



Artificial Intelligence Use and Digital Mental Health Literacy among Adolescents: A Cross-Sectional Study

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Abstract

Background: The increasing use of Artificial Intelligence (AI) among adolescents has created new opportunities for accessing mental health information. However, AI engagement may not necessarily reflect the ability to critically evaluate and appropriately use digital mental health information.

Aim: The study examined Artificial Intelligence Use and Digital Mental Health Literacy (DMHL), their relationship, differences across age and gender, and the predictive role of AI use in DMHL among adolescents.

Methods: A quantitative cross-sectional correlational study was conducted among 600 adolescents aged 13–18 years studying in government and private schools in Dhanbad, Jharkhand, India. Participants were selected using multistage stratified random sampling. Data were collected using the Artificial Intelligence Use Scale and Digital Mental Health Literacy Scale. Pearson correlation, *t*-test, one-way ANOVA, and regression analysis were employed.

Results: The findings indicated significant gender differences, with boys showing greater AI engagement, while girls demonstrated higher digital mental health literacy. Both AI use and digital mental health literacy showed significant age-related differences, with higher levels generally observed among older adolescents. A moderate, positive, and significant association was found between AI use and digital mental health literacy. Regression analysis further indicated that AI use significantly predicted digital mental health literacy, accounting for a meaningful proportion of its variance.

Conclusion: The findings suggest that AI engagement is significantly associated with digital mental health literacy among adolescents. However, greater AI use does not necessarily imply greater mental health literacy. The study highlights the need for age- and gender-sensitive interventions integrating AI literacy, critical evaluation of digital mental health information, responsible AI use, online safety, and appropriate help-seeking skills.

Keywords: Artificial Intelligence, Digital Mental Health Literacy, Adolescents, AI Use, Digital Health Literacy, Mental Health.

1. Introduction

Artificial intelligence (AI) has emerged as one of the most transformative technological advancements of the twenty-first century, significantly influencing healthcare, education, business, and psychological services. Recent developments in machine learning, natural language processing (NLP), deep learning, and generative artificial intelligence have enabled intelligent systems to simulate human cognitive functions, including learning, reasoning, decision-making, language comprehension, and problem-solving (Russell & Norvig, 2021). AI-powered technologies are increasingly integrated into healthcare systems to improve disease screening, diagnosis, clinical decision-making, personalised treatment, patient monitoring, and health education (Topol, 2019). In recent years, AI has become an integral component of digital mental healthcare through conversational agents, virtual assistants, predictive analytics, emotion recognition systems, and digital therapeutic interventions, offering innovative opportunities to improve accessibility, efficiency, and

personalisation of mental health services (Graham *et al.*, 2019; Inkster *et al.*, 2018).

The rapid emergence of generative AI platforms such as ChatGPT, Google Gemini, Microsoft Copilot, Claude, and other conversational AI systems has fundamentally changed the way individuals access information, including information related to psychological health and well-being. Unlike conventional search engines, these platforms provide interactive, personalised, and immediate responses to users' queries, making them increasingly attractive sources of mental health information among adolescents and young adults (OpenAI, 2023; Sallam, 2023). AI-powered systems are now being used for psychoeducation, emotional support, symptom monitoring, stress management, cognitive behavioural therapy, and early identification of mental health concerns (Abd-Alrazaq *et al.*, 2023; Torous *et al.*, 2021). As digital technologies become embedded within adolescents' daily lives, understanding how young people use AI for mental health information has become an important area of

scientific investigation.

Adolescence represents a unique developmental stage characterised by rapid physical, cognitive, emotional, and social changes that influence lifelong mental health outcomes. During this period, adolescents experience identity formation, academic transitions, peer relationship challenges, emotional regulation, increasing autonomy, and changing family dynamics, all of which contribute to psychological vulnerability (Sawyer *et al.*, 2018). According to the World Health Organisation (2022), approximately one in seven adolescents aged 10–19 years experiences a mental health disorder, with depression, anxiety disorders, behavioural disorders, eating disorders, and self-harm contributing substantially to disability and disease burden worldwide. Furthermore, epidemiological evidence indicates that nearly 50% of all lifetime mental disorders begin before the age of 14 years and approximately 75% develop before the age of 24 years, emphasising the importance of early recognition, prevention, and intervention during adolescence (Kessler *et al.*, 2005; Solmi *et al.*, 2022).

Despite the increasing prevalence of mental health problems among adolescents, a substantial proportion of young people do not receive timely psychological support. Stigma, inadequate mental health knowledge, misconceptions regarding psychological disorders, poor awareness of available services, financial barriers, and limited accessibility to qualified mental health professionals continue to impede help-seeking behaviour (Gulliver *et al.*, 2010; Patel *et al.*, 2007; World Health Organisation, 2022). The treatment gap is particularly pronounced in low- and middle-income countries, where shortages of trained mental health professionals, unequal healthcare infrastructure, and cultural barriers further restrict access to evidence-based mental healthcare (Patel *et al.*, 2018).

In response to these challenges, mental health literacy has emerged as a critical component of mental health promotion and prevention. Jorm *et al.* (1997) originally defined mental health literacy (MHL) as "knowledge and beliefs about mental disorders which aid their recognition, management, or prevention." Over the past two decades, the concept has evolved considerably to include knowledge of positive mental health, emotional regulation, resilience, self-care strategies, stigma reduction, awareness of available treatments, and appropriate help-seeking behaviour (Kutcher *et al.*, 2016; Kelly *et al.*, 2007; Wei *et al.*, 2015). Adolescents with higher mental health literacy are more likely to recognise psychological symptoms, seek professional assistance at an earlier stage, support peers experiencing emotional distress, and engage in adaptive coping strategies (Bjørnsen *et al.*, 2017; Kutcher *et al.*, 2016).

However, recent evidence suggests that increased awareness of mental health does not necessarily translate into adequate mental health literacy. Although educational programmes, awareness campaigns, and digital platforms have improved public recognition of common psychological disorders, many adolescents continue to experience difficulty distinguishing normal developmental stress from clinically significant mental health conditions, while misconceptions regarding treatment, stigma, and professional help remain common (Kutcher *et al.*, 2016; Mansfield *et al.*, 2020). Consequently, contemporary approaches emphasise strengthening mental health literacy through comprehensive educational strategies that extend beyond symptom recognition to include psychological well-being, resilience, emotional competence, and informed decision-making.

The rapid digitalisation of society has further expanded the concept of mental health literacy into digital mental health literacy (DMHL). Digital mental health literacy refers to an individual's ability to access, understand, critically evaluate, and appropriately utilise mental health information obtained through digital platforms while identifying credible information sources and avoiding misinformation (Brijnath *et al.*, 2016; Batterham *et al.*, 2016). It integrates traditional mental health literacy with digital literacy, information literacy, and critical thinking skills required for navigating online mental health resources. Adolescents with higher levels of digital mental health literacy are better equipped to identify reliable online information, evaluate the credibility of digital content, make informed help-seeking decisions, and protect themselves from misinformation and unsafe online practices (Chan & Leung, 2020; Torous *et al.*, 2021).

Digital technologies have substantially transformed the way adolescents obtain health-related information. Social media platforms, mobile applications, online counselling services, telepsychiatry, mental health websites, podcasts, and AI-powered conversational systems now represent important sources of psychological information and support (Naslund *et al.*, 2020; Torous *et al.*, 2021). Online platforms have contributed positively to mental health promotion by increasing public awareness, reducing stigma, facilitating psychoeducation, promoting peer support, and improving access to evidence-based interventions (Naslund *et al.*, 2020; World Health Organisation, 2022). Young people increasingly report that digital platforms help them recognise emotional difficulties, understand coping strategies, and encourage conversations about mental health that might otherwise remain unaddressed.

Artificial intelligence has further accelerated this transformation by providing immediate, interactive, and personalised mental health information. AI-powered conversational agents can answer questions regarding stress, anxiety, depression, emotional regulation, relationships, academic pressure, sleep difficulties, and coping strategies within seconds. Recent systematic reviews have demonstrated that AI-based chatbots and virtual mental health assistants can improve psychological engagement, increase accessibility to psychoeducation, reduce mild symptoms of anxiety and depression, and support self-management of emotional difficulties (Abd-Alrazaq *et al.*, 2023; Inkster *et al.*, 2018). Machine learning algorithms have also shown promising accuracy in predicting depression, suicidal ideation, emotional distress, and behavioural changes using speech patterns, text analysis, wearable devices, and digital behavioural data (Dwyer *et al.*, 2018; Graham *et al.*, 2019; Topol, 2019). These findings suggest that AI has considerable potential to complement conventional mental healthcare by facilitating early identification, prevention, and continuous psychological support.

Nevertheless, the increasing use of AI in mental healthcare presents important ethical, educational, and clinical challenges. AI-generated responses may occasionally contain inaccurate, incomplete, or oversimplified information that lacks appropriate clinical context (Fiske *et al.*, 2019). Adolescents may be particularly vulnerable to accepting AI-generated responses without critically evaluating their scientific accuracy, thereby increasing the risk of misinformation, inappropriate self-diagnosis, confirmation bias, and delayed professional consultation (Foulkes & Andrews, 2023). Concerns regarding privacy, data security, algorithmic bias, transparency, informed consent, and

accountability have further raised questions about the responsible integration of AI into adolescent mental healthcare (Floridi & Cowls, 2019; World Health Organisation, 2021). Consequently, several researchers emphasise that AI should function as a complementary educational and supportive tool rather than replacing qualified mental health professionals (Topol, 2019; Torous *et al.*, 2021).

International research has increasingly explored AI-assisted mental health interventions among adolescents and young adults. Fitzpatrick *et al.* (2017) demonstrated that the AI-based chatbot Woebot significantly reduced symptoms of anxiety and depression through cognitive behavioural therapy-based interactions. Similarly, Inkster *et al.* (2018) reported improved emotional engagement and psychological support among users of AI-enabled conversational agents. Abd-Alrazaq *et al.* (2023), in a systematic review, concluded that AI-powered conversational agents show promising effectiveness in improving emotional well-being, treatment accessibility, and psychoeducation, although the quality of evidence remains moderate and further longitudinal studies are needed. Emerging evidence also indicates that adolescents increasingly rely on generative AI platforms for emotional support, academic stress management, and mental health information because of their anonymity, convenience, and immediate availability (Sallam, 2023).

Within the Indian context, research examining artificial intelligence and adolescent mental health remains in its infancy. India has one of the largest adolescent populations globally, with rapidly increasing internet penetration, smartphone ownership, and digital technology use (Internet and Mobile Association of India [IAMAI], 2023). Simultaneously, Indian adolescents experience substantial psychological challenges arising from academic competition, examination stress, family expectations, peer pressure, cyberbullying, and social media exposure (Deb *et al.*, 2015; Patel *et al.*, 2018). Although digital technologies are increasingly used for educational and health-related purposes, empirical studies investigating adolescents' use of AI for mental health information and their level of digital mental health literacy remain extremely limited. Existing Indian research has largely focused on digital health interventions or mental health awareness, with comparatively little attention given to AI-assisted mental health information seeking, critical evaluation of AI-generated content, and responsible digital help-seeking behaviours.

Therefore, there is a growing need to examine how adolescents utilize artificial intelligence for mental health-related information and whether AI use contributes to improved digital mental health literacy. Understanding adolescents' awareness, patterns of AI use, critical evaluation skills, and digital mental health literacy is essential for developing evidence-based educational programmes, school mental health initiatives, and digital health policies that promote responsible AI use while strengthening adolescents' capacity to make informed mental health decisions. This evidence is particularly important in developing countries such as India, where rapid digital transformation is occurring alongside significant unmet mental health needs, making digital mental health literacy an increasingly important public health priority.

2. Methodology

2.1. Aim of the Study

The present study aimed to examine the relationship between

artificial intelligence (AI) use and digital mental health literacy among adolescents. Specifically, the study sought to assess adolescents' patterns of AI use for mental health-related information, determine their level of digital mental health literacy, and investigate whether AI use significantly predicts digital mental health literacy after controlling for selected demographic variables.

2.2. Research Objectives

- i). To assess the level of artificial intelligence use among adolescents.
- ii). To assess the level of digital mental health literacy among adolescents.
- iii). To examine the relationship between artificial intelligence use and digital mental health literacy.
- iv). To compare AI use and digital mental health literacy across demographic variables such as age and gender of the participants.
- v). To determine whether artificial intelligence use significantly predicts digital mental health literacy among adolescents.

2.3. Research Design

The present investigation employed a quantitative, descriptive cross-sectional correlational research design. A cross-sectional approach was considered appropriate because it allows the simultaneous assessment of artificial intelligence use and digital mental health literacy within a defined adolescent population at a single point in time. The design facilitates the examination of associations between variables without manipulating any independent variable and provides valuable evidence regarding existing behavioural patterns and relationships within the target population.

2.4. Study Setting

The study was conducted in government and private secondary and higher secondary schools located in Dhanbad, Jharkhand, India. Schools were selected from both urban and semi-urban areas to obtain a heterogeneous sample representing adolescents from different educational and socioeconomic backgrounds. Data collection was carried out during regular school hours after obtaining permission from school authorities.

2.5. Participants

The study included 600 adolescents studying in Grades VIII to XII. Participants were between 13 and 18 years of age, representing middle and late adolescence. Both male and female students were included in the study. The sample size was determined based on recommendations for correlation and multiple regression analyses, ensuring adequate statistical power and generalizability of findings.

2.6. Sampling Technique

A multistage stratified random sampling technique was employed. Initially, schools were selected using stratified sampling based on school management (government and private). Subsequently, classrooms were randomly selected within each school, and all eligible students present on the day of data collection were invited to participate. This sampling procedure ensured adequate representation across gender, educational settings, and residential backgrounds.

2.7. Inclusion Criteria

Participants were eligible for inclusion if they were

adolescents aged 13 to 18 years and were enrolled in Grades VIII to XII in selected Schools. Participants were required to be able to read and understand the questionnaire in which it was administered. To ensure adequate exposure to digital technologies, only adolescents who had regular access to a smartphone, computer, tablet, or the internet and who had used at least one digital platform during the preceding six months were included in the study.

2.8. Exclusion Criteria

Participants were excluded from the study if they had a documented diagnosis of intellectual disability or severe neurodevelopmental disorders that could interfere with their ability to comprehend or independently complete the study questionnaires. Adolescents with severe psychiatric conditions requiring immediate clinical intervention, such as acute psychosis or severe mood disorders, were also excluded to ensure the appropriateness of participation in this non-clinical survey. In addition, individuals with significant visual, hearing, or communication impairments that prevented independent completion of the assessment instruments were not included. Questionnaires with more than 20% missing or incomplete responses were excluded from the final analysis to maintain the quality, reliability, and validity of the data.

2.9. Instruments

- i). **Socio-demographic Information Schedule:** A structured demographic questionnaire was developed by the investigators to obtain information regarding participants' age, gender, educational level, school type, place of residence, parental education, internet access, average daily screen time, preferred digital platforms, and frequency of artificial intelligence use.
- ii). **Artificial Intelligence Use Scale (AIUS):** The Artificial Intelligence Use Scale (AIUS) was used to assess the extent and patterns of artificial intelligence (AI) use among adolescents. The scale was constructed following an extensive review of the contemporary literature on artificial intelligence, digital learning technologies, adolescent digital behaviour, and AI-assisted educational applications (OpenAI, 2023; Sallam, 2023; UNESCO, 2023). The initial item pool was generated to reflect the diverse ways in which adolescents interact with AI technologies in their daily academic and personal lives. The final version of the AIUS comprises 20 self-report items rated on a five-point Likert scale, ranging from 1 (Never) to 5 (Always). Higher total scores indicate greater frequency and broader utilization of artificial intelligence technologies.

The scale measures five major domains of AI use:

- **Frequency of AI use** (e.g., frequency of using AI applications in daily life);
- **Academic use** (e.g., use of AI for homework, assignments, and learning support);
- **Mental health information seeking** (e.g., obtaining information about stress, anxiety, emotional well-being, or coping strategies through AI platforms);
- **Emotional support and self-help** (e.g., using AI to discuss emotions, receive guidance, or manage everyday challenges); and
- **Responsible AI use** (e.g., verifying AI-generated information, maintaining privacy, and using AI ethically and responsibly).

The total AIUS score was calculated by summing responses across all 20 items, with higher scores representing greater engagement with artificial intelligence technologies. The scale was designed as a brief, easy-to-administer instrument suitable for assessing AI utilisation among school-going adolescents in educational and research settings.

iii). Digital Mental Health Literacy Scale (DMHLS):

Digital Mental Health Literacy (DMHL) was assessed using the Digital Mental Health Literacy Scale (DMHLS), which was adapted by the investigators based on established frameworks of mental health literacy and digital health literacy (Kutcher *et al.*, 2016; Bjørnsen *et al.*, 2017; O'Connor & Casey, 2015). The instrument was designed to evaluate adolescents' knowledge, skills, and competencies in accessing, understanding, evaluating, and appropriately utilizing digital mental health information and services. The adapted scale consists of 28 self-report items, each rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Higher total scores indicate greater levels of digital mental health literacy.

The instrument assesses six major domains:

- Recognition of mental health problems (ability to identify common signs and symptoms of mental health difficulties);
- Searching for digital mental health information (ability to locate appropriate online mental health resources);
- Evaluating the credibility of online information (ability to distinguish reliable and evidence-based information from misinformation);
- Responsible use of artificial intelligence (ability to use AI tools ethically, critically, and safely when seeking mental health information);
- Help-seeking knowledge (awareness of appropriate professional services and available mental health support resources); and
- Online mental health safety (knowledge of digital privacy, confidentiality, cyber safety, and responsible online behaviour while accessing mental health information).

The overall Digital Mental Health Literacy score was obtained by summing the responses across all 28 items, with higher scores reflecting better knowledge, critical appraisal skills, responsible digital behaviour, and greater confidence in accessing and utilizing online mental health information and support services. The scale provides a comprehensive assessment of adolescents' digital mental health literacy and is suitable for use in educational, clinical, and community-based research settings.

2.10. Procedure

Following approval from the Institutional Ethics Committee, permission was obtained from the selected schools. Meetings were conducted with school principals and teachers to explain the objectives and procedures of the study. Parental informed consent and adolescent assent were obtained before data collection. Participants completed the questionnaires in classroom settings under the supervision of the investigators. Instructions were standardised across schools to ensure consistency. The average time required to complete the questionnaires was 25–30 minutes. Participants were assured that there were no right or wrong answers and were encouraged to respond honestly.

2.11. Statistical Analysis

The collected data were analyzed using appropriate descriptive and inferential statistical techniques. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize the demographic characteristics and major study variables. Pearson's product-moment correlation coefficient was employed to examine the relationship between Artificial Intelligence Use and Digital Mental Health Literacy. An independent-samples *t*-test was used to assess gender differences, while one-way Analysis of Variance (ANOVA) was conducted to examine differences across the three age groups. Simple linear regression analysis was performed to determine whether Artificial Intelligence Use significantly predicted Digital Mental Health Literacy

among adolescents.

2.12. Ethical Considerations

Participation in the study was entirely voluntary. Written informed consent was obtained from parents or legal guardians, and informed assent was obtained from all adolescent participants prior to enrolment. Participants were informed about the purpose of the study, confidentiality of the collected information, anonymity of responses, and their right to withdraw from the study at any time without any academic consequences. No identifying information was recorded on the questionnaires, and all data were stored securely with access restricted to the research investigators.

3. Results and Discussion

3.1. Demographic Characteristics of the Participants

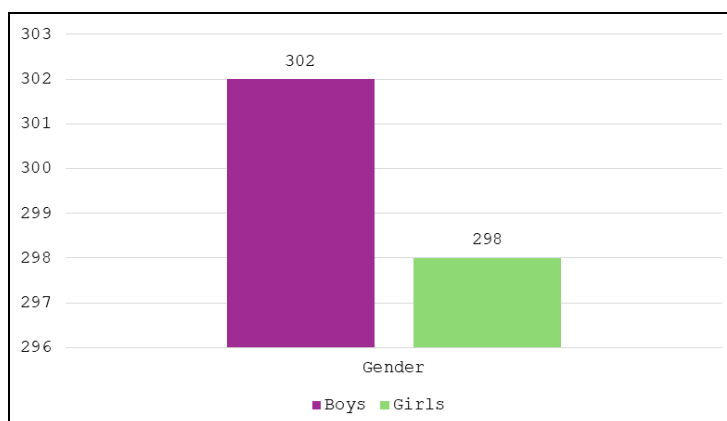


Fig 1: Gives the gender of the participants.

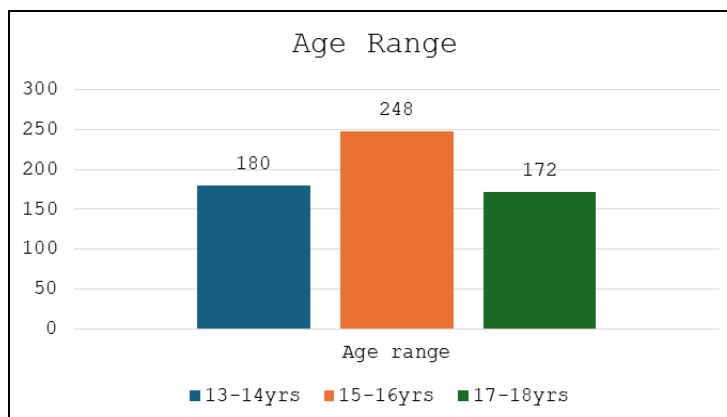


Fig 2: Gives the age range of the participants.

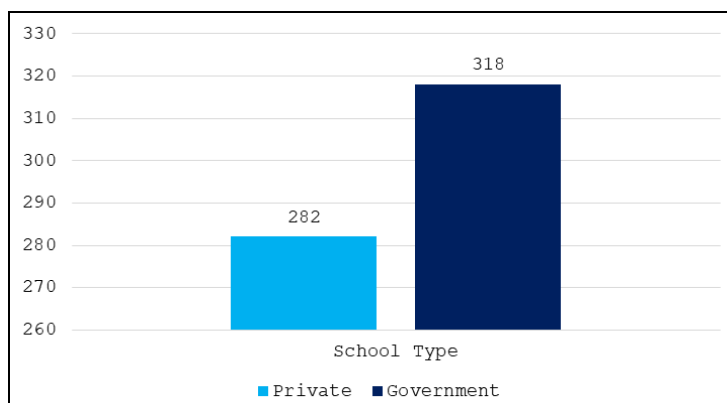


Fig 3: Gives the type of school

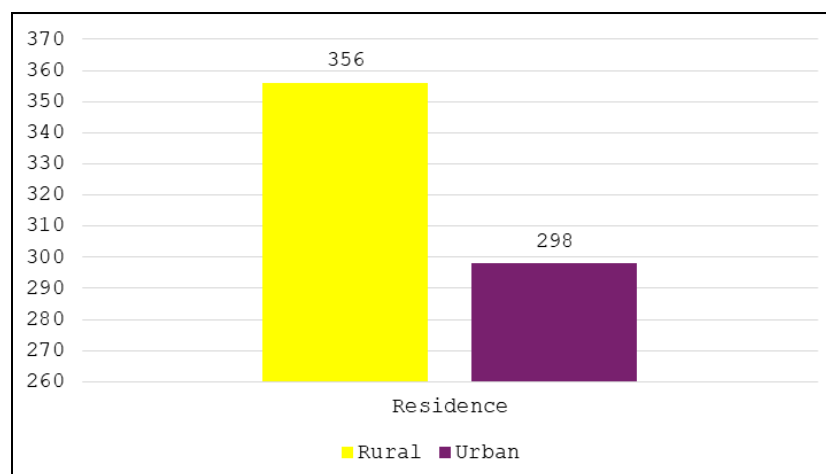


Fig 4: Gives the residence of the participants.

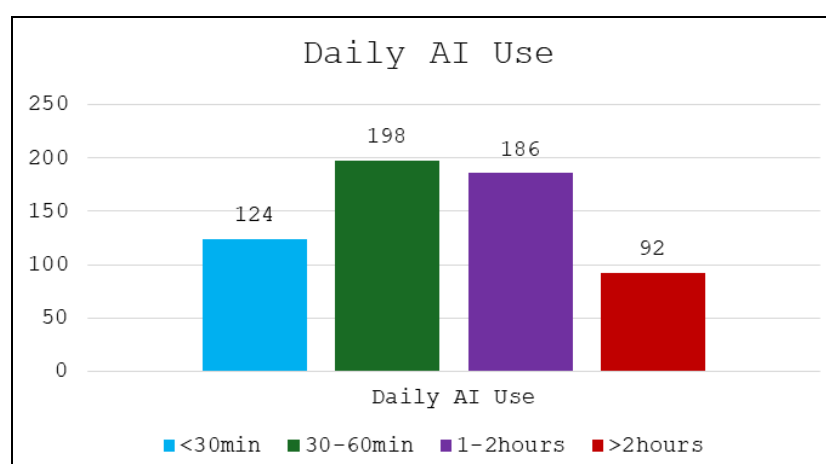


Fig 5: Daily Use of AI by the participants.

The demographic characteristics of the participants are presented in Figures 1–5. A total of 600 adolescents participated in the study, comprising 302 boys (50.3%) and 298 girls (49.7%), indicating a nearly equal gender distribution. With regard to age, the largest proportion of participants belonged to the 15–16-year age group (41.3%), followed by those aged 13–14 years (30.0%) and 17–18 years (28.7%).

In terms of school type, 318 participants (53.0%) were enrolled in private schools, while 282 (47.0%) attended government schools. Regarding residential area, 356 adolescents (59.3%) were from urban settings, and 244 (40.7%) were from rural areas.

With respect to daily AI use, the largest proportion of adolescents (33.0%) reported using AI applications for 30–60 minutes per day, followed by 31.0% who reported using AI for 1–2 hours daily. A further 20.7% reported using AI for less than 30 minutes per day, while 15.3% reported using AI applications for more than two hours per day. Overall, the demographic profile indicates a relatively balanced representation by gender, with adequate variation across age groups, school type, residential background, and duration of daily AI use.

The sample comprised adolescents from diverse demographic backgrounds, with balanced gender representation and sufficient variation in age, school type, and residential setting. Most participants reported using AI applications for at least 30 minutes per day, suggesting that artificial intelligence has become an increasingly common and integral part of adolescents' daily digital activities.

3.2. Descriptive Statistics of Artificial Intelligence Use and Digital Mental Health Literacy

Table 1: Descriptive Statistics of Study Variables (N = 600)

Variable	Mean	SD	Minimum	Maximum
Artificial Intelligence Use	69.82	11.34	32	97
Digital Mental Health Literacy	88.46	13.27	44	117

Descriptive statistics were computed to examine the levels and distribution of Artificial Intelligence (AI) use and Digital Mental Health Literacy among the 600 adolescents included in the study. The results are presented in Table 1. As shown in Table 1, adolescents reported a moderately high level of Artificial Intelligence use, with a mean score of 69.82 (SD = 11.34). The observed scores ranged from 32 to 97, indicating considerable individual variation in the extent of AI use among participants.

Similarly, the adolescents demonstrated a moderately high level of Digital Mental Health Literacy, with a mean score of 88.46 (SD = 13.27). Scores ranged from 44 to 117, suggesting variability in participants' ability to access, understand, evaluate, and use digital mental health information and resources. Overall, the findings indicate that both Artificial Intelligence use and Digital Mental Health Literacy were relatively high among the adolescents in the sample, although the observed ranges and standard deviations suggest meaningful differences between individual participants.

The findings indicate that adolescents were generally frequent users of AI-based technologies and demonstrated a relatively

good level of digital mental health literacy. Nevertheless, the variability in scores suggests notable individual differences in both the extent of AI engagement and the ability to access, understand, evaluate, and effectively utilize digital mental health information. These differences highlight the importance of considering individual variations in adolescents' digital experiences and competencies.

3.3. Levels of Artificial Intelligence Use

The level of Artificial Intelligence (AI) use among the participants was examined by classifying their total AI Use Scale scores into three categories like low, moderate, and high based on percentile cut-off scores. The distribution of participants across these categories is presented in Table 2.

Table 2: Distribution of Participants According to the Level of Artificial Intelligence Use (N = 600)

Level of AI Use	Score Range	Frequency (n)	Percentage (%)
Low	20–52	96	16.0
Moderate	53–76	336	56.0
High	77–100	168	28.0
Total	—	600	100.0

The findings indicate that the majority of adolescents (56.0%) demonstrated a moderate level of AI use, followed by 28.0% who reported a high level of AI use. In comparison, 16.0% of participants demonstrated a low level of AI use. Thus, 84.0% of the adolescents fell within the moderate-to-high AI-use categories, suggesting that AI technologies constituted a relatively prominent component of digital engagement among the participants.

The predominance of moderate and high AI use may indicate that AI-based technologies are increasingly incorporated into adolescents' everyday activities, including academic learning, information seeking, communication, and other forms of digital engagement. However, the classification reflects the extent of AI use and should not, by itself, be interpreted as indicating whether such use is beneficial, responsible, or effective. Further analysis of the relationship between AI use and digital mental health literacy is therefore important to understand the implications of adolescents' AI engagement.

3.4. Levels of Digital Mental Health Literacy

The level of Digital Mental Health Literacy (DMHL) among the participants was assessed by categorising the total DMHL scores into three levels are low, moderate, and high. The distribution of adolescents across these levels is presented in Table 3.

Table 3: Distribution of Participants According to the Level of Digital Mental Health Literacy (N = 600)

Level of Digital Mental Health Literacy	Score Range	Frequency (n)	Percentage (%)
Low	30–69	84	14.0
Moderate	70–95	352	58.7
High	96–120	164	27.3
Total	—	600	100.0

The findings indicate that the majority of adolescents (58.7%) demonstrated a moderate level of Digital Mental Health Literacy, while 27.3% demonstrated a high level. In contrast, 14.0% of the participants fell within the low digital mental health literacy category. Overall, 86.0% of the adolescents

demonstrated moderate-to-high levels of digital mental health literacy.

These findings suggest that most adolescents in the present sample possess a reasonable level of knowledge and skills related to accessing, understanding, evaluating, and appropriately using digital mental health information. However, the presence of 14.0% of adolescents with low digital mental health literacy indicates a continuing need for targeted educational initiatives to strengthen their ability to identify reliable mental health information, critically evaluate online content, recognise misinformation, understand appropriate help-seeking options, and use digital and AI-based mental health resources safely and responsibly. The results therefore highlight the importance of strengthening digital mental health literacy among adolescents, particularly as their use of digital technologies continues to increase.

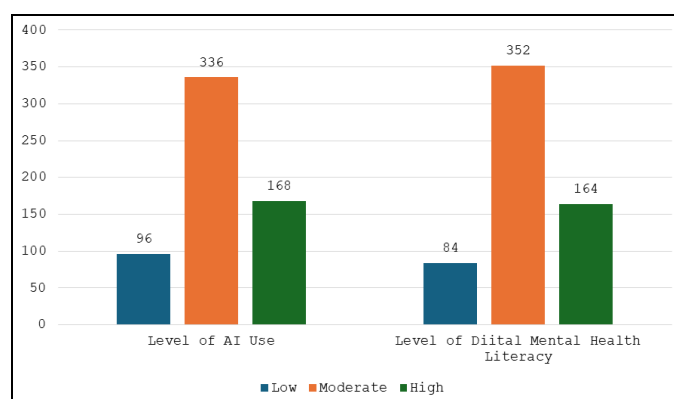


Fig 6: Gives the Level of Artificial Intelligence Use & Digital Mental Health Literacy.

3.5. Comparison of Artificial Intelligence Use and Digital Mental Health Literacy by Gender

Table 4: Comparison of Artificial Intelligence Use and Digital Mental Health Literacy by Gender

Variables	Boys (n=302) M ± SD	Girls (n=298) M ± SD	t	p	Significance
Artificial Intelligence Use	71.54 ± 11.02	68.07 ± 11.41	3.82	<.001	Significant
Digital Mental Health Literacy	86.74 ± 13.62	90.21 ± 12.71	-2.94	.003	Significant

Note. $p < .05$ was considered statistically significant.

An independent-samples *t*-test was conducted to examine whether boys and girls differed significantly in their levels of Artificial Intelligence (AI) use and Digital Mental Health Literacy. The results indicated statistically significant gender differences in both variables. With regard to Artificial Intelligence Use, boys reported significantly higher levels of AI use ($M = 71.54$, $SD = 11.02$) compared with girls ($M = 68.07$, $SD = 11.41$). This difference was statistically significant, $t = 3.82$, $p < .001$. The findings suggest that boys in the present sample demonstrated greater engagement with or utilization of AI-based technologies than girls.

In contrast, a statistically significant gender difference was observed in Digital Mental Health Literacy, with girls obtaining a higher mean score ($M = 90.21$, $SD = 12.71$) than boys ($M = 86.74$, $SD = 13.62$). The difference was statistically significant, $t = -2.94$, $p = .003$. This finding indicates that girls demonstrated a comparatively higher level of knowledge, awareness, and ability to understand or evaluate

digital mental health information than boys.

Overall, the findings reveal a distinct gender pattern across the two domains. Boys showed significantly greater AI use, whereas girls demonstrated significantly higher digital mental health literacy. Thus, greater engagement with artificial intelligence did not correspond to higher digital mental health literacy in the present sample. The results suggest that frequency or extent of AI engagement and the ability to critically understand and utilize digital mental health information may represent different dimensions of digital competency.

The observed gender differences may have implications for digital mental health education and intervention programs. While boys may benefit from greater emphasis on the responsible, informed, and health-oriented use of AI technologies, girls may benefit from opportunities that further strengthen their practical application of AI for mental health information, self-management, and help-seeking. However, these findings should be interpreted as group-level differences and should not be generalised to all boys or girls, as individual differences and contextual factors may also contribute to patterns of AI use and digital mental health literacy.

In summary, the results demonstrate that gender was significantly associated with both AI use and digital mental health literacy in the present sample. Boys had higher AI use scores, whereas girls had higher digital mental health literacy scores. These findings highlight the importance of considering gender-specific patterns when designing programs aimed at promoting responsible AI engagement and digital mental health literacy among young people.

3.6. Comparison of Artificial Intelligence Use and Digital Mental Health Literacy Across Age Groups

Table 5: Comparison of Artificial Intelligence Use and Digital Mental Health Literacy across Age Groups.

Variables	13–14 Years (n = 198) M ± SD	15–16 Years (n = 201) M ± SD	17–18 Years (n = 201) M ± SD	F	p	Significance
Artificial Intelligence Use	65.82 ± 10.74	70.16 ± 11.08	74.21 ± 11.36	31.64	< .001	Significant
Digital Mental Health Literacy	82.76 ± 13.41	88.93 ± 12.84	94.58 ± 11.97	42.87	< .001	Significant

Note. *F* = one-way analysis of variance; *p* < .05 was considered statistically significant.

The results indicated a statistically significant difference in Artificial Intelligence Use across the three age groups, $F(2, 597) = 31.64, p < .001$. The mean AI Use score increased progressively with age. Participants aged 13–14 years reported the lowest level of AI use ($M = 65.82, SD = 10.74$), followed by those aged 15–16 years ($M = 70.16, SD = 11.08$). Participants in the 17–18-year age group demonstrated the highest level of AI use ($M = 74.21, SD = 11.36$). This pattern suggests that AI engagement may increase with age during adolescence, potentially reflecting greater exposure to digital technologies, increased independence in technology use, and more frequent use of AI-based applications for educational, informational, communication, and entertainment purposes. A statistically significant difference was also observed in

Digital Mental Health Literacy across the three age groups, $F(2, 597) = 42.87, p < .001$. The 13–14-year group obtained the lowest mean score ($M = 82.76, SD = 13.41$), whereas the 15–16-year group showed a higher mean score ($M = 88.93, SD = 12.84$). The 17–18-year group demonstrated the highest level of Digital Mental Health Literacy ($M = 94.58, SD = 11.97$). The progressive increase in scores suggests that older adolescents may possess greater awareness and understanding of mental health information available through digital platforms.

Taken together, the findings demonstrate a clear age-related pattern in both Artificial Intelligence Use and Digital Mental Health Literacy. The 17–18-year-old participants demonstrated the highest scores on both measures, while the 13–14-year-old participants obtained the lowest scores. This pattern indicates that increasing age may be associated with greater exposure to AI technologies as well as greater familiarity with digital mental health information.

The increase in Artificial Intelligence Use across age groups may be attributable to increasing autonomy and digital exposure during adolescence. Older adolescents may have greater opportunities to independently access AI-based tools for academic learning, information seeking, communication, problem-solving, and personal interests. In contrast, younger adolescents may have greater parental supervision or comparatively limited independent access to digital technologies.

Similarly, the higher Digital Mental Health Literacy observed among older adolescents may reflect increased cognitive maturity, greater exposure to mental health-related information, and more independent engagement with online resources. Older adolescents may also be more likely to encounter information concerning stress, anxiety, emotional well-being, relationships, and other psychological concerns through social media, educational platforms, and online health resources.

3.7. Prediction of Digital Mental Health Literacy from Artificial Intelligence Use

Table 6: Simple Linear Regression Analysis Predicting Digital Mental Health Literacy from Artificial Intelligence Use (*N* = 600)

Predictor	B	SE B	β	t	p
Constant	51.20	2.72	—	18.82	< .001
Artificial Intelligence Use	0.52	0.039	.48	13.38	< .001

Model Summary: $R = .48, R^2 = .23, Adjusted R^2 = .23, F(1, 598) = 179.00, p < .001$.

The simple linear regression analysis indicates that Artificial Intelligence Use significantly predicts Digital Mental Health Literacy among adolescents, $\beta = .48, t = 13.38, p < .001$. The overall regression model was statistically significant, $F(1, 598) = 179.00, p < .001$.

The model produced an R^2 of .23, indicating that Artificial Intelligence Use accounted for approximately 23% of the variance in Digital Mental Health Literacy among the 600 adolescents. This represents a meaningful proportion of explained variance, while the remaining 77% may be attributable to other individual, social, educational, and environmental factors not examined in the present model.

The positive standardised regression coefficient ($\beta = .48$) indicates that higher Artificial Intelligence Use was associated with higher Digital Mental Health Literacy. In practical terms, adolescents who reported greater engagement with AI

technologies tended to demonstrate higher levels of digital mental health literacy.

These findings are also consistent with the previously obtained Pearson correlation ($r = .48, p < .001$), indicating a moderate positive association between the two variables. The regression analysis extends this finding by demonstrating that AI Use significantly contributes to the prediction of Digital Mental Health Literacy.

4. Discussion

The present study examined the relationship between artificial intelligence (AI) use and digital mental health literacy among adolescents. The findings demonstrated that adolescents reported a moderately high level of AI use and moderately high digital mental health literacy, with AI use emerging as a significant predictor of digital mental health literacy. The results suggest that AI technologies are increasingly becoming integrated into adolescents' daily lives and may play an important role in facilitating access to mental health information, psychoeducation, and help-seeking resources.

The descriptive findings revealed that most adolescents reported moderate to high engagement with AI-based technologies. This observation reflects the rapid expansion of generative AI tools such as ChatGPT, AI-powered educational assistants, intelligent search engines, and mental health chatbots among school-going adolescents. Today's adolescents are digital natives who increasingly rely on AI for academic learning, problem-solving, information retrieval, and emotional support. Similar trends have been reported globally, where adolescents are increasingly using conversational AI systems for educational assistance and health-related information (OpenAI, 2023; Sallam, 2023; Torous *et al.*, 2021). The widespread accessibility of smartphones, internet connectivity, and AI-powered applications has transformed the way adolescents acquire knowledge and interact with digital health information.

The findings further indicated that adolescents demonstrated a moderately high level of digital mental health literacy. This suggests that participants possessed reasonable knowledge regarding common mental health problems, online help-seeking resources, evaluation of digital information, and responsible use of mental health content available through digital platforms. These findings are consistent with previous studies indicating that mental health literacy among adolescents has improved considerably due to school-based awareness programmes, social media campaigns, digital psychoeducation, and public mental health initiatives (Kutcher *et al.*, 2016; Bjørnsen *et al.*, 2017). Nevertheless, the predominance of moderate rather than high literacy levels suggests that many adolescents continue to experience difficulty distinguishing reliable mental health information from misinformation and may lack confidence in making informed decisions regarding online mental health resources.

One of the most important findings of the present study was the moderately positive correlation between AI use and digital mental health literacy. Adolescents who reported greater engagement with AI applications also demonstrated higher digital mental health literacy. This finding suggests that AI technologies may facilitate access to evidence-based psychological information, improve awareness of emotional well-being, and support informed decision-making regarding mental health. AI-powered platforms enable adolescents to obtain immediate responses to mental health queries, explore coping strategies, and access psychoeducational resources that might otherwise remain unavailable because of geographical,

financial, or social barriers. Similar observations have been reported by Graham *et al.* (2019), who suggested that AI has considerable potential to improve mental healthcare through personalized information delivery and early identification of psychological concerns. Likewise, Torous *et al.* (2021) emphasized that digital technologies are reshaping contemporary mental healthcare by expanding access to information and self-management resources.

However, the observed correlation should not be interpreted as evidence that AI use alone improves mental health literacy. Digital mental health literacy is a multidimensional construct influenced by educational experiences, digital literacy, family support, socioeconomic status, critical thinking skills, and exposure to mental health education. Adolescents who possess greater digital competence may naturally use AI more effectively and critically evaluate the information obtained. Consequently, AI should be viewed as a supportive educational tool rather than an independent determinant of mental health literacy.

The present study also identified significant gender differences in AI use and digital mental health literacy. Boys reported significantly greater AI use than girls, whereas girls demonstrated significantly higher digital mental health literacy. Greater AI use among boys may reflect higher engagement with emerging technologies, gaming platforms, coding activities, and technology-oriented educational resources. Conversely, higher mental health literacy among girls is consistent with previous literature indicating that female adolescents are generally more willing to discuss emotional experiences, seek psychological information, recognize symptoms of emotional distress, and access professional support when required (Gulliver *et al.*, 2010; Wei *et al.*, 2015). Socialization processes may encourage girls to express emotional concerns more openly, whereas boys often experience societal expectations that discourage emotional disclosure, thereby influencing differences in mental health literacy.

Age-related differences observed in the present study further indicated that older adolescents reported significantly greater AI use compared with younger participants. Increased academic demands, greater digital independence, higher exposure to technology, and improved digital competence during late adolescence may explain this finding. Older adolescents are more likely to utilize AI for academic writing, career planning, information searching, and problem-solving, thereby increasing their familiarity with AI-based applications. Similar developmental trends have been described by Sawyer *et al.* (2018), who highlighted that cognitive maturity and digital engagement increase substantially during middle and late adolescence.

The present findings are especially relevant given the rapid integration of generative AI into adolescents' educational and everyday digital environments. AI systems can provide easily accessible information and may reduce barriers to information seeking. However, adolescents may also encounter inaccurate, incomplete, biased, or inappropriate health information through digital technologies. Consequently, digital mental health literacy should include not only the ability to find information but also the ability to critically evaluate its credibility, understand its limitations, protect personal information, and make appropriate decisions regarding professional help-seeking.

Overall, the findings suggest that AI use and digital mental health literacy are significantly related among adolescents, while gender and age appear to differentiate patterns of

engagement and literacy. The results support the importance of developing adolescent-focused digital mental health education that combines AI literacy, critical thinking, mental health awareness, online safety, and responsible technology use.

5. Conclusion

The present study contributes to the growing literature examining the intersection of artificial intelligence and adolescent mental health by demonstrating a positive association between AI use and digital mental health literacy. The findings also revealed significant gender differences. Boys demonstrated significantly higher AI Use, whereas girls demonstrated significantly higher Digital Mental Health Literacy. This finding highlights that the extent of AI engagement does not necessarily correspond directly to the quality of digital mental health knowledge or literacy.

Significant age-related differences were also observed, with older adolescents demonstrating higher levels of AI Use and Digital Mental Health Literacy than younger adolescents. This suggests that digital experiences and competencies may develop progressively throughout adolescence.

Taken together, the findings emphasize that adolescents need more than access to AI technologies. They require the knowledge and critical skills to use AI responsibly, safely, ethically, and effectively, particularly when seeking mental health information. Digital mental health interventions should therefore integrate AI literacy with evidence-based mental health education, critical evaluation of online information, privacy awareness, and appropriate professional help-seeking. The study provides a foundation for future research and intervention programs aimed at preparing adolescents to navigate the rapidly changing digital and AI-enabled mental health information environment.

i). Implications

- Schools should integrate digital mental health literacy and AI literacy into health education curricula to enhance adolescents' ability to identify credible online mental health information and use AI responsibly.
- School psychologists, counsellors, and teachers should incorporate AI-assisted psychoeducation as a supplementary resource while emphasizing the importance of professional mental health consultation for psychological concerns.
- Parents should receive guidance regarding adolescents' AI use to encourage healthy digital habits, critical evaluation of online information, and appropriate help-seeking behaviour.
- Mental health professionals may consider developing evidence-based AI-supported educational resources that provide reliable psychoeducation while maintaining ethical standards and privacy protection.
- Policymakers should formulate national guidelines addressing ethical AI use, digital safety, data privacy, and adolescent protection within digital mental health services.

ii). Limitations

- The cross-sectional design prevents conclusions regarding causal relationships between AI use and digital mental health literacy. Longitudinal research is required to examine developmental changes over time.
- The study relied exclusively on self-report questionnaires, which may be influenced by recall bias,

response bias, and social desirability.

- Participants were recruited from selected schools within a limited geographical region, potentially restricting the generalizability of findings to adolescents from different cultural, socioeconomic, or educational backgrounds.
- The study assessed the frequency of AI use but did not differentiate between specific AI platforms or evaluate the quality and accuracy of AI-generated mental health information.
- Several factors known to influence digital mental health literacy, including socioeconomic status, parental digital literacy, emotional intelligence, psychological well-being, previous mental health experiences, and school mental health programmes, were not examined.

iii). Future Directions

- Future research should employ longitudinal and experimental designs to examine causal relationships between AI use and digital mental health literacy across different stages of adolescence.
- Studies involving nationally representative samples from urban, rural, and socioeconomically diverse populations would improve the generalizability of findings. Future investigations should also compare different AI platforms, including conversational AI systems, mental health chatbots, and virtual counselling applications, to determine their relative effectiveness.
- Research should evaluate AI-assisted mental health literacy interventions delivered through schools and investigate whether structured AI-based psychoeducation improves psychological knowledge, stigma reduction, resilience, emotional regulation, and professional help-seeking behaviour.
- Future studies may additionally explore moderating variables such as gender, digital literacy, parental supervision, personality characteristics, emotional intelligence, and cultural beliefs influencing adolescents' engagement with AI technologies.

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