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Determinants of Emotional Intelligence and its Association with Psychological Well-Being among mid-adolescents in southern India: a Cross-Sectional study

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Abstract

Background

Adolescence is the developmental window in which emotional competencies are established, and adolescent mental health is a stated priority of India's Rashtriya Kishor Swasthya Karyakram (RKSK) and the School Health and Wellness Programme. Emotional intelligence (EI) is potentially modifiable, but data on which Indian adolescents have lower EI, and on how EI relates to psychological well-being (PWB), remain scarce. We assessed the distribution of EI among school-going mid-adolescents in a tier-II Indian city, its correlates, and its relationship with PWB.

Methods

Between June 2024 and December 2025, 2,040 adolescents aged 14–17 years in classes IX-XII in Mysuru city, Karnataka, India, were surveyed in a school-based cross-sectional study using multistage sampling. Instruments were a pre-tested semi-structured questionnaire, the 33-item Schutte Self-Report Emotional Intelligence Test and the 18-item Ryff Psychological Well-being Scale. EI was categorized operationally as low (< 111), normal (111–137) and high (> 137); PWB as low, moderate or high. Analyses used chi-square tests, Spearman's rank correlation and ordinal logistic regression, reporting adjusted odds ratios (AOR) with 95% confidence intervals (CI). Reporting followed the STROBE statement.

Results

EI was normal in 1,281 participants (62.8%), low in 550 (27.0%) and high in 209 (10.2%) (median 121, IQR 109–130); 1,842 (90.3%) had moderate PWB (median 82, IQR 75–90). EI correlated positively but weakly with PWB (Spearman's $\rho = 0.212$; $p < 0.001$). After simultaneous adjustment, lower odds of higher EI were observed for male sex (AOR 0.45; 95% CI 0.36–0.57), government schooling (0.36; 0.24–0.56), rural residence (0.70; 0.52–0.93) and poor academic performance (0.33; 0.18–0.62), and higher odds for nuclear family type (1.65; 1.06–2.57), extracurricular participation (1.44; 1.16–1.78), any physical activity (regular 1.56; 1.16–2.11) and an excellent family relationship (2.69; 1.26–5.72).

Conclusions

Emotional competency was socially patterned by school type, place of residence, family environment and participation in structured activities rather than randomly distributed. Its association with psychological well-being was positive but weak, and the cross-sectional design precludes inference about direction. Government-school students, rural residents, boys and adolescents without extracurricular or physical activity are identifiable priority groups for social and emotional learning under the School Health and Wellness Programme and RKSK.

Background

Adolescence, defined by the World Health Organization as the period between 10 and 19 years of age, is a stage of rapid biological, cognitive, emotional and social transition that establishes the foundation for lifelong health, educational achievement and psychosocial functioning [1, 2]. Although adolescents constitute approximately one-sixth of the global population, they continue to carry a substantial burden of mental health problems, with an estimated one in seven experiencing a diagnosable mental health condition [1, 3]. Promoting positive mental health during adolescence has therefore become a global public health priority.

Public health approaches to adolescent mental health have increasingly shifted from a disease-oriented model towards a strengths-based model that focuses psychological assets promoting resilience and adaptive functioning. Within this framework, emotional intelligence (EI) has emerged as a determinant of adolescent mental health. Originally conceptualised by Salovey and Mayer as the ability to perceive, understand, regulate and utilize emotions effectively, EI enables individuals to manage emotional experiences, develop healthy interpersonal relationships and respond adaptively to environmental challenges [4]. Subsequent models, including those proposed by Goleman and by Petrides and Furnham, expanded the concept to encompass emotional competencies and trait-based emotional self-perceptions that influence academic performance, social functioning and psychological adjustment [5, 6].

Adolescence is a particularly important period for the development of EI, because maturation of cognitive control, emotional regulation and social competence occurs alongside increasing academic demands, peer influence, identity formation and exposure to psychosocial stressors. Adolescents with higher EI generally demonstrate greater resilience, adaptive coping and problem-solving ability, and lower levels of emotional distress and behavioral problems [7, 8]. Alongside EI, psychological well-being (PWB) has become a central construct in mental health research. Unlike measures that focus on the absence of mental illness, PWB reflects optimal psychological functioning. Ryff's multidimensional model conceptualizes PWB across six domains: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance [9].

Systematic reviews and meta-analyses have established a positive association between EI and well-being in adolescents across settings [10–12]. What remains poorly characterized, particularly in low- and middle-income settings, is the social patterning of EI, which groups of adolescents have lower emotional competency, and whether those groups are reachable through existing school health platforms. Most available evidence originates from high-income countries, and Indian studies have largely been conducted in metropolitan centres, using small samples and heterogeneous instruments [13].

India has the largest adolescent population globally [14]. The Government of India's Rashtriya Kishor Swasthya Karyakram (RKSK) identifies mental health as one of its six strategic pillars and delivers services through Adolescent Friendly Health Clinics and the Saathiya peer-educator program, while the School Health and Wellness Programme under Ayushman Bharat provides a national platform for life-

skills and social and emotional learning within schools [15]. Both programs require evidence on which adolescent subgroups to prioritize. Mysuru, a tier-II city undergoing rapid sociodemographic transition and containing government, private-aided and private-unaided schools operating in both English and Kannada medium, offers a setting in which such gradients can be examined within a single urban education system.

Against this background, the present study was undertaken to (i) estimate the distribution of emotional intelligence and psychological well-being among school-going mid-adolescents in Mysuru city, (ii) identify the sociodemographic, lifestyle and psychosocial factors associated with emotional intelligence, and (iii) examine the association between emotional intelligence and psychological well-being.

Materials and Methods

Study design and setting

A school-based cross-sectional study was conducted among mid-adolescents aged 14–17 years studying in higher secondary schools in Mysuru city, Karnataka, India. Mysuru district covers approximately 6854 km² and had a population of 3001127 at the 2011 Census, of whom 1014227 resided in Mysuru city. The study was conducted between June 2024 and December 2025. The extended field period reflects the need to schedule data collection around school academic and examination calendars across successive academic years. Permission was obtained from the Deputy Director of Public Instruction (DDPI), Mysuru, and from the authorities of each participating school.

Participants

Adolescents aged 14–17 years enrolled in classes IX-XII of selected schools in Mysuru city were eligible.

- *Inclusion criteria*: students aged 14–17 years; enrolled in classes IX-XII; written informed consent from a parent or guardian and written assent from the student.
- *Exclusion criteria*: students below 14 or above 17 years of age; students with known learning disabilities or psychiatric illness; students absent on the day of the school visit or unwilling to provide assent; incompletely filled questionnaires.

Sample size

The sample size was estimated using the formula for estimating a population mean,

$$n = \frac{Z^2 \sigma^2}{d^2}$$

where Z = 1.96 for a 95% confidence level, σ = 16.42 (the standard deviation of the emotional intelligence score reported by Kulkarni and Velhal among Indian mid-to-late adolescents) [16], and d = 0.75 (absolute precision). The calculated sample size was 1,842. After adding a 10% allowance for non-response, the required sample size was 2026, which was rounded to 2040 participants. The calculation was performed for the estimation of a mean emotional intelligence score.

Sampling technique

A multistage sampling technique was employed. In stage 1, a sampling frame of 40 higher secondary schools (classes IX-XII) located within Mysuru city was constructed by purposive selection from the 782 schools in Mysuru district, using the school list obtained from the Department of Public Instruction. In stage 2, one school was selected from this sampling frame by simple random sampling. In stage 3, one section each from classes IX, X, XI and XII was selected within the school by simple random sampling, and all eligible students present on the day of the survey were invited to participate. In stage 4, subsequent schools were selected from the same sampling frame by simple random sampling and the procedure repeated until the required sample size was reached. All analyses were complete-case analyses. Questionnaires were checked for completeness at the time of collection and incomplete forms were excluded before data entry.

Study instruments

Data were collected using a pre-tested, self-administered questionnaire in three parts. All three parts were administered in either Kannada or English as required by the participants.

Part 1: Sociodemographic, lifestyle and psychosocial profile. A pre-validated semi-structured questionnaire was used to record age, sex, class, type of school, syllabus, medium of instruction, religion, type and place of residence, family type, parental survival, parental education and occupation, number of siblings, birth order, socioeconomic status, participation in extracurricular activities, substance use, screen time, sleep duration, dietary pattern, physical activity, perceived relationships with family, teachers and peers, perceived health status, academic satisfaction and recent academic performance.

Part 2: Emotional intelligence. EI was assessed using the 33-item Schutte Self-Report Emotional Intelligence Test (SSEIT), which covers appraisal and expression of emotion (13 items), regulation of emotion (10 items) and utilisation of emotion (10 items). Each item is scored on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), giving total scores from 33 to 165, with higher scores indicating greater emotional intelligence [17]. The instrument showed good internal consistency in the present sample (Cronbach's α = 0.847).

Part 3: Psychological well-being. PWB was assessed using the 18-item Ryff Psychological Well-being Scale, which evaluates six domains (autonomy, environmental mastery, personal growth, positive

relations with others, purpose in life and self-acceptance) with three items each. Responses were recorded on a seven-point Likert scale, with reverse scoring applied to items 1, 2, 3, 8, 9, 11, 12, 13, 17 and 18. Domain scores range from 3 to 21 and the total score from 18 to 126, with higher scores indicating better psychological well-being [9, 18]. The instrument showed good internal consistency in the present sample (Cronbach's α = 0.802).

Variables and operational definitions

The outcome variable was emotional intelligence. Independent variables comprised sociodemographic characteristics, family and socioeconomic characteristics, lifestyle behaviors, psychosocial characteristics, academic variables and psychological well-being.

Emotional intelligence

The published normative mean of the SSEIT across large samples is approximately 124 with a standard deviation of approximately 13. Applying a cut-off of approximately one standard deviation on either side of this normative mean, EI was categorized a priori as low (< 111), normal (111–137) and high (> 137) [17, 19].

Psychological well-being. Domain scores were categorized as low (3–7), moderate (8–13) and high (14–21). For the overall score, well-being was conceptualized as a spectrum, with scores in the lowest quartile of the possible score range taken as low and scores in the upper quartile taken as high. The total score (range 18–126) was therefore categorized as low (≤ 54), moderate (55–99) and high (≥ 100) [18].

Socioeconomic status

Classified using the Modified B.G. Prasad Socioeconomic Classification updated to January 2025, based on per-capita monthly family income, into upper, upper middle, middle, lower middle and lower classes [20].

Physical activity

Engagement in moderate-to-vigorous physical activity during a typical week, categorized as regular (daily or most days of the week), occasional (3–4 days/week), rare (< 1 day/week) or no activity, consistent with the WHO 2020 guidelines on physical activity and sedentary behavior [21].

Screen time

Average daily duration of use of television, mobile phone, laptop or computer for academic and non-academic purposes, categorised as < 1, 1–2, 2–4, 4–6 and > 6 hours per day.

Sleep duration. Average number of hours slept per day, categorised as > 7, 6–7, 5–6 and < 5 hours.

Family type

Nuclear (a married couple and their dependent unmarried children), joint (several married couples related through the male line, sharing a common kitchen) and three-generation (a young couple living with their parents and their own children).

Recent academic performance

Percentage of marks obtained in the most recent school examination, categorized as poor (< 50%), average (50–69%), good (70–84%) and excellent (≥ 85%).

Data collection

Following approval from the Institutional Ethics Committee (approval number JSS/MC/PG/2324/2023-24) and permissions from educational authorities, written informed consent was obtained from parents or guardians and written assent from students. Data were collected during school hours in classroom settings under the supervision of the investigator. Participants completed the questionnaires without recording identifying information, and completed forms were checked for completeness before data entry. Confidentiality was maintained throughout.

Statistical analysis

Data were entered in Microsoft Excel and analyzed using IBM SPSS Statistics version 28 (IBM Corp., Armonk, NY, USA). Normality was assessed using the Kolmogorov-Smirnov test. As the emotional intelligence and psychological well-being scores were not normally distributed ($p < 0.001$), continuous variables are summarized as median and interquartile range (IQR) and categorical variables as frequencies and percentages. Associations between emotional intelligence categories and independent variables were assessed using the chi-square test or Fisher's exact test where expected cell counts were small. The relationship between total emotional intelligence and total psychological well-being scores was assessed using Spearman's rank correlation coefficient.

Ordinal logistic regression using the cumulative logit model was used to identify independent predictors of emotional intelligence (low, normal, high). All variables listed under "Variables and operational definitions" were entered simultaneously into a single model. No stepwise selection was applied. Adjusted odds ratios (AOR) with 95% confidence intervals were obtained by exponentiating the regression coefficients and their confidence limits. Significant predictors are presented in Table 7 and the complete model, including all non-significant terms, in Additional file. A p value < 0.05 was considered statistically significant.

Results

Sociodemographic characteristics

Among the 2040 adolescents who participated, the largest group was aged 15 years (736; 36.1%), and the mean age was 15.15 ± 1.05 years. Females accounted for 1402 participants (68.7%). Classes IX to XII were equally represented (510 participants; 25.0% each). Most participants attended private-unaided schools (1277; 62.6%), studied under the State syllabus (1634; 80.1%) and received instruction in English (1626; 79.7%). Hindus constituted 1052 participants (51.6%), 1767 (86.6%) resided in urban areas and 1549 (75.9%) belonged to nuclear families. Both parents were alive for 1978 participants (97.0%) (Table 1).

Table 1
Sociodemographic characteristics of the study participants (N = 2040)

Variable	Category	n	%
Age (years)	14	664	32.5
	15	736	36.1
	16	313	15.3
	17	327	16.1
Sex	Male	638	31.3
	Female	1402	68.7
Class	IX	510	25.0
	X	510	25.0
	XI	510	25.0
	XII	510	25.0
Type of school	Government	135	6.6
	Private unaided	1277	62.6
	Private aided	628	30.8
Syllabus	State	1634	80.1
	CBSE	406	19.9
Medium of instruction	English	1626	79.7
	Kannada	414	20.3
Religion	Hindu	1052	51.6
	Muslim	826	40.5
	Christian	159	7.8
	Others	3	0.1
Type of residence	Own house	1964	96.3
	Hostel	70	3.4
	Living with others	6	0.3
Place of residence	Urban	1767	86.6
	Rural	273	13.4

Variable	Category	n	%
Family type	Nuclear	1549	75.9
	Joint	391	19.2
	Three-generation	100	4.9
History of parental death	None	1978	97.0
	Father deceased	58	2.8
	Mother deceased	4	0.2

Family and socioeconomic characteristics

Most parents had completed high school education. Fathers were predominantly engaged in skilled occupations or professional work, while 1244 mothers (61.0%) were homemakers or unemployed. Nearly half of the participants had one sibling (876; 42.9%), 1098 (53.8%) were first-born, and 1579 (77.4%) were classified as belonging to the upper socioeconomic class by the Modified B.G. Prasad scale (Table 2).

Table 2
Family and socioeconomic characteristics of the study participants (N = 2040)

Variable	Category	n	%
Father's education	Illiterate	60	3.0
	Primary	147	7.3
	Middle school	301	14.6
	High school	767	37.6
	Intermediate/Diploma	364	17.8
	Graduate	338	16.6
	Postgraduate	63	3.1
Mother's education	Illiterate	49	2.4
	Primary	74	3.6
	Middle school	253	12.4
	High school	815	40.0
	Intermediate/Diploma	436	21.4
	Graduate	339	16.6
	Postgraduate	74	3.6
Father's occupation	Unemployed	15	0.7
	Semi-skilled	203	10.0
	Shop/clerk/farmer	315	15.4
	Skilled	783	38.4
	Professional	724	35.5
Mother's occupation	Unemployed/homemaker	1244	61.0
	Semi-skilled	112	5.5
	Shop/clerk/farmer	98	4.8
	Skilled	420	20.6
	Professional	166	8.1
Number of siblings	None	136	6.7
	One	876	42.9

Variable	Category	n	%
	Two	569	27.9
	Three	267	13.1
	Four	141	6.9
	More than four	51	2.5
Birth order	First	1098	53.8
	Second	701	34.4
	Third or later	241	11.8
Socioeconomic status	Upper	1579	77.4
	Upper middle	297	14.6
	Middle	84	4.1
	Lower middle	75	3.7
	Lower	5	0.2

Lifestyle and psychosocial characteristics

Most adolescents participated in extracurricular activities (1435; 70.3%), reported sleeping more than 7 hours per day (1156; 56.6%) and reported 2–4 hours of daily screen time (984; 48.2%). Reported substance use was low, with fewer than 2% reporting alcohol consumption, smoking or tobacco chewing. A mixed diet was reported by 1775 participants (87.0%), whereas regular physical activity was reported by only 383 (18.8%). Most participants reported positive relationships with family, teachers and peers, perceived their health as very good (1277; 62.6%), and were satisfied with their academic performance (1051; 51.5%) (Table 3).

Table 3
Lifestyle and psychosocial characteristics of the study participants (N = 2040)

Variable	Category	n	%
Extracurricular activities	Yes	1435	70.3
	No	605	29.7
Alcohol consumption	Yes	23	1.1
	No	2017	98.9
Smoking	Yes	23	1.1
	No	2017	98.9
Tobacco chewing	Yes	17	0.8
	No	2023	99.2
Sleep duration	> 7 hours	1156	56.6
	6–7 hours	841	41.2
	5–6 hours	38	1.9
	< 5 hours	5	0.2
Screen time/day	< 1 hour	185	9.1
	1–2 hours	725	35.5
	2–4 hours	984	48.2
	4–6 hours	140	6.9
	> 6 hours	6	0.3
Dietary pattern	Vegetarian	265	13.0
	Mixed	1775	87.0
Physical activity	Regular	383	18.8
	Occasional	416	20.4
	Rare	743	36.4
	No activity	498	24.4
Relationship with family	Excellent	1248	61.2
	Good	668	32.7
	Fair	90	4.4

Variable	Category	n	%
	Poor	34	1.7
Relationship with teachers	Excellent	870	42.6
	Good	1047	51.3
	Fair	101	5.0
	Poor	22	1.1
Relationship with friends and peers	Excellent	1248	61.2
	Good	657	32.2
	Fair	107	5.2
	Poor	28	1.4
Perceived health status	Very good	1277	62.6
	Satisfactory	709	34.8
	Unsatisfactory	54	2.6
Academic satisfaction	Satisfied	1051	51.5
	Neutral	775	38.0
	Unsatisfied	214	10.5
Recent academic performance	Poor (< 50%)	53	2.6
	Average (50–69%)	484	23.7
	Good (70–84%)	877	43.0
	Excellent (≥ 85%)	626	30.7

Emotional intelligence and psychological well-being

The median emotional intelligence score was 121 (IQR 109–130). Applying the pre-specified cut-offs, 1281 participants (62.8%) had normal emotional intelligence, 550 (27.0%) low emotional intelligence and 209 (10.2%) high emotional intelligence (Fig. 1).

The median psychological well-being score was 82 (IQR 75–90). A large majority (1842; 90.3%) were categorized as having moderate psychological well-being, whereas 179 (8.8%) had high and 19 (0.9%) had low psychological well-being (Fig. 1).

Association of sociodemographic characteristics with emotional intelligence

Emotional intelligence was significantly associated with age, sex, class, type of school, medium of instruction, religion, place of residence, type of residence and family type (all $p < 0.05$). Low emotional intelligence was most frequent among male participants (41.4%), government-school students (50.4%), Kannada-medium students (39.4%), rural residents (35.9%) and adolescents from three-generation families (39.0%). History of parental death, father's education, father's occupation, number of siblings and birth order were not significantly associated with emotional intelligence (Table 4)

Table 4
Association of sociodemographic characteristics with emotional intelligence (N = 2040)

Variable	Category	Low EI, n (%)	Normal EI, n (%)	High EI, n (%)	χ^2/Fisher's exact	p value
Age (years)	14	185 (27.9)	403 (60.7)	76 (11.4)	17.57	0.007
	15	211 (28.7)	447 (60.7)	78 (10.6)		
	16	74 (23.6)	223 (71.2)	16 (5.1)		
	17	80 (24.5)	208 (63.6)	39 (11.9)		
Sex	Male	264 (41.4)	320 (50.2)	54 (8.5)	98.07	< 0.001
	Female	286 (20.4)	961 (68.5)	155 (11.1)		
Class	IX	172 (33.7)	298 (58.4)	40 (7.8)	30.92	< 0.001
	X	143 (28.0)	305 (59.8)	62 (12.2)		
	XI	136 (26.7)	321 (62.9)	53 (10.4)		
	XII	99 (19.4)	357 (70.0)	54 (10.6)		
Type of school	Government	68 (50.4)	60 (44.4)	7 (5.2)	43.89	< 0.001
	Private unaided	339 (26.5)	803 (62.9)	135 (10.6)		
	Private aided	143 (22.8)	418 (66.6)	67 (10.7)		
Syllabus	State	439 (26.9)	1025 (62.7)	170 (10.4)	0.235	0.889
	CBSE	111 (27.3)	256 (63.1)	39 (9.6)		
Medium of instruction	English	387 (23.8)	1087 (66.9)	152 (9.3)	56.97	< 0.001
	Kannada	163 (39.4)	194 (46.9)	57 (13.8)		

Variable	Category	Low EI, n (%)	Normal EI, n (%)	High EI, n (%)	χ^2/Fisher's exact	p value
Religion	Hindu	302 (28.7)	632 (60.1)	118 (11.2)	13.07	0.042
	Muslim	210 (25.4)	546 (66.1)	70 (8.5)		
	Christian	36 (22.6)	102 (64.2)	21 (13.2)		
	Others	2 (66.7)	1 (33.3)	0 (0.0)		
Place of residence	Rural	98 (35.9)	154 (56.4)	21 (7.7)	13.39	0.001
	Urban	452 (25.6)	1127 (63.8)	188 (10.6)		
Type of residence	Own house	532 (27.1)	1240 (63.1)	192 (9.8)	16.19	0.003
	Hostel	16 (22.9)	37 (52.9)	17 (24.3)		
	Living with others	2 (33.3)	4 (66.7)	0 (0.0)		
Family type	Nuclear	387 (25.0)	989 (63.8)	173 (11.2)	18.01	0.001
	Joint	124 (31.7)	237 (60.6)	30 (7.7)		
	Three-generation	39 (39.0)	55 (55.0)	6 (6.0)		
Extracurricular activities	Yes	344 (24.0)	931 (64.9)	160 (11.1)	23.24	< 0.001
	No	206 (34.0)	350 (57.9)	49 (8.1)		

Association of lifestyle factors with emotional intelligence

Emotional intelligence was significantly associated with smoking, screen time and physical activity. Adolescents reporting no physical activity had the highest proportion of low emotional intelligence (34.1%), and those reporting more than 6 hours of daily screen time had the highest proportion of low emotional intelligence (42.9%). Alcohol consumption, tobacco chewing, sleep duration and dietary pattern were not significantly associated with emotional intelligence (Table 5).

Table 5
Association of lifestyle factors with emotional intelligence (N = 2040)

Variable	Category	Low EI, n (%)	Normal EI, n (%)	High EI, n (%)	χ^2/Fisher's exact	p value
Alcohol consumption	Yes	7 (30.4)	14 (60.9)	2 (8.7)	0.172	0.917
	No	543 (26.9)	1267 (62.8)	207 (10.3)		
Smoking	Yes	11 (47.8)	12 (52.2)	0 (0.0)	6.557	0.038
	No	539 (26.7)	1269 (62.9)	209 (10.4)		
Tobacco chewing	Yes	6 (35.3)	7 (41.2)	4 (23.5)	4.670	0.097
	No	544 (26.9)	1274 (63.0)	205 (10.1)		
Screen time/day	< 1 hour	60 (32.1)	99 (52.9)	28 (15.0)	20.910	0.007
	1–2 hours	173 (23.9)	475 (65.5)	77 (10.6)		
	2–4 hours	282 (28.7)	606 (61.6)	96 (9.8)		
	4–6 hours	32 (23.4)	98 (71.5)	7 (5.1)		
	> 6 hours	3 (42.9)	3 (42.9)	1 (14.3)		
Sleep duration	< 5 hours	2 (40.0)	3 (60.0)	0 (0.0)	3.489	0.745
	5–6 hours	9 (23.7)	27 (71.1)	2 (5.3)		
	6–7 hours	222 (26.4)	525 (62.4)	94 (11.2)		
	> 7 hours	317 (27.4)	726 (62.8)	113 (9.8)		
Dietary pattern	Vegetarian	78 (29.4)	170 (64.2)	17 (6.4)	5.141	0.076
	Mixed	472 (26.6)	1111 (62.6)	192 (10.8)		
Physical activity	Regular	112 (29.2)	228 (59.5)	43 (11.2)	24.89	< 0.001
	Occasional	98 (23.6)	269 (64.7)	49 (11.8)		
	Rare	170 (22.9)	497 (66.9)	76 (10.2)		
	No activity	170 (34.1)	287 (57.6)	41 (8.2)		

Association of psychosocial factors and psychological well-being with emotional intelligence

Emotional intelligence was significantly associated with the quality of relationships with family, teachers and peers, perceived health status, academic performance, academic satisfaction and psychological well-being (all $p < 0.05$). The proportion with normal or high emotional intelligence rose consistently with better academic performance, from 50.9% among those with poor performance to 80.4% among those with excellent performance. Adolescents with high psychological well-being had the lowest proportion of low emotional intelligence (10.6%) and those with low psychological well-being the highest (52.6%) (Table 6).

Table 6
Association of psychosocial factors and psychological well-being with emotional intelligence (N = 2040)

Variable	Category	Low EI, n (%)	Normal EI, n (%)	High EI, n (%)	χ^2/Fisher's exact	p value
Relationship with family	Excellent	266 (21.3)	818 (65.5)	164 (13.1)	72.68	< 0.001
	Good	239 (35.8)	390 (58.4)	39 (5.8)		
	Fair	29 (32.2)	58 (64.4)	3 (3.3)		
	Poor	16 (47.1)	15 (44.1)	3 (8.8)		
Relationship with teachers	Excellent	223 (25.6)	532 (61.1)	115 (13.2)	23.93	< 0.001
	Good	283 (27.0)	674 (64.4)	90 (8.6)		
	Fair	33 (32.7)	64 (63.4)	4 (4.0)		
	Poor	11 (50.0)	11 (50.0)	0 (0.0)		
Relationship with friends and peers	Excellent	295 (23.6)	802 (64.3)	151 (12.1)	27.16	< 0.001
	Good	213 (32.4)	394 (60.0)	50 (7.6)		
	Fair	32 (29.9)	70 (65.4)	5 (4.7)		
	Poor	10 (35.7)	15 (53.6)	3 (10.7)		
Perceived health status	Very good	364 (28.5)	769 (60.2)	144 (11.3)	13.37	0.010
	Satisfactory	168 (23.7)	478 (67.4)	63 (8.9)		
	Unsatisfactory	18 (33.3)	34 (63.0)	2 (3.7)		
Academic performance	Poor (< 50%)	26 (49.1)	25 (47.2)	2 (3.8)	54.81	< 0.001
	Average (50–69%)	159 (32.9)	299 (61.8)	26 (5.4)		

Variable	Category	Low EI, n (%)	Normal EI, n (%)	High EI, n (%)	χ^2/Fisher's exact	p value
	Good (70–84%)	242 (27.6)	543 (61.9)	92 (10.5)		
	Excellent (≥ 85%)	123 (19.6)	414 (66.1)	89 (14.2)		
Academic satisfaction	Satisfied	258 (24.5)	664 (63.2)	129 (12.3)	17.00	0.002
	Neutral	219 (28.3)	495 (63.9)	61 (7.9)		
	Unsatisfied	73 (34.1)	122 (57.0)	19 (8.9)		
Psychological well-being	Low	10 (52.6)	6 (31.6)	3 (15.8)	36.38	< 0.001
	Moderate	521 (28.3)	1143 (62.1)	178 (9.7)		
	High	19 (10.6)	132 (73.7)	28 (15.6)		

Correlation between emotional intelligence and psychological well-being

A weak but statistically significant positive correlation was observed between the total psychological well-being score and the total emotional intelligence score (Spearman's $\rho = 0.212$; $p < 0.001$). The coefficient of determination ($R^2 = 0.041$) indicates that approximately 4.1% of the variation in emotional intelligence was shared with psychological well-being; considerable variability in emotional intelligence scores was observed across all levels of psychological well-being (Fig. 2).

Independent predictors of emotional intelligence

On ordinal logistic regression adjusting simultaneously for all measured variables, age, sex, class, type of school, place of residence, family type, participation in extracurricular activities, physical activity, relationship with family, academic performance and psychological well-being remained independently associated with emotional intelligence (Table 7). The complete model, including all non-significant terms, is provided in Additional file.

Male participants had 55% lower odds of belonging to a higher emotional intelligence category than females (AOR 0.45; 95% CI 0.36–0.57). Students attending government schools (AOR 0.36; 95% CI 0.24–0.56) and those residing in rural areas (AOR 0.70; 95% CI 0.52–0.93) had significantly lower odds than students in private-aided schools and urban residents respectively. Adolescents with poor (AOR 0.33; 95% CI 0.18–0.62), average (AOR 0.62; 95% CI 0.47–0.82) and good (AOR 0.73; 95% CI 0.58–0.92)

academic performance had lower odds than those with excellent performance, and adolescents with moderate psychological well-being had lower odds than those with high psychological well-being (AOR 0.56; 95% CI 0.40–0.79).

Conversely, adolescents from nuclear families (AOR 1.65; 95% CI 1.06–2.57), those participating in extracurricular activities (AOR 1.44; 95% CI 1.16–1.78) and those reporting an excellent relationship with their family (AOR 2.69; 95% CI 1.26–5.72) had higher odds of belonging to a higher emotional intelligence category. Compared with adolescents reporting no physical activity, those reporting regular (AOR 1.56; 95% CI 1.16–2.11), occasional (AOR 1.62; 95% CI 1.21–2.16) and rare (AOR 1.41; 95% CI 1.10–1.81) physical activity all had higher odds, with overlapping confidence intervals and no gradient across increasing frequency.

Age and class produced adjusted estimates in opposite directions within the same model: 14-year-olds had higher odds than 17-year-olds (AOR 1.76; 95% CI 1.19–2.58), while class IX students had lower odds than class XII students (AOR 0.39; 95% CI 0.27–0.55).

Table 7
Independent predictors of emotional intelligence: ordinal logistic regression (N = 2040)

Variable	Category	SE	AOR	95% CI	p value
Age (years)	14	0.197	1.76	1.19–2.58	0.004
	17	-	Reference	-	-
Sex	Male	0.118	0.45	0.36–0.57	< 0.001
	Female	-	Reference	-	-
Class	IX	0.185	0.39	0.27–0.55	< 0.001
	XII	-	Reference	-	-
Type of school	Government	0.218	0.36	0.24–0.56	< 0.001
	Private aided	-	Reference	-	-
Place of residence	Rural	0.146	0.70	0.52–0.93	0.013
	Urban	-	Reference	-	-
Family type	Nuclear	0.226	1.65	1.06–2.57	0.027
	Three-generation	-	Reference	-	-
Extracurricular activities	Yes	0.108	1.44	1.16–1.78	0.001
	No	-	Reference	-	-
Physical activity	Regular	0.152	1.56	1.16–2.11	0.003
	Occasional	0.148	1.62	1.21–2.16	0.001
	Rare	0.128	1.41	1.10–1.81	0.007
	No activity	-	Reference	-	-
Relationship with family	Excellent	0.385	2.69	1.26–5.72	0.010
	Poor	-	Reference	-	-
Academic performance	Poor (< 50%)	0.318	0.33	0.18–0.62	0.001
	Average (50–69%)	0.143	0.62	0.47–0.82	0.001
	Good (70–84%)	0.119	0.73	0.58–0.92	0.008
	Excellent (≥ 85%)	-	Reference	-	-
Psychological well-being	Moderate	0.174	0.56	0.40–0.79	0.001
	High	-	Reference	-	-

Discussion

In this cross-sectional study of 2040 school-going mid-adolescents in a tier-II south Indian city, emotional intelligence was normal in 62.8%, low in 27.0% and high in 10.2%, and psychological well-being was moderate in 90.3%. The principal finding is that more than one in four adolescents had low emotional intelligence, and that burden was concentrated among students in government schools, students taught in Kannada medium, rural residents, adolescents from three-generation families, those not participating in extracurricular activities, those reporting no physical activity and those with poor academic performance. These gradients persisted after simultaneous adjustment for all measured variables, indicating that emotional competency in this population is socially distributed rather than randomly distributed.

The predominance of normal emotional intelligence is consistent with reports from other Indian adolescent populations. Kulkarni and Velhal, in a study of mid-to-late adolescents in an Indian context, and Ng and Sharmila among school-going adolescents in Imphal, both reported that average emotional intelligence represents the predominant profile during adolescence [16, 22]. Suvarnamma et al similarly reported a preponderance of moderate emotional intelligence among adolescents in Tirupati [23]. Contemporary international syntheses reinforce these observations. Mancini and colleagues, in a systematic review of trait emotional intelligence and adolescent psychological well-being, and Ruíz-Ortega and Berrios-Martos, in a systematic review of emotional intelligence and well-being in adolescents, both concluded that higher emotional intelligence is consistently associated with better emotional adjustment and social functioning [11, 12].

Psychological well-being was predominantly moderate, indicating satisfactory psychological functioning while leaving substantial scope for improvement. Comparable distributions have been reported among Indian adolescents by Shalini and colleagues in Raipur and by Jha and colleagues in Bihar, who attributed moderate rather than high psychological well-being to the combined influence of academic demands, developmental transitions and family expectations [24, 25]. Although only 0.9% of participants had low psychological well-being, this should not be read as reassurance. The predominance of the middle category means that most adolescents in this population sit in a range in which well-being can move in either direction, which is precisely the population in which upstream, universal school-based promotion is most likely to be efficient.

The correlation between emotional intelligence and psychological well-being was positive and statistically significant but weak ($\rho = 0.212$), with the two constructs sharing approximately 4% of their variance. This magnitude should be interpreted with restraint. It is consistent in direction with existing meta-analytic evidence [10–12] but indicates that emotional intelligence accounts for only a small fraction of variation in adolescent psychological well-being. Because both constructs were measured by self-report on the same instrument in the same sitting, part of even this modest association may reflect shared method variance. Furthermore, the design does not permit any inference about direction. Psychological well-being was modelled as a covariate of emotional intelligence, and the reverse

specification would be equally consistent with these data. From a public health standpoint, a small effect at the individual level can still be material at population scale when the exposure is common and the delivery platform is universal and low-cost.

The gradient by type of school was the single strongest educational finding. Half of government-school students had low emotional intelligence, compared with roughly a quarter of students in private-aided and private-unaided schools, and government schooling remained independently associated with lower odds after adjustment (AOR 0.36). A comparable influence of school management type on emotional intelligence has been reported by Vijayan and colleagues among Indian adolescents [26]. The similar gradient by medium of instruction and by rural residence points in the same direction. These findings point to a structural equity gradient rather than individual differences. Government and Kannada-medium schools, which predominantly serve households with lower economic and educational resources, have less access to the social environments, educational infrastructure, and experiential opportunities that cultivate emotional competency.

Family environment was similarly influential. Adolescents reporting an excellent relationship with their family had substantially higher odds of higher emotional intelligence than those reporting a poor relationship (AOR 2.69), and adolescents from nuclear families had higher odds than those from three-generation families. Shee and colleagues, in a cross-sectional study of Indian adolescents, and Ghanawat and colleagues, in a study of family functioning, similarly identified parent-child relationship quality and family functioning as important correlates of adolescent emotional intelligence [27, 28]. It should be noted that the family-relationship estimate rests on a reference category of only 34 adolescents reporting poor family relationships, and its confidence interval is correspondingly wide.

Participation in extracurricular activities was independently associated with higher emotional intelligence (AOR 1.44), consistent with the findings of Chowdhury and colleagues on leisure-time activities and emotional intelligence among adolescents [29], and with meta-analytic evidence that structured social and emotional learning provision improves emotional competence and psychosocial functioning [30, 31]. The physical-activity finding merits specific comment because it does not follow the expected dose-response pattern. Regular, occasional and rare physical activity all conferred higher odds than no activity, with overlapping confidence intervals and no gradient across increasing frequency. The operative distinction in this population therefore appears to be between any physical activity and none, rather than between more and less. This has a direct programmatic reading: in a population where only 18.8% report regular physical activity and 24.4% report none at all, moving adolescents from complete inactivity into any structured activity may be the more achievable and more relevant target. Ubago-Jiménez and colleagues have similarly reported an influence of physical activity on emotional intelligence and psychological well-being in adolescents [32].

Female participants had markedly higher emotional intelligence than males, both in unadjusted comparison (41.4% of males had low emotional intelligence versus 20.4% of females) and after adjustment (AOR 0.45 for males). This is consistent with Garaigordobil, who reported sex differences in

intrapersonal emotional intelligence during adolescence, and with the reviews cited above, which attribute such differences to variation in emotional socialisation and emotion regulation [11, 33]. The male disadvantage requires explicit attention in the design of school-based emotional learning components, which are frequently taken up preferentially by girls.

Better academic performance was independently associated with higher emotional intelligence, in line with the meta-analysis by MacCann and colleagues showing that emotional intelligence predicts academic performance [34].

Public health and programmatic implications

These findings identify specific, addressable subgroups rather than a general recommendation. India already possesses the delivery architecture required to act on them. The School Health and Wellness Programme under Ayushman Bharat provides for life-skills and social and emotional learning delivered by trained Health and Wellness Ambassadors within schools, and the Rashtriya Kishor Swasthya Karyakram identifies mental health as one of its six strategic pillars, delivered through Adolescent Friendly Health Clinics and the Saathiya peer-educator network [15]. The present findings suggest three specific applications. First, prioritisation: government schools and Kannada-medium schools, which currently show the highest burden of low emotional intelligence, should be sequenced first rather than last in the rollout of social and emotional learning content, and materials must be available in Kannada. Second, targeting within schools: adolescent boys, adolescents not participating in any extracurricular activity and adolescents reporting no physical activity constitute identifiable groups within every school that can be reached without individual screening. Third, the physical-activity finding supports the use of existing sports and extracurricular provision as a vehicle for emotional competency, with the emphasis on universal participation rather than on intensity.

Strengths and limitations

The principal strengths of this study are its size, the use of standardized instruments with good internal consistency in this sample, and the breadth of the determinant set, which permitted simultaneous adjustment for sociodemographic, family, lifestyle, psychosocial and academic characteristics.

Several limitations must be acknowledged. First, the cross-sectional design precludes any causal inference and does not establish the direction of the association between emotional intelligence and psychological well-being. Second, the sampling was multistage and school-clustered, but the analysis treated observations as independent. Clustering within schools and sections was not accounted for, and the reported confidence intervals and p values are therefore likely to be narrower than the design warrants. Third, the sample is not representative of all adolescents in Mysuru: females were over-represented (68.7%), government schools were under-represented (6.6%), and 77.4% of participants were classified in the upper socioeconomic class by the Modified B.G. Prasad scale. The findings should not be extrapolated to out-of-school adolescents or to rural adolescents, who were a small minority here.

Fourth, age and class were entered into the same model despite being near-collinear in this population, and produced adjusted estimates in opposite directions; neither estimate should be interpreted in isolation. Fifth, questionnaires were self-administered under classroom supervision, and the very low reported prevalence of alcohol use, smoking and tobacco chewing (all < 2%) is likely to reflect under-reporting under those conditions rather than true prevalence.

CONCLUSIONS

Among 2040 school-going mid-adolescents in Mysuru, 27.0% scored below the applied cut-off for emotional intelligence. After simultaneous adjustment, lower emotional intelligence was associated with male sex, government schooling, rural residence and poorer academic performance, and higher emotional intelligence with nuclear family type, participation in extracurricular activities, any reported physical activity and better family relationships. Emotional intelligence and psychological well-being were positively but weakly correlated, and the cross-sectional design does not establish the direction of that association.

Emotional competency in this population therefore varied by school type, place of residence, family environment and participation in structured activities rather than being uniformly distributed. The subgroups identified are reachable through the school-based platforms already established under the School Health and Wellness Programme and RKSK. Longitudinal studies are needed to determine whether emotional intelligence is modifiable in these groups and whether change in emotional intelligence is accompanied by change in psychological well-being.

Declarations

Ethics approval and consent to participate

The study was approved by the Institutional Ethics Committee of JSS Medical College, JSS Academy of Higher Education and Research, Mysuru (approval number JSS/MC/PG/2324/2023-24). Administrative permission was obtained from the Deputy Director of Public Instruction, Mysuru, and from the authorities of each participating school. Written informed consent was obtained from the parents or legal guardians of all participants, and written informed ascent was obtained from all participating students. All methods were performed in accordance with the Declaration of Helsinki and with relevant institutional guidelines and regulations.

Human Ethics and Consent for publication

Not applicable. The manuscript contains no individual person’s data in any form.

Clinical trial number:

Not applicable.

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available because the participants are minors and consent for public data deposition was not obtained.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Jesymol Joy: Conceptualization, Manuscript Drafting, Statistical Analysis,

M Renuka: Supervision, Review, Manuscript Drafting

Sheeba Pakkan: Statistical Analysis, Review

B M Suraj: Review and Manuscript Drafting

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Figures

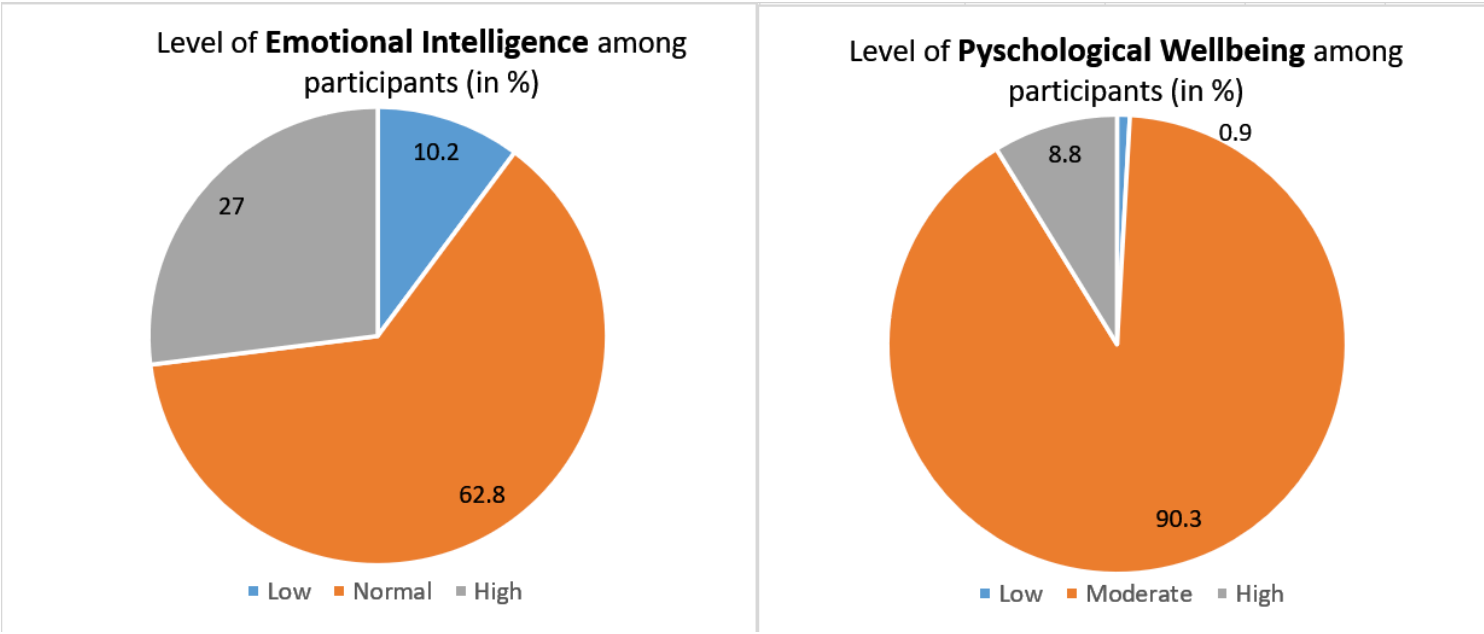


Figure 1

Level of Emotional Intelligence and Psychological Wellbeing among participants

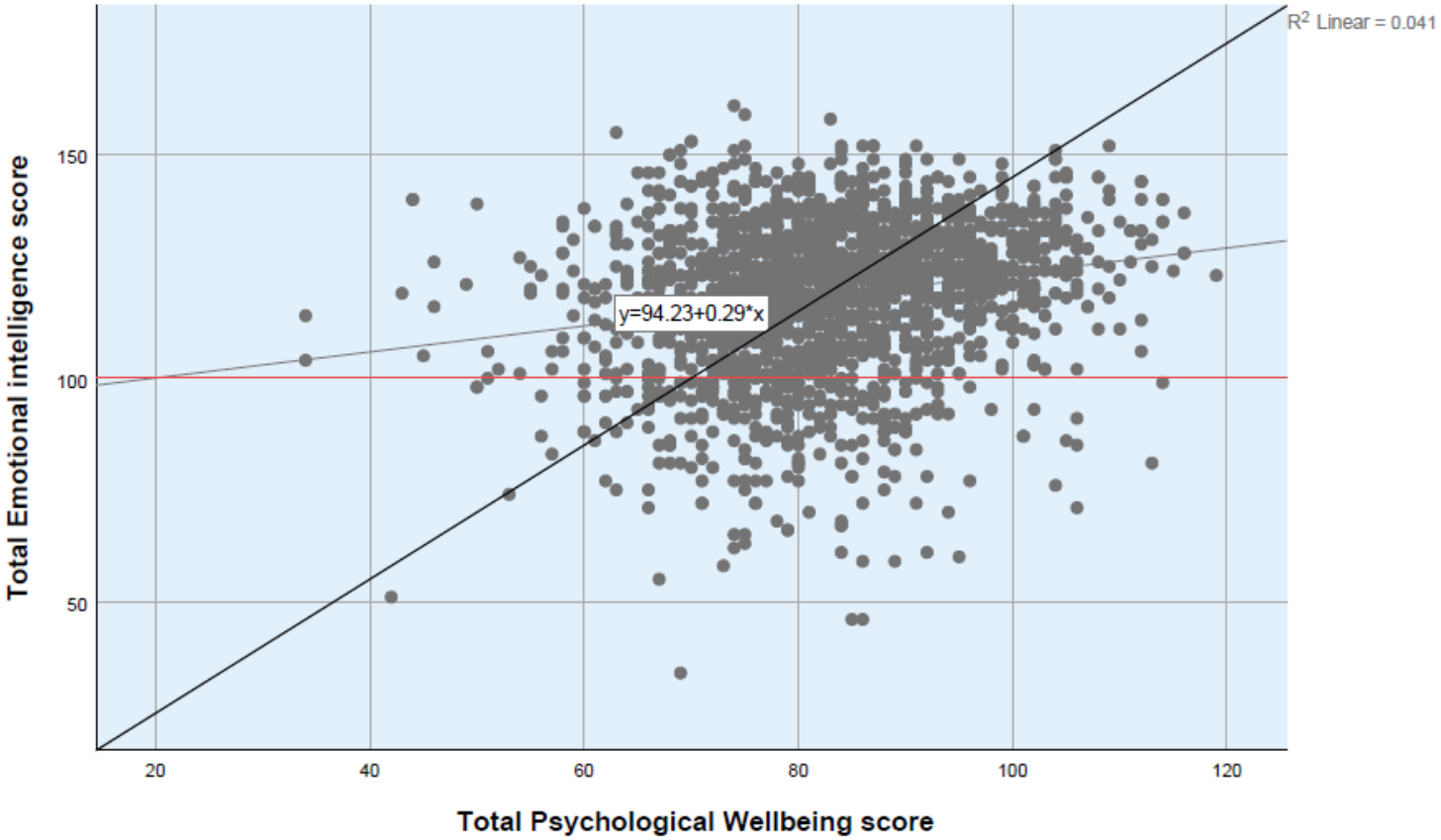


Figure 2

Correlation between total psychological well-being score and total emotional intelligence score among study participants (N=2,040). Spearman's ρ = 0.212; p < 0.001

Supplementary Files

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