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Influence of Excessive Social Media Usage on Sleep Patterns Among Adolescents in the United Kingdom: A Systematic Review

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Declaration

I, Md Nurul Hoque declare that this dissertation has been composed by myself, that the work contained herein is entirely my own except where explicitly stated otherwise in the text, and that this work has not been submitted for any other degree or qualification, in whole or in part, except as specified.

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Abstract

Background: As social networks have become an integral part of the adolescents' lives in the United Kingdom, there is growing concern about the negative impact of nighttime use of electronic devices. Social media platforms such as Instagram, TikTok, and Snapchat are some of the platforms many teenagers use, but their constant use has been associated with poor sleep quality and an increase in anxiety, depression, or low mood.

Objectives: This study aimed to establish the impact of excessive use of social media on the sleep of adolescents. It investigates potential causes of this disruption, whether it is physical, emotional or behavioral and how this disruption may impact the young people.

Methods: This study conducted a secondary research design using a systematic review approach to identify and analyses existing literature relevant to the research questions. The articles were retrieved from the databases such as PubMed, EBSCOhost, ProQuest Central, and Google Scholar, and the search was done within the years 2010-2024. The review involved 12 studies of adolescents between the age of 12 and 18 years in the United Kingdom. The quality of each study was also determined using assessment tools that were developed for systematic reviews.

Results: In all the reviewed articles, there was consensus that late-night social media usage is associated with sleep disturbances such as delayed sleep onset, reduced total sleep time, and reduced sleep quality. It identified that issues such as FOMO (Fear of missing out) and social pressure would aggravate these issues to stress, anxiety, Depression and low mood.

Conclusion: Such results suggest that there is an urgent need to address the issue of healthy use of screen time especially before going to bed as a way of ensuring that teenagers are not negatively affected by excessive screen time.

Keywords: Adolescent, Sleep, Social Media, Mental Health, UK, Sleep patterns.

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Chapter 1: Introduction

Sleep is a vital biological process that is needed for restoration and revitalization not only of the body but also of the human mind (Eugene and Masiak, 2015). Adolescents rely on it to ensure physical, emotional, and cognitive development, supply conditions for development, memory consolidation, and stability of mental health (LeBourgeois et al., 2017). Healthy sleep means sleep of appropriate duration about 8-9 hours for adolescents (Vestergaard et al., 2024), within a proper time of the day, which depends upon the daily fluctuations in the human circadian rhythms (Kumar Swain & Pati, 2021). On the other hand, unhealthy sleep is disturbed, unhealthy sleep and negatively impacts the body's functions. example, sleep onset delays, reduced sleep duration, poor sleep quality, and irregular sleep schedule. Factors that exacerbate these issues include excessive screen time (Colten and Altevogt, 2019), especially socially oriented screen involvement on a late-night basis, which incongruously disrupts the body's natural sleep processes (Levenson et al., 2017; Scott et al., 2019).

Sleep patterns are affected by many factors including their environmental, physiological, psychological, and behavioral sides (Johnson, Billings and Hale, 2018). Additionally, for example, digital exposure to blue light from electronic devices may cause suppression of melatonin and delay sleep onset (LeBourgeois et al., 2017), while components of psychological factors such as anxiety and FOMO (fear of missing out) can inspire adolescents to stay on social media well past the time where they should be preparing for sleep (Przybylski et al., 2017). Other behavioral factors like late night scrolling and compulsive checking social media also significantly bit to the cause of sleep disturbances (Ilham et al., 2022).

Any of these social media platforms, which include Instagram, Facebook, YouTube, Snapchat, and TikTok, are integral parts of adolescents' lives as they allow them to interact, express themselves, and be updated on the current trending social scene (Wood et al.,2023; Bozzola, 2022). Yet, it is often overused, especially at night, disrupting sleep as it is an addictive drug and constant notifications (Zhang et al., 2022; Winstone et al., 2021). However, excessive use of social media is related to delayed sleep onset, decreased sleep duration, and lower quality of sleep (Sohn et al., 2021; Ilham et al., 2022), which is further associated with various cognitive and emotional problems.

Adolescents experience the rapid integration of social media into everyday life in developed countries, much like the United Kingdom. Today, roughly 87% of young people (ages 12 to 18) use screens on a daily basis, like Instagram, Snapchat, or TikTok, for communication,

entertainment, and expression (Kelly et al., 2018; Ofcom, 2023). While social media offers tremendous potential for social connectedness and personal development, the ubiquitous presence of social media as a tool for these has severe implications for adolescent health and well-being, especially as a correlate of sleep (Scott et al., 2019; Bozzola, 2022).

Sleep is an important biological process for the physical, emotional and cognitive development of adolescents (Tarokh, Saletin and Carskadon, 2016). During adolescence, the body undergoes amazing hormonal changes, and thus, it is imperative that they sleep well enough (Colrain and Baker, 2011). However, the increased usage of social media is a massive disruptor of healthy sleep patterns. Individuals less prone to suffer from circadian disruption such as adolescents, who spend more time on social media platforms, especially at night, tend to experience increased sleep onset latency, a lower number of hours spent asleep, and increased sleep problems (Sohn et al., 2021; Zhang et al., 2021). The disruptions are often attributed to many interrelated factors, including physiological, psychological and behavioral influences.

Physiologically speaking, exposure to blue light coming from smartphones and other digital devices interferes with melatonin production, causing sleep to begin later (the onset of sleep is delayed) and disrupting the natural circadian rhythm (LeBourgeois et al., 2017; Silvani, Werder and Perret, 2022). Moreover, adolescents continue to have compulsive behavior of late-night scrolling or frequent checking of notifications that further prolong wakefulness and disrupt bedtime routines (Ilham et al., 2022).

These issues are exacerbated by psychological fear, anxiety, FOMO, and things like that (Gupta and Sharma, 2021). The connection with our social networks can feel so important during our lifetime that we must stay connected even at night to avoid being excluded or uninformed. This sustained engagement drives yet further cognitive arousal, making it difficult for them to relax and move on to restful sleep (Przybylski et al., 2017; Twenge et al., 2018).

However, the following behaviors require a closer look on how social media affects adolescent sleep patterns since they are becoming more rampant. The goal of this study is to understand the ways in which these disruptions are physiologically, psychologically and behaviorally manifested, and their function in general adolescent health and functioning. The purpose of the study is to identify the policy and educational strategies that could help present healthier digital habits and sleep to teenagers.

1.1 Background of the study

The Role of Social Media in Adolescent Lives

Social media platforms are so much a part of adolescents' lives (Guo and Cheung, 2023). Platforms such as Instagram, Facebook, Snapchat, and TikTok have risen, generating an online system for teens to interact with other people to share their experiences or even look for social validation. Yet, this reliance on social media can lead to compulsive behavior for want of social approval and social connection (Winstone et al., 2021; Cataldo et al., 2021). There is little known about the development of FOMO (fear of missing out) in adult; however, many adolescents are susceptible to experiencing FOMO, an anxiety-driven state characterized by worrying about missing enjoyable social interactions. Adolescents stay hung up on social media beyond nighttime hours due to FOMO, which deters their ability to practise healthy sleep hygiene (Przybylski et al., 2017; Zhang et al., 2022).

This problem only gets worse, given the design of social media platforms. Notifications, curated content based on algorithms, and real-time updates are all things that keep the digital engagement always drawing you in. Such elements make adolescents put online engagement first over essential endeavors, such as sleep, expanding the danger of sleep issues (LeBourgeois et al., 2017; Montag et al., 2019). It is important to note that these trends are also the subject of recent research, and their broader societal implications point to potential interventions, including school policies limiting daytime social media use, to address the behavioral challenges involved with spending too much screen time (Wood et al., 2023).

Physiological Disruptions Caused by Social Media

With its effects on physiological levels, social media is one of the most well-documented ways that social media disrupts adolescent sleep. In fact, blue light suppresses the production of melatonin (a hormone needed to organize the sleep cycle). Disruption of melatonin production by this leads to delayed sleep onset, prolongation of wakefulness, and disruption to the adolescents' circadian rhythms (LeBourgeois et al., 2017; Hisler et al., 2020). Given the adolescents' biological predisposition for later sleep and wake times and further social media use exacerbates the effect on them (Sohn et al., 2021), it is particularly harmful in adolescents.

Aside from the physiological effects of blue light, what we see on social media is a factor in sleep disturbance. Often, cognitively arousing content on digital platforms-being engaged and present in the world leads to cognitive arousal, making it hard for teenagers to unwire to a good place to allow themselves the opportunity to rest until they sleep. As shown in studies written by Ilham et al. (2022), social media use causes a delay in sleep onset and additionally decreases sleep quality. However, this sleep debt can be cumulative, and serious health consequences can result

from this lack of sleep over time, which makes it so important to intervene to help people have healthier screen time habits.

Psychological and Behavioral Factors

Social media use is driven to a large extent by psychological factors, in particular, FOMO. Often, FOMO shows up as an anxiety provoking compulsion to stay connected to social networks at the cost of sleep. The more adolescents feel FOMO, the more likely they are to be cramming a last-minute (or overnight, even) social media session onto their already late-night hours, thus disrupting their sleep schedule and increasing stress and anxiety (Przybylski et al., 2017; Dhir et al., 2018).

They have documented the high toll that excessive social media use takes on adolescent mental health. It has been seen that continued exposure to digital platforms is associated with an increased probability of anxiety, depression and low self-esteem (Keles et al., 2020; Naslund et al., 2020). One important point is that poor sleep can feed into this feedback loop such that poor sleep is associated not only with psychological distress but also further amplifies social media use and sleep disturbances (Scott et al., 2019). Such a bidirectional relationship between social media, mental health, and sleep emphasizes the need to consider behavioral as well as psychological aspects when developing interventions for promoting adolescent well-being (Wojtowicz, Buckley and Galea, 2024).

Broader Health Implications of Sleep Deprivation

Sleep deprivation consequences do not stop one from tiredness and irritation; rather, they affect all the dimensions of the health status of adolescents (Short and Louca, 2015). Having poor sleep quality has been associated with reduced attention span, poor memory, and poor problem-solving (Levenson et al., 2017; Varghese et al., 2021). Translation to reduced academic performance and reduced participation in school activities is common with these cognitive deficits.

Physiologically, deficient sleep affects the immune system to help increase vulnerability to infections and chronic diseases (LeBourgeois et al., 2017). It's also been shown that sleep deprivation can mess with metabolic processes that then lead to weight gain and insulin resistance in adolescents (Kim, Jeong and Hong, 2015).

Neither social consequence of sleep deprivation is less worrying than the other. Poor sleep also increases the likelihood of adolescents showing impulsive behaviors, overreacting to emotions and forming and maintaining relationships. Research that Wood et al. (2023) summaries, for

instance, demonstrates that poor sleep worsens interpersonal conflicts and risk behavior, such as substance use and unsafe decisions. These trends represent a larger social impact of sleepless teens and the subsequent effect they could have on their effectiveness in their families, their school, and their social lives.

1.2 Addressing Research Gaps

However, despite the large volume of social media research on sleep, we lack much of the literature. However, most of the studies carried out so far do not elucidate precisely the different social media behaviors causing sleep disruption (Ilham et al., 2022). Additionally, there is little longitudinal work that examines the accumulation of sleep deprivation on adolescent health across different demographic groups.

A second and important gap in the current literature is the relative lack of understanding of how individual factors, like gender, socioeconomic status, and prior mental health problems, contribute to the effects of social media use on sleep outcomes. For instance, Bin Eid et al. (2022) show how cultural factors and lifestyle differences play a major role in getting to sleep at night for adolescents from the UK compared with other countries. This should lead to the development of targeted interventions that take into account the diversity of adolescent experiences.

1.3 Objectives of the Study

This study aims to fill the identified gaps in the literature by exploring the various ways by which social media affects adolescent sleep. Specifically, it aims to:

1. Discover the physiological mechanisms by which social media usage disrupts sleep through the introduction of effects of blue light and cognitive arousal.
2. Explore how psychological factors, including FOMO (Fear of Missing Out) and anxiety, contribute to excessive social media use and negatively impact sleep patterns.
3. Examine the larger health and social effects of sleep deprivation in terms of how it affects school performance, mood and social interactions.
4. Provide evidence-based recommendations for promoting healthier digital habits in adolescents, specifically decreasing social media usage late in the evening and enhancing sleep hygiene.

Consequently, this study synthesizes existing research and achieves these objectives by contributing to the development of the prevention of adverse social media effects on adolescent sleep. One such strategy could be dedicated education of adolescents and their parents, regulation in the educational sphere of limiting students' screen time, and cooperation with

technology companies to build features aimed at healthier digital behavior. The findings of this research will ultimately help to optimize efforts to create a balance between digital engagement and restorative sleep to promote adolescent well-being.

Chapter 2: Literature Review

2.1 Introduction to Chapter

This chapter aims to present the state of research about the impact of over-reliance in SNS (social networking sites) on adolescent sleep in the United Kingdom. This paper considers social media in adolescents' lives, the sleep quality affected, psychological and physiological consequences and implications of social media usage in society.

According to Oztemel and Gursev (2020), a literature review is a critical and integrative analysis of some published literature in the given subject area. It allows summarizing the state of the current knowledge, defining trends and even describing different methods and outcomes (Carrera-Rivera et al., 2022). The literature review, as presented in the previous section, helps to classify the previous studies, which creates the basis for further investigation of knowledge gaps in the literature and the rationale for further research (Lim et al., 2022). The literature review is important because it points out what is agreed upon and disagreed upon among scholars, helps develop theories and propositions for new research, and directs all research to be anchored on a solid literature foundation (Van Lange, Paul et al., 2015; Paré and Kitsiou, 2017).

This literature review will be conducted through a search in databases like ProQuest Central, EBSCOhost, Google Scholar, and PubMed. These will help collect articles and other related studies relevant to the research question and objectives. The following Boolean operators will be used to filter the results to retrieve only the best papers: The paper will proceed systematically to focus on 12 papers most relevant to the genre of the study. Some of these studies will be relevant in supporting the findings and providing a thorough analysis of the issue at hand.

2.2 The Role of Social Media in Adolescent Lives

Social networking is an important element of teenage communication and self-identification, as well as leisure activity (Khalaf et al., 2023). On the one hand, it is stated that the opportunities for self-expression and peer support are to be found through these social networking sites (SNSs) (Antheunis et al., 2016), whereas on the other hand, the negative effects, especially sleep disturbances, cannot be overlooked. According to the Royal Society for Public Health (2017), 87% of teenagers in the UK use social networks such as Instagram, Snapchat, or TikTok every day, as supported by the Office for National Statistics (2020). While digital connectivity helps users feel connected with others, it also makes them addicted to using the device by increasing screen time and affecting their sleep (Scott and Woods, 2018; Cain and Gradisar, 2010).

One of the issues of concern is the fact that FOMO plays a part in the continued use of social media (Alutaybi et al., 2020). According to Przybylski et al. (2017), adolescents who reported FOMO also reported that they continued to check notifications and scroll at night, leading to delayed sleep and poor quality sleep. This is in concordance with Twenge et al. (2018), whose studies revealed that more screen time leads to poor well-being among adolescents. Some researchers posit that social media helps adolescents in that it provides them with emotional support and reduces feelings of loneliness (Orben and Przybylski, 2019). Nonetheless, it is evident that overuse leads to sleep deprivation, anxiety, and dependency (Dhir et al., 2018).

In addition, there are feelings such as likes and comments that make users develop psychological dependence on social media and thus make them keep on checking on social media (Twenge et al., 2018; Amirthalingam and Khera, 2024). This engagement pattern increases cognitive activation before going to bed, thus making it harder for adolescents to sleep (Scott and Woods, 2018). While it is known for offering great opportunities to develop digital literacy and establish social connections, social media negatively impacts sleep. As it has been observed that there are different views regarding the effect of social networking sites on young people, more studies need to be conducted to identify the best ways of reducing the negative effects of youths' over-reliance on social media.

2.3 Impact of Social Media on Sleep Quality

The present study further corroborated the previous findings, which found that adolescents who frequently used social media had poor sleep quality. While some may feel that social media usage may help them relax before sleep, literature proves that excessive use leads to delayed sleep and fewer sleep hours (Alonzo et al., 2021; Heath et al., 2018). Therefore, adolescents who use social media for long before going to bed are likely to have poor sleep quality due to increased cognitive activation and constant exposure to stimuli content (Levenson et al., 2016; Orben and Przybylski, 2019).

The first of these is that social media is structured to support the constant engagement of users. These features include notifications, auto play videos and other auto-generated content that keep the adolescent engaged and glued to their devices, making it hard for them to detach and prepare for sleep as recommended (Kircaburun et al., 2019; Hale and Guan, 2015). Also, the nature of social media interactions leaves the users psychologically dependent on the platforms, thus delaying their bedtime and causing increased nighttime wakefulness (Lemola et al., 2017). Although some authors claim that the negative impact of social media can be avoided if its usage

is moderate, it is a known fact that most teenagers lack self-control (Twenge et al., 2018; Popat and Tarrant, 2022).

Furthermore, the blue light emitted by screens interferes with melatonin synthesis, which is a hormone responsible for the regulation of sleep (Mainster et al., 2022; Lissak, 2018). Study shows that adolescents who are exposed to high levels of blue light before sleep are likely to have poor sleep quality, both in terms of onset and efficiency (Levenson et al., 2016; Heath et al., 2018). The effects of blue light on the human body are aggravated by social and psychological factors such as FOMO and anxiety that affect the quality of sleep (Scott and Woods, 2018; Moura et al., 2021).

While some authors noted that social media is useful for receiving social support, identification and belongingness, the benefits should be viewed along with the harm that social media causes to sleep (Dhir et al., 2018). This is because the high usage of social media at night for teenagers leads to high stress and irritation hence low happiness levels (Twenge et al., 2018). Therefore, it is important to look for other effective interventions that could be more helpful in dealing with the negative impact of adolescent sleep loss including the time spent on screen and digital health.

2.4 Psychological Factors: FOMO, Anxiety, and Depression

From this, it can be deduced that social media utilization by the teenage is involved not only with sleep disturbances but also almost all types of mental health complications (Yu et al., 2024). FOMO (Fear of missing out) is one of the major factors that contribute to the constant engagement in the use of social media, it leads to high levels of stress and anxiety (Dhir et al., 2018; Przybylski et al., 2017). The effects of FOMO are that adolescents who are afflicted with this syndrome cannot let go of the need to check on social interactions even when it is night time and they should be sleeping. This not only changes the time which children spend in bed, but also reduces the quality of their night sleep and, therefore, makes them more tired with mood swings in the long term (Twenge et al., 2018; Kelly et al., 2018).

It is, therefore, clear that social media use for longer periods has a strong correlation with anxiety and depression. Based on the literature review, adolescents who spend long hours on social networking sites have higher levels of stress and depressive tendencies (Scott et al., 2019; Keles, McCrae, and Grealish, 2020). Social media consumption contributes to the development of self-esteem issues in people due to the need to constantly receive likes and comments (Kacker and Saurav, 2020). Some people believe that social media supports people and connects them, but it only worsens mental health problems (Orben and Przybylski, 2019).

In the same respect, social comparison is also a key contributor to adolescent self-image. Interacting with cultivated profiles generates presumed Typical Media Images that cause dissatisfaction with one's own life (Twenge et al., 2018; Nesi and Prinstein, 2015). This negativity, when women compare themselves with other women, increases stress levels and sleep disturbances and vice versa since depression and anxiety affect sleep quality as well (Scott and Woods, 2018). Such psychological issues should be handled through the following approaches: Digital competency, psychological awareness, and parents' guidance to help young people embrace the right social media usage.

2.5 Physiological Effects of Screen Time on Sleep

According to Touitou and Reinberg (2016), the effects of screen time on adolescent sleep are a major issue of concern because the disruption of circadian rhythms is apparent based on new research. Blue light is a major feature as it disrupts the secretion of melatonin which is used in regulating the sleep cycle (Mainster et al., 2022; Lissak, 2018). The suppression of melatonin due to screen exposure results in delayed sleep onset and reduced overall sleep duration (Heath et al., 2018).

Apart from blue light, extended screen time causes cognitive and physiological hyper arousal. The feature of social media such as notifications and auto play video affect the brain in a way that hampers the ability of adolescents to detach and go to sleep (Chang et al., 2019). This makes the individual to take long time to sleep and have frequent night waking (Levenson et al., 2016).

There are two schools of thought which argue that it is not the duration of screen time that poses the main issue, but rather the nature of the activities undertaken and the timing of their use (Orben and Przybylski, 2019). According to the study, some people believe that screen use with blue light filters, which are not excessive, will reduce the negative impacts (Mainster et al., 2022). Nevertheless, research reveals that most adolescents are unable to regulate their screen use adequately as required (Twenge et al., 2018).

Besides, other negative consequences of sleep loss are not limited to the loss of sleep only but have further implications. One of the effects of spending many hours on the screens is that one is denied adequate sleep, which in turn leads to high stress and anxiety levels due to the high cortisol levels (Scott and Woods, 2018). This leads to exacerbation of the patient's mental health, depression and cognitive impairment in the long-run according to Keles et al., 2020. From these findings, it is recommended to find ways such as implementing no-screen time and increasing

awareness of the impact of blue light on the negative physiological impacts of screen time among adolescents.

2.6 Societal and Health Consequences

Sleeping depriving is socially unprofitable and damaging to health and affects performance, temper, and health. Viner et al., (2019) affirms that lack of sleep has negative impacts on an individual's cognitive capacity, hence poor productivity and truancy. Scott et al. (2019) also state that sleep loss resulting from the use of social media is associated with impulsivity, mood swings, and behavior issues in adolescents leading to risk-taking behavior.

Moreover, the effects of sleep loss occur not only in the social sphere, but also in the sphere of contacts (Ben Simon and Walker, 2018). According to Domingues-Montanari (2017), the adolescent who suffer from chronic sleep deprivation are likely to have issues with their ability to manage emotions and this leads to increased anxiety and shyness (Haslam et al., 2021). This may result in conflict within the family and social isolation among peers, which results to loneliness and stress.

There are many negative effects of the internet, which is why organizations like the Royal Society for Public Health (O'Reilly, 2020) have called for various interventions like digital literacy and screen time policies. Although social media offers opportunities for connection, the effect of sleep disruption on adolescents is about to be concerning, and policymakers, educators, and families should address the issue to achieve healthy digital social interaction.

2.7 Gaps in Existing Research and Need for Further Study

Despite the existing studies on social media and sleep, several questions remain unanswered Most past research mostly in terms of the time spent on the screen and not in terms of engagement patterns; thus, there are unclear data on various forms of social media interactions and their impact on sleep disturbances (Przybylski et al., 2017). This is quite limited in the sense that it does not consider the qualitative aspect of social media use that may have a psychological impact on the sleep of adolescents.

Also, there is inadequate information about the effects of sleep loss resulting from extended time spent on social media platforms in later years. Most prior studies use cross-sectional data that do not allow for establishing causality instead of a mere correlation (Scott et al., 2019). It is crucial to gain a better understanding of how the lack of sleep caused by social media affects adolescents' cognitive and emotional functioning over the long term.

A final limitation is that the preventive measures which can be implemented to reduce the negative impact of social networking sites on sleep quality have not yet been well-researched and tested (Ajemba et al., 2022). Though there are recommendations such as digital detoxification, usage of screen time, and the presence of a parent during the use of the device, there is limited literature on the effectiveness of these measures (Twenge et al., 2018). More studies are required in order to establish which interventions within this group's lifestyle are useful and realistic to apply.

Further, there is limited information provided in existing literature regarding the cross-cultural and cross-national variations in the use of social media and sleep. Hence, household income, parental control over the child, and cultural perception toward the use of technology could help to mitigate the impacts of social media on adolescent sleep. If these variables are not taken into account, the results could not be generalized to different groups.

Future studies should employ longitudinal design, qualitative methods of research, and experimental trials to refine the findings of the present cross-sectional research and increase the understanding of the link between the use of social networks and adolescent sleep. In this way, closing these gaps will allow scholars to offer practical recommendations on how adolescents can change their digital behavior to enhance their sleep quality.

2.8 Conclusion

This literature review presents evidence of the existence of a relationship between the frequency of social media use and the sleep patterns of adolescents. FOMO, anxiety, stress, and blue light effects on the human body also play their part in this, and poor sleep quality. While prior research has enlightened the field somewhat, more research studies are required to create concrete strategies for tackling the executioner of these obstacles. Such gaps in research should be closed in future studies to contribute to better adolescent welfare and useful policy recommendations regarding the use of digital platforms.

Chapter 3: Methodology

3.1 Introduction to Chapter

This chapter also describes the way in which the author undertook to determine the impact of high usage of social media on the sleep patterns of adolescents in the United Kingdom. This study focuses on secondary research carried out in the systematic literature review where the study is based on 12 primary research papers and context is set in the United Kingdom. To fulfil the aim of this chapter, the authors will only use peer-reviewed articles to determine how the use of social media affects the quality and duration of sleep among individuals. This paper, therefore, explores the causes of sleep disturbances in adolescents in relation to the population characteristics of the students.

3.2 Systematic Literature Review (SLR)

The Systematic Literature Review (SLR) is defined as a more rigorous approach to literature review in terms of the process of identifying, evaluating and synthesizing the existing body of knowledge in a given field of study (Van Dinter et al., 2021). SLR also enhances the quality of the studies that are used to address the research question since only the best quality, peer-reviewed studies that meet the laid-down criteria are used in the process (Polanin et al., 2019). This process involves a priori formulation of hypotheses and a subsequent, consecutive, and deliberate screening of articles according to the inclusion and exclusion criteria. This systematic review's purpose is to find out all the published articles that address social media use and sleep disturbances among adolescents in the United Kingdom between the years 2010 and 2024.

Search Strategy

In this case, two approaches were employed when searching for sources for this study, The PICO and the PEO models both of which are recommended best practices in systematic literature reviews. These frameworks assist in defining and fine-tuning the research question and also assist in forming the most appropriate search terms in order to achieve an efficient search. More narrowly, only the works that focused on adolescents in the UK, their activity on social media, and the impact of sleep were included into the review. Thus, the search for the articles was conducted in the PubMed, ProQuest Central, EBSCO Host, and Google scholar databases, due to which a large number of works could be selected. The search was conducted on articles of which were published in between the year 2010 and 2024. For example, 'AND' and 'OR' Boolean operators were used in the keywords including adolescent sleep, social media use, sleep disturbance, and

the UK. It makes it easier to have a focused but comprehensive search of the literature (LeBourgeois et al., 2017; Woods and Scott, 2016).

3.4 Search Terms

The terms for searching are very important in any type of research, particularly SLR, and they define the scope of the to be reviewed studies. All the search terms are meant to help in identifying articles relevant to the formulated research question. In addition, since the selected keywords refer to the elements of the formulated research question, the keywords are as follows: social media usage, adolescents' sleep, and the UK.

While adopting such terms when conducting the research, it is useful to note that synonyms are very useful in terms of developing the search terms. They allow for an expanded coverage since one paper may use a different name for what is in fact the same concept. For example, "social media" can be referred to as "social networking sites," "New media or social networking sites in other studies. This is done because this can expand the search to all the synonyms that may be used to search for the particular type of studies. They include the terms such as 'sleep disturbance', 'poor sleep quality', 'sleep onset delay', and 'sleep disorders' to cover all the approaches by which sleep loss might be defined in the literature.

In order to conduct the search more efficiently, the PICO/PEO model is used. This assists in narrowing down the search terms to the Population, Intervention/Exposure and Outcome of interest to the research question.

Population/Problem (P): The population of concern is the youths within the age bracket of 12 to 18 years in the United Kingdom. Terms like 'adolescent, 'teen', 'youth', and 'UK' are used in the search. Appending "UK" makes the search results specific to adolescents in the United Kingdom as the study is interested in adolescent population in this country.

Intervention/Exposure (I/E): The intervention in the present study is social media use, specifically, the excessive use of Instagram, Facebook, Snapchat, and TikTok. Possible keywords are "social network," "social networking," "screen time," "digital media usage," and "social media sites." These terms are meant to define the studies that analyses the effect of using digital technologies on sleep.

Outcome (O): The outcome of interest in this study is sleep disturbances. The keywords that correspond to sleep-related problems are "sleep rhythm," "sleep/wake disturbances," "sleep disorders and sleep disorder," "sleep quality and sleeper," and "duration of sleep." These terms

make sure that any investigation of different facets of sleep loss is covered, whether it is sleep onset delay, reduction in the total number of hours of sleep, or poor quality of sleep.

Boolean operators are employed to include all these terms in the search. For example, ‘‘social media OR digital media’’ is used together with ‘‘adolescents AND sleep disturbances’’ to include any study on the two subjects. The Boolean operator used for synonyms of each search component is ‘OR’, while the PICO components are joined by ‘AND’.

Altogether, the use of relevant keywords and their synonyms in the search strategy guarantees the identification of all the studies exploring the link between problematic use of social networking sites and adolescent sleep in the United Kingdom.

PICO/PEO Framework

Population/Problem	Intervention/Issue	Context	Outcome
Adolescents aged 12-18 years	Excessive social media usage	United Kingdom	Sleep disruption, sleep quality

The research question is: How does excessive social media usage affect the sleep quality of adolescents in the United Kingdom? The search was performed with the help of Boolean operators to link the terms and analyses the articles in various academic databases.

3.5 Key Words

In the process of searching articles, keywords are used to narrow down the results and locate articles on a particular subject. To search for the articles, the following keywords were used: adolescent sleep, Social Media, social media usage, sleep disorders, Sleep patterns, adolescents UK, and blue light. These keywords were used with the Boolean operators in order to filter the obtained results and include only the most relevant articles in the review.

3.6 Databases

Thus, the selection of the databases is equally crucial in the context of searching the appropriate literature. The application of more databases leads to the variety of the identified studies and enhances the credibility of the systematic reviewing. The databases selected for this paper to search for articles on the impacts of social media on adolescents’ sleep in the UK are shown below:

The articles had to be published in English language only and the sources used for the research were limited to PubMed, ProQuest Central, EBSCO Host and Google Scholar databases. Of the

two databases, PubMed focuses on the health and behavioral sciences, and both databases have a number of articles on sleep disorders and adolescent health (Robins and S 2022). While ProQuest Central provides access to several disciplines such as social sciences and psychology, Google Scholar allows a search for scholarly and other material.

The use of multiple databases also improves the bias because the search is not restricted to the use of a single database (LeBourgeois et al., 2017; Levenson et al., 2017).

3.7 Inclusion/Exclusion Criteria

They are important in that they assist to define the best and credible study to include in a systematic review depending on the research questions or hypothesis (LeBourgeois et al., 2017; Levenson et al., 2017). The inclusion criteria, therefore, outline the characteristics that will be used to include relevant studies pertaining to the research question while the exclusion criteria will be useful to screen out irrelevant studies. It also ensures the exclusion of studies that do not meet certain methodological, temporal, and geographical standards to increase the internal and external validity of the findings.

3.7.1 Inclusion Criteria

Criterion	Description
Publication Year	Studies published between 2010 and 2024
Population	Adolescents aged 12-18 years in the UK
Focus Area	Social media use and sleep disturbances
Study Type	Quantitative studies measuring both sleep and social media usage

The search criteria consist of the studies conducted on adolescents in the UK, during January 2010 December 2024 and on the use and impact of social media on adolescent sleep.

3.7.2 Exclusion Criteria

Criterion	Description
Population	Studies focused on populations outside the UK or children under 12
Study Type	Qualitative or non-peer-reviewed studies
Irrelevant Focus	Studies that do not measure sleep patterns or social media usage

Exclusion criteria help to remove papers that lack geographical relevance to the UK or do not contain information on sleep and social media usage, thus including only the most suitable and credible sources.

3.8 Search Results

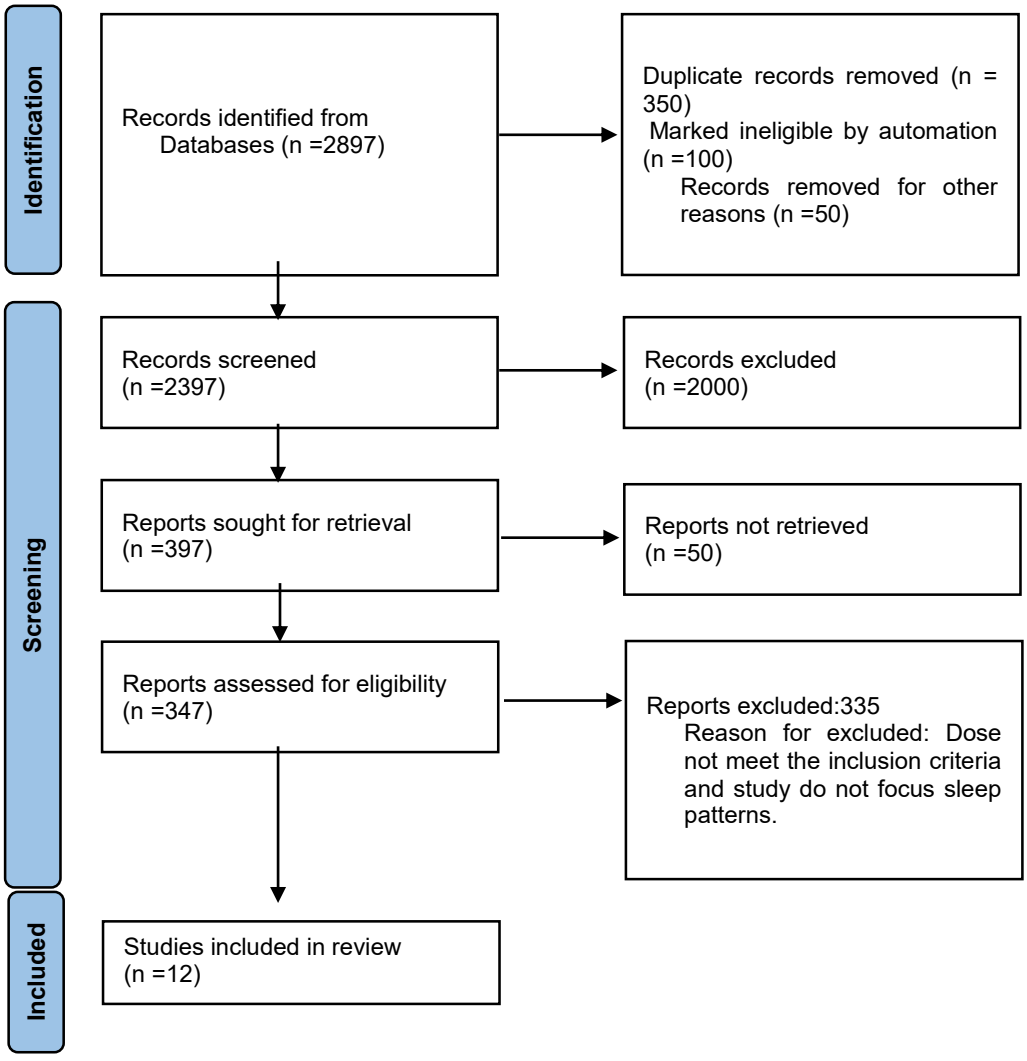
This search strategy yielded a total of 2897 articles from the different databases used in this study; they included PubMed, ProQuest Central, EBSCO Host, as well as Google Scholar. These articles were first reviewed based on their subjects and summaries in order to select the articles relevant to the research question of the effect of social media on adolescents' sleep in the UK. Out of these, 2897 were omitted due to the following reasons: the studies did not meet the inclusion criteria, for instance, if the study was carried out on a population that was not the UK population or if the study did not have data on social media use and sleep patterns.

The 2897 were retrieved from the identified databases, and a full-text review was conducted with further exclusion based on the following reasons: methodological issues or lack of direct relevance. For instance, some research studies were purely qualitative or failed to encompass the subject of sleep disturbances in relation to social media use. This process helped to reduce the number of studies that were irrelevant, and therefore, only the most suitable studies were used to inform the analysis.

Based on the above criteria, a total of 12 studies were included in the systematic review. These papers were published between the years 2010 and 2024, and all of them involved adolescents within the age range of 12-18 years old in the United Kingdom; the measures used to assess the variables of interest were quantitative, that is, the use of social media and sleep disturbances. The studies also used different types of procedures, some of them using survey data, other experiments, or data collected over time. Nevertheless, all the studies contribute to understanding the relationship between the level of social network usage and the problems with sleep among adolescents.

PRISMA flow chart is presented below (Fig. 1) in order to illustrate the selection procedure and the number of studies identified, screened, eligible and included in the review. The PRISMA flow chart shows how papers were excluded at each step and thus, the process is clear. Thus, the selected 12 studies can be considered to present a comprehensive and methodologically sound picture of the effects of social media on adolescent sleep in the UK.

Figure 1: PRISMA Flow Chart



3.9 Ethical Considerations

Regarding the subject of ethical considerations, it is crucial to respect the participant and maintain the highest ethical standards within the context in this review. In this research, ethical issues are mainly associated with data collection since the study relies on secondary sources of data through a systematic review of the literature. Hence, all the articles to be included in the peer review are derived from primary research, which has been through the ethical scrutiny of the respective journals and research ethics committees. Basic standard of referencing has been followed to ensure that there is no case of plagiarism and to maintain integrity. This work complies with the principles of honesty, fairness, and respect for the rights of the author of the primary research and the participants.

3.10 Chapter Summary

This chapter described the method used when establishing the impact of social media addiction to adolescents' sleep in UK. Therefore, the present SLR was conducted by selecting twelve peer-reviewed research articles in this current topic, and the data was gathered from these articles published in between the years 2010 and 2024. The chapter also described the identification of the information sources used in the study PICO/PEO, keywords and Boolean operators. To improve the quality of the study, the inclusion and exclusion of studies were defined. As for the things that were considered unethical, participants' identities were preserved and proper citations were used when quoting the information. The effects of social media on adolescent sleep will also be presented in the next chapter including the results derived from the selected articles.

Chapter 4: Data Extraction and Evaluation

4.1 Introduction to Chapter

This chapter summarizes the data collected from the selected studies in the current systematic review. It is doing research that, using critical appraisal tools, assesses the quality of the methodology incorporated in each study and only includes evidence of great quality. It is imperative to evaluate the quality of the studies and their findings on the plausible association between the use of social media and sleep disturbances among adolescents (Liberati et al., 2009). To address this issue, the chapter would use other quality assessment tools to assess the validity and reliability of the findings for adolescent sleep (Wells et al., 2014). This chapter also emphasizes the significance of an evaluation of past studies, as such research can assist in developing public health policy and intervention programs to deal with the negative effects of social media abuse on adolescents' sleep quality.

4.2 Data Extraction

The replication of study findings is a comprehensive procedure of identifying and obtaining vital information from the chosen study for replication. For this review, data extraction was focused mainly on the type of study, the subjects of study populations, the process of exposures, and outcomes impacted on adolescents' sleep by excessive social media use in the UK. The study characteristics, the sample (participants' age), the investigated social media, the exposure variables (time spent on the platforms, the type of use), and the sleep outcomes (duration and quality of sleep, delayed sleep onset) form the collected information. Presented in tables to help understand all the data extracted and provide an easy way to compare them.

In this particular review, the researcher used a pre–developed data extraction form in which the following information was obtained:

- **Study characteristics:** Authors, year of publication, study design, and country of origin.
- **Population/subjects:** Age, number of participants in the sample, criteria for inclusion or exclusion of participants, and their characteristics.
- **Exposure assessment:** the characteristics of the social media exposure used, such as the type of exposure, platforms used, time spent on social media, and frequency.
- **Outcome measurement:** Sleep disturbances. Example, sleep onset delay, duration, quality.

These variables explain the connection between social media usage and disrupted sleep in adolescents. The identified data will then critique each of the studies under consideration.

4.3 Brief Introduction to Critical Appraisal and Paper Quality Assessment

Critical appraisal is the critical review of the qualities of the research studies to determine the quality of the studies being conducted. This is a crucial aspect of the systematic review process since it assists in evaluating the quality of the evidence retrieved, and only the quality evidence is used in the review (Greenhalgh, 2014; Tod, Booth and Smith, 2021). Critical appraisal aims to evaluate design, methodology, and data collection techniques used in the studies and bias, confounders, or limitations that may impact the findings (Moher et al., 2015).

In the current case study, particularly regarding the connection of social networking site use to adolescent sleep problems, methodological rigor could be argued to be especially important. As a result, the quality of the studies in this area may vary depending on the study design, sample size, and measurement of exposure and outcomes. For example, studies trying to determine whether cases differ at all or are measured differently to measure exposure to social media may be less accurate (Kmet et al., 2004). Therefore, because the evidence found must be valid in real-life contexts, it is necessary to appraise the methodological quality of each study to retain only evidence from studies considered valid in real-life contexts. Tools such as the Newcastle-Ottawa Quality Assessment Scale (NOS) combine critical appraisal and nominating a study's quality based upon criteria.

4.4 Critical Appraisal Tools

Therefore, Critical appraisal tools refer to structured checklists used to assess the quality and validity of studies (Barker et al.,2023). These tools offer a systematic way to evaluate the major characteristics of the study procedures and conclusions to consider whether the results are reliable and relevant (Burls, 2009). In this review, several critical appraisal tools could be used. However, after critically appraising the selected articles, the Newcastle-Ottawa Quality Assessment Scale for Case-Control Studies was deemed suitable. This tool is applied to evaluate non-randomized studies. It is particularly appropriate for case-control studies as it appraises three broad categories: Selection, Comparability, and Exposure, according to Wells et al., 2014.

The NOS (Newcastle Ottawa Scale) adopted a star system to assess the quality of studies. Each study can get a maximum of 9 stars, One star for each in the selection and exposure criteria, and two stars for comparability. This scoring system enables one to compare the studies' quality based

on methodological criteria. Since a higher score signifies that the study is less methodologically problematic and thus more valid, we can see that the study with the lowest number is.

In addition to the NOS, it is also possible to use other critical appraisal tools, such as the CASP tool, for randomized controlled trials and cohort studies. Many possible tools and techniques can be used for the studies; which tools are used depend on type of study and research questions to be solved by the study. The tools include CASP, which determines the evaluation of the study based on the criteria of randomization, blinding, and the management of confounding factors (CASP, 2018; Kryshtafovych et al., 2021). These are very good tools because we want to ensure that we have solid ground for the conclusion at the end of a systematic review.

4.5 Evaluation of Quantitative Studies Using an Appropriate Tool

Introduction to the Critical Appraisal Tool for Quantitative Studies

The criteria for robustness and reliability are common things that are used to take place in a systematic review, and it is the process of doing the critical appraisal. It enables us to locate which reviewed studies hold biases, methodological weaknesses, or possible room for improvement. The 12 quantitative studies of this systematic review applied the Newcastle-Ottawa Quality Assessment Scale (NOS) for case control studies to critically appraise for inclusions of the findings. It is selected because it has been widely applied for evaluating the methodological rigor of observational studies and, to a greater extent, case-control studies. According to the NOS systematic approach to evaluation studies, there are three main domains to which the selection, comparability, and exposure are important (Wells et al., 2021).

The Newcastle-Ottawa Quality Assessment Scale (NOS) is one of the most common tools used to appraise the quality of case-control studies. For the criteria for the controlling confounders, the number of stars is up to 2 in the Comparability domain, and the tool awards stars in the Selection and Exposure domains up to 1 star per criterion. This structured approach allows for an overall analysis of the study design and validity of the findings, including a lower propensity to reduce the bias.

For this review, studies of the relationship between social media use and adolescents' sleep disturbance (both qualitative and quantitative) were focused, with the focus on the quantitative studies being on those that have taken place in the UK. More and more, excessive screen time or social media use has been linked with disruptions in sleep quality, onset delay, and duration in adolescents. This is critical in evaluating the strength of the evidence base and detecting the range of studies that can be generalized or used to develop interventions.

Critical Appraisal of the 12 Quantitative Studies

The Newcastle-Ottawa Quality Assessment Scale (NOS) critically appraised twelve quantitative studies. Secondly, the studies selected were chosen based on their relevance to the research question in terms of examining how social media plays a role in causing sleep disturbances among adolescents. There are cross-sectional and cohort study designs for performing these studies, which have their own importance and are useful for understanding the association. In this order, the evaluation process of each study will be described, as well as its methodological benefits and drawbacks and a concise synthesis of the total quality of the evidence.

Study Designs

Most of these studies are cross-sectional or cohort; however, there is a combination of 12 studies. Cohort studies, however, are a better method to assess causal relations in time. In contrast, cross-sectional studies are most appropriate for studying associations at a single point in time. Eight of the 12 studies were cross-sectional, and 4 were cohort studies.

- Cross-sectional studies investigate the correlation between social media usage and sleep disorders at a certain time and thus only reveal associations, not causes. These studies are useful in observing trends of various adolescent populations; however, they are not ideal because they do not provide causal relationships.
- On the other hand, Cohort studies involve monitoring participants over time and how their use of social media affects their sleep disturbances. Cohort studies are more suitable for determining causality as they measure the given outcome over time to determine whether a change in the exposure leads to a change in the outcome.

Cohort studies are less likely to be affected by many of these limitations and are therefore preferred in social media and sleep. Nevertheless, cross-sectional studies remain useful as they show the current interconnection between social media and sleep and help establish connections and patterns.

Purpose and Aim of the Studies

The overall purpose of all 12 studies was to establish social media's impact on sleep disturbances in adolescents. More specifically, these studies were designed to compare specific social media use and, more broadly, the use of social media in the late evening and night and the amount and quality of sleep.

- The second type of cross-sectional studies mentioned in this paper are the ones conducted by Scott et al. (2019) and Woods et al. (2016), who determined the frequency of sleep disturbances and the use of social media among adolescents at a given time.
- Bye et al. (2024) and Anto et al. (2023) researched cohorts by studying adolescents. Thus, they could identify if the adolescents who continued using social media had worsened sleep and related sleep disorders.

These studies enhance the knowledge of adolescent sleep disturbances in the public health domain with a focus on the effects of the social networking sites on psychological health, academic stress and lifestyle.

The Newcastle-Ottawa Quality Assessment Scale (NOS) for Case-Control Studies

The quality of all 12 finally chosen studies was evaluated based on the criteria of the Newcastle-Ottawa Quality Assessment Scale (NOS) for case-control studies. Since the quality of a study determines all the outcomes of the study, it is very important to do an assessment. In order to perform a strong evaluation of those selected articles, this research was based on the Newcastle-Ottawa Scale (NOS), as it was suggested by Wells et al. (2014). The NOS was identified by The Cochrane Collaboration as the appropriate method for grading the quality of case control and cohort studies as well as other non-randomized studies. Originally, the Newcastle-Ottawa Scale was introduced as an instrument to assess the quality of case reports and case control studies; it was developed by the University of Newcastle in Australia and the University of Ottawa in Canada, where it is derived (Norris et al., 2021). The NOS takes into account three broad categories, which are the study group considerations, group comparison, and the outcome assessment. Every domain includes a set of criteria; four of them are aimed at assessing the process of selecting the studies, two criteria are related to the comparability of the groups, and three criteria are concerning the outcomes. Each criterion is assessed on a three-point scale, good, fair and poor, based on the scores that are accorded to the responses using the weights provided. The quality score on each of the eligible studies provides a range of 0-9, where a higher quality score represents better methodological quality. In general, the study of literature that had received higher ratings was considered more valid and less distorted, which in turn helped to minimize bias when addressing the relationship between social media use and adolescent sleep disturbances.

The NOS was selected for this study because it is commonly used in the evaluation of observational research and allows for the assessment of sample selection, exposure measurement and control of confounding factors. It is especially useful for evaluating the quality

and credibility of research concerning the effects of social networks on the quality of sleep in adolescents. The NOS also helps in structuring a critical appraisal of the literature by only allowing high-quality research to inform the synthesis of evidence in this area.

Newcastle-Ottawa Quality Assessment Criteria are presented in Figure 4.1.

Figure 4.1 presents the detailed criteria used in the methodological quality assessment of the selected studies.

Selection of Study Groups (Maximum 4 Points)

1. **Representativeness of the Sample**
    - Very representative of the target population (random sampling of all subjects)
    - Moderately representative of the target population (partial random sampling)
    - Not representative of the target population
2. **Selection of Groups**
    - Cohort or matched groups
    - No matched groups
3. **Description of Sampling Strategy**
    - Clear description
    - Poor description

Comparability of the Groups (Maximum 2 Points)

4. **Baseline Characteristics**
    - The baseline characteristics are comparable based on study design or analysis type.
    - The findings may be used to predict the final results.

Assessment of Outcomes (Maximum 3 Points)

5. **Outcome Evaluation Criteria**
    - The study quality is close to the final response.

- The study quality is more direct.

Based on these criteria, the total score for each study was computed, providing a comprehensive measure of study quality. Table [4.1] presents the Newcastle-Ottawa Quality Assessment Scale (NOS) for Case-Control Studies.

Table 4.1 The Newcastle-Ottawa Quality Assessment Scale (NOS) for Case-Control Studies

Study	Name of Study	Date of Publication	Quality assessment	Total Score
Bye (2023)	Observational prospective study of social media, smartphone use, and self-harm in a clinical sample of young people: study protocol	2023	• Selection-*** • Comparability- ** • Exposure-***	8/9
Arora et al. (2014)	Associations between specific technologies and adolescent sleep quantity, sleep quality, and parasomnias	2014	• Selection-** • Comparability- * • Exposure-*	4/9
Anto et al. (2023)	Exploring the impact of social media on anxiety among university students in the United Kingdom: qualitative study	2023	• Selection-*** • Comparability- ** Exposure-***	8/9
Sohn et al. (2021)	The association between smartphone addiction and sleep: a	2021	• Selection-*** • Comparability- **	8/9

	UK cross-sectional study of young adults		Exposure-***	
Kelly et al. (2018)	Social media use and adolescent mental health: Findings from the UK Millennium Cohort Study	2018	• Selection-*** • Comparability- ** Exposure-***	8/9
Scott et al. (2019)	Social media use and adolescent sleep patterns: cross-sectional findings from the UK millennium cohort study	2019	• Selection-** • Comparability- * Exposure-**	5/9
Wood et al. (2023)	Smartphones, social Media and Adolescent mental well-being: the impact of school policies Restricting day Time use protocol for a natural experimental observational study using mixed methods at secondary schools in England (SMART Schools Study)	2023	• Selection-*** • Comparability- ** Exposure-***	8/9
Winstone et al. (2021)	Social media use and social connectedness among adolescents in the United Kingdom: a qualitative exploration	2021	• Selection-*** • Comparability- ** Exposure-***	8/9

	of displacement and stimulation			
Woods et al. (2016).	Sleepy teens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression, and low self-esteem	2016	• Selection-*** • Comparability- ** Exposure-***	8/9
Bye et al. (2024)	Cohort profile: The Social Media, Smartphone Use and Self-Harm in Young People (3S-YP) Study–A Prospective, observational cohort study of Young People in contact with Mental Health Services	2024	• Selection-*** • Comparability- ** Exposure-***	8/9
Bin Eid et al. (2022)	Characteristics of Sleep Patterns in Adolescents: Comparisons between Saudi Arabia and the UK	2022	• Selection-** • Comparability- * Exposure-**	5/9
Das-Friebel et al. (2020)	Bedtime social media use, sleep, and affective well-being in young adults: An	2020	• Selection-*** • Comparability- ** Exposure-***	8/9

	experience sampling study			

Key to Scores:

- Selection (Max 4 points): Evaluates representativeness, selection of cases, and exposure definition.
- Comparability (Max 2 points): Assesses control of confounding factors.
- Outcome (Max 3 points): Considers measurement and completeness of data.

Summary of Study Designs and Quality Assessment

Number of Studies Critically Appraised: 12 quantitative studies were critically appraised using the Newcastle Ottawa Scale (NOS).

Study Designs:

- **8 Cross-sectional studies:** These works compare the level of social media usage to the degree of sleep disturbances in a given population at a certain time and, therefore, only establish associations, not cause-and-effect connections.
- **4 Cohort Studies:** Here, the participants are followed up, and through this, the effect of changes in social media use on sleep disturbances can be deduced.

Purpose of the Studies: The purpose of the studies discussed was to establish the correlation between social network use and sleep disorders, emphasizing the duration, quality, and delay of sleep. The studies identified anxiety or depression as another facet of the patient's condition that could influence disrupted sleep.

Methodology Appropriateness: Most studies employed stringent methods in defining cases and methods for exposure, thereby coming up with high-quality data. However, there are limitations in the method of some studies, such as those by Arora et al. (2014) and Scott et al. (2019), that employed self-report data to do the analysis, influencing bias.

Conclusion on Study Quality: Applying the Newcastle-Ottawa Quality Assessment Scale showed that most studies had a well-developed methodological quality with adequate sample selection, exposure assessment, and control for confounding factors. As for the methodological quality, the studies that received high scores included Bye et al. (2023) and Kelly et al. (2018) whose methodological quality was relatively strong and more reliable, while for example, Arora et

al. (2014) and Bin Eid et al. (2022) had methodological flaws attributed to the sample selection or the use of self-report measures.

Next Steps

These findings will be discussed in the next chapter. Based on the strengths and limitations of the above studies, the general implications of the studies on health policies and interventions meant to enhance adolescent sleep in the UK will be evaluated.

4.6 Chapter Summary

This chapter evaluated the studies identified for the systematic review, specifically through critical appraisal of the included studies' methodological quality. Newcastle-Ottawa Quality Assessment Scale for Case-Control Studies was used as the primary criterion for quality assessment of the studies. This tool made it possible to have a systematic approach when assessing the three primary areas of Selection, Comparability, and Exposure. Using the NOS helped eliminate studies of poor quality and those with high levels of bias, increasing the results' validity.

Based on the critical appraisal, the studies were generally of high quality; this was seen if there was a clear definition of the case and control group, accurate exposure measurement, and consideration of potential confounders. Nonetheless, some studies had limitations that may impact their results regarding validity and reliability; some of them included self-reported data, and some studies had unclear or ambiguous case definitions.

This chapter was useful in developing the quality assessment framework used in the next chapter to synthesize the studies. The findings of the existing studies will be compared to establish the applicability of social media on adolescents' sleep interference in the UK. This chapter also covered critical appraisal that will result in the inclusion of only the best evidence in the systematic reviews, which may help in developing new health policies and interventions.

Chapter 5: Data Analysis and Synthesis

5.1 Introduction to Chapter

This chapter is going to summarize the findings from the 12 articles selected. This chapter presents the findings of the systematic review using a thematic analysis approach, outlining the key themes emerged from the included studies. The themes that will be discussed include the effect of mental health on sleep, patterns of sleep and the effects of anxiety, depression and stress, among other related effects. The analysis is based on studies ranging from Arora et al. (2014) and more recent literature by Bye et al. (2024). These studies present several findings, and it was summaries that the impact of social media use is linked to sleep disturbances among adolescents in the United Kingdom.

This chapter is including the summarized the 12 studies focus on the use of the social media at impact on the adolescent on sleep. The number of studies included 12 selected article are based in the UK. And it includes the number of participant 17368.the number of the study participants varies considerably the smallest sample is 24 in the qualitative study by Winstone et al. (2021), while the largest sample is 10,904 adolescents in the Millennium Cohort study by Kelly et al. (2018). the study included the latest 2024 and the oldest study is the 2014.the thematic analysis approach has been used in this chapter due to the Heterogeneity of the study. the majority of these studies including Kelly et al. (2018), Woods and Scott (2016), Winstone et al. (2021), Bye et al. (2023; 2024), and Scott et al. (2019) were conducted in the United Kingdom and consistently demonstrate that increased engagement with social media is significantly associated with poor sleep quality, delayed sleep onset, reduced sleep duration, and heightened levels of anxiety, depression, and stress. These findings suggest a negative reciprocal relationship between excessive digital engagement and adolescent mental and physical well-being. In contrast, a few studies, such as those by Das-Friebel et al. (2020), which examined young adults in the UK, and Bin Eid et al. (2022).

Thematic synthesis was used as the main approach to data analysis in this synthesis mainly because the included studies were diverse in terms of study design, participants, and research context. According to Vodra (2018), thematic analysis is well suited for synthesizing results from various qualitative and quantitative studies, recognizing the common themes and subtle differences. Using this approach, the outcomes, mental health effects, sleep patterns, and social impacts could be classified systematically and coherently, which helped evaluate the literature.

The theme has been identified based on the impact of sleep on mental health, from the most common impact to the less common impact. Then, it has been divided according to the impact on mental, social, and physical well-being. The characteristics table (Table number-5.2), which consolidates key data about the study designs, participant demographics, and findings, will be used to summarize these shared results. This approach will allow for a comprehensive understanding of the collective impact of social media on adolescent sleep and well-being in the UK.

Table 5.2 Characteristics table of the included studies impact of, social media on adolescent sleeps

The characteristics table summarize the studies from the date of publication (from oldest to latest)

SL NO	Studies	Study Design	Sample	Setting	Data Collection Time	Outcome
1	Arora et al.., 2014	Cross-sectional study	**Sample Size:** 738 adolescents **Age:** 11-13 years **Gender :** 54.5% boys **Ethnicity:** 42.9% White, 41.8% Asian, 5.1% Black, 4.2% Mixed Race, and 6.0% Other.	7 schools in the Midlands region of the United Kingdom.	The data collection took place in 2010	• Shorter Sleep Duration • Longer Sleep Onset Latency (SOL) • Early Awakening • Difficulty Falling Asleep • Increased Risk of Nightmares
2	Woods & Scott, 2016	Correlational Study	**Sample Size:** 467 secondary school pupils aged 11–17 years	Scottish secondary school pupils, Pupils in 5th and 6th year An online questionnaire is available outside of class via a link circulated by the school.	Exact start and end dates are not provided	• Poor sleep quality • Anxiety • Depression • Lower self esteem • Night-time social media use
3	Kelly et al., 2018	Longitudinal study	**Sample Size:** 10,904 adolescents **Age:** Average age 14.3 years (SD = 0.34) **Gender:** Girls (5496), Boys (5408)	National cohort study (Millennium Cohort Study)	Multiple waves	• Poor sleep • Depressive symptoms • Short sleep hours • Sleep disruption • Poor body image • Body weight dissatisfaction • Online harassment

SL NO	Studies	Study Design	Sample	Setting	Data Collection Time	Outcome
4	Scott et al., 2019	Cross-sectional study	**Sample Size:** 1872 Adolescents **Age**- 13-15	UK Millennium Cohort	Sep-2000-Dec-2001.	• Poor sleep patterns • Late sleep Onset • Nighttime Awakening
5	Das-Friebel et al., 2020	Experience sampling study	**Sample Size:** 101 undergraduate students. **Age:** Mean age = 19.7 years, SD = 1.09 years. **Gender:** Not explicitly mentioned	University of Warwick, UK.	14 consecutive days	Bedtime social media use did not negatively affect sleep or well-being in healthy young adults.
6	Sohn et al., 2021	Cross-sectional study	**Sample Size:** 1,043 participants. **Age:** 18 to 30 years (Median age = 21.1 years). **Gender:** 763 (73.2%) females, 280 (26.8%) males	UK	January 21st to February 30th, 2019	• Poor sleep quality • Smartphone addiction

SL NO	Studies	Study Design	Sample	Setting	Data Collection Time	Outcome
7	Winstone et al., 2021	Qualitative study	**Sample Size:** 24 **Age:** (13-14 years old). **Gender**: 19 girls and 5 boys	2 secondary schools in inner-city locations of southwest England	February-March 2020.	• Poor sleep quality • "over-stimulation" and stress.
8	Bin Eid et al., 2022	Comparative study	**Sample Size:** 58 participants from the UK **Age:** Adolescents aged between 12 to 18 years **Gender:** 28 (48%) males and 30 (52%) females	United Kingdom, focusing on typical development (TD) adolescents. Data collection was conducted through online and school-administered questionnaires.	Not specific mentioned	• Reduce sleep patterns • Late bedtime • Negative mental health outcomes

9	Wood et al., 2023	Natural experimental study	**Sample Size:** 1,170 pupils **Age:** 12–13 and 14–15 years	30 schools (20 schools with restrictive policies and 10 schools	Exact start and end dates are not provided	• Anxiety and Depression • Impact on Mental Well-being • Sleep and Physical Activity
10	Anto et al., 2023	Qualitative study	**Sample size:**29 participants Age-Average 21 **Gender**: male-19 Female-10	6 University Students.	March 2022-April 2022	• Late Sleep • Anxiety • Stress • Negative experiences • Fear of missing out
11	Bye et al., 2023	Cohort study	**Sample Size:** 600 young people are expected to consent to participate, with 480 followed for 6 months. **Age:** 13 to 25 years. **Gender:** Not explicitly mentioned but diverse across the study.	South London and Maudsley NHS Foundation Trust (SLaM)	6-month follow-up	• Sleep disturbance • Anxiety • Depression • loneliness • bullying • higher risks of self-harm.

12	Bye et al., 2024	a prospective observational cohort study	**Sample size:** 362 young people. **Age:** 13-25 years. **Gender:** A larger proportion of female participants (70.2%) are represented. The cohort was ethnically diverse, with over 30% identifying as Black or having a mixed or multiple ethnic background.	South London and Maudsley NHS Foundation Trust (SLaM)	June 3, 2021, to November 30, 2022.	• Sleep disturbance • Anxiety • Depression • loneliness • bullying victimisation

5.3 Emerging Themes from Included Studies

After going to this 12 studies, this review has come up with the four themes, these are the following themes-

- Mental health impact of proper sleep
- Sleep patterns
- Sleep duration
- Social impact

5.3.1 Impact of sleep disturbance on mental health

A dominant theme across the reviewed literature is the association between sleep disturbance and deteriorating mental health among adolescents. Studies conducted in the UK by Woods and Scott (2016), Kelly et al. (2018), Winstone et al. (2021), and Bye et al. (2023; 2024) consistently identify that excessive social media use disrupts sleep, contributing to increased levels of anxiety, depression, and stress.

Anxiety

Among the mental health disorders reported to affect sleep, anxiety was found to be the most common in the included studies. Woods & Scott, 2016 conducted a cross-sectional study with 467 secondary school pupils aged between 11 and 17 years in Scotland. They found a positive relationship between night-time use of social media and anxiety. They found out that adolescents who use social media at night have poor sleep quality, which is characterized by delayed onset and increased night-time waking. The constant messaging and feed scrolling put the participants in a state of high arousal, which does not allow the natural sleep onset.

Winstone et al. (2021) also conducted a qualitative study involving 24 adolescents aged between 13 and 14 years from two secondary schools in southwest England and ascertained that the psychological need satisfaction that emanates from social media use like perceived social exclusion, rumination on social interactions, and anticipation of reactions was positively linked with anxiety and poor sleep quality. They found it hard to unwind before going to bed and their minds were often engaged with content from the internet which led to a long time to fall asleep and frequent night waking.

This is supported by Bye et al. (2023) who, in their cross-sectional survey study with 13–25-years old participants from the South London and Maudsley NHS Foundation Trust, established a significant correlation between high social media usage, anxiety and sleep disruption. The study

found that adolescents who frequently used social media, especially in the evening, had a higher likelihood of having persistent anxiety symptoms that affected their ability to sleep and have sound sleep.

Depression

Depression was another of the outcomes that was reported in the studies that focused on the effects of sleep disruption. According to another study by Kelly et al. (2018), using a large sample of 10,904 adolescents from the United Kingdom, the authors concluded that adolescents experiencing less sleep duration and poor-quality sleep have increased symptoms of depression. Such symptoms were primarily associated with disturbed sleep-wake cycle and the psychological outcomes of night-time social media engagement, including a negative effect, social isolation, and low self-esteem. The study also recommended that disrupted sleep not only causes depressive symptoms but also the symptoms of depression cause disrupted sleep, and thus, a cycle is formed.

Similarly, Bye et al. (2024) also revealed that there is a positive relationship between sleep disturbances and depressive symptoms in adolescents; the study conducted a prospective cohort survey on 362 adolescents. Late sleepers who also complained of interrupted sleep demonstrated emotional problems, poor social interaction and were often sad. The study also established that bullying victimization and loneliness, which are common in cyberspace, magnified depressive outcomes and reduced sleep quality.

Woods and Scott (2016) also noted that low self-esteem and negative self-evaluation lead to poor sleep and depression. This study showed that adolescents with lower levels of self-esteem are more sensitive to changes in their mood due to online communication and have a higher risk of sleep disturbances and depressive symptoms.

Stress

Another common theme in all the reviewed studies was academic and social stress resulting from poor sleep quality. Similarly, in an equally designed cross-sectional study conducted on 1872 adolescents from the UK Millennium Cohort, Scott et al. (2019) found that the participants who engaged in nighttime social media use had disrupted circadian rhythms and sleep timing. Such changes in sleep were associated with increased stress, mainly in terms of academic work and social interactions in the online environment. Participants expressed the pressure to reply to

messages immediately or check on the activities of other people, which affected their ability to wind down before sleeping.

Winstone et al. (2021) also acknowledged stress as one factor affecting adolescent sleep. According to their qualitative data, the intensity and synchronization of adolescents' mental attendance to social media was difficult to let go of. As a result, it affected their psychological state, making them overwhelmed, anxious and pressured to always be available on social platforms. This state of 'perpetual connectivity' did not allow the subjects to achieve emotional and cognitive detachment that is required for restful sleep. Therefore, many adolescents in the study mentioned that they often experience emotional and physical tiredness, which is usually associated with high stress levels.

Negative experiences on social media

Cyberbullying and peer comparison, which are common on social media, also contribute to the worsening of sleep problems and emotional issues. Similarly, in a qualitative study on 29 University students in the UK, Anto et al. (2023) recognized that increased use of social media late at night exposes students to harmful content such as peer criticism, exclusion and perceived inadequacy. These experiences caused increased emotional stress, particularly before bedtime, resulting in delayed sleep and reduced sleep quality. Some of the effects that the participants described included having intrusive thoughts, worry and feeling emotionally tense, which interfered with their ability to relax and sleep.

The authors Bye et al. (2024) also observed that adolescents who are bullied and socially excluded through the use of technology have sleeping disorders. Specifically, sleep-onset insomnia, night awakenings, and early morning waking were common among the participants who had been victims of negative online interactions. These studies imply that social media can provide opportunities for the occurrence and sustenance of psychologically disturbing experiences that interfere with standard sleep patterns.

Similarly, Bin Eid et al. (2022) in a cross-sectional study of 58 adolescents from the UK found that there is a relationship between late bedtimes and negative mental health. This is because the study established that the more time one spends on social media, the higher the chances of getting emotionally compromised, resulting in loneliness and low self-esteem. These emotional responses disrupted sleep by enhancing negative thinking and decreasing the adolescents' capacity to detach mentally from stressors.

The conclusions drawn in these studies show a bidirectional connection between sleep disorders and mental disorders. Teenagers who use social media at night are likely to have poor sleep quality, and this worsens the symptoms of anxiety, depression, and stress. On the other hand, people with pre-existing psychological disorders are likely to use social media to cope with the stress, which degrades their sleep quality.

Due to the variation of the methods and samples of the included studies, from large-scale survey studies to small-scale qualitative studies, thematic synthesis was used as the most suitable approach. According to Vodra (2018), thematic analysis is ideal for use when working with diverse data, as it helps the researcher compare studies with different designs and goals. In this case, the fact that mental health issues have come out as the most common outcome of sleep disturbance supports the use of thematic analysis as it offers a systematic approach to synthesizing the data that may otherwise be diverse and numerous. It helps to examine how sleep deprivation moderates the relationship between adolescent mental health and social media usage more systematically, based on the methodological heterogeneity of studies.

The analyzed studies provide evidence of the fact that sleep problems, especially those related to night-time use of social networking sites, are highly correlated with anxiety, depression, stress, and negative interactions in the online environment among adolescents in the UK. These outcomes not only hurt the mental health of adolescents but also affect their health, academic performance and interpersonal relations. Managing the psychological effects of sleep loss involves extensive strategies that include teaching people about digital technologies, encouraging people to adopt healthy sleep behaviors, and helping people find ways of reducing their emotional dependence on social media.

5.3.2: Sleep Patterns

It has been widely observed that excessive use of social media has greatly affected adolescents' sleep patterns, especially at night. Several types of studies (Arora et al.2014; Kelly et al. 2018; Scott et al. 2019; Woods & Scott, 2016; Winstone et al. 2021) have shown how effectively and when sleep is interrupted when people engage in social media, especially at night. The subsequent sections describe the particularities of the last wake and the low quality of the night sleep depicted in the analyzed studies.

Late Sleep/Poor Sleep

One of the most significant trends observed in multiple types of research is a close relationship between late-night social network use and the delayed onset and shorter duration of sleep. All

the above studies by Arora et al. (2014), Kelly et al. (2018), and Scott et al. (2019) noted that youths who engaged in excessive social media use, especially in the evening, had longer sleep latency. This was coupled with a reduction in total sleep time hence led to the quality of the sleep of the adolescents being affected.

Arora et al. (2014) also, in their published research study, discovered that teenagers who engage in the use of social media at night will be able to delay their sleep by half an hour. This was due to the content that the adolescent got from social media, which interfered with the intra-psychic processes resulting in delayed sleep protocol time. They received messages, videos, and notifications, allowing them to stay awake and avoid the general tendency to doze off.

The effects of late-night social media use on sleep were also detected by Kelly et al. (2018) who noted that youths participating in late-night social media use had disrupted sleep. Such adolescents had irregular sleep-wake schedules and therefore disrupted sleep hygiene among adolescents. Scott et al. (2019) developed this conclusion by noting that at night time, social media use interferes with sleep and leads to what is referred to as circadian disruption, which is equivalent to lack of sleep.

Thus, the effects of late sleep and shortened sleep are not only limited to tiredness and any other effects that the lack of sleep causes. In the long run, teenagers who are able to go to bed late and have poor quality, or little, sleep will be categorized as chronically sleep deprived and the effects on their physical, psychological, and cognitive wellbeing will be seen as such. Altogether, these studies point out to the fact that adolescent use of social media at night should be a consideration of adolescent sleep.

Late Sleep Quality

Apart from the other subject areas concerning sleep, its quality was established as another issue in the studies. Teenagers who were active on social media before going to bed slept less qualitatively, for example by the number of times they woke up during the night or the number of times they had to go back to sleep. This was demonstrated in Woods et al. (2016) and Winstone et al. (2021), where the authors examined the impact of using social media during night time on sleep architecture.

Woods et al. (2016) established in a cross-sectional study that showed that adolescents who used social media before bedtime had poor night sleep quality, and they are likely to wake up severely during the night. The results also indicated that the use of devices increase cognitive and emotion

of the sleeper to an extent that affected the restorative stages of recovery. These interferences with sleep quality were even more damaging for adolescents, because short sleep is followed by issues like an impaired memory and mood control as well as other health problems.

Similarly, Winstone et al. (2021) found that youths who frequently used social media at night were wake-urge and latency-insomnia; they wake up only to find it hard to fall back to sleep again. This was especially the case of adolescents, who are the primary users of social media for the purpose of having conversations or getting updates. The feelings that came along with these interactions were enough to interfere with their ability to easily go back to sleep.

However, the reduction in sleep quality caused by using social media at night is exacerbated by the impact of blue light. This is why it is recommended that children and teenagers avoid using electronic devices at night, as blue light disrupts the secretion of melatonin. Even here, sleep disruption resulting from social media use is particularly detrimental for adolescents, as it disrupts their circadian rhythm and makes it difficult for them to both fall and stay asleep.

In short, chronotype and sleep duration are negatively impacted by late-night social media use, resulting in lower sleep quality. Late-night social media users are likely to go to bed later, sleep for shorter periods, and experience poor-quality sleep. They can disrupt one's biological rhythm, hence having severe effects on the health of adolescents and therefore increasing the need to change some of the habits and minimize the effects of social media on sleep. Thus, to enhance the quality of sleep, recommendations for adolescents will include adjusting bedtime and wake-up times promptly.

5.3.3 Duration of Sleep

It is evident from the various studies included in this review that adolescents have experienced shortened sleep duration due to the use of social media. The two aspects the studies focus on are brevity and quality of sleep. Such are some of the challenges that highlight the significant extent of disruption caused by late-night social media use and the need to find ways of mitigating its effects.

Shorter Sleep Pattern

Another common concern that emerges in several studies examining the correlation between social media and adolescent sleep patterns is the shortened duration of sleep. That is why, according to the results of studies such as Kelly et al. (2018) and Sohn et al. (2021), students with high social media activity get fewer hours of sleep at night, which is recommended to be 8-9

hours. This is quite alarming because sleep is crucial for the growth and development of both the body and brain during adolescence. Staying awake late at night using social media affects the onset of sleep and reduces the overall hours that adolescents spend in bed. In the long run, one is left severely with no adequate sleep, which hinders cognitive performance, mood regulation, and physical well-being.

The nuisance of having one's sleep reduced is detrimental; according to several studies, sleeping less can impair one’s ability to focus, remember things, and even solve problems. Further, sleep deprivation causes stress, mood swings, anxiety and depressive disorders to enhance. This further leads to poor management of emotions of adolescents who, therefore, display social, academic and mental difficulties. Hence, it is necessary to recommend limiting the time spent on social media, especially in the evening, so that adolescents can get the required sleep and reduce the adverse effects that can be caused by insufficient sleep.

Reduced Sleep Pattern

Moreover, not only was sleep duration shortened, but various sleep patterns were also affected by the different groups of individuals in many of the studies. Regarding opportunities for positive engagement, adolescents with high usage of social networking sites, especially those who go online at night, have disrupted circadian rhythms, which leads to reduced sleep time. Arora et al. (2014) and Scott et al. (2019) establish that adolescent’s screen time and social media usage lead to a general decrease in the hours of sleep they get per night. This is further compounded by the fact that most of what is received through social media platforms, in the form of videos, messages, and other notifications, is more engaging and provocative, taking up more time for adolescents.

A sleep pattern shortage refers to both the overall duration of sleep and its quality. Young people who sleep less have a low chance of achieving the restorative stages of sleep, which are essential for the body’s healing, brain function, and mental well-being. Persistent sleep loss results in a cumulative sleep deficit, which has more adverse effects on mood, focus, and decision-making. Preventing changes in their sleeping habits, therefore, means not only minimising their time spent on social media but also ensuring that teenagers have enough knowledge about the need for a fixed bedtime and wake-up time.

Sleep Disturbance

Another component is sleep disturbance, which has also been established as an issue across the studies examined in the paper. Teenagers who engage in social media late at night also experience sleep disruptions and are likely to wake up frequently, taking longer to fall back asleep (Butris et al., 2023). This perturbation in sleeping patterns compromises the quality of sleep one gets and the duration of rest one receives. As noted by Scott et al. (2019), subjects who reported using social media after 10 p.m. experienced more sleep-related issues, including sleep-onset insomnia and wake-maintaining insomnia.

The disturbances are occasioned by the very characteristics of using social media. Such contents on the platform generally involve stressful interactions or emotionally charged posts, which are likely to keep the brain in a state of high arousal. Additionally, the light emitted by screens exposes people to blue light, disrupting the natural sleep-wake cycle by preventing the brain from producing melatonin. Therefore, adolescents often experience difficulties with sleep onset and may require more time to fall asleep, which can result in disrupted sleep patterns. One consequence of sleep disturbance is an increase in fatigue levels during the day, mood swings, and poor working memory. Therefore, it is necessary to limit the time spent on social media before going to bed.

5.3.4 Social impact

Loneliness and Bullying

Social isolation and bullying, which can be associated with social networks, are some of the aspects that cause mental health problems and sleep disturbances in adolescent students. Several works, including Anto et al. (2023) and Bye et al. (2024), have posited that social media usage can increase isolation and loneliness among teenagers who engage in comparison and negative use of social media. Self-pressure to meet physical beauty standards, as well as the risks associated with cyber persecution, add to stress and anxiety that, in turn, affect sleep.

Cyberbullying in particular, which have become more present because of the availability of anonymity that social networks offer, include an ability to harass or exclude somebody. Those who are bullied on social network sites have high levels of fear, anxiety, and depression, which results in poor quality sleep. The stress from being bullied and the psychological effect of negative remarks on the internet deter adolescents from feeling at ease before retiring to bed. This implies that they cannot easily fall asleep or maintain sound sleep during the night.

Alongside, bullying on social media can impact the psychological well-being of people and bring about feelings of loneliness and insecurity due to the addiction to likes, comments, messages,

etc. This is evident since adolescents start comparing themselves with others and may feel like they are unworthy or that their lives are not as interesting as the lives of others; this causes anxiety and depression. Such sensations lead to sleep disruption as teenagers focus on their feelings of isolation at night. To address these effects, people should avoid using social media and, at the same time, seek resources that enable adolescents to cope with the psychological and emotional impacts of using social media platforms.

5.3.5 FOMO (Fear of Missing Out)

One of the reasons for disturbances at night is the phenomenon referred to as the Fear of Missing Out (FOMO). Some studies have focused on FOMO and its relationship to sleep, including those conducted by Anto et al. (2023) and Woods et al. (2016). FOMO adolescents are likely to spend long hours using social media platforms at night because they are always worried they may miss an important social event, new post or interaction with friends. This need to be awake results in delayed bedtimes and, therefore, a lack of sleep among social network users.

FOMO intensifies symptoms of insomnia, as it keeps the teenager's mind and emotional state alert, thus not letting them relax before sleep. While doing so, they are likely to experience delayed sleep onset and low-quality sleep. Further studies are needed to examine the psychological roots of FOMO and its consequences on teenagers' circadian rhythms, psychological well-being, and sleep quality. Exploring possibilities of intervention, such as a digital detoxification programme or mindfulness training for FOMO, could prove useful in minimising disturbances in sleep patterns.

5.4 Summary of this chapter

The various studies presented point to a very clear fact that having more than average engagement with social media is detrimental to the quality of sleep, anxiety, stress and depressive levels prevalent in an individual. In total, 12 papers were included, enrolling more than 16000 adolescents, and disrupted sleep was frequently described due to late-night social media use. These patterns included the prolonged onset of sleep, reduced duration of sleep and frequent interruption during the night, and they resulted in sleep deprivation and, in turn, adverse consequences to the mental health of the patients.

All the studies indicated that there was a reciprocal relationship whereby poor sleep quality was associated with the worsening of mental health disorders and vice versa: anxiety, depression, stress, and sleep disturbance. Interestingly, the large-sample studies by authors such as Kelly et al. (2018) and Scott et al. (2019), which enrolled more than 10,000 and 10,700 participants, respectively, provided support for the validity and applicability of these results. The researchers

used large samples to arrive at their findings and ensured that the approaches used in their research were well-defined and reliable, all of which provided conclusive evidence that social media negatively affected adolescents sleep.

The findings are supported by the inclusion of studies that employed a range of research designs, including cross-sectional, longitudinal and cohort methodologies. Sleep duration, quality and mental health evidence such as stress, anxiety, and depression were the most frequently studied outcomes across all of the studies. Since these outcomes are closely related to the development and well-being of adolescents and are known to be sensitive to exposure to social media, especially at night, they have been continuously examined. When taken as a whole, the studies show that frequent or late-night social media use linked to disturbed sleep habits, which in turn affect adolescents' mental health.

Chapter 6: Discussion

6.1 Introduction to Chapter

This chapter critically evaluates the findings derived from the systematic literature review regarding the effects of the overuse of social media on adolescents' sleep in the United Kingdom. Based on the results, the current chapter discusses the physiological, psychological, and behavioral processes involved in the onset of sleep disorders. It also discusses the research method used in the study, the strengths and limitations of the study, and the future research directions. These are mental health, FOMO, sleep, and the position of the online space in adolescent life, which are then combined to provide an understanding of the study's implications.

6.2 Discussion

Disruption of Sleep through Psychological Mechanisms

A common and consistent finding in the reviewed articles is that excessive social media use negatively affects adolescent sleep patterns. The literature review clearly shows that psychological factors like anxiety, FOMO, stress, and depressive symptoms are both antecedents and outcomes of late-night use of digital devices. Adolescents are especially vulnerable to these processes as they are in the process of their personality formation, and they are more sensitive to the assessments of their peers and their belongingness to a specific group.

Przybylski et al. (2017), Woods and Scott (2016), and Bye et al. (2023) have identified that adolescents' fear of missing out on social interactions forces them to continue using Instagram and Snapchat during important hours like nighttime. This leads to sleep-onset insomnia, frequent nighttime waking, and poor-quality sleep. Winstone et al. (2021) built on this by explaining that adolescents cannot easily disengage from online interactions, which makes them experience cognitive activation before sleep.

This issue resonates with theoretical models in adolescent psychology, such as Erikson's theory of identity vs. role confusion, where social belonging becomes central to identity formation. When peer validation is sought predominantly through social media, emotional dependence intensifies, leading to overstimulation at bedtime.

Physiological Mechanisms and the Impact of Blue Light

In addition to psychological factors, physiological factors, especially blue light exposure, affect sleep. Children and adolescents today are more often than not using LED (Light emitting diode)

screens at odd hours of the night. LeBourgeois et al. (2017) and Mainster et al. (2022)'s works support the argument that blue light from smartphones and tablets suppresses melatonin secretion. This hormone controls the sleep-wake cycle. This suppression affects the ability to fall asleep and disrupts the circadian cycle.

Arora et al. (2014) and Sohn et al. (2021) also found similar results in their studies, indicating that more nighttime screen exposure leads to reduced nighttime sleep duration and interrupted nighttime sleep. The habitual use of social media in low-light settings exacerbates these effects. However, it is not the light exposure but the content of emotionally charged events, such as emotionally charged conversations, dramatic news, or online fights, which increases physiological and emotional activity and delays sleep.

The adolescent brain naturally experiences later sleep and wake times due to changes in circadian biology and is further at risk when coupled with media use. This is particularly worrisome because adolescents and parents do not understand this mechanism well regarding its biological impact on the human body. Consequently, all sorts of good intentions and healthy behaviours that people engage in while interacting with technology, be it to check messages or watch videos to unwind, turn into counterproductive habits when it comes to sleep.

The Bidirectional Nature of Mental Health and Sleep Disturbance

One of the important and complex issues that can be identified from this systematic review is the reciprocal relationship between mental health problems and sleep disturbances. All the studies by Kelly et al. (2018), Bye et al. (2024), and Scott et al. (2019) show a cycle through which poor sleep leads to anxiety, depression, and stress that leads to late-night social media use, leading to poor sleep.

From a theoretical framework, this dynamic can be understood in terms of the stress-diathesis model, where psychological sensitivities are triggered and manifest in the event of stressors such as cyberbullying, social comparison, or loneliness, often carried out on social media. The youth who experience emotional problems may turn to social media for comfort or companionship. Although this strategy helps reduce stress during the day and compensates for the lack of daylight at night, it leads to increased screen time at night and, as a result, normalizes psychological and sleep disorders.

Several participants in Winstone et al.'s (2021) study described feeling emotionally charged or anxious after engaging with social content late at night, reporting feelings of exclusion, sadness,

or irritation. These emotions and physiological alertness prevent the mind from entering a state conducive to sleep. The implications of such a cycle are significant; it compromises sleep quality and undermines emotional regulation, academic functioning, and interpersonal relationships.

Social Pressures and Perceived Online Obligations

Another emergent theme relates to the social and cultural expectations embedded within digital communication. The reviewed literature revealed that adolescents often feel obligated to remain online, be immediately responsive, and maintain their social presence (Woods and Scott, 2016; Bin Eid et al., 2022). This sense of 'digital duty' stems from the fear of social repercussions, such as being left out of group chats or missing out on trending conversations.

Such perceived obligations are deeply embedded in adolescent peer culture. Social media platforms, by design, encourage continuous engagement through push notifications, tagging, and algorithmically curated feeds. Adolescents interpret these signals not just as features but as social mandates. The desire to avoid social isolation or being left out keeps them logged in most of the time, even at the detriment of sleep.

This phenomenon can be explained using sociological theories, particularly Goffman's presentation of self. The youth are consumers and actors who engage in the performance and display of self on media platforms. The pressure to be active and timely increases at night when most posts are made, leading to disturbed sleep or a lack of sleep. This shows that interventions targeting digital well-being should focus not only on the behaviour of the users but also on society.

Disruption of Sleep Duration and Quality

In summarizing quantitatively, almost all the studies reviewed have found a negative correlation between heavy social media use and sleep quality, shorter sleep duration, and delayed sleep. For instance, the findings of Kelly et al. (2018) and Arora et al. (2014) demonstrate that adolescents who are heavy social media users sleep fewer hours and experience more frequent disturbances during the night.

These outcomes align with neurological and cognitive research indicating that sleep is essential for brain plasticity, emotional regulation, and memory consolidation (Lim and Dinges, 2010). Adolescents, in particular, require more sleep than adults due to the rapid neurodevelopment occurring during this life stage. Therefore, even moderate disruptions to sleep can have profound cognitive and emotional consequences.

Moreover, the research conducted by Scott et al. (2019) and Bye et al. (2023) reveal that lack of sleep leads to severe functional consequences, such as reduced academic achievement, increased temper, lack of social interactions, and participation in risky behaviours. These effects are not just short-term, and they disrupt the normal developmental processes of the children. From the above discussion, it is clear that a lack of sleep not only results in tiredness but also has a significant effect on almost all the activities of an adolescent.

Reflections on the Research Approach and Limitations

Conducting a systematic literature review offered a rigorous and methodical framework for synthesising diverse studies, enabling a thorough exploration of the topic. The multi-thematic approach facilitated the identification of recurring patterns and allowed for an integrated interpretation of the findings. Nevertheless, it is important to acknowledge several limitations.

Firstly, most of the reviewed studies were cross-sectional, which limits the ability to infer causality. Longitudinal data is necessary to understand how social media behaviours and sleep outcomes evolve. Also, most studies used self-reports prone to social desirability or recall bias.

A limitation of the studies is that most are conducted in a single geographical location. Cultural, family, and educational differences might impact the use and regulation of social media in the United Kingdom only. Thus, generalizations of the findings cannot be made to other adolescents in other countries or with different socio-economic statuses.

In addition, although this review discussed the negative effects of social media use, it did not provide much information on the buffering conditions. It is also important to note that some adolescents may possess good parental control, digital literacy, or school regulation that may reduce the effects of screen time on sleep. The following moderating variables need to be examined in future research.

Moreover, despite these limitations, the SLR effectively captures the intricate and intertwined relationship between adolescents' digital media use and sleep problems and provides valuable findings on an emerging public health issue.

6.3 Strengths and Limitations

This research has several advantages that improve the credibility of the work results. Firstly, the systematic literature review (SLR) approach helped to systematically collect and synthesize the evidence concerning the effects of too much time spent on social networks on adolescents' sleep. The use of four databases, namely, PubMed, EBSCOhost, ProQuest Central, and Google

Scholar, guaranteed the coverage of peer-reviewed articles published between 2010 and 2024. Combining PICO/PEO with Boolean search terms enhanced the search strategy because it restricted the search further.

One of the methodological strengths is using the Newcastle-Ottawa Scale to evaluate the quality of the included quantitative studies. Also, thematic synthesis facilitated the synthesis of findings across the different thematic areas, settings, and study designs to provide a rich and complex view of the topic. This helped gain an understanding of the psychological, physiological, behavioral, and social processes that played a role in sleep disruption in adolescents.

However, the study has some limitations, which are as follows: The use of secondary data also limits the researcher’s access to controlling the variability of methods used in the included studies. Some of the selected articles were cross-sectional, so the causal relations and long-term impacts could not be ascertained. Besides, using self-administered questionnaires increases the possibility of social desirability and recall bias. Finally, the participants of the current study were restricted to UK adolescents only, which may reduce the generalizability of the study to other cultural or socio-economic contexts; thus, there is a need for future research to incorporate longitudinal, cross-sectional, and mixed-method studies.

6.4 Chapter Summary

This chapter critically discusses the systematic review's findings, demonstrating that excessive social media use significantly disrupts adolescent sleep patterns through physiological and psychological pathways. Sleep disturbances were shown to correlate with increased anxiety, depression, stress, and diminished cognitive and emotional functioning. The chapter illuminated the complex, reciprocal relationships between digital engagement and adolescent well-being by situating these results within the broader literature. Strengths and limitations of the research were acknowledged, highlighting both the robustness and constraints of the SLR approach.

Chapter 7: Recommendations and Conclusion

7.1 Introduction to Chapter

This chapter focuses on the results of this research on the impact of the overuse of social networks on adolescents' sleep in the United Kingdom. It is a summary of the identified knowledge acquired from the systematic analysis of twelve peer-reviewed articles and the evaluation of their quality, and the result is a view on the significance of the findings for adolescent mental health, educational attainment, and general well-being. The policy and practice recommendations of the chapter are then derived from the evidence presented in the chapter. Also, it presents guidelines for further research, especially in the directions that appeared during the analysis. The last chapter restates the need to address the problem of overuse of digital devices among adolescents and promote better behavioral patterns.

7.2 Implications of Findings

This study shows that social networking sites lead to poor sleep among adolescents, especially at night. This manifests in several ways, such as delayed onset of sleep, shorter sleep duration, and poor sleep quality (Kelly et al., 2018; Scott et al., 2019). These sleep disorders are not mere disturbances of sleep; on the contrary, they are correlated with various ill effects on mental health, cognition, and behavior.

The first of the implications is the relationship between sleep loss and psychological health. For instance, Bye et al. (2024) and Woods and Scott (2016) have established that adolescents who use social media during night hours spend most of the time reporting high levels of anxiety, depression, and stress. The continuous flow of notifications and the possibility to interact on social media platforms also leads to increased cognitive activation, which makes it rather challenging for adolescents to unwind and fall asleep (Winstone et al., 2021). More critically, this mental overstimulation not only leads to sleep deprivation, but it is a vicious cycle where the students with low self-esteem or those with anxiety use social media to divert their minds or seek validation, which worsens their sleep and mental health (Przybylski et al., 2017).

Moreover, it has been established that poor sleep quality leads to learning and academic problems. Levenson et al. (2017) state that sleep loss affects attention, memory, and decision-making abilities, which are crucial in learning. This is supported by the study conducted by Kelly et al. (2018), which also establishes that adolescents who sleep poorly due to social media use

are likely to report poor academic performance. Besides, the problems such as impulsivity, irritability, and mood swings mentioned by Woods and Scott (2016) may affect the learning process and cause conflicts with other children.

Physiological consequences are equally significant. According to LeBourgeois et al. (2017), night-time screen use inhibits melatonin secretion and alters the circadian and immune systems. Sleep deprivation has been associated with metabolic disturbances such as obesity and insulin resistance (Hisler et al., 2020). These biological effects may not be as apparent as the others, but if left unattended, they may have severe long-term effects.

On the social aspect, adolescents who lack adequate sleep are likely to isolate themselves from meaningful relationships. According to Bin Eid et al. (2022), lack of sleep is associated with loneliness and social isolation. Stress arising from bullying and social comparison, which are evident on Instagram among other social media platforms, exacerbates these problems, affecting both sleep and social-emotional development (Twenge et al., 2018).

The present study's results indicate that adolescents' social media use, sleep, and well-being interact reciprocally. If they do not receive the necessary support, their mental, academic, and physical well-being may deteriorate into adulthood.

7.3 Recommendations for Practice

Digital Education in Schools

Teaching digital literacy in schools is essential because most adolescents are unaware of the consequences of using screens at night, such as poor sleep and poor mood. Through lessons, it is possible to explain to learners what science is behind sleep and the dangers of using social networks too much. However, information sharing may not suffice in this case. Such sessions should be engaging and real-life so schools can facilitate change in self and behavior. Thus, the problem may not be addressed without real-life examples and other forms of learning involving a student's active participation, the problem may not be addressed. Instead of focusing on the negative aspects, education should also provide better habits that can be utilized in the real world.

Encourage Healthy Sleep Routines at Home

It is therefore important to establish that parents have a crucial role when creating and implementing bedtime routines. The rules, like no use of devices for an hour before sleep and no phones in the bedroom, are helpful to foster better sleeping habits. However, these routines should be well-choreographed and appropriate to the child's age. Failure to explain the rules will

be counterproductive and may be met with much resistance. Parents should set the pace on how to sleep and educate the children on the importance of quality sleep. It is important to establish rapport and be as communicative as possible. Otherwise, adolescents will look for a way to do it secretly, especially if parents use the devices late at night without setting limits.

Use of Technology Tools

Some of the features found in the devices include screen time monitors or night modes to enable adolescents to regulate their use of the devices. These tools provide real-life solutions for minimizing the stimulating content one will likely encounter at night. However, it may be noted that the use of these technologies is highly dependent on the users' motivation. This is because adolescents are likely to ignore the alerts or disable the limits if they are unwilling to change. Hence, it can be concluded that such tools are useful but not as effective as education and family members' support. Dependence on digital tools may mask the emotional factors leading to the use, such as stress or FOMO.

Support from Mental Health Services

This is the reason mental health services for adolescents who have sleep issues, anxiety, or even depression elements related to social media should be made accessible. It is recommended to consult a school counsellor or a youth clinic to determine the causes and learn how to manage emotions. However, not all schools have trained professionals or resources to attend to children with disabilities. This results in a lack of early intervention. There should be more service delivery, and mental health issues should be spoken about more frequently to demystify them. Without this support, adolescents may continue with negative behaviors, not knowing that their online conduct is an indication of deeper emotional problems.

Social Media Design Improvements

Social media platforms must incorporate features that limit the usage of the platforms at night, such as notification settings that will remind users that it is time to go to bed or a 'Do not disturb' option. These changes encourage healthier behavior but do not reduce the level of freedom that a user has. Nevertheless, it is crucial to understand that such companies are interested in engagement and profits, so expecting them to act responsibly without regulation may be ungrounded. It is seen that voluntary changes are helpful, but not uniform across the different platforms. There may be a need for governments or some other independent organizations to

lobby for ethical design standards. Otherwise, adolescents continue to be exposed to features that are addictive and encourage usage over and above the welfare of the individual.

7.4 Recommendations for Future Research

Although the findings of this study have provided significant evidence of the relationship between excessive use of social media and sleep disturbances in adolescents in the UK, more research needs to be done to enhance the knowledge in this area. Such as, longitudinal and experimental studies are needed in the future, as highlighted by Woods and Scott (2016), Wood et al. (2023), and Bye et al. (2023). These studies would focus on specific variables, specific number of hours spent on social media, as well as sleep duration for the adolescent and identify which areas require further attention. They would also provide the most evidence-based information for future research. The following are the future research directions, which are explained and supported by the existing studies as follows;

Examine Moderating Factors Such as Gender, Socioeconomic Status, and Pre-existing Conditions

Most of the existing studies tend to treat adolescents as a single group, even though sleep outcomes may vary significantly across different subgroups based on gender, socioeconomic status, or pre-existing mental health condition. For instance, Keles et al. (2020) postulate that girls are more vulnerable to experiencing negative emotions as a result of online interactions than boys because of social comparison and FOMO. In the same regard, Bin Eid et al. (2022) observed that cultural and environmental factors affect the sleep behaviors of adolescents in the UK in one way or another compared to other regions.

More studies are needed to determine how specific characteristics like gender, income, or prior mental health affect the connection between social media and sleep. This would help identify the specific areas that need more attention and avoid using blanket approaches that may not suit all adolescents.

Evaluate the Effectiveness of Intervention Programs

However, there is still no research evidence that would indicate which interventions help reduce social media's negative impact on sleep. In line with such studies, Wood et al. (2023) have pointed out the need for further experimental or quasi-experimental research that manipulates the variables in school, home, or clinical contexts.

For instance, a study can evaluate whether reducing screen time in secondary school positively impacts sleep quality and students' emotional state after a semester. Without such evaluations, interventions remain in the air, and educational or health policies may not have an evidence-based rationale. Hence, future research must involve real-life experiments that analyses different strategies' short-term and long-term effects.

Incorporate Adolescent Voices Through Qualitative Methods

Most studies incorporated in the systematic review are based on quantitative surveys. Although such data helps understand such patterns, they do not capture the reasons or subjectivity of adolescents' digital behaviors. For instance, Winstone et al. (2021), one of the few qualitative studies, found that adolescents felt 'overstimulated' by social media and had difficulty disengaging emotionally before going to sleep, which questionnaires could not have elicited.

It would be more appropriate to conduct quantitative research in the future through interviews, focus groups, or diaries. These can help further understand how adolescents perceive their use of social media, how they cope with stress or FOMO, and the challenges they encounter in enhancing their sleep quality. Such data would be instrumental in developing practical, feasible, research-based, and more importantly, adolescent-centered interventions.

Explore Technology Design as a Preventive Measure

Only a limited number of investigations have examined how features of social media platforms can cause sleep problems. Elements like auto-playing videos, algorithmic notifications, and the endless scroll are purposely made to capture consumers' attention. Further research should determine how these choices affect adolescent sleep behavior and whether less obtrusive designs are possible.

Further experimental research could compare the impact of turning off notifications or using 'sleep mode' in apps on sleeping habits, or examine the consequences of sleep loss in applications on sleep length. This research would be useful for future cooperation among psychologists, designers, and policymakers who work on developing ethical technologies for adolescents.

Investigate the Role of Parental Mediation and Digital Literacy

It is generally supposed that parental attention and direction are protective factors; nevertheless, scarce research has been devoted to ascertaining how efficient these approaches are. (Wood et al., 2023) also stated that it is possible to have positive outcomes when engaged parents set limits

on their children's use of digital devices. However, many parents are not computer literate enough to monitor or assist their children as they should.

Future research should explore the effects of parental mediation, such as restricting or setting rules regarding screen time and engaging in conversation or discussion about screen time with the child or adolescent. More research should also determine whether focusing on the parents or developing joint parent-child digital education programmers can be used as prevention measures.

7.5 Conclusion

This paper reviews the literature on the correlation between social media addiction and sleep disturbances among adolescent in the United Kingdom. Twelve research articles published in peer-reviewed journals found that late-night social media use is associated with delayed sleep and reduced sleep quantity and quality. These disturbances are not peculiar; they are correlated with increased anxiety, depressive signs, poor cognitive performance, and poor academic achievement.

This is a significant and reciprocal relationship, as the evidence shows. On the one hand, adverse effects of social media include overstimulation and emotional distress that comes with the use of social media, particularly before going to sleep. On the other hand, the youths who are stressed, have low self-esteem or are lonely find solace in the devices, hence perpetuating sleep deprivation and poor mental health. It is characterized by a specific cycle that, once created, can shape people's emotional stability, learning abilities, and well-being in the future.

The review also highlights the research's limitations, which comprise cross-sectional designs, a lack of cultural and socio-economic variables, and insufficient assessment of applied interventions. These drawbacks strongly indicate the need for better longitudinal and contextual studies to design policies and support structures.

Finally, the results suggest that social networking is a new and significant source of sleep loss among adolescents and its associated health problems. To overcome this problem, everyone must raise awareness and involve educators, families, health services, and technology designers. If no collective efforts are made, it may become almost impossible to reverse the negative trends in adolescent mental and physical health in the future.

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Appendices

Appendix 1

The Newcastle-Ottawa Quality Assessment Scale (NOS) for Case-Control Studies

Study	Name of Study	Date of Publication	Quality assessment	Total Score
Bye (2023)	Observational prospective study of social media, smartphone use, and self-harm in a clinical sample of young people: study protocol	2023	• Selection-*** • Comparability- ** • Exposure-***	8/9
Arora et al. (2014)	Associations between specific technologies and adolescent sleep quantity, sleep quality, and parasomnias	2014	• Selection-** • Comparability- * • Exposure-*	4/9
Anto et al. (2023)	Exploring the impact of social media on anxiety among university students in the United Kingdom: qualitative study	2023	• Selection-*** • Comparability- ** Exposure-***	8/9
Sohn et al. (2021)	The association between smartphone addiction and sleep: a UK cross-sectional study of young adults	2021	• Selection-*** • Comparability- ** Exposure-***	8/9

Kelly et al. (2018)	Social media use and adolescent mental health: Findings from the UK Millennium Cohort Study	2018	• Selection-*** • Comparability- ** Exposure-***	8/9
Scott et al. (2019)	Social media use and adolescent sleep patterns: cross-sectional findings from the UK millennium cohort study	2019	• Selection-** • Comparability- * Exposure-**	5/9
Wood et al. (2023)	Smartphones, social Media and Adolescent mental well-being: the impact of school policies Restricting day Time use protocol for a natural experimental observational study using mixed methods at secondary schools in England (SMART Schools Study)	2023	• Selection-*** • Comparability- ** Exposure-***	8/9
Winstone et al. (2021)	Social media use and social connectedness among adolescents in the United Kingdom: a qualitative exploration of displacement and stimulation	2021	• Selection-*** • Comparability- ** Exposure-***	8/9

Woods et al. (2016).	Sleepy teens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression, and low self-esteem	2016	• Selection-*** • Comparability- ** Exposure-***	8/9
Bye et al. (2024)	Cohort profile: The Social Media, Smartphone Use and Self-Harm in Young People (3S-YP) Study–A Prospective, observational cohort study of Young People in contact with Mental Health Services	2024	• Selection-*** • Comparability- ** Exposure-***	8/9
Bin Eid et al. (2022)	Characteristics of Sleep Patterns in Adolescents: Comparisons between Saudi Arabia and the UK	2022	• Selection-** • Comparability- * Exposure-**	5/9
Das-Friebel et al. (2020)	Bedtime social media use, sleep, and affective well-being in young adults: An experience sampling study	2020	• Selection-*** • Comparability- ** Exposure-***	8/9