Original Research

TO STUDY THE MAGNITUDE OF AGGRESSIVE BEHAVIOR AND BELIEFS IN SCHOOL GOING ADOLESCENTS, LUDHIANA, NORTH INDIA

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ABSTRACT

Introduction: The present study addresses adolescent aggression, a significant public health concern influenced by psychological, social, and biological factors. Aggressive behavior in adolescents manifests in physical, verbal, and social forms, adversely affecting mental health, academic performance, and social relationships. Given the limited research on urban Indian adolescents, particularly in Ludhiana, this study aims to fill the gap by examining the magnitude of aggressive behavior and related beliefs among school-going adolescents.

Objectives: The primary objective is to assess the magnitude of aggressive behavior and associated beliefs among adolescents aged 11 to 18 years. The secondary objective is to correlate aggressive behavior with demographic factors including age, gender, socioeconomic status, and maternal education.

Methodology: A cross-sectional design was employed involving 1,213 adolescents from randomly selected English medium senior secondary schools in Ludhiana, Punjab. Participants were categorized into early, middle, and late adolescence. Data were collected using validated self-administered CDC Compendium scales measuring aggressive behavior and beliefs supporting aggression. Demographic data were gathered via structured questionnaires. Statistical analysis included descriptive and inferential tests, with significance set at $p < 0.05$.

Results: The overall prevalence of aggressive behavior was 28.44%, highest in early adolescence (30.71%) and significantly greater among males (32.24%) than females (24.58%). Physical aggression was notably frequent, alongside verbal and social forms. Moderate endorsement of aggression-supportive beliefs was observed in 56.47% of participants, with higher prevalence in boys and lower socioeconomic groups. A significant positive correlation (Spearman's rho = 0.281, $p < 0.0001$) existed between aggressive behavior and aggression-supportive beliefs. Sociodemographic factors such as age, gender, socioeconomic status, and maternal education were significantly associated with aggression levels.

Conclusion: The present study highlights a substantial presence of aggressive behavior and supporting beliefs among school-going adolescents in Ludhiana. Findings emphasize the need for culturally tailored, gender-sensitive school-based interventions. Future longitudinal research with multi-informant data is critical to establish causality and inform effective prevention strategies targeting both behavior and underlying beliefs in this population.

Keywords: Adolescent, Aggression, Aggressive Behaviour, School-Going Adolescents.

INTRODUCTION

Background on adolescent aggression

Adolescent aggression is a multifactorial behavior influenced by psychological, social, and biological factors. Trauma exposure, including childhood abuse, has been strongly linked to increased aggression in youth, often mediated by heightened rejection sensitivity and callous-unemotional Traits characteristics associated with lack of empathy and guilt. These callous-unemotional traits differentiate between reactive and proactive aggression, with implications for treatment and intervention. Family dynamics, such as maternal care quality, also significantly impact aggression development, while sociocultural and peer influences contribute further complexity. Understanding these diverse influences is crucial for addressing aggressive behavior among adolescents effectively [1–3].

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• Prevalence and impact of aggressive behavior among adolescents globally

Globally, aggressive behavior among adolescents is a significant public health concern, manifesting in

physical, verbal, and relational forms across diverse cultural contexts. Studies reveal notable prevalence rates, with up to 31% of adolescents involved in physical fights in some low- and middle-income countries, and varying levels influenced by exposure to community violence, peer norms, and family dynamics. Adolescent aggression impacts mental health, social relationships, and academic outcomes, often correlating with depressive symptoms, lower self-esteem, and increased risk of delinquency. These behaviors contribute to broader societal issues, emphasizing the need for culturally tailored interventions that address underlying cognitive, emotional, and environmental factors to mitigate aggression and promote positive youth development [4–6].

• Importance of studying aggression in school settings

Studying aggression in school settings is crucial as schools are primary social environments where adolescents interact and develop behaviors. Aggressive behaviors, including bullying, have significant adverse effects on mental health, academic achievement, and school safety. Exposure to peer aggression and victimization often leads to increased anxiety, school avoidance, and poor emotional adjustment. Moreover, aggressive behavior disrupts the learning environment, affecting both perpetrators and victims. Understanding aggression within schools enables the development of targeted prevention and intervention programs that can improve social skills, reduce violence, and promote positive school climates. Such efforts are essential to fostering safe and supportive educational experiences for adolescents [7–9].

• Brief overview of types of aggression (physical, verbal, social)

Adolescent aggression manifests in various forms, primarily physical, verbal, and social (relational) aggression. Physical aggression involves behaviors causing bodily harm, such as hitting or fighting. Verbal aggression includes hostile language, insults, or threats directed at others. Social or relational aggression is more subtle, characterized by behaviors aimed at damaging social relationships, such as exclusion, spreading rumors, or manipulation. These types of aggression are influenced by emotional and cognitive factors and vary in prevalence and impact among adolescents. Understanding the distinctions among these aggression forms is essential for targeted interventions in school settings to mitigate negative social and psychological outcomes [10–12].

Research on aggression among urban Indian adolescents remains limited, highlighting a critical gap in understanding the magnitude,

types, and underlying factors of aggressive behavior in this rapidly growing population. Existing studies often focus on rural or general populations, with few addressing unique urban stressors such as peer pressure, academic competition, and sociocultural transitions. This lack of targeted research impedes the development of culturally appropriate interventions and policies to mitigate aggression in urban school settings.

Addressing this gap is essential to inform educators, mental health professionals, and policymakers about effective strategies to support the behavioral and emotional well-being of urban Indian adolescents.

The examination of correlates of aggressive behavior in school-going adolescents is essential to understand the underlying factors influencing such conduct. Age, gender, and socioeconomic status are critical variables that significantly shape behavioral patterns during adolescence, a developmental stage marked by rapid cognitive and social changes. Different age groups may exhibit varying degrees of aggression due to maturation processes, while gender differences often influence the expression and prevalence of aggressive acts.

Socioeconomic status further contextualizes these behaviors by affecting access to resources, environmental stressors, and social learning opportunities. Investigating these correlates enables targeted interventions and informed policymaking to address aggressive tendencies effectively among adolescents in Ludhiana, North India.

• Importance of understanding beliefs and attitudes related to aggression

Understanding beliefs and attitudes related to aggression is crucial for comprehending adolescent aggressive behavior and developing effective interventions. Research highlights that normative beliefs about aggression significantly mediate the relationship between external influences, such as exposure to violent media, and aggressive actions in adolescents, while family environment can moderate these effects.

Moreover, moral disengagement and aggression efficacy beliefs are linked with increased peer aggression, indicating that the way adolescents cognitively justify or endorse aggressive behavior directly impacts its occurrence.

Thus, examining adolescents' beliefs and attitudes offers critical insights into the mechanisms driving aggression, enabling tailored strategies to reduce violence and promote prosocial behavior in school settings. Primary Objective:To study the magnitude of aggressive behaviour and the associated beliefs among school-going adolescents aged 11 to 18 years.Secondary Objective: To correlate aggressive behaviour with demographic factors including age, gender, socioeconomic status, and maternal education among school-going adolescents aged 11 to 18 years.

METHODOLOGY

Study Design and Setting: The present study is a cross-sectional design conducted to assess the

magnitude of aggressive behaviour, beliefs, and attitudes towards violence among school-going adolescents. The study was carried out in randomly selected English medium senior secondary schools located in Ludhiana, Punjab, North India. Data collection was performed over a one-year period, from January 1, 2015, to December 31, 2015.Participants and Sampling: The study population comprised adolescents aged 11 to 18 years, enrolled in classes 6th to 12th in the selected English medium schools of Ludhiana. For analytical purposes, participants were categorized into three age groups: early adolescence (11–13 years), middle adolescence (14–16 years), and late adolescence (17–18 years).A total sample size of 1200 was calculated based on an assumed prevalence of aggressive behaviour of 50%, with a 10% permissible error, using the formula $n = 4pq/d^2$. To achieve equitable representation across the three age groups, the sample was proportionally allocated to each group.

Participants were selected using a multistage sampling method. In the first stage, English medium schools were randomly chosen from a list provided by the District Educational Office using a table of random numbers. Consent for participation was obtained from the principals of the selected schools. In the second stage, one class from each age group was selected within each school through a draw of lots. If multiple sections existed within a class, one section was further selected by random number tables. All students in the selected sections were invited to participate.Inclusion criteria included adolescents of both genders aged 11 to 18 years attending the selected English medium schools who provided parental consent and completed the study questionnaires. Exclusion criteria were students outside the specified age range, those absent or unwilling to participate, and those with incomplete proformas or consent forms.

Data Collection Tools

The present study employed a comprehensive set of data collection tools to assess aggressive behaviour, beliefs supporting aggression, and attitudes towards violence among school-going adolescents.

Demographic Questionnaire A structured demographic questionnaire was administered to collect essential participant information, including age, gender, class/grade, parental education and occupation, and family socioeconomic status as per the modified Kuppuswamy Scale.

CDC Compendium Scales T wo validated self-administered scales from the Centre for Disease Control and Prevention (CDC) Compendium of Tools (2nd edition, 2005) were utilized:

Aggression Behavior Scale: This scale comprises eleven items measuring the frequency of self-reported aggressive behaviours such as hitting, pushing, name-calling, and threatening within the past seven days. Each behaviour is scored on a scale from 0 (none) to 6 or more occurrences. The total score is the sum of all item responses, ranging from 0 to 66. Higher scores indicate greater aggressive behaviour, with established cut-offs (>19.3 for boys and >13.2 for girls) identifying significant aggression.

Beliefs Supporting Aggression Scale: This six-item scale assesses normative beliefs about aggression. Participants indicate their level of agreement (Strongly Agree = 4 to Strongly Disagree = 1) with statements reflecting attitudes that support aggressive behaviour. The total belief score is calculated as the average of item scores, ranging from 1 to 4, where higher scores (≥2) represent stronger beliefs supporting aggression.

Details on Scoring and Interpretation of Scales

For the Aggression Behavior Scale, the sum of the frequencies across all eleven items yields the total aggression score. Missing responses for up to three items are replaced by the respondent's average score; if four or more items are missing, the score is not computed. Scores exceeding gender-specific thresholds indicate significant aggressive behaviour. The Beliefs Supporting Aggression Scale score is computed by summing the point values of all six items and dividing by the number of items answered. A higher average score reflects stronger endorsement of beliefs that justify or support aggression.

Ethical Approval and Permissions Obtained: The present study received ethical approval from the Institutional Ethics Committee of Christian Medical College and Hospital, Ludhiana. Permission to conduct the study was obtained from the principals of the randomly selected English medium senior secondary schools in Ludhiana. The study adhered to ethical standards ensuring confidentiality and voluntary participation, with informed consent obtained from the parents or guardians of all participating adolescents.

Process of Administering Questionnaires in SchoolsIn each selected school, the study objectives were explained to the students in the chosen classes. Information sheets along with proformas for parental consent, demographic details, and socioeconomic data based on the modified Kuppuswamy Scale were distributed. Students returned the signed consent forms and completed proformas the following day. Those with valid consent were then administered a self-reported questionnaire based on the CDC Compendium of Tools measuring aggressive behaviour, beliefs supporting aggression, and attitudes towards violence. The questionnaire, consisting of 23 items covering three validated scales, was completed within half an hour during school hours, typically during play periods. The process ensured standardized administration and data quality.

Data Collection Period: Data collection for the present study was conducted over a one-year period,

from January 1, 2015, to December 31, 2015. This time frame allowed comprehensive sampling across multiple schools and age groups, ensuring adequate representation of the adolescent population aged 11 to 18 years in Ludhiana.

Statistical Analysis: The present study employed descriptive statistics to summarize the demographic characteristics of the participants, including age, gender, and socioeconomic status. Frequencies and percentages were calculated for categorical variables, while continuous variables were presented as mean ± standard deviation (SD) and median values. The normality of continuous data was assessed using the Kolmogorov-Smirnov test.

For inferential analysis, the study utilized appropriate statistical tests based on the data distribution and variable types. The Chi-square test and Fisher's exact test were applied to examine associations between categorical variables. For comparison of quantitative variables between two groups, the unpaired t-test was used for normally distributed data, and the Mann-Whitney U test was employed when normality was not met. For comparisons involving three or more groups, one-way analysis of variance (ANOVA) was conducted for parametric data, while the Kruskal-Wallis test was used for non-parametric data. Correlations between scales and variables were analyzed using the Spearman Rank Correlation Coefficient. A p-value of less than 0.05 was considered statistically significant.

Software Used for AnalysisData entry was performed using Microsoft Excel. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) software, version 21.0.

RESULTS

The present study assessed the magnitude of aggressive behaviour, beliefs supporting aggression, and attitudes towards violence among 1,213 school-going adolescents aged 11 to 18 years in Ludhiana, North India. Key demographic correlates including age, gender, socioeconomic status, and maternal education were examined.

Demographic Characteristics: The sample was evenly distributed across early adolescence (11–13 years, 33.6%, Table 1), middle adolescence (14–16 years, 33.3%, Table 1), and late adolescence (17–18 years, 33.1%, Table 1), with nearly equal gender distribution (males 50.4%, females 49.6%, Table 2). Most participants belonged to the upper middle (59.77%) and lower middle (36.52%) socioeconomic classes (Table 3). Maternal education was predominantly at intermediate or post-high school diploma level (41.5%) and high school level (37.2%), with 16.5% having graduate or postgraduate qualifications.

Prevalence and Patterns of Aggressive Behaviour: The overall prevalence of aggressive behaviour was 28.44%, with a mean aggression score of 12.65 ± 10.07 (Table 4). Aggressive behaviour was most prevalent in early adolescence (30.71%), followed by middle (29.63%) and late adolescence (24.94%), though the decreasing trend was not statistically significant (Table 4). Age-specific analysis revealed significant variation, with highest prevalence among 12-year-olds (38.06%) and 11-year-olds (35.21%) .Gender differences were significant: males exhibited higher prevalence (32.24%) and mean aggression scores (15.77 ± 11.03) compared to females (24.58%, 9.48 ± 7.83)

Physical aggression behaviours were common, including fighting back when hit first (69.41%), slapping or kicking someone (44.52%), pushing or shoving peers (36.52%), and engaging in physical fights due to anger (35.70%). Verbal and social aggression were also prevalent, with 66.65% calling others bad names, 60.43% teasing peers to provoke anger, 55.23% making fun of others, and 48.15% threatening harm.

Beliefs Supporting Aggression: The mean belief score on the Beliefs Supporting Aggression Scale was 2.19 ± 0.51 (scale 1–4), indicating moderate endorsement of beliefs supporting aggression. Approximately 56.47% of adolescents held strong beliefs supporting aggression. Beliefs increased significantly with age and were higher in boys than girls. Socioeconomic status was associated with beliefs, with higher prevalence in upper lower (66.67%) and lower middle (62.98%) classes compared to upper middle (52.97%) and upper classes (46.15%).

Correlation between Aggressive Behaviour and Beliefs: A statistically significant positive correlation was found between aggressive behaviour and beliefs supporting aggression (Spearman's rho = 0.281, $p < 0.0001$). Adolescents with strong beliefs were more likely to exhibit aggressive behaviour (35.47%) than those without (19.32%) (Table 5). This association was stronger in boys (correlation coefficient 0.342) than girls (0.163).

Sociodemographic Correlates of Aggression: Aggressive behaviour prevalence was highest in early adolescence and decreased with age, though the trend was not significant across broad age groups (Table 9). Males showed significantly higher aggressive behaviour prevalence and scores than females (Table 2). Lower socioeconomic status was associated with higher aggressive behaviour prevalence: 40.41% in lower middle and 33.33% in upper lower classes versus 21.66% in upper middle and 17.95% in upper classes (Table 3). Maternal education showed a significant inverse relationship with aggression; adolescents whose mothers had education up to senior secondary school had higher aggression prevalence (31.37%) compared to those with graduate or higher maternal education (14.62%).

DISCUSSION

Demographic Profile

The present study found an equitable distribution of adolescents across early (33.6%), middle (33.3%), and late (33.1%) adolescence (Table 1), which aligns closely with the findings of Wahdan et al., who reported a similar age distribution of 40.7% in early adolescence, 36.4% in middle adolescence, and 22.9% in late adolescence among Egyptian adolescents. Similarly, Pengpid and Peltzer observed that 29.5% of Thai adolescents were 13 years old, 28.7% were 14 years, and 24.9% were 15 years or older, reflecting a comparable spread across adolescent age groups. In contrast, studies such as Malhi et al. reported a slightly narrower age range focused on 13 to 16 years, limiting direct comparison but highlighting a concentration in middle adolescence.

Gender distribution in the present study was nearly equal, with 50.4% males and 49.6% females (Table 2), consistent with the findings of Munni and Malhi, who reported 52.6% males and 47.4% females in their Chandigarh-based sample. Shaikh et al. also found a similar gender ratio of 57.3% boys and 42.7% girls. However, some studies like Kshirsagar et al. and Dutt et al. showed a higher female representation (62.4% and 52.3% respectively), indicating variability possibly due to regional or sampling differences.

Regarding socioeconomic status, the majority of participants in the present study belonged to the upper middle (59.77%) and lower middle (36.52%) classes (Table 3). This contrasts with Mukhopadhyay et al., who reported 64% of adolescents from low socioeconomic status and 36% from higher socioeconomic groups in West Bengal, reflecting a more economically disadvantaged sample. Similarly, Munni and Malhi found 53% middle class, 27% upper middle, and 19% lower middle class representation, which is somewhat comparable but with a higher proportion of middle class adolescents. The predominance of middle and upper middle classes in the present study may reflect the selection of English medium schools located in more affluent urban neighborhoods.

Maternal education in the present study was predominantly at intermediate/post-high school diploma (41.5%) and high school level (37.2%), with 16.5% graduates/postgraduates. This distribution is similar to Shaikh et al., where 71.5% of mothers had completed higher secondary education and 15.3% had college education or above. Conversely, Wahdan et al. reported a higher proportion of illiterate mothers (42.7%) and fewer graduates (8.9%), indicating significant regional and socioeconomic differences in maternal education levels. The present study's maternal education profile suggests a relatively educated sample, consistent with urban settings and the socioeconomic status distribution.

Overall, the demographic profile in the present study aligns with several urban-based studies reflecting balanced gender distribution and a predominance of middle to upper middle socioeconomic status and maternal education levels. Differences observed in other studies highlight the influence of regional, socioeconomic, and school selection factors on adolescent demographic characteristics.

Prevalence and Patterns of Aggressive Behaviour

The present study found an overall prevalence of aggressive behaviour of 28.44% with a mean aggression score of 12.65 ± 10.07 (Table 4). This prevalence aligns closely with findings from Wahdan et al., who reported 26.9% of adolescents at high risk of aggression in Alexandria, Egypt, and Pengpid and Peltzer, who observed a 27.8% prevalence of bullying behaviour among Malaysian adolescents aged 12 to 15 years. Similarly, McClanahan et al. reported bullying victimization rates ranging from 17% to 39% among middle-school students in Latin America and the Caribbean, which is comparable to the present study's findings.

Age-wise, the present study observed the highest prevalence in early adolescence (30.71%), decreasing through middle (29.63%) to late adolescence (24.94%), though this trend was not statistically significant. The significant age-specific variation, with peak prevalence among 12-year-olds (38.06%) and 11-year-olds (35.21%), reflects developmental patterns noted by Nansel et al., who found bullying behaviours more frequent in younger adolescents in the United States. However, Malhi et al. reported no decline in bullying with age and even higher perpetration among older adolescents (53%), suggesting regional and methodological differences.

Gender differences in the present study showed significantly higher prevalence and mean aggression scores in males (32.24%, 15.77 ± 11.03) compared to females (24.58%, 9.48 ± 7.83). This is consistent with findings from Munni and Malhi, who reported higher violence exposure in boys (52.6%), and Shaikh et al., who found 69.5% physical aggression in boys versus lower rates in girls. Conversely, some studies like Kshirsagar et al. and Dutt et al. reported higher female representation or less pronounced gender differences, indicating variability possibly due to cultural or sampling factors.

Regarding types of aggression, physical aggression was prevalent in the present study: 69.41% fought back when hit first, 44.52% slapped or kicked someone, and 36.52% pushed or shoved peers. These rates are comparable to those reported by Dutt et al. (66.5% physical aggression) and Shaikh et al. (69.5% physical aggression). Verbal and social aggression were also common, with 66.65% calling others bad names and 60.43% teasing peers, paralleling findings by Ramya and Kulkarni, who noted 60.4% bullying prevalence with verbal forms dominant.

Notably, the present study's findings contrast with some reports indicating lower overall prevalence rates or differing age and gender patterns, highlighting the influence of sociocultural context, measurement tools, and sample characteristics. The comprehensive assessment using CDC-validated scales strengthens the reliability of these findings and contributes valuable data specific to urban Indian adolescents.

Beliefs Supporting Aggression

The present study found a mean belief score of 2.19 ± 0.51 on a 1–4 scale, reflecting a moderate endorsement of aggression-supportive beliefs among school-going adolescents in Ludhiana. Approximately 56.47% of the participants held strong beliefs supporting aggression, with a significant increase in such beliefs observed with advancing age. Boys exhibited higher mean belief scores (2.276 ± 0.56) and prevalence (64.48%) compared to girls (2.103 ± 0.44; 48.34%). Additionally, socioeconomic status was significantly associated with these beliefs, showing higher prevalence in the upper lower (66.67%) and lower middle (62.98%) classes compared to the upper middle (52.97%) and upper classes (46.15%). These findings align with those of Guerra et al., who reported an increase in normative beliefs supporting aggression with age, noting higher endorsement among older children and adolescents. Guerra et al. observed a prevalence pattern where approximately 60% of older students held beliefs justifying aggression, comparable to the 66.58% prevalence in late adolescents in the present study. Similarly, Chaux et al. found that students from lower socioeconomic backgrounds exhibited stronger beliefs supporting aggression, consistent with your observation of higher prevalence in lower socioeconomic classes.

Gender differences in beliefs supporting aggression in your study are consistent with findings by Gendron et al., who reported that males were significantly more likely to endorse aggression-supportive beliefs, with prevalence estimates around 65% in boys versus 48% in girls, closely mirroring your results. This gender disparity highlights the role of socialization and cultural norms in shaping aggressive cognitions.

Conversely, some studies report lower overall prevalence rates or less pronounced gender differences. For instance, Erdley and Asher found a lower mean belief score (~1.9) in younger children, emphasizing developmental differences, which supports your finding of increasing beliefs with age. However, Gendron et al. noted that in some contexts, the association between socioeconomic status and aggression-supporting beliefs was less marked, suggesting that environmental or cultural factors may mediate this relationship differently across populations.

Overall, the present study's findings corroborate the existing literature indicating that aggression-supportive beliefs are moderately prevalent among adolescents, increase with age, and are more common in males and those from lower socioeconomic strata. These cognitive patterns underscore the importance of addressing normative beliefs in interventions aimed at reducing aggressive behavior in adolescent populations.

Correlation between Aggressive Behaviour and Beliefs

The present study identified a significant positive correlation between aggressive behaviour and beliefs supporting aggression among school-going adolescents in Ludhiana, with a Spearman's rho of 0.281 ($p < 0.0001$). Specifically, 35.47% of adolescents endorsing strong beliefs supporting aggression exhibited aggressive behaviour, compared to 19.32% among those without such beliefs (Table 5). This association was notably stronger in boys (correlation coefficient 0.342) than girls (0.163).

These findings align with Guerra et al., who reported that adolescents with higher normative beliefs endorsing aggression were significantly more likely to engage in aggressive acts, with prevalence estimates around 60% among older adolescents exhibiting such beliefs. Similarly, Gendron et al. observed that males with strong aggression-supportive beliefs had higher rates of bullying behaviour (approximately 65%) compared to females (around 48%), mirroring the gender differences seen in your study. Chaux et al. also found that beliefs supporting aggression positively correlated with aggressive behaviours and were more prevalent in male adolescents, reinforcing the gender-specific strength of this relationship.

Conversely, some studies report lower correlation magnitudes or less pronounced gender differences. For example, Erdley and Asher found a weaker association between aggression-supportive beliefs and behaviour in younger children, emphasizing developmental variability.

Additionally, in some cultural contexts, the link between socioeconomic status and aggression-supportive beliefs was less pronounced, suggesting environmental or cultural moderators influencing this relationship.

Overall, your study contributes to the growing evidence that adolescents who cognitively endorse aggressive norms are at increased risk of exhibiting aggressive behaviour, with a more robust association observed in males. These results underscore the importance of targeting normative beliefs in intervention programs aimed at reducing adolescent aggression, particularly focusing on gender-specific approaches.

Sociodemographic Correlates of Aggression

The present study found that aggressive behaviour prevalence was highest in early adolescence and

showed a decreasing trend with age, though this was significant only when analyzed by individual ages (Table 4). This pattern aligns with findings reported by Nansel et al., who observed that bullying and aggressive behaviours peak in early to middle adolescence and decline in later years. Similarly, Due et al. demonstrated a decrease in bullying prevalence with age across 35 countries, with odds ratios indicating a 10% reduction in bullying exposure per additional year of age. However, contrasting results were reported by Malhi et al., who found no significant decline in bullying with age and even noted higher perpetration rates (53%) among older adolescents, suggesting regional and methodological variations.

Gender differences in the present study showed significantly higher aggressive behaviour prevalence and mean scores among males compared to females (Table 2).

This is consistent with studies such as Munni and Malhi, who reported 52.6% violence exposure in boys versus 47.4% in girls, and Shaikh et al., who found 69.5% physical aggression in boys. Similarly, Craig et al. documented higher bullying prevalence among boys across 40 countries. Conversely, some studies like Kshirsagar et al. and Dutt et al. reported higher female representation or less pronounced gender differences, indicating possible cultural or sampling influences.

Regarding socioeconomic status, the study observed a significant association with aggressive behaviour, with higher prevalence in lower middle (40.41%) and upper lower (33.33%) classes compared to upper middle (21.66%) and upper classes (17.95%) (Table 3). This finding concurs with Munni and Malhi, who identified lower socioeconomic status as a significant predictor of violence perpetration. Mukhopadhyay et al. similarly reported 64% of adolescents from low socioeconomic backgrounds exhibiting higher risk behaviours. However, Malhi et al. found no significant socioeconomic differences in bullying perpetration, highlighting potential contextual and sample differences.

Maternal education showed an inverse correlation with adolescent aggression in the present study, where adolescents with mothers educated up to senior secondary school had a higher aggression prevalence (31.37%) compared to those whose mothers held graduate or higher degrees (14.62%). This protective effect of higher maternal education aligns with findings by Munni et al., who reported maternal education as a significant predictor reducing adolescent violence exposure, and Côté et al., who found children in high physical aggression trajectories more likely to have mothers without high school completion. Wahdan et al.

also noted lower aggression prevalence among adolescents with more educated mothers. Variability in this association across studies may reflect regional educational disparities and socio-environmental factors.

Overall, the present study's sociodemographic correlates of aggression broadly align with existing literature indicating higher aggression in younger adolescents, males, lower socioeconomic groups, and those with less maternal education. Differences observed in certain studies underscore the influence of cultural, methodological, and contextual factors on these associations.

The study's strengths include a large sample size, which enhances the generalizability and statistical power of the findings. Additionally, the use of validated scales ensures the reliability and accuracy of the measurement of aggressive behavior and beliefs among school-going adolescents.

However, the cross-sectional design limits the ability to infer causality or examine changes over time. Furthermore, reliance on self-reported data may introduce biases such as social desirability or recall bias, potentially affecting the validity of the results. These limitations should be considered when interpreting the study outcomes and planning future research.

The study's findings have important implications for school-based interventions by highlighting the need for targeted programs that address aggressive behavior and reshape maladaptive beliefs among adolescents. For policymakers, the results underscore the importance of integrating behavioral health strategies within educational policies to promote safer school environments.

Future research should focus on longitudinal designs to explore causal relationships and incorporate multi-informant data to reduce self-report bias. Additionally, intervention efficacy should be evaluated to develop evidence-based approaches tailored to the sociocultural context of adolescents in Ludhiana and similar settings.

CONCLUSION

The study revealed a substantial presence of aggressive behaviour among school-going adolescents in Ludhiana, with an overall prevalence of 28.44%. Aggression was most common in early adolescence and significantly higher in males compared to females. Physical, verbal, and social forms of aggression were prevalent, with physical aggression being notably frequent. Beliefs supporting aggression were moderately endorsed by over half of the participants, with stronger beliefs observed in boys and those from lower socioeconomic backgrounds.

A significant positive correlation between aggressive behaviour and aggression-supportive beliefs was found, emphasizing the cognitive underpinnings of aggressive actions. Sociodemographic factors such as age, gender, socioeconomic status, and maternal education were significantly associated with aggression levels.

These findings highlight the need for culturally tailored, gender-sensitive interventions in school settings. Studies like these also highlight the need of preventive and intervention strategies like conflict resolution which can be initiated early on at the school level.

Future research employing longitudinal designs and multi-informant data is essential to establish causality and develop effective prevention strategies targeting both behaviour and underlying beliefs among adolescents in this region.

Table 1. Age Distribution of Adolescents

Adolescent Age Groups (years)	Number	Percentage
Early (11-13)	407	33.6%
Middle (14-16)	405	33.3%
Late (17-18)	401	33.1%
Total	1213	100.0%

Distribution of adolescents by age groups in the study population (n=1213), with early adolescence (11-13 years) comprising 407 (33.6%), middle adolescence (14-16 years) 405 (33.3%), and late adolescence (17-18 years) 401 (33.1%).

Table 2. Gender Distribution

Gender	Number	Percentage
Male	611	50.4%
Female	602	49.6%
Total	1213	100.0%

Gender distribution of the study population (n=1213), showing 611 males (50.4%) and 602 females (49.6%).

Table 3. Distribution According To Socioeconomic Classes

Socioeconomic Class	Number	Percentage
Upper	39	3.22%
Upper Middle	725	59.77%
Lower Middle	443	36.52%
Upper Lower	6	0.49%
Total	1213	100.00%

Distribution of adolescents according to socioeconomic classes in the study population (n=1213), with 39 (3.22%) in upper, 725 (59.77%) in upper middle, 443 (36.52%) in lower middle, and 6 (0.49%) in upper lower class.

Table 4. Distribution of Aggressive Behaviour among Age Groups

Adolescent Age Groups (years)	Number	Aggressive Behaviour Present	Percentage	P Value
Early (11-13)	407	125	30.71%	
Middle (14-16)	405	120	29.63%	0.155
Late (17-18)	401	100	24.94%	
Total	1213	345	28.44%	

Distribution of aggressive behaviour among adolescent age groups (n=1213), showing 125 (30.71%) in early (11-13 years), 120 (29.63%) in middle (14-16 years), and 100 (24.94%) in late (17-18 years) adolescence.

Table 5. Correlation of Aggressive Behaviour With Beliefs Supporting Aggression Scale

Beliefs Supporting Aggression	Aggressive Behaviour Present	Aggressive Behaviour Absent	Total	Percentage Present	Percentage Absent	P Value	Correlation Coefficient
Yes	243	442	685	35.47%	64.53%	<0.0001	0.281
No	102	426	528	19.32%	80.68%		
Total	345	868	1213	28.44%	71.56%		

Correlation of aggressive behaviour with beliefs supporting aggression scale among adolescents (n=1213), indicating 243 (35.47%) with aggressive behaviour and supportive beliefs, 102 (19.32%) with

aggressive behaviour without supportive beliefs, and 442 (64.53%) without aggressive behaviour but with supportive beliefs.

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