

Gender difference in the change of adolescents' mental health and subjective wellbeing trajectories

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Abstract

Background

Gender differences in adolescents' mental health problems have been extensively reported. Yet, there is limited research in exploring longitudinal trends in mental health and wellbeing between boys and girls. This study investigated any emerging developmental trends of gender differences in mental health problems and subjective wellbeing for young people from early to mid-adolescence in England.

Methods

A longitudinal group of 8612 young people's mental health and subjective wellbeing trajectories were investigated between the period of ages 11/12 and 13/14. Mental health difficulties and subjective wellbeing were measured using the child self-report Strengths and Difficulties Questionnaire (SDQ) and Short Warwick and Edinburgh Wellbeing Scale (SWEMWBS), respectively. Any gender difference in the change of adolescents' mental health and subjective wellbeing over 3 year period were estimated using multi-level regression while accounting for various socio-demographic and resilience factors.

Results

Young people are at increased risk of mental health problems between the ages of 11 and 14, particularly girls. The overall difficulty levels reported by girls were significantly higher than boys across a range of mental health problems and subjective wellbeing. These developmental trends persisted after controlling for a broad range of potential confounders.

Conclusion

Young people has shown clear signs of mental distress as they get older. This escalation was particularly evident among girls. Distress can come at the time of significant physical, emotional, and social changes in an adolescents' life, and can be heightened during secondary

school transition. This evidence highlights the importance of early intervention to reduce risk of distress.

Key words:

Mental health and wellbeing, children and young people, longitudinal analysis

Introduction

Background/rationale

Recent research estimates that 1 in 8 children and young people experience mental health problems in England and its record went up to 1 in 6 during the COVID-19 pandemic [34, 35]. Evidence also indicates that there might be higher rates in some populations such as children from more deprived backgrounds, or those with additional learning needs [9, 32]. Mental health disorders experienced in adolescence have a wide range of impacts and implications both within adolescence and adulthood in terms of mental health outcomes as well as other areas of person's life [10]. Thus, adolescence is a key period to examine the development of mental health disorders longitudinally, particularly as during this period, young people enter puberty and experience new stressors including educational stress, sexual exploration and peer conflict [1, 42].

Recent population surveys of adolescents also highlight that the prevalence of mental health problems and types of disorder are relatively different between genders, with adolescent girls being more prone to experience internalising disorders such as depression or anxiety and boys being more likely to experience externalising problems [4, 20, 47]. A range of theories in psychological wellbeing and mental health outcomes in adolescence have proposed determinants of gender difference and their associated effects. [14] An influential theory, the Gender Intensification Hypothesis, posits that the increased pressure for girls and boys to conform to normative gender roles during adolescence with the onset of puberty explains the emergence of the gender difference in depression. Girls enter the state of pubertal development before boys and thus undergo associated physical and hormonal changes. Early pubertal development in girls along with effects of femininity has been linked to depressive

systems and is considered as a factor in the gender differences of depression [7, 28] Studies also suggest that girls that mature early display increased levels of depressive symptoms than those whose pubertal timing is similar to that of their peers [21, 28, 31, 37].

Peer relationships have been also considered to be a pertinent risk factor to explain the gender differences in mental health problems. The transition from childhood to adolescent creates greater difference in the individual and social context that peer relations comes salient. Peer relations become a significant source of influence on adolescent attitude, activities and emotional wellbeing. [3] In these circumstances, girls often display increased sensitivity to distress in other peers, more empathy and fear rejection by peers more than their male counterparts, [30, 41] causing significant internalising symptoms. [40]

Furthermore, some research suggests that the differences in managing and coping with stressors between boys and girls can be another relevant factors. Several studies found that girls may perceive more difficulties from the same stressors and report more frequently than boys. [16, 24, 44] This can be related with the fact that boys tend to ignore problems as a strategy to cope with problems [15, 43] or seek distraction through physical activities, [39] whilst girls are more willing to seek support through family, school and/or friends [49].

Objectives

Despite evidence reporting gender difference in adolescent mental health, it remains unclear when and how the divergence between boys and girls happens. To address this issue, this study draws on a recent, large-scale longitudinal data from a community-based survey of adolescents to explore gender differences in mental health and wellbeing over time. Using these data, we aim to examine longitudinal trajectories of mental health problems and

subjective well-being over time between boys and girls, moving from early (11–12 years old) to mid-adolescence (13–14 years old), while accounting relevant predictive factors.

Methods

Study design/ setting

This study utilised survey data collected from the HeadStart programme as well as socio-demographic data extracted from the National Pupil Database (NPD). The HeadStart programme is a 6-year, £67.4 million National Lottery funded programme, aiming to improve mental health problems and wellbeing of children and young people aged 10–16 and prevent developing serious mental health issues. It is based on six local authorities in England and the programme works with local young people, schools, families, charities, communities, and public services to deliver a wide range of early interventions for young people. Every year, the children and young people who participate in the HeadStart programme complete an annual survey (The Wellbeing Measurement Framework, WMF) at their schools. The socio-demographic characteristics of children and young people were extracted through a data linkage with the NPD.

Participants

This study is based on children and young people who participated in the WMF yearly, starting in 2017, when they were in year 7 (aged 11–12) until 2019, when they were in year 9 (aged 13–14). Out of the 10,888 children and young people who participated in the survey yearly, 2,276 children and young people either had missing data at least one time point from the survey or had no socio-demographic data from the NPD. Hence, 8,612 pupils from 121 state secondary schools were included in the final analyses with all study variables. Of those

not included in the analyses, there were relatively higher proportion of children and young people from Black ethnic background, with free school meals (FSM) eligibility, special education needs (SEN) status. Compared to the national average, the study sample had a slightly higher proportion of children and young people from deprived backgrounds based on FSM eligibility (study sample: 14.3%, national average: 12.9%). The study sample had much lower proportion of children and young people with SEN support (study sample: 9.7%, national average: 14.4%), slightly higher proportion of White children and young people (study sample: 76.9%, national average: 75.2%), and more females (study sample 56.0%, national average: 49.3%).

Variables

Main outcomes

Children and young people's mental health difficulties were measured with the child self-report Strengths and Difficulties Questionnaire (SDQ). SDQ is a 25-item measure comprising four problem scales (emotional symptoms, conduct problems, peer-relationship problems, hyperactivity/inattention problems) and a prosocial behaviour scale. This study focused on the four problem subscales of the SDQ. The total scores of each subscale were used in the analysis and higher scores indicate higher levels of difficulty.

Subjective wellbeing was measured with the 7-item child self-report Short Warwick and Edinburgh Wellbeing Scale (SWEMWBS) and total scores were used in the analyses. High scores on the SWEMWBS indicate greater positive mental wellbeing.

Main exposures

The main exposure variable was gender, collected from the WMF survey as well as the NPD, to explore any gender differences in adolescents' mental health and wellbeing trajectories. Gender variable is coded as a binary variable.

Covariates

Various potential confounders were extracted at baseline including individuals' socio-demographic characteristics and resilience factors. Ethnicity, FSM eligibility in the last six years, SEN status (with or without statement), and English as an additional language were derived from the NPD. Resilience factors from the Headstart survey were derived from the Student Resilience Survey [SRS; 46] which captures a range of internal and external protective characteristics. The 6 of the SRS subscales - (a) problem-solving, goals and aspirations and empathy as internal protective factors and (b) family connection, school connection and peer problem as external protective factors - which are closely associated with adolescents' mental health and wellbeing [17, 29] were selected. Higher scores on the SRS reflect greater resilience.

Procedure

Every year, children in participating schools completed surveys using a secure online system during a usual school day. The online system was designed to be easy to read and child friendly. Every year, consent for participation in the research was sought from parents prior to, and from children and young people at the outset of, the survey sessions. Parental opt outs were received by post, phone or email and child assent was recorded via computer at the beginning of survey sessions. This research was approved by the UCL ethics committee (reference: 8097/003).

Statistical analysis

Characteristics of the sample can be found in Table 1. To examine any gender difference in the change of adolescents' mental health and subjective wellbeing trajectories over 3 year period, generalised mixed linear models (GLMM) were applied using STATA 15.

For each outcome variable (i.e., the total scores from the 4 SDQ subscales and SWEMWBS total score), four preparatory models were estimated. First model examined the crude association between change of young people's mental health difficulties and subjective wellbeing level and gender over time. In the second model, socio-demographic characteristics (i.e., ethnicity and eligibility of FSM in last 6 years, SEN status, and English as additional language) were included. In the third model, SRS internal protective factors including problem solving, goals and aspirations, and empathy subscales were added. In the fourth model, SRS external protective factors including family connection, school connection, and peer support subscales were added. In the final model, the interaction between time and gender was further added into the model to identify any gender differences in mental health and subjective wellbeing trajectories. The likelihood ratio test was used to compare the model fits between the models and the model fit significantly improved successively. Therefore, all variables were retained in the final model (see Table 2).

Sensitivity analysis

To investigate whether gender difference in mental health problems and subjective wellbeing trajectories were significantly different between young people from mainstream secondary schools and other types of schools (i.e., special schools, Pupil Referral Units, and Alternative provisions), sensitivity analysis was conducted with only mainstream schools.

Results

Table 1 provides information on the socio-demographic and protective characteristics at baseline, broken down by gender. There were relatively sizeable ethnic and socio-economic diversity within the sample, particularly with those from all ethnic groups other than White, making up nearly 25% of study population. The sample included a higher proportion of boys with SEN than girls ($p < 0.01$). In addition, girls had higher resilience scores except goals and aspiration subscale at baseline ($p < 0.01$).

Table 1. Sample Characteristics

| Sample Characteristic | Gender | | p-value |
|--|-------------------|---------------------|---------|
| | Male (n=3,799) | Female (n=4,832) | |
| Ethnicity, N (%) | | | |
| White | 2,967 (78.1) | 3,671(76.0) | 0.036 |
| Black | 207 (5.5) | 261 (5.4) | |
| Mixed | 149 (3.9) | 205 (4.2) | |
| Asian | 366 (9.6) | 564 (11.7) | |
| Any other group | 110 (2.9) | 131 (2.7) | |
| Eligible to FSM in the last 6 years : Yes, N (%) | 1,260 (33.2) | 1,532 (31.7) | 0.15 |
| SEN status: Yes, N (%) | 523 (13.8) | 313 (6.5) | <0.001 |
| English as additional language: Yes, N (%) | 645 (17.0) | 839 (17.4) | 0.63 |
| Student Resilience survey (SRS) | | | |
| Mean score: Problem solving at 2016/17 (SD) | 10.98 (3.2) | 11.34 (3.2) | <0.001 |
| Mean score: Goals & Aspiration at 2016/17 (SD) | 8.43 (1.9) | 8.26 (1.9) | <0.001 |
| Mean score: Empathy at 2016/17 (SD) | 7.92 (1.95) | 8.68 (1.61) | <0.001 |
| Mean score: Family connection at 2016/17 (SD) | 17.79 (2.6) | 18.16 (2.5) | <0.001 |
| Mean score: School connection at 2016/17 (SD) | 15.39 (3.8) | 15.56 (3.7) | 0.034 |
| Mean score: Peer support at 2016/17 (SD) | 50.71 (11.39) | 55.38 (10.17) | <0.001 |

Table 2 presents the results from the generalised linear growth models and Figure 1 and 2 show the change in mental health and wellbeing level over time between boys and girls,

highlighting the significant gender role in early adolescent's mental health and wellbeing¹. Overall, there was a general trend of increasing mental health difficulties and declining subjective wellbeing over time when accounting for school-level variations and various socio-demographic and resilience factors at the individual level. During the early (aged 11–12) to mid-adolescent (aged 13–14) period, young people were more likely to experience emotional difficulties, behavioural difficulties, and hyperactivity/inattention difficulties and fairly stable level of difficulties in peer relationship as they get older. Young people's subjective well-being has decreased notably over this period. However, it is important to note that individual's different socio-demographic characteristics, particularly, ethnicity, FSM eligibility, SEN status, and resilience factors, were closely associated with young people's mental health and wellbeing level at baseline.

Examining the results by gender, particularly the interaction effect between gender and time, revealed that the rise in mental health problems and the decline in subjective wellbeing in the period of early to mid-adolescence were largely driven by overall deterioration for girls, since boys reported a fairly stable level of difficulties over time. These results accounted for various socio-demographic and resilience factors that were known to be linked to mental health and subjective wellbeing level. More specifically, young people's various socio-demographic and resilience characteristics were closely linked to young people's emotional difficulty level at baseline. For example, young people from Black and Asian backgrounds had significantly reduced risk of experiencing emotional difficulties than White young people. Similarly, young people who had English as additional language were less likely to experience emotional difficulties than those with English as a first language. FSM

¹ The change in mental health and wellbeing scores over time between boys and girls is presented in supplementary table 1.

eligibility in the last 6 years was closely associated with increased chance of emotional difficulties as did having SEN status. In terms of resilience factors, several internal and external factors were negatively associated with emotional difficulties. In fact, having good problem-solving skills, high goals and aspirations, good family connections, and/or peer support significantly reduced the chance of experiencing emotional difficulties. On the other hand, the young people who had high empathy were more likely to experience emotional difficulties. Accounting for these variances in the model, there was still a marked gender difference in the trend of emotional difficulties. The average emotional difficulty level for girls was already higher than boys at the age of 11–12 and continued to increase year on year. However, boys' emotional difficulties remained relatively stable over time, even decreased slightly which resulted a significant gender differences in emotional difficulties (in the presence of interaction).

Similarly, various socio-demographic and resilience factors were closely associated with young people's behavioural difficulties level. Being Black or Asian, FSM eligibility, SEN status, English as additional language, and both internal and external resilience factors were significant predictive factors. While controlling these factors, the developmental trends in behavioural difficulties were fairly different between boys and girls over time. At the time of early adolescence (aged 11–12), boys, on average, were more likely to experience behavioural difficulties than girls. However, girls' level of behavioural difficulties increased to almost the same level as boys by mid-adolescence (age 13–14) as the level of behavioural difficulties for boys stayed relatively stable over time. The results also showed that the levels of hyperactivity/ inattention difficulties were significantly associated with various individual factors at baseline. Being Asian, English as additional language and internal resilience characteristics as well as good family and school connection had significantly

reduced the risk of experiencing hyperactivity/inattention difficulties. On the other hand, having SEN status and FSM eligibility were associated with nearly 50% increase in risk of experiencing hyperactivity/inattention difficulties respectively. By controlling these significant predictive factors, the level of hyperactivity/inattention difficulties in the early adolescent (the period of ages 11/12 to 13/14) cannot be understood without accounting for gender differences given the gender - time interaction against hyperactivity/ inattention difficulties was significant. While boys' average hyperactivity/inattention level stayed relatively stable, girls' level increased year on year.

The levels of peer-relationship problems were closely associated with a number of covariates at baseline. In particular, the young people from Black or Asian ethnic backgrounds (relative to White ethnicity), those who had good problem-solving skills, good family connections, and peer support were significantly less likely to have peer-relationship problems. By contrast, FSM eligibility, SEN status, and high empathy were closely associated with prevalence of peer-relationship problems. In terms of the peer problem scores, there were no significant differences between boys and girls at the early adolescence (age 11–12) when adjusting the impact of the covariates. However, girls were more likely to experience peer problems by the mid-adolescence than boys.

Young people's subjective wellbeing levels were closely linked to individual's various socio-economic and resilience factors as were mental health difficulties. At baseline, children and young people from Black, Asian, and mixed ethnic backgrounds (relative to White ethnicity), children and young people who identified English as additional language (relatively to first language), those who had good problem-solving skills and high goals and aspirations as well as those who had strong external supports from home, school and peers were more likely to

experience better well-being. On the other hand, FSM eligibility had a significant inverse association with positive mental wellbeing. While these associations remained significant at baseline, the gap of subjective wellbeing levels between boys and girls had increased significantly over time. At age 11–12, girls had slightly but significantly lower subjective wellbeing than boys' and girls' wellbeing further deteriorated year on year. This indicated that there was a significant gender differences in adolescent's mental wellbeing.

In the sensitivity analyses, we did not find any significant changes in the direction or magnitude of young people's mental health problems and subjective wellbeing over time when focused on the young people and adolescents from mainstream schools (see supplementary table 2).

Discussion

In this longitudinal study of 8612 adolescent, the results showed that young people were more likely to experience a higher level of mental health problems and negative mental wellbeing as they transition through adolescence. However, it is important to note that the distress level that reported by adolescences was relatively different by gender. The overall difficulty levels that reported by girls were significantly higher than boys across a range of mental health problems and subjective wellbeing. These developmental trends persisted after controlling for a broad range of potential con- founders and were robust to sensitivity analyses.

The average emotional difficulty level for girls was already higher than boys at age 11–12 and continued to increase year on year. Similarly, girls had slightly but significantly lower subjective wellbeing than boys at the age of 11–12 and their wellbeing further deteriorated

year on year, while boys' wellbeing level stayed fairly stable over time. This is consistent with literature, suggesting that girls are more likely to display depressive symptoms across most of the life span, beginning at some point in adolescence [38]. It has been suggested that girls can be vulnerable to emotional problems due to earlier pubertal timing [18], negative coping styles such as rumination [36], and more problems in relationships with parents and peers [27]. In fact, the results showed that healthy family connections good peer support, having good problem-solving skills, and having goals and aspirations significantly reduced the chances of experiencing emotional difficulties which is in agreement with the existing research [12, 25, 33, 45, 50, 51]. In addition, White young people were more likely to experience emotional difficulties and poor wellbeing than those from Black and Asian backgrounds. This is in line with the previous longitudinal findings, showing that children from ethnic minority groups have better mental health than their counterparts [19, 22]. Considering that ethnicity is a multifaceted construct which combines biological elements, ethnic self-identification, and broader social and institutional factors, it is possible that the experiences of particular groups may be shaped differently leading to more or less mental health difficulties and wellbeing [19].

Table 2. Multilevel Regression Models of Mental Health Problems and Subjective Wellbeing and Gender

| | SDQ emotional difficulties | | | SDQ behavioural difficulties | | | SDQ hyperactivity difficulties | | | SDQ peer problems | | | SWEMWBS | | |
|-------------------------------|----------------------------|--------|-------|------------------------------|--------|-------|--------------------------------|--------|-------|-------------------|--------|-------|--------------|--------|-------|
| | B | 95% CI | | B | 95% CI | | B | 95% CI | | B | 95% CI | | B | 95% CI | |
| Male (Ref.female) | -1.02 *** | -1.12 | -0.91 | 0.45 *** | 0.37 | 0.54 | 0.51 *** | 0.40 | 0.62 | - 0.04 | -0.12 | 0.03 | 0.60 *** | 0.41 | 0.78 |
| Time (ref. 2016/17) | | | | | | | | | | | | | | | |
| 2017-2018 | 0.31 *** | 0.24 | 0.38 | 0.19 *** | 0.13 | 0.24 | 0.23 *** | 0.16 | 0.29 | - 0.03 | -0.08 | 0.03 | -0.71 *** | -0.84 | -0.57 |
| 2018-2019 | 0.79 *** | 0.72 | 0.86 | 0.26 *** | 0.21 | 0.32 | 0.53 *** | 0.47 | 0.60 | 0.10 *** | 0.05 | 0.15 | -1.52 *** | -1.66 | -1.39 |
| Ethnicity (ref. White) | | | | | | | | | | | | | | | |
| Black | -0.63 *** | -0.83 | -0.42 | 0.23 ** | 0.07 | 0.39 | -0.21 | -0.42 | 0.01 | - 0.31 *** | -0.45 | -0.17 | 1.08 *** | 0.75 | 1.41 |
| Asian | -0.29 ** | -0.47 | -0.11 | -0.18 * | -0.32 | -0.03 | -0.52 *** | -0.71 | -0.33 | - 0.25 *** | -0.37 | -0.12 | 0.47 ** | 0.18 | 0.76 |
| Mixed | -0.18 | -0.38 | 0.03 | 0.07 | -0.10 | 0.23 | -0.18 | -0.39 | 0.04 | - 0.02 | -0.16 | 0.12 | 0.54 ** | 0.21 | 0.87 |
| Other | -0.26 | -0.51 | 0.00 | 0.02 | -0.19 | 0.22 | -0.03 | -0.30 | 0.23 | - 0.25 ** | -0.42 | -0.07 | 0.17 | -0.24 | 0.57 |
| Everfsm (ref.no) | 0.28 *** | 0.19 | 0.37 | 0.45 *** | 0.38 | 0.52 | 0.46 *** | 0.37 | 0.56 | 0.28 *** | 0.22 | 0.34 | -0.54 *** | -0.69 | -0.40 |
| SEN (ref.no) | 0.42 *** | 0.28 | 0.55 | 0.44 *** | 0.33 | 0.55 | 0.43 *** | 0.29 | 0.58 | 0.51 *** | 0.42 | 0.61 | -0.22 | -0.44 | 0.01 |
| EAL (Ref. English) | -0.28 *** | -0.42 | -0.14 | -0.15 * | -0.26 | -0.03 | -0.49 *** | -0.64 | -0.34 | - 0.06 | -0.15 | 0.04 | 0.35 ** | 0.12 | 0.58 |

| | | | | | | | | | | | | | | | | | |
|--|--------------|-------|-------|--------------|-------|-------|--------------|-----------|-------|-------------|-------|------------|--------------|-------|------------|--|--|
| SRS Internal factors | | | | | | | | | | | | | | | | | |
| Problem solving at 2016/17 | -0.11 *** | -0.12 | -0.09 | -0.03 *** | -0.04 | -0.02 | -0.08 *** | -0.09 | -0.06 | - | -0.05 | -0.03 | 0.22 *** | 0.20 | 0.25 | | |
| | | | | | | | | | | 0.04 *** | | | | | | | |
| Goals & aspiration at 2016/17 | -0.13 *** | -0.16 | -0.11 | -0.03 ** | -0.05 | -0.01 | -0.10 *** | -0.13 | -0.08 | - | -0.03 | 0.01 | 0.35 *** | 0.31 | 0.39 | | |
| | | | | | | | | | | 0.01 | | | | | | | |
| Empathy at 2016/17 | 0.25 *** | 0.22 | 0.28 | -0.12 *** | -0.15 | -0.10 | -0.08 *** | -0.11 | -0.06 | 0.09 *** | 0.07 | 0.11 | 0.02 | -0.02 | 0.07 | | |
| | | | | | | | | | | | | | | | | | |
| SRS External factors | | | | | | | | | | | | | | | | | |
| Family connection at 2016/17 | -0.08 *** | -0.09 | -0.06 | -0.10 *** | -0.12 | -0.09 | -0.10 *** | -0.12 | -0.08 | - | -0.05 | -0.02 | 0.18 *** | 0.15 | 0.21 | | |
| | | | | | | | | | | 0.04 *** | | | | | | | |
| School connection at 2016/17 | 0.01 | -0.01 | 0.02 | -0.05 *** | -0.06 | -0.04 | -0.07 *** | -0.08 | -0.06 | 0.02 *** | 0.02 | 0.03 | 0.08 *** | 0.06 | 0.10 | | |
| | | | | | | | | | | | | | | | | | |
| Peer support at 2016/17 | -0.03 *** | -0.04 | -0.03 | 0.00 ** | 0.00 | 0.01 | 0.01 *** | 0.01 | 0.02 | - | -0.07 | -0.06 | 0.04 *** | 0.03 | 0.05 | | |
| | | | | | | | | | | 0.06 *** | | | | | | | |
| Male x Year 2017/18 (ref. female x year 2016/17) | -0.48 *** | -0.58 | -0.38 | -0.19 *** | -0.27 | -0.11 | -0.34 *** | -0.44 | -0.24 | - | -0.14 | 0.02 | 0.67 *** | 0.46 | 0.88 | | |
| | | | | | | | | | | 0.06 | | | | | | | |
| Male x Year 2018/19 (ref. female x year 2016/17) | -0.95 ** | -1.05 | -0.85 | -0.34 *** | -0.42 | -0.26 | -0.64 *** | -0.73 | -0.54 | - | -0.28 | -0.12 | 1.51 *** | 1.30 | 1.72 | | |
| | | | | | | | | | | 0.20 *** | | | | | | | |
| Constant | 7.39 *** | 7.05 | 7.73 | 6.00 *** | | | 8.91 *** | 8.56 | 9.27 | 5.59 *** | 5.35 | 5.82 | 10.07 *** | | | | |
| | | | | | | | | | | | | | | | | | |
| Log likelihood | -55440.155 | | | -49547.78 | | | | -54790.28 | | | | -48160.819 | | | -65465.993 | | |
| Total n | 8630 | | | 8630 | | | | 8630 | | | | 8630 | | | 8612 | | |

* $P \leq 0.05$ ** $P \leq 0.01$ *** $P \leq 0.001$

Our results also showed that at the time of early adolescence (aged 11–12), boys, on average, were more likely to experience behavioural problems and hyperactivity/inattention problems compared to girls. This fits with literature suggesting that during the transition to secondary school that there is an increase in aggression and behaviour difficulties in boys [13].

However, our study indicated that girls' self-reported levels of behavioural and hyperactivity/inattention problems increased to almost the same levels as boys by mid-adolescence (age 13–14). These findings demonstrated rather concerning trends for girls as the distress, they experience across a range of mental health difficulties appears higher than for boys.

While there were no significant score differences between boys and girls in early adolescence (age 11–12) in peer problem, young people with good problem-solving skills, good family connection, and peer support were significantly less likely to experience peer-relationship problems. This is consistent with literature, suggesting that good parental relationships and social problem-solving skills have a positive impact on how the children develop peer relationships [2, 11]. By contrast, ethnicity, FSM eligibility and SEN status were closely associated with higher prevalence of peer-relationship problems. Social acceptance research consistently shows that students with special educational needs, particularly those who are placed in mainstream schools, are accepted to a lesser degree than their non-SEN classmates [26]. This confirms that significant efforts should be invested in supporting those with additional learning needs.

Limitations and future directions

It is important to note the limitations of the study. First, the population of the study was not drawn to be representative of all school children in England; however, the participants were from six local areas of England which increased the generalisability of the results. Second,

even though self-report is an acknowledged way of measuring adolescent mental health, it can be subject to issues including social desirability and there is generally low to modest agreement between different reporters of child mental health problems [6]. This is particularly true for boys that they tend to have difficulty articulating mental health problems which may, to some extent, be a reason to explain the lower rates of difficulties reported by boys in this study [5, 48]. Thus, qualitative work could further investigate gender differences in mental health difficulties which can help to understand the mechanisms underpinning the findings of the current study. Furthermore, a 3-year longitudinal study might not be long enough to capture the adolescents' mental health and well-being trajectories. Thus, future research may benefit from further time points over longer term period. Finally, the longitudinal association between the covariates, such as internal and external protective factors and mental health problems, was out of this paper's scope. The covariates were measured at the first time point; hence, the longitudinal causality cannot be established. Future studies should investigate the directionality of such relationships.

Notwithstanding these limitations, the current paper shows that boys' and girls' emotional difficulties diverge significantly from early to mid-adolescence and that girls' behavioural problems escalate in the same period. Findings suggest that early adolescence as a key period for prevention activity to reduce escalation in mental problems for girls, especially those from poorer backgrounds or those with special educational needs. Results also highlighted the importance of supportive relationships in this period, especially those who have difficulties with peers and family.

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Declarations

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Conflicts of interest/ Competing interests

None exist

Availability of data and material

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Authors' contributions

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Ethics approval

This research was approved by the UCL ethics committee (reference: 8097/003)

Consent to participate

All the HeadStart survey participants provided a written informed consent.

Consent for publication

N/A

