Metadata of the article that will be visualized in OnlineFirst

ArticleTitle	Gender, Paid Work, and Mental Health of Adolescents and Young Adults in Resource-Poor Settings of India
Article Sub-Title	
Article CopyRight	The Author(s), under exclusive licence to Springer Nature B.V. (This will be the copyright line in the final PDF)
Journal Name	Child Indicators Research

Corresponding Author	FamilyName	**Ganguly**
	Particle	
	Given Name	**Dibyasree**
	Suffix	
	Division	Centre for the Study of Regional Development, School of Social Sciences (SSS)
	Organization	Jawaharlal Nehru University (JNU)
	Address	Delhi, 110067, India
	Phone	
	Fax	
	Email	dibyasreeganguly@gmail.com
	URL	
	ORCID	http://orcid.org/0000-0001-5677-6316
Author	FamilyName	**Goli**
	Particle	
	Given Name	**Srinivas**
	Suffix	
	Division	Department of Fertility and Social Demography
	Organization	International Institute for Population Sciences (IIPS)
	Address	Deonar, Mumbai, 400 088, India
	Phone	
	Fax	
	Email	srinivasgoli@iipsindia.ac.in
	URL	
	ORCID	
Author	FamilyName	**Sullivan**
	Particle	
	Given Name	**Oriel**
	Suffix	
	Division	
	Organization	IOE - Social Research Institute, UCL
	Address	London, WC1H 0AL, UK
	Phone	
	Fax	
	Email	o.sullivan@ucl.ac.uk
	URL	
	ORCID	http://orcid.org/0000-0002-0995-5888

Abstract	This paper investigates the gendered impact of paid work, and transition into paid work, on the mental health of adolescents and young adults (AYAs) in resource-poor settings in India. Data on 16,292 AYAs aged 10–19 years at the baseline were drawn from a longitudinal survey conducted in 2015–16 in India who are followed-up again in 2018–19. The mean estimates convey that Mental Ill-health Score (MIS) for AYAs who participated in paid work was significantly higher than those who had never participated, especially for females. The absolute female-male gap in MIS also increased from 1.16 in 2015–16 to 1.78 in 2018–19. Findings based on multiple robust econometric models reveal that the increase in MIS as a result of transitioning from not working to paid work or remaining in paid work was more significant for females than males net of other confounders. The gendered effect of paid work on MIS was sensitive to school attendance and marital status. Instrument variable regression estimates strengthen our argument that transition to paid work in adolescents and school-going ages higher psychological issues net of other predictors. In conclusion, we advance that participation in paid work during adolescence negatively impacts mental health and is gender-sensitive, with a more pronounced effect for school-going and married female AYAs.
Keywords (separated by '-')	
Footnote Information	

Gender, Paid Work, and Mental Health of Adolescents and Young Adults in Resource-Poor Settings of India

Dibyasree Ganguly[1] [iD] · **Srinivas Goli[2]** · **Oriel Sullivan[3]** [iD]

Abstract

This paper investigates the gendered impact of paid work, and transition into paid work, on the mental health of adolescents and young adults (AYAs) in resource-poor settings in India. Data on 16,292 AYAs aged 10–19 years at the baseline were drawn from a longitudinal survey conducted in 2015–16 in India who are followed-up again in 2018–19. The mean estimates convey that Mental Ill-health Score (MIS) for AYAs who participated in paid work was significantly higher than those who had never participated, especially for females. The absolute female-male gap in MIS also increased from 1.16 in 2015–16 to 1.78 in 2018–19. Findings based on multiple robust econometric models reveal that the increase in MIS as a result of transitioning from not working to paid work or remaining in paid work was more significant for females than males net of other confounders. The gendered effect of paid work on MIS was sensitive to school attendance and marital status. Instrument variable regression estimates strengthen our argument that transition to paid work in adolescents and school-going ages higher psychological issues net of other predictors. In conclusion, we advance that participation in paid work during adolescence negatively impacts mental health and is gender-sensitive, with a more pronounced effect for school-going and married female AYAs.

Keywords Gender · Child labour · Mental health · Education · Child marriage · India

✉ Dibyasree Ganguly
dibyasreeganguly@gmail.com

Srinivas Goli
srinivasgoli@iipsindia.ac.in

Oriel Sullivan
o.sullivan@ucl.ac.uk

[1] Centre for the Study of Regional Development, School of Social Sciences (SSS), Jawaharlal Nehru University (JNU), Delhi 110067, India

[2] Department of Fertility and Social Demography, International Institute for Population Sciences (IIPS), Deonar, Mumbai 400 088, India

[3] IOE - Social Research Institute, UCL, London WC1H 0AL, UK

1 Introduction

27 Child and teenage labor remains inadmissibly common in the world today and is
28 directly imperiling the health and wellbeing of children and adolescents. Labour
29 force participation in the age group 5 to 17 years has risen to 160 million in 2020
30 from its earlier estimate of 152 million in 2016, a rise of 8 million in four years
31 (International Labour Office [ILO], 2017; International Labour Office & United
32 Nations Children's Fund [ILO & UNICEF], 2021). In particular, the situation is
33 dismal in low-middle income countries where gendered influences and partici-
34 pation in paid work at an early age are more common. In the world's poorest
35 regions, more than 1 in 5 children are involved in child labor (UNICEF, 2022)
36 and the ratio would be slightly higher for the age group 10–19 years. Moreover,
37 this has an enduring impact on the mental health status and development of ado-
38 lescents, especially among those who belong to fragile socioeconomic settings
39 (Edmunds & Alcaraz, 2021; World Health Organization [WHO], 2021).

40   Because of the recent growing significance of better education and decent
41 employment for the well-being of the population across the life course, under-
42 standing the impact of transition from school to paid work at an early age has
43 become very important. Adolescents experience wide-ranging and emotionally
44 challenging pathways from school to work (Ibrahim et al., 2019; Woodhead,
45 2004) and this process is often governed by a gendered pattern of socialization
46 (Kapungu et al., 2018). In particular, the low quality of work available at these
47 ages makes adolescents more vulnerable as it defies them through stressful condi-
48 tions for which they are impromptu. Further, the poor employment preparedness,
49 adverse working environments, along with an additional burden of unpaid house-
50 hold work for girls shows a gendered impact on their psychological wellbeing
51 (Lam et al., 2016; Mortimer et al., 2002).

52   This paper investigates the gendered impact of paid work, and transition into
53 paid work, on the mental health of adolescents and young adults (AYAs) aged
54 10–19 years in resource-poor settings in India. Cutting-edge empirical research on
55 adolescents with a gender focus in the analyses in the global context has helped
56 to formulate gender-specific interventions (Lane et al., 2017; Murray, 2003; Pat-
57 ton et al., 2016). Until now, difficulties in obtaining comprehensive mental health
58 data in a longitudinal framework, exclusively for adolescents in a resource-poor
59 setting in India, have inhibited robust empirical assessment. Therefore, our study
60 is a significant addition to the empirical literature linking transition to paid work
61 and its gendered influence on the mental health of AYAs in India.

62   Specifically, this study has three objectives: first, to assess the independent
63 effect of paid work and gender on the mental health of AYAs. Second is to inves-
64 tigate the interaction effect of gender and the transition to paid work on men-
65 tal health. Third, to assess the heterogeneous effect of the interaction of gender
66 and the transition to paid work on mental health across sub-populations derived
67 from schooling and marital status. To examine these objectives, we used a robust
68 and multifaceted dataset provided by a longitudinal survey titled "Understanding
69 the lives of adolescents and young adults (UDAYA)" conducted in the Bihar and

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

Gender, Paid Work, and Mental Health of Adolescents and Young…

Uttar Pradesh states of India. In this survey, interviewers asked all the questions on mental health directly to the AYAs, which provide a reliable measure directly reported by the study participants to understand their mental well-being (Ben-Arieh, 2005).

1.1 Mental Health Burden among Adolescents

Globally, 33% and 16% of all population in 2020 are in the age group 0–19 years and 10–19 years, respectively, and almost 90% of them live in low-income and middle-income countries (United Nations, Department of Economic and Social Affairs, Population Division, 2022). Mental health disorders are a fast-emerging global issue that accounts for 13% of the global burden of diseases and disability among adolescents. One in seven of 10–19-year-olds experiences a mental disorder such as depression, anxiety, and behavioral issues (WHO, 2021). Among adolescents, psychological disorders are a top cause of health-related burden (Erskine et al., 2015; Kieling et al., 2011).

Adolescents with mental illness and disability conditions are particularly susceptible to social isolation, exclusion, discrimination, and humiliation (affecting readiness to seek help). Further, they face obstacles in educational attainment and achievements (Agnafors et al., 2021; Smith et al., 2021), are prone to risky behaviors (Orri et al., 2022), and experience physical ill-health (Aarons et al., 2008; Chen et al., 2006; Hughes et al., 2017). Previous studies have already documented multiple factors which affect adolescent mental health. Some of the important determinants of mental health during adolescence include the quality of their home environment (Repetti et al., 2002), early marriages and intimate partner violence (Burgess et al., 2022; John et al., 2022), exposure to family violence in terms of both interparental and parent/caregiver to the child (particularly physical abuse, sexual violence, verbal abuse) (Annerbäck et al., 2012; Hughes et al., 2016; Mehlhausen-Hassoen & Winstok, 2019), emotional neglect (Leiva et al., 2022), school bullying and relationships with peers (Arslan et al., 2021; Kaufman et al., 2020; Long et al., 2021), mother's education level and area of residence (Pandia et al., 2021) and financial hardships (Kiely et al., 2015).

Greater the risk factors adolescents are exposed to, higher the likelihood of adverse impact on their mental health in later life. Notwithstanding the worldwide acknowledgment of the significance of mental health preferment and prevention in AYAs, there is a dearth of quality evidence in terms of measuring the extent of the problem, mapping underlying predictors and needs across the heterogeneous populations, especially in low and lower-middle-income countries (Belfer, 2008; WHO, 2021).

The undesirable costs of failing to protect adolescents from adverse mental health conditions extend to adulthood—damaging them both psychologically and physically and off-putting prospects to lead recompensing lives as grownups (Lane et al., 2017; Patton et al., 2016; WHO, 2021). In particular, the failure to prevent mental health disorders, together with developmental and intellectual impairments in adolescents and young populations in low-resource settings, is not only a health crisis

but also has wide-reaching impacts on the accomplishment of basic developmental goals of the country (Eaton et al., 2014; Kieling et al., 2011).

1.2 Paid Work and Mental Health among Adolescents

Adolescence is a critical juncture in a life-course for developing social and emotional habits important for mental well-being (Petersen et al., 1993). At this stage, human life experiences not only lead to physiological changes in the body but also set the foundation for the process of attaining critical social and economic achievement and personal life goals (Patton et al., 2016). In particular, adolescence is the important life course stage and a primary preparatory period for transition from school to work (Patton et al., 2016; Vuolo et al., 2014). Thus, this phase in a human life course is sensitive and emotionally challenging, and any unfavorable circumstances put extra pressure on psychological well-being (Mortimer et al., 2002).

In the context of India, the transition from school to work or continuing both school and work among adolescents is largely determined by the socio-economic status of their household and the demand for labor (paid work and unpaid domestic work) in the family (Chowdhury, 2020; Singh et al., 2018). Adolescents from socio-economically disadvantaged section disproportionately carry the burden of paid work. Further, studies underscored that factors like financial difficulties (Richardson et al., 2017), the experience of material hardships (Edmunds & Alcaraz, 2021; Kim et al., 2015), and poor quality of work (Mortimer et al., 2002; Ornek & Esin, 2018) are deleterious to the mental health outcomes of the AYAs. In particular, the conflict between school and paid and unpaid domestic work at school-going age, and their impact on mental health in adolescence received significant attention in the global context (Ibrahim et al., 2019; Woodhead, 2004). However, the adverse impact of paid work on mental health in adolescence received very little attention in low-income settings such as India where children and adolescents often support parents in earning livelihoods.

1.3 Intersection Axes of Gender, Paid Work, and Mental Health

The cross-cutting and multi-layered influence of gender roles and norms on adolescent behavior plays a key role in determining their mental health, especially in low and middle income settings (Kapungu et al., 2018). Unequal treatment for male and female children in households, schools, and other public spaces, especially at the adolescent ages is widely documented in a highly patriarchal setup like India (Gnanaselvam & Joseph, 2018; John, 2021; Raj, 2010; Raj et al., 2019). Specifically, socioeconomic and family institutions interacting with gender exacerbate the low well-being of female children and adolescents in the country (Afifi, 2007). With a similar hypothesis, a few studies on time-use data of children suggested that girls with lower socio-economic status in India are burdened with both paid and unpaid work, and higher prevalence of child marriage compared with boys disrupting their physical health, educational performance, skill formation, and subjective well-being (Borga, 2019; Pells, 2011; Vikram, 2021). Further,

154 female adolescents have a greater likelihood of involving in low-quality unpaid
155 work than their male counterparts (Das & Mukherjee, 2011; Khan & Lyon, 2015).
156 Thus, the susceptibility to psychological distress is higher for females.

157   However, not many studies have investigated the question of whether the par-
158 ticipation in paid work during adolescence is a defining factor of mental ill-health
159 perpetuated in adulthood. In the Indian context, two existing studies suggest that
160 children with a history of work are at a higher risk of mental health problems
161 (Pandey et al., 2020; Trinh, 2020). Nevertheless, Pandey and colleagues (2020)
162 did not report gender gaps, while Trinh (2020) assessed a cohort of children aged
163 7 to 8 years who are generally less commonly found in paid work and not really
164 in a position to self-assess their mental health status. Moreover, the overall sam-
165 ple of Trinh (2020) is very small (n = 956). Thus, it is critical to understand the
166 gendered influence of paid work on mental health among AYAs using a bigger
167 longitudinal dataset and robust statistical assessment.

2 Need for the Study and Contribution

169 The level of the child and teenage labor in India is one of the largest in the world
170 and the highest among the South-Asian countries (ILO & UNICEF, 2021; Khan
171 & Lyon, 2015). In addition, despite undercounting the numbers, mental disorders
172 during adolescence have increased in the last two decades with notable gender
173 differentials (Gundi et al., 2020a, 2020b; Ibrahim et al., 2019; Sagar et al., 2020).
174 A limited number of previous studies from India have examined socioeconomic
175 and demographic determinants of poor mental health among AYAs (Chauhan &
176 Dhar, 2020; Gamlin et al., 2015; Gautham et al., 2020; Sagar et al., 2020). Few
177 studies have also investigated other factors that contribute to mental health issues
178 such as abuse (Beattie et al., 2019), the gendered nature of socialization (Ram
179 et al., 2014), lifestyle issues, and substance use (Kumar et al., 2012; Pillai et al.,
180 2008; Sunitha & Gururaj, 2014).

181   However, how far transition to paid work in adolescents adversely impacts men-
182 tal health across gender with their increasing age has not been documented so far.
183 School drop-out rates due to financial problems or early marriages and entering into
184 paid work at an early age is a widely recognized social problem in India, which can
185 have a significant impact on the mental health of AYAs; however, empirical evi-
186 dence is weak owning data related limitations. Thus, understanding the intersection
187 of gender, adolescent labor, and mental health is the key focus of our study. Using
188 comprehensive and robust longitudinal survey data, this study contributes in three
189 aspects: (1) the study is the first comprehensive investigation of the transition to
190 paid work and its impact on the mental health of AYAs. (2) Using the intersectional
191 framework for the investigation of differential effects of the transition to paid work
192 on the mental health of AYAs by gender, this study makes a significant contribution
193 to existing literature. (3) Additionally, we examined the heterogeneous effect of the
194 transition to paid work on the mental health of male and female AYAs by their edu-
195 cational and marital status, the first attempt in the Indian context.

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

D. Ganguly et al.

3 Methods

3.1 Study Design

We used data from the UDAYA project, which was administered by the Population Council and supported by the Bill and Melinda Gates Foundation and the David and Lucile Packard Foundation. In India, UDAYA is the only longitudinal survey that collected comprehensive information on the socio-psychological, economic, and demographic behaviors of AYAs. It was conducted in 2015–16 and 2018–19 using a multi-stage systematic sampling method and provides representative robust data for the states of Bihar and Uttar Pradesh (UP). UP and Bihar rank first and third in terms of the share of population, represent about 25% of the country's population and contribute the largest number of child labour in India (Census of India, 2011; Labour Resources Department, 2017). The respondents were interviewed face-to-face in both the waves. In the first wave of the survey (2015–16), the age of the respondents was between 10 to 19 years. The age range was selected as per the World Health Organization's definition for adolescents. The study design remains same in both waves. A full description of the study design, sampling weights, and quality assessment and challenges are documented elsewhere (see, Santhya et al., 2017a, 2017b).

3.2 Study Population

For the analyses, we created panel data using two rounds of the survey from both surveyed states. Our study is restricted to a total of 16,292 (UP: 7825 & Bihar: 8467) individuals who were interviewed in wave 1 and re-interviewed in the second wave. All means indicated in the tables and figures have been weighted using normalized state individual follow-up weights for deriving estimates representative of the general population (Gundi et al., 2020a, 2020b). The survey incorporated a range of questions on the socioeconomic, demographic, and lifestyle characteristics of the respondents and their parents and other related domains to assess the quality of their transition to adulthood (Santhya et al., 2017a, 2017b). Information has been collected from the boys and girls by maintaining their privacy to avoid any conflict with the family as well as in the community.

3.3 Outcome Measure

Our outcome measure was the mental ill-health score (MIS). MIS was measured based on a series of 9 questions obtained from the Patient Health Questionnaire (PHQ-9) depression screening module, a reliable, valid, and sensitive depression severity measure (Kroenke et al., 2001). AYAs reported whether they experienced such symptoms in the past two weeks preceding the survey. For each question, respondents can report "not at all", "less than one week", "one week or more", and "nearly every day", the weightage for each response ranges from 0 to 3 in the order of the response categories on the scale. Therefore, for a total of 9 questions, the overall MIS ranges from 0 to 27 with a higher score indicating a greater degree of ill-health. A detailed description of the questions used for the construction of the measure is given in Table 8, while their

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

Gender, Paid Work, and Mental Health of Adolescents and Young…

234 reliability (Cronbach's alpha) coefficients and the direction of contribution to the MIS
235 scale are presented in Table 9. The overall reliability (Cronbach's alpha) coefficient of
236 9 items used in the MIS measure is 0.86 in 2015–16 and 0.83 in 2018–19 (Table 9). A
237 qualitative evaluation of the robustness of mental health status measures in this survey
238 was also documented elsewhere (Gundi et al., 2020a, 2020b).

3.4 Independent and Control Measures

240 Our principal independent measure was the participation in paid work of male and
241 female AYAs in the last 12 months preceding the survey. Out of the total sample,
242 27.2% were boys and 72.8% were girls. Both male and female AYAs were asked
243 whether they were engaged in any paid work in the last 12 months (yes/no) pre-
244 ceding the survey in both waves. In the study sample, 21% and 42% of boys and
245 14% and 21% of girls, respectively in 2015–16 and 2018–19 reported that they were
246 engaged in paid work in the last 12 months. A detailed description of the control
247 measures used in this study is presented in Table 10.

4 Ethical Considerations

249 The UDAYA project protocol was approved by the Institutional Review Board of
250 the Population Council. The Population Council took several measures to guarantee
251 that research ethics were strictly followed. Interviewers undertook rigorous training
252 in ethical considerations, and teams were taught to acquaint community leaders with
253 the study and seek their support for its implementation in their community. Both
254 oral and written consent was also sought from each individual to be interviewed, and
255 from their parents. The interviewers or their parents were signed in a consent form
256 that explains the content and purpose of the survey. The anonymity of the respond-
257 ents and their households is fully ensured in the datasets available for public access
258 (for more details see Santhya et al., 2017a, 2017b).

5 Statistical Analyses

260 The statistical analyses were performed in three stages. First, an ordinary least squares
261 (OLS) regression model was conducted on the pooled sample to investigate the inde-
262 pendent effect of gender and paid work on MIS controlling for all other socio-eco-
263 nomic and demographic factors for the overall sample and separately for male and
264 female AYAs. Second, using panel data from the two waves (Panel 1 & 2), OLS and
265 Probit regression models were carried out with the interaction effect of the transition
266 to paid work and gender as an explanatory variable on MIS, indicating the direction
267 of the influence after controlling for a range of other factors. Taking the advantage
268 of longitudinal data, the status of participation in paid work among AYAs available
269 from wave 1 and wave 2 can provide us an opportunity to assess whether transition
270 to participating in paid work impacts on their mental health in comparison to those

271 discontinued participation in paid work in the subsequent wave. Third, we analyzed the
272 heterogeneous effect of paid work across axes of schooling status and marital status by
273 modeling the interaction of 'schooling status and participation in paid work' and 'mar-
274 ital status and participation in paid work' on MIS for both male and female AYAs sep-
275 arately. Fourth, we computed random-effect regression models as robustness checks to
276 confirm the validity of our findings after controlling for dependencies of unobserved,
277 independent variables on MIS. Random-effects regression models are usually com-
278 puted in panel data to estimate the influence of variables that change over time (e.g.,
279 participation in paid work) as well as stable characteristics of the respondents (e.g.,
280 gender) on the outcome (Wooldridge, 2016). We used Hausman test specification to
281 decide between fixed versus random effects model. Lastly, we used instrument vari-
282 able regression to validate our main findings after adjusting to endogeneity issue in our
283 main explanatory variable: paid work.

284 The mathematical description of our linear regression model is written as below:

$$Y_{MIS} = \alpha + \beta_1 X_{(gender*transition\ in\ paid\ work)} + \beta X_{controls} + \varepsilon_i \tag{1}$$

287 where,

288 Y   Mental ill-health score
289 $\beta_1.....\beta_n$ the coefficients of interest
290 ε the standard idiosyncratic error term

291 The same methodology has been followed to assess the heterogeneous effect of
292 paid work on the linear variable of MIS among the study participants.

293 Further, a Probit regression model has been computed for assessing predictors
294 of change in MIS among AYAs: increase in MIS from 2015–16 to 2018–19.

295 The specification of the Probit regression model has been written as below:

$$P_r(\text{increased MIS} = 1) = \varnothing\{\beta_0 + \beta_1 X_{(gender*transition\ in\ paid\ work)} + \beta X_{controls} + \varepsilon_i\} \tag{2}$$

298 where,

299 $\varnothing$ the standard normal distribution.
300 $\beta_0, \beta_{1...}$ parameters to be estimated.

301 The same methodology has been followed to assess the predictors of change in
302 MIS of the males and female respondents separately.

6 Results

6.1 Descriptive Statistics

305 The results presented in column 1 of the Table 1 suggest a two-fold increase in the mean
306 MIS of the sampled AYAs, from 1.97 in 2015–16 to 3.50 in 2018–19. During this period,

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

Gender, Paid Work, and Mental Health of Adolescents and Young…

307 the average percentage of AYAs participating in paid work also increased. There was no
308 change in the gender distribution of the sample over time, while the average age of the
309 respondents increased from 16 years in 2015–16 to 19 years in 2018–19. School attend-
310 ance significantly dropped, whereas the proportion of ever-married samples increased
311 from 0.26 in 2015–16 to 0.37 in 2018–19. The socio-economic characteristics of the sam-
312 ple are in line with the general population characteristics of the states.

313   Column 2 of Table 1 presents the mean MIS by paid work, gender, and other
314 socio-economic and demographic characteristics. MIS for AYAs involved in paid
315 work (2.18) is higher than their counterparts (1.92) in 2015–16, though this differ-
316 ence is significantly narrowed by the second wave of the survey in 2018–19. A con-
317 siderable male–female difference in MIS was observed in both years where female
318 AYAs were disproportionately burdened with higher MIS. The absolute female-male
319 gap in MIS increased from 1.16 in 2015–16 to 1.78 in 2018–19. AYAs not attend-
320 ing school report higher MIS compared to those currently attending school. Married
321 AYAs have higher MIS than unmarried counterparts in both years. AYAs reported
322 seeking for a job has higher MIS than those reported not seeking for a job. AYAs in
323 households with lower educated mothers and disadvantageous social groups have
324 higher MIS in both waves of the survey.

325   The mean estimates of MIS for AYAs across the intersectional axes of gender and
326 paid work by survey year presented in Fig. 1 reveal that the score is higher for the
327 females engaged in paid work for both years. Furthermore, not only the level of mean
328 MIS was higher for females, but it also increased more for females than males over time.

6.2 Independent Effect of Gender and Paid Work on MIS

330 In this section, we tested the hypothesis that paid work and female gender are posi-
331 tively associated with MIS net of other socio-economic, demographic, and behav-
332 ioral factors. The results of the pooled OLS regression model in column 1 from
333 Table 2 suggested that relative to males, females reported significantly higher lev-
334 els of MIS ($\beta = 1.15$; 95% confidence interval [CI]:$1.04 - 1.26$). The level of MIS
335 ($\beta = 0.18$; 95% CI:$-0.07 - 0.30$) was also significantly higher for those who partici-
336 pated in paid work in the preceding 12 months.

337   Separate estimates for male and female AYAs in column 2 and column 3 respec-
338 tively presented in Table 2 also affirm that paid work makes a significant difference in
339 MIS scores net of other socio-economic, demographic, and behavioral factors. Specifi-
340 cally, paid work showed a greater effect on MIS among female population ($\beta = 0.34$;
341 95% CI: $0.20 - 0.49$) than male population ($\beta = 0.25$; 95% CI: $0.10 - 0.39$). Further,
342 these estimates also suggest that the effect of socio-economic characteristics on MIS
343 is gender-sensitive. In particular, the results demonstrate that education, marital status,
344 caste affiliation, and urban/rural residence make a significant difference in terms of
345 the prevalence of MIS only for female samples. On the other hand, consumption of
346 tobacco and alcohol, seeking jobs, physical violence by parents, and religious affilia-
347 tion are significant predictors of MIS in case of both male and female samples, but in
348 all cases, the adverse effect is stronger for female AYAs than male AYAs.

Table 1 Change in MIS from 2015–16 to 2018–19

Explanatory variables	Category	(1) Sample distribution of the study variables, n = 16,292 (unweighted), mean/proportion (SD)		(2) Mean MIS (SE) (weighted)		
		2015–16 (1)	2018–19 (2)	2015–16 (3)	2018–19 (4)	Difference (4)—(3)
MIS		1.97 (3.52)	3.50 (4.25)			
Paid work	Yes	0.16 (0.37)	0.27 (0.44)	2.18 (0.07)	3.48 (0.06)	1.30***
	No	0.84 (0.37)	0.73 (0.44)	1.92 (0.03)	3.43 (0.04)	1.51***
Gender	Male	0.27 (0.45)	0.27 (0.45)	1.12 (0.03)	2.15 (0.04)	1.03***
	Female	0.73 (0.45)	0.73 (0.45)	2.28 (0.04)	3.93 (0.04)	1.65***
Age	10–14 years	16.10 (2.44)	18.99 (2.47)	0.82 (0.03)	-	-
	15–19 years			2.24 (0.03)	-	-
	13–17 years			-	2.17 (0.05)	-
	18–22 years			-	3.79 (0.04)	-
Education level	Illiterate (None)	0.10 (0.31)	0.10 (0.31)	2.50 (0.11)	4.14 (0.11)	1.64***
	1–4 years (primary)	0.10 (0.30)	0.04 (0.19)	1.19 (0.07)	3.43 (0.17)	2.24***
	5–9 years (secondary)	0.49 (0.50)	0.39 (0.49)	1.90 (0.04)	3.38 (0.05)	1.48***
	10 & above (higher)	0.31 (0.46)	0.47 (0.50)	2.15 (0.05)	3.35 (0.05)	1.20***
Attending school	Yes	0.68 (0.47)	0.44 (0.50)	1.61 (0.03)	2.60 (0.04)	0.99***
	No	0.33 (0.47)	0.56 (0.50)	2.49 (0.06)	3.91 (0.05)	1.42***
Marital status	Ever married	0.26 (0.44)	0.37 (0.48)	2.87 (0.07)	4.64 (0.06)	1.77***
	Never married	0.74 (0.44)	0.63 (0.48)	1.64 (0.03)	2.66 (0.03)	1.02***
Consumed tobacco	Yes	0.05 (0.22)	0.14 (0.35)	2.31 (0.12)	3.43 (0.09)	1.12***
	No	0.95 (0.22)	0.86 (0.35)	1.95 (0.03)	3.45 (0.04)	1.50***

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

Gender, Paid Work, and Mental Health of Adolescents and Young…

Table 1 (continued)

Explanatory variables	Category	(1) Sample distribution of the study variables, n = 16,292 (unweighted), mean/proportion (SD)		(2) Mean MIS (SE) (weighted)		Difference
		2015–16	2018–19	2015–16	2018–19	(4)—(3)
		(1)	(2)	(3)	(4)	
Consumed alcohol	Yes	0.01 (0.12)	0.05 (0.22)	2.37 (0.24)	3.11 (0.14)	0.74*
	No	0.99 (0.12)	0.95 (0.22)	1.96 (0.03)	3.46 (0.03)	1.50*
Currently seeking job	Yes	0.15 (0.35)	0.25 (0.43)	2.80 (0.10)	4.07 (0.07)	1.27***
	No	0.85 (0.35)	0.75 (0.43)	2.14 (0.03)	3.46 (0.04)	1.32***
Physically hurt by parents	Yes	0.39 (0.49)	0.39 (0.49)	1.96 (0.04)	3.02 (0.12)	1.06***
	No	0.61 (0.49)	0.61 (0.49)	1.97 (0.04)	2.60 (0.04)	0.63***
Mother's education	Illiterate	0.70 (0.46)	0.70 (0.46)	2.01 (0.03)	3.51 (0.04)	1.50***
	1–9 years (primary & sec)	0.18 (0.39)	0.18 (0.39)	1.89 (0.06)	3.32 (0.08)	1.43*
	10 and above (higher)	0.12 (0.32)	0.12 (0.32)	1.73 (0.07)	3.19 (0.09)	1.46***
Caste	SC/ST	0.24 (0.43)	0.24 (0.43)	2.52 (0.06)	3.54 (0.07)	1.02***
	OBC	0.59 (0.49)	0.59 (0.49)	1.90 (0.03)	3.45 (0.04)	1.55*
	General	0.18 (0.38)	0.18 (0.38)	1.91 (0.06)	3.27 (0.07)	1.36***
Religion	Hindu	0.80 (0.40)	0.80 (0.40)	1.94 (0.03)	3.46 (0.04)	1.52***
	Muslim	0.20 (0.40)	0.20 (0.40)	2.07 (0.07)	3.36 (0.08)	1.29***
	Others	0.00 (0.06)	0.00 (0.06)	1.71 (0.37)	3.40 (0.45)	1.69*
Wealth quintile[#]	Poorest	0.12 (0.32)	0.12 (0.32)	1.87 (0.08)	3.49 (0.10)	1.62
	Poorer	0.16 (0.37)	0.16 (0.37)	1.87 (0.07)	3.50 (0.08)	1.63*
	Middle	0.21 (0.41)	0.21 (0.41)	2.02 (0.06)	3.53 (0.07)	1.51
	Richer	0.27 (0.44)	0.27 (0.44)	2.05 (0.06)	3.45 (0.06)	1.40***

Table 1 (continued)

Explanatory variables	Category	Sample distribution of the study variables, n=16,292 (unweighted), mean/proportion (SD) (1)		Mean MIS (SE) (weighted) (2)		
		2015–16 (1)	2018–19 (2)	2015–16 (3)	2018–19 (4)	Difference (4)—(3)
	Richest	0.25 (0.43)	0.25 (0.43)	1.96 (0.05)	3.25 (0.06)	1.29*
Place of residence	Urban	0.43 (0.49)	0.43 (0.49)	2.01 (0.05)	3.58 (0.05)	1.57***
	Rural	0.58 (0.49)	0.58 (0.49)	1.96 (0.04)	3.42 (0.04)	1.46***
States	Bihar	0.52 (0.50)	0.48 (0.50)	2.05 (0.04)	3.77 (0.05)	1.72***
	Uttar Pradesh	0.48 (0.50)	0.52 (0.50)	1.88 (0.04)	3.08 (0.05)	1.20***

Note: MIS = mental ill-health score; SD = standard deviation; SE = Standard error; SC = Scheduled caste; ST = Scheduled Tribe; OBC = Other Backward Class

* T-test significance level
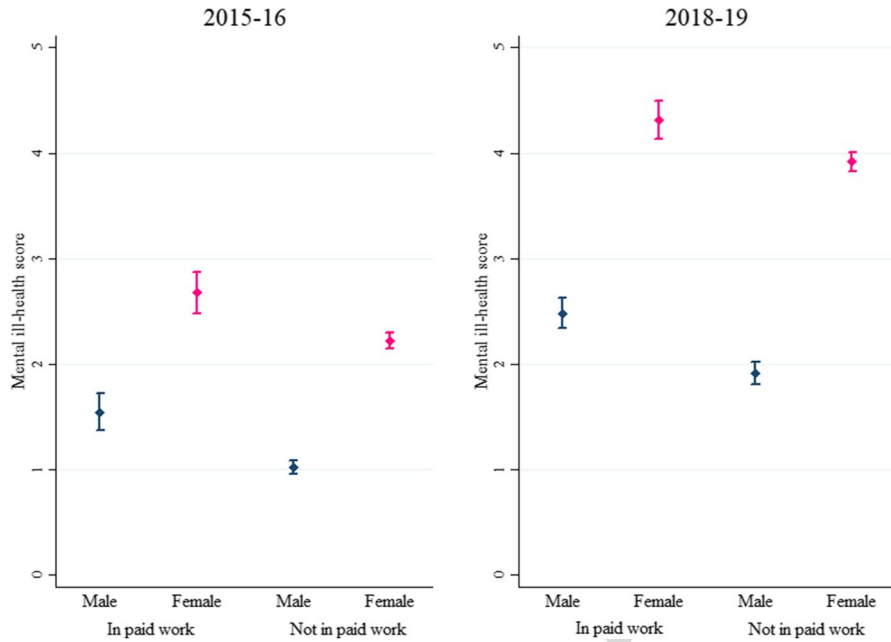
Fig. 1 Mean MIS by gender and paid work interactions across the waves

349 Additionally, separate regression models for 2015–16 and 2018–19 reveal that
350 while the effect of paid work on MIS has not changed much over time, gender differ-
351 ences widened such that MIS worsened in females relative to males (Fig. 2).

6.3 Interaction Effect of Gender and Transition in Paid Work on MIS

353 The second hypothesis was that the transition from no work to paid work impacts the
354 mental health status of female AYAs more than male AYAs. Evidence presented in
355 Fig. 3 suggests that the proportion of AYAs who have experienced a decrease in MIS
356 from 2015–16 to 2018–19 was lower than those who experienced an increase. Although
357 the transition from not working to participating in paid work from 2015–16 to 2018–19
358 adversely affected the MIS of both female and male AYAs, the absolute level of MIS for
359 the second wave (2018–19) and its increase over time (from 2015–16 to 2018–19) was
360 greater for female AYAs than male AYAs.
361 Supporting the bivariate estimates shown in Fig. 3, the Probit regression esti-
362 mates (Table 3) also suggest that the predicted probabilities of the increase in MIS
363 was significantly higher for the AYAs who transited from not working to paid work
364 during 2015–16 to 2018–19 than the reference category (those transited from partic-
365 ipated in paid work in wave 1 to not participated in paid work in wave 2) net of other
366 controls. Thus, our longitudinal results provide evidence on how an exit or entry into
367 paid work over two waves can bring changes in the MIS of AYAs, and help to estab-
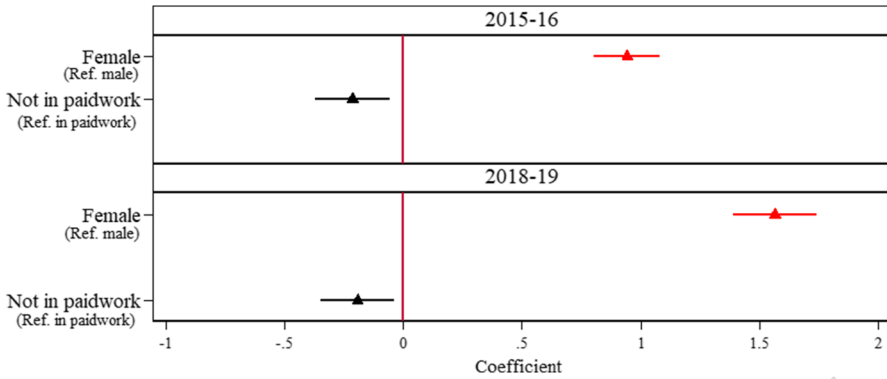368 lish the direction of causal relationship between participation in paid work and MIS.

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

D. Ganguly et al.

Table 2 Pooled OLS regression estimates: The independent effect of gender and paid work on MIS of the study participants

	(1) Overall (N = 32,584)	(2) Male (N = 8856, 27.2%)	(3) Female (N = 23,728, 72.8%)
Explanatory variables	Coefficient (95% CI)	Coefficient (95% CI)	Coefficient (95% CI)
Gender			
Female	1.15 (1.04,1.26)***	-	-
Paid work			
Yes	0.18 (0.07, 0.30)***	0.25 (0.10, 0.39)***	0.34 (0.20, 0.49)***
Age	0.22 (0.20, 0.24)***	0.07 (0.04, 0.10)***	0.28 (0.26, 0.31)***
Education level			
1–4 years	0.38 (0.17, 0.60)***	-0.13 (-0.53, 0.27)	0.46 (0.18, 0.73)***
5–9 years	0.46 (0.31, 0.61)***	0.14 (-0.22, 0.50)	0.58 (0.40, 0.75)***
10 & above	0.15 (-0.02, 0.32)*	0.27 (-0.11, 0.65)	0.17 (-0.03, 0.37)
Attending school	0.001 (-0.12, 0.12)	0.16 (-0.002, 0.32)*	-0.12 (-0.27, 0.03)
Marital status			
Ever married	0.86 (0.74, 0.99)***	-0.003 (-0.37, 0.36)	0.67 (0.52, 0.81)***
Consumed tobacco	0.53 (0.36, 0.69)***	0.41 (0.26, 0.57)***	1.13 (0.87, 1.39)***
Consumed alcohol	0.06 (-0.20, 0.33)	0.31 (0.11, 0.51)***	3.55 (2.62, 4.48)***
Currently seeking job	1.01 (0.89, 1.13)***	0.71 (0.57, 0.85)***	1.29 (1.13, 1.44)***
Physically hurt by parents	0.32 (0.23, 0.41)***	0.14 (0.03, 0.25)**	0.37 (0.26, 0.49)***
Mother's education			
1–9 years	0.06 (-0.05, 0.18)	0.10 (-0.04, 0.24)	0.05 (-0.10, 0.20)
10 and above	0.01 (-0.14, 0.16)	0.04 (-0.14, 0.21)	-0.04 (-0.24, 0.16)
Caste			
OBC	-0.21 (-0.31, -0.10)***	-0.06 (-0.20, 0.07)	-0.23 (-0.37, 0.10)***
General	-0.12 (-0.27, 0.02)*	0.11 (-0.07, 0.29)	-0.20 (-0.39, -0.01)**
Religion			
Muslim	0.20 (0.09, 0.32)***	0.17 (0.02, 0.33)**	0.19 (0.05, 0.03)***
Others	-0.25 (-0.94, 0.43)	-0.33 (-1.26, 0.60)	-0.22 (-1.09, 0.65)
Wealth quintile			
Poorer	0.03 (-0.13, 0.19)	-0.01 (-0.24, 0.21)	0.07 (-0.13, 0.27)
Middle	0.04 (-0.12, 0.19)	0.07 (-0.14, 0.29)	0.04 (-0.15, 0.24)
Richer	0.11 (-0.05, 0.26)	0.15 (-0.06, 0.37)	0.12 (-0.07, 0.31)
Richest	-0.03 (-0.20, 0.14)	0.11 (-0.12, 0.34)	-0.06 (-0.28, 0.16)
Place of residence			
Urban	0.26 (0.16, 0.35)***	-0.04 (-0.17, 0.08)	0.35 (0.23, 0.47)***
States			
Uttar Pradesh	-0.19 (-0.28, -0.10)***	-0.08 (-0.19, 0.03)	-0.26 (-0.38, -0.15)***
Constant	-2.86 (-3.29, -2.43)***	-0.37 (-0.98, 0.24)	-2.90 (-3.44, -2.35)***
Prob > F	0.00	0.00	0.00
R-squared	0.09	0.07	0.08
Adj R-squared	0.09	0.06	0.08

Note: Estimations are statistically significant at *** $p < 0.001$, ** $p < 0.05$, * $p < 0.1$

Journal : SmallExtended 12187	Article No : 10009	Pages : 34	MS Code : 10009	Dispatch : 14-1-2023

Gender, Paid Work, and Mental Health of Adolescents and Young…

Fig. 2 Linear regression estimates: The effect of gender and paid work on MIS. Note: All models include additionally: age, educational level, currently attending school, marital status, consuming tobacco, consuming alcohol, currently seeking a job, physically hurt by parents, mother's education, caste, religion, wealth quintile, place of residence, states
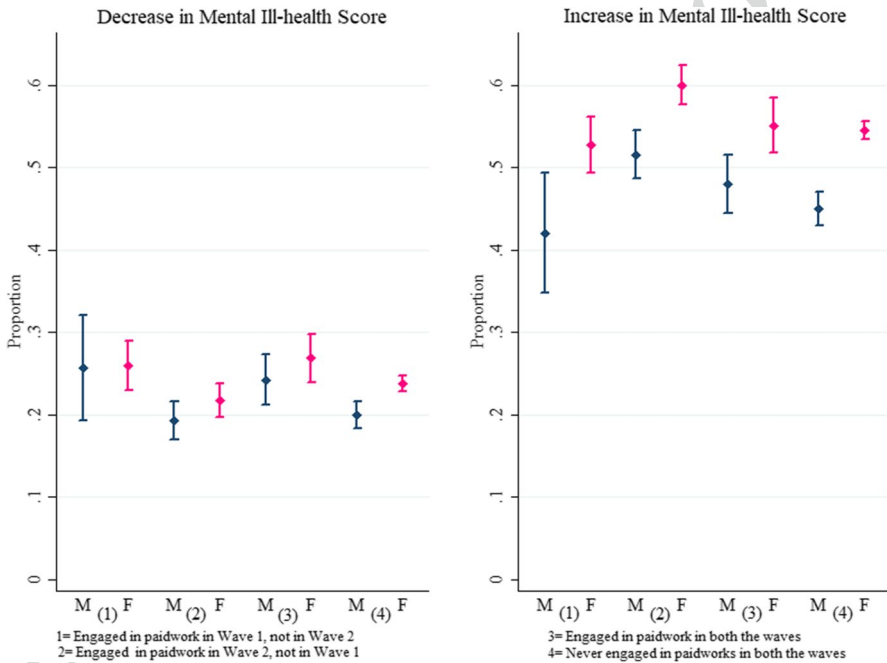
Fig. 3 Proportion of decrease and increase in MIS by gender and paid work interactions across the waves, 2015–16 to 2018–19

6.4 Heterogeneous Effect of Paid Work on MIS

Table 4 shows the results in support of our third hypothesis that the burden of paid work coupled with schooling and marriage may worsen the MIS of AYAs. The estimates based on linear regression models for the overall sample revealed that AYAs who participated

Table 3 Linear and Probit regression estimates: The interaction effect of transition in paid work and gender on MIS of the study participants

Interaction of transition in paid work and gender	Category	Coefficient of MIS in 2018–19 (95% CI)	Coefficient of increased MIS (95% CI)
Male*Paid work transition	Paid work in Panel 1 not in Panel 2®		
	Paid work in Panel 2 not in Panel 1	0.21 (-0.25, 0.67)	0.22 (0.02, 0.42)**
	Paid work in Panel 1 and in Panel 2	0.14 (-0.35, 0.62)	0.14 (-0.07, 0.35)
	No Paid work in Panel 1 and Panel 2	-0.21 (-0.67, 0.24)	0.05 (-0.15, 0.24)
Female*Paid work transition	Paid work in Panel 1 not in Panel 2®		
	Paid work in Panel 2 not in Panel 1	0.45 (0.07, 0.83)**	0.20 (0.09, 0.31)***
	Paid work in Panel 1 and in Panel 2	0.42 (-0.01, 0.84)*	0.07 (-0.05, 0.19)
	No Paid work in Panel 1 and Panel 2	-0.17 (-0.49, 0.16)	0.03 (-0.06, 0.13)

Note: All models include additionally: age, educational level, currently attending school, marital status, consuming tobacco, consuming alcohol, currently seeking a job, physically hurt by parents, mother's education, caste, religion, wealth quintile, place of residence, states. Full results are provided in Table S1

® Reference category

Estimations are statistically significant at *** $p < 0.001$, ** $p < 0.05$, * $p < 0.1$

MIS = mental ill-health score; CI = confidence interval

in paid work while also attending school had a significantly higher likelihood of MIS ($\beta = 0.38$; 95% CI: $0.21 - 0.55$) compared with those attending school but were not engaged in paid work. However, the models disaggregated by gender suggest that participating in paid work irrespective of attending school makes a greater difference for female AYAs than male AYAs. Females engaged in paid work reported higher MIS irrespective of their current schooling status. Model 2 indicated that married females doing paid work reported a significantly higher MIS ($\beta = 0.37$; 95% CI: $0.13 - 0.62$) than their counterparts not doing paid work. Unmarried women, however, had lower levels of MIS irrespective of paid work status. The effect of marital status made no difference for men. The heterogeneous effect analyses, therefore, suggested that the interaction effect of paid work with schooling and paid work with marital status on MIS was gender-sensitive.

7 Robustness Checks

7.1 Panel Data Regression Estimates

As a part of the robustness check for the aforementioned estimates reported in Tables 2, 3, and 4, taking advantage of the panel data, we re-estimated the models using a random effects regression model to control for dependencies of unobserved

Table 4 Linear regression estimates: heterogeneous effect of paid work on MIS of the study participants

Interaction terms	Category	Overall (N=32,584) Coefficient (95% CI)	Male (N=8856, 27.2%) Coefficient (95% CI)	Female (N=23,728, 72.8%) Coefficient (95% CI)
Model 1				
Attending school*Paid work	Attending school but not in paid work®			
	Attending school and in paid work	0.38 (0.21, 0.55)***	0.41 (0.24, 0.59)***	0.42 (0.19, 0.66)***
	Not attending school and paid work	0.09 (-0.05, 0.22)	0.07 (-0.15, 0.28)	0.14 (-0.02, 0.31)*
	Not attending school, but in paid work	0.13 (-0.03, 0.28)	0.02 (-0.17, 0.21)	0.44 (0.24, 0.65)***
Model 2				
Marital status*Paid work	Ever married, not in paid work®			
	Ever married and in paid work	0.26 (0.04, 0.47)**	-0.60 (-1.59, 0.38)	0.37 (0.13, 0.62)***
	Unmarried, not in paid work	-0.85 (-0.98, -0.71)***	-0.73 (-1.64, 0.19)	-0.66 (-0.81, -0.51)***
	Unmarried and in paid work	-0.69 (-0.83, -0.54)***	-0.46 (-1.37, 0.45)	-0.33 (-0.53, -0.14)***

Note: All models include additionally: age, educational level, currently attending school, marital status, consuming tobacco, consuming alcohol, currently seeking a job, physically hurt by parents, mother's education, caste, religion, wealth quintile, place of residence, states. Full results are provided in Table S2

® Reference category

Estimations are statistically significant at *** p<0.001, ** p<0.05, * p<0.1

CI=confidence interval

389 independent variables on MIS. We choose random effects over fixed effects follow-
390 ing Hausman test. The model can be mathematically written as:

$$Y_{MIS} = \alpha_i + \beta_1 X_{(gender*transition\ in\ paid\ work)} + \beta X_{controls} + u_i + \varepsilon_i \quad (3)$$

393 where,

394 Y   dependent variable, MIS
395 α_i (i = 1…..n) is unknown intercept for each entity (n entity specific
396   intercept)
397 $\beta_1 ….. \beta_n$ the coefficients of interest
398 $X_1 ….. X_n$ gender*transition in paid work and other covariates
399 u   between entity error
400 ε within entity error

401 The results reported in Tables 5 and 6 suggested that the findings from the ran-
402 dom effect models are in tune with our main analyses, which affirm the robustness
403 of the empirical findings reported in this study. For instance, results in Table 5 sug-
404 gest 1.12 times higher MIS for females compared to their male counterparts. With
405 reference to AYAs in paid work, those not involved in paid work have 0.20 times
406 lesser MIS in the overall sample. While estimates for male and female sub-samples
407 suggest that in comparison with AYAs involved in paid work, MIS is significantly
408 less for not working females (0.35 times) than not working males (0.27 times).
409 The results in Table 6 are also in line with what we observed in Table 4, where
410 findings further assert that additional burden imposed due to schooling and marriage
411 coupled with paid work leads to a higher MIS, especially for female AYAs.
412 However, the random effect model assumes that observations from the same indi-
413 vidual are correlated and this results in "non-standard" standard errors. Also, ran-
414 dom effect models include a distributional assumption about the individual effect
415 too. However, it is well known that random effect models cannot deal with the prob-
416 lem of confounding (Wooldridge, 2016). Therefore, we have also run a fixed regres-
417 sion model to see whether our results from random effects significantly vary from
418 fixed effects, thereby ruling out potential bias in the results of random effects. Fixed
419 effects model results from Fig. 4 do not hint at any bias and align with the results
420 from the random effect model and pooled OLS model. Participation in paid work
421 significantly pushes the MIS net of other socio-economic, demographic, and behav-
422 ioral factors, particularly for female in comparison to male AYAs.

7.2 Instrument Variable Regression Estimates

424 The association that we observed in both OLS and panel data regression models
425 could be a conditional correlation between employment outcomes and MIS because
426 improvements in mental health can also lead to a higher probability of entry into
427 employment. In order to deal with the possibility of reverse causality or endogene-
428 ity, we modelled two instrument variable (IV) regressions. We have considered three

Journal : **SmallExtended 12187**	Article No : **10009**	Pages : **34**	MS Code : **10009**	Dispatch : **14-1-2023**

Gender, Paid Work, and Mental Health of Adolescents and Young…

Table 5 Panel-data estimates: Random effects of gender and paid work on MIS of the study participants

Explanatory variables	Category	Overall (N = 32,514) Coefficient (95% CI)	Male (N = 8842, 27.2%) Coefficient (95% CI)	Female (N = 23,672, 72.8%) Coefficient (95% CI)
Gender	Male®			
	Female	1.12 (1.02,1.21)***	-	-
Paid work (last 12 months)	Yes®			
	No	-0.20 (-0.32, -0.08)***	-0.27 (-0.43, -0.10)***	-0.35 (-0.50, -0.20)***

Note: All models include controlled for age, educational level, consuming tobacco, consuming alcohol, currently seeking a job, physically hurt by parents, mother's education, caste, religion, wealth quintile, place of residence, states. Full results are provided in Table S3

® Reference category

Estimations are statistically significant at *** $p < 0.001$, ** $p < 0.05$, * $p < 0.1$

CI = confidence interval

instruments for two models (Model 1: seeking a job and mother's education; Model 2: seeking a job, mother's education, and receiving a scholarship for schooling).

First, seeking a job or entering the labour market at a young age in India is an indicator of impoverishment, given the very-low paid, unsafe, and informal nature of jobs available to them (Chowdhury, 2020; Singh et al., 2018). Also, seeking a job indicates a willingness to enter the labour market at tender ages. Moreover, voluntary participation in paid work is less likely to cause mental health problems than those compelled to do it without their will. Second, better educated mothers, most probably from higher income or social status, tend to encourage their children to continue their education instead of compelling them to enter into low-paid labour markets (Desai et al., 2010). In particular, the mother's education is used as a proxy of the parental preference for the investment in continuing children's education instead of pushing them into low paid jobs to help parents earn for the household. Third, access to scholarship for schooling or college helps AYAs from lower socio-economic groups to continue their education and prevents forceful entry into the labour market, which can protect their mental health; otherwise, it can adversely impact their mental health. Thus, the study uses these three variables to control for endogeneity. The statistical expression for the model is as follows:

$$Y_{MIS} = \alpha + \beta_0(paid\ work = seeking\ job, mother's\ education,\ schooling\ scholarship) + \beta X_{i(control\ variables)} + \varepsilon_i \quad (4)$$

where,

Y_{MIS} dependent variable, MIS

Instruments   seeking a job, mother's education and schooling scholarship.

Instrumented   paid work

X_i control variables

Table 6 Panel-data random effect estimates: Heterogeneous effect of paid work on MIS of the study participants

Category	Overall (N=32,514) Coefficient (95% CI)	Male (N=8842, 27.2%) Coefficient (95% CI)	Female (N=23,672, 72.8%) Coefficient (95% CI)
Model 1			
Gender*Paid work			
Male not in paid work®			
Male in paid work	-0.40 (-0.55, -0.24)***	-	-
Female not in paid work	0.90 (0.79, 1.00)***	-	-
Female in paid work	1.37 (1.20, 1.53)***	-	-
Model 2			
Attending schooling*Paid work			
Attending school but not in paid work®			
Attending school and in paid work	0.39 (0.23, 0.55)***	0.43 (0.23, 0.63)***	0.43 (0.19, 0.66)***
Not attending school and paid work	0.08 (-0.06, 0.21)	0.06 (-0.17, 0.29)	0.13 (-0.03, 0.29)
Not attending school, but in paid work	0.14 (-0.02, 0.30)*	0.04 (-0.17, 0.25)	0.44 (0.22, 0.65)***
Model 3			
Marital status*Paid work			
Ever married, not in paid work®			
Ever married and in paid work	0.28 (0.02, 0.54)**	-0.64 (-1.93, 0.65)	0.41 (0.12, 0.69)**
Unmarried, not in paid work	-0.81 (-0.96, -0.66)***	-0.79 (-2.01, 0.43)	-0.62 (-0.79, -0.46)***
Unmarried and in paid work	-0.64 (-0.80, -0.47)***	-0.51 (-1.73, 0.72)	-0.30 (-0.50, -0.10)**

Note: All models include controlled for age, educational level, consuming tobacco, consuming alcohol, currently seeking a job, physically hurt by parents, mother's education, caste, religion, wealth quintile, place of residence, states. Full results are provided in Table S4

Estimations are statistically significant at *** p<0.001, ** p<0.05, * p<0.1
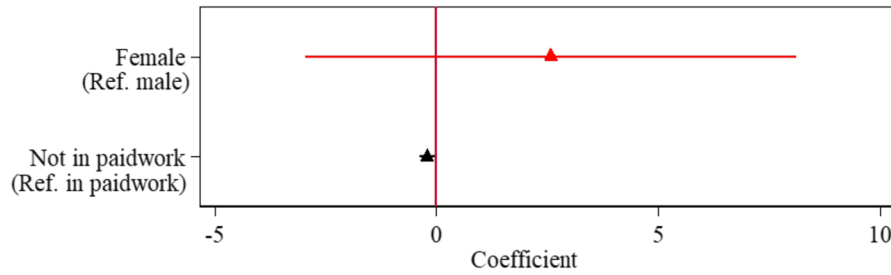
Fig. 4 Panel data regression estimates: The fixed effect of gender and paid work on MIS

The Instrument variable regression results reported in the Table 7 model 1 and 2 strengthen our argument that transition to paid work in adolescent ages influence MIS. In particular, Table 7 suggests that AYAs in paid work are more likely to have higher MIS (6 times) than their counterparts. Tests of over-identifying restrictions suggest that our instruments are valid and not weak.

8 Discussion

Social, economic, and health behavior transition during adolescence and related psychological issues are cause for concern and need an urgent call for action in poor resource settings of India (Sunitha & Gururaj, 2014). In this context, using a robust dataset and statistical assessment, this study explored participation in paid work at adolescent and young ages and its impact on MIS. The findings from our study are in line with prior research in global (Ibrahim et al., 2019) and Indian (Pandey et al., 2020; Trinh, 2020) contexts. However, our study adds new and significant insights in three ways, in particular for the Indian context. First, our findings are based on a large sample relative to those in previous studies from India. Second, we provide evidence of more a mere correlation using longitudinal data for estimating the influence of the transition to paid work on mental health status for both male and female AYAs. Third, the heterogeneous effect analyses indicate that the mental health impact of paid work's burden varies significantly by schooling and marital status, especially for female AYAs. Thus, we can interpret that the association between paid work and mental health is gender-sensitive across socio-economic characteristics, often resulting in a more adverse impact on female than male AYAs, particularly in resource-poor settings. Fourth, using instrument variable regression estimates, we ruled out the possibility of reverse causality: 'better mental health leading to higher-paid work' and also the endogeneity issues in our main explanatory variable, thereby affirming robustness of our main findings.

Our findings support the previous assertion that mental health problems dramatically escalate with age, more so for females than males, possibly due to the interference of bio-psychosocial factors (Petersen et al., 1993). Consumption of AQ2 tobacco and alcohol, seeking for jobs, physical violence from parents and Muslim

Table 7 Estimates of Instrumental variables (2SLS) regression

Variables	Coefficient (Standard error)	
	Model 1	Model 2
Male	-2.02*** (0.098)	-2.02*** (0.098)
Paid work	6.52*** (0.475)	6.49*** (0.473)
Constant	-1.15*** (0.376)	-1.15**(0.375)
Observations	24,849	24,849
Tests of endogeneity—Ho: variables are exogenous		
Durbin (score) chi2 (1)	231.916 (*p*=0.000)	230.03 (*p=0.000*)
Wu-Hausman F (1,24,827)	233.894 (*p*=0.000)	231.974 (*p=0.000*)
Weak instrument test—Ho: Instruments are weak		
First-stage F-statistic:	217.17 (*p*=0.0000)	*163.304*
Tests of overidentifying restrictions- Ho: all instruments are valid		
Sargan chi(2)	1.936 (*p*=0.380)	3.824 (0.281)
Basmann chi(2)	1.934 (*p*=0.380)	3.821 (0.281)

Note: *Dependent variable:* mental ill-health score

Instrumented: Paid work of AYAs

Instruments in Model 1: Seeking job, Mother educational level

Instruments in Model 2: Getting scholarship, Seeking job, Mother educational level

Control variables: age, educational level, consuming tobacco, consuming alcohol, currently seeking a job, physically hurt by parents, mother's education, caste, religion, wealth quintile, place of residence, states

Full results are provided in Table S5

Estimations are statistically significant at *** p < 0.001, ** p < 0.05, * p < 0.1

religious affiliation (in the case of both male and female AYAs), urban place of residence, and marital status is positively associated with poor MIS. Female AYAs from socially disadvantaged section Scheduled castes and Scheduled tribes (SCs/STs) revealed a higher MIS in comparison to the other castes, whereas caste is not significantly associated with MIS for boys. These findings are also in line with previous studies in India (Chauhan & Dhar, 2020; Gnanaselvam & Joseph, 2018; Kumar et al., 2012; Pillai et al., 2008) and global context (Kaufman et al., 2020; Mehlhausen-Hassoen & Winstok, 2019; Russell & Odgers, 2020). The economic (wealth) status did not show a significant difference in the MIS of AYAs according to their paid work status, the lack of significant and expected direction of influence by wealth status on AYAs is possibly due to its strong collinearity with participation in paid work.

8.1 Limitations

This study has some limitations. First, the UDAYA dataset used in this study provides information on AYAs only for two states of India, which hinders the scope of national-level estimations. Second, to identify the mental health

501 condition of the AYAs in resource poor settings of India, the UDAYA survey
502 was used only the PHQ-9 module, which does not capture other dimensions of
503 mental ill-health associated with adolescents such as anxiety disorder and other
504 behavioral developmental problems. Measures like the Diagnostic and Statis-
505 tical Manual of Mental Disorders-5 (DSM-5) and International Classification
506 of Mental and Behavioral Disorders-Tenth Edition (ICD-10) can provide a bet-
507 ter understanding of mental ill-health that include occupational, interpersonal,
508 and social impairments as the important symptoms and markers of depression
509 among AYAs in the cultural context of India (Aggarwal et al., 2021). Third, data
510 collected on the mental health of the respondents were based on self-reports,
511 therefore, there is a greater chance of underreporting due to the public stigma
512 or lesser priority associated with mental health issues (Gautham et al., 2020).
513 Despite this, for the first time, this study empirically tested whether transition-
514 ing to paid work impacts mental health and further revealed that schooling
515 and marital status affect the relationship of MIS with paid work showing more
516 adverse impact on female than male AYAs.

9 Conclusion

518 Transition to work at the schooling ages with poor preparedness to deal with
519 stressors and adversities in work environments, especially managing con-
520 flicts in 'school time' and 'work time' put a lot of psychological burden on
521 AYAs. In highly patriarchal cultural and resource-poor settings like Bihar
522 and UP states of India, gender norms and discrimination towards female chil-
523 dren put additional psychological burdens on them. High child marriage rates
524 and the additional burden of household chores for females alongside paid
525 work worsen school time and work time conflicts for female AYAs. These
526 could be the leading reasons why female adolescents in our sample report
527 higher MIS than male adolescents. In conclusion, from a policy and prac-
528 tice point of view, our findings advance the argument that existing policies
529 addressing adolescent mental health issues in India must consider gender-
530 sensitive interventions for the positive development of AYAs. As suggested
531 previously (Moreau et al., 2021), interventions at the individual, household,
532 education, and community levels to prevent the early transition into paid
533 work, early marriage, substance abuse, and parental violence will greatly
534 improve adolescent mental health and wellbeing. School-based interventions
535 to improve mental health of the students and introducing social assistance
536 programmes can also be an effective strategy to deal with mental illness of
537 AYAs (Fazel & Kohrt, 2019; Kosher et al., 2014; Mendes de Oliveira, et al.,
538 2022; Vaalavuo & Bakkum, 2021). From a practical perspective, we suggest
539 an urgent need for generating a comprehensive longitudinal dataset repre-
540 sentative of the entire country on adolescents' familial, social, and economic
541 contexts of mental health for tracking adolescent social and health behaviors
542 and wellbeing. **AQ3**

Appendix

Table 8 Sample distribution of AYAs according to mental health questions by gender and participation in paid work, n = 16,292

Questions on mental health	Paid work in last 12 months							
	2015–16				2018–19			
	Yes		No		Yes		No	
	Male	Female	Male	Female	Male	Female	Male	Female
Had trouble in falling asleep or sleeping too much in the last two weeks								
Nearly every day	25.68	74.32	9.83	90.17	30.73	69.27	6.88	93.12
One week or more	29.70	70.30	13.17	86.83	21.35	78.65	8.23	91.77
Less than one week	27.74	72.26	19.64	80.36	33.60	66.40	14.82	85.18
Not at all	37.86	62.14	27.12	72.88	47.59	52.41	25.33	74.67
Been feeling tired or having little energy in the last 2 weeks								
Nearly every day	19.74	80.26	6.25	93.75	23.94	76.06	5.51	94.49
One week or more	25.40	74.60	11.76	88.24	22.73	77.27	5.14	94.86
Less than one week	32.28	67.72	18.12	81.88	35.88	64.12	15.36	84.64
Not at all	38.34	61.66	28.54	71.46	50.46	49.54	28.11	71.89
Had been poor appetite or overeating in the last 2 weeks								
Nearly every day	20.91	79.09	16.41	83.59	29.91	70.09	10.52	89.48
One week or more	30.66	69.34	17.45	82.55	26.58	73.42	8.54	91.46
Less than one week	27.84	72.16	20.86	79.14	35.35	64.65	15.57	84.43
Not at all	39.15	60.85	27.25	72.75	48.67	51.33	26.13	73.87
Had trouble concentrating on things in the last 2 weeks								
Nearly every day	26.53	73.47	15.42	84.58	30.86	69.14	17.98	82.02
One week or more	28.43	71.57	13.94	86.06	23.17	76.83	14.61	85.39
Less than one week	22.35	77.65	17.73	82.27	33.79	66.21	16.37	83.63
Not at all	38.74	61.26	27.33	72.67	46.93	53.07	23.44	76.56

Table 8 (continued)

Questions on mental health	Paid work in last 12 months							
	2015–16				2018–19			
	Yes	No	Yes	No	Yes	No	Yes	No
Had little interest or pleasure in doing things in the last 2 weeks								
Nearly every day	21.74	78.26	12.09	87.91	30.94	69.06	15.47	84.53
One week or more	24.18	75.82	9.85	90.15	21.23	78.77	8.89	91.11
Less than one week	25.00	75.00	15.88	84.12	30.72	69.28	14.33	85.67
Not at all	39.39	61.61	27.43	72.57	47.51	52.49	24.33	75.67
Been feeling down, depressed or hopeless in the last 2 weeks								
Nearly every day	20.29	79.71	4.90	95.10	29.00	71.00	10.24	89.76
One week or more	20.59	79.41	6.30	93.70	27.57	72.43	8.86	91.14
Less than one week	24.46	75.54	13.79	86.21	36.22	63.78	14.22	85.78
Not at all	39.22	60.78	28.47	71.53	47.57	52.43	25.41	74.59
Been feeling bad about yourself in the last 2 weeks								
Nearly every day	20.93	79.07	4.19	95.81	27.45	72.55	8.49	91.51
One week or more	25.00	75.00	3.94	96.06	25.74	74.26	7.34	92.66
Less than one week	24.07	75.93	14.16	85.84	34.36	65.64	12.58	87.42
Not at all	37.60	62.40	26.94	73.06	45.52	54.48	23.71	76.29
Been moving or speaking so slowly in the last 2 weeks								
Nearly every day	5.56	94.44	2.94	97.06	29.58	70.42	6.56	93.44
One week or more	23.81	76.19	4.17	95.83	20.62	79.38	7.00	93.00
Less than one week	21.72	78.28	11.17	88.83	28.25	71.75	10.83	89.17
Not at all	37.58	62.42	26.95	73.05	46.14	53.86	23.84	76.16
Had thoughts that r would be better off dead in the last 2 weeks								
Nearly every day	0.00#	100.00	0.00#	100.00	12.12	87.88	6.02	93.98

Table 8 (continued)

Questions on mental health	Paid work in last 12 months							
	2015–16				2018–19			
	Yes	No	Yes	No	Yes	No	Yes	No
One week or more	15.00	85.00	5.63	94.37	21.54	78.46	9.38	90.63
Less than one week	8.02	91.98	4.99	95.01	22.39	77.61	5.27	94.73
Not at all	38.16	61.84	26.59	73.41	44.70	55.30	22.81	77.19

Note: # Zero because the cross tab of this variable with gender reveals that no boy reported "nearly every day"

Gender, Paid Work, and Mental Health of Adolescents and Young…

Table 9 Estimates of reliability test-scale of items used in MIS measure

2015–16

Items	Observations	Sign	Item-test correlation	Item-rest correlation	Average inter-item covariance	Alpha
Had trouble in falling asleep or sleeping too much in the last two weeks	16,292	+	0.6802	0.5635	0.1294301	0.8477
Been feeling tired or having little energy in the last 2 weeks	16,292	+	0.7352	0.6256	0.1231958	0.8415
Had been poor appetite or overeating in the last 2 weeks	16,292	+	0.7203	0.596	0.1224676	0.8464
Had trouble concentrating on things in the last 2 weeks	16,292	+	0.7638	0.6785	0.1250705	0.8354
Had little interest or pleasure in doing things in the last 2 weeks	16,292	+	0.7533	0.6725	0.1281319	0.8367
Been feeling down, depressed or hopeless in the last 2 weeks	16,292	+	0.7608	0.6697	0.1238509	0.8361
Been feeling bad about yourself in the last 2 weeks	16,292	+	0.6534	0.5645	0.1382271	0.8475
Been moving or speaking so slowly in the last 2 weeks	16,292	+	0.6590	0.5844	0.1411991	0.8475
Had thoughts that r would be better off dead in the last 2 weeks	16,292	+	0.4595	0.3798	0.1540443	0.8617
Test scale					0.1317353	0.8597

2018–19

Items	Observations	Sign	Item-test correlation	Item-rest correlation	Average inter-item covariance	Alpha
Had trouble in falling asleep or sleeping too much in the last two weeks	16,292	+	0.6354	0.495	0.1814593	0.8126
Been feeling tired or having little energy in the last 2 weeks	16,292	+	0.6806	0.5501	0.1752813	0.8054
Had been poor appetite or overeating in the last 2 weeks	16,292	+	0.6575	0.5118	0.1765233	0.8116
Had trouble concentrating on things in the last 2 weeks	16,292	+	0.6985	0.5911	0.1780776	0.8000
Had little interest or pleasure in doing things in the last 2 weeks	16,292	+	0.7020	0.6024	0.1798649	0.7992
Been feeling down, depressed or hopeless in the last 2 weeks	16,292	+	0.7264	0.6133	0.1705533	0.7967
Been feeling bad about yourself in the last 2 weeks	16,292	+	0.6453	0.5391	0.1876226	0.8067
Been moving or speaking so slowly in the last 2 weeks	16,292	+	0.6315	0.5422	0.1946392	0.8083
Had thoughts that r would be better off dead in the last 2 weeks	16,292	+	0.4455	0.3632	0.2152804	0.8246
Test scale					0.1843669	0.8252

Table 10 Description of study variables

Name of the variables	Description/Definition
Mental ill-health score	Mental Ill-health Score (MIS) was measured based on a series of nine questions which were asked from the Patient Health Questionnaire (PHQ-9) depression screening module (Appendix Table 1). The questions are: 1) *Had trouble in falling asleep or sleeping too much in the last two weeks*, 2) *Been feeling tired or having little energy in the last 2 weeks*, 3) *Had been poor appetite or overeating in the last 2 weeks*, 4) *Had trouble concentrating on things in the last 2 weeks*, 5) *Had little interest or pleasure in doing things in the last 2 weeks*, 6) *Been feeling down, depressed or hopeless in the last 2 weeks*, 7) *Been feeling bad about yourself in the last 2 weeks*, 8) *Been moving or speaking so slowly in the last 2 weeks*, 9) *Had thoughts that respondents would be better off dead in the last 2 weeks*. For each question, respondents can report "not at all", "less than one week", "one week or more", and "nearly every day" and the value varies from 0 to 3, thus for a total of 9 questions, overall MIS ranges from 0 to 27, a higher score represent greater illness
Paid work	The respondents were asked if they were participated in any paid activities in last 12 months. The answers were reported in "yes" or "no"
Gender	The sex of the respondent. Out of the total sample, 27.2% were boys and 72.8% were girls
Age	The age of the respondents ranges between 10 to 23 years. The mean ages of the respondents were 16 and 19 years respectively during 2015–16 and 2018–19
Education level	The recorded education levels of the respondents was recoded in four categories: illiterate, 1–4 years of education (primary level), 5–9 years of education (secondary level), and 10 years and above level of education (higher secondary and above)
Attending school	The respondents were asked if they were currently attending school. The answers were reported in "yes" or "no"
Marital status	The respondents were asked their current marital status. The recorded response was recoded in two categories: "ever married" and "never married"
Consumed tobacco	The respondents were asked if they ever consumed tobacco. The answers were reported in "yes" or "no"
Consumed alcohol	The respondents were asked if they ever consumed alcohol. The answers were reported in "yes" or "no"
Currently seeking job	The respondents were asked if they were currently seeking for a paid job. The answers were reported in "yes" or "no"
Physically hurt by parents	The respondents' were asked if they were physically hurt by their parents since age 10 years. The reported response was recoded in "yes" or "no"
Mother's education	The level of respondents' mother's education was recoded in three categories: illiterate, 1–9 years (primary and secondary), and 10 and above years (higher)
Caste	The caste system is a social hierarchical division of Indian society. The caste of the respondents was recoded in three categories: SC/ST (Scheduled caste and Scheduled tribe), OBC (Others backward class), and general (unreserved category). SC/STs are the lower caste groups historically experienced oppression and socio-economically marginalized section
Religion	The religion of the respondents was recoded in three categories: Hindu, Muslim, and Others (combining Christian, Sikh, Buddhist, Neo-Buddhist, Jain and no religion)

Table 10 (continued)

Name of the variables	Description/Definition
Wealth quintile	Wealth quintile was recoded as poorest, poorer, middle, richer, and richest. The survey measured respondents' household economic status using a wealth index composed of household asset data on ownership of selected durable goods, including means of transportation, as well as data on access to a number of amenities. The wealth index was constructed by allocating the following scores to a households reported assets or amenities. By using the scores, they were divided it into five quintiles. Wealth quintile collected during first wave of the survey (2015–16)
Place of residence	Place of residence is categorised into urban (42.5%) and rural (57.5%) area
States	The survey collected data for the states of Bihar and Uttar Pradesh

Author Contribution Conception and design of the study: Dibyasree Ganguly, Srinivas Goli, Oriel Sullivan

Acquisition of data: Dibyasree Ganguly

Analysis and interpretation of data: Dibyasree Ganguly

Drafting the manuscript: Dibyasree Ganguly

Revising the manuscript critically for important intellectual content: Dibyasree Ganguly, Srinivas Goli, Oriel Sullivan

Declarations

Ethical Statement The authors declare that all the procedures used in the data collection process comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008 (for more details see Santhya et al., 2017a, 2017b).

Competing Interest The authors declare that there is no conflict of interest.

References

Aarons, G. A., Monn, A. R., Leslie, L. K., Garland, A. F., Lugo, L., Hough, R. L., & Brown, S. A. (2008). Association between mental and physical health problems in high-risk adolescents: A longitudinal study. *Journal of Adolescent Health, 43*(3), 260–267. https://doi.org/10.1016/j.jadohealth.2008.01.013

Afifi, M. (2007). Gender differences in mental health. *Singapore Medical Journal, 48*(5), 385–391.

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

D. Ganguly et al.

Aggarwal, P., Raval, V. V., Chari, U., Raman, V., Kadnur Sreenivas, K., Krishnamurthy, S., & Visweswariah, A. M. (2021). Clinicians' perspectives on diagnostic markers for depression among adolescents in India: An embedded mixed-methods study. *Culture, Medicine, and Psychiatry, 45*(2), 163–192. https://doi.org/10.1007/s11013-020-09680-8

Agnafors, S., Barmark, M., & Sydsjö, G. (2021). Mental health and academic performance: A study on selection and causation effects from childhood to early adulthood. *Social Psychiatry and Psychiatric Epidemiology, 56*(5), 857–866. https://doi.org/10.1007/s00127-020-01934-5

Annerbäck, E. M., Sahlqvist, L., Svedin, C. G., Wingren, G., & Gustafsson, P. A. (2012). Child physical abuse and concurrence of other types of child abuse in Sweden—Associations with health and risk behaviors. *Child Abuse & Neglect, 36*(7–8), 585–595. https://doi.org/10.1016/j.chiabu.2012.05.006

Arslan, G., Allen, K. A., & Tanhan, A. (2021). School bullying, mental health, and wellbeing in adolescents: Mediating impact of positive psychological orientations. *Child Indicators Research, 14*(3), 1007–1026. https://doi.org/10.1007/s12187-020-09780-2

Beattie, T. S., Prakash, R., Mazzuca, A., Kelly, L., Javalkar, P., Raghavendra, T., Ramanaik, S., Collumbien, M., Moses, S., Heise, L., Isac, S., & Watts, C. (2019). Prevalence and correlates of psychological distress among 13–14-year-old adolescent girls in North Karnataka, South India: A cross-sectional study. *BMC Public Health, 19*(1), 1–12. https://doi.org/10.1186/s12889-018-6355-z

Belfer, M. L. (2008). Child and adolescent mental disorders: The magnitude of the problem across the globe. *Journal of Child Psychology and Psychiatry, 49*(3), 226–236. https://doi.org/10.1111/j.1469-7610.2007.01855.x

Ben-Arieh, A. (2005). Where are the children? Children's role in measuring and monitoring their wellbeing. *Social Indicators Research, 74*(3), 573–596. https://doi.org/10.1007/s11205-004-4645-6

Borga, L. G. (2019). Children's own time use and its effect on skill formation. *The Journal of Development Studies, 55*(5), 876–893. https://doi.org/10.1080/00220388.2018.1499893

Burgess, R. A., Jeffery, M., Odero, S. A., Rose-Clarke, K., & Devakumar, D. (2022). Overlooked and unaddressed: A narrative review of mental health consequences of child marriages. *PLOS Global Public Health, 2*(1), e0000131. https://doi.org/10.1371/journal.pgph.0000131

Census of India. (2011). Population projections for India and states 2011 – 2036. National Commission on Population, Ministry of Health & Family Welfare, New Delhi. https://main.mohfw.gov.in/sites/default/files/Population%20Projection%20Report%202011-2036%20-%20upload_compressed_0.pdf

Chauhan, S. K., & Dhar, M. (2020). Prevalence and predictors of mental health disorder among the adolescent living in the slums of Lucknow, India: A cross-sectional study. *Community Mental Health Journal, 56*(3), 383–392. https://doi.org/10.1007/s10597-019-00452-2

Chen, H., Cohen, P., Kasen, S., Johnson, J. G., Berenson, K., & Gordon, K. (2006). Impact of adolescent mental disorders and physical illnesses on quality of life 17 years later. *Archives of Pediatrics & Adolescent Medicine, 160*(1), 93–99. https://doi.org/10.1001/archpedi.160.1.93

Chowdhury, K. (2020). The intersection of caste and child labour in Bihar. *Economic and Political Weekly*, 55(4). https://www.epw.in/engage/article/intersection-caste-and-child-labour-bihar

Das, S., & Mukherjee, D. (2011). Measuring deprivation due to child work and child labour: A study for Indian children. *Child Indicators Research, 4*(3), 453–466. https://doi.org/10.1007/s12187-010-9097-8

Desai, S. B., Dubey, A., Joshi, B. L., Sen, M., Shariff, A., & Vanneman, R. (2010). *Human development in India: Challenges for a Society in Transition*. Oxford University.

Eaton, J., DeSilva, M., Regan, M., Lamichhane, J., & Thornicroft, G. (2014). There is no wealth without mental health. *The Lancet. Psychiatry, 1*(4), 252–253. https://doi.org/10.1016/S2215-0366(14)70277-9

Edmunds, C., & Alcaraz, M. (2021). Childhood material hardship and adolescent mental health. *Youth & Society, 53*(7), 1231–1254. https://doi.org/10.1177/0044118X211001896

Erskine, H. E., Moffitt, T. E., Copeland, W. E., Costello, E. J., Ferrari, A. J., Patton, G., Degenhardt, L., Vos, T., Whiteford, H. A., & Scott, J. G. (2015). A heavy burden on young minds: The global burden of mental and substance use disorders in children and youth. *Psychological Medicine, 45*(7), 1551–1563. https://doi.org/10.1017/S0033291714002888

Fazel, M., & Kohrt, B. A. (2019). Prevention versus intervention in school mental health. *The Lancet Psychiatry, 6*(12), 969–971. https://doi.org/10.1016/S2215-0366(19)30440-7

Gamlin, J., Camacho, A. Z., Ong, M., & Hesketh, T. (2015). Is domestic work a worst form of child labour? The findings of a six-country study of the psychosocial effects of child domestic work. *Children's Geographies, 13*(2), 212–225. https://doi.org/10.1080/14733285.2013.829660

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

Gender, Paid Work, and Mental Health of Adolescents and Young…

Gautham, M. S., Gururaj, G., Varghese, M., Benegal, V., Rao, G. N., Kokane, A., Chavan, B. S., Dalal, P. K., Ram, D., Pathak, K., Singh, R. K. L., Singh, L. K., Sharma, P., Saha, P. K., Ramasubramanian, C., Mehta, R. Y., Shibukumar, T. M., NMHS Collaborators group. (2020). The National Mental Health Survey of India (2016): Prevalence, socio-demographic correlates and treatment gap of mental morbidity. *International Journal of Social Psychiatry, 66*(4), 361–372. https://doi.org/10.1177/0020764020907941

Gnanaselvam, N. A., & Joseph, B. (2018). Depression and behavioral problems among adolescent girls and young women employees of the textile industry in India. *Workplace Health & Safety, 66*(1), 24–33. https://doi.org/10.1177/2165079917716187

Gundi, M., Santhya, K. G., Haberland, N., Zavier, A. J. F., & Rampal, S. (2020a). The increasing toll of mental health issues among adolescents and youth in Bihar. *Policy Brief. New Delhi: Population Council*. https://www.projectudaya.in/wp-content/uploads/2017/03/Mental-Health-Brief_Bihar.pdf

Gundi, M., Santhya, K. G., Haberland, N., Zavier, A. J. F., & Rampal, S. (2020b). The increasing toll of mental health issues among adolescents and youth in Uttar Pradesh. *Policy Brief. New Delhi: Population Council*. https://www.projectudaya.in/wp-content/uploads/2017/03/Mental-Health-Brief_U.P.pdf

Hughes, K., Lowey, H., Quigg, Z., & Bellis, M. A. (2016). Relationships between adverse childhood experiences and adult mental well-being: Results from an English national household survey. *BMC Public Health, 16*(1), 1–11. https://doi.org/10.1186/s12889-016-2906-3

Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health, 2*(8), e356–e366. https://doi.org/10.1016/S2468-2667(17)30118-4

Ibrahim, A., Abdalla, S. M., Jafer, M., Abdelgadir, J., & De Vries, N. (2019). Child labor and health: A systematic literature review of the impacts of child labor on child's health in low-and middle-income countries. *Journal of Public Health., 41*(1), 18–26. https://doi.org/10.1093/pubmed/fdy018

International Labour Office and United Nations Children's Fund [ILO & UNICEF] (2021). Child Labour: Global estimates 2020, trends and the road forward, ILO and UNICEF, New York, 2021. License: CC BY 4.0. https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---ipec/documents/publication/wcms_797515.pdf

International Labour Office [ILO]. (2017). Global estimates of child labour: results and trends, 2012–2016. Geneva: International Labour Office. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_575499.pdf

John, M. E. (2021). *Child marriage in an international frame: A feminist review from India* (1st ed.). Routledge.

John, N. A., Kapungu, C., Sebany, M., & Tadesse, S. (2022). Do gender-based pathways influence mental health? Examining the linkages between early child marriage, intimate partner violence, and psychological well-being among young Ethiopian women (18–24 years old). *Youth & Society*, 0044118X221079375. https://doi.org/10.1177/0044118X221079375

Kapungu, C., Petroni, S., Allen, N. B., Brumana, L., Collins, P. Y., De Silva, M., Dua, T., Haj-Ahmad, J., Leichner, A., Patton, G., Pringle, B., Omigbodun, O., Silver, K. L., Estrin, G. L., Singh, S., Zaka, N., & Zeck, W. (2018). Gendered influences on adolescent mental health in low-income and middle-income countries: Recommendations from an expert convening. *The Lancet Child & Adolescent Health, 2*(2), 85–86. https://doi.org/10.1016/S2352-4642(17)30152-9

Kaufman, T. M., Lee, H. Y., Benner, A. D., & Yeager, D. S. (2020). How school contexts shape the relations among adolescents' beliefs, peer victimization, and depressive symptoms. *Journal of Research on Adolescence, 30*(3), 769–786. https://doi.org/10.1111/jora.12558

Khan, S. R., & Lyon, S. (2015). *Measuring children's work in South Asia: perspectives from national household surveys*. International Labour Office. https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-new_delhi/documents/publication/wcms_359371.pdf

Kieling, C., Baker-Henningham, H., Belfer, M., Conti, G., Ertem, I., Omigbodun, O., Rohde, L. A., Srinath, S., Ulkuer, & Rahman, A. (2011). Child and adolescent mental health worldwide: evidence for action. *The Lancet, 378*(9801), 1515–1525. https://doi.org/10.1016/S0140-6736(11)60827-1

Kiely, K. M., Leach, L. S., Olesen, S. C., & Butterworth, P. (2015). How financial hardship is associated with the onset of mental health problems over time. *Social Psychiatry and Psychiatric Epidemiology, 50*(6), 909–918. https://doi.org/10.1007/s00127-015-1027-0

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

D. Ganguly et al.

Kim, J. E., Min, W. H., Lee, B. J., & Ku, I. H. (2015). A panel study to examine the impact of multidimensional poverty on Korean adolescents' health. *Asia Pacific Journal of Social Work and Development, 25*(3), 145–156. https://doi.org/10.1080/02185385.2015.1027952

Kosher, H., Jiang, X., Ben-Arieh, A., & Huebner, E. S. (2014). Advances in children's rights and children's well-being measurement: Implications for school psychologists. *School Psychology Quarterly, 29*(1), 7–20. https://doi.org/10.1037/spq0000051

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine., 16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Kumar, G. S., Jain, A., & Hegde, S. (2012). Prevalence of depression and its associated factors using Beck Depression Inventory among students of a medical college in Karnataka. *Indian Journal of Psychiatry., 54*(3), 223. https://doi.org/10.4103/0019-5545.102412

Labour Resources Department. (2017). State action plan for elimination of child labour and prohibition and regulation of adolescent labour,2017. Government of Bihar, India. https://labour.gov.in/sites/default/files/Annex-8.pdf

Lam, C. B., Greene, K. M., & McHale, S. M. (2016). Housework time from middle childhood through adolescence: Links to parental work hours and youth adjustment. *Developmental Psychology, 52*(12), 2071. https://doi.org/10.1037/dev0000223

Lane, C., Brundage, C. L., & Kreinin, T. (2017). Why we must invest in early adolescence: Early intervention, lasting impact. *Journal of Adolescent Health., 61*(4), S10-11. https://doi.org/10.1016/j.jadohealth.2017.07.011

Leiva, L., Torres-Cortés, B., & Antivilo-Bruna, A. (2022). Adverse childhood experiences and mental health: When well-being matters. *Child Indicators Research*, 1–25. https://doi.org/10.1007/s12187-021-09904-2

Long, E., Zucca, C., & Sweeting, H. (2021). School climate, peer relationships, and adolescent mental health: A social ecological perspective. *Youth & Society, 53*(8), 1400–1415. https://doi.org/10.1177/0044118X20970232

Mehlhausen-Hassoen, D., & Winstok, Z. (2019). The association between family violence in childhood and mental health in adulthood as mediated by the experience of childhood. *Child Indicators Research, 12*(5), 1697–1716. https://doi.org/10.1007/s12187-018-9605-9

Mendes de Oliveira, C., Santos Almeida, C. R., & HofheinzGiacomoni, C. (2022). School-based positive psychology interventions that promote well-being in children: A systematic review. *Child Indicators Research*. https://doi.org/10.1007/s12187-022-09935-3

Moreau, C., Blum, R., Mmari, K., Hunersen, K., Mafuta, E., Lulebi, A., Wilopo, S., Stones, W., Shervington, D., Michielsen, K., Lou, C., Borges, A. L., & Maddaleno, M. (2021). Gender and health in very young adolescents. *Journal of Adolescent Health, 69*(1), S3–S4. https://doi.org/10.1016/j.jadohealth.2021.04.012

Mortimer, J. T., Harley, C., & Staff, J. (2002). The quality of work and youth mental health. *Work and Occupations, 29*(2), 166–197. https://doi.org/10.1177/0730888402029002003

Murray, U. (2003). Good practices: Gender mainstreaming in actions against child labour. Geneva, International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/@dgreports/@gender/documents/publication/wcms_084177.pdf

Ornek, O. K., & Esin, M. N. (2018). Psychological health problems among adolescent workers and associated factors in Istanbul. *Turkey. Safety and Health at Work, 9*(1), 101–108. https://doi.org/10.1016/j.shaw.2017.06.004

Orri, M., Ahun, M. N., Naicker, S., Besharati, S., & Richter, L. M. (2022). Childhood factors associated with suicidal ideation among South African youth: A 28-year longitudinal study of the Birth to Twenty Plus cohort. *PLoS medicine, 19*(3), e1003946. https://doi.org/10.1371/journal.pmed.1003946

Pandey, R., Gupta, S., Upadhyay, A., Gupta, R. P., Shukla, M., Mishra, R. C., Arya, Y. K., Singh, T., Niraula, S., Lau, J. Y. F., & Kumari, V. (2020). Childhood maltreatment and its mental health consequences among Indian adolescents with a history of child work. *Australian & New Zealand Journal of Psychiatry, 54*(5), 496–508. https://doi.org/10.1177/0004867420909524

Pandia, V., Noviandhari, A., Amelia, I., Hidayat, G. H., Fadlyana, E., & Dhamayanti, M. (2021). Association of mental health problems and socio-demographic factors among adolescents in Indonesia. *Global Pediatric Health*, 8. https://doi.org/10.1177/2333794X211042223

Patton, G. C., Sawyer, S. M., Santelli, J. S., Ross, D. A., Afifi, R., Allen, N. B., Arora, M., Azzopardi, P., Baldwin, W., Bonell, C., Kakuma, R., Kennedy, E., Mahon, J., McGovern, T., Mokdad, A. H.,

Patel, V., Petroni, S., Reavley, N. … Viner, R. M. (2016). Our future: a Lancet commission on adolescent health and wellbeing. *The Lancet, 387*(10036), 2423–2478. https://doi.org/10.1016/S0140-6736(16)00579-1

Pells, K. (2011). Poverty and gender inequalities: Evidence from young lives. Young Lives Policy Paper 3. https://www.younglives.org.uk/sites/www.younglives.org.uk/files/YL_PP3_Poverty-and-Gender-Inequalities.pdf

Petersen, A. C., Compas, B. E., Brooks-Gunn, J., Stemmler, M., Ey, S., & Grant, K. E. (1993). Depression in adolescence. *American Psychologist, 48*(2), 155. https://doi.org/10.1037/0003-066x.48.2.155

Pillai, A., Patel, V., Cardozo, P., Goodman, R., Weiss, H. A., & Andrew, G. (2008). Non-traditional lifestyles and prevalence of mental disorders in adolescents in Goa, India. *The British Journal of Psychiatry, 192*(1), 45–51. https://doi.org/10.1192/bjp.bp.106.034223

Raj, A. (2010). When the mother is a child: The impact of child marriage on the health and human rights of girls. *Archives of Disease in Childhood., 95*(11), 931–935. https://doi.org/10.1136/adc.2009.178707

Raj, A., Salazar, M., Jackson, E. C., Wyss, N., McClendon, K. A., Khanna, A., Belayneh, Y., & McDougal, L. (2019). Students and brides: A qualitative analysis of the relationship between girls' education and early marriage in Ethiopia and India. *BMC Public Health, 19*(1), 1–20. https://doi.org/10.1186/s12889-018-6340-6

Ram, U., Strohschein, L., & Gaur, K. (2014). Gender socialization: Differences between male and female youth in India and associations with mental health. *International Journal of Population Research*, 2014. https://doi.org/10.1155/2014/357145

Repetti, R. L., Taylor, S. E., & Seeman, T. E. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin, 128*(2), 330. https://doi.org/10.1037/0033-2909.128.2.330

Richardson, T., Elliott, P., Roberts, R., & Jansen, M. (2017). A longitudinal study of financial difficulties and mental health in a national sample of British undergraduate students. *Community Mental Health Journal, 53*(3), 344–352. https://doi.org/10.1007/s10597-016-0052-0

Russell, M. A., & Odgers, C. L. (2020). Adolescents' subjective social status predicts day-to-day mental health and future substance use. *Journal of Research on Adolescence, 30*, 532–544. https://doi.org/10.1111/jora.12496

Sagar, R., Dandona, R., Gururaj, G., Dhaliwal, R. S., Singh, A., Ferrari, A., Dua, T., Ganguli, A., Varghese, M., Chakma, J. K., & Kumar, G. A. (2020). The burden of mental disorders across the states of India: The Global Burden of Disease Study 1990–2017. *The Lancet Psychiatry, 7*(2), 148–161. https://doi.org/10.1016/S2215-0366(19)30475-4

Santhya, K. G., Acharya, R., Pandey, N., Singh, S. K., Rampal, S., Zavier, A. J., & Gupta, A. K. (2017a). Understanding the lives of adolescents and young adults (UDAYA) in Bihar, India. Population Council, New Delhi. https://www.popcouncil.org/uploads/pdfs/2017aPGY_UDAYA-BiharReport.pdf

Santhya, K. G., Acharya, R., Pandey, N., Singh, S. K., Rampal, S., Zavier, A. J., & Gupta, A. K. (2017b). Understanding the lives of adolescents and young adults (UDAYA) in Uttar Pradesh, India. Population Council, New Delhi. https://www.projectudaya.in/wp-content/uploads/2018/08/UP-Report-pdf.pdf

Singh, R., Galab, P. S., Reddy, P. P., & Benny, L. (2018). *Reaching the last child: Evidence from Young Lives India*. University of Oxford.

Smith, N. R., Marshall, L., Albakri, M., Smuk, M., Hagell, A., & Stansfeld, S. (2021). Adolescent mental health difficulties and educational attainment: findings from the UK household longitudinal study. *BMJ Open, 11*(7), e046792. https://doi.org/10.1136/bmjopen-2020-046792

Sunitha, S., & Gururaj, G. (2014). Health behaviours & problems among young people in India: Cause for concern & call for action. *The Indian Journal of Medical Research, 140*(2), 185.

Trinh, T. A. (2020). Mental health impacts of child labour: Evidence from Vietnam and India. *The Journal of Development Studies, 56*(12), 2251–2265. https://doi.org/10.1080/00220388.2020.1746280

United Nations, Department of Economic and Social Affairs, Population Division. (2022). World Population Prospects 2022. Online edition. UN.

United Nations Children's Fund. (2022). Child Labour: In the world's poorest countries, slightly more than 1 in 5 children are engaged in child labour. UNICEF Data: Monitoring the situation of children and women. Available from: https://data.unicef.org/topic/child-protection/child-labour/#

| Journal : **SmallExtended 12187** | Article No : **10009** | Pages : **34** | MS Code : **10009** | Dispatch : **14-1-2023** |

D. Ganguly et al.

Vaalavuo, M., & Bakkum, B. (2021). Mental health problems at a critical juncture: Exit from social assistance among young Finns. *Journal of Social Policy, 50*(4), 764–787. https://doi.org/10.1017/S0047279420000501

Vikram, K. (2021). Early marriage and health among women at midlife: Evidence from India. *Journal of Marriage and Family, 83*(5), 1480–1501. https://doi.org/10.1111/jomf.12793

Vuolo, M., Mortimer, J. T., & Staff, J. (2014). Adolescent precursors of pathways from school to work. *Journal of Research on Adolescence, 24*(1), 145–162. https://doi.org/10.1111/jora.12038

World Health Organization [WHO] (2021). Adolescent mental health: Key facts. Geneva, World Health Organization. https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health

Woodhead, M. (2004). Psychosocial impacts of child work: A framework for research, monitoring, and intervention. *The International Journal of Children's Rights, 12*, 321–327. https://doi.org/10.1163/1571818043603607

Wooldridge, J. M. (2016). Advanced panel data methods. In J. M. Wooldridge (Ed.), *Introductory econometrics: A modern approach* (6th ed., pp. 492–496). Cengage Learning.

Author Query Form

Please ensure you fill out your response to the queries raised below and return this form along with your corrections

Dear Author

During the process of typesetting your article, the following queries have arisen. Please check your typeset proof carefully against the queries listed below and mark the necessary changes either directly on the proof/online grid or in the 'Author's response' area provided below

Query	Details Required	Author's Response
AQ1	Hughes, 2017 has been changed to Hughes et al., 2017 so that this citation matches the Reference List. Please confirm that this is correct.	
AQ2	Petersen, 1993 has been changed to Petersen et al., 1993 so that this citation matches the Reference List. Please confirm that this is correct.	
AQ3	Data availability statement is desired for this journal. Please provide the statement.	