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Research Article

Peer Victimization and Psychological Outcomes in Adolescents with Pubertal Gynecomastia: A Case-Control Study

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What is already known on this topic?
- Pubertal gynecomastia affects approximately 1% of adolescents and is associated with psychosocial difficulties.
- Physical appearance differences increase bullying risk in adolescents.
- Limited research has systematically examined bullying experiences in adolescents with gynecomastia.

What this study adds?
- Adolescents with gynecomastia experience 2.63-fold increased peer victimization risk.
- Victimized adolescents show significantly elevated anxiety and depression across multiple domains.
- Routine bullying assessment should be integrated into clinical evaluation of gynecomastia patients.

Abstract
Objective: Pubertal gynecomastia is associated with psychosocial consequences including anxiety, depression, and body image disturbances. However systematic examination of bullying experiences and their psychological correlates in adolescents with gynecomastia remains limited. This study aims to investigate peer victimization prevalence and its relationship with psychological outcomes in this vulnerable population.
Methods: This case-control study included 155 male adolescents aged 10-17 years, comprising 78 participants with gynecomastia and 77 healthy controls. Gynecomastia diagnosis and severity were assessed using clinical examination and Rohrich classification. Participants completed validated Turkish versions of the Olweus Bully/Victim Questionnaire, Rosenberg Self-Esteem Scale, and Revised Child Anxiety and Depression Scale.
Results: Adolescents with gynecomastia demonstrated significantly elevated peer victimization rates compared to controls (34.6% versus 16.9%, p=0.012), with markedly increased victim-perpetrator status (12.8% versus 1.3%, p=0.005). Gynecomastia diagnosis increased victimization risk 2.63-fold (95% CI: 1.076-6.436, p=0.034). Victimized participants exhibited elevated anxiety and depression scores across multiple symptom domains ($p < 0.05$). Behavioral modifications were prevalent, including altered clothing preferences (58.9%), changing room avoidance (44.8%), and swimming avoidance (41.0%).
Conclusions: Adolescents with gynecomastia experience substantially elevated peer victimization with consequential psychological impact. These findings underscore the imperative for routine bullying assessment during clinical evaluation and implementation of comprehensive psychosocial screening protocols with early intervention strategies.
Keywords: Pubertal gynecomastia, peer victimization, bullying, adolescents, anxiety, depression

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Introduction

Pubertal gynecomastia (PG), defined as the benign enlargement of male breast tissue, represents one of the most common endocrine conditions encountered during puberty, affecting an estimated 1.08% of adolescents aged 12-15 years according to recent population-based data (1). The condition typically manifests between ages 13-14 years, corresponding to Tanner stages 3-4, with bilateral involvement observed in approximately 90% of cases (2,3). While pubertal gynecomastia is largely physiological and resolves spontaneously within 1-3 years in most cases, persistent enlargement occurs in approximately 10% of adolescents by age 17, necessitating medical or surgical intervention (4). PG develops due to transient imbalances between androgens and estrogens during pubertal development, is idiopathic in over 95% of patients, though pathological causes including endocrine disorders, medications, and genetic syndromes account for less than 5% of cases (5,6).

PG represents a physical condition affecting adolescent males, yet its effects extend far beyond anatomical changes to encompass significant psychosocial consequences. Controlled research demonstrates that adolescents with gynecomastia exhibit impairments in social functioning, mental health, and self-esteem parameters compared to their healthy peers (7). The psychosocial manifestations include shame, anxiety, social isolation, body image disturbance, and excessive self-consciousness. This condition frequently associated with avoidance behaviors regarding physical activities and decline in academic performance (7,8). Clinical studies reveal elevated rates of anxiety disorders, depression, social phobia, disordered eating behaviors, and adjustment disorders among this population (7,9–11). Follow-up studies conducted after surgical intervention demonstrate improvements in patients' self-esteem, social functioning, and quality of life scores. These findings underscore the critical importance of early diagnosis and appropriately timed therapeutic interventions (10,12).

Peer victimization and bullying during adolescence have emerged as major public health concerns, with recent meta-analyses indicating that approximately 36% of adolescents worldwide experience some form of bullying victimization (13). The relationship between physical appearance differences and increased bullying risk has been extensively documented (14,15). Beyond immediate psychological effects, systematic reviews demonstrate that bullying experiences have lasting consequences into adulthood, including depression, anxiety, self-harm behaviors, and suicidal ideation (16). Appearance-based bullying in particular shows particularly high correlations with body image issues,

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and low self-esteem in adolescent populations (14). The intersection of physical appearance differences with peer victimization creates a complex pathway toward psychological distress that warrants careful investigation in vulnerable populations such as adolescents with medical conditions affecting appearance.

Despite the well-established psychological impact of gynecomastia and the documented relationship between appearance differences and bullying victimization, limited research has systematically examined the intersection of these phenomena. This knowledge gap is particularly concerning given that adolescents with visible physical differences may be at heightened risk for peer victimization, potentially amplifying the already significant psychological burden associated with gynecomastia. The present study aimed to investigate the prevalence of peer victimization among adolescents with gynecomastia compared to healthy controls, examine the relationship between bullying experiences and psychological outcomes including self-esteem, anxiety, and depressive symptoms, and identify predictive factors for victimization within this vulnerable population. Through comprehensive assessment of both bullying experiences and psychological wellbeing, this research seeks to inform evidence-based approaches to clinical care and intervention strategies for adolescents with gynecomastia.

Methods

This case-control study was conducted between June 2023 and January 2024 at Basaksehir Cam and Sakura City Hospital, Istanbul, Turkey, Department of Pediatric Endocrinology. The study protocol was approved by the Institutional Ethics Committee of Basaksehir Cam and Sakura City Hospital (approval number 254, 2023) and conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants and their parents or legal guardians prior to enrollment.

The study included 155 male adolescents aged 10-17 years, comprising 78 participants with gynecomastia and 77 healthy controls. Case group participants were recruited from patients presenting to the pediatric endocrinology outpatient clinic with a confirmed diagnosis of gynecomastia. Gynecomastia diagnosis was established through clinical examination by a pediatric endocrinologist and severity assessed using the Rohrich classification. Control group participants were recruited from healthy adolescents attending routine pediatric check-ups or accompanying siblings to medical appointments.

Inclusion criteria for the gynecomastia group included male adolescents aged 10-17 years with clinical diagnosis of gynecomastia confirmed by pediatric endocrinologist, gynecomastia duration of at least 6 months, and ability to complete questionnaires in Turkish. Control group inclusion criteria included healthy male adolescents aged 10-17 years with no clinical evidence of gynecomastia, no history of chronic medical conditions, no current psychiatric disorders requiring treatment, and age-matching to the gynecomastia group.

Exclusion criteria for both groups included presence of serious psychiatric disorders such as psychosis, cognitive impairment preventing questionnaire completion, chronic medical conditions affecting psychological wellbeing, current use of psychotropic medications, and refusal to participate or provision of incomplete data.

Sample size was determined using G*Power software (version 3.1.9.2, Heinrich-Heine-Universität Düsseldorf, Germany) based on anticipated differences in peer victimization prevalence between groups. Given the limited literature on bullying in adolescents with gynecomastia, we assumed a medium effect size (Cohen's $h = 0.5$) for the primary outcome, with $\alpha = 0.05$ and power $(1-\beta) = 0.80$, yielding a required sample size of 64 participants per group. To ensure adequate power, we recruited 78 and 77 participants respectively.

Clinical Assessment

All participants underwent comprehensive clinical evaluation including measurement of height, weight, and calculation of body mass index standard deviation scores using Turkish reference standards (17). Gynecomastia severity was assessed using Rohrich classification system. Pubertal development was evaluated according to Tanner staging. Additional clinical data collected included family history, medication use, and presence of any concurrent medical conditions.

For participants with gynecomastia, detailed clinical characteristics were documented including laterality (unilateral or bilateral), Rohrich stage, and associated behavioral modifications. Specific behavioral modifications assessed included social avoidance behaviors, clothing preference changes favoring loose-fitting garments, avoidance of changing rooms, and avoidance of swimming pools or beaches.

Psychological Assessment Instruments

Peer Victimization Assessment

Bullying and victimization experiences were evaluated using the validated Turkish adaptation of the Olweus Bully/Victim Questionnaire (18,19). This comprehensive instrument consists of 39 items designed to assess various forms of peer aggression and victimization occurring within the preceding month. The questionnaire employs a frequency-based classification system, where participants reporting experiences occurring two to three times or more frequently are categorized into distinct groups: pure victims, pure perpetrators, bully-victims (individuals who both perpetrate and experience bullying), or uninvolved participants. The Turkish version has demonstrated satisfactory psychometric properties with internal consistency coefficients of $\alpha = 0.81$ in adolescent populations.

Self-Esteem Measurement

Global self-esteem was assessed using the ten-item self-esteem subscale from the Turkish adaptation of the Rosenberg Self-Esteem Scale (20,21). This widely utilized instrument evaluates overall self-worth and self-acceptance through items addressing personal satisfaction, self-respect, and perceived adequacy. Responses are recorded on a four-point Likert format ranging from strongly disagree to strongly agree, with higher composite scores reflecting enhanced self-regard. The Turkish version of this subscale has demonstrated robust psychometric characteristics with validity coefficients of $r = 0.71$ and test-retest reliability indices of $r = 0.75$ in adolescent populations.

Anxiety and Depression Symptomatology

Psychological distress was measured using the Turkish version of the Revised Child Anxiety and Depression Scale (RCADS), a DSM-IV aligned assessment tool comprising 47 items (22,23). The instrument evaluates six distinct symptom domains through dedicated subscales: generalized anxiety (6 items), separation anxiety (7 items), panic symptomatology (9 items), obsessive-compulsive features (6 items), social anxiety manifestations (9 items), and major depressive symptoms (10 items). Response options range across a four-point continuum from 0 (never experienced) to 3 (always experienced), with elevated scores indicating greater symptom severity. The Turkish adaptation has demonstrated excellent internal reliability with overall Cronbach's alpha coefficients of 0.95.

Data Collection Procedure

Data collection was conducted in a quiet, private room within the hospital setting. All questionnaires were administered by trained research personnel in a standardized manner. Participants completed the questionnaires individually, with research staff available to provide clarification when needed. The assessment session lasted approximately 20-45 minutes for each participant. Demographic information was collected through a structured interview with both the participant and accompanying parent or guardian.

Statistical Analysis

Statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) version 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics including frequencies, percentages, means, standard deviations, and medians were calculated for all variables. The normality of continuous variables was assessed using the Shapiro-Wilk test. Since the data did not meet normality assumptions, non-parametric tests were employed for group comparisons.

Categorical variables were compared between groups using Chi-square tests or Fisher's exact test when appropriate. Continuous variables were compared using the Mann-Whitney U test for independent groups. Statistical significance was set at $p < 0.05$ for all analyses.

Binary logistic regression analysis was performed to identify predictors of peer victimization. The overall model included group status (gynecomastia vs control), age, body mass index standard deviation score, self-esteem scores, and total anxiety-depression scores as independent variables. A separate logistic regression analysis was conducted within the gynecomastia group to identify specific predictors of

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victimization among affected adolescents. Model fit was assessed using the Omnibus test, and the explained variance was reported using Nagelkerke R-squared values.

Results

Participant Characteristics

This case-control study included 155 male adolescents aged 10-17 years, with 78 participants diagnosed with gynecomastia and 77 healthy controls. The groups were well-matched for demographic characteristics, with no significant differences observed in grade level distribution, educational levels, family income status (all $p > 0.05$).

Anthropometric measurements revealed significant differences between groups. Participants with gynecomastia demonstrated significantly higher weight standard deviation scores (SDS) and body mass index (BMI) SDS ($p=0.001$) compared to controls. However, no significant differences were found in age, pubertal stage, height standard deviation scores, or daily screen time between the two groups.

The clinical presentation of gynecomastia showed bilateral involvement in 89.7% of participants. Distribution according to Rohrich staging system revealed that 34.6% were classified as Stage 2, 30.7% as 3, and 19.2% as 4. The physical changes associated with gynecomastia resulted in substantial behavioral modifications among affected adolescents. Social avoidance behaviors were reported by 43.5% of participants, while 58.9% experienced changes in clothing preferences, specifically favoring loose-fitting garments. Additionally, 44.8% reported avoiding changing rooms and 41.0% avoided swimming pools or beaches, indicating significant impact on daily activities and social participation (see Table 1).

Peer Victimization Outcomes

The primary analysis revealed markedly higher rates of peer victimization among adolescents with gynecomastia compared to controls. Overall victimization prevalence reached 34.6% in the gynecomastia group versus 16.9% in the control group ($p=0.012$), representing a statistically significant two-fold increase. Furthermore, participants with gynecomastia demonstrated elevated rates of perpetrating bullying behaviors (15.4% vs 5.2%, $p=0.037$) and were significantly more likely to exhibit dual victim-perpetrator status (12.8% vs 1.3%, $p=0.005$) (see Table 2).

Psychological Well-being Measures

Assessment of self-esteem using the Rosenberg Self-Esteem Scale revealed no significant difference between groups ($p=0.064$). Similarly, overall psychological symptoms measured by the RCADS showed comparable total scores between groups ($p=0.569$). Individual subscale analyses revealed no significant between-group differences for any RCADS domain (all $p > 0.05$) (see Table 3).

Impact of Victimization Within the Gynecomastia Group

Among participants with gynecomastia, those who experienced peer victimization demonstrated significantly elevated psychological distress across multiple domains compared to their non-victimized counterparts. Victimized adolescents showed markedly higher total RCADS scores ($p=0.001$).

Detailed analysis of symptom domains revealed significant elevations in social phobia ($p=0.004$), obsessive-compulsive symptoms ($p=0.001$), panic disorder ($p=0.001$), generalized anxiety ($p=0.006$), and depression ($p=0.001$). Despite these pronounced differences in psychological symptoms, self-esteem scores remained comparable between victimized and non-victimized participants with gynecomastia ($p=0.695$) (see Table 4).

Predictive Factors for Peer Victimization

Logistic regression analysis across the entire sample identified two significant predictors of peer victimization. The presence of gynecomastia diagnosis emerged as the strongest predictor, increasing victimization risk by 2.63-fold (OR=2.631, 95% CI: 1.076-6.436, $p=0.034$). Additionally, psychological symptom severity, as measured by total anxiety and depression scores, showed a dose-response relationship with victimization risk, with each unit increase associated with a 4% increase in victimization probability (OR=1.040, 95% CI: 1.021-1.060, $p=0.001$). This comprehensive model explained 24.2% of the variance in victimization status (Nagelkerke $R^2=0.242$).

Within the gynecomastia subgroup, a more nuanced pattern emerged. Higher total anxiety and depression scores remained a significant predictor of victimization (OR=1.080, 95% CI: 1.036-1.125, $p=0.001$), while elevated separation anxiety subscale scores demonstrated a protective association (OR=0.718, 95% CI: 0.529-0.974, $p=0.033$). This gynecomastia-specific model demonstrated enhanced explanatory power, accounting for 36.5% of the variance in victimization among affected adolescents (Nagelkerke $R^2=0.365$). Age, body mass index standard deviation scores, self-esteem levels, and gynecomastia-related behavioral modifications did not emerge as significant predictors in either analytical model (see Table 5).

Discussion

This study aimed to evaluate the prevalence of peer victimization, self-esteem, and anxiety-depressive symptoms in adolescents with gynecomastia and compare these findings with a control group. Our findings demonstrated that adolescents with gynecomastia had significantly higher rates of bullying victimization compared to the control group (34.6% versus 16.9%), with the proportion of adolescents exhibiting a mixed victim-perpetrator profile being 10 times higher. While adolescents with gynecomastia who experienced bullying showed significant elevations across all anxiety and depression subscales, no significant differences were found in psychological parameters between adolescents with gynecomastia and the control group overall. Logistic regression analysis revealed that a gynecomastia diagnosis increased the risk of bullying victimization by 2.63-fold. Additionally, each increase in anxiety and depression symptom severity was found to proportionally increase bullying risk.

Physical appearance differences have been extensively documented in the literature as significant risk factors for peer victimization (24–27). In this context, gynecomastia constitutes an important risk factor for bullying as a condition that significantly affects physical appearance during adolescence. Although studies examining bullying experiences in adolescents with gynecomastia remain limited, existing data support this relationship. Karpinski and colleagues' 2024 study reported that 95.7% of adolescents with gynecomastia had a history of bullying, teasing, or shame related to their breast appearance (12). In a study published by Isik and Ozturk in 2025, adolescents with gynecomastia experienced significantly more teasing and attacks on personal belongings compared to controls, with an observed trend toward increased overall bullying scores (28). Our findings strengthen these data in the literature; the 34.6% overall bullying prevalence and 2.63-fold increased risk ratio obtained in our study confirm that bullying risk is significantly elevated in adolescents with physical differences. The variation in prevalence rates across the literature underscores the importance of methodological approaches used in bullying assessment. The 95.7% rate reported by Karpinski and colleagues differs substantially from our finding of 34.6%. This discrepancy likely stems from fundamental differences in assessment approaches. Karpinski and colleagues retrospectively evaluated "any history of bullying, teasing, or shame related to breast appearance" whereas our study utilized the Olweus questionnaire to measure more specific and recurrent bullying behaviors with a defined frequency threshold (two to three times per month or more) . Despite methodological differences, all studies have identified a robust relationship between gynecomastia and bullying. Our logistic regression analysis further validates this relationship by demonstrating that a gynecomastia diagnosis represents an independent risk factor for victimization even after controlling for other potential confounding factors.

The complex relationship between psychological symptoms and bullying experiences has been comprehensively examined in the literature. As demonstrated in Reijntjes and colleagues' longitudinal meta-analysis, internalizing problems can serve as both antecedents and consequences of bullying (29). Cook and colleagues' meta-analytic study revealed that children with elevated anxiety and depression symptoms have increased risk of bullying victimization (30). Similarly, bullying experiences have been documented to lead to long-term psychological consequences in Moore and colleagues' systematic review (16). In our study, each unit increase in RCADS total score

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increased bullying risk by 4% (OR=1.040, p=0.001), demonstrating that this dose-response relationship is also valid in adolescents with gynecomastia. The gynecomastia group-specific analysis model demonstrated higher explanatory power compared to the general sample and was able to explain 36.5% of the variance in bullying. This finding indicates that bullying risk factors are more distinct and predictable in adolescents with gynecomastia. Therefore, early recognition and intervention of psychological symptoms in adolescents with gynecomastia may be important for reducing bullying risk.

The clinical significance of adolescents exhibiting a mixed bully-victim profile has been documented in comprehensive research in recent years. In Ariani and colleagues' global meta-analysis published in 2025, which examined 116 studies and 603,231 participants, the prevalence of adolescents with a mixed bully-victim profile was reported as 16% (31). Cook and colleagues' meta-analytic study supports that bullying experiences can serve as both antecedents and consequences, creating a complex cycle (30). In our study, the proportion of adolescents with a bully-victim profile in the gynecomastia group was 10 times higher compared to the control group (12.8% versus 1.3%), indicating that adolescents with physical differences are overrepresented in this category. This finding reveals that adolescents with gynecomastia may not only experience bullying victimization but may also exhibit bullying behaviors themselves, emphasizing the necessity for comprehensive psychosocial assessment and multidimensional intervention strategies.

Systematic reviews and meta-analyses have shown that bullying victimization is associated with various mental health problems including emotional distress, loneliness, anxiety, depression, suicidal ideation, and self-harm behaviors. In many cases, these effects persist beyond adolescence into adulthood (16,31,32). The findings from our study are consistent with this literature and demonstrate the effects of bullying on adolescents with gynecomastia. Adolescents with gynecomastia who experienced bullying exhibited higher scores on anxiety and depression subscales compared to their peers with gynecomastia who had no bullying victimization. Increases were particularly observed in social phobia, obsessive-compulsive symptoms, panic disorder symptoms, and depressive symptoms. These findings indicate that bullying history should be routinely assessed during psychiatric evaluation of adolescents with gynecomastia. Evaluating bullying experiences in adolescents with gynecomastia who present with psychological symptoms is of critical importance for developing effective intervention strategies.

The literature has reported patient statements and clinical observations indicating that adolescents with gynecomastia prefer loose clothing to conceal their breasts and avoid social settings where the upper body is exposed, such as changing rooms and swimming (6,11,33). However, systematic and quantitative data regarding the prevalence of these behaviors have remained limited to date. Our study addresses this gap by revealing that approximately 60% of participants made changes in clothing preferences (favoring looser and more concealing garments), 44% avoided changing rooms, and 41% avoided swimming or beach activities. Therefore, our findings demonstrate that these behavioral adaptation strategies, previously mentioned only as possible outcomes, are quite prevalent and clinically significant in adolescent gynecomastia.

Previous research reports inconsistent psychological outcomes in adolescents with gynecomastia, with some studies demonstrating elevated anxiety, depression, and impaired self-esteem (10,12,34), while others found no differences (35). In our regression analysis, the absence of significant effects of age, body mass index, self-esteem, and behavioral modifications on bullying victimization risk reveals that gynecomastia diagnosis is the strongest determining factor in the general sample, with anxiety-depressive symptom levels contributing as an independent risk factor. In the gynecomastia group-specific analysis, while anxiety-depressive symptom levels increased bullying risk, separation anxiety was unexpectedly identified as a protective factor (OR=0.718, p=0.033), suggesting that family closeness may have a protective effect against bullying. The literature has documented that adolescents with gynecomastia can exhibit extreme avoidance behaviors including withdrawal from social environments, peer exclusion, and even thoughts of dropping out of school due to severe bullying (9,36). In this context, adolescents with high separation anxiety may have reduced their bullying victimization risk by avoiding social risks with the motivation to preserve the safety of the family environment. The absence of significant differences in baseline anxiety, depression, and self-esteem levels between gynecomastia and control groups suggests that the pronounced psychological elevations observed in bullied adolescents with gynecomastia may be a consequence of the bullying experience.

Study Limitations

Several methodological limitations warrant consideration when interpreting these findings. The cross-sectional design prevents establishment of causal relationships between gynecomastia, psychological symptoms, and bullying experiences. While the sample size was adequate for detecting the primary outcome based on power analysis, the relatively modest sample size, coupled with predominance of mild-to-moderate gynecomastia cases, limits generalizability and precludes definitive conclusions regarding severe presentations. Assessment of psychological symptoms relied exclusively on self-report measures rather than clinical diagnostic interviews, potentially compromising the depth and reliability of psychological evaluations. Single-center recruitment from a tertiary care facility may introduce selection bias, potentially overrepresenting individuals seeking medical intervention. The study did not assess detailed characteristics of bullying experiences, including frequency, duration, or specific types of victimization. Additionally, the study did not evaluate family or school context variables such as family support, parenting styles, teacher support, and peer relationships, which could strongly influence bullying experiences and psychological outcomes. Finally, the absence of longitudinal follow-up prevents examination of temporal relationships and long-term psychosocial outcomes.

Conclusion

This investigation demonstrates that adolescents with gynecomastia experience significantly elevated rates of peer victimization, with prevalence reaching 34.6% compared to 16.9% in healthy controls. The 2.63-fold increased risk, particularly in dual victim-perpetrator categories, highlights the complex bullying dynamics affecting this population. Victimized adolescents with gynecomastia showed substantial psychological burden across multiple anxiety and depressive symptom domains. These findings indicate that while gynecomastia may not invariably precipitate clinical-level psychological disorders, it imposes considerable psychosocial burden characterized by social difficulties and avoidance behaviors. The results emphasize the importance of routine bullying assessment during clinical evaluation and implementing comprehensive psychosocial screening protocols with early intervention strategies. Future studies should focus on developing and implementing school-based bullying prevention programs and evaluating the effectiveness of integrated mental health interventions for this high-risk population. Future research utilizing larger samples across gynecomastia severity levels and incorporating longitudinal designs will be essential for understanding these psychosocial dynamics and developing targeted intervention strategies for this vulnerable adolescent population.

Authorship Contribution: Yasin Caliskan: Project administration, conceptualization, funding acquisition, original draft writing, reviewing and editing, resources, statistical analysis. Zumrut Kocabey Sutcu: Conceptualization, funding acquisition, reviewing and editing, resources. Emel Hatun Aytaç Kaplan: Original draft writing, funding acquisition, reviewing, statistical analysis.

References

1. Berger O, Hornik-Lurie T, Talisman R. Pubertal gynecomastia incidence among 530,000 boys: a cross sectional population based study. Frontiers in Pediatrics [Internet]. 2024 [cited 2025 Sept 14];12:1367550. Available from: https://www.frontiersin.org/journals/pediatrics/articles/10.3389/fped.2024.1367550/full

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2. Metwalley KA, Farghaly HS. Gynecomastia in adolescent males: current understanding of its etiology, pathophysiology, diagnosis, and treatment. Annals of Pediatric Endocrinology & Metabolism [Internet]. 2024 [cited 2025 Sept 14];29(2):75–81. Available from: https://synapse.koreamed.org/articles/1516087087
3. Rohrich RJ, Ha RY, Kenkel JM, Adams Jr WP. Classification and management of gynecomastia: defining the role of ultrasound-assisted liposuction. Plastic and reconstructive surgery. 2003;111(2):909–23.
4. Ma NS, Geffner ME. Gynecomastia in prepubertal and pubertal men. Current opinion in pediatrics [Internet]. 2008 [cited 2025 Sept 14];20(4):465–70. Available from: https://journals.lww.com/co-pediatrics/abstract/2008/08000/gynecomastia_in_prepubertal_and_pubertal_men.19.aspx
5. Berger O, Landau Z, Talisman R. Gynecomastia: a systematic review of pharmacological treatments. Frontiers in Pediatrics [Internet]. 2022 [cited 2025 Sept 14];10:978311. Available from: https://www.frontiersin.org/articles/10.3389/fped.2022.978311/full
6. Lemaine V, Cayci C, Simmons P, Petty P. Gynecomastia in Adolescent Males. Seminars in Plastic Surgery [Internet]. 2013 May 23 [cited 2025 Sept 14];27(01):056–61. Available from: http://www.thieme-connect.de/DOI/DOI?10.1055/s-0033-1347166
7. Nuzzi LC, Cerrato FE, Erikson CR, Webb ML, Rosen H, Walsh EM, et al. Psychosocial impact of adolescent gynecomastia: a prospective case-control study. Plastic and reconstructive surgery [Internet]. 2013 [cited 2025 Sept 13];131(4):890–6. Available from: https://journals.lww.com/plasreconsurg/FullText/2013/04000/Psychosocial_Impact_of_Adolescent_Gynecomastia__A.44.aspx
8. Lashin R, Youssef RA, Elshahat A, Mohamed EN. Postoperative psychological impact on teenagers after Gynecomastia correction. Plastic and Reconstructive Surgery–Global Open [Internet]. 2023 [cited 2025 Sept 15];11(6):e5094. Available from: https://journals.lww.com/prsgo/fulltext/2023/06000/Postoperative_Psychological_Impact_on_Teenagers.55.aspx?context=LatestArticles
9. Kinsella Jr C, Landfair A, Rottgers SA, Cray JJ, Weidman C, Deleyiannis FWB, et al. The psychological burden of idiopathic adolescent gynecomastia. Plastic and reconstructive surgery. 2012;129(1):1–7.
10. Nuzzi LC, Firriolo JM, Pike CM, Cerrato FE, DiVasta AD, Labow BI. The effect of surgical treatment for gynecomastia on quality of life in adolescents. Journal of Adolescent Health [Internet]. 2018 [cited 2025 Sept 15];63(6):759–65. Available from: https://www.sciencedirect.com/science/article/pii/S1054139X18302817
11. Rew L, Young C, Harrison T, Caridi R. A systematic review of literature on psychosocial aspects of gynecomastia in adolescents and young men. Journal of adolescence [Internet]. 2015 [cited 2025 Sept 15];43:206–12. Available from: https://www.sciencedirect.com/science/article/pii/S0140197115001293
12. Karpinski M, Tuen YJ, Courtemanche R, Arneja JS. Quality of Life Measured Using the BODY-Q After Adolescent Gynecomastia Surgery: A Cross-Sectional Analysis. Plast Surg (Oakv) [Internet]. 2024 May 7 [cited 2025 Sept 13];22925503241249753. Available from: https://journals.sagepub.com/doi/10.1177/22925503241249753
13. Modecki KL, Minchin J, Harbaugh AG, Guerra NG, Runions KC. Bullying prevalence across contexts: A meta-analysis measuring cyber and traditional bullying. Journal of Adolescent Health [Internet]. 2014 [cited 2025 Sept 14];55(5):602–11. Available from: https://www.sciencedirect.com/science/article/pii/S1054139X14002547
14. Puhl RM, Lessard LM. Weight Stigma in Youth: Prevalence, Consequences, and Considerations for Clinical Practice. Curr Obes Rep [Internet]. 2020 Dec [cited 2025 Sept 14];9(4):402–11. Available from: https://link.springer.com/10.1007/s13679-020-00408-8
15. Low E, Monsen J, Schow L, Roberts R, Collins L, Johnson H, et al. Predicting bullying victimization among adolescents using the risk and protective factor framework: a large-scale machine learning approach. BMC Public Health [Internet]. 2025 Jan 25 [cited 2025 Sept 14];25(1):321. Available from: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-025-21521-0
16. Moore SE, Norman RE, Suetani S, Thomas HJ, Sly PD, Scott JG. Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. World journal of psychiatry [Internet]. 2017 [cited 2025 Sept 13];7(1):60. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC5371173/
17. Neyzi O, Bundak R, Gökçay G, Günöz H, Furman A, Darendeliler F, et al. Reference values for weight, height, head circumference, and body mass index in Turkish children. Journal of clinical research in pediatric endocrinology [Internet]. 2015 [cited 2025 Aug 3];7(4):280. Available from: https://jag.journalagent.com/z4/download_fulltext.asp?pdir=jcrpe&plng=tur&un=JCRPE-08068
18. Olweus D. Revised Olweus bully/victim questionnaire. Journal of Psychopathology and Behavioral Assessment [Internet]. 1996 [cited 2025 July 30]; Available from: https://psycnet.apa.org/doiLanding?doi=10.1037%2Ft09634-000
19. Sipahi HT, Karababa AO. Olweus öğrenciler için akran zorbalığı anketinin Türkçeye ve Türkiye'ye uyarlanması ve geçerlilik, güvenirlik analizi. Ege Tıp Dergisi [Internet]. 2018 [cited 2025 July 30];57(4):222–7. Available from: https://dergipark.org.tr/en/download/article-file/461077
20. Rosenberg M. Rosenberg self-esteem scale. Journal of Religion and Health [Internet]. 1965 [cited 2025 July 30]; Available from: https://psycnet.apa.org/doiLanding?doi=10.1037%2Ft01038-000&utm_medium=email&utm_source=transaction
21. Çuhadaroğlu F. Adölesanlarda Benlik Saygısı. [Ankara]: Hacettepe University; 1986.
22. Chorpita BF, Moffitt CE, Gray J. Psychometric properties of the Revised Child Anxiety and Depression Scale in a clinical sample. Behaviour research and therapy. 2005;43(3):309–22.
23. Gormez V, Kılınçaslan A, Orengul AC, Ebesutani C, Kaya I, Ceri V, et al. Psychometric properties of the Turkish version of the Revised Child Anxiety and Depression Scale–Child Version in a clinical sample. Psychiatry and Clinical Psychopharmacology. 2017;27(1):84–92.
24. Myers TA, Crowther JH. Social comparison as a predictor of body dissatisfaction: A meta-analytic review. Journal of abnormal psychology [Internet]. 2009 [cited 2025 Sept 13];118(4):683. Available from: https://psycnet.apa.org/journals/abn/118/4/683/
25. Van Geel M, Vedder P, Tanilon J. Are overweight and obese youths more often bullied by their peers? A meta-analysis on the relation between weight status and bullying. International journal of obesity [Internet]. 2014 [cited 2025 Sept 13];38(10):1263–7. Available from: https://www.nature.com/articles/ijo2014117
26. Webb HJ, Zimmer-Gembeck MJ. The Role of Friends and Peers in Adolescent Body Dissatisfaction: A Review and Critique of 15 Years of Research. J of Research on Adolesc [Internet]. 2014 Dec [cited 2025 Sept 13];24(4):564–90. Available from: https://onlinelibrary.wiley.com/doi/10.1111/jora.12084
27. Anderson M, Faverio M, Gottfried J. Teens, social media and technology 2023. Pew Research Center [Internet]. 2023 [cited 2025 Sept 13];11. Available from: https://abfe.issuelab.org/resources/43096/43096.pdf
28. Isik CM, Ozturk M, Bestas A. Gynecomastia and adolescence: Psychological effects of social appearance anxiety and peer bullying. Journal of Pediatric Nursing [Internet]. 2025 [cited 2025 Sept 13];83:23–9. Available from: https://www.sciencedirect.com/science/article/pii/S0882596325001228
29. Reijntjes A, Kamphuis JH, Prinzie P, Telch MJ. Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. Child abuse & neglect [Internet]. 2010 [cited 2025 Sept 13];34(4):244–52. Available from: https://www.sciencedirect.com/science/article/pii/S0145213410000505
30. Cook CR, Williams KR, Guerra NG, Kim TE, Sadek S. Predictors of bullying and victimization in childhood and adolescence: A meta-analytic investigation. School psychology quarterly [Internet]. 2010 [cited 2025 Sept 13];25(2):65. Available from: https://psycnet.apa.org/fulltext/2010-14197-002.html

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31. Ariani TA, Putri AR, Firdausi FA, Aini N. Global prevalence and psychological impact of bullying among children and adolescents: a meta-analysis. Journal of Affective Disorders [Internet]. 2025 Sept 15 [cited 2025 Sept 28];385:119446. Available from: https://www.sciencedirect.com/science/article/pii/S0165032725008821
32. López-Castro L, Smith PK, Robinson S, Görzig A. Age differences in bullying victimisation and perpetration: Evidence from cross-cultural surveys. Aggression and Violent Behavior [Internet]. 2023 Nov 1 [cited 2025 Sept 28];73:101888. Available from: https://www.sciencedirect.com/science/article/pii/S1359178923000757
33. Crerand CE, Magee L. Cosmetic and Reconstructive Breast Surgery in Adolescents: Psychological, Ethical, and Legal Considerations. Semin Plast Surg [Internet]. 2013 Feb [cited 2025 Sept 28];27(1):72–8. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC3706055/
34. Arslan SC, Esin IS, Cayır A, Orbak Z, Dursun OB. The Relationship between Psychopathology, Self-esteem, Body Perception and Serum Sex Steroids in Pubertal Gynecomastia. Clin Psychopharmacol Neurosci [Internet]. 2021 Aug 31 [cited 2025 Sept 28];19(3):498–506. Available from: https://www.cpn.or.kr/journal/view.html?doi=10.9758/cpn.2021.19.3.498
35. Meral Y, Sezgin M, Özer Y. Psychological Resilience, Body Appreciation, and Associations with Anxiety and Depression in Pubertal Gynecomastia: A Case-Controlled Study. Neuropsychiatric Investigation [Internet]. 2025 July 31 [cited 2025 Sept 28];63(1):1–9. Available from: https://neuropsychiatricinvestigation.org/index.php/pub/article/view/1165
36. Kasielska A, Antoszewski B. Effect of operative treatment on psychosocial problems of men with gynaecomastia. Pol Przegl Chir. 2011 Nov;83(11):614–21.

Table 1. Demographic and Clinical Characteristics of Study Participants

Characteristic	**Gynecomastia Group (n=78)**	**Control Group (n=77)**	**p-value**
Age, years	14.13 ± 1.87	13.97 ± 1.82	0.661
Grade Level, n (%)			0.797
Primary school	1 (1.3)	2 (2.6)	
Middle school	36 (46.2)	37 (48.1)	
High school	41 (52.6)	38 (49.4)	
Weight SDS	1.07 ± 1.54	0.14 ± 1.09	**0.001***
Height SDS	0.42 ± 1.26	0.07 ± 1.26	0.123
BMI SDS	1.01 ± 1.34	0.16 ± 0.93	**0.001***
Pubertal Stage			0.975
Stage 2	10 (12.8)	11 (14.2)	
Stage 3	20 (25.6)	19 (24.6)	
Stage 4	16 (20.5)	17 (22)	
Stage 5	32 (41.0)	30(38.9)	
Gynecomastia-Specific Characteristics			
Laterality n (%)			
Unilateral	8 (10.3)	-	-
Bilateral	70 (89.7)	-	-
Rohrich Staging n (%)			
Stage 1	12 (15.3)	-	-
Stage 2	27 (34.6)	-	-
Stage 3	24 (30.7)	-	-
Stage 4	15 (19.2)	-	-
Behavioral Modifications n (%)			
Social avoidance	34 (43.5)	-	-
Clothing preference changes	46 (58.9)	-	-
Changing room avoidance	35 (44.8)	-	-
Swimming/beach avoidance	32 (41.0)	-	-
Screen time, hours/day	4.97 ± 2.97	4.15 ± 2.75	0.061
Family Income, n (%)			0.835
Below minimum wage	16 (20.5)	14 (18.2)	
Minimum wage - 2x	42 (53.8)	47 (61.0)	
2x - 3x minimum wage	14 (17.9)	11 (14.3)	
> 3x minimum wage	6 (7.7)	5 (6.5)	

*p < 0.05; SDS: Standard Deviation Score; BMI: Body Mass Index

Table 2. Peer Victimization Patterns by Group

Victimization Type	**Gynecomastia Group (n=78)**	**Control Group (n=77)**	**p-value**
Overall victimization, n (%)	27 (34.6)	13 (16.9)	**0.012***
Victim only, n (%)	17 (21.8)	12 (15.6)	0.322
Perpetrator only, n (%)	2 (2.6)	3 (3.9)	0.639
Victim-perpetrator, n (%)	10 (12.8)	1 (1.3)	**0.005***
No involvement, n (%)	49 (62.8)	61 (79.2)	**0.025***

*p < 0.05; Chi-square test

Table 3. Psychological Measures by Group

Measure	**Gynecomastia Group (n=78)**	**Control Group (n=77)**	**p-value**
Rosenberg Self-Esteem Scale	23.40 ± 3.24	22.43 ± 3.1	0.064
RCADS Total Score	33.28 ± 25.39	33.05 ± 20.1	0.569

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RCADS Subscales			
Separation anxiety	3.17 ± 2.93	3.36 ± 2.84	0.476
Social phobia	8.72 ± 6.32	7.99 ± 5.17	0.793
Obsessive-compulsive	5.21 ± 4.33	4.84 ± 3.57	0.993
Panic disorder	4.12 ± 5.02	4.31 ± 4.59	0.199
Generalized anxiety	5.40 ± 3.92	5.74 ± 3.54	0.384
Major depression	6.68 ± 6.8	6.81 ± 5.74	0.399
Data presented as mean ± standard deviation; RCADS: Revised Child Anxiety and Depression Scale; Mann-Whitney U test; *p < 0.05			

Table 4. Psychological Outcomes by Victimization Status Within Gynecomastia Group

Measure	**Victimized (n=27)**	**Non-victimized (n=51)**	**p-value**
Rosenberg Self-Esteem Scale	23.59 ± 3.14	23.29 ± 3.32	0.695
RCADS Total Score	48.70 ± 26.64	25.12 ± 19.24	**0.001***
RCADS Subscales			
Separation anxiety	3.81 ± 3.03	2.82 ± 2.85	0.124
Social phobia	11.96 ± 7.53	7.0 ± 4.84	**0.004***
Obsessive-compulsive	7.85 ± 5.18	3.80 ± 3.01	**0.001***
Panic disorder	7.15 ± 5.49	2.51 ± 3.94	**0.001***
Generalized anxiety	7.19 ± 4.44	4.45 ± 3.28	**0.006***
Major depression	10.74 ± 7.98	4.53 ± 4.94	**0.001***
Data presented as mean ± standard deviation; RCADS: Revised Child Anxiety and Depression Scale; Mann-Whitney U test; *p < 0.05			

Table 5. Logistic Regression Analysis: Predictors of Peer Victimization

Overall Sample Analysis

Variable	**β**	**OR**	**95% CI**	**p-value**
Gynecomastia diagnosis	0.967	2.631	1.076-6.436	**0.034***
Age	-0.066	0.936	0.747-1.173	0.566
BMI SDS	0.140	1.151	0.812-1.631	0.430
Self-esteem score	-0.023	0.978	0.861-1.110	0.727
RCADS total score	0.039	1.040	1.021-1.060	**0.001***

Model: $\chi^2 = 27.774$, $p = 0.001$; Nagelkerke $R^2 = 0.242$

*p < 0.05; OR: Odds Ratio; CI: Confidence Interval; BMI: Body Mass Index; SDS: Standard Deviation Score; RCADS: Revised Child Anxiety and Depression Scale

Gynecomastia Group Analysis

Variable	**β**	**OR**	**95% CI**	**p-value**
Age	-0.152	0.859	0.610-1.210	0.385
BMI SDS	0.374	1.454	0.896-2.359	0.130
Self-esteem score	0.013	1.013	0.851-1.206	0.881
RCADS total score	0.077	1.080	1.036-1.125	**0.001***
RCADS separation anxiety	-0.331	0.718	0.529-0.974	**0.033***
Clothing preference change	-0.507	0.602	0.187-1.945	0.397

Model: $\chi^2 = 23.568$, $p = 0.001$; Nagelkerke $R^2 = 0.365$

*p < 0.05; OR: Odds Ratio; CI: Confidence Interval; BMI: Body Mass Index; SDS: Standard Deviation Score; RCADS: Revised Child Anxiety and Depression Scale

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