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Breaking the Scroll (BTS): A Randomized Controlled Trial Assessing Social Media Use and Youth Mental Health in the Context of a Developing Economy

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**Breaking the Scroll (BTS): A Randomized Controlled Trial Assessing Social Media Use
and Youth Mental Health in the Context of a Developing Economy**

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Abstract

This study examines the causal impact of addictive patterns of social media use on mental health outcomes through a randomized controlled trial conducted among young individuals (18 to 24 years) in Pakistan. Participants in the treatment group received an intervention designed to limit their social media use, while the control group maintained their usual usage patterns. The findings indicate that limiting social media use leads to significant improvements in mental health, including reductions in depression and anxiety, alongside notable increases in self-esteem and overall well-being among young adults. The intervention improves sleep quality and reduces perceived stress, demonstrating that excessive use of social media apps significantly affects psychological and behavioural health. The findings highlight the potential for policy interventions, including behavioural nudges, youth-targeted awareness campaigns, and regulatory actions, to decrease the negative externalities associated with unregulated social media use. Future research should evaluate the long-term effects of addictive patterns of social media use and the differential impacts across diverse socio-demographic groups, considering the increasing integration of digital platforms into everyday life.

JEL Codes: I12, I31, D91, O33

Keywords: Social Media, Mental Health, Randomized Controlled Trial, Digital Well-being, Behavioural Nudges

1. Introduction

Social media has become a central aspect of everyday life in the contemporary digital era, particularly among young adults. Various social media platforms and networking sites, such as Facebook, Instagram, TikTok, and Twitter, have fundamentally reshaped the modes of communication, information dissemination, and social connection (Braghieri et al., 2022). Despite offering unmatched opportunities for self-expression and connectivity, growing concerns have been raised about their influence on mental health (Twenge et al., 2018). The recent literature has drawn attention to the issue that unregulated use of social media can cause adverse mental health outcomes, including depression, anxiety, low self-esteem, and poor sleep quality. Individuals, particularly young adults, often make unnecessary comparisons with fabricated information and images posted on these social media platforms (Chancellor et al., 2020). In developing economies, this challenge is intensified due to rapid investment in digital infrastructure and smartphones' widespread and affordable availability (Huma et al., 2024). More than 72 million individuals are active social media users in 2024, and sizeable proportions belong to the ages of 18-24 years in case of Pakistan (Global Digital Insights, 2024). Based on the previously mentioned facts and figures, assessing the interconnection between social media and mental health outcomes is pertinent.

On a global scale, social media usage has surged, with over five billion users worldwide as of 2024 (Statista, 2024). Eastern Asia leads in digital engagement, boasting approximately 1.25 billion users, primarily driven by China's massive online presence, followed by South Asia with 961.81 million users (Global Digital Insights, 2024). Social media demographics show that 53.6% of global users are males, while 46.4% are females. There are, however, platform-specific differences; for example, 56.6% of Facebook users are males, whereas 57% of TikTok users are females (Global Digital Insights, 2024). Furthermore, studies show that people spend an average of 2.31 hours per day on social media, with younger generations spending even more time on online platforms (We Are Social, 2024). In a recent study conducted in the USA, fifty per cent of the teenagers included in the survey stay online on various social media

platforms all the time (Long, 2025). These statistics underscore the global scale of digital engagement and its potential influence on mental well-being.

The recent surge of social media in Pakistan is due to increased internet accessibility, affordable mobile devices, and digital infrastructure growth. According to national statistics, over 50% of Pakistan's population now has access to the internet, a figure that continues to grow annually (Pakistan Telecommunication Authority, 2023). A sizeable proportion of young people residing in urban areas use social media platforms for numerous reasons, such as information, education, entertainment, and socialization. In recent years, visually engaging short video-making and sharing apps, such as TikTok and Instagram, have become more famous among adolescents. Undoubtedly, social media offers various merits, but simultaneously, it introduces unique challenges, for example, cyberbullying, misinformation, and digital dependency (Berryman et al., 2018). Therefore, it is essential to examine this issue and formulate suitable policies to improve mental health outcomes and promote healthy digital practices.

The interplay between unregulated social media use and mental health is intricate and offers merits and demerits. Social media helps individuals connect with their peers, provide freedom of expression, and pursue emotional support. Social media facilitates young adults in sharing their experiences and accessing mental health resources through various groups and pages, inspiring them to participate in healthy discussions (Naslund et al., 2020). Furthermore, for many young adults, social media is an escape from societal and gender norms, allowing them to inquire about new concepts, ideas, and identities in a relatively free environment. Nonetheless, the unregulated use of social media has its disadvantages, and it is interconnected with various mental health challenges. The prior literature elaborates that prolonged and unregulated social media use causes unnecessary comparison and develops feelings of inadequacy and low self-esteem among young adults (Fardouly et al., 2018). These trends can be well observed on TikTok and Instagram, where adolescents frequently encounter idealized and fabricated representations of affluence, beauty, and lifestyle. These unnecessary comparisons bring feelings of body dissatisfaction, depressive symptoms, and anxiety; these conditions are more pronounced among teenagers and young adults who are in the process of self-discovery and identity formation (O'Reilly et al., 2018).

The influence of social media on the mental well-being of young individuals in Pakistan is deeply intertwined with socio-cultural elements. Conventional values, familial expectations, and societal standards are crucial in shaping individuals' self-image and psychological health. Adolescents often face significant pressure to conform to societal standards, and the influence of social media intensifies these demands, leading to increased stress and mental health issues (Ali & Bhatti, 2021). Cyberbullying and online harassment have surfaced as critical concerns in Pakistan, with numerous young users facing digital abuse. Social media platforms provide a veil of anonymity, allowing individuals to engage in harmful behaviours with little to no accountability. People who experience cyberbullying often show increased levels of anxiety, depression, and social isolation, which exacerbates the negative influence of online interactions on mental well-being (Khan et al., 2022).

A further important issue is the impact of prolonged screen time on sleep quality and general well-being. Research has shown that prolonged screen time, especially in the evening, disrupts sleep patterns and diminishes overall sleep quality (Levenson et al., 2017). The relationship between sleep deprivation and mood swings, cognitive deficits, and heightened stress vulnerability underscores the essential importance of awareness and effective management strategies.

In developing economies, mental health challenges are frequently considered less important as compared to physical health and other broader economic concerns. According to WHO (2023), almost 24 per cent of the population experience mental health disorders in Pakistan, yet only 0.4 per cent of the national budget is allocated to mental health services. The increasing accessibility to internet services and affordable smartphones have positioned social media as one of the significant aspects of young people's lives. It highlights the need for a comprehensive investigation of its psychological impacts. As opposed to advanced economies, which promote a higher level of digital literacy and mental health awareness, young adults in developing economies lack adequate coping strategies to reduce the adverse effects of social media. A survey conducted in 2023 by Gallup Pakistan revealed that 62% of young participants reported experiencing anxiety associated with social media content, mainly due to unrealistic lifestyle representations and instances of cyberbullying. Moreover, the emergence of short-form video content, especially on TikTok, has exacerbated digital addiction in young people, leading to disturbances in sleep patterns and cognitive concentration. Empirical studies consistently show a notable link between high levels of social media use and declining mental health. For example, Hunt et al. (2018) elaborated that restricting social media usage to 30 minutes daily led to significant decreases in feelings of loneliness and depression in college students. Similarly, Keles et al. (2020) performed a meta-analysis of 16 studies, establishing that social media addictive patterns are interconnected with elevated anxiety and depressive symptoms in young adults.

The prime objective of the present research is to assess the influence of unregulated social media use on the mental health outcomes of young adults in a developing economy by using a randomized controlled trial (RCT). The research examines the efficacy of treatment that controls or regulates social media usage to improve mental health symptoms. The present study employed an RCT design to illustrate causality, with participants being randomly assigned to a treatment group with limited social media use, a maximum of two hours daily, and a control group with no restriction on social media usage. We will monitor the intervention's impact on modifying mental health indicators after four weeks (post-intervention) and three months (follow-up). To assess mental health, we have adopted various psychosocial scales, including the PHQ-9 for depression, GAD-7 for anxiety, and PSS for perceived stress. The present study intends to provide policy-relevant scientific evidence to guide health policy experts in designing digital well-being projects and mental health and well-being interventions in low and middle-income economies.

Based on the previously discussed scenarios, the study will address the following key research questions:

1. What is the causal impact of addictive patterns of social media use on the mental health of young adults (18 to 24 years) in a developing economy in Pakistan?

The present study intends to evaluate the causal relationship between excessive or compulsive patterns of social media use and mental health outcomes among young adults in the case of a developing economy. Particularly, the study focuses on the addictive patterns of social media use that contribute to increased symptoms of anxiety, depression, low self-esteem, and stress.

2. Does the intervention that limits social media usage lead to improved mental health outcomes?

The research question assesses the effectiveness of behavioural interventions, i.e., regulated or limited screen time, digital detox challenges, and awareness campaigns on mindful use of social

media. Our objective is to examine whether regulated social media use causally improves mental health.

This study contributes substantially to academic literature and policy discourse by comprehensively examining social media's effects on the mental health of young people in a developing economy such as Pakistan. Despite a growing body of academic research on the psychological impacts of social media in advanced economies (Vannucci et al., 2017; Twenge et al., 2018; Orben & Przybylski, 2019; Braghieri et al., 2022), there is an important gap in the literature about its influence on South Asian and emerging economies. This study addresses the knowledge gap by offering empirical evidence about the impact of social media addiction on mental health outcomes in Pakistan.

This study offers valuable insights for policymakers from a policy standpoint. It emphasizes the necessity for digital literacy initiatives, mental health interventions, and regulatory frameworks to promote mindful social media usage. Considering Pakistan's demographic dividend and rapid technological advancement, such interventions can be essential in protecting young people's mental health and promoting healthy digital practices. Furthermore, the research study contributes to the current body of literature by including localized data and contextual variables that impact social media usage trends in Pakistan. The empirical outcomes can be a foundation for future multidisciplinary research into digital behaviour, mental health, and socio-cultural effects in developing economies.

The empirical outcomes of the present research will contribute to a broader policy discourse on mental health and digital well-being among young people (18-24 years) in Pakistan. Suppose the study's empirical findings support the negative influence of social media use on mental health. In that case, health policy practitioners must consider tailored interventions, i.e., parental guidance programs, digital literacy workshops and campaigns, and restricted social media usage for young adults.

The study is divided into five sections. We discuss the theoretical underpinnings and empirical literature in sections two and three. Section four elaborates on the RCT design. Section five discusses the empirical results, and sections six, seven, and eight explain the empirical discussions, strengths, and limitations of the study, as well as summary and policy recommendations. In the last section, we provide future research directions.

2. Theoretical Framework

The study's theoretical approach is based on several well-established models and theories that explain the interconnections between mental health outcomes and social media use. Numerous psychological and sociological theories offer a thorough grasp of how social media affects mental health because of the intricacy of digital relationships. In order to place the study's goals within the body of current research, this section examines many important theoretical stances, such as the Ecological Systems Theory, the Uses and Gratifications Theory, the Social Comparison Theory, and the Cognitive-Behavioral Model of Internet Addiction.

According to the Social Comparison Theory (SCT), people evaluate themselves by comparing their skills, views, and personal characteristics to those of others (Festinger, 1954). This notion is especially pertinent in social media, where users are continuously exposed to curated and frequently idealized depictions of their peers, celebrities, and influencers. According to research, passive social media use—such as scrolling information without engaging—increases unnecessary social comparison, resulting in feelings of inadequacy and body dissatisfaction

(Fardouly et al., 2018). Young people in Pakistan regularly use visual-centric sites like Instagram and TikTok, where they are exposed to unattainable beauty standards and depictions of prosperity. This can result in adverse self-evaluations, low self-esteem, and increased levels of anxiety and depression. Social media provides various functions, including entertainment, information gathering, social engagement, and emotional support. According to The Uses and Gratifications Theory (UGT) (Blumler & Katz, 1974), those who use social media for social contact and validation are more likely to have negative psychological impacts, especially if their expectations for engagement and recognition are not realized (Andreassen et al., 2017). Most young adults use social media to seek emotional support and make relationships; nevertheless, uncontrolled use of social media can lead to addiction, sleep disorders, and mental health problems.

The Cognitive-Behavioral Model of Internet Addiction (CBMIA) posits that individuals who stay online and use social media all the time often suffer from various kinds of mental health disorders (Davis, 2001). This notion can be proven through the evidence from the prior literature, as Keles et al. (2020) illustrated that unregulated social media usage creates anxiety, stress, and depression among adolescents. Young adults do not have strong coping mechanisms and are easily addicted to social media's glamorous world. They do not realize the negative consequences of social media addiction. They are unintentionally indulging in unnecessary competition and comparison with their social peers, which ultimately heightens the depressive symptoms. On the other hand, the Ecological Systems Theory (EST) offers a comprehensive framework for comprehending the socio-cultural and environmental influences that form an individual's experiences (Bronfenbrenner, 1979). This perspective underscores that mental health outcomes are shaped by various interconnected systems, i.e., family, peers, community, and digital environment. The model elaborates that cultural norms and societal expectations influence the effects of social media, rendering its impact highly context-dependent (Rideout & Fox, 2018). The present research illustrates a conceptual model that illustrates the previously mentioned theories.

- **Social Comparison and Self-Esteem:** Exposure to curated online content leads to self-esteem issues and mental distress.
- **Gratifications and Negative Outcomes:** Different motives for social media use influencing psychological well-being.
- **Addiction and Cognitive Distortions:** Excessive use contributes to anxiety, depression, and sleep disturbances.
- **Socio-Cultural Moderators:** The role of Pakistani societal values in shaping the impact of social media on youth mental health.

Integrating diverse theoretical models provides a nuanced framework for identifying how social media influences mental health outcomes in developing economies, focusing on Pakistan.

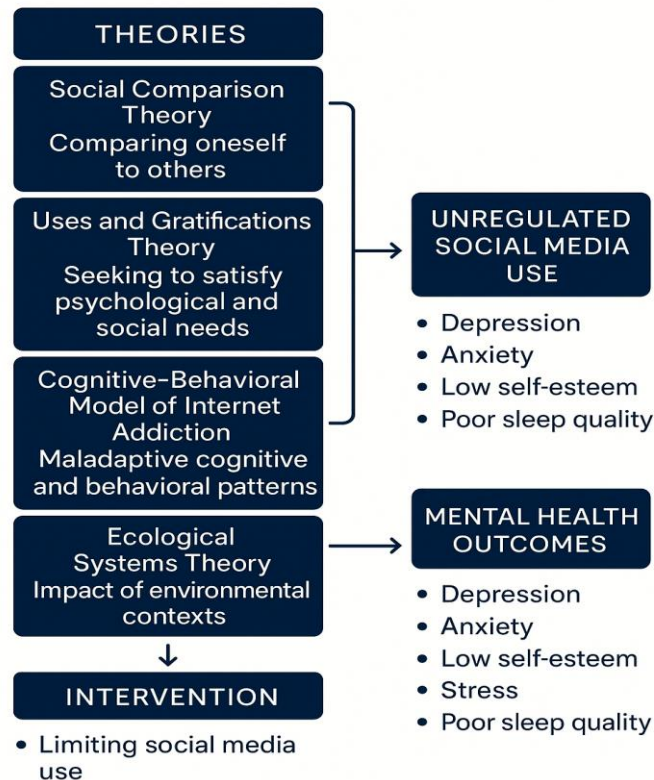


Figure 1: Theoretical framework

3. Empirical Literature

The literature review critically evaluates various studies across diverse demographic groups, assessing their methodologies, empirical findings, and limitations. The review aims to comprehensively understand the complex interconnections between social media use and mental health by synthesizing the prior scholarly work.

Strickland (2014) highlighted the interconnection between social media use and mental health symptoms, i.e., depression, anxiety, and self-esteem. The empirical findings elaborate on both the positive and negative influence of social media use on mental health outcomes. The positive impacts include social support for the users, whereas negative impacts include severe mental health disorders. Meanwhile, Lin et al. (2016) illustrated a significant interplay between social media engagement and depressive symptoms. The study identifies the key mechanisms, i.e., cyberbullying, social comparison, and prolonged screen time. Nonetheless, both studies relied on self-reported information and cross-sectional designs. It limits their ability to establish causal inferences and underscores the need for longitudinal analyses. On the contrary, Firth et al. (2017) have conducted a meta-analysis and demonstrated that smartphone interventions that promote mental health, particularly those that incorporate cognitive-behavioural therapy (CBT), provide small to moderate improvement in depressive symptoms. The findings are further supported by Vannucci et al. (2017), who have elaborated on a significant interconnection between addictive patterns of social media use and anxiety among young people. The unnecessary social comparison and fear of missing out (FOMO) are two pertinent reasons behind the heightened anxiety. However, despite their contributions, these researches

share common methodological limitations, such as these studies rely on self-reported data and heterogeneity in intervention designs, illustrating the ongoing need to conduct RCT and context-specific mental health strategies.

The role of social media in identifying mental health conditions has been explored through novel approaches, such as Reece and Danforth (2017), who utilized Instagram photos to identify predictive markers of depression using machine learning. While their findings suggest that depressed individuals post images with lower brightness and saturation, the study's reliance on publicly available data limits the generalization of results. Similarly, Twenge and Campbell (2018) examined screen time and well-being in children and adolescents, finding that excessive digital engagement correlated with lower happiness and emotional stability. Nonetheless, the study called for a more comprehensive approach based on causality. The research further emphasizes the urgency for longitudinal research studies for a more comprehensive understanding of the issue. In another interesting study, Kelly et al. (2018) employed the survey data and examined the influence of social media engagement on young adults. The empirical findings segregated the gender impact of unregulated use of social and its interconnection with mental health outcomes. The study highlights that girls are more prone to social media apps' negative influence. As compared to boys, young girls suffer from low self-esteem and sleep disruptions. O'Reilly et al. (2018) emphasize the need to integrate adolescents' viewpoints into mental health discourse and formulate therapies that address gender-specific vulnerabilities. In an exploratory study, Mishna et al. (2018) are of the view that young adults, especially teenagers, are more prone to cyberbullying.

Challenging common assumptions, Berryman et al. (2018) found no significant connotations between social media use and depression, anxiety, or loneliness, suggesting that engagement patterns are more critical than mere screen time. Coyne et al. (2020) supported this perspective through an eight-year longitudinal study, demonstrating minimal direct effects of social media time on mental health. These findings highlight the complexity of social media's influence, suggesting that content type, individual differences, and engagement patterns significantly affect mental health outcomes. Gao et al. (2020) provided a contextual analysis during the COVID-19 outbreak in Wuhan, China, finding high levels of depression and anxiety among individuals with high social media exposure. The study underscores the potential for social media to amplify distress during public health crises, reinforcing the need for strategies to mitigate adverse effects in times of pandemic. O'Reilly (2020) further examined adolescent health concerns through focus groups, revealing a disconnect between adolescents' perceptions and professional concerns regarding social media risks. These findings highlight the need for balanced discourse and nuanced mental health assessments integrating social media use. Deepa and Priya (2020) conducted a survey in Chennai, India, and explained that there is a positive connection between addictive patterns of social media use and anxiety and depression among young adults.

Sadagheyani et al. (2021) conducted a systematic literature review and illustrated that excessive use of social media causes severe mental disorders. Islam et al. (2021) explored the impact of social media use on the mental health outcomes of young adults in the Bangladeshi economy. As per the empirical findings, social media addiction creates various mental health-related issues, i.e., depression, anxiety, low self-esteem, and disrupted sleeping patterns. The study supported the need for clinical interventions and digital well-being practices among young adults. Maksniemi et al. (2022) underscore that unregulated use of social media negatively influences sleep quality and emotional exertion among young adults. The study highlights the need for age-specific mental health interventions for vulnerable populations. Braghieri and

Makarin (2022) used the difference and difference method and highlighted the impact of social media use on college students in the USA. According to the empirical outcomes, students have reported a decline in academic performance due to mental health disorders. Nazari et al. (2023) have collected data from 781 university students in Iran. According to the study findings, compulsive use of social media is positively connected with higher DASS21 scores, which shows worse mental health.

Fiedler et al. (2023) addressed the influence of social media on young athletes and described that compulsive social media engagement at a young age brings adverse emotional outcomes and unhealthy behaviours. Zsila and Reyes (2023) elucidated the risks and opportunities of social media use and called for a nuanced approach to digital well-being interventions. Zhou et al. (2023) assessed the impact of social media usage on marital satisfaction. According to the study outcomes, social media use positively affects marriage satisfaction among married women in China. Ergün et al. (2025) have explored the interconnections between social media addiction and mental health outcomes. The data is collected from 603 respondents. As per the study's findings, social media addiction is significantly and strongly interconnected with anxiety and depressive symptoms.

The prior literature underscores the intricate nature of social media's impact on mental health, challenging oversimplified narratives, and its potential risks and benefits. The prior literature elaborates that unregulated use of social media is interconnected with depressive symptoms, heightened levels of anxiety, and poor sleep quality. However, the existing literature also highlights the positive influence of social media, i.e., social support, freedom of expression, access to new and updated information, and learning from others' experiences. In order to gain a more comprehensive understanding of this intricate connotation, the field called for longitudinal studies and the development of target interventions that can present the multifaceted effects of social media on mental health and well-being.

4. Methods

4.1. Study design

Using a Randomized Controlled Trial (RCT) methodology, the research examines the relationship between social media usage and the psychological well-being of young people in Pakistan. Participants will be randomly assigned to either a treatment group, which receives an intervention aimed at limiting or regulating social media usage, or a control group, which continues using social media without any imposed restrictions; interventions include time-limiting applications, social media detox challenges, behavioural nudges, or self-monitoring tools designed to reduce screen time. The study evaluates whether these interventions lead to improvements in key mental health indicators, such as depression, anxiety, self-esteem, stress levels, sleep quality, and offline social interactions. Data are collected through baseline and end-line surveys measuring self-reported mental health outcomes, supplemented by digital tracking of social media usage where feasible. In order to reduce any kind of bias in measurement, the study incorporates blinding where applicable—while participants are aware of their assigned intervention, outcome assessors and data analysts remain blinded. The intervention period is four weeks for short-term effects, with follow-up assessments conducted over three months to examine sustained impacts. Ethical considerations, including informed consent and data privacy protections, are strictly followed to ensure participant safety. The findings contribute policy-relevant evidence to inform digital well-being initiatives and mental health interventions in developing economies. The study is registered on the Open Science Framework. The registration includes study protocol, RCT design and planned analysis.

As mentioned previously, this RCT aims to examine the impact of social media use on the mental health of Pakistani youth aged 18-24, with a focus on depression, anxiety, self-esteem, and stress. The study recruited participants from colleges and universities in Islamabad, the capital city of Pakistan, randomly assigning them to one of two groups: (1) a treatment group, where participants will limit their social media usage to a maximum of two hours per day, and (2) a control group that continues regular social media use. We collected data through baseline, four weeks after the intervention, a follow-up survey after three months, weekly self-reported digital diaries, and mobile tracking (with consent), measuring primary outcomes using validated psychological scales such as PHQ-9, GAD-7, and the Rosenberg Self-Esteem Scale. Secondary outcomes include sleep quality and the overall well-being of an individual with limited social media use. As mentioned, ethical considerations include obtaining informed consent, ensuring participant anonymity, and providing mental health support where necessary.

4.2. Recruitment

We have used a combination of targeted outreach strategies, including online advertisements, school and university partnerships, and direct engagement with youth organizations to ensure a diverse and representative sample of participants. Participants have been screened according to eligibility criteria, and informed consent has been secured before enrollment. We ensured data collection through reliable recruitment, effective survey administration, and strong participant retention throughout the study.

4.3. Intervention

For the treatment group, the intervention involves limiting their social media usage to two hours per day, while the control group will continue to engage in their usual social media use. Participants in the treatment group will be encouraged to monitor their usage and be provided with guidance on managing their social media engagement. Both sets of participants will be monitored for three months, with follow-up assessments scheduled at the end of this period to evaluate changes in mental health outcomes, sleep quality, and overall well-being. The intervention's enduring effects on variables such as depression, anxiety, self-esteem, tension, and sleep duration will be assessed during the follow-up.

We have monitored the compliance with the intervention by using a combination of mobile tracking applications and self-reported digital diaries (with participants' consent). We have asked participants in the treatment group to log their daily social media usage in weekly diaries, and they are encouraged to install social media tracking apps (Digital Wellbeing by Google, StayFree and YourHour) on their smartphones. Even though we have recorded information from both methods, we have mainly relied on self-reported usage logs due to inconsistent data availability across different devices. To reinforce compliance and address technical or motivational issues, we have done weekly follow-ups via SMS and check-in calls.

4.4. Outcome Measures

4.4.1. Primary Outcome

The prime objective of the present research is to examine the impact of unregulated social media use on the mental health of young adults. Therefore, the study will evaluate various mental health symptoms, including low self-esteem, anxiety, depression, and stress. These conditions are assessed through various well-established psychological scales; for instance, for assessing depression, we have used the Patient Health Questionnaire (PHQ-9), whereas the

Generalized Anxiety Disorder (GAD-7) scale is employed for anxiety. Additionally, we have utilized the Rosenberg Self-Esteem Scale and the Perceived Stress Scale (PSS) for self-esteem and perceived stress levels. We assessed these mental health outcomes before, after four weeks of intervention (post-intervention), and after three months (follow-up). We aim to identify any change in mental health status due to intervention. We hypothesize that regulated use of social media will help young adults to see remarkable improvement in mental health indicators. We describe these scales in detail.

4.4.1.1. Patient Health Questionnaire (PHQ-9) for Assessment of Depression

The PHQ-9 is a widely used and well-established scale to measure, screen, and monitor depression among individuals. It consists of nine items, each aligned with the DSM-IV criteria for major depressive disorder. The individuals were inquired how often they had encountered the symptoms of depression in the last two weeks. The queries are based upon many symptoms, including feelings of hopelessness, difficulties in concentration, thoughts of self-harm, and also lost interest in daily life activities. The score ranges from 0 (not at all) to 20-27 (severe symptoms). This scale is not only used to identify depressive symptoms but also helps researchers track changes over time.

4.4.1.2. Generalized Anxiety Disorder (GAD-7) for Anxiety

The Generalized Anxiety Disorder 7 (GAD-7) scale is comprised of seven items, each aligned with the DSM-IV criteria for generalized anxiety disorder. It helps researchers screen, diagnose, and monitor the assessment of anxiety disorders. The participants are asked how often they experience anxiety in the past two weeks. The score ranges from 0, i.e., not at all, to 21, which shows severe anxiety. A score above 10 is generally considered a threshold for further clinical evaluations. The scale helps researchers to track the changes in anxiety symptoms over time.

4.4.1.3. Rosenberg Self-Esteem Scale (RSES)

This scale, developed by Morris Rosenberg (1965), measures self-esteem. It has ten items on the list. The individuals were asked to mark various statements about self-worth and self-acceptance. The score ranges from 0 (highest self-esteem) to 30 (lowest self-esteem). Generally, a score below 15 elaborates on low self-esteem. This scale is widely used in various research in psychology and health economics.

4.4.1.4. Perceived Stress Scale (PSS)

The PSS (Cohen, 1983) is widely used to measure how individuals experience stress daily. The inquiries are based on various questions, illustrating how individuals feel overloaded, uncontrollable, and unpredictable daily. The reference period is past month. This scale has ten items on the list, and the scores vary from 0 never to 40, which means more significant perceived stress. This valid scale assesses and monitors stress among various populations and contexts.

4.4.2. Secondary Outcomes

Along with the study's primary outcomes, we have evaluated the secondary outcomes, which include sleep quality and overall well-being. We have used two well-established indices to

assess the secondary outcomes. The Pittsburgh Sleep Quality Index (PSQI) assesses sleep quality, duration, and interruption. The WHO-5 Well-Being Index is used to assess life satisfaction and mood. These secondary outcomes will present a more in-depth analysis of how limited or regulated social media use will help increase overall well-being among young adults. We elaborate on these indices in detail.

4.4.2.1. Pittsburgh Sleep Quality Index (PSQI)

This index was developed by Buysse et al. (1989). It asked various questions to measure sleep quality and disruptions. The reference period is one month. The score varies from 0 to 21. The higher score indicates poor sleep quality. The index is widely used in clinical practices to measure and monitor sleep quality.

4.4.2.2. WHO-5 Well-Being Index

It comprises five items, a self-reported measure that helps researchers evaluate overall well-being and moods. The index was developed by the World Health Organization in 1998. The original score ranges from 0 to 25. Here, the reference period is the past two weeks. To interpret this index, the raw score is multiplied by four, producing a standardized score from 0 to 100. The higher scores indicate greater well-being.

The present research has employed these scales and indices to provide a thorough examination of mental health outcomes connected with the excessive use of social media among young adults.

4.5. Data Collection and Management

We have collected data in various phases. We have used various techniques in the data collection process, including self-reported surveys, digital tracking, and psychological assessments. In the first phase, we collected the baseline information from all the participants before applying any intervention. The survey gathers information on age, gender, region, and the province of residence and inquires about their mental health status using the previously mentioned scales and indices.

During the intervention phase, participants in the treatment group received digital well-being interventions designed to limit or regulate their social media usage, i.e., two hours a day. Data collection during this period includes app-based tracking of social media usage (with participant consent), self-reported compliance logs, and weekly check-ins or short surveys to monitor any immediate psychological effects of reduced social media use. These methods will provide real-time insights into behavioural changes and engagement with the intervention.

Following the intervention, the end-line data collection phase involves a follow-up survey, administered after four weeks, to assess changes in mental health outcomes and social media behaviour. The same standardized mental health assessments from the baseline survey will measure any improvements or deteriorations in participants' psychological well-being. Additionally, participants reported changes in social media habits, the perceived impact of the intervention, and any shifts in academic or work performance.

To examine the long-term effects, follow-up assessments are conducted three months post-intervention to determine whether any mental health improvements persist and whether

participants maintain reduced social media usage. These follow-up surveys help assess the sustainability of the intervention's effects.

The study follows strict ethical guidelines, ensuring informed consent, data privacy, and participant confidentiality. Any digital tracking is fully disclosed, with participants given the option to opt out. All collected data is securely stored and anonymized to protect participant identities. This structured data collection approach provides robust empirical evidence on social media regulation's short-term and long-term impact on youth mental health, informing policy recommendations for digital well-being initiatives.

4.6. Sample Size Calculations and Statistical Analysis

4.6.1. Sample Size Calculations

The sample size for this study was determined to ensure sufficient statistical power to examine significant differences between the treatment and control groups. Using an assumed medium effect size of 0.3 for the primary mental health outcomes (depression, anxiety, self-esteem, and stress), power calculations were conducted to achieve 80% power at a 5% significance level ($\alpha = 0.05$). Based on these parameters, the minimum required sample size for each group (treatment and control) was estimated to be 200 participants per group. This sample size allows for a robust comparison between the groups on the primary outcomes of interest. Additionally, to account for potential participant attrition and dropouts over the three-month follow-up period, a conservative 10% dropout rate was assumed. As a result, the final sample size will be 400 participants in total, with 200 in each group. The details of the sample size are mentioned in Figure 2.

4.6.2. Statistical Analysis:

The primary analysis compares changes in the outcomes (mental health, sleep quality, etc.) from baseline to post-intervention to follow-up between the treatment and control groups. In Table 1, descriptive statistics (mean and standard deviation) are computed for baseline demographic characteristics and outcome variables. This will ensure a detailed sample summary and check for baseline imbalances between the two groups. In addition, to estimate the treatment effects, we have used analysis of covariance (ANCOVA). The main advantage of using this method is that it is more precise and provides accurate results than difference-in-difference and simple mean comparison methods.

5. Results

5.1. Participants and Attrition

5.1.1. Participants

We have recruited 400 participants from a diverse sample of Pakistani youth aged 18-24. Participants are randomly assigned to one of two groups: the treatment group (social media usage to a maximum of two hours per day) and the control group (continue their usual social media habits). The inclusion criteria include young individuals aged 18 to 24 who actively use social media platforms and are willing to adhere to the study's procedures for the duration of the intervention. Exclusion criteria include individuals who have pre-existing severe mental health disorders (e.g., psychosis or severe depression) that require immediate medical intervention, as well as those who do not use social media regularly. In order to enhance the generalizability of the present research's findings, we ensured that the recruitment strategy is well designed and captures a diverse and representative sample of young adults in the context

of a developing economy. We have paid attention to details and carefully collected data by focusing on key demographic variables, i.e., age, gender, educational background, and region and province of residence.

5.1.1.1. Attrition and Retention Strategies

We have carefully designed the present research and minimized participant attrition. However, we anticipate some dropouts over the three-month follow-up period. There could be many reasons behind this attrition, including loss of interest, non-adherence to the intervention, or any other unexpected situation. We have implemented various retention strategies to reduce attrition and preserve the research's statistical power. It includes sending text messages or occasionally making phone calls to remind the treatment group participants about the intervention. The participants were encouraged to monitor and document the time and duration of their social media usage. All communications are crafted in a friendly manner so that we can motivate participants to stay committed to the study's intervention.

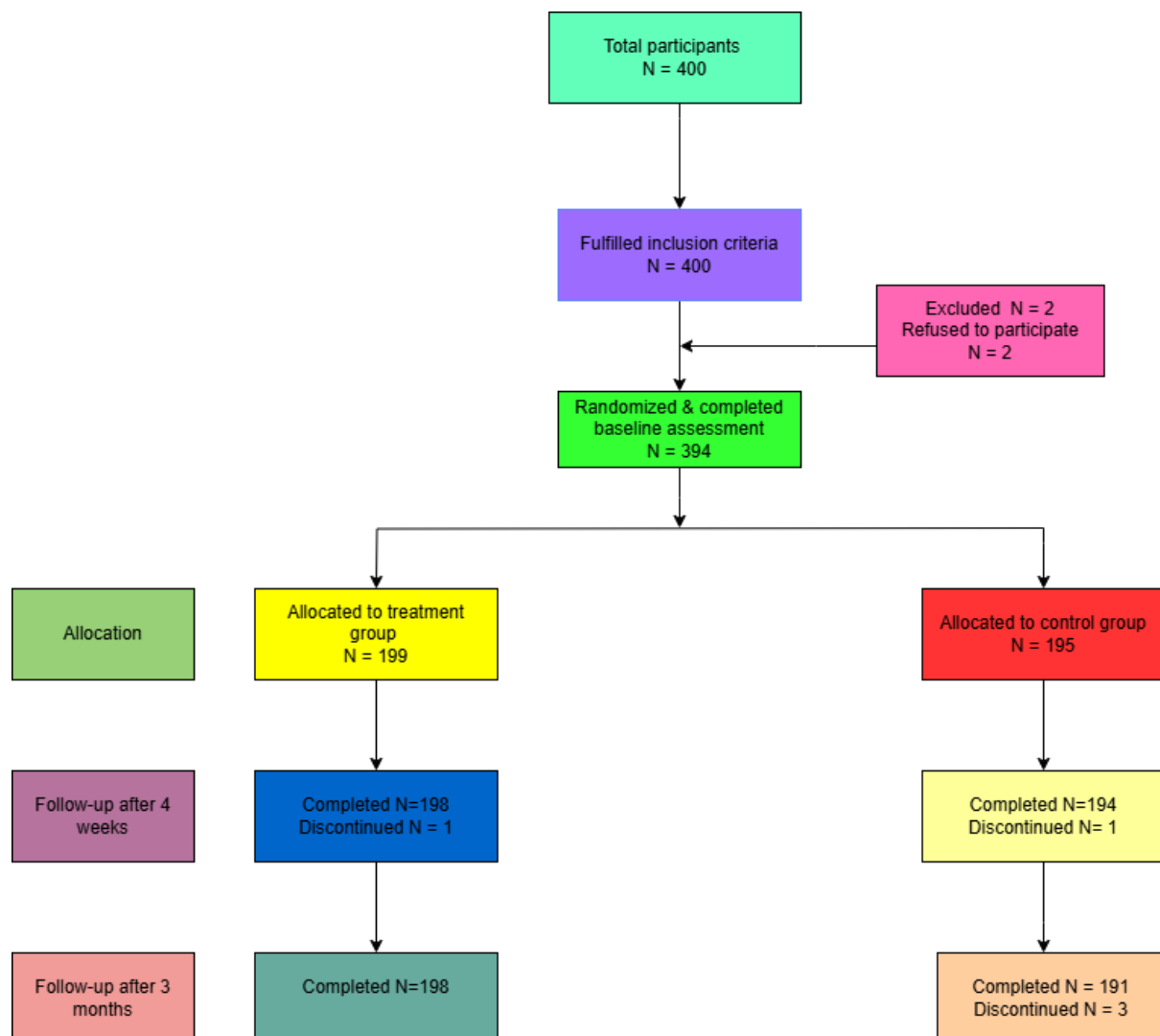


Figure 2: Flow diagram of RCT

To further reduce attrition, participants can send a message or email with any questions or difficulties related to the study or the intervention. This provides a sense of reassurance and encourages participants to remain engaged. Flexible follow-up options are available for participants who experience difficulties with the study procedures (e.g., technical issues with tracking apps or scheduling conflicts). For example, if a participant misses the follow-up survey or cannot complete it on the designated date, they can reschedule to ensure they can provide data at the three-month mark.

5.1.1.2.Participants Characteristics

Table 1: Participants characteristics

Characteristics	Intervention group N (%)	Control group N (%)	p*
Participants	198	191	
Mean age	20.75 (3.44)	21.55 (3.47)	0.051
Gender			
Males	101 (51)	99 (52)	0.442
Females	97 (49)	92 (48)	
Education			
Education in years	14.44 (1.22)	14.51 (1.19)	0.117
Region			
Urban	103 (52)	96 (50)	0.531
Rural	95 (48)	95 (50)	
Province			
Punjab	84 (42)	77 (41)	0.361
Sind	58 (29)	58 (30)	
KP	31 (16)	33 (17)	
Baluchistan	25 (13)	23 (12)	
Time spent on social media			
Time spent on social media in hours	5.76 (3.80)	5.69 (3.65)	0.271
Most frequently used apps.			
Facebook	24 (12)	23 (12)	0.611
Instagram	68 (34)	66 (34)	
Tiktok	52 (26)	49 (26)	
Snapchat	34 (17)	34 (18)	
Twitter	20 (10)	19 (10)	
Mental health scales and indices			
Patient Health Questionnaire (PHQ-9)	10.39 (3.80)	10.61 (3.82)	0.351
Generalized Anxiety Disorder (GAD-7)	10.26 (2.71)	10.67 (2.33)	0.441
Rosenberg Self-Esteem Scale	11.79 (5.65)	11.38 (5.24)	0.621
Perceived Stress Scale (PSS)	21.14 (0.96)	21.54 (0.64)	0.491
Pittsburgh Sleep Quality Index (PSQI)	10.14 (0.96)	10.54 (0.64)	0.337

WHO-5 Well-Being Index	41.14 (0.96)	41.54 (0.64)	0.501
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p* values using a t-test for age, education, time to use social media and mental health scales, and Chi-square for the rest of the variables.

The baseline characteristics of the study sample indicate a well-balanced randomization between the intervention and control groups. The sample consists of 198 participants in the intervention group and 191 in the control group. The mean age is slightly lower in the intervention group (20.75 vs. 21.55 years, $p = 0.051$), but the difference is not statistically significant. Gender distribution is nearly identical, with 51% males in the intervention group and 52% in the control group ($p = 0.442$). Participants have an average of approximately 14.5 years of education, with no significant differences between groups ($p = 0.117$).

The geographic distribution of participants is also well-balanced. About half of the participants come from urban areas (52% in the intervention group vs. 50% in the control group, $p = 0.531$), while the rest reside in rural regions. Provincial representation is consistent across Punjab, Sindh, Khyber Pakhtunkhwa (KP), and Baluchistan, ensuring a diverse sample. The data also indicate similar patterns of social media usage across groups. The average daily time spent on social media is nearly identical between the intervention and control groups (5.76 vs 5.69 hours, $p = 0.271$). The most frequently used platforms, including Facebook, Instagram, TikTok, Snapchat, and Twitter, show comparable usage patterns, reinforcing the randomization balance.

Mental health indicators at baseline, including the Patient Health Questionnaire (PHQ-9) for depression, Generalized Anxiety Disorder (GAD-7) scale for anxiety, the Rosenberg Self-Esteem Scale, the Perceived Stress Scale (PSS), the Pittsburgh Sleep Quality Index (PSQI), and the WHO-5 Well-Being Index, exhibit no statistically significant differences between groups. This confirms that pre-existing mental health conditions are evenly distributed across both groups. The results suggest no significant differences in baseline demographic, geographic, social media usage, or mental health characteristics. This balance ensures that observed outcome differences can be attributed to the intervention rather than pre-existing group disparities.

Table 2: Comparison of Outcome Variables Between the Intervention and Control Arms at Baseline, Post-Intervention (T1), and Follow-Up (T2)

Scales and Indices	Treatment Mean (SD)	Control Mean (SD)	Mean difference (CI)	p*
Primary Outcomes				
Patient Health Questionnaire (PHQ-9) for Depression				
Baseline (T0)	10.39 (3.80)	10.61 (3.82)	0.22 (-0.56 to 0.97)	0.760
Post-intervention. (T1)	9.30 (2.05)	10.12 (3.78)	0.82 (0.22 to 1.44)	0.060
Follow-up (3 months). (T2)	7.84 (2.05)	10.94 (3.70)	3.1 (2.51 to 3.72)	0.000
Generalized Anxiety Disorder (GAD-7) for Anxiety				
Baseline (T0)	10.26 (2.71)	10.67 (2.33)	0.41 (-0.08 to 0.93)	0.665
Post-intervention. (T1)	8.16 (2.73)	10.17 (3.03)	3.01 (2.45 to 3.61)	0.005
Follow-up (3 months). (T2)	6.25 (1.38)	10.89 (3.31)	4.64 (4.15 to 5.16)	0.000
Rosenberg Self-Esteem Scale				
Baseline (T0)	11.79 (5.65)	11.38 (5.24)	-0.41 (-1.49 to 0.68)	0.341
Post-intervention. (T1)	14.19 (3.65)	11.47 (5.04)	-2.72 (-3.62 to -1.84)	0.000
Follow-up (3 months). (T2)	16.19 (3.12)	11.22 (4.24)	-4.97 (-5.72 to -4.23)	0.002
Perceived Stress Scale (PSS)				
Baseline (T0)	21.14 (0.96)	21.54 (0.64)	0.4 (0.25 to 0.56)	0.438
Post-intervention. (T1)	19.94 (4.97)	21.43 (4.93)	1.49 (0.52 to 2.49)	0.065

Follow-up (3 months). (T2)	17.51 (3.43)	21.33 (5.00)	3.82 (2.95 to 4.67)	0.000
Secondary Outcomes				
Pittsburgh Sleep Quality Index (PSQI)				
Baseline (T0)	10.14 (0.96)	10.54 (0.64)	0.4 (0.25 to 0.57)	0.652
Post-intervention. (T1)	7.80 (0.78)	10.40 (0.73)	2.6 (2.44 to 2.76)	0.000
Follow-up (3 months). (T2)	6.75 (1.89)	10.31 (0.83)	3.56 (3.26 to 3.85)	0.001
WHO-5 Well-Being Index				
Baseline (T0)	41.14 (0.96)	41.54 (0.64)	0.4 (0.25 to 0.58)	0.521
Post-intervention. (T1)	50.80 (2.78)	41.40 (0.73)	-2.4 (-9.08 to 9.82)	0.000
Follow-up (3 months). (T2)	51.65 (2.89)	41.31 (0.83)	-10.34 (-10.92 to -9.75)	0.061

p* values using ANCOVA.

5.2.Primary Outcomes

The study's empirical findings elaborate that the intervention has a significant and sustained impact on various mental health and well-being outcomes. Both control and intervention groups have identical baseline scores (10.61 vs 10.39) for depression, as measured by PHQ-9. Nonetheless, after the intervention, the treatment group experienced a notable reduction in depressive symptoms. This is observed in Table 2, where the score is reduced to 9.30 after four weeks of intervention and 7.84 at the three-month follow-up. On the contrary, no significant improvement has been seen for the control group; their score is still at 10. The empirical findings highlight that limited use of social media is effective in reducing depressive symptoms among young adults.

On the same lines, for anxiety, measured by the GAD-7, the intervention group has seen a moderate decrease in anxiety symptoms from 10.26 to 8.16 after four weeks of using social media for two hours. However, the score is reduced to 6.25 at the time of follow-up. In the case of the control group, the scores remained stable and showed only a slight change; they increased slightly at the time of follow-up. The difference is statistically significant, which shows that the intervention is effective for young adults in reducing anxiety.

The study used the Rosenberg Self-Esteem Scale (RSES) to observe self-esteem among social media users and young adults. The empirical findings showed that at the baseline, both groups have almost similar scores, around 11. Nonetheless, after the intervention, the treatment group experienced a substantial increase in the score, i.e., 14.19, and this improvement was sustained at the time of follow-up. Unlike the treatment group, the control group did not significantly change the self-esteem scores. It highlights that regulated use of social media helps to improve self-esteem.

For perceived stress, measured using the Perceived Stress Scale (PSS), baseline stress levels were similar between the two groups. In the post-intervention, the intervention group demonstrated reduced stress levels, which continued to decline over time, while the control group showed no significant changes. This suggests that the intervention effectively reduced stress and that these effects persisted over time.

5.3.Secondary Outcomes

In addition to the significant improvement in the primary outcomes, the intervention also enhanced the secondary outcomes, which include sleep quality and overall well-being. The sleep quality is assessed by the Pittsburgh Sleep Quality Index (PSQI). Before the intervention, both groups had poor sleep scores; however, after four weeks and after three months of the intervention, the treatment group marked a significant improvement. On the other hand, the

control group did not show any change. We infer that intervention has a lasting and positive influence on sleep patterns among young adults.

Lastly, in our research, the treatment group experienced a marked improvement in overall well-being, which the WHO-5 Well-Being Index measures. At the baseline, the treatment and control scores had low well-being scores; however, after the intervention, the treatment group showed a significant improvement, which lasted until the follow-up assessment. The control group showed no significant change in their well-being throughout the observed period.

Taken together, these findings provide strong evidence that the intervention effectively improved depression, anxiety, self-esteem, stress, sleep quality, and overall well-being. Notably, the improvements were not only significant immediately after the intervention but were also sustained over time. The control group, which did not receive the intervention, showed little to no improvement across all measures, further reinforcing the effectiveness of the intervention. These results highlight the potential of such interventions to enhance mental health and well-being in the target population.

6. Empirical Discussion

The empirical findings of the present study based on an RCT provide interesting policy insights for health policy practitioners in developing economies. It highlighted that limited use of social media substantially improved mental health and well-being outcomes among young adults, which stayed sustained over time. The treatment group experienced a reduction in depressive symptoms from baseline to post-intervention, as well as at the three-month follow-up. On the contrary, the control group did not show any change in their scores. It suggests that the observed changes are directly attributable to the intervention. The prior literature highlighted that structural behavioural and psychological interventions could effectively reduce depressive symptoms, especially when they integrate cognitive and emotional regulation strategies (Braghieri et al., 2022). The sustained improvement over the long run indicates that the intervention promoted lasting mental health resilience rather than offering a short-lived outcome.

Anxiety symptoms, assessed using the GAD-7, followed a similar pattern, with a moderate but significant reduction in the intervention group, while the control group showed minimal change. It is well observed from the prior literature that anxiety is closely interconnected to difficulties in social interactions and workplace performance (Stein et al., 2017). The improvement in anxiety symptoms in the post-intervention as well as in the follow-up period illustrates that participants in the treatment group have developed long-term coping mechanisms by regulating the use of social media. The results are particularly significant in the context of increasing global anxiety levels, and young adults are more likely to suffer from mental health issues. In her book *The Anxious Generation*, Jonathan Haidt has presented a compelling argument that smartphones and digital platforms are some of the strangest drivers behind mental health disorders among adolescents. According to the World Health Organization, anxiety disorders are affecting almost 301 million people worldwide.

The study applied the Rosenberg Self-Esteem Scale to measure self-esteem among the participants in the experiment. Before any intervention, both treatment and control groups have similar scores in terms of self-esteem. However, we have seen a significant improvement in the self-esteem score in the treatment score. This highlights that intervention, i.e., regulated use of social media, helps to improve self-esteem by not indulging in unnecessary comparison and

promoting self-worth and positivity (Orth & Robins, 2022). There is a strong interconnection between self-esteem and various mental health outcomes, including depression, anxiety, and poor academic and career performance. The empirical findings also elaborate on the broader implication of the intervention beyond mental health to overall well-being in all spheres of life.

The empirical findings related to perceived stress, assessed through the Perceived Stress Scale (PSS), further support the intervention's role in improving the mental well-being of young adults. The participants who were part of the treatment group reported lower stress levels. It is again a well-observed phenomenon that chronic stress contributes to a wide range of physical and psychological health issues (McEwen, 2017). Thus, the results significantly affect public health policies and practices. Reducing stress highlights that regulating social media helps individuals adopt a healthy lifestyle and lasting protection against mental stress.

The findings indicate improved sleep quality among the treatment group, as measured by the Pittsburgh Sleep Quality Index (PSQI). It illustrates further evidence of the intervention's efficacy. There is a plethora of literature that supports the strong connotation between depression, anxiety, and sleep quality (Harvey et al., 2021; Scott et al., 2021). A statistically significant and sustained improvement in sleep quality is observed among the treatment group. This is notably silent given the strong interconnections between poor sleep and a wide range of adverse outcomes, i.e., emotional dysregulation, cognitive impairment, and high risk of chronic health conditions.

Finally, we have examined increased well-being as evaluated by the WHO-5 Well-Being Index. It is a comprehensive index assessing overall well-being, including positive moods and engagement in life. The treatment group has shown a significant increase in overall well-being; it highlights that intervention or regulated use of social media helps alleviate stress levels and actively enhances the participant's capacity to experience positive emotion and life satisfaction (Keyes, 2002).

7. Strengths and Limitations of the Study:

The study's (RCT) design is one of its key strengths. Randomization ensures that the treatment and control groups are comparable at baseline, minimizing selection bias (internal validity) and allowing for a more straightforward interpretation of causal relationships between the intervention (limiting social media use) and the outcomes (mental health, cognitive functioning, sleep quality, etc.). This study addresses an important and contemporary issue—the impact of social media on the mental health and well-being of young adults in a developing economy. Given the growing concern about the mental health of young people in Pakistan, especially in the context of the digital age, the study's findings have the potential to inform public health policies and digital well-being initiatives in the South Asian region.

The present research has employed well-established scales and indices to measure various mental health outcomes, including depression, anxiety, low self-esteem, sleeping quality, and overall well-being. These scales and indices were widely used in prior literature to measure and monitor various mental health symptoms. We have recruited participants from diverse backgrounds and regions to generalize the findings to a broader population and context. The diversity enhances the external validity of the present study.

We have implemented a relatively straightforward intervention, limiting the use of social media to two hours a day. The simplicity and clarity of the intervention make it possible for all the

participants to adapt it easily, keep track of their social media use, and adhere to the intervention. We primarily focused on retention strategies; we connected with the participants and encouraged them through text messages and phone calls. These efforts helped us to collect high-quality data and assess the impact of the intervention on mental health outcomes.

One study limitation is the reliance on self-reported data for measuring social media use, mental health outcomes, and other secondary variables. Participants may underreport or overreport their social media use or mental health symptoms due to social desirability bias or recall bias. Although validated scales will be used, self-reports are still subject to these biases. The study's follow-up period of three months may be too short to fully capture the long-term effects of limiting social media use. Mental health and cognitive functioning improvements may require a longer duration of intervention to manifest fully. A more extended follow-up period could provide insight into whether the intervention has sustained long-term effects.

Although the study includes participants from both urban and rural areas, the findings may still be limited in their generalizability to different age groups. The cultural and socio-economic context of Pakistan may affect how social media use influences mental health, meaning that the results may not be directly applicable to other countries or regions with different social dynamics. Despite the efforts to support participants, some may struggle to comply with the social media restriction, leading to deviations from the prescribed two-hour daily limit. Non-compliance could dilute the intervention's effectiveness and introduce variability in the results. Monitoring compliance through digital tracking apps will help mitigate this issue, but there may still be some non-adherence. Even though we did not measure cyberbullying in detail, its influence remains relevant.

While randomization should control for many confounding variables, there may still be unmeasured factors influencing mental health and cognitive outcomes. For example, external events (e.g., family or school stressors) or personal characteristics (e.g., coping mechanisms) could affect the outcomes independently of the intervention, introducing potential bias. The study focuses on the total time spent on social media usage but does not consider the content of social media interactions. The impact of social media on mental health may vary depending on the type of content consumed (e.g., positive vs. harmful content, interactions with peers vs. exposure to public figures). Future research could explore the role of content in greater detail.

8. Conclusion and Policy Implications:

The RCT aimed to assess the impact of limiting social media use on the mental health and well-being of individuals aged 15 to 24. The findings from this study have the potential to contribute to the growing body of literature on the effects of digital media on mental health, particularly within the context of a developing economy like Pakistan. By comparing a treatment group that limited their social media use to two hours per day with a control group that continued their usual social media habits, this study provides empirical insights into whether time-limited social media interventions can lead to significant improvements in mental health outcomes such as depression, anxiety, stress, and self-esteem. Furthermore, the present research assessed the impact of regulated social media usage on sleep quality and overall well-being. It provides an in-depth evaluation of the intervention's effects on young adults' mental health and well-being. The well-designed RCT enables robust causal inferences, providing practical insights for health policy practitioners advancing digital well-being initiatives.

The study's empirical narratives have significant implications for policy partitioners in developing economies facing similar mental health challenges at the intersection of social media, digital technologies, and mental health outcomes.

The empirical findings highlight the need for policies at the regional and national levels on digital well-being, particularly for young adults, as they are more prone to the adverse impact of social media use. Policy practitioners should initiate various college and university campaigns to highlight the importance of mental health and the regulated use of social media. There is a need to educate students on the healthy use of social media and digital well-being. Integrating digital well-being into the curricula and guiding students to monitor and regulate their social media use to promote mental well-being is pertinent. In addition, educational institutes should consider structured interventions to support young adults' health. It includes digital detox days and encourages social media-free zones in universities and classrooms. It is imperative to assist the students who may struggle with the adverse consequences of social media. Establishing collaborations between mental health practitioners and organizing workshops and counselling sessions on managing screen time and improving mental health is also pertinent.

The findings of this study may prompt the expansion of mental health programs targeting social media usage as a key risk factor. Government and non-governmental organizations could fund initiatives to provide mental health resources for youth, focusing on addressing the psychological effects of social media. These programs could incorporate strategies for managing screen time, such as promoting digital mindfulness and fostering offline social connections.

9. Future Research Directions:

The study provides guidelines for future researchers to examine the intersection of social media and mental health in the context of developing economies. Future studies must extend the follow-up period from six months to one year. Future studies may focus on a broader set of behavioural nudges to maximize the impact of the intervention(s). Also, we have included almost 400 participants in our study; however, it is suggested that the sample size should be increased in future studies. Gender is one of the essential aspects here; it is plausible to examine the role of social media use in the mental health of young people for both genders separately.

Declarations

Ethics approval and consent to participate

The Research Ethics Committee, RCTXIMPACT, Islamabad, Pakistan, approved the present research. All participants provided informed consent before participating in the research, and the researcher ensured compliance with the ethical guidelines outlined in the Declaration of Helsinki.

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