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Central themes, core concepts and knowledge gaps concerning social media use, and mental health and well-being among adolescents. A scoping review of published literature.

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PROTOCOL: Central themes, core concepts and knowledge gaps concerning social media use, and mental health and well-being among adolescents. A scoping review of published literature.

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Abstract

Introduction: The use of social media has risen steadily since its introduction in the early 2000s, and today there are between two and three billion users worldwide. Research on the link between use of social media and mental health has resulted in a vast number of studies covering diverse aspects of the link between them. The existing body of knowledge on use of social media, and mental health and well-being among adolescents is complex and difficult-to-follow. In this paper we present a protocol for a scoping review to systematically identify and summarize the central research foci and knowledge gaps in the research field of social media use, and mental health and well-being among adolescents.

Methods and analysis: The current scoping review will adhere to the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews). The first step is to search relevant databases for eligible studies. Next, two reviewers from the research team will independently screen the identified studies for eligibility. Data extraction and data synthesis will be performed and result in summarized themes based on the findings.

Ethics and dissemination: A scoping review can be described as a method of gaining an overview and understanding of a research area, with its strengths and weaknesses, and as it involves peer-reviewed and published articles, a scoping review does not require ethical approval. We expect that the results from the current scoping review will produce a consolidated overview of existing studies and research gaps, and gather this knowledge into a coherent review. The results will be disseminated through relevant journals and conferences.

Keywords: scoping review; social media; mental health; adolescence; well-being

Article summary

Strengths and limitations of this study:

- This will be the first scoping review to systematically identify and summarize the central research foci and knowledge gaps in the research field of social media use, and mental health and well-being among adolescents.
- The search strategy includes several electronic databases with published peer-reviewed literature, with an aim to cover all relevant research publications.
- Initial selection of articles will be done by two reviewers independently.
- Data extraction from included articles will be done by two reviewers independently to ensure the quality of the collected information.
- Being a scoping review, no formal assessment of study quality will be carried out.

Background

Social media is a relatively new phenomenon with an increasing popularity. The number of social media users worldwide has increased rapidly the last years, reaching 2 billion in 2015 and is estimated to reach 3 billion users in 2021 [1]. Social media include services such as Facebook, Twitter, Snapchat and Instagram, with Facebook being the largest social media based on the number of users, followed by YouTube and WhatsApp [2, 3]. Young adults are more likely than older adults to use social media, with the demographic of users varying slightly between type of media [4]. The effects of increased social media use on youth health are still largely unknown, though some studies indicate detrimental effects on mental health [3]. A US survey from 2016 found a significant association between social media use and increased depression, but the mechanisms and direction of the association were not identified [5]. A systematic narrative review reports contradictory findings with both beneficial and harmful effects of social media use [6]. Given the research interest in the link between adolescents' social media use, and mental health and well-being, the planned scoping review will establish an overview over the existing body of knowledge and contribute to advance this field of research. Given the recency of the phenomenon, it is vital to identify and describe core themes as well as knowledge gaps when it comes to the effect of social media use on adolescent's mental health and well-being. The realm of social media is complex and multi-layered with several stakeholders, and a scoping review would help provide a foundation for further research, and in time also for policymaking and service delivery.

The purpose of scoping reviews can be described as a way of mapping "the key concepts underpinning a research area, and the main sources and types of evidence available, and can be undertaken as standalone projects in their own right, especially where an area is complex or has not been reviewed comprehensively before" [7]. In our context, a scoping review will help provide an understanding of the "big picture" and the main foci of research within the field of social media and mental health and well-being among adolescents, as well as the data sources and research instruments typically used. By utilizing the scoping review approach, the current study aims to produce a consolidated overview of studies with diverging methodological designs and gather this knowledge into a coherent review. Furthermore, one of the most frequent reasons for conducting a scoping review is to identify gaps in the research literature [8]. A vast number of studies on social media use and mental health has been conducted over the last decade, but to the authors' knowledge no scoping review has yet been carried out.

The review described here will follow the framework put forward by Arksey and O'Malley, which can be described according to five steps: 1) identifying the research question, 2) identifying relevant studies, 3) selecting studies, 4) charting the data, and 5) collating, summarising and reporting the results [8].

Aims

This scoping review aims to give an overview of the main research questions that have been focused on in relation to use of social media among adolescents and mental health and well-being. Both quantitative and qualitative studies are of interest. Three specific secondary research questions will be addressed:

- Investigate which aspects of mental health and well-being have been the focus or foci of research so far.
- Investigate if the research have focused on different research aims across gender or reported different findings across gender.
- Organise and describe the main sources of evidence related to social media that have been used in the quantitative studies identified.

Defining adolescence and social media

In the present review, adolescence is defined as those between 13 and 19 years of age. All pertinent studies which present results relevant for this age range is within the scope of this review. Social media is a broad term that is difficult to pin down. We have chosen to use the following definition offered by Kietzmann and colleagues (2011, page 1): "Social media employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content" [9]. This definition can be applied to Kaplan and Haenlein's [10] classification scheme that specify types of social media across two axes – *social presence/media richness* and *self-presentation/self-disclosure* (see figure 1).

		Social presence/media richness		
		Lower	Medium	Higher
Self-pres	High	Blogs	Vlogs/Social networking sites (e.g. Facebook)	Virtual social worlds (e.g. Second Life,)

entation/ Self-disclosure	Low	Collaborative projects (e.g. Wikipedia)	Content communities (e.g. Twitch, YouTube)	Virtual game worlds (e.g. League of Legends, Apex Legends)
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Figure 1: Characteristics of social media across the axes social presence/media richness and self-presentation/self-disclosure. Adapted from Kaplan and Haenlein [9].

The chosen definition of social media exclude other use of electronic or web-based media or programs, such as medical or health-related services (e.g. monitoring devices or medical reference), one-way transmissions of content (e.g. podcasts) and real-time exchanges via technology (e.g. Skype). We also exclude joint projects involving via technology (e.g. Microsoft Whiteboard). Online discussion forums and bulletin boards will however be included, as the content is at least partly generated by the users.

Data sources and search strategy

The following data sources were chosen due to their scope that include social sciences and public health research: Ovid Medline, Embase, PsycINFO, Sociological Abstracts, Sociological Services Abstracts, ERIC, Cochrane Database of Systematic Reviews, CRD (Database of Abstracts of Reviews of Effects), NHS EED, HTA and Epistemonikos. The search terms included combinations of different variants of 'adolescent', 'mental health', 'well-being' and 'social media', and only studies published the last five years were eligible. The snowballing technique will be used to identify articles that are not covered by our search, but only for studies published after 2014 [11]. Publisher and journals will be assessed for legitimacy according to the relevant criteria described by the Directory of Open Access Journals (DOAJ; for open access publications) and other relevant sources [12].

Study selection: Exclusion and inclusion criteria

Inclusion

- English
- Peer-reviewed papers
- Published within the last 5 years (since 2014)
- Participants/Informants aged between 13-19 years
- Empirical studies of primary research
- Observational or participatory studies
- Systematic reviews (and meta-analyses)
- Explicit focus on mental health, social support, sleep and/or well-being
- Explicit focus on social media

Exclusion

- Editorials, opinion pieces, commentaries
- Study or review protocols
- Book chapters
- Publications not peer-reviewed
- Non-empirical studies
- Theoretical studies, perspective articles
- Specific populations such as individuals with chronic illness or physical or mental disabilities
- Specific sub-populations, minority groups
- Intervention studies
- Treatment studies
- Internet- or app-based therapy
- Unpublished studies/conference proceedings
- Not within our definition of social media
- Studies where social media is only used as a moderator
- Studies which focus on internet gambling
- Clinical case-reports
- Studies focusing on the use of online information
- Studies focusing on aggression and violence (beyond cyber bullying)
- Studies focusing on brain disorders/cognitive disorders
- Studies focusing on information processing, decision-making or personality

The initial criteria used for study selection are part of an iterative process [13], and we will follow a two-stage approach:

- 1) Learning and adjusting stage: Two reviewers will independently screen titles and abstracts of 300 randomly drawn studies for eligibility. The purpose of this stage is to clarify the initial inclusion criteria, and to identify any uncertainties related to the inclusion and exclusion of papers. A third independent reviewer can be consulted if necessary. Adjustments will be made if deemed necessary.
- 2) Final selection stage: Two reviewers will independently screen titles and abstracts of all studies for eligibility according to the revised and updated inclusion and exclusion criteria. The full text of studies assessed as 'relevant' or 'unclear' will then be independently evaluated by two reviewers. The interrater agreement will be computed and discrepancies will be resolved by consensus or if necessary, by adjudication by a third independent reviewer.

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3 The selection process will be illustrated by a flow-chart indicating the stages from unsorted search
4 results to the total number of included studies. Study selection will be accomplished and organised
5 using the Rayyan QCRI software (<https://rayyan.qcri.org/welcome>).
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11 Data extraction and organisation

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15 Data extraction will be done for all included papers by one reviewer. A randomly drawn proportion
16 (5-10% depending on the total number of included papers) of these papers will also be assessed by a
17 second reviewer to ensure adherence to the data extraction plan as well as assessment of the quality
18 of the extraction. Data will be extracted according to the following details:
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- 22 • Bibliographic information
 - 23 ○ Author information
 - 24 ○ Title
 - 25 ○ Journal
 - 26 ○ Year of publication
 - 27 ○ Country of corresponding author
- 28 • Information about study design
 - 29 ○ Quantitative or qualitative
 - 30 ○ Study design
 - 31 ○ Study setting
 - 32 ○ Participants
 - 33 ○ Gender distribution
- 34 • Subject matter information
 - 35 ○ Main aim of study
 - 36 ○ Type of social media use
 - 37 ○ How social media use was assessed
 - 38 ○ Mental health or well-being measure
 - 39 ○ Report gender differences
 - 40 ○ Main finding/conclusion (free text)
 - 41 ○ Type of scales used (only applicable in quantitative studies)

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49 Data extraction and synthesis will be accomplished and organised using an electronic data
50 spreadsheet.
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52 Data synthesis: Quantification and narrative approach

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55 The extracted data will first submitted to simple quantitative analysis using descriptive statistics
56 (frequencies and measures of central tendencies) with purpose of providing an overview of the main
57 characteristics of the included studies [7]. The data will also be narratively assessed with a focus on
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3 the core themes and concepts emerging from the extracted data. This thematic analysis will be
4 performed by two reviewers independently, guided by three main axes:

- 5
6
7 1) **Mental health:** Which aspects of mental health were focussed in each study?
- 8
9 2) **Social media:** What type of social media use was the focus of the study? Typology will be
10 based on Kaplan and Haenlein's [10] classification scheme.
- 11
12 3) **Type of study:** Was the study qualitative or quantitative?

13
14 The results will be compared and consolidated by consensus between the two reviewers. The
15 resulting themes will be reviewed by a third independent reviewer to ensure validity and credibility.
16 The themes will be reported to highlight the similarities, patterns and differences found in the
17 literature, using a content-based approach.
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23 Presentation of the results

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25 The purpose of scoping reviews is to aggregate and synthesise data in order to gain an overview of a
26 field of research. Our results will be presented in tables and visual illustrations (e.g. graphs and
27 figures) and according to the emerging themes from the analyses described above. The exact
28 presentation format will be further specified as the review process develops [8]. The current scoping
29 review will strive to adhere to the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and
30 Meta-analyses extension for Scoping Reviews) as presented by Tricco and colleagues [14].
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37 Ethical considerations and dissemination of knowledge gained

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39 This protocol is a transparent description of the planned methodology for a scoping review. Our
40 aspiration is that this protocol will lay the groundwork for a comprehensive and rigorous review that
41 can contribute to the advancement of research related to adolescents, social media, mental health
42 and well-being. The review will contribute to the advancement of research on this subject by
43 identifying central research themes and gaps in knowledge and research. The results will be
44 disseminated through publications as well as presentations at relevant conferences. Furthermore,
45 our results may inform new research and policy initiatives addressing the subject matter.
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54
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56 University of Applied Sciences for their collaboration and help with the review.
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Conflicts of interests

None.

Author statement

All authors, VS, LEA and JCS, have made substantive intellectual contributions to the development of this protocol. JCS conceptualised the review approach, provided general guidance to the research team, and drafted the first version. VS developed the draft further, and all authors were involved in further revisions of the draft, review questions and the review design. All authors approve the final version of the manuscript.

Data statement

Data statement not applicable.

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Keywords:	MENTAL HEALTH, Child & adolescent psychiatry < PSYCHIATRY, Anxiety disorders < PSYCHIATRY, Depression & mood disorders < PSYCHIATRY

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25 Abstract

26 **Introduction:** The use of social media has risen steadily since its introduction in the early 2000s, and
27 today there are between two and three billion users worldwide. Research on the link between use of
28 social media and mental health has resulted in a vast number of studies covering diverse aspects of
29 the link between them. The existing body of knowledge on use of social media, and mental health
30 and well-being among adolescents is complex and difficult-to-follow. In this paper we present a
31 protocol for a scoping review to systematically identify and summarize the central research foci and
32 knowledge gaps in the research field of social media use, and mental health and well-being among
33 adolescents.

34 **Methods and analysis:** The current scoping review will adhere to the PRISMA-ScR (Preferred
35 Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews). The first
36 step is to search relevant databases for eligible studies. Next, two reviewers from the research team
37 will independently screen the identified studies for eligibility. Data extraction and data synthesis will
38 be performed and result in summarized themes based on the findings.

39 **Ethics and dissemination:** A scoping review can be described as a method of gaining an overview and
40 understanding of a research area, with its strengths and weaknesses, and as it involves peer-
41 reviewed and published articles, a scoping review does not require ethical approval. We expect that
42 the results from the current scoping review will produce a consolidated overview of existing studies
43 and research gaps, and gather this knowledge into a coherent review. The results will be
44 disseminated through relevant journals and conferences.

45
46 Keywords: scoping review; social media; mental health; adolescence; well-being

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48 Article summary

49 Strengths and limitations of this study:

- 50 • A strength of the current study is that it will be the first scoping review to systematically
51 identify and summarize the central research foci and knowledge gaps in the research field of
52 social media use, and mental health and well-being among adolescents in both qualitative
53 and quantitative studies. In an effort to cover most of the research field, social media is
54 broadly defined, and mental health and well-being is not restricted to any particular disorder
55 or system cluster.
- 56 • Another strength is that the search strategy includes several electronic databases with
57 published peer-reviewed literature, with an aim to cover all relevant research publications.
- 58 • Initial selection of articles will be done by two reviewers independently which is considered a
59 strength of the study.
- 60 • It is considered a strength that data extraction from included articles will be done by two
61 reviewers independently to ensure the quality of the collected information.
- 62 • Being a scoping review, no formal assessment of study quality will be carried out. This is
63 considered a limitation of the current study.

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65 Background

66 Social media is a relatively new phenomenon with an increasing popularity. The number of social
67 media users worldwide has increased rapidly the last years, reaching 2 billion in 2015 and is
68 estimated to reach 3 billion users in 2021 [1]. Among youth aged 12-15 years in the UK, 99 % go
69 online for at least 20 hours a week and 69 % gave a social media profile according to an rapport on
70 media use [2]. Today, social media use is ubiquitous in adolescents worldwide regardless of
71 differences such as culture, geographic region or socioeconomic status. Social media include services
72 such as Facebook, Twitter, Snapchat and Instagram, with Facebook being the largest social media
73 based on the number of users, followed by YouTube and WhatsApp [3, 4]. Young adults are more
74 likely than older adults to use social media, with the demographic of users varying slightly between
75 type of media [5]. The effects of increased social media use on youth health are still largely unknown,
76 though some studies indicate detrimental effects on mental health [4]. A US survey from 2016 found
77 a significant association between social media use and increased depression, but the mechanisms
78 and direction of the association were not identified [6]. A systematic narrative review reports
79 contradictory findings with both beneficial and harmful effects of social media use [7]. There is
80 currently an ongoing debate regarding the strength of the association between adolescent well-being
81 and the use of digital technology and social media with Twenge and colleagues being adamant about
82 its negative impact [8]. On the other side, Przybylski and colleagues have found that the association
83 between digital technology use and adolescent well-being is negative but only explaining 0.4 % of the
84 variation in well-being, and they suggest that these effects are too small to warrant any policy
85 change [9]. The possibility that concerns regarding social media use may be exaggerated is also
86 suggested by Berryman and colleagues in their study from 2018 [10]. There is also the possibility that
87 the issue of moral panic is contributing to misrepresenting the detrimental effects of social media
88 use on adolescents well-being, a phenomenon which has been heavily discussed regarding the
89 effects of introducing new media technologies such as video games, TV and radio [11]. It is, however,
90 difficult to pinpoint if moral panic exists and what role it plays in presenting the evidence of social
91 media use on well-being. Given the research interest in the link between adolescents' social media
92 use, and mental health and well-being, the planned scoping review will establish an overview over
93 the existing body of knowledge and contribute to advance this field of research. Given the recency of
94 the phenomenon, it is vital to identify and describe core themes as well as knowledge gaps when it
95 comes to the effect of social media use on adolescent's mental health and well-being. The realm of
96 social media is complex and multi-layered with several stakeholders and a constantly changing
97 technological landscape. The content of social media is both user-generated and commercially
98 generated and there are often both corporate and public interests and stake-holders in the

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3 99 phenomenon. A scoping review would help provide a foundation for further research, which in time
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5 100 will provide a knowledge base for policymaking and service delivery.

6 101 The purpose of scoping reviews can be described as a way of mapping “the key concepts
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8 102 underpinning a research area, and the main sources and types of evidence available, and can be
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10 103 undertaken as standalone projects in their own right, especially where an area is complex or has not
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12 104 been reviewed comprehensively before” [12]. In our context, a scoping review will help provide an
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14 105 understanding of the “big picture” and the main foci of research within the field of social media and
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16 106 mental health and well-being among adolescents, as well as the data sources and research
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18 107 instruments typically used. By utilizing the scoping review approach, the current study aims to
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20 108 produce a consolidated overview of studies with diverging methodological designs and gather this
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22 109 knowledge into a coherent review. Furthermore, one of the most frequent reasons for conducting a
23
24 110 scoping review is to identify gaps in the research literature [13]. A vast number of studies on social
25
26 111 media use and mental health has been conducted over the last decade, but to the authors’
27
28 112 knowledge no scoping review has yet been carried out.

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30 113 The review described here will follow the framework put forward by Arksey and O’Malley, which can
31
32 114 be described according to five steps: 1) identifying the research question, 2) identifying relevant
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34 115 studies, 3) selecting studies, 4) charting the data, and 5) collating, summarising and reporting the
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36 116 results [13].

37 117 Aims

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39 118 This scoping review aims to give an overview of the main research questions that have been focused
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41 119 on in relation to use of social media among adolescents and mental health and well-being. Both
42
43 120 quantitative and qualitative studies are of interest. Three specific secondary research questions will
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45 121 be addressed and together with the main research question serve as a template for organizing the
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47 122 results:

- 48 123 • Which aspects of mental health and well-being have been the focus or foci of research so
49
50 124 far?
- 51 125 • Has the research focused on different research aims across gender, ethnicity, socio-economic
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53 126 status, geographic location? What kind of findings are reported across these groups?
- 54
55 127 • Organise and describe the main sources of evidence related to social media that have been
56
57 128 used in the studies identified.

129 Defining adolescence and social media

130 In the present review, adolescence is defined as those between 13 and 19 years of age. We chose the
 131 age of 13 as our lower limit as nearly all social media services require users to be at least 13 years of
 132 age to access and use their services [14]. This includes Facebook, Snapchat, Twitter, Instagram and
 133 Skype [14]. All pertinent studies which present results relevant for this age range is within the scope
 134 of this review. Social media is a broad term that is difficult to pin down. We have chosen to use the
 135 following definition offered by Kietzmann and colleagues (2011, page 1): “Social media employ
 136 mobile and web-based technologies to create highly interactive platforms via which individuals and
 137 communities share, co-create, discuss, and modify user-generated content” [16]. This definition can
 138 be applied to Kaplan and Haenlein’s [15] classification scheme that specify types of social media
 139 across two axes – *social presence/media richness* and *self-presentation/self-disclosure* (see table 1).

		Social presence/media richness		
		Lower	Medium	Higher
Self- presentation/Self- disclosure	High	Blogs	Vlogs/Social networking sites (e.g. Facebook)	Virtual social worlds (e.g. Second Life,)
	Low	Collaborative projects (e.g. Wikipedia)	Content communities (e.g. Twitch, YouTube)	Virtual game worlds (e.g. League of Legends, Apex Legends)

141 **Table 1: Characteristics of social media across the axes social presence/media richness and self-**
 142 **presentation/self-disclosure. Adapted from Kaplan and Haenlein [15].**

143 The chosen definition of social media excludes other use of electronic or web-based media or
 144 programs, such as medical or health-related services (e.g. monitoring devices or medical reference),
 145 one-way transmissions of content (e.g. podcasts) and real-time exchanges via technology (e.g.
 146 Skype). We also exclude joint projects involving via technology (e.g. Microsoft Whiteboard). Online
 147 discussion forums and bulletin boards will however be included, as the content is at least partly
 148 generated by the users.

149 Data sources and search strategy

150 The following data sources were chosen due to their scope that include social sciences and public
 151 health research: CINAHL, Ovid Medline, Embase, PsycINFO, Sociological Abstracts, Sociological

1
2
3 152 Services Abstracts, ERIC, Cochrane Database of Systematic Reviews, CRD (Database of Abstracts of
4
5 153 Reviews of Effects), NHS EED, HTA and Epistemonikos. The search terms included combinations of
6
7 154 different variants of 'adolescent', 'mental health', 'well-being' and 'social media', and only studies
8
9 155 published the last five years were eligible. This limited search period was chosen mainly due to rapid
10
11 156 changes in the use and types of use of social media. Findings more than five years old were therefore
12
13 157 deemed to be less relevant to shed light on our research questions. There were also practical reasons
14
15 158 to limiting our search to 2014, related to available resources. The start-date for the search was April
16
17 159 2019, with additional searches in May 2019. The snowballing technique will be used to identify
18
19 160 articles that are not covered by our search, but only for studies published after 2014 [17]. Publisher
20
21 161 and journals will be assessed for legitimacy according to the relevant criteria described by the
22
23 162 Directory of Open Access Journals (DOAJ; for open access publications) and other relevant sources
24
25 163 [18].

164 Study selection: Exclusion and inclusion criteria

165 Inclusion

- 166 • English
- 167 • Peer-reviewed papers
- 168 • Published within the last 5 years (since 2014)
- 169 • Participants/Informants aged between 13-19 years
- 170 • Empirical studies of primary research
- 171 • Observational or participatory studies
- 172 • Systematic reviews (and meta-analyses)
- 173 • Explicit focus on mental health, sleep and/or well-being
- 174 • Explicit focus on social media

175 Exclusion

- 176 • Editorials, opinion pieces, commentaries
- 177 • Study or review protocols
- 178 • Book chapters
- 179 • Publications not peer-reviewed
- 180 • Non-empirical studies
- 181 • Theoretical studies, perspective articles
- 182 • Specific (sub-)populations such as individuals with chronic illness or physical or mental
183 disabilities
- 184 • Specific sub-populations, minority groups
- 185 • Intervention studies
- 186 • Treatment studies

- 187 • Internet- or app-based therapy
- 188 • Unpublished studies/conference proceedings
- 189 • Not within our definition of social media
- 190 • Studies where social media is only used as a moderator
- 191 • Studies which focus on internet gambling
- 192 • Clinical studies or clinical case-reports
- 193 • Studies focusing on the use of online information
- 194 • Studies focusing on aggression and violence (beyond cyber bullying)
- 195 • Studies focusing on brain disorders/cognitive disorders
- 196 • Studies focusing on information processing, decision-making or personality

197 The initial criteria used for study selection are part of an iterative process [19], and we will follow a
198 two-stage approach:

- 199 1) Learning and adjusting stage: Two reviewers will independently screen titles and abstracts of
200 300 randomly drawn studies for eligibility. The purpose of this stage is to clarify the initial
201 inclusion criteria, and to identify any uncertainties related to the inclusion and exclusion of
202 papers. A third independent reviewer can be consulted if necessary. Adjustments will be
203 made if deemed necessary.
- 204 2) Final selection stage: Two reviewers will independently screen titles and abstracts of all
205 studies for eligibility according to the revised and updated inclusion and exclusion criteria.
206 The full text of studies assessed as 'relevant' or 'unclear' will then be independently
207 evaluated by two reviewers. The interrater agreement will be computed and discrepancies
208 will be resolved by consensus or if necessary, by adjudication by a third independent
209 reviewer.

210 The selection process will be illustrated by a flow-chart indicating the stages from unsorted search
211 results to the total number of included studies. Study selection will be accomplished and organised
212 using the Rayyan QCRI software (<https://rayyan.qcri.org/welcome>).

213 Data extraction and organisation

214 Data extraction will be done for all included papers by one reviewer. A randomly drawn proportion
215 (5-10% depending on the total number of included papers) of these papers will also be assessed by a
216 second reviewer to ensure adherence to the data extraction plan as well as assessment of the quality
217 of the extraction. Data will be extracted according to the following details:

- 218 • Bibliographic information
 - 219 ○ Author information
 - 220 ○ Title

- 221 ○ Journal
- 222 ○ Year of publication
- 223 ○ Country of corresponding author
- 224 ● Information about study design
 - 225 ○ Quantitative or qualitative
 - 226 ○ Study design
 - 227 ○ Study setting
 - 228 ○ Participants
 - 229 ○ Gender distribution
- 230 ● Subject matter information
 - 231 ○ Main aim of study
 - 232 ○ Type of social media use
 - 233 ○ How social media use was assessed
 - 234 ○ Mental health or well-being measure
 - 235 ○ Report gender differences
 - 236 ○ Main finding/conclusion (free text)
 - 237 ○ Type of scales used (only applicable in quantitative studies)

238 Data extraction and synthesis will be accomplished and organised using an electronic data
239 spreadsheet.

240 Data synthesis: Quantification and narrative approach

241 The extracted data will first be submitted to simple quantitative analysis using descriptive statistics
242 (frequencies and measures of central tendencies) with purpose of providing an overview of the main
243 characteristics of the included studies [12]. The data will also be narratively assessed with a focus on
244 the core themes and concepts emerging from the extracted data. This thematic analysis will be
245 performed by two reviewers independently, guided by three main axes:

- 246 1) **Mental health:** Which aspects of mental health were focussed in each study?
- 247 2) **Social media:** What type of social media use was the focus of the study? Typology will be
248 based on Kaplan and Haenlein's [15] classification scheme.
- 249 3) **Type of study:** Was the study qualitative or quantitative?

250 The results will be compared and consolidated by consensus between the two reviewers. The
251 resulting themes will be reviewed by a third independent reviewer to ensure validity and credibility.
252 The themes will be reported to highlight the similarities, patterns and differences found in the
253 literature, using a content-based approach. The reviewers are trained clinical psychologists educated
254 based on the scientist-practitioner model. All but one of the researchers involved have experience
255 with different kinds of reviews, such as narrative reviews and systematic reviews.

256 Presentation of the results

257 The purpose of scoping reviews is to aggregate and synthesise data in order to gain an overview of a
258 field of research. Our results will be presented in tables and visual illustrations (e.g. graphs and
259 figures) and according to the emerging themes from the analyses described above. The exact
260 presentation format will be further specified as the review process develops [13]. The current
261 scoping review will strive to adhere to the PRISMA-ScR (Preferred Reporting Items for Systematic
262 reviews and Meta-analyses extension for Scoping Reviews) as presented by Tricco and colleagues
263 [20].

264 Ethical considerations and dissemination of knowledge gained

265 This protocol is a transparent description of the planned methodology for a scoping review. Our
266 aspiration is that this protocol will lay the groundwork for a comprehensive and rigorous review that
267 can contribute to the advancement of research related to adolescents, social media, mental health
268 and well-being. The review will contribute to the advancement of research on this subject by
269 identifying central research themes and gaps in knowledge and research. The results will be
270 disseminated through publications as well as presentations at relevant conferences. Furthermore,
271 our results may inform new research and policy initiatives addressing the subject matter.

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274 University of Applied Sciences for their collaboration and help with the review.

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277 specific funding was received for the present project. The present project is associated with a larger
278 innovation-project lead by Bergen municipality in Western Norway related to the use of social media
279 and mental health and well-being. The innovation-project is funded by a programme initiated by the
280 Norwegian Directorate of Health, and aims to explore social media as platform for health-promotion
281 among adolescents.

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2
3
4 282 **Conflicts of interests**

5
6 283 None.

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9
10 284 **Author statement**

11
12 285 All authors, VS, LEA and JCS, have made substantive intellectual contributions to the development of
13
14 286 this protocol. JCS conceptualised the review approach, provided general guidance to the research
15
16 287 team, and drafted the first version. VS developed the draft further, and all authors were involved in
17
18 288 further revisions of the draft, review questions and the review design. All authors approve the final
19
20 289 version of the manuscript.

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23 290 **Data statement**

24
25 291 Data statement not applicable.
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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	Page 1 Line 5
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 2 Lines 25-46
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Page 4 Lines 29-30
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 5 Lines 117-121
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	This is a protocol
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Page 6-8, lines 149-195
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Page 6-7, lines 149-162
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	SEE ATTACHMENT
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Page 7-8 Line 163-195
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Page 8-9 Line 196-245
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 8-9 Line 213-236
Critical appraisal of individual	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	Page 8 Line 213-216



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
sources of evidence§		the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Page 9 Line 240-244
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Page 6 Line 149-152
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Not applicable, this is a protocol
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not applicable, this is a protocol
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Not applicable, this is a protocol
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Not applicable, this is a protocol
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Not applicable, this is a protocol
Limitations	20	Discuss the limitations of the scoping review process.	Not applicable, this is a protocol
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Not applicable, this is a protocol
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Page 10 Line 275-280

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169:467–473. doi: 10.7326/M18-0850.



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BMJ Open

Central themes, core concepts and knowledge gaps concerning social media use, and mental health and well-being among adolescents. A protocol of a scoping review of published literature.

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2019-031105.R2
Article Type:	Protocol
Date Submitted by the Author:	21-Dec-2019
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Primary Subject Heading:	Public health
Secondary Subject Heading:	Public health, Health policy
Keywords:	MENTAL HEALTH, Child & adolescent psychiatry < PSYCHIATRY, Anxiety disorders < PSYCHIATRY, Depression & mood disorders < PSYCHIATRY

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25 Abstract

26 **Introduction:** The use of social media has risen steadily since its introduction in the early 2000s, and
27 today there are between two and three billion users worldwide. Research on the link between use of
28 social media and mental health has resulted in a vast number of studies covering diverse aspects of
29 the link between them. The existing body of knowledge on use of social media, and mental health
30 and well-being among adolescents is complex and difficult-to-follow. In this paper we present a
31 protocol for a scoping review to systematically identify and summarize the central research foci and
32 knowledge gaps in the research field of social media use, and mental health and well-being among
33 adolescents.

34 **Methods and analysis:** The current scoping review will adhere to the PRISMA-ScR (Preferred
35 Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews). The first
36 step is to search relevant databases for eligible studies. Relevant databases are CINAHL, Ovid
37 Medline, Embase, PsycINFO, Sociological Abstracts, Sociological Services Abstracts, ERIC, Cochrane
38 Database of Systematic Reviews, CRD (Database of Abstracts of Reviews of Effects), NHS EED, HTA
39 and Epistemonikos. Next, two reviewers from the research team will independently screen the
40 identified studies for eligibility. Data extraction and data synthesis will be performed and result in
41 summarized themes based on the findings.

42 **Ethics and dissemination:** A scoping review can be described as a method of gaining an overview and
43 understanding of a research area, with its strengths and weaknesses, and as it involves peer-
44 reviewed and published articles, a scoping review does not require ethical approval. We expect that
45 the results from the current scoping review will produce a consolidated overview of existing studies
46 and research gaps, and gather this knowledge into a coherent review. The results will be
47 disseminated through relevant journals and conferences.

48

49 **Keywords:** scoping review; social media; mental health; adolescence; well-being

50

51 Article summary

52 Strengths and limitations of this study:

- 53 • A strength of the current study is that it will be one of the first scoping review to
54 systematically identify and summarize the central research foci and knowledge gaps in the
55 research field of social media use, and mental health and well-being among adolescents (13-
56 19 years) in both qualitative and quantitative studies.
- 57 • Another strength is that the search strategy includes several electronic databases with
58 published peer-reviewed literature, with an aim to cover all relevant research publications.
- 59 • Initial selection of articles will be done by two reviewers independently which is considered a
60 strength of the study.
- 61 • It is considered a strength that data extraction from included articles will be done by two
62 reviewers independently to ensure the quality of the collected information.
- 63 • Being a scoping review, no formal assessment of study quality will be carried out. This is
64 considered a limitation of the current study.

65

66 Background

67 Social media is a relatively new phenomenon with an increasing popularity. The number of social
68 media users worldwide has increased rapidly the last years, reaching 2 billion in 2015 and is
69 estimated to reach 3 billion users in 2021 [1]. Among youth aged 12-15 years in the UK, 99 % go
70 online for at least 20 hours a week and 69 % gave a social media profile according to an rapport on
71 media use [2]. Today, social media use is ubiquitous in adolescents worldwide regardless of
72 differences such as culture, geographic region or socioeconomic status. Social media include services
73 such as Facebook, Twitter, Snapchat and Instagram, with Facebook being the largest social media
74 based on the number of users, followed by YouTube and WhatsApp [3, 4]. Young adults are more
75 likely than older adults to use social media, with the demographic of users varying slightly between
76 type of media [5]. The effects of increased social media use on youth health are still largely unknown,
77 though some studies indicate detrimental effects on mental health [4]. A US survey from 2016 found
78 a significant association between social media use and increased depression, but the mechanisms
79 and direction of the association were not identified [6]. A systematic narrative review reports
80 contradictory findings with both beneficial and harmful effects of social media use [7]. There is
81 currently an ongoing debate regarding the strength of the association between adolescent well-being
82 and the use of digital technology and social media with Twenge and colleagues being adamant about
83 its negative impact [8]. On the other side, Przybylski and colleagues have found that the association
84 between digital technology use and adolescent well-being is negative but only explaining 0.4 % of the
85 variation in well-being, and they suggest that these effects are too small to warrant any policy
86 change [9]. The possibility that concerns regarding social media use may be exaggerated is also
87 suggested by Berryman and colleagues in their study from 2018 [10]. There is also the possibility that
88 the issue of moral panic is contributing to misrepresenting the detrimental effects of social media
89 use on adolescents well-being. Moral panic can be defined as an exaggerated concern about a
90 supposed threat to the current culture, way of life or society's current structure. Moral panic is a
91 phenomenon which has been heavily discussed regarding the effects of introducing new media
92 technologies such as video games, TV and radio [11]. It is, however, difficult to pinpoint if moral panic
93 exists and what role it plays in presenting the evidence of social media use on well-being. Given the
94 research interest in the link between adolescents' social media use, and mental health and well-
95 being, the planned scoping review will establish an overview over the existing body of knowledge
96 and contribute to advance this field of research. Given the recency of the phenomenon, it is vital to
97 identify and describe core themes as well as knowledge gaps when it comes to the effect of social
98 media use on adolescent's mental health and well-being. The realm of social media is complex and
99 multi-layered with several stakeholders and a constantly changing technological landscape. The

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3 100 content of social media is both user-generated and commercially generated and there are often both
4
5 101 corporate and public interests and stake-holders in the phenomenon. A scoping review would help
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7 102 provide a foundation for further research, which in time will provide a knowledge base for
8
9 103 policymaking and service delivery.

10 104 The purpose of scoping reviews can be described as a way of mapping “the key concepts
11
12 105 underpinning a research area, and the main sources and types of evidence available, and can be
13
14 106 undertaken as standalone projects in their own right, especially where an area is complex or has not
15
16 107 been reviewed comprehensively before” [12]. In our context, a scoping review will help provide an
17
18 108 understanding of the “big picture” and the main foci of research within the field of social media and
19
20 109 mental health and well-being among adolescents, as well as the data sources and research
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22 110 instruments typically used. By utilizing the scoping review approach, the current study aims to
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24 111 produce a consolidated overview of studies with diverging methodological designs and gather this
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26 112 knowledge into a coherent review. Furthermore, one of the most frequent reasons for conducting a
27
28 113 scoping review is to identify gaps in the research literature [13]. A vast number of studies on social
29
30 114 media use and mental health has been conducted over the last decade, but to the authors’
31
32 115 knowledge no scoping review has yet been carried out.

33 116 The review described here will follow the framework put forward by Arksey and O’Malley, which can
34
35 117 be described according to five steps: 1) identifying the research question, 2) identifying relevant
36
37 118 studies, 3) selecting studies, 4) charting the data, and 5) collating, summarising and reporting the
38
39 119 results [13].

40 120 Aims

41
42 121 This scoping review aims to give an overview of the main research questions that have been focused
43
44 122 on in relation to use of social media among adolescents and mental health and well-being. Both
45
46 123 quantitative and qualitative studies are of interest. Three specific secondary research questions will
47
48 124 be addressed and together with the main research question serve as a template for organizing the
49
50 125 results:

- 51 126 • Which aspects of mental health and well-being have been the focus or foci of research so
52
53 127 far?
- 54
55 128 • Has the research focused on different research aims across gender, ethnicity, socio-economic
56
57 129 status, geographic location? What kind of findings are reported across these groups?
- 58
59 130 • What are the main sources of evidence related to social media that have been used in the
60
61 131 studies identified?

132 Defining adolescence and social media

133 In the present review, adolescence is defined as those between 13 and 19 years of age. We chose the
 134 age of 13 as our lower limit as nearly all social media services require users to be at least 13 years of
 135 age to access and use their services [14]. This includes Facebook, Snapchat, Twitter, Instagram and
 136 Skype [14]. All pertinent studies which present results relevant for this age range is within the scope
 137 of this review. Social media is a broad term that is difficult to pin down. We have chosen to use the
 138 following definition offered by Kietzmann and colleagues (2011, page 1): “Social media employ
 139 mobile and web-based technologies to create highly interactive platforms via which individuals and
 140 communities share, co-create, discuss, and modify user-generated content” [15]. This definition can
 141 be applied to Kaplan and Haenlein’s [16] classification scheme that specify types of social media
 142 across two axes – *social presence/media richness* and *self-presentation/self-disclosure* (see table 1).
 143

		Social presence/media richness		
		Lower	Medium	Higher
Self- presentation/Self- disclosure	High	Blogs	Vlogs/Social networking sites (e.g. Facebook)	Virtual social worlds (e.g. Second Life,)
	Low	Collaborative projects (e.g. Wikipedia)	Content communities (e.g. Twitch, YouTube)	Virtual game worlds (e.g. League of Legends, Apex Legends)

144 **Table 1: Characteristics of social media across the axes social presence/media richness and self-**
 145 **presentation/self-disclosure. Adapted from Kaplan and Haenlein [16].**

146 The chosen definition of social media excludes other use of electronic or web-based media or
 147 programs, such as medical or health-related services (e.g. monitoring devices or medical reference),
 148 one-way transmissions of content (e.g. podcasts) and real-time exchanges via technology (e.g.
 149 Skype). We also exclude joint projects involving via technology (e.g. Microsoft Whiteboard). Online
 150 discussion forums and bulletin boards will however be included, as the content is at least partly
 151 generated by the users.

152 Data sources and search strategy

153 The following data sources were chosen due to their scope that include social sciences and public
 154 health research: CINAHL, Ovid Medline, Embase, PsycINFO, Sociological Abstracts, Sociological

1
2
3 155 Services Abstracts, ERIC, Cochrane Database of Systematic Reviews, CRD (Database of Abstracts of
4 156 Reviews of Effects), NHS EED, HTA and Epistemonikos. The search terms included combinations of
5 157 different variants of 'adolescent', 'mental health', 'well-being' and 'social media', and only studies
6 158 published the last five years were eligible. This limited search period was chosen mainly due to rapid
7 159 changes in the use and types of use of social media. Findings more than five years old were therefore
8 160 deemed to be less relevant to shed light on our research questions. There were also practical reasons
9 161 to limiting our search to 2014, related to available resources. Before starting the full search, the
10 162 search strategy was piloted in order to assess relevance. The start-date for the search was April 2019,
11 163 with additional searches in May 2019. The snowballing technique will be used to identify articles that
12 164 are not covered by our search, but only for studies published after 2014 [17]. Publisher and journals
13 165 will be assessed for legitimacy according to the relevant criteria described by the Directory of Open
14 166 Access Journals (DOAJ; for open access publications) and other relevant sources [18].

167 Study selection: Exclusion and inclusion criteria

168 Inclusion

- 169 • Published in English.
- 170 • Peer-reviewed papers
- 171 • Published within the last 5 years (since 2014)
- 172 • Participants/Informants aged between 13-19 years
- 173 • Empirical studies of primary research
- 174 • Observational or participatory studies
- 175 • Systematic reviews (and meta-analyses)
- 176 • Explicit focus on mental health, sleep and/or well-being
- 177 • Explicit focus on social media

178 Exclusion

- 179 • Editorials, opinion pieces, commentaries
- 180 • Study or review protocols
- 181 • Book chapters
- 182 • Publications not peer-reviewed
- 183 • Non-empirical studies
- 184 • Theoretical studies, perspective articles
- 185 • Specific (sub-)populations such as individuals with chronic illness or physical or mental
186 disabilities
- 187 • Specific sub-populations, minority groups
- 188 • Intervention studies
- 189 • Treatment studies

- 190 • Internet- or app-based therapy
- 191 • Unpublished studies/conference proceedings
- 192 • Not within our definition of social media
- 193 • Studies where social media is only used as a moderator
- 194 • Studies which focus on internet gambling
- 195 • Clinical studies or clinical case-reports
- 196 • Studies focusing on the use of online information
- 197 • Studies focusing on aggression and violence (beyond cyber bullying)
- 198 • Studies focusing on brain disorders/cognitive disorders
- 199 • Studies focusing on information processing, decision-making or personality

200 The initial criteria used for study selection are part of an iterative process [19], and we will follow a
 201 two-stage approach:

- 202 1) Learning and adjusting stage: Two reviewers will independently screen titles and abstracts of
 203 300 randomly drawn studies for eligibility. The purpose of this stage is to clarify the initial
 204 inclusion criteria, and to identify any uncertainties related to the inclusion and exclusion of
 205 papers. A third independent reviewer can be consulted if necessary. Adjustments will be
 206 made if deemed necessary.
- 207 2) Final selection stage: Two reviewers will independently screen titles and abstracts of all
 208 studies for eligibility according to the revised and updated inclusion and exclusion criteria.
 209 The full text of studies assessed as 'relevant' or 'unclear' will then be independently
 210 evaluated by two reviewers. The interrater agreement will be computed and discrepancies
 211 will be resolved by consensus or if necessary, by adjudication by a third independent
 212 reviewer.

213 The selection process will be illustrated by a flow-chart indicating the stages from unsorted search
 214 results to the total number of included studies. Study selection will be accomplished and organised
 215 using the Rayyan QCRI software (<https://rayyan.qcri.org/welcome>). Both reviewers are trained
 216 clinical psychologists based on the scientist-practitioner model.

217 Data extraction and organisation

218 Data extraction will be done for all included papers by one reviewer. A randomly drawn proportion
 219 (5-10% depending on the total number of included papers) of these papers will also be assessed by a
 220 second reviewer to ensure adherence to the data extraction plan as well as assessment of the quality
 221 of the extraction. Data will be extracted according to the following details:

- 222 • Bibliographic information
 - 223 ○ Author information

- 1
2
3 224 ○ Title
4 225 ○ Journal
5 226 ○ Year of publication
6 227 ○ Country of corresponding author
7
8 228 • Information about study design
9 ○ Quantitative or qualitative
10 229 ○ Study design
11 230 ○ Study setting
12 231 ○ Participants
13 232 ○ Gender distribution
14 233
15 234 • Subject matter information
16 ○ Main aim of study
17 235 ○ Type of social media use
18 236 ○ How social media use was assessed
19 237 ○ Mental health or well-being measure
20 238 ○ Report gender differences
21 239 ○ Main finding/conclusion (free text)
22 240 ○ Type of scales used (only applicable in quantitative studies)
23 241

24 242 Data extraction and synthesis will be accomplished and organised using an electronic data
25 243 spreadsheet.

244 Data synthesis: Quantification and narrative approach

245 The extracted data will first be submitted to simple quantitative analysis using descriptive statistics
246 (frequencies and measures of central tendencies) with purpose of providing an overview of the main
247 characteristics of the included studies [12]. The data will also be narratively assessed with a focus on
248 the core themes and concepts emerging from the extracted data. This thematic analysis will be
249 performed by two reviewers independently, guided by three main axes:

- 250 1) **Mental health:** Which aspects of mental health were focussed in each study?
251 2) **Social media:** What type of social media use was the focus of the study? Typology will be
252 based on Kaplan and Haenlein's [16] classification scheme.
253 3) **Type of study:** Was the study qualitative or quantitative?

254 The results will be compared and consolidated by consensus between the two reviewers. The
255 resulting themes will be reviewed by a third independent reviewer to ensure validity and credibility.
256 The themes will be reported to highlight the similarities, patterns and differences found in the
257 literature, using a content-based approach. The reviewers are trained clinical psychologists educated
258 based on the scientist-practitioner model. All but one of the researchers involved have experience
259 with different kinds of reviews, such as narrative reviews and systematic reviews.

260 Public and Patient Involvement

261 No patient involved.

262 Presentation of the results

263 The purpose of scoping reviews is to aggregate and synthesise data in order to gain an overview of a
264 field of research. Our results will be presented in tables and visual illustrations (e.g. graphs and
265 figures) and according to the emerging themes from the analyses described above. The exact
266 presentation format will be further specified as the review process develops [13]. The current
267 scoping review will strive to adhere to the PRISMA-ScR (Preferred Reporting Items for Systematic
268 reviews and Meta-analyses extension for Scoping Reviews) as presented by Tricco and colleagues
269 [20].

270 Ethical considerations and dissemination of knowledge gained

271 This protocol is a transparent description of the planned methodology for a scoping review. Our
272 aspiration is that this protocol will lay the groundwork for a comprehensive and rigorous review that
273 can contribute to the advancement of research related to adolescents, social media, mental health
274 and well-being. The review will contribute to the advancement of research on this subject by
275 identifying central research themes and gaps in knowledge and research. The results will be
276 disseminated through publications as well as presentations at relevant conferences. Furthermore,
277 our results may inform new research and policy initiatives addressing the subject matter.

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284 innovation-project lead by Bergen municipality in Western Norway related to the use of social media
285 and mental health and well-being. The innovation-project is funded by a programme initiated by the
286 Norwegian Directorate of Health, and aims to explore social media as platform for health-promotion
287 among adolescents.

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2
3
4 288 **Conflicts of interests**

5
6 289 None.

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9
10 290 **Author statement**

11
12 291 All authors, VS, LEA and JCS, have made substantive intellectual contributions to the development of
13 292 this protocol. JCS conceptualised the review approach, provided general guidance to the research
14 293 team, and drafted the first version. VS developed the draft further, and all authors were involved in
15 294 further revisions of the draft, review questions and the review design. All authors approve the final
16 295 version of the manuscript.

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22 296 **Data statement**

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25 297 Data statement not applicable.
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342 *explanation*. Annals of internal medicine, 2018. **169**(7): p. 467-473.

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	Page 1 Line 5
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 2 Lines 25-46
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Page 4 Lines 29-30
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 5 Lines 117-121
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	This is a protocol
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Page 6-8, lines 149-195
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Page 6-7, lines 149-162
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	SEE ATTACHMENT
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Page 7-8 Line 163-195
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Page 8-9 Line 196-245
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 8-9 Line 213-236
Critical appraisal of individual	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	Page 8 Line 213-216



SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
sources of evidence§		the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Page 9 Line 240-244
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Page 6 Line 149-152
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Not applicable, this is a protocol
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not applicable, this is a protocol
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Not applicable, this is a protocol
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Not applicable, this is a protocol
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Not applicable, this is a protocol
Limitations	20	Discuss the limitations of the scoping review process.	Not applicable, this is a protocol
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Not applicable, this is a protocol
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	Page 10 Line 275-280

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169:467–473. doi: 10.7326/M18-0850.



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