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Online risks and parental mediation in social media usage among kids: a quantitative study in Rawalpindi City

Enaam Youssef[1,2,3]*, Sana Ali[4,5]*, Mahra Al Malek[2] and Saqib Riaz[5]

[1]Sociology Department, Ajman University, Ajman, United Arab Emirates, [2]Humanities and Social Sciences Research Center (HRC), Ajman University, Ajman, United Arab Emirates, [3]Department of Sociology, Ain Shams University, Cairo, Egypt, [4]College of English and Media, Birmingham City University, Birmingham, United Kingdom, [5]Allama Iqbal Open University, Islamabad, Pakistan

This research investigates different aspects of online media usage among children and the dynamics surrounding it. It aims to determine the patterns of online media consumption among children and comprehend their perceptions concerning exposure to inappropriate content online. This research is supported by the Parental Mediation Theory and quantitative design to examine children's online experiences. Data gathered from 346 respondents revealed that the respondents indicated high-level engagement in online media, mainly for surfing and instant messaging, with daily usage varying from 1 to 3 h and some exceeding five hours. Respondents have personal accounts on more than four social networking sites, with Facebook being the principal platform. Concerning vulnerability to online indecent content, respondents emphasized examples of accidental exposure during online activities, i.e., surfing and instant messaging, mostly occurring at home and school. The frequency of exposure was usually categorized as occurring four or more times, leading to possible risks and hazards to children's well-being. The study further highlighted children's perceptions of parental mediation in online media use. Therefore, this study emphasizes the importance of programs empowering parents with the knowledge and abilities to handle and manage their children's online media activities adeptly. Also, maintaining a balance between using the educational benefits of online media and protecting children from possible risks becomes crucial, highlighting parents' significant role in this critical domain. Finally, this research proposed some implications, and limitations are discussed accordingly.

KEYWORDS

parental mediation, accidental exposure to indecent content, children, quantitative design, Pakistan, survey method

1 Introduction

Internet usage among children varies based on the purposes and demands of the potential users. The previous debate has extensively discussed the purposes of internet usage among children. A common agreement regarding the right approach to use the internet for entertainment and educational purposes questions the nature and effects of children's internet usage and experiences (Rachmayani, 2017). Especially during and after the Covid-19 pandemic, the use of online platforms has ever increased. A report by UNICEF (2021) shows that the increased risks online are directly related to augmented time spent in front of screens. Notably, the pandemic led to the closure of educational institutions and the implementation of social distancing measures, resulting in an overall dependence on online

media among children globally. As a result, around 1.5 billion children worldwide turned to online media for both education and social interaction, thereby exalting their susceptibility to different online dangers, i.e., sexual exploitation, cyberbullying, and vulnerability to inappropriate content. UNICEF also states that the increased dependence on the virtual environment raised the likelihood of sharing and obtaining sexualized content. Also, unrestrained, and unscheduled screen time exposed many individuals to cyberbullying and psychological problems (UNICEF, 2019).

In this regard, exposure to online indecent content is one of the most critical concerns. Exposure to internet-based indecent content among children and teenagers is a highly prevalent issue. The young generation today has a substantial amount of exposure to indecent online content. Notably, children under eighteen years of age frequently get exposed to online indecent content that needs strong attention from the internet regulatory bodies and website owners. Besides, exposure to online indecent content is not a simple phenomenon. Instead, it is considered a modern type of child abuse in the digital world. This argument is also supported by UNICEF, which coins the term child sexual abuse in an unsupervised or unregulated environment where children become susceptible to abuse even in cyberspace (UNICEF, 2021). Despite many other cybercrimes against children, accidental or non-consensual exposure to online indecent content reflects another bleak aspect of the cyber world (Ghet and Elgharnah, 2020). In this context, internet usage and dependency among children are considered one of the primary reasons behind accidental online indecent content (UNICEF, 2020). However, the internet is one of the most important sources for children to extend their world knowledge and understanding and enhance critical thinking abilities; the dark side of its usage demands strict attention from parents and guardians (Livingstone and Stoilova, 2021). Compared to conventional media platforms such as newspapers, the internet, and radio, the internet offers access to both the audiences and the platforms' owners. The moment when a child enters the digital world, the chances of their exposure to almost every type of information become inevitable (EECERA, 2019). Furthermore, exposure to online children's indecent content also brings several detrimental physical and social consequences. When a child experiences accidental exposure to online indecent content adversely influences their psychological health. For example, stress, feeling of guilt, shame, depression, and even sexual and physical violence against the opposite gender are some commonly witnessed outcomes (Blumross and Livingstone, 2020). However, parents' importance in ensuring children's online safety and mitigating any unusual exposure among them is highly considerable. A report by UNICEF also urged parents and guardians to ensure safe internet usage among children worldwide. It is recommended that parents are widely responsible for providing safe internet usage for their children. Parents' digital media literacy, supervision, and guiding children about safe internet usage are considered important (Livingstone et al., 2012). Researchers and critics consider parents a critical factor in preventing children's accidental exposure to online indecent content. Especially, the role of parents in nullifying the potential effects is of greater magnitude (OfCom, 2021).

1.1 Objectives and significance

Considering the increased internet usage during the post-pandemic era, this research aims to determine online media usage among children, examining their exposure to indecent content. Besides, it strives to scrutinize how children view parental mediation regarding online media use, offering insights into their experiences and perspectives. This study is significant for parents, the government, and policymakers. For parents, it highlights their critical role in monitoring and ensuring their children's online safety by observing any unusual online exposure and responding effectively. It also acts as a foundational study for childcare and social support services, emphasizing the need to focus on children's online well-being and development in Pakistan. Also, the research provides the government with valuable insights to help design and implement effective policies that facilitate safe internet usage, contributing to the physical and cognitive development of children in the country.

1.2 Study background

Recent data showed the internet penetration rate at 36.5% during the beginning of 2022. Kepois's analysis indicates that the internet growth rate in Pakistan has reached 35.9% from 2021 to 2022. These figures also revealed that 144.4 million people did not use the internet at the start of 2022., indicating that approximately 63.5% of the population remained offline at the start of 2022 (Portal, 2022). Data published by Meta advertising indicates that there were 43.44 million Facebook users in Pakistan by January 2022, comprising 19.2% of the total population. As Facebook restricted its usage, 27.5% of the Facebook users are 13 years old and above. While 19.1% of Facebook users are females and 80.9% are females. Besides, 71.70 million YouTube users in Pakistan comprise 31.5% of the total population, regardless of age. The relevant data also indicates 18.26 million TikTok users above 18 in early 2022. Notably, 17.8% of the TikTok audience was female, while 82.2% were male. Finally, 13.75 million Instagram users were recorded by the end of February 2022. As Instagram restricts its usage to individuals above 13 years of age, 8.7% of the eligible audience is using Instagram (34.8% females, 65.2% males). Linking this internet usage to children, it is argued that exposure to online indecent content among children and teenagers is a highly prevalent issue. The young generation today has a substantial amount of exposure to indecent online content. Children under eighteen years of age frequently get exposed to online indecent content that needs strong attention from internet regulatory bodies and website owners. Besides, exposure to inappropriate online content is not a simple phenomenon. Instead, it is considered a modern type of child abuse in the digital world. This argument is also supported by UNICEF, which coins the term child sexual abuse in an unsupervised or unregulated environment where children become susceptible to abuse even in cyberspace (UNICEF, 2021). Despite many other cybercrimes against children, accidental or non-consensual exposure to indecent online content reflects another bleak aspect of the cyber world (Ghet and Elgharnah, 2020). In this context, internet usage and dependency among children are considered one of the primary reasons behind accidental online indecent content (UNICEF, 2019). However, the internet is one of the most important sources for children to extend their world knowledge and understanding

and enhance critical thinking abilities; the dark side of its usage demands strict attention from parents and guardians (Iqbal et al., 2021). Exposure to online children's indecent content also brings several detrimental physical and social consequences. When a child experiences accidental exposure to inappropriate online content adversely influences their psychological health. For example, some commonly witnessed outcomes are stress, guilt, shame, depression, and even sexual and physical violence against the opposite gender (Dinh and O'neill, 2019). However, parents' importance in ensuring children's online safety and mitigating any unusual exposure among them is highly considerable. A report by UNICEF also urged parents and guardians to ensure safe internet usage among children worldwide. It is recommended that parents are widely responsible for providing safe internet usage for their children. Parents' digital media literacy, supervision, and guiding children about safe internet usage are all considered important (Warren, 2020). Researchers and critics consider parents a critical factor in preventing children's accidental exposure to online indecent content. Especially, the role of parents in nullifying the potential effects is of greater magnitude (OfCom, 2021).

2 Review of literature

2.1 Online media usage among children

The exponential growth of the internet during the past fifteen years has also increased its usage across the globe. Youngsters, especially children under eighteen, are more attracted by the interaction as it offers them extraordinary opportunities to interact with others. However, they also maintain their anonymity in the digital environment and create and sustain their sense of belonging and social acceptance. However, social media researchers, critics, and behavioral scientists attribute this usage to addiction and problematic reliance for several reasons (Barr et al., 2020). For instance, Thorell et al. (2024) consider increased internet usage among Korean youth as one of the major reasons behind academic failure, psychological pressure, loneliness, and cyberbullying. As noted, despite many children being well aware of the consequences of increased internet usage, more than 69% of individuals under eighteen use it for prolonged hours. They primarily use the internet for gaming, excluding them from their family and also causing damage to their educational activities. Konok et al. (2020) also witnessed the effects of internet usage as they examined it specifically in terms of chat messengers' usage among young students in Japan. The researchers applied the case study method and found that youngsters consider online chatting an integral part of their everyday lives. Most participants only perceive themselves as confident if they contact other online chat users who inform them about different things. As a result, both the presence and absence of chat messengers affect their behavior leading to internet usage among children (chat messengers) (Neumann et al., 2022). According to Eales et al. (2021), internet usage has become a fundamental part of children's lives. This increased internet usage also questions the extent to which they have control over their internet usage and reliance. The leading concern is if children are too reliant on the internet, they will be more likely to develop internet addiction. Moreover, declined academic performance, decreased family life, less interaction with family members, and many others are also attributed to increased internet

usage among children. Other psychological issues like depression, stress, loneliness, anxiety, physical health issues such as decreased sleep, insomnia, and lack of physical activities are other concerns attributed to increased internet usage among the young generation.

2.2 Internet usage and exposure to indecent content (online pornography)

According to Ali et al. (2024), the prevalence of internet access through personal devices like mobile phones, tablets, and computers contributes to the increased risk of vulnerability to online pornography exposure. The lack of parental supervision in internet usage further increases concerns about children's susceptibility to such content. Beyond deliberate exposure, accidental encounters with online pornography pose consequential challenges and render questions about the appropriateness of the internet for children (Twenge et al., 2020). Emphasize that the availability and openness to sexual content have reached exceptional levels. Users, including children, are aware of the easy accessibility of online pornography, enabled by explicit content, anonymity, and the portability of devices. However, compared to adults, children's exposure to online pornography has notably increased due to heightened usage, sparking curiosity to explore further. Children's inadvertent exposure to cyberporn is impulsive, undesirable, and unexpected, occurring through different means, i.e., pop-up advertisements, emails, websites, and web searches. This accidental exposure expands beyond images and videos of nudity and sexual acts to contain excessively violent and deviant activities, such as sexual abuse, viciousness, and child sexual abuse (Barr et al., 2020; Puukko et al., 2020). Empirically investigated the potential routes having increased online pornography exposure among children. The researcher applied the case study method and selected individuals younger than eighteen in the United Kingdom. Findings showed several sources of exposure to online pornography among children. First, online gaming through personal computers, laptops, Xbox, and PlayStation is one of the major sources of exposure to online pornography. Despite many games and websites mentioning that the relevant games are for adults, children still play them, which increases their exposure to online pornography. Second, personal mobile phones and laptops are used for communication purposes. These devices are modified versions of television and desktop computers that give users more privacy to search for the required content and keep their privacy under control. Consequently, while accessing online platforms through these devices, exposure to pop-up advertisements, sexualized emails, and other relevant increases the chances of accidental exposure to online pornography. The third important source of accidental exposure to online pornography involves pornographic content available on social networking sites (SNS). These sites contain advertisements and deliberately made and regulated personal accounts that display pornographic images and videos. Children's exposure to these accounts, their posts, and details further increases their accidental exposure to online pornography, a highly thought-provoking phenomenon (Ali and Pasha, 2024). The concern regarding online risks, particularly accidental exposure to online pornography among children, increased due to the Covid-19 pandemic. Notably, the lockdown measures and increased online media usage compromised the ability of child protection strategies to identify any unusual online activity against them (Livingstone et al., 2023).

2.3 Theory of parental mediation and online media usage

The concept of parental mediation has evolved from its early applications in the context of television to its relevance in the digital era, encompassing the internet, social media, and other digital platforms. Contemporary researchers (Livingstone et al., 2023), have emphasized the importance of parental mediation in light of the widespread availability of digital devices and easy access to the internet. These advancements have transformed how children engage with the world, providing a new environment away from their parents and families yet equally accessible as a source of education and social interaction (Nagy et al., 2021). Children are increasingly exposed to digital content in this digital landscape, which can facilitate learning and pose risks. As highlight, these risks include safe internet usage, cyberbullying, privacy concerns, and exposure to inappropriate content. Parental mediation plays a critical role in navigating this complex online environment (Padilla-Walker and Coyne, 2011). Chandrimaa et al. (2020) highlight the importance of parents regulating their children's use of online technology to ensure safe and healthy digital interactions. The Parental Mediation Theory applied in this research guides the conceptualization and analysis, emphasizing two primary aspects. First, it focuses on enabling children to become responsible online users by equipping them with the necessary skills to navigate digital platforms safely, avoid online predators, manage privacy settings, and protect personal information. Second, it aims to mitigate potential harms associated with online media, such as cyberbullying, addiction, and exposure to inappropriate content. The literature suggests several strategies for effective parental mediation, including active supervision of online activities, setting boundaries for device usage, and employing parental controls to filter and restrict access to unsuitable content (Bloemen and De Coninck, 2020; Konca, 2022). Additionally, parents can proactively educate their children about online safety through open discussions and by establishing rules to manage their internet use (Matthes et al., 2021). However, current literature indicated parents' digital literacy as a critical factor in ensuring child online safety. Parents' digital literacy involves critical competencies and skills for navigating, evaluating, and interacting with information in media while ensuring safe and supportive online experiences for children's development (Tran et al., 2020). As access to the internet continues to expand for different purposes, the concept of parental literacy has become increasingly crucial. Romero (2014) emphasizes that parenting in the digital age presents new complexities, requiring parents to address unique challenges in facilitating child well-being and development. When parents allow children to engage in online activities or games, their decisions reflect their understanding of the opportunities and risks associated with the digital world (Tomczyk, 2020). Highlight that children grow up in a media-rich environment, where their interactions with digital platforms deeply influence social and cognitive development. Tosun and Mihci (2020) recognize that internet access significantly impacts children's lives, further highlighting the critical role of parental digital literacy in supporting healthy child development and managing online risks. Besides, Ali and Pasha (2024) stress the importance of parental digital competency in addressing the complexities of multi-purpose internet usage, which directly affects children's social and cognitive growth. A lack of digital literacy challenges parents in effectively recognizing and mitigating online risks, influencing their ability to promote a safe and nurturing environment

for child development. This highlights the need for parents to be prepared with the necessary knowledge and skills to support children's healthy development in an increasingly digital world. Thus, based on these arguments, this research uses Parental Mediation Theory to inform its methodology and interpret findings. It focuses on how parental involvement can influence children's online media usage while addressing the associated risks and fostering safe digital practices (see Figures 1, 2).

> RQ1: What is the frequency of children using different types of online media?
>
> RQ2: What are the effects of online media use on children's emotions, behaviors, and interactions?
>
> RQ3: What are parental mediation strategies regulating children's online media use?

3 Research methods

3.1 Study design and data gathering tool

This research involved quantitative design, as the aim was to gather firsthand data, also known as primary data from the respondents in short time to acquire generalizable results. Data was gathered by using close-ended, structured questionnaires designed by obtaining measurement items and scales from existing literature. As noted by Okada and Suto (2003), social scientists widely prefer using survey research due to different advantages attributed to the relevant data gathering method. Today, researchers are showing a serious interest in examining different contextual and dispositional factor influencing human thoughts and behavior. Thus, the questionnaire was based on a total of four sections. The first section involved questions regarding the demographics of the respondents including gender, age, type of family and grade/educational level. The next five sections were based on measuring internet usage, accidental exposure to indecent content, and parental mediation. Table 1 represents the details regarding the study questionnaire.

3.2 Ethical considerations

Ethics approval for the study was obtained following protocols emphasizing child-sensitive review processes. The research adhered to ethical standards designed to safeguard the well-being of child

FIGURE 1
Conceptual framework of current research.

FIGURE 2
Results of final path analysis.
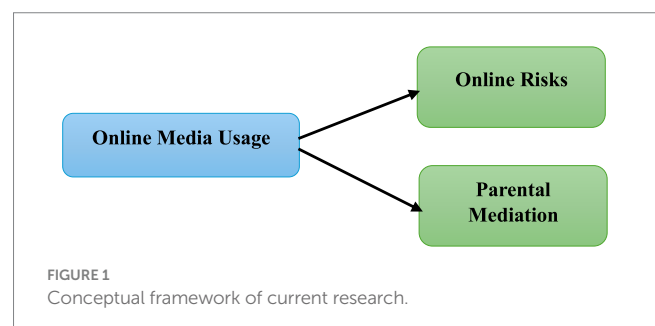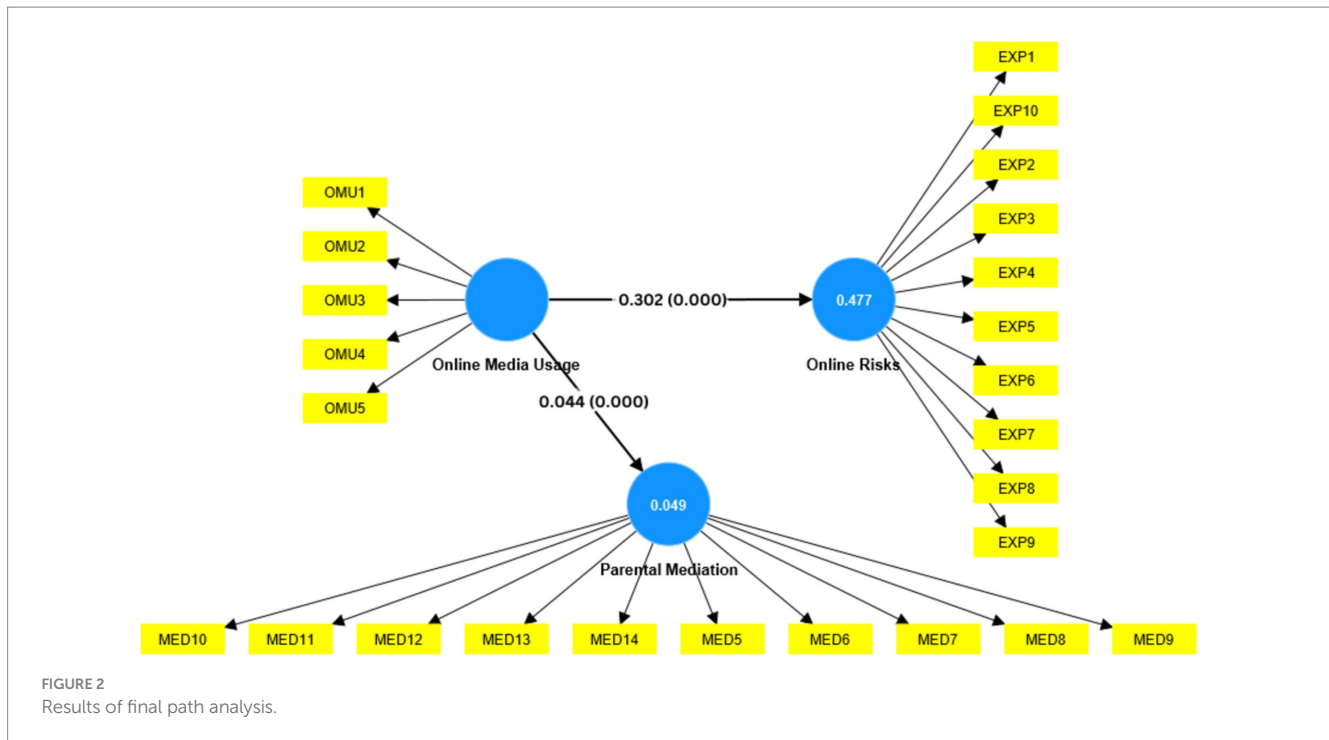
participants. Formal permission was acquired from the heads of the respective institutions, ensuring institutional oversight. Informed consent was assured from both children and their guardians, with clear communication about the study's objectives, procedures, and the voluntary nature of participation. The research was conducted in a manner sensitive to the needs and vulnerabilities of children, with anonymization of personal data to protect privacy and confidentiality. Participants were also informed of their right to revoke at any point without providing a reason, ensuring their autonomy and comfort throughout the study.

3.3 Study population and sampling

Based on the study's nature, objectives, and research questions, the population consists of children from Rawalpindi city aged less than eighteen years. According to the Convention on the Rights of the Child (Vaghri et al., 2022), a child is anyone below eighteen years of age dependent on their parents or guardians. To ensure a representative sample, the researchers employed a stratified sampling technique by dividing the selected institutions into two groups based on their regulatory status (public and private). According to Acharya et al. (2013), stratified sampling is widely used in social sciences research because it provides equal chances of selecting respondents within distinct strata. This method enhances the generalizability of the findings while minimizing selection bias by ensuring that all groups within the population are adequately represented.

Empirically validated formulas were employed to determine the sample size. Using Taro Yamane's formula (Olonite, 2022), which estimates sample size based on population size and margin of error, the total population for the study was 2,608. By applying a +/−5% error margin, the ideal sample size was calculated as $n = 346$ ($n = 2,161/(1 + 2,500 * 0.05^2) = 243.71$, rounded up to 346). After

data collection, 34 questionnaires were found to be incomplete or missing. Consequently, 303 questionnaires were finalized, resulting in a response rate of 87.5%, which exceeds the minimum acceptable response rate of 60% (Deutskens et al., 2004). Furthermore, the study clarifies the age range criteria for participant selection. While the study addresses "children," the sample includes participants up to 17 years old. This ensures that the definition of childhood aligns with international standards and provides a comprehensive understanding of children's online behaviors and parental mediation.

3.4 Data analysis

Data was analyzed by using both descriptive and inferential statistics. First, descriptive statistics is used to calculate the frequency of respondents' demographics and responses. Further, inferential statistics was employed to test the structural relationships between predictor and dependent variables. SPSS and Smart-PLS were used for the data analysis purposes.

4 Analysis and results

4.1 Respondents' demographics

The descriptive analysis further involved calculating the demographics of the study respondents. Data indicated that most of the respondents were females (84.5%) while 12.9% were males (M = 1.897, SD = 0.380). Regarding the age of the respondents, most of them (82.8%) were 14–15 years old, 11.6% were 16–17 years old, and 5.6% were 13 years old or below (M = 2.059, SD = 0.410). 57.4% of respondents further revealed that they belong to nuclear family, 37.5% were from single-parent family, and 5.6% were living with

TABLE 1 Items and sources of study questionnaires.

Variables	Items	Sources	Scales
Internet usage	Internet use characteristics:	Parlak Sert and Başkale (2022)	(High level of Internet use, Low level of Internet use)
	Most frequent internet activity		(Email, Instant Messaging, Chatrooms, Surfing)
	Time spent on the internet on a daily basis:		(Less than 1 h, 1–3 h, 3–5 h, More than 5 h)
	Days spent on online media on a weekly basis:		(Less than 1 h, 1–3 h, 3–5 h, More than 5 h)
	Number of online media websites users I have an account on:		(One, Two, Three, Four or more)
	Online media websites users have an account on.		(WhatsApp, Facebook, Instagram, Others)
Exposure to indecent content	How exposure happened:	Mitchell et al. (2003) and Teimouri et al. (2014)	(Surfing, E-mail, Games, Others)
	Location when you were using Internet when exposure occurred.		(Home, School, Someone else's home, Library)
	Frequency of exposure:		(Once, Twice, Thrice, Four or more times)
	I spent much time thinking about online media use of online media.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	I felt a desire to use online media more.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	Become anxious or disturbed if you have been prohibited from using online media.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	Used online media that much that it impacted studies.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	Opened a message or a link in a message that showed indecent activities that you did not want to watch.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	Received an E-mail or message that you did not want to see?		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	Seen or received indecent messages.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	Received any inappropriate message that bothered me		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	Been asked to watch or listen.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)

(Continued)

TABLE 1 (Continued)

Variables	Items	Sources	Scales
Parental mediation	My parents usually speak to me about personal information and privacy.	Nikken and Schols (2015)	(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents often guide me how to use webmail.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents often surf together because they want to.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents often surf together because I want to.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents often tell me that online games are unsuitable.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents often tell me about which genre of online games is suitable to me.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents monitor my online media usage hours.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents monitor the online content I download.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents monitor what I buy online.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents monitor what type of avatar I use online.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents monitor the type of music I listen.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents often check my internet search history.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents allow using online media only in their presence.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)
	My parents monitor stay close when I use online media and ask me questions about the content I watch/listen.		(Disagree, Strongly Disagree, Neutral, Agree, Strongly Disagree)

TABLE 2 Respondents' demographics.

Variables	Constructs	N	%
Gender	Male	39	12.9%
	Female	256	84.5%
	Other	8	2.6%
Age	13 years or below	17	5.6%
	14–15 years	251	82.8%
	16–17 years	35	11.6%
Family	Single parent	112	37.0%
	Nuclear family	174	57.4%
	Extended family	17	5.6%
Educational Level	Secondary	245	80.9%
	Higher secondary	58	19.1%

extended family (M = 1.686, SD = 0.573). Finally, 80.9% of respondents were secondary students and 19.1% were higher secondary level students (M = 1.191, SD = 0.394). Table 2 represents the summary of respondents' demographics.

4.2 Structural equation modelling

As this study involved Partial Least Square Structural Equation Modelling (PLS-SEM), a two-step process was employed, encompassing inner and outer model analysis. According to Barrett (2007), Structural Equation Modelling (SEM) comprises two critical elements: the measurement model estimation (instrument) and the structural model estimation. The measurement model predominantly examines the relationships between indicators and the constructs they represent. On the other hand, the structural model analysis examines the directional relationships among the proposed constructs. The measurement model analyzes the constructs to facilitate a comprehensive SEM analysis, while the structural model scrutinizes and establishes the predicted relationships between the constructs (Tenenhaus, 2008).

4.2.1 Measurement model analysis

First the measurement model analysis was tested by using convergent validity analysis, goodness of fit, multicollinearity analysis, and discriminant validity analysis. Each test involved further criterion to affirm the reliability and validity of the measurement model to ensure its suitability for the final structural model. According to Carlson and Herdman (2010), measurement model analysis, also known as inner model, aims to examine the reliability and validity of the measurement model further ensuring the generalizability of study results. The relevant analysis also involves evaluating the variable individually within the study model.

This research first assessed convergent validity to measure the correlation among the study constructs. To investigate convergent validity, Factor Loads (FL), Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach Alpha values (CA) were calculated. De Mello and Collins (2001) stated that convergent validity involves Confirmatory Factor Analysis (CFA) to examine background factors contributing to score variability. While CFA can independently assess relationships among variables, a specific type of structural equation modelling (SEM) is more rigorously considered. The results

reveal that most Factor Loads exceed the minimum threshold of >0.5, indicating satisfactory convergent validity. However, some items show lower loading values (<0.5), suggesting their deduction to mitigate any effects on structural model testing. Furthermore, all AVE values surpass >0.5 (Online Media Use 0.605, Online Risks 0.638, Parental Mediation 0.547), providing more support for convergent validity in the current research study. Further, construct reliability was tested by first calculating Cronbach Alpha values. Overall, the Cronbach Alpha values of all the constructs was greater than minimum cutoff value <0.7 (Online Media Use 0.740, Online Risks 0.759, and Parental Mediation 0.781). Furthermore, results showed the Composite Reliability value of Online Media Use was 0.765, Online Risks was 0.701, and Parental Mediation was 0.827. Overall, the Construct Reliability values of all the constructs were greater than minimum cutoff value <0.7, indicating that the survey constructs are internal consistent and interrelated. Table 3 represents the summary of convergent validity and construct reliability analyses.

As some items showed lower loading values, the goodness of fit was conducted after eliminating them to mitigate their effects on the final model. According to Tenenhaus (2008), goodness-of-fit (GoF) involves comparing observed and expected data from a precise model using different fit statistics, including residuals, Chi-square, etc. The role of the goodness of fit is critical, as the model describes a set of relationships about the observation processes that generated the data. A statistically fitting model represents consistency with research premises, suggesting that the data aligns with the model's assumptions, thus confirming the sufficiency of the research model (Demler et al., 2015). Thus, after removing the relevant values, the Chi-square value was $x2 = 4.65$ (<5.0). The Tucker and Lewis (TLI) value remained between 0–1 (0.531). Non-fit indices were at 0.390 (between 0–1), and the Standardized Root Mean Square (SRMR) value was 0.114 (<0.85). Overall, the model demonstrated a good fit for further processing. Table 4 represents the summary of goodness of fit.

According to Shiu et al. (2011), assessing discriminant validity is an important step in analyzing the measurement instrument (model) to comprehend how effectively a distinct construct differs from others within the structural model. This process helps confirm whether a construct is distinct from others in the study. This research also analyzed discriminant validity through the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio. According to Rasoolimanesh (2022), the Fornell-Larcker criterion involves comparing the squared

TABLE 3 Convergent validity analysis and construct reliability analysis.

Variables	Items	Items	AVE	CA	CR
Online media use	OMU1	0.763	0.605	0.740	0.765
	OMU2	0.562			
	OMU3	0.727			
	OMU4	0.673			
	OMU5	0.562			
	OMU6	0.481			
Online risks	EXP1	0.772	0.638	0.759	0.701
	EXP2	0.796			
	EXP3	0.731			
	EXP4	0.782			
	EXP5	0.701			
	EXP6	0.840			
	EXP7	0.881			
	EXP8	0.622			
	EXP9	0.818			
	EXP10	0.618			
	EXP11	−0.173			
	EXP12	−0.143			
Parental mediation	MED1	0.035	0.547	0.781	0.827
	MED2	0.462			
	MED3	0.066			
	MED4	0.126			
	MED5	0.517			
	MED6	0.775			
	MED7	0.856			
	MED8	0.750			
	MED9	0.861			
	MED10	0.769			
	MED11	0.799			
	MED12	0.808			
	MED13	0.900			
	MED14	0.570			

TABLE 4 Goodness of fit analysis.

	Saturated model	Criteria
SRMR	0.114	<0.85
TLI	0.531	Between 0–1
Chi-square	0.648	<5.0
NFI	0. 390	Between 0–1

variance within a construct (known as Average Variance Extracted) with the squared inter-construct correlation. The squared inter-construct correlation evaluates the shared variance between the distinct construct and all other constructs measured within the structural model. This analysis validates each construct's distinctiveness and improves the reliability of research results. As indicated in Table 5, applying the Fornell-Larcker criterion reveals no correlation between the study variables, as the correlation values concerning each variable are distinct. This additionally rejects the possibility of correlations among them.

De Mello and Collins (2001) argued that the Heterotrait-Monotrait ratio (HTMT) is a supplementary measure for discriminant validity in

TABLE 5 Fornell-Larcker criterion.

	Online media use	Online risks	Parental mediation
Online media use	0.037		
Online risks	0.302	0.488	
Parental mediation	0.044	0.028	0.268

TABLE 6 Heterotrait-Monotrait ratio scale (HTMT).

	(HTMT)
Online risks <− > Online media use	0.327
Parental mediation <− > Online media use	0.133
Parental mediation <− > Online risks	0.133

TABLE 7 Coefficients of determination R square.

Variables	R-square	R-square adjusted
Online risks	0.491	0.488
Parental mediation	0.222	0.210

research studies involving various constructs. This approach involves comparing the correlations between different constructs (Heterotrait correlations) with the correlations between items within the same construct (Monotrait correlations). A low HTMT value, typically below 0.85, proposes strong discriminant validity, suggesting that the constructs are empirically distinctive. In the current study, the HTMT value for each variable remained below 0.850, confirming that all variables are distinctive and unrelated. The results of the Hetreotrait- Monotrait Ratio analysis is detailed in Table 6.

4.2.2 Structural model analysis

Coefficients of Determination R^2 is a statistical approach for estimating a liner regression model's predictive power. Also known as R-square, it specifically measures the proportion of variance in the dependent variable (Y) that can be expected by the linear relationship with the independent variable (X) (Piepho, 2019). When more predictor variables are included, the R^2 values increase, even if the new predictors lack influential relationship with the results. Hence, to counter this issue, R^2 adjust is used as a more reliable measure. Thus, the adjusted R^2 shows a more pragmatic estimate of the proportion of variation in the dependent variable effectively described by the included covariates. In the present study, the R^2 value of Online Risks is reported as 0.491, while the adjusted R^2 is 0.488. Further, the predictive power of Online Media Use on Parental Media is 0.222 and the adjusted R-square value is 0.210. According to Nakagawa et al. (2018), a 20.0% value in the social sciences is deemed good. R^2 and adjusted R^2 values for both variables in this context suggest a satisfactory level of variance explained by the predictor variable (Online Media Use). Table 7 represents the results of the coefficient of determination R^2.

Path analysis plays a crucial role by providing a systematic and precise technique to test the validity of research hypothesis and facilitating evidence-based conclusions. Research can organize their investigations with precise research objectives, guiding their direction towards examining the proposed effects and relationships suggested by Valenzuela and Bachmann (2017). Thus, this research also used path analysis to address the study questions. Including bootstrapping helps generate confidence intervals that account for potential sampling

variability, providing more precise insights into the significance of the relationships (Streiner, 2005). For the effect of online media use on online risks, the bootstrapped beta coefficient ($\beta = 0.302$) demonstrated a consistent positive relationship, with a t-value of 36.354 and a highly significant p-value of <0.000. The confidence intervals from bootstrapping (2.5% = 0.344 and 97.5% = 0.352) further reinforce the robustness of this effect, confirming that online media use significantly increases online risks for children. This relationship's effect size (Cohen's d) is approximately 0.68, indicating a large effect size.

Similarly, the relationship between online media use and parental mediation showed a beta coefficient of $\beta = 0.044$, with a t-value of 41.807 and a significant p-value of <0.000. The bootstrapped confidence intervals (2.5% = 0.396 and 97.5% = 0.459) support this effect, highlighting that parental mediation is crucial in managing children's online behavior. The effect size for this relationship is approximately 0.18, indicating a small to medium effect size. Bootstrapping results also provide further confidence in the significant relationships identified through path analysis. These findings highlight the critical influence of online media use on both online risks and parental mediation, offering practical insights for future research and practical application.

Furthermore, a deeper analysis of gender differences, given the sample composition, emphasises distinct patterns in how boys and girls interact with online platforms. Gender-based differences were apparent in risk exposure and parental mediation practices, with boys showing a higher tendency toward risky online behaviors compared to girls. This distinction supports the need for gender-specific approaches to parental mediation and online risk management. The discussion of age-related differences has also been refined. The analysis shows that younger children are more susceptible to risks and require more intensive parental mediation than older adolescents, who gradually achieve independence in online interactions. This progression highlights the importance of tailoring parental mediation strategies based on the child's developmental stage. Finally, a stronger link to the theoretical framework has been established. This research deepens the understanding of how online media use, parental mediation, and online risks interact with social media consumption

by incorporating insights from Dynamic Capabilities Theory and Social Exchange Theory. These frameworks provide a structured lens to examine the complex relationships and interactions, offering a more comprehensive analysis (see Table 8).

4.3 Correlation analysis

The correlation matrix is also conducted as it highlights the relationships between key variables, providing insights into how they interact (Halunga et al., 2017). A positive correlation between online media use and online risks ($r = 0.357$) indicates increased media use is associated with higher risk exposure. Meanwhile, the weak correlation between parental mediation and online media use ($r = 0.062$) suggests a slight influence of parental involvement on managing online behavior. Furthermore, the low correlation between parental mediation and online risks ($r = 0.044$) highlights that parental mediation alone may not fully mitigate online risks. These results suggest the need for a comprehensive approach that includes multiple strategies beyond parental mediation to manage online risks effectively. This analysis complements the structural model, presenting a deeper understanding of how these variables interact (see Table 9).

5 Discussion on results

The first research question of the current study was "What is the frequency of children using different types of online media?". The study respondents indicated a high-level online media use is accompanied by surfing and instant messaging purposes. The further revealed that their daily online media use comprises 1 to 3 h, while many of them also indicated more than five hours of online media use on daily basis. Regarding their online media use on a daily basis, most

of the respondents agreed that they use it on daily basis while the second highest percentage indicated that they use it at least three days a week. Respondents also revealed that they have personal accounts on more than four social networking sites, indicating the multiplicity of platforms they prefer due to factors like ease of access and perceived useful outcomes as also witnessed by Tran et al. (2020). Regarding the specific platforms and their names, most of the respondents indicated their profiles on "Others" that may include YouTube, Pinterest, Twitter, and others while the second the greatest number of respondents indicated that they have their accounts on Facebook indicating consistency with the current data, showing Facebook as one of the most preferred social networking platforms among users, particularly children below eighteen years old (Gerwin et al., 2024). According to Geurts et al. (2022), online media platforms offer myriad modes of internet-based communication, facilitating connections and allowing instant interaction through features like likes and comments. Also, smartphones and social media serve as information education tools, supporting information dissemination and educational purposes even during emergencies. However, Bozzola et al. (2022) consider this use as strongly associated with the Covid-19 pandemic as a major reason behind online media use among children even during the post pandemic era. As noted, media and social networks have become omnipresent in households during and after the pandemic and are widely considered valuable resources for individuals, including children. The internet has played a critical role in fostering peer communication and sustaining educational activities like remote schooling, especially during lockdown periods. It has made them an integral part of everyday life even after the pandemic. Table 10 provides a detailed descriptives statistics of key variables.

Regarding the second research question was "What are the effects of online media use among children?", Notably, these effects are further categorized as accidental exposure to online, pornographic indecent content classified by Blumross and Livingstone (2020). According to

TABLE 8 Path analysis.

Constructs	M	SD	β	t	P	95% confidence interval	
						2.5%	97.5%
Online media use ➔ Online risks	0.357	0.429	0.302	36.354	0.000	0.344	0.352
Online media use ➔ Parental mediation	0.062	0.360	0.044	41.807	0.000	0.396	0.459

TABLE 9 Results of correlation analysis.

Variables	Online risks	Parental mediation	Online media use
Online risks	1		
Parental mediation	0.456**	1	
Online media use	0.302**	0.044**	1

**$p < 0.01$ indicates statistical significance.

TABLE 10 Detailed descriptives statistics of key variables.

Variables	N	Mean	(SD)	Min	Max
Online risks	303	2.54	0.89	1	4
Parental mediation	303	3.10	0.78	1	4
Online media use	303	2.78	0.95	1	4

Descriptive statistics include means, standard deviations, minimum, and maximum values for key study variables.

most of the study respondents, their accidental exposure to indecent content happened during surfing the online media while the second majority of the respondents indicated instant messaging as a source of the relevant exposure. Further, most respondents also revealed that the exposure to indecent content happened at home and school. Further, regarding the frequency of exposure, the respondents indicated a repeated exposure categorizing it as happened four more than or four times. These results indicate the online media usage among children as accompanied several content risks and threats witnessed by different studies (Bozzola et al., 2022; Livingstone et al., 2017; Savoia et al., 2021) that can be detrimental to their health further leading to increase their curiosity and likelihood to deliberate exposure to indecent content (Willoughby, 2019). The respondents strongly agreed that they spent a lot of time thinking about online media or planned use of online media. Also, they agreed that they felt an urge to use online media more and more. According to the respondents, they become restless or troubled if they have been prohibited from using online media. Consequently, they use online media to the extent that it also impacted their studies. In their study, Tejada-Garitano et al. (2024) also examined the proactive use of online media use among school-going children in Spain. Data collected from 197 children from 11 to 14 years old revealed that some of the students showed reasonable digital technology usage. However, the majority of the students misuse it. Konca (2022) further indicated the similar results as they investigated social media's influence on students' academic performance in secondary schools in Zambia's Lusaka district. Using qualitative and quantitative methods, data was gathered using interviews and questionnaires. The findings showed that social media is an efficient and cost-effective communication globally among friends and families. Also, it emerged as a useful information source, giving students access to educational content, news, and resources that contribute to their learning. Nonetheless, the study emphasized social media as a significant distraction for students, shifting their focus from studies, assignments, and other academic obligations. Also, excessive social media use, especially late at night, was determined as a possible cause of sleep deprivation, further leading to impaired cognitive functioning and academic performance.

Similarly, the current study respondents revealed that their accidental exposure to online indecent content happened as they opened a message or link in message that exposed them to obscene acts they did not want to watch. Further, they also indicated that they often receive email or instant messages that they do not want to open and check. Moat of the respondents further revealed that they very often seen or received messages that may contain in appropriate content. Besides most of them indicated that they sometimes also received inappropriate messages that bothered them, and they often asked to watch the content that they considered inappropriate. As a result, Livingstone and Stoilova (2021) argued that there is growing evidence that parallel to children riding a bicycle or learning to swim, using the internet involves some possible risks. The challenge lies in not eliminating all risk but managing it effectively. The purpose is to ensure children can manage and learn from milder risks while directing resources towards minimizing harm, especially from more severe threats. The objectives should be to identify specific circumstances that pose certain risks, specify factors that increase or reduce risk, and determine when risks do or do not lead to discernible harm.

Finally, regarding the third research question "What are parental mediation strategies regulating children's online media use?" the respondents agreed that their parents often guided them on how to use webmail. Most of the respondents, on the other hand, disagreed that their parents often surf with them because the children want to while they also disagreed that their parent do not surf together if the parents want to. Study respondents agreed that their parents often tell them that online games are unsuitable to them while the same number of respondents remained neutral about it. According to the respondents, their parent usually tell them about which genre of online games is suitable to them and their parents monitor their online media usage hours. In a similar study by Gentile et al. (2022), the researchers examined the potential effect of parental supervision of children's media usage on their physical, social, and educational well-being. Data gathered from 1,323 school-level children in Italy revealed that parental monitoring of children's media positively impacted children's sleep, school performance, and prosocial and aggressive behaviors. These effects were mediated through factors such as total screen time and exposure to media violence.

Furthermore, study respondents agreed that their parents monitor the content they download and what they purchase online. According to the respondents, their parent slaps monitor the type of avatar they use online, check the music they listen to, and also monitor their internet search history. Respondents also agreed that their parents allowing using online media only in their presence and stay close when they use online media and also ask question about the content they watch or listen to online. Padilla-Walker and Coyne (2012) examined changes in parents' use of active monitoring and differences over three years in the United States. It also examined different adolescent and parent characteristics as predictors of the initial levels of media monitoring and the changes marked in such monitoring. Data collected from 276 individuals indicated that active monitoring was the most prevalent approach at the initial and intermediate times. Also, active monitoring and difference were equally shared at the final time. Latent growth curve analysis showed decreased monitoring over time, whereas deference increased. Also, adolescent and parent characteristics played a role in forecasting initial levels of monitoring and changes in monitoring behaviors. Another study by Bleakley et al. (2016) examined the correlation between problematic internet behavior and parental monitoring, parental mediation of internet use, and parental supervision of their adolescent's computer usage time in a national online survey involving 629 children in the United States and a corresponding survey of one of their parents. The analyses showed that problematic internet use was related to reduced parental monitoring and mediation and fragile parent–child relationships. Adolescents who spent considerable time on the computer were also more inclined to problematic internet behavior. Although the direction of these relationships cannot be firmly specified, the findings highlight the influential role of parents in affecting adolescents' problematic internet use. These results also showed consistency with the study by Kalmus et al. (2022) as they examined the relationship between adolescents' Excessive Internet Use (EIU) and parental mediation. The analysis involved a random sample of 18,709 children and their parents from 25 European countries. The results showed that active parental involvement in the child's Internet use, especially when the child had faced online harm and restrictive mediation, was linked to lower levels of EIU. Contrarily, higher EIU was associated with harmful online experiences, augmented time spent online, a wide range of online activities, and the age of adolescents.

5.1 Implications and recommendations

Based on the study's findings, it is prominent that parental involvement in children's online media use is critical to ensuring a safer online experience. The study showed that while children are highly engaged in online activities, spending several hours on different social media platforms, they are frequently exposed to inappropriate content. Parents need to understand the significance of monitoring their children's online behaviors, such as the type of websites they visit, the games they play, and the messages they receive. Parents can help mitigate the risks associated with excessive media use and inappropriate exposure by staying informed and guiding their children on appropriate online behavior.

Another important implication is the need for parents to establish clear boundaries and communication channels with their children concerning internet use. The study's respondents revealed that parental mediation, i.e., guiding them on which games to play and monitoring their internet usage hours, played a significant role in managing their online exposure. Parents should maintain an open dialogue with their children, ensuring they feel comfortable discussing their online experiences, including any accidental exposure to harmful content. By promoting trust and awareness, parents can help children navigate the digital world more responsibly while minimizing the risks associated with online activities. Finally, the study highlights the importance of active parental monitoring in diminishing problematic online behavior. Children who reported having consistent parental supervision, i.e., parents checking their internet history or staying close when they use online media, exhibited fewer issues related to inappropriate online behavior. This suggests that parents actively mediate their children's internet use, set clear rules, and ensure regular monitoring to foster responsible online habits. Thus, parents can help children use the internet safely while supporting their cognitive and social development by balancing supervision and guidance.

Further, there are implications for policymakers to consider. Given the prevalence of online risks, policymakers should create and enforce stricter regulations to protect children from inappropriate content. Policies could include more stringent age restrictions, improved content filtering technologies, and enhanced awareness programs for parents and children. Moreover, educational campaigns and workshops on digital literacy and safe internet use should be promoted to empower children and parents to manage online risks.

For future research, it is recommended to explore longitudinal studies assessing parental mediation's long-term impacts on children's online behavior. Besides, research should examine the effects of varying socio-economic backgrounds on children's online experiences and how different parental strategies influence online safety. Studies focusing on diverse cultural contexts are also necessary to understand the global variations in parental mediation practices and their effectiveness in managing online risks. Finally, the cultural context is critical in shaping children's online experiences. Cultural values, societal norms, and family structures influence how children interact with digital media and the level of parental involvement. Future research should address how these cultural factors impact parental mediation strategies and their effectiveness in different regions or communities. Hence, by understanding these differences, educators, researchers, and policymakers can better design their approaches to promote safer and more inclusive digital environments for children.

5.2 Implications for stakeholders

The results of this research highlight the significance of collaboration between parents, educators, and policymakers in handling children's online behavior and mitigating risks associated with online media use. Parents play a critical role in guiding and supporting their children by promoting responsible online habits and setting boundaries. Educators should incorporate digital literacy into the curriculum, preparing students with the required skills to steer online spaces safely. Policymakers are responsible for creating and implementing regulations that protect children from online risks while ensuring that age-appropriate content is accessible. Specifically, parents should promote an environment of open communication, empowering children to share their experiences and concerns related to their online activities. Educators can improve students' understanding of ethical online practices, cyber safety, and the importance of critical thinking when engaging with digital content. Policymakers should introduce measures regulating content and platforms, ensuring children have safe access to educational and recreational digital resources.

Further, collaborative efforts between these stakeholders are critical to developing effective interventions that promote digital well-being and address emerging challenges in the rapidly evolving digital landscape. By working together, parents, educators, and policymakers can create a supportive ecosystem that empowers children to use technology responsibly and safely.

6 Conclusion

This study indicated that the Internet is essential to children's lives, providing useful resources for education, entertainment, and communication. With the increasing accessibility of online media, children can engage with information and content that assist their cognitive and social development. However, alongside these benefits, there is a growing concern about the risks associated with internet use, especially accidental exposure to indecent or inappropriate content. This study showed that many children encounter such content while surfing the web or using instant messaging services, frequently leading to repeated and unwanted exposure. In this context, online safety and well-being for children have emerged as significant concerns in the digital age. The Internet's widespread use has made it challenging to shield children from harmful content, posing risks to their psychological and emotional health. The findings suggest that children may be inadvertently exposed to content that can negatively influence their behavior and development. Addressing this issue is imperative as the digital environment continues to evolve, becoming a constant in children's daily lives. Without proper safeguards, the risks posed by online media will continue to threaten children's safety and well-being. Thus, it is concluded that parents play a critical role in ensuring their children's online safety. The results emphasize that parental mediation can significantly reduce the likelihood of children encountering harmful content. Parents must proactively guide their children's online behavior, ensuring they understand the risks while helping them navigate the digital world safely. Thus, parents can help create a safer online environment that supports their children's educational and developmental needs while minimizing the risks associated with internet use by mediation and ensuring their safety.

6.1 Limitations

Despite this research's broader scope and significance, several limitations may impact the findings and their generalizability. First, this study was conducted in Rawalpindi, which may introduce sampling bias and restrict the applicability of the results. Future research should strive for more diverse and representative samples for various socioeconomic backgrounds, age groups, and cultural differences. Employing a stratified sampling approach would help ensure a balanced representation, enhancing the validity of the findings. Besides, the rapidly evolving nature of online media and technology limits the study's conclusions. The fast-paced changes in digital platforms and content consumption may affect the long-term relevance of the findings. Future studies should consider longitudinal designs to capture and analyze trends over time, offering a deeper understanding of how online media use and parental mediation practices evolve.

Furthermore, this research mainly focused on established social media platforms, potentially bypassing the implications of emerging technologies and newer online platforms. Expanding the scope to include these newer platforms would provide a more comprehensive view of current trends and challenges. This approach would ensure that the research remains applicable as new technologies continue to shape online interactions among children. Addressing these limitations through more inclusive and longitudinal research designs will contribute to a more thorough understanding of the active relationship between online media use and parental mediation in children's lives.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the Board of Advanced Studies (BASR) of Allama Iqbal Open University,

Islamabad, Pakistan. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

EY: Methodology, Writing – original draft. SA: Data curation, Formal analysis, Writing – original draft, Conceptualization. MM: Funding acquisition, Resources, Writing – review & editing. SR: Supervision, Validation, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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