as the feelings of people other than oneself, detect them, and utilize this knowledge to influence decisions and actions, promote original ideas, concentrate attention on important topics, inspire others, and assist flexible planning [1]. According to the World Health Organization, any motion of the body caused by skeletal muscles that involve energy expenditure is considered physical activity (PA). Physical, mental, and social well-being are all correlated with physical activity (PA) [2]. Aggression is described as a tendency to harm others—whether they be people or animals—or respond violently or angrily towards them. Physical and relational aggression are two different subtypes of aggressive behaviour. Physical aggression refers to actions that cause bodily injury to a target (such as striking and shoving), whereas relational aggression describes actions that cause social harm to others (such as gossiping and social exclusion) [3]. Aggression, physical activity, and emotional intelligence are all associated. We

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will now talk about the connections between these three in undergraduate medical students. A medical student's life in medical school is quite demanding and busy. A student's medical career presented many difficulties, including pressure from professors, poor class performance, intense stress during viva, difficulty covering the entire syllabus in a day, intense study sessions but unsatisfactory results as well as the aggressive behaviour of college staff members, friends' company if they are not supportive, poor time management, insufficient physical activity, and excessive screen time. These difficulties contribute to the development of aggression and emotional instability [4]. PA may assist the students in overcoming these obstacles with ease, having better emotional control, and transforming angry behaviour into pleasant moods. Students who engage in physical activities feel relaxed, their moods change for the better, they are happier, and they feel more energetic. Students who are not physically active, are not involved in any activities, and who spend more time on their phones than on other activities are reported to have exceptionally high rates of emotional changes and anger [5]. Jiménez-Picón *et al.*, revealed a strong relationship between emotional intelligence and mindfulness, particularly the capacity to control emotions. Additionally, emotional exhaustion has a bad effect on mindfulness [1]. Ubago-Jiménez *et al.*, investigated the association evolved among emotional intelligence, physical activity and aggressive behaviors in 932 university students. They found that Men are more likely than women to engage in aggressive behaviours, and the relationship between physical activity and emotional intelligence is stronger across all of its dimensions [6]. Espaillat *et al.*, highlighted the presence, impact and responses to macroaggressions among medical learners. Female students reported encountering macroaggressions dominantly, while Second-year medical students were more likely than third-year students to get engaged in macroaggressions (31% versus 23%) [7]. Issah *et al.*, focus on various aspects of emotional intelligence, including recognition of oneself, control of one's emotions, inspiration from oneself, feelings for others, and social ability. They suggested that emotional intelligence can support change leadership by emphasizing team development and overcoming opposition [8]. Sundararajan *et al.*, examined medical students' emotional intelligence levels and their perceptions of how emotions play a part in clinical practice. When it came to emotional scenes, women performed better than males (p=0.056), and students who went to government high schools performed better than those who went to private educational institutions (p=0.044). Medical students at the university under investigation, both sexes, exhibited high emotional quotients [9]. Currently, aggression is observed commonly in undergraduate medical students and they are less aware of emotional intelligence. To make them wiser, emotional intelligence has been observed in the study. Physical activity plays an important role in the lives of students. Medical students deal with the harsh realities of life; hence they should have very high emotional intelligence to carry out their duties.

The study aims to find out the association of physical activity with emotional intelligence and aggression among undergraduate medical students.

METHODS

This analytical cross-sectional study was conducted for four months after ethical approval (Case #.709/ERC/CMH/LMC) from May to August 2023. The sample size was calculated from this formula [10], n= (Zα/2+Zβ)2/r2. Where Zα/2=critical value for the confidence level (for 95% confidence, Zα/2=1.96), Zβ=critical value for the power (for 80% power, Zβ=0.84) and r=expected correlation coefficient (r=0.1718). So, by putting these values, n=(1.996+0.84)^2/(-0.1718)^2. For an expected correlation coefficient (r=0.1718) [6], with 95% confidence and 80% power, approximately 267 participants are needed. Data were collected from Combined Military Hospital, Lahore, Medical College and Institute of Dentistry, Lahore, University of Lahore, Lahore, Rahbar Medical College, Lahore, University of South Asia, Lahore, University of Management and Technology, Lahore using non-probability convenience sampling technique with the consent of the participants. Both male and female, 18-26 years old and enrolled in any class from 1st to final year undergraduate medical students like MBBS, Bachelor of Dental Surgery (BDS), Doctor of Physical Therapy (DPT), Doctor of Pharmacy (PHARM-D), Medical Imaging Technology (MIT) and Nursing were included. Students other than these programs and those who were unwilling to take part, those diagnosed with mental and physical disabilities and those students diagnosed with psychological disorders were excluded from this study. The data were collected using the Emotional Intelligence Questionnaire [11], the International Physical Activity Questionnaire (IPAQ) [12] and the Buss-Perry Aggression Questionnaire (BPAQ) [13]. The emotional intelligence questionnaire (EIQ) measures five different emotional intelligence competencies including Self-awareness, controlling your emotions, self-motivation, empathy, and social skills. Each statement on the questionnaire is scored on a scale of 1 to 5 with 1 meaning that the statement doesn't apply to you at all, 3 meaning that it does around half the time, and 5 meaning that it always does. Total score ranges from 50 to 250 with 50 for each competent. A score core ranging from 35-50 is a strength, 18-34 needs attention and 10-17an is an area of development priority for each domain. The higher the total score is a strength and vice versa [11]. Short form of IPAQ (Short form of International Physical

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Activity Questionnaire) is a seven-item questionnaire, used to calculate the amount of time spent sitting and different kinds of physical activity that people engage in daily to their total weekly physical activity in Metabolic equivalents (MET) per minute. IPAQ has 7 items, scoring a high level of physical activity on the IPAQ means physical activity levels equate to approximately one hour of activity per day or more at least a moderate intensity activity level, scoring moderate level of physical activity on the IPAQ means the person is doing some the activity more than likely equivalent to half an hour of at least moderate intensity physical activity on most days. Scoring a low level of physical activity on the IPAQ means that the person is not meeting any of the criteria for either moderate or high levels of physical activity [12]. Buss Perry Aggression Questionnaire (BPAQ) is a 29-item scale with 4 subscales which involves items 1 through 9 make up the Physical Aggression Subscale, Items 10 through 14 make up the Verbal Aggression Subscale, Items 15 through 21 make up the Anger Subscale, and Items 22 through 29 make up the Hostility Subscale. Each scale's score is the total of the item ratings. Reverse scoring is used for the two items (7 and 18) that are phrased the other way from aggressive. The sum of these scale values is the aggressiveness level overall. The total score ranges from 29 to 145. The higher scores suggest more aggressive behaviours. The tool is valid for 9-88 years old individuals [13]. SPSS version 23.0 was used for statistical analysis; qualitative variables were presented in the form of frequency tables and percentages. A correlation test was used to find the correlation between variables, the standard significant p-value was less than 0.05.

RESULTS

The mean age of the participants was 20.91 ± 1.70 years ranging from 18 to 26 years. There were 23.20% male and 76.80% female. Most students who took the study form were 21-23 years old, with 48.31%, 44.19%, 18-20 years, and 7.49%, 24-26 years. The participants from each institution, year of study and the discipline in which students were enrolled are also listed below (Table 1).

Table 1: Demographic and Academic Status of the Participants (n=267)

Variables	n (%)
Gender	
Male	62 (23.20%)
Female	67 (71.3%)
Age (Years) Range 18-26 Years	
Mean ± SD	20.91 ± 1.70
18-20	118 (44.19%)
21-23	129 (48.31%)
24-26	20 (7.49%)
Institutions	
CMH Lahore Medical College	146 (54.68%)
University of Lahore	53 (19.85%)
Rahbar Medical College	23 (8.61%)
University of South Asia	26 (9.73%)
University of Management & Technology	19 (7.11%)
Year of Study	
1st year	63 (23.60%)
2nd year	50 (18.73%)
3rd year	63 (23.60%)
4th year	40 (14.98%)
5th year	51 (19.10%)
Discipline of Study	
MBBS	55 (20.60%)
BDS	42 (15.73%)
DPT	55 (20.60%)
Pharm D	32 (11.98%)
MIT	41 (15.35%)
Nursing	43 (16,10%)

The total mean score of Self-Awareness Score was 32.17 ± 73.21, Managing Emotions was 21.58 ± 25.44, Motivating Oneself was 37.19 ± 67.54, Empathy Score was 42.18 ± 48.28, Social Skill Score was 29.37 ± 69.18 while the total mean score of all subsets was 162.49 ± 23.65. The total of subsets of the Bus Perry Aggression Questionnaire included Physical Aggression Subscale 24.69 ± 72.51, Verbal Aggression Subscale 12.53 ± 32.11, Anger Subscale 20.34 ± 53.26, Hostility Subscale 26.92 ± 76.83 with a total mean score 162.49 ± 23.65. In terms of IPAQ Scores, the mean for low active was 68.26 ± 35.80, moderately active was 25.30 ± 51.63, and for highly active was16.87 ± 47.26 with an overall total mean of 109.43 ± 34.69 MET-Min (Table 2).

Table 2 : Mean Scores of Items of Questionnaires

Items of Questionnaires	Total score (Mean ± SD)
EIQ Subscales	
Self-Awareness Score (SAS)	32.17 ± 73.21
Managing Emotions (MES)	21.58 ± 25.44
Motivating Oneself (MOS)	37.19 ± 67.54
Empathy Score (ES)	42.18 ± 48.28
Social Skill Score (SSS)	29.37 ± 69.18
Emotional Intelligence Questionnaire Total Score	162.49 ± 23.65
BPAQ Subscales	
Physical Aggression Subscale (PAS): (Item 1-9)	24.69 ± 72.51
Verbal Aggression Subscale (VASS): (Item 10-14)	12.53 ± 32.11
Anger Subscale(ASS): (Item 15-21)	20.34 ± 53.26
Hostility Subscale (HSS): (Item 22-29)	26.92 ± 76.83
Bus Perry Aggression Questionnaire Total Score	84.48 ± 34.74
International Physical Activity Questionnaire (IPAQ) (MET-Min)	
Low Active	68.26 ± 35.80
Moderately Active	25.30 ± 51.63
Highly Active	16.87 ± 47.26
Total Score (MET-Min)	109.43 ± 34.69

EIQ: Emotional Intelligence Questionnaire, BPAQ: Bus Perry

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Aggression Questionnaire

Table 3 shows the association between IPAQS (International Physical Activity Questionnaire Score) and BPAQS (Bus Perry Aggression Questionnaire Score). p-Value based on the total score of all subscales of BPAQ and IPAQ in male was significant (p=0.020) and non-significant in female was 0.894. There was no significant association between scores of individual subscales of BPAQ and IPAQ among male and female. The association between physical activity and aggression based on gender is given (Table 3).

Table 3: Association between Physical Activity and Aggression (n=267)

Association	Male (n=62)		Female (n=205)	
	(r)	p-value	(r)	p-value
IPAQS Vs BPAQS	0.295	0.020*	-0.009	0.894
IPAQS Vs PAS	0.307	0.015*	-0.038	0.591
IPAQS Vs VASS	0.236	0.065	0.080	0.255
IPAQS Vs ASS	0.179	0.164	-0.038	0.589
IPAQS Vs HSS	0.052	0.689	-0.010	0.892

BPAQ: Bus Perry Aggression Questionnaire, PAS: Physical Aggression Subscale, VASS: Verbal Aggression Subscale, ASS: Anger Subscale, HSS: Hostility Subscale

While the association between physical activity and emotional intelligence based on gender is expressed. Further study shows a correlation between IPAQS and categories of Emotional Intelligence. The association between IPAQS (International Physical Activity Questionnaire Score) and SAS (Self Awareness Score) shows p-value in men was 0.224 and in women was 0.158 which is non-significant. The association between IPAQS and MES (Managing Emotions Sub-scale) shows p-value in male was 0.072 and in female was 0.19, which is non-significant. The association between IPAQS and MOS (Motivating Oneself Score) shows p-value in male was significant which is 0.034 and in female, it was 0.265 which is non-significant. The association between IPAQS and ES (Empathy Score) shows p-value in male was 0.787 and in female was 0.119 which is non-significant. The association between IPAQS and SSS (Social Skill Score) shows p-value in male was significant which is 0.005 and in female it was 0.19 which is non-significant (Table 4).

Table 4: Association between Physical Activity and Emotional Intelligence (n=267)

Association	Male (n=62)		Female (n=205)	
	(r)	p-value	(r)	p-value
IPAQS Vs SAS	0.157	0.224	0.099	0.158
IPAQS Vs MES	0.23	0.072	0.092	0.19
IPAQS Vs MOS	0.27	0.034*	0.078	0.265
IPAQS Vs ES	0.035	0.787	0.109	0.119
IPAQS Vs SSS	0.352	0.005*	0.092	0.19

SAS: Self Awareness Score, MES: Managing Emotions, MOS: Motivating Oneself, ES: Empathy Score, SSS: Social Skill Score

DISCUSSION

Examining the relationship between emotional intelligence, physical activity, and aggressive behaviour is the goal of the study. It highlights the effects that these factors have on undergraduate medical students, most of whom are in their first and third years. There was a significant association between violent behaviour and lack of exercise in male students. Female students displayed lower levels of aggressiveness than male students, both in their overt and covert displays. The majority of research studies relating to aggression and physical activity have similar findings. These results contrasted with the findings reported by Björkqvist, which revealed that in a sample of school students, women were more likely to engage in verbal violence (60%) than male were to engage in physical aggression (40%) [14]. Medical students in their first years were particularly fragile in terms of their mental health. Academic performance-related stress during the university years is what causes medical students to become aggressive and experience emotional changes. According to the categories of emotional intelligence and aggression, emotional intelligence showed a weak significant association. Self-awareness score, Managing Emotion Scale, Empathy Score, Self-Motivation Score, and Social Skill Score are the categories. Current findings indicate a negative correlation between aggression and social competence scores in undergraduate medical students, with a p-value of 0.787. Similar findings in 2023 show that children's aggressive behaviour is inversely correlated with their social adaptation abilities [15]. We found a significant association between a male's score on self-motivating behaviour and aggression, as well as a negative association between empathy and emotion management (p-value=0.019). These results contrasted with those of a study conducted by Myburgh et al., who discovered that interpersonal and intrapersonal factors including "positive inclination towards others, positive inclination towards self, and acting responsibly towards self" can predict violence. When a student acts with greater self-responsibility and has stronger positive inclinations towards others and lesser negative inclinations towards themselves, aggression is reduced [16]. The association between emotional intelligence categories and aggression has been discovered, and it demonstrates that it hurt undergraduate medical students' scores, except for the score for self-motivation. The p-value of the Motivating Oneself Score in males was significantly associated. However, the findings of the earlier study, carried out in 2021, indicate a positive relationship between emotional intelligence and mindfulness p-value for the correlation was 0.02 [1]. Current results provide support to the hypothesis that engaging in physical activity as a leisure

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activity is linked to emotional intelligence. Similar to a prior study done on undergraduate medical students, these experiences cause a variety of pleasant and negative emotions. Men do better than women in terms of LTPA levels (p=0.002) and Workplace physical activity (p=0.001) [17]. In contrast, a previous study conducted in 2017 on medical students in a college shows that women respond to emotional episodes and exhibit greater emotional intelligence than men. We discovered that emotional intelligence hurt undergraduate female medical students [10]. Current findings show that women had a negative association between physical activity and aggression compared to men. Different findings were seen in a 2019 study, which demonstrates that women experience greater macroaggression than men [10]. An insignificant correlation between aggressiveness and social skill score was found in present study of undergraduate medical students; similar findings were found in a 2019 study of 900 students that looked at the relationship between aggression and social cognitive theory. We found an insignificant association between physical activity and self-awareness scores in undergraduate medical students with a p-value of 0.224 in male and a p-value of 0.158 in females. Different analyses in Spanish of the relationship between quality of life and physical exercise among undergraduates at public and private universities demonstrate a favourable effect on male students with a p-value of 0.001 [18]. In current findings, we found a significant connection between the level of aggression and physical activity in males on the other hand female had an insignificant association. Similar findings were seen in the majority of research papers relating aggression to physical activity in 2021 showing a higher degree of aggression in men than women [6]. These results, however, differed from those that were reported in a study by Martnez-Monteagudo, who discovered that the categories of Gender X Course Year did not differ statistically significantly from one another. When it came to men, the p-value for aggression was constant at 0.06, whereas it remained consistent for women at 0.082. The probability of being a cyberbully aggressor dropped by 4% and 5% for every unit improvement in emotional knowledge, according to a 2019 study that found a similar outcome. On undergraduate students, we discovered a strong connection between physical activity and aggressive behaviour [3]. The brain's blood circulation is stimulated by exercise. Then, your brain cells are stimulated, which promotes cell development, particularly in the brain. A 2021 investigation had somewhat different findings. This demonstrates that physical exercise, motivation, and neuro-education were positively associated with both male and female students. It implies that students of both genders engage in physical activity. However, present findings indicate that men motivating themselves score and physical activity are positively correlated and men engage in more physical activity than women [19]. The low response rate from students and use of lengthy questionnaires proved to be a major limitation while, consideration of postgraduate medical students and inclusion of other disciplines as well i.e.; engineering, architects, aviation, literature etc. could be utilized to further implications. Zhu *et al.*, found that Interventions involving physical activity alone were more effective in reducing aggressive behaviour than those that combined physical activity with other activities, team-based physical activity might be used for preventing or reducing aggressive behaviour in children and adolescents [20]. Yu et al., found that physical activity is a potent method for decreasing aggressive behaviour and psychological issues in university students while additionally promoting self-efficacy and self-control. Increasing the intensity of PA may enhance the effectiveness of these chain benefits [21].

CONCLUSIONS

It was concluded that study highlighted the strong relationship between emotional intelligence, aggression and physical activity among undergraduate medical students. Male exhibit aggressive behaviour more often than female do. Male showed a positive relation between emotional intelligence and physical activity.

Authors Contribution

Conceptualization: FA, MAR, WP
Methodology: MUC, FA, EM, RS, HHT, MAR
Formal analysis: RS, WP
Writing review and editing: MUC, FA, HHT

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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