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Original Research

Associations between adult relationships and Problematic Social Media Use across adolescent ages in Italy: Findings from the international HBSC 2021/2022 survey

Alberto Borraccino [a,*], Giacomo Lazzeri [b]

[a] Department of Clinical and Biological Sciences, University of Torino, Italy
[b] Department of Molecular and Developmental Medicine, University of Siena, Siena, Italy

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ABSTRACT

Objective: Problematic Social Media Use (PSMU) is increasingly recognised as a public health concern in adolescence. This study examined age- and sex-specific associations between health, perceived social support, and PSMU among adolescents in Tuscany, Italy
Study design: Cross-sectional, school-based survey.
Methods: Data from 3210 adolescents aged 11–17 years were drawn from the Italian 2021/2022 HBSC survey. PSMU was assessed using the Social Media Disorder Scale (≥6/9 criteria). Sex-stratified logistic regression models adjusted for age group and family affluence examined associations with health and social support indicators.
Results: Overall PSMU prevalence was 12.1%, higher in girls than boys (13.6% vs. 10.5%). Among boys, prevalence declined with age; among girls, it peaked at 15 years (16.8%). In both sexes, PSMU was inversely associated with good self-rated health (boys: OR = 0.44; girls: OR = 0.41), high wellbeing (boys: OR = 0.57; girls: OR = 0.59), and family support (boys: OR = 0.37; girls: OR = 0.63), and positively associated with weekly sleep difficulties (boys: OR = 2.22; girls: OR = 1.94) and multiple psychosomatic symptoms (boys: OR = 1.84; girls: OR = 2.90). Parental communication was inversely associated with PSMU among girls only, while peer support was inversely associated among boys.
Conclusions: PSMU co-occurred with poorer health and lower perceived social support. Family support and parent–adolescent communication were associated with lower odds of PSMU, but the cross-sectional design precludes causal interpretation. Longitudinal and intervention studies are needed to clarify directionality.

1. Introduction

Social media is now central to adolescent daily life. While moderate use may support social connection, some adolescents develop patterns characterised by compulsive use, loss of control, and persistence despite negative consequences, commonly conceptualised as Problematic Social Media Use (PSMU). PSMU differs from intensive use and reflects addiction-like symptoms such as salience, tolerance, withdrawal, conflict, and functional impairment.[1]

Recent 2021/2022 Health Behaviour in School-aged Children (HBSC) data from 44 European and Central Asian countries indicate that more than one in ten adolescents meets criteria for PSMU, with prevalence increasing from 7% in 2018 to 11% in 2022 and higher levels among girls than boys.[2] Italian HBSC data show comparable prevalence, marked sex- and age-related variation, and regional differences, supporting the relevance of sub-national analyses for public health monitoring.[3]

International evidence consistently links PSMU with poorer mental health, lower wellbeing, sleep difficulties, and somatic complaints.[4–8] Sleep difficulties are among the most robust correlates, and longitudinal studies suggest possible bidirectional relationships between PSMU and mental health, with sleep and distress-related pathways potentially involved.[9,10] At the same time, the broader social environment may be relevant. Family support has been associated with lower PSMU,[11] while

* Corresponding author. Department of Clinical and Biological Sciences - University of Turin Azienda Ospedaliero-Universitaria San Luigi Gonzaga Regione Gonzole 10, 10043, Orbassano, Torino, Italy.
E-mail addresses: alberto.borraccino@unito.it (A. Borraccino), giacomo.lazzeri@unisi.it (G. Lazzeri).

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family, peer, and school support have also been examined in Italian adolescents in relation to problematic digital behaviours.[12]

The 2021/2022 HBSC wave introduced two important developments, the inclusion of 17-year-olds for the first time[13] and data collection in a post-pandemic context marked by declining family and school support.[3] Although associations between PSMU, poorer health, and lower perceived support are widely documented internationally, updated region-specific evidence including 17-year-olds and sex- and age-stratified estimates remains limited in the Italian context.

The present analysis is guided by a relational-health perspective in which PSMU is considered part of a broader adolescent adjustment profile involving health-related difficulties and perceived relational support.[9,10] Consistently, we examine whether PSMU clusters with selected health and support indicators, accounting for age, sex, and socioeconomic position.[11,12] Causal pathways cannot be tested with the present cross-sectional design.

1.1. Study aims

The present study aimed to estimate age- and sex-specific prevalence of PSMU among adolescents in Tuscany using 2021/2022 HBSC data and examine the association between PSMU and selected health indicators and social support measures, adjusting for age group and family affluence. By focusing on a regional sample and including 17-year-olds, this study seeks to extend existing national findings and describe relational and health-related correlates of PSMU in adolescence.

2. Methods

2.1. Study design and study population

This study is a secondary analysis of the Italian 2021/2022 Health Behaviour in School-aged Children (HBSC) survey, restricted to Tuscany. HBSC is a repeated cross-sectional, school-based survey conducted in collaboration with the WHO Regional Office for Europe using a standardised international protocol.[14–16]

Schools were selected from Ministry of Education lists, and students were recruited through cluster sampling, with school class as the primary sampling unit.[15,16] The 2021/2022 Italian wave included students aged 11, 13, 15, and, for the first time, 17 years.[13] In Tuscany, 194 classes participated. Overall, 3210 adolescents provided complete or near-complete questionnaires (response rate 98.1%). Participants with three or more missing items on the Social Media Disorder Scale were excluded from PSMU analyses, in line with the validation protocol.[1,17]

2.2. Ethical approval

The HBSC survey protocol was approved by the Institutional Ethical Board of the National Institute of Health (General protocol: PRE-876/17). Participation was voluntary and anonymous, and written informed consent was obtained from parents or legal guardians prior to data collection.

2.3. Measures

2.3.1. Problematic social media use (PSMU)

PSMU was assessed using the nine-item Social Media Disorder Scale (SMDS), a validated yes/no instrument measuring DSM-like symptoms of disordered social media use over the past year.[17] Adolescents endorsing ≥6 of 9 criteria were classified as having PSMU, as originally recommended.[1] Cross-national measurement invariance of the SMDS across sex, age groups, and socioeconomic strata has been demonstrated within HBSC.[1]

2.3.2. Subjective health and wellbeing

Self-rated health was assessed with the HBSC standard item and dichotomised as good/excellent versus fair/poor.[18]

Wellbeing was measured using the Cantril Ladder (0–10), with high wellbeing defined as a score ≥6, in line with HBSC practice.[18,19]

2.3.3. Somatic and psychological symptoms

Symptoms were assessed using the HBSC Symptom Checklist (HBSC-SCL), covering eight somatic and psychological complaints experienced in the past six months.[20,21] Three dichotomous indicators were derived: (i) weekly sleep difficulties; (ii) multiple psychosomatic complaints (more than two symptoms at least weekly); and (iii) reporting at least one symptom daily.

2.3.4. Symptomatic medication use

According to available evidence on item validity,[22] medication use in the past month was assessed using HBSC items on medicines taken for headache, stomach-ache, nervousness, and difficulties in getting to sleep,[18] responses were dichotomised as any use versus none.

2.3.5. Social support

Teacher and classmate support were assessed using validated HBSC three-item scales, with mean scores dichotomised at the standard cut-off ≥2.5.[23]

Family and peer support were assessed using the four-item HBSC-adapted Multidimensional Scale of Perceived Social Support and dichotomised using the cut-off ≥5.5.[18,24] Internal consistency was good for all support scales (Cronbach's α = 0.73–0.90).

Parental communication was assessed through HBSC items on ease of talking with mother and father about things that really bother the adolescent, categorised as easy versus difficult.[18]

2.3.6. Socioeconomic status

Socioeconomic status was assessed using the validated six-item Family Affluence Scale III and categorised as low (<6), medium (7–9), and high (≥10).[25,26]

2.4. Statistical analysis

Descriptive statistics were computed as frequencies and percentages, stratified by sex and age group. Sex differences were assessed using chi-square tests, with statistical significance set at $p < 0.05$.

Associations between health indicators, social support, and PSMU were examined using sex-stratified logistic regression models. Each predictor was first entered in a separate model adjusted for age group and family affluence, run separately for boys and girls. As a sensitivity analysis, we fitted a parsimonious mutually adjusted model, stratified by sex, including age group, family affluence, weekly sleep difficulties, multiple psychosomatic symptoms, family support, and ease of talking with mother and father. Variables were selected a priori to represent key health and family-relational domains while limiting redundancy.

Results are reported as odds ratios (ORs) with 95% confidence intervals (95% CI). Class-level clustering was assessed using the intraclass correlation coefficient, which was low (ICC = 0.018; 95% CI 0.002–0.136). Multilevel models were therefore not fitted; standard errors were adjusted for clustering at the class level. All analyses were performed using Stata 14.2 (StataCorp, College Station, TX, USA) and reported according to STROBE guidelines.

3. Results

3.1. Sample characteristics and prevalence of PSMU

The study included 3210 adolescents (1507 boys; 1703 girls) aged 11–17 years. After exclusion of participants with excessive missing SMDS items (n = 180), 3030 were included in PSMU analyses. Descriptive characteristics are shown in Table 1.

Overall, 12.1% of adolescents met criteria for PSMU, with higher

Table 1
Distribution of Problematic Social Media Use (PSMU), Family Affulence Scale (FAS), health and social support indicators by age and sex group, Tuscany, Italian HBSC 2021/2022.

	11 Years (n = 877)		13 Years (n = 879)		15 Years (751)		17 Years (n = 703)		Total (n = 3210)	
	Boys %(n)*	Girls %(n)*	Boys %(n)*	Girls %(n)*	Boys %(n)*	Girls %(n)*	Boys %(n)*	Girls %(n)*	Boys %(n)*	Girls %(n)*
PSMU	15.7 (65)	14.1 (56)	10.2 (42)	14.1 (59)	7.3 (28)	16.8 (56)	7.7 (23)	9.6 (36)	10.5 (158)	13.6 (207)
FAS low	18.0 (79)	22.0 (91)	16.3 (69)	19.0 (80)	19.9 (77)	19.2 (66)	20.9 (64)	22.4 (86)	18.6 (289)	20.7 (323)
FAS medium	55.7 (244)	53.6 (222)	56.8 (241)	61.4 (259)	61.1 (237)	60.9 (209)	60.8 (186)	65.6 (252)	58.3 (908)	60.3 (942)
FAS high	26.3 (115)	24.4 (101)	26.9 (114)	19.7 (83)	19.1 (74)	19.8 (68)	18.3 (56)	12.0 (46)	23.1 (359)	19.1 (298)
Reporting Good Health	91.4 (413)	91.9 (386)	92.5 (408)	86.4 (375)	89.0 (357)	75.9 (265)	86.5 (270)	71.4 (277)	90.2 (1448)	81.9 (1303)
Reporting High Wellbeing	90.5 (410)	80.2 (337)	87.4 (387)	74.7 (324)	84.0 (335)	67.6 (236)	84.5 (262)	67.1 (261)	86.9 (1394)	72.7 (1158)
Sleep Difficulties weekly	21.2 (96)	27.5 (115)	19.6 (87)	31.6 (137)	18.2 (73)	35.3 (123)	17.5 (55)	28.8 (112)	19.3 (311)	30.6 (487)
>2 symptoms weekly	44.4 (199)	55.0 (230)	43.8 (192)	75.8 (328)	46.4 (185)	83.6 (291)	43.1 (135)	78.9 (307)	44.5 (711)	72.8 (1156)
1 symptom daily	30.8 (138)	46.2 (193)	27.8 (122)	58.9 (255)	27.8 (111)	66.7 (232)	22.4 (70)	59.1 (230)	27.6 (441)	57.3 (910)
Medication use last month	56.3 (247)	61.0 (250)	48.2 (206)	68.7 (292)	51.2 (196)	79.5 (267)	52.3 (159)	75.1 (275)	52.0 (808)	70.5 (1084)
High Teacher Support	88.9 (402)	92.1 (381)	80.7 (356)	83.1 (359)	77.1 (309)	69.6 (240)	70.1 (220)	64.9 (252)	80.1 (1287)	78.1 (1232)
High Classmate Support	94.2 (242)	91.6 (384)	90.5 (401)	77.2 (335)	91.7 (365)	80.1 (277)	89.3 (277)	83.0 (322)	91.6 (1467)	83.0 (1318)
High Family support	92.7 (416)	88.5 (369)	88.0 (388)	81.1 (351)	86.3 (340)	75.6 (264)	89.4 (278)	79.0 (304)	89.2 (1422)	81.3 (1288)
Easy talk to Mother	86.6 (389)	77.6 (326)	78.0 (343)	64.8 (282)	73.8 (293)	61.0 (213)	71.8 (222)	62.7 (244)	78.2 (1247)	66.9 (1065)
Easy talk to Father	75.4 (340)	64.1 (269)	66.3 (293)	45.5 (198)	58.7 (233)	42.0 (146)	59.6 (184)	36.0 (139)	65.7 (1050)	47.3 (752)
High Peer Support	89.9 (399)	90.6 (376)	84.7 (371)	83.1 (360)	88.3 (347)	82.5 (287)	87.1 (270)	86.6 (335)	87.5 (1387)	85.8 (1358)

Missing values by variable: Family Affluence Scale n = 91; Problematic Social Media Use n = 180; Subjective health n = 13; High Wellbeing n = 13; Weekly sleep difficulties n = 9; >2 symptoms weekly n = 24; Daily symptom reporting n = 24; Medication use last month n = 120; High family support n = 31; High peer support n = 42; High teacher support n = 25; Easy communication with mother n = 22; Easy communication with father n = 22. Variables with no missing values: High student support n = 0.
*All sex differences were statistically significant at $p < 0.001$ (chi-square test) except for FAS and Sleep difficulties signficant at $p < 0.05$.

prevalence among girls than boys (13.6% vs. 10.5%). Age patterns differed by sex: prevalence declined from 15.7% at age 11 to 7.7% at age 17 among boys, while among girls it peaked at age 15 (16.8%) and declined at age 17 (9.6%).

3.2. Health and social-support indicators

Girls reported poorer health and higher symptom burden than boys across age groups (from 91.9% to 71.4%), including more frequent sleep difficulties (30.6% vs 19.3%), multiple psychosomatic symptoms (72.8%, peeking to 83.6% at age 15), daily symptoms (57.3%), and medication use (70.5% vs 52.0%).

Perceived family support and ease of communication with parents declined with age and were consistently lower among girls, particularly for communication with fathers (47.3% girls vs. 65.7% boys). Teacher and classmate support also declined with age, while peer support remained relatively stable. Full age- and sex-stratified distributions are reported in Table 1. All sex differences were statistically significant.

3.3. Health correlates of PSMU

Age- and SES-adjusted sex-stratified logistic regression results are presented in Table 2. PSMU was inversely associated with good self-rated health in both boys (OR = 0.44, 95% CI 0.3–0.7) and girls (OR = 0.41, 95% CI 0.3–0.6), and similarly with high wellbeing (boys: OR = 0.57, 95% CI 0.4–0.9; girls: OR = 0.59, 95% CI 0.4–0.8).

Weekly sleep difficulties were associated with higher odds of PSMU in both sexes (boys: OR = 2.22, 95% CI 1.5–3.2; girls: OR = 1.94, 95% CI 1.4–2.6). Multiple psychosomatic symptoms were also associated with PSMU, with a stronger association among girls (boys: OR = 1.84, 95% CI 1.3–2.6; girls: OR = 2.90, 95% CI 1.9–4.5). Medication use was associated with PSMU among girls only (OR = 1.89, 95% CI 1.3–2.8). Age was associated with PSMU among boys only, consistent with the prevalence pattern.

3.4. Social support correlates of PSMU

Family support showed the strongest inverse association with PSMU in both sexes, particularly among boys (boys: OR = 0.37, 95% CI 0.2–0.6; girls: OR = 0.63, 95% CI 0.4–0.9). Among girls, ease of communication with both father (OR = 0.51, 95% CI 0.4–0.7) and mother (OR = 0.64, 95% CI 0.5–0.9) was associated with lower odds of PSMU; these associations were not observed among boys.

Peer support was inversely associated with PSMU among boys only (OR = 0.51, 95% CI 0.3–0.8), whereas classmate support was inversely

Table 2
Age- and SES-adjusted associations between health and social support correlates of Problematic Social Media Use (PSMU), stratified by sex, Tuscany, Italian HBSC 2021/2022.

	Boys		Girls	
	OR	95% IC	OR	95% IC
11 years old	ref.	-	ref.	-
13 years old	**0.60**	**(0.4–0.9)**	0.97	(0.6-1.4)
15 years old	**0.41**	**(0.3–0.7)**	1.23	(0.8-1.8)
17 years old	**0.41**	**(0.2–0.7)**	0.66	(0.4-1.0)
FAS low	ref.	-	ref.	-
FAS medium	0.96	(0.6-1.5)	0.95	(0.6-1.4)
FAS high	0.63	(0.4-1.1)	1.15	(0.7-1.8)
Health correlates				
Reporting Good Health	**0.44**	**(0.3–0.7)**	**0.41**	**(0.3–0.6)**
Reporting High Wellbeing	**0.57**	**(0.4–0.9)**	**0.59**	**(0.4–0.8)**
Sleep Difficulties weekly	**2.22**	**(1.5–3.2)**	**1.94**	**(1.4–2.6)**
reporting >2 symptoms weekly	**1.84**	**(1.3–2.6)**	**2.90**	**(1.9–4.5)**
reporting 1 symptom daily	**1.60**	**(1.1–2.3)**	**2.31**	**(1.7–3.2)**
Medication use last month	1.30	(0.9-1.9)	**1.89**	**(1.3–2.8)**
Social support correlates				
High Teacher Support	0.97	(0.6-1.5)	0.74	(0.5-1.1)
High Classmate Support	0.90	(0.6-1.3)	**0.58**	**(0.4–0.8)**
High Family support	**0.37**	**(0.2–0.6)**	**0.63**	**(0.4–0.9)**
Easy talk to Mother	1.04	(0.7-1.6)	**0.64**	**(0.5–0.9)**
Easy talk to Father	0.87	(0.6-1.3)	**0.51**	**(0.4–0.7)**
High Peer Support	**0.51**	**(0.3–0.8)**	0.98	(0.6-1.5)

Odds ratios and 95% confidence intervals in each row derive from a separate sex-stratified logistic regression model in which the listed predictor was entered individually. Medication use refers to symptomatic medication use in the past month. Standard errors were adjusted for clustering at the class level. Statistically significant results at $p < 0.05$ are shown in bold.
*All analyses are adjusted for age and SES, measured using the Family Affluence Scale (FAS).

associated among girls only (OR = 0.58, 95% CI 0.4–0.8). Teacher support showed no statistically significant association in either sex.

In the parsimonious mutually adjusted sensitivity model (Supplementary Table S1), sleep difficulties, multiple psychosomatic symptoms, and family support remained associated with PSMU among boys. Among girls, sleep difficulties, multiple psychosomatic symptoms, and ease of talking with the father remained associated with PSMU. Partial attenuation after mutual adjustment was consistent with overlap between health burden and family-relational indicators.

4. Discussion

4.1. Principal findings and their interpretation

In this Tuscany HBSC 2021/2022 sample, 12.1% of adolescents met criteria for PSMU, a prevalence consistent with the most recent European HBSC estimate and higher than the previous Italian HBSC figure from 2018.[2,8] The contribution of this study is to provide updated regional evidence showing that internationally documented patterns are also observed in Tuscany, including among 17-year-olds and with marked sex- and age-specific variation.

PSMU was more prevalent among girls than boys, but age patterns differed by sex: prevalence declined steadily among boys, while among girls it peaked at age 15 and declined by age 17. This pattern is consistent with international evidence showing higher PSMU prevalence among girls and with literature suggesting sex differences in motivations and patterns of social media engagement.[2,7]

Across both sexes, PSMU co-occurred with poorer self-rated health, lower wellbeing, sleep difficulties, and psychosomatic symptom burden. In parallel, perceived social support, particularly family support, showed inverse associations with PSMU, with additional sex-specific patterns for parental communication, peer support, and classmate support. These findings support the interpretation of PSMU as part of a broader health and relational vulnerability profile rather than an isolated SES dependent digital behaviour.[3]

4.2. Health correlates: clustering of burden and plausible pathways

The strongest and most consistent health correlates of PSMU involved sleep difficulties and psychosomatic symptom burden. This clustering is coherent with international evidence linking PSMU with sleep disruption, lower wellbeing, and health complaints.[4,6,8] The cross-sectional design cannot establish directionality, but three evidence-informed pathways may help interpret these associations.

First, sleep-related disruption may link PSMU with poorer health, as problematic use has been consistently associated with sleep difficulties across countries.[5,6] Second, distress-related or compensatory use may contribute to the co-occurrence of PSMU with lower wellbeing and psychosomatic symptoms, consistent with compensatory internet-use models and longitudinal evidence on bidirectional associations.[9,10,27] Third, lower family and social support may reflect a relational vulnerability context associated with problematic patterns of use.[11,12] These pathways are plausible explanations rather than causal mechanisms tested here.

The stronger association between PSMU and psychosomatic symptoms among girls may reflect higher baseline symptom prevalence and closer clustering between PSMU and internalising vulnerability.[7] This does not imply that PSMU is more harmful in girls but suggests that PSMU among girls may be more tightly embedded within psychosomatic distress profiles.

4.3. Adult support and PSMU: associations beyond general family climate

Among social factors, family support showed the strongest inverse association with PSMU in both sexes, particularly among boys. This is consistent with studies reporting inverse associations between family support and problematic digital behaviours.[11,12] In the mutually adjusted sensitivity model, family support remained associated with PSMU among boys, while among girls the association was attenuated after accounting for health burden and parental communication. This suggests overlap between family support, health difficulties, and relational communication, rather than evidence that family support is unrelated to PSMU among girls.

Parental communication showed a sex-specific pattern. Among girls, ease of talking with both parents was associated with lower odds of PSMU in the main models, while father communication remained associated in the mutually adjusted model. This may indicate that the accessibility of specific parental figures captures a relational dimension not fully represented by general family support.[28,29] Given the cross-sectional design, however, these findings should be interpreted as associations and require longitudinal confirmation.

Peer support was inversely associated with PSMU among boys only, whereas classmate support was inversely associated among girls only. Teacher support showed no significant association. These findings suggest that family, peer, and school relational domains may be differently linked with PSMU by sex, but do not establish whether relational support reduces PSMU or whether PSMU affects perceived relationships.[2,30]

4.4. Public health implications

The findings add regional evidence that PSMU clusters with adolescent health and relational vulnerabilities. For public health monitoring, PSMU should therefore be considered alongside sleep difficulties, psychosomatic symptoms, family support, and parent–adolescent communication, rather than only as a screen-use behaviour. The observed sex- and age-specific patterns suggest that prevention-oriented research and intervention planning should consider developmental timing and sex-specific relational profiles.

These implications remain hypothesis-generating. Longitudinal and intervention studies are needed to clarify directionality and assess whether changes in relational support or health burden are followed by changes in PSMU.

4.5. Strengths and limitations

This study used standardised HBSC methodology and validated instruments, including the SMDS with documented measurement invariance.[1] It provides sex-stratified regional estimates and includes 17-year-olds, extending previous Italian analyses limited to younger age groups.[13]

Several limitations should be considered. First, the cross-sectional design precludes causal inference and temporal ordering; associations may be bidirectional or reflect shared vulnerability. Second, all measures were self-reported, increasing the possibility of shared method variance and reporting bias. Some continuous or ordinal variables were dichotomised using standard HBSC cut-offs to ensure comparability, but this may reduce statistical power and obscure dose–response associations. Third, the primary models examined each indicator separately, adjusted for age group and family affluence. A parsimonious mutually adjusted sensitivity model was added, but it should not be interpreted as evidence of independent causal effects because attenuation may reflect shared variance between health burden and relational vulnerability. Fourth, the Tuscany-specific sample may limit generalisability to other Italian regions. Finally, 180 participants (5.6%) were excluded from PSMU analyses because of excessive missing SMDS items. Although exclusions were limited, missingness was higher among boys, younger adolescents, and those with low FAS; selection bias therefore cannot be excluded.

4.6. Conclusions

PSMU affected approximately one in eight adolescents in Tuscany

and showed marked sex- and age-specific patterns. It co-occurred with poorer health, sleep difficulties, psychosomatic symptoms, and lower perceived support, particularly family support. These findings suggest that PSMU may be better understood within a broader cluster of adolescent health and relational vulnerabilities than as an isolated digital behaviour. Future research should extend this analysis to the full Italian HBSC 2022 sample and use longitudinal or intervention designs to clarify temporal pathways and potential intervention targets.

Author contributions

A.B. and G.L.: Conceptualisation. A.B.: Data curation, methodology, formal analysis. A.B., G.L.: Writing, editing and validation.

Data availability statement

The datasets generated and/or analysed during the current study are available from the corresponding author upon reasonable request.

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Declaration of competing interest

The authors declare no conflict of interest.

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This study was conducted and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.

Claude (Anthropic) was used to support final text editing. All scientific content regarding the manuscript was made exclusively by the authors, who take full responsibility for its integrity and accuracy.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2026.106361.

References

1. Boer M, van den Eijnden RJ, Finkenauer C, et al. Cross-national validation of the social media disorder scale: findings from adolescents from 44 countries. *Addiction*. 2022;117:784–795.
2. Boniel-Nissim M, Marino C, Galeotti T, et al. *A Focus on Adolescent Social Media Use and Gaming in Europe, Central Asia and Canada*. Copenhagen, Denmark: WHO Regional Office for Europe; 2024. https://www.hbsc.org/publications/reports/a-focus-on-adolescent-social-media-use-and-gaming-in-europe-central-asia-and-canada/.
3. Galeotti T, Marino C, Canale N, et al. La Sorveglianza HBSC-Italia 2022 Health Behaviour in School-aged Children: le tecnologie digitali negli adolescenti. *Notiziario dell'Istituto Superiore di Sanità*. 2023;36. https://www.iss.it/-/la-sorveglianza-hbsc-italia-2022-health-behaviour-in-school-aged-children-le-tecnologie-digitali-negli-adolescenti-supplemento-1-al-n-12-volume-36-2023-del-notiziario-dell-iss. Accessed March 15, 2026.
4. Behera N, Khuntia S, Pandey K, et al. Impact of social media use on physical, mental, social, and emotional health, sleep quality, body image, and mood: evidence from 21 Countries—A systematic literature review with narrative synthesis. *Int J Behav Med*. November 2025. https://doi.org/10.1007/s12529-025-10411-9. Epub ahead of print 24.
5. Boer M, Van Den Eijnden RJ, Boniel-Nissim M, et al. Adolescents' intense and problematic social media use and their well-being in 29 countries. *J Adolesc Health*. 2020;66:S89–S99.
6. Khan A, Thomas G, Karatela S, et al. Intense and problematic social media use and sleep difficulties of adolescents in 40 countries. *J Adolesc*. 2024;96:1116–1125.
7. Poli S, Salerno L, Delvecchio E, et al. Problematic social media use in mid-adolescents: a systematic review of intrapersonal and interpersonal protective/risk factors and psychosocial interventions. *Curr Addict Rep*. 2025;12:81.
8. Marino C, Lenzi M, Canale N, et al. Problematic social media use: associations with health complaints among adolescents. *Ann Ist Super Sanita*. 2020;56:514–521.
9. Pazdur M, Tutus D, Haag A-C. Risk factors for problematic social media use in youth: a systematic review of longitudinal studies. *Adolescent Res Rev*. 2025;10:237–253.
10. Todorovic L, Bozhar H, De Rooij SR, et al. Bidirectional associations of problematic social media use and problematic gaming with mental health difficulties and strengths in adolescents: sex and social support as potential moderators. *J Res Adolesc*. 2025;35, e70076.
11. Lin S, Yuan Z, Niu G, et al. Family matters more than friends on problematic social media use among adolescents: mediating roles of resilience and loneliness. *Int J Ment Health Addiction*. 2024;22:2907–2925.
12. Borraccino A, Marengo N, Dalmasso P, et al. Problematic social media use and cyber aggression in Italian adolescents: the remarkable role of social support. *IJERPH*. 2022;19:9763.
13. Pierannunzio D, Ciardullo S, Berchialla P, et al. The HBSC - italy 2022 - health behavior in school-aged children surveillance: the description of the sample and the family context among adolescents aged 11, 13, 15 and 17, 36 (suppl 1 https://www.iss.it/-/la-sorveglianza-hbsc-italia-2022-health-behaviour-in-school-aged-children-la-descrizione-del-campione-e-del-contesto-familiare-dei-ragazzi-e-delle-ragazze-di-11-13-15-e-17-anni; 2023.
14. Findings from the 2017/2018 health behaviour in school-aged children (HBSC) survey in Europe and Canada. In: Inchley J, Currie D, Budisavljevic S, et al., eds. *Spotlight on Adolescent Health and well-being*. Copenhagen, Denmark: WHO Regional Office for Europe; 2020:. International Report Volume 2. Key Data.
15. Roberts C, Freeman J, Samdal O, et al. The health behaviour in school-aged children (HBSC) study: methodological developments and current tensions. *Int J Publ Health*. 2009;54:140–150.
16. Lazzeri G, Vieno A, Charrier L, et al. The methodology of the Italian health behaviour in School-aged children (HBSC) 2018 study and its development for the next round. *J Prev Med Hyg*. 2022;62:E926–E933.
17. van den Eijnden RJJM, Lemmens JS, Valkenburg PM. The social media disorder scale. *Comput Hum Behav*. 2016;61:478–487.
18. Inchley J, Currie D, Taryn Y, et al. *Growing up Unequal: Gender and Socioeconomic Differences in Young People's Health and well-being. Copenaghen*. World Health Organization; 2016. https://www.who.int/europe/publications/i/item/9789289051361. Accessed May 10, 2026.
19. Levin KA, Currie C. Reliability and validity of an adapted version of the Cantril Ladder for use with adolescent samples. *Soc Indic Res*. 2014;119:1047–1063.
20. Haugland S, Wold B. Subjective health complaints in adolescence—reliability and validity of survey methods. *J Adolesc*. 2001;24:611–624.
21. Ravens-Sieberer U, Auquier P, Erhart M, et al. The KIDSCREEN-27 quality of life measure for children and adolescents: psychometric results from a cross-cultural survey in 13 European countries. *Qual Life Res*. 2007;16:1347–1356.
22. Andersen A, Krølner R, Currie C, et al. High agreement on family affluence between children's and parents' reports: international study of 11-year-old children. *J Epidemiol Community Health*. 2008;62:1092–1094.
23. Torsheim T, Wold B, Samdal O. The teacher and classmate support scale factor structure, test-retest reliability and validity in samples of 13-and 15-Year-Old adolescents. *Sch Psychol Int*. 2000;21:195–212.
24. Zimet GD, Dahlem NW, Zimet SG, et al. The multidimensional scale of perceived social support. *J Pers Assess*. 1988;52:30–41.
25. Hartley JEK, Levin K, Currie C. A new version of the HBSC family affluence Scale - FAS III: Scottish Qualitative findings from the international FAS development Study. *Child Ind Res*. 2016;9:233–245.
26. Dalmasso P, Borraccino A, Lazzeri G, et al. Being a young migrant in Italy: the effect of perceived social support in adolescence. *J Immigr Minority Health*. 2018;20:1044–1052.
27. Kardefelt-Winther D. A conceptual and methodological critique of internet addiction research: towards a model of compensatory internet use. *Comput Hum Behav*. 2014;31:351–354.
28. Frederick J, Spratt T, Devaney J. Supportive relationships with trusted adults for children and young people who have experienced adversities: implications for social work service provision. *Br J Soc Work*. 2023;53:3129–3145.
29. Vossen HG, Van Den Eijnden RJ, Visser I, et al. Parenting and problematic social media use: a systematic review. *Current Addiction Reports*. 2024;11:511–527.
30. Valkenburg PM, Peter J. The differential susceptibility to media effects model. *J Commun*. 2013;63:221–243.