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Menstrual Tracking Apps, Fertility Algorithms, and Intimate Behavior Data

Maria Kovacova[1], Jakub Horak[2], and Adela-Claudia Cuțitoi[3]

ABSTRACT. We draw on a substantial body of theoretical and empirical research on menstrual cycle and fertility tracking apps. With increasing evidence of female self-governance and empowerment, there is an essential demand for comprehending whether menstrual trackers can quantify and visualize a fertile window in conformity with basic and approximate determinants of the period physiology, possibly leading to unintended pregnancies. In this research, prior findings were cumulated indicating that fertility apps tracking menstrual cycles leverage intimate behavior data. We carried out a quantitative literature review of ProQuest, Scopus, and the Web of Science throughout February 2022, with search terms including "menstrual tracking apps" + "sexual and reproductive health," "fertility algorithms," and "intimate behavior data." As we analyzed research published in 2015 and 2022, only 196 papers met the eligibility criteria. By removing controversial or unclear findings (scanty/unimportant data), results unsupported by replication, undetailed content, or papers having quite similar titles, we decided on 14, chiefly empirical, sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Distiller SR, ROBIS, and SRDR.

Keywords: fertility algorithm; sexual and reproductive health; intimate behavior data

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1. Introduction

Digital health technologies such as self-tracking apps, in relation to fertility and reproductive functions, assist women in ovulation and menstrual cycle mapping through bodily indicators so as to avoid pregnancy or enable effective conception. The purpose of our systematic review is to examine the recently published literature on menstrual tracking apps and integrate the insights it configures on fertility algorithms and intimate behavior data. By analyzing the most recent (2015–2022) and significant (Web of Science, Scopus, and ProQuest) sources, our paper has attempted to prove that menstrual cycle and fertility tracking apps are pivotal in reproductive healthcare. The actuality and novelty of this study are articulated by addressing self-tracking practices as regards ovulation and fertility, that is an emerging topic involving much interest. Our research problem is whether menstrual trackers can quantify and visualize a fertile window in conformity with basic and approximate determinants of the period physiology, possibly leading to unintended pregnancies.

In this review, prior findings have been cumulated indicating that menstrual tracking apps can articulate practical representations of users' experiences by assimilating quantitative and qualitative data. The identified gaps advance sexuality and reproduction self-tracking apps. Our main objective is to indicate that fertility apps tracking menstrual cycles leverage intimate behavior data. This systematic review contributes to the literature on female self-governance and empowerment (Morrison, 2021) by clarifying that menstrual tracking apps articulate a data-mediated body, showing partiality towards quantitative metrics and not in relation to embodied lived practices of users. This research endeavors to elucidate whether bodily experiences and perceptions of menstrual cycle monitoring apps's users as regards contraceptive acceptability are intimately correlated. Our contribution is by integrating research findings indicating that digital health technologies act in accordance with deep-rooted self-tracking habits of users associated with their ovulation and fertility (Welch, 2021), producing data in relation to heterogeneous bodily functions that can be accurate when aggregated.

2. Theoretical Overview of the Main Concepts

Fertility-related apps log data in relation to menstrual cycles to visualize, inspect, and predict ovulation. Menstrual tracking apps typically rely on fertility awareness-based methods as regards contraception in terms of users' basal body temperature, with fertility algorithms enabling the detection of ovulation and predict pregnancy risks. Fertility awareness apps encourage users to log data increasingly, with data science and customized artificial intelligence algorithms predicting and configuring irregular cycles and distinct

menstrual dynamics. mHealth apps and monitoring devices (e.g., menstrual trackers) can provide users with effortless access to preventive health data and further conformity with critical clinical screenings, public health tools, and disease prevention behaviors, reducing health disparities. Trying to avoid pregnancy by leveraging digital health technologies may enable an increased grasp of users' bodies and fertility awareness, as particular bodily symptoms may be related to the fertile window, leading to a deepened sense of bodily awareness. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), fertility awareness apps, sexual and reproductive health, and intimate behavior data (section 4), menstrual tracking apps, fertility algorithms, and preventive health data (section 5), menstrual tracking apps, women's sexuality and reproduction, and gynaecological health care (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

We carried out a quantitative literature review of ProQuest, Scopus, and the Web of Science throughout February 2022, with search terms including "menstrual tracking apps" + "sexual and reproductive health," "fertility algorithms," and "intimate behavior data." As we analyzed research published in 2015 and 2022, only 196 papers met the eligibility criteria. By removing controversial or unclear findings (scanty/unimportant data), results unsupported by replication, undetailed content, or papers having quite similar titles, we decided on 14, chiefly empirical, sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Distiller SR, ROBIS, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
menstrual tracking apps + sexual and reproductive health	67	5
menstrual tracking apps + fertility algorithms	66	5
menstrual tracking apps + intimate behavior data	63	4
Type of paper		
Original research	144	13
Review	9	1
Conference proceedings	23	0
Book	9	0
Editorial	11	0

Source: Processed by the authors. Some topics overlap.

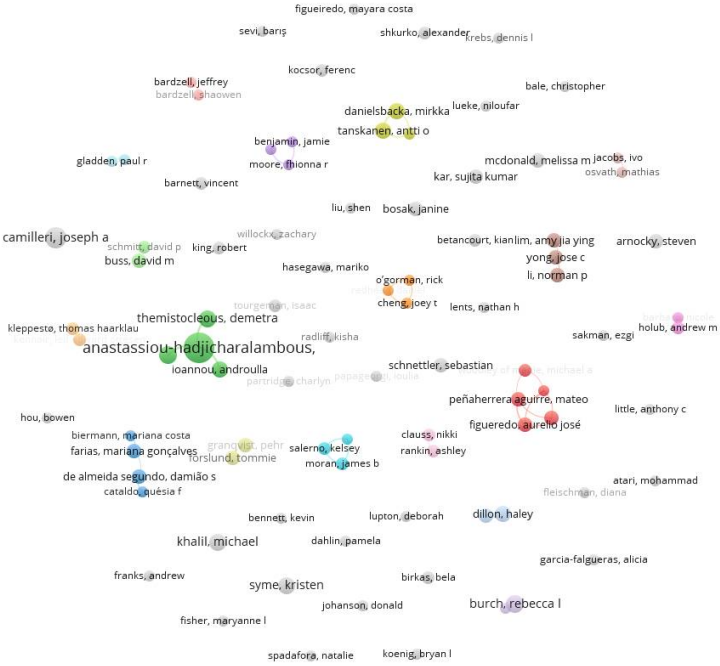


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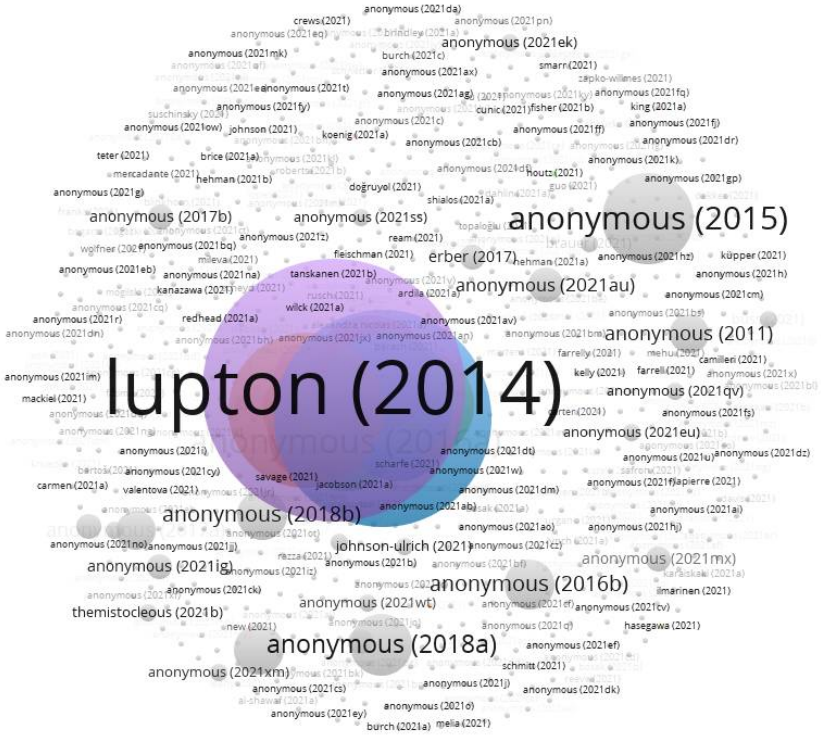


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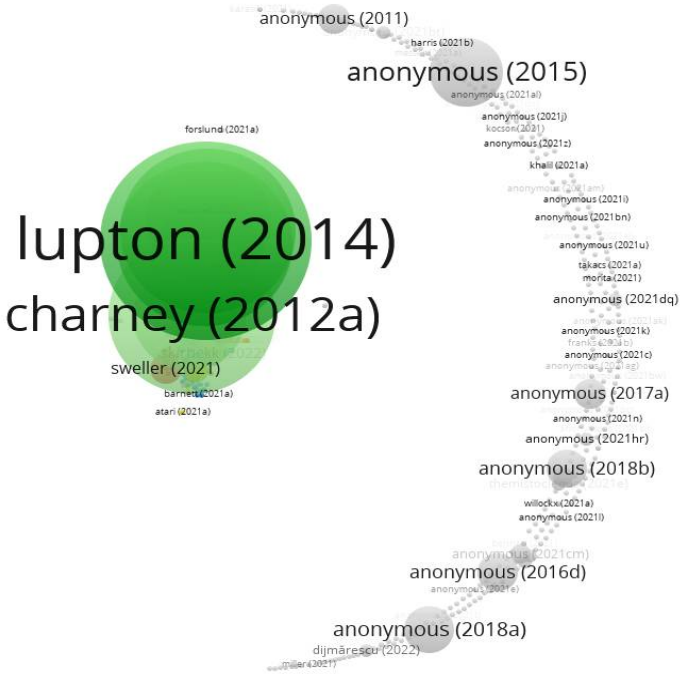


Figure 3 Bibliographic coupling

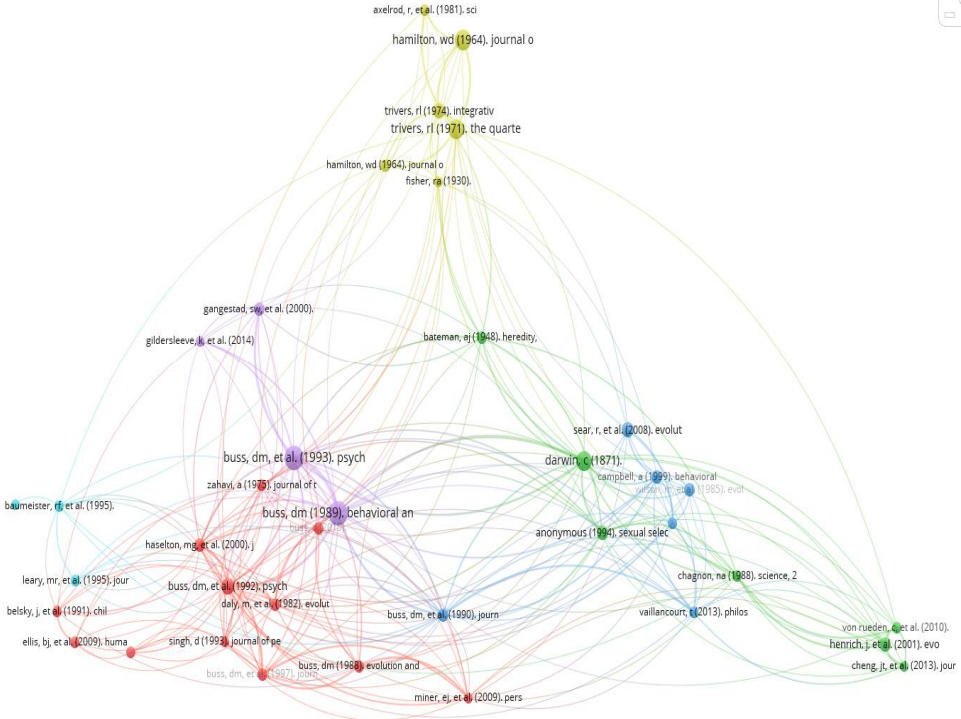


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Women seeking to prevent pregnancy can make behavioral decisions in conformity with science-based fertility app data. Menstrual tracking apps articulate a data-mediated body, showing partiality towards quantitative metrics and not in relation to embodied lived practices of users.	Dudouet, 2022; Pichon et al., 2021; Starling et al., 2018
Fertility awareness apps track users' sexual and reproductive health and serve as a form of contraception, being used for pregnancy prevention, but contraceptive effectiveness concerns and risky sexual behaviors should be considered.	Boivin et al., 2019; Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Reproductive age women require robust and coherent family planning methods to control their ability to conceive and avoid unintended pregnancy through period trackers and fertility apps.	Broad et al., 2022; Mu et al., 2022; Pichon et al., 2021
Digital reproductive self-tracking routines customize fertility and contraception, aiming to facilitate female self-governance and empowerment. mHealth apps and monitoring devices (e.g., menstrual trackers) can provide users with effortless access to preventive health data and further conformity with critical clinical screenings, public health tools, and disease prevention behaviors, reducing health disparities.	Broad et al., 2022; Mishra and Suresh, 2021; Pichon et al., 2021; Reyes et al., 2018
Sexuality and reproduction self-tracking apps can assist users in monitoring their ovulation and menstruation cycles while managing their fertility.	Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Reliable, evidence-based period tracker apps enable users to accurately monitor their fertility and menstrual cycles, being leveraged to prevent or achieve pregnancy while offering a suitable way to examine fertility biomarkers.	Duane et al., 2016; Kleinschmidt et al., 2019; Pichon et al., 2021
Fertility awareness apps can affect individual reproductive behavior and decision-making processes, and contraceptive choices.	Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Fertility-based apps, as regards pregnancy planning and contraception, and menstrual cycle apps, in relation to period and symptom tracking, should be effective in predicting users' periods and gynaecological health.	Broad et al., 2022; Moglia and Castano, 2015; Pichon et al., 2021
Self-tracking practices as regards ovulation and fertility can be pivotal in women's sexuality and reproduction. Menstrual tracking apps can articulate practical representations of users' experiences by assimilating quantitative and qualitative data.	Dalessandro et al., 2022; Lupton, 2015; Pichon et al., 2021; Sanchez and Maresh, 2021

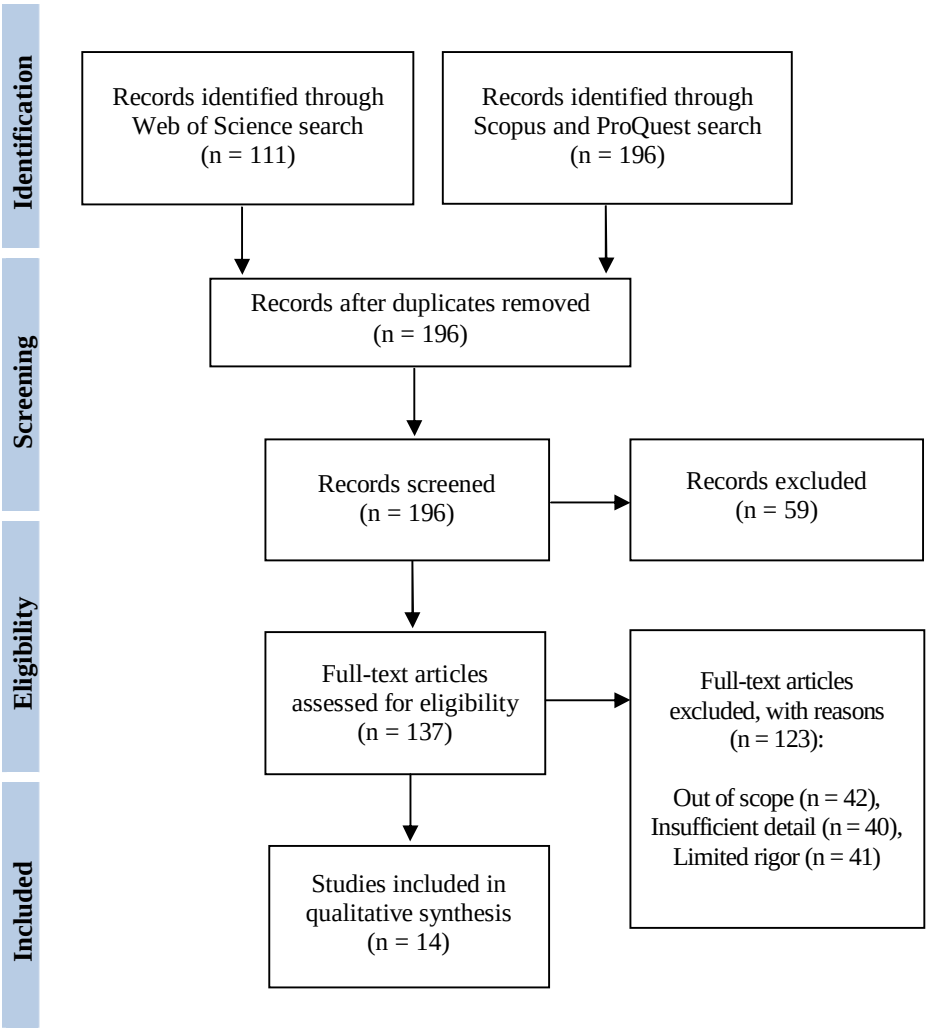


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

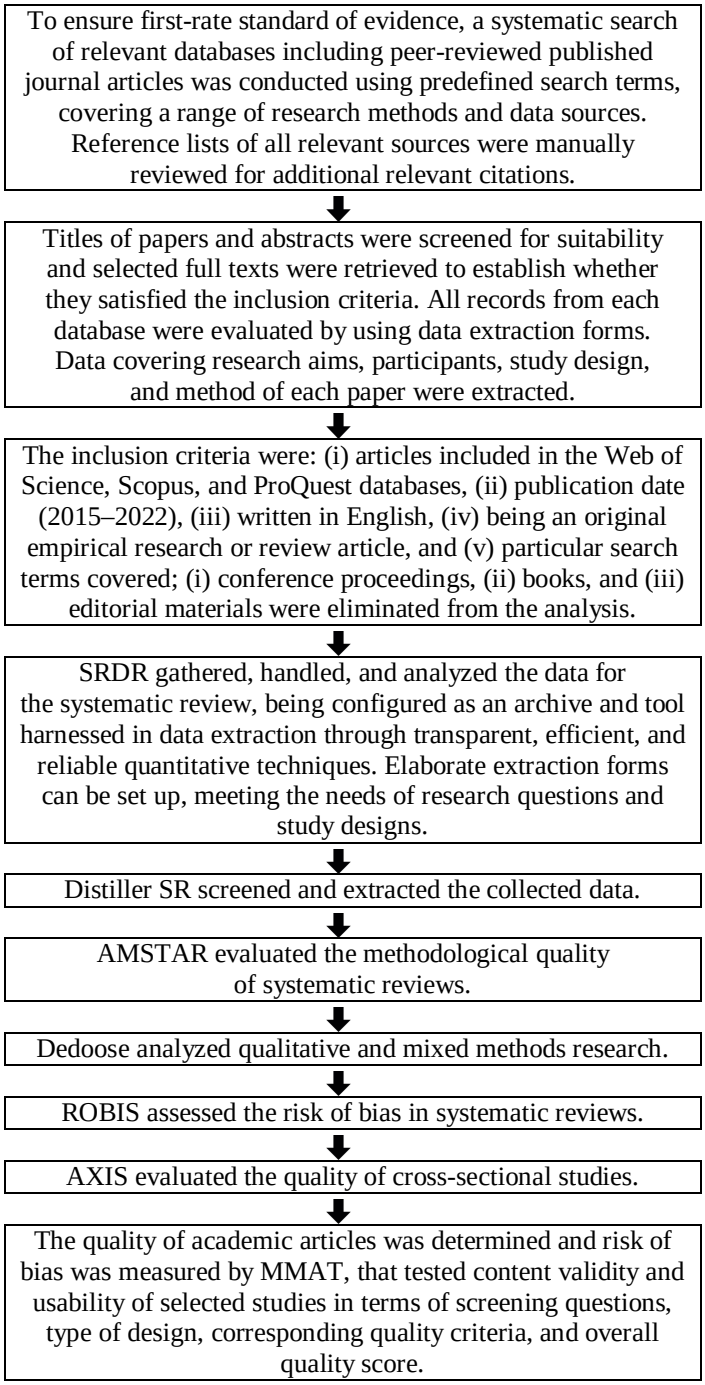


Figure 6 Screening and quality assessment tools

4. Fertility Awareness Apps, Sexual and Reproductive Health, and Intimate Behavior Data

Women seeking to prevent pregnancy can make behavioral decisions (Dudouet, 2022; Pichon et al., 2021; Starling et al., 2018) in conformity with science-based fertility app data. Trying to avoid pregnancy by leveraging digital health technologies may enable an increased grasp of users' bodies and fertility awareness, as particular bodily symptoms may be related to the fertile window, leading to a deepened sense of bodily awareness. Menstrual tracking apps articulate a data-mediated body, showing partiality towards quantitative metrics and not in relation to embodied lived practices of users.

Fertility awareness apps track users' sexual and reproductive health and serve as a form of contraception, being used for pregnancy prevention (Boivin et al., 2019; Dudouet, 2022; Lupton, 2015; Pichon et al., 2021), but contraceptive effectiveness concerns and risky sexual behaviors should be considered. Digital health technologies such as self-tracking apps, in relation to fertility and reproductive functions, assist women in ovulation and menstrual cycle mapping through bodily indicators so as to avoid pregnancy or enable effective conception. Fertility-related apps log data in relation to menstrual cycles to visualize, inspect, and predict ovulation. Fertility apps tracking menstrual cycles leverage intimate behavior data.

Reproductive age women require robust and coherent family planning methods to control their ability to conceive and avoid unintended pregnancy (Broad et al., 2022; Mu et al., 2022; Pichon et al., 2021) through period trackers and fertility apps. Inaccurate data provided by period tracker apps as regards the menstrual cycle can bring about stress to users, possibly resulting in pregnancy or infertility. Users can hide the fertility-related app on their mobile devices, conceal reminders on calendars, and circumvent menstrual status disclosure. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Women seeking to prevent pregnancy can make behavioral decisions in conformity with science-based fertility app data.	Dudouet, 2022; Pichon et al., 2021; Starling et al., 2018
Fertility awareness apps track users' sexual and reproductive health and serve as a form of contraception, being used for pregnancy prevention, but contraceptive effectiveness concerns and risky sexual behaviors should be considered.	Boivin et al., 2019; Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Reproductive age women require robust and coherent family planning methods to control their ability to conceive and avoid unintended pregnancy through period trackers and fertility apps.	Broad et al., 2022; Mu et al., 2022; Pichon et al., 2021

5. Menstrual Tracking Apps, Fertility Algorithms, and Preventive Health Data

Digital reproductive self-tracking routines customize fertility and contraception (Broad et al., 2022; Mishra and Suresh, 2021; Pichon et al., 2021; Reyes et al., 2018), aiming to facilitate female self-governance and empowerment. The accuracy of period tracker apps in predicting menstrual cycle start dates shapes users' feelings and behaviors. Fertility tracking mobile apps regularize the meaningful, unmanageable menstruation experience by confinements in data collection and incoherent data streams from heterogeneous sources. mHealth apps and monitoring devices (e.g., menstrual trackers) can provide users with effortless access to preventive health data and further conformity with critical clinical screenings, public health tools, and disease prevention behaviors, reducing health disparities.

Sexuality and reproduction self-tracking apps can assist users in monitoring their ovulation and menstruation cycles (Dudouet, 2022; Lupton, 2015; Pichon et al., 2021) while managing their fertility. Menstrual tracking apps typically rely on fertility awareness-based methods as regards contraception in terms of users' basal body temperature, with fertility algorithms enabling the detection of ovulation and predict pregnancy risks. Menstrual tracking apps monitor flow and fertility in terms of basal body temperature, ovulation tests, and cervical mucus.

Reliable, evidence-based period tracker apps enable users to accurately monitor their fertility and menstrual cycles (Duane et al., 2016; Kleinschmidt et al., 2019; Pichon et al., 2021), being leveraged to prevent or achieve pregnancy while offering a suitable way to examine fertility biomarkers. App design should integrate users throughout intricate spheres of sex and gender in terms of identity and structural non-inclusion. Menstrual trackers can quantify and visualize a fertile window in conformity with basic and approximate determinants of the period physiology, possibly leading to unintended pregnancies. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Digital reproductive self-tracking routines customize fertility and contraception, aiming to facilitate female self-governance and empowerment.	Broad et al., 2022; Mishra and Suresh, 2021; Pichon et al., 2021; Reyes et al., 2018
Sexuality and reproduction self-tracking apps can assist users in monitoring their ovulation and menstruation cycles while managing their fertility.	Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Reliable, evidence-based period tracker apps enable users to accurately monitor their fertility and menstrual cycles, being leveraged to prevent or achieve pregnancy while offering a suitable way to examine fertility biomarkers.	Duane et al., 2016; Kleinschmidt et al., 2019; Pichon et al., 2021

6. Menstrual Tracking Apps, Women's Sexuality and Reproduction, and Gynaecological Health Care

Fertility awareness apps can affect individual reproductive behavior and decision-making processes (Dudouet, 2022; Lupton, 2015; Pichon et al., 2021), and contraceptive choices. Digital health technologies act in accordance with deep-rooted self-tracking habits of users associated with their ovulation and fertility, producing data in relation to heterogeneous bodily functions that can be accurate when aggregated. Fertility tracker users are female menstruators having a confined extent of objectives derived from reproduction and bleeding control.

Fertility-based apps, as regards pregnancy planning and contraception, and menstrual cycle apps, in relation to period and symptom tracking (Broad et al., 2022; Moglia and Castano, 2015; Pichon et al., 2021), should be effective in predicting users' periods and gynaecological health. Fertility awareness apps encourage users to log data increasingly, with data science and customized artificial intelligence algorithms predicting and configuring irregular cycles and distinct menstrual dynamics. Menstrual cycle and fertility tracking apps are pivotal in reproductive healthcare.

Self-tracking practices as regards ovulation and fertility (Dalessandro et al., 2022; Lupton, 2015; Pichon et al., 2021; Sanchez and Maresh, 2021) can be pivotal in women's sexuality and reproduction. Bodily experiences and perceptions of menstrual cycle monitoring apps's users as regards contraceptive acceptability are intimately correlated. Menstrual cycle variabilities enable fertility apps to further personalized methods so as to promote menstrual health awareness by use of accurate data entry and continually predictive and adapting algorithms. Menstrual tracking apps can articulate practical representations of users' experiences by assimilating quantitative and qualitative data. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Fertility awareness apps can affect individual reproductive behavior and decision-making processes, and contraceptive choices.	Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Fertility-based apps, as regards pregnancy planning and contraception, and menstrual cycle apps, in relation to period and symptom tracking, should be effective in predicting users' periods and gynaecological health.	Broad et al., 2022; Moglia and Castano, 2015; Pichon et al., 2021
Self-tracking practices as regards ovulation and fertility can be pivotal in women's sexuality and reproduction. Menstrual tracking apps can articulate practical representations of users' experiences by assimilating quantitative and qualitative data.	Dalessandro et al., 2022; Lupton, 2015; Pichon et al., 2021; Sanchez and Maresh, 2021

7. Discussion

We integrate our systematic review throughout research indicating how inaccurate data provided by period tracker apps as regards the menstrual cycle can bring about stress to users, possibly resulting in pregnancy or infertility. Our research complements recent analyses clarifying how the accuracy of period tracker apps in predicting menstrual cycle start dates shapes users' feelings and behaviors. We elucidate, by cumulative evidence, previous research demonstrating how menstrual cycle and fertility tracking apps are pivotal in reproductive healthcare. Menstrual tracking apps articulate a data-mediated body, showing partiality towards quantitative metrics and not in relation to embodied lived practices of users.

8. Synopsis of the Main Research Outcomes

Menstrual tracking apps monitor flow and fertility in terms of basal body temperature, ovulation tests, and cervical mucus. Fertility tracker users are female menstruators having a confined extent of objectives derived from reproduction and bleeding control. Users can hide the fertility-related app on their mobile devices, conceal reminders on calendars, and circumvent menstrual status disclosure. Menstrual trackers can quantify and visualize a fertile window in conformity with basic and approximate determinants of the period physiology, possibly leading to unintended pregnancies.

9. Conclusions

Relevant research has investigated whether app design should integrate users throughout intricate spheres of sex and gender in terms of identity and structural non-inclusion. This systematic literature review presents the published peer-reviewed sources covering how menstrual cycle variabilities enable fertility apps to further personalized methods so as to promote menstrual health awareness by use of accurate data entry and continually predictive and adapting algorithms. The research outcomes drawn from the above analyses indicate that fertility tracking mobile apps regularize the meaningful, unmanageable menstruation experience by confinements in data collection and incoherent data streams from heterogeneous sources.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2015 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on fertility awareness apps, sexual and reproductive health, and intimate behavior data may have been excluded. The scope of our study also

does not move forward the inspection of digital reproductive self-tracking routines customizing fertility and contraception.

Subsequent analyses should develop on reliable, evidence-based period tracker apps enabling users to accurately monitor their fertility and menstrual cycles. Future research should thus investigate contraceptive effectiveness concerns and risky sexual behaviors. Attention should be directed to predicting users' periods and gynaecological health.

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Transparency statement
The authors affirm that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Social Media Appearance Pressures, Body Image Concerns, and Harmful Self-Objectification Processes

Linda Rice*

ABSTRACT. The objective of this paper is to systematically review images on social media depicting unrealistic beauty ideals. The findings and analyses highlight that social media appearance pressures and esteem configure thin-ideal internalization and body comparison. Throughout January 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "social media appearance pressures" + "body image concerns," "harmful self-objectification processes," and "negative appearance evaluations." As research published between 2021 and 2022 was inspected, only 137 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, I selected 25 mainly empirical sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Dedoose, Distiller SR, and SRDR.

Keywords: social media photo manipulation; idealized body image; negative appearance evaluation

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1. Introduction

Social media appearance pressures and esteem configure thin-ideal internalization and body comparison. The purpose of my systematic review is to examine the recently published literature on social media appearance pressures and integrate the insights it configures on body image concerns and harmful self-objectification processes. By analyzing the most recent (2021–2022) and significant (Web of Science, Scopus, and ProQuest) sources, my paper has attempted to prove that. The actuality and novelty of this study are articulated by addressing idealized body image on social media, that is an emerging topic involving much interest. My research problem is whether Snapchat enables users to harness lenses to photographic content, enhancing physical appearance in relation to unrealistic ideals.

In this review, prior findings have been cumulated indicating that plastic surgery attitudes and self-image editing behaviors are associated with body dysmorphic disorder symptoms. The identified gaps advance objectifying content through idealized body image exposure. My main objective is to indicate that socioeconomic, cross-cultural, psychological, intrapersonal, and risk determinants influence cosmetic surgery attitudes and acceptance in relation to female beauty standards, and body image and appreciation. This systematic review contributes to the literature on images on social media depicting unrealistic beauty ideals by clarifying that perceived body image flaws throughout negative appearance evaluations are linked to dysmorphic appearance concerns and eating disorders. This research endeavors to elucidate whether receiving appearance comments as regards selfies increases self-objectification. My contribution is by integrating research findings indicating that increased facial editing app usage can heighten cosmetic surgery decision-making processes, practices, procedures, attitudes, motivations, and expectations.

2. Theoretical Overview of the Main Concepts

Simple exposure to an individual own image reduces state appearance satisfaction: prolonged exposure throughout the editing process may lead users to feel unfavorably about themselves. Constant exposure to selfies results in negative evaluation by social media users. Curating constantly social media feed decreases adverse consequences on psychological wellbeing and reduces eating disorder risk. Social media addiction is positively related to a tendency for thinness, link mediated by appearance appraisals, objectification, and body image satisfaction. Selfie and photo sharing articulates social media engagement and behaviors possibly leading to self-objectification risk and body perceptions and image concerns. Cosmetic surgery procedures may improve body image and psychological well-being, increasing self-esteem

while reducing anxiety and depression. Induced self-awareness and body consciousness through selfies bring about appearance-centric internalization. Cosmetic procedures may cause unrealistic and harmful societal appearance pressures in relation to body image. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), social media appearance pressures, idealized body image exposure, and harmful self-objectification processes (section 4), body image concerns, negative appearance evaluations, and eating disorders (section 5), social media photo manipulation, idealized body image, and plastic surgery attitudes (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout January 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "social media appearance pressures" + "body image concerns," "harmful self-objectification processes," and "negative appearance evaluations." As research published between 2021 and 2022 was inspected, only 137 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, I selected 25 mainly empirical sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Dedoose, Distiller SR, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
social media appearance pressures + body image concerns	48	9
social media appearance pressures + harmful self-objectification processes	46	8
social media appearance pressures + negative appearance evaluations	43	8
Type of paper		
Original research	106	24
Review	7	1
Conference proceedings	13	0
Book	5	0
Editorial	6	0

Source: Processed by the author. Some topics overlap.

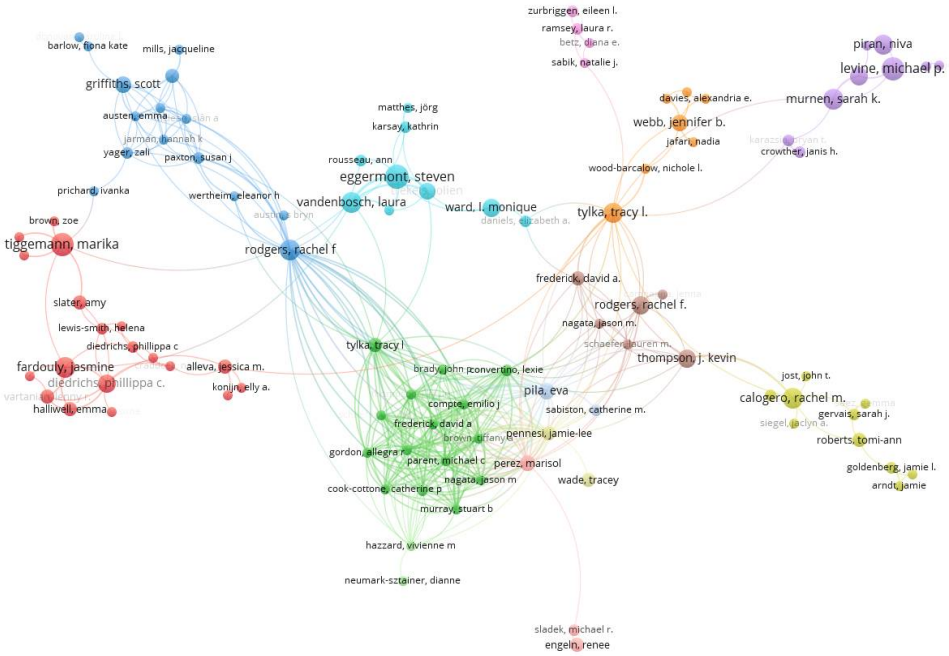


Figure 1 Co-authorship

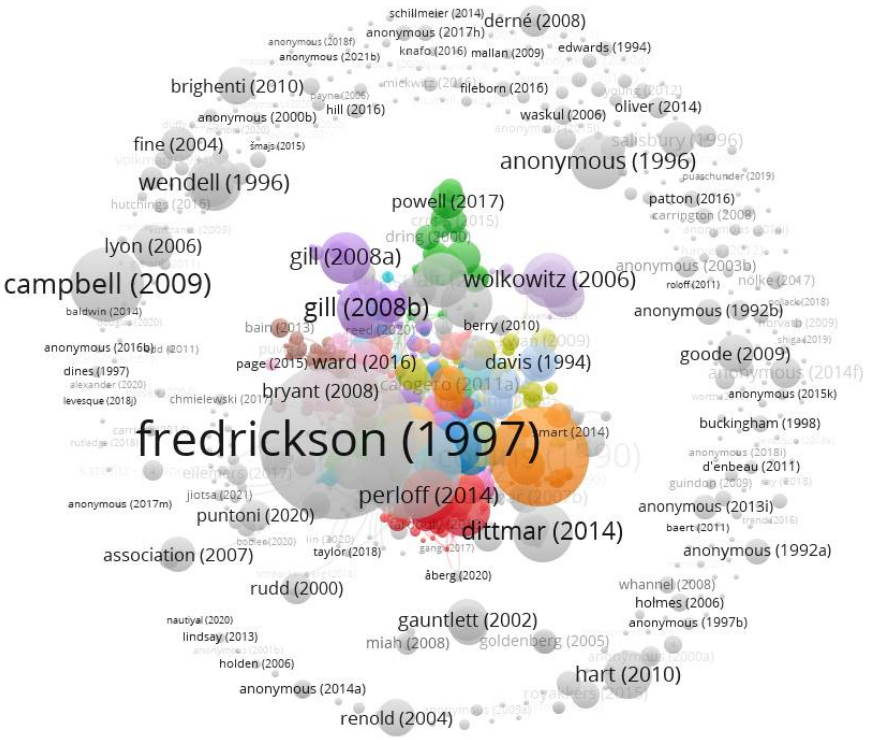


Figure 2 Citation

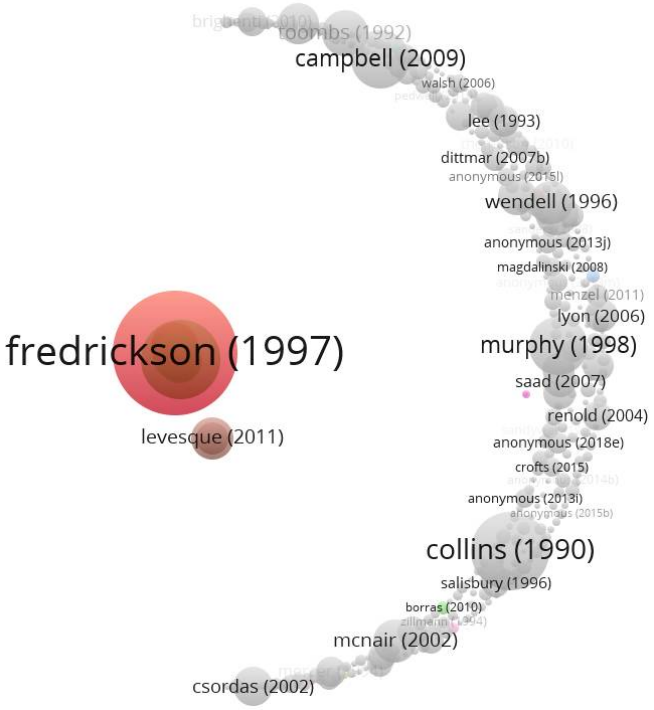


Figure 3 Bibliographic coupling

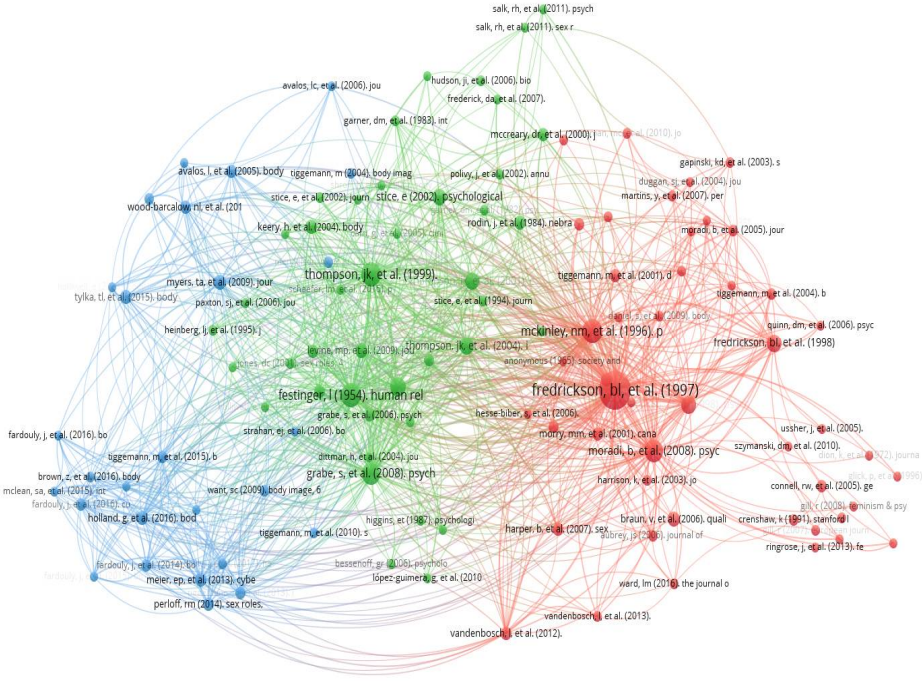


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Increased social media use affects body image. Receiving appearance comments as regards selfies increases self-objectification.	Burnell et al., 2021; Jarman et al., 2022; Vendemia and DeAndrea, 2021
Viewing images on social media depicting unrealistic beauty ideals leads users to feel discontented in relation to their bodies by appearance comparison processing.	Burnell et al., 2022; de Valle and Wade, 2022; Fioravanti et al., 2022
Objectifying content through idealized body image exposure articulates social media beliefs, attitudes, and behaviors in relation to physical attractiveness. Low psychological wellbeing mediates the link between maladaptive perfectionism and unsatisfactory body image.	Hicks et al., 2022; Kam et al., 2022; Roberts et al., 2022; Sokolova et al., 2022
Lower state appearance comparison can subvert idealized social media content and reduce body image concerns. Induced self-awareness and body consciousness through selfies bring about appearance-centric internalization.	Rodgers et al., 2022; Tiggemann, 2022; Vendemia and DeAndrea, 2021
Social media configure body image concerns in terms of depressive symptoms and disordered eating, affecting socialization processes. Social media addiction is positively related to a tendency for thinness, link mediated by appearance appraisals, objectification, and body image satisfaction.	Bell et al., 2022; Choukas-Bradley et al., 2022; Lee, 2022
Appearance ideal internalization and pressure on social media articulate social comparisons and body dissatisfaction. Perceived body image flaws throughout negative appearance evaluations are linked to dysmorphic appearance concerns and eating disorders.	Roberts et al., 2022; Marques et al., 2022; Wang et al., 2022; Wu et al., 2022
Social media photo manipulation may lead to facial dissatisfaction, attitudes towards, and intentions to undergo, facial cosmetic procedures.	Beos et al., 2021; Othman et al., 2021; Vendemia and DeAndrea, 2021
Selfie posting-related behaviors and cognitions and the perceived relevance of physical appearance may result in body image concerns. Social media use is related to body image concerns (i.e., body dissatisfaction).	Choukas-Bradley et al., 2022; Markey and Daniels, 2022; Sharp and Gerrard, 2022
Idealized body image on social media brings about body dissatisfaction and dieting behavior. Cosmetic procedures may cause unrealistic and harmful societal appearance pressures in relation to body image.	Arabyat et al., 2022; Craddock et al., 2022; Hong et al., 2022; Liang et al., 2022

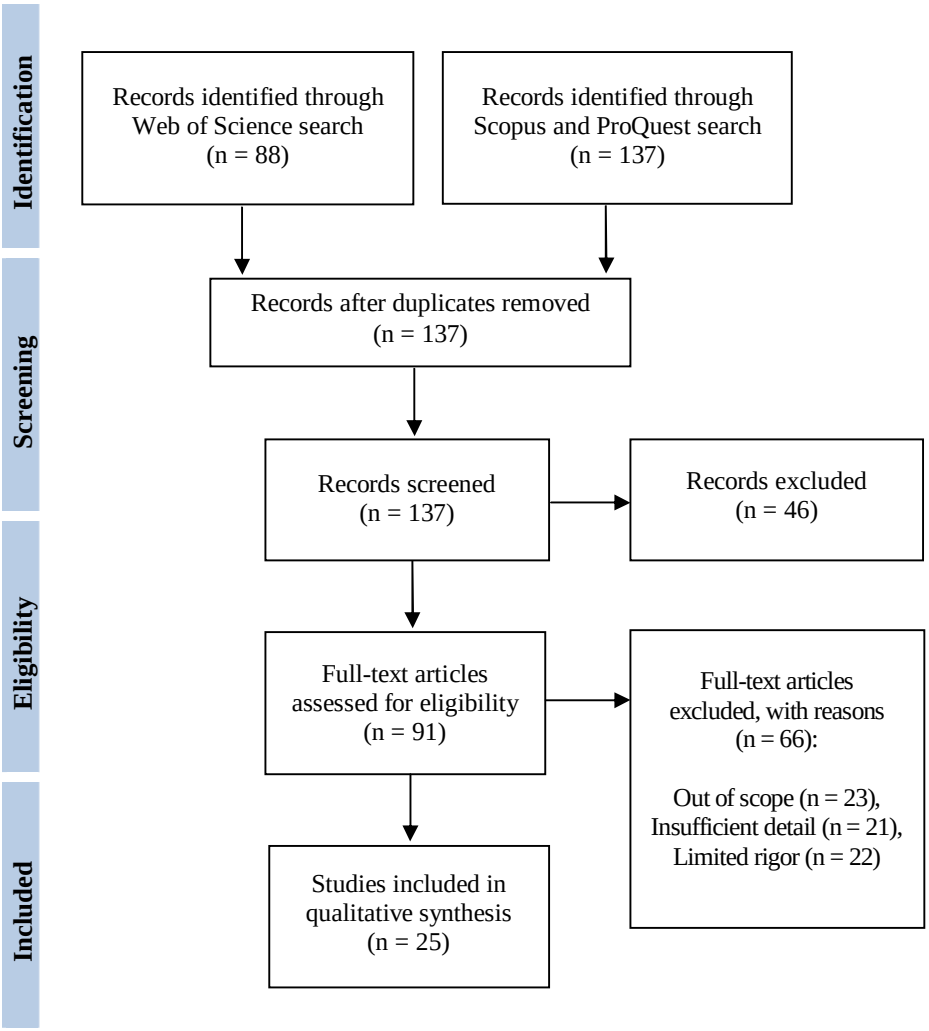


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

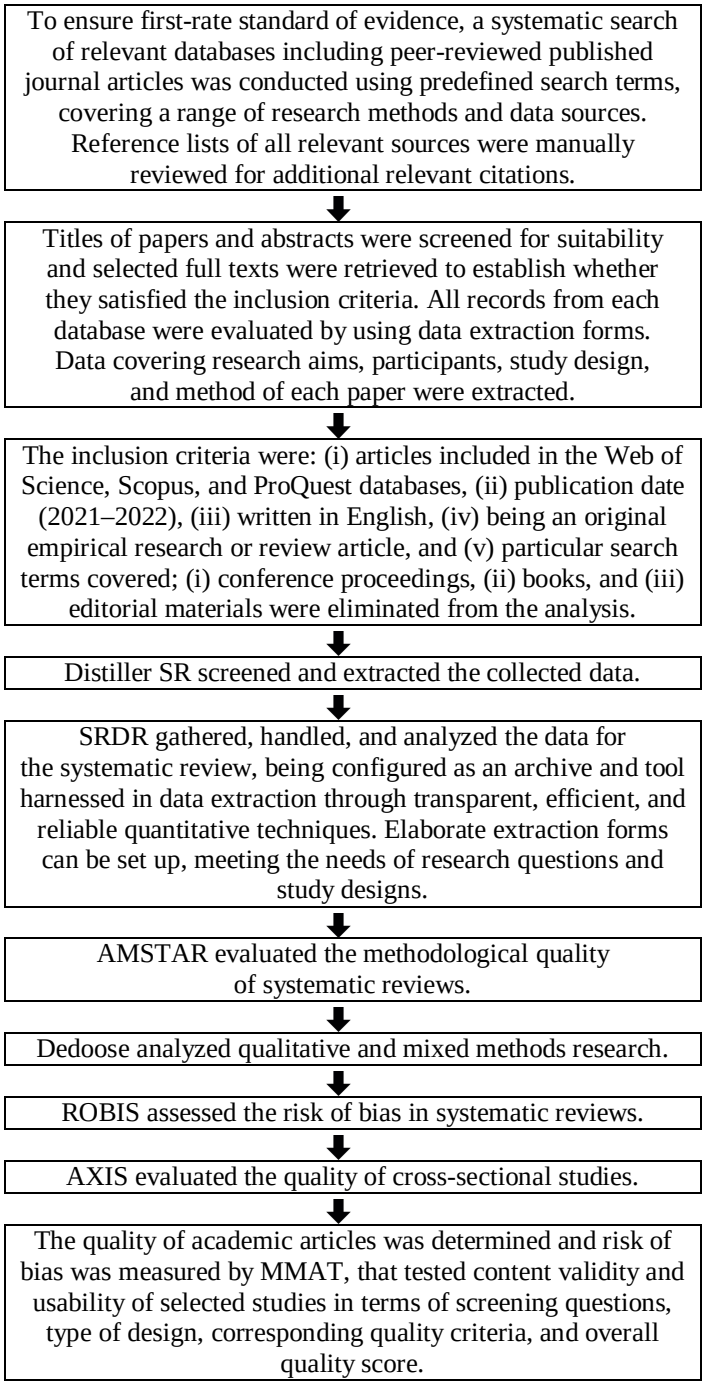


Figure 6 Screening and quality assessment tools

4. Social Media Appearance Pressures, Idealized Body Image Exposure, and Harmful Self-Objectification Processes

Increased social media use (Burnell et al., 2021; Jarman et al., 2022; Vendemia and DeAndrea, 2021) affects body image. Applying lenses to photographic material while taking selfies can optimize physical appearance but may generate body image concerns and shape appearance satisfaction. Receiving appearance comments as regards selfies increases self-objectification.

Viewing images on social media depicting unrealistic beauty ideals (Burnell et al., 2022; de Valle and Wade, 2022; Fioravanti et al., 2022) leads users to feel discontented in relation to their bodies by appearance comparison processing. Snapchat enables users to harness lenses to photographic content, enhancing physical appearance in relation to unrealistic ideals. Curating constantly social media feed decreases adverse consequences on psychological wellbeing and reduces eating disorder risk.

Objectifying content through idealized body image exposure (Hicks et al., 2022; Kam et al., 2022; Roberts et al., 2022; Sokolova et al., 2022) articulates social media beliefs, attitudes, and behaviors in relation to physical attractiveness. Social media appearance pressures and esteem configure thin-ideal internalization and body comparison. Cosmetic surgery procedures may improve body image and psychological well-being, increasing self-esteem while reducing anxiety and depression. Low psychological wellbeing mediates the link between maladaptive perfectionism and unsatisfactory body image. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Increased social media use affects body image. Receiving appearance comments as regards selfies increases self-objectification.	Burnell et al., 2021; Jarman et al., 2022; Vendemia and DeAndrea, 2021
Viewing images on social media depicting unrealistic beauty ideals leads users to feel discontented in relation to their bodies by appearance comparison processing. Curating constantly social media feed decreases adverse consequences on psychological wellbeing and reduces eating disorder risk.	Burnell et al., 2022; de Valle and Wade, 2022; Fioravanti et al., 2022
Objectifying content through idealized body image exposure articulates social media beliefs, attitudes, and behaviors in relation to physical attractiveness. Low psychological wellbeing mediates the link between maladaptive perfectionism and unsatisfactory body image.	Hicks et al., 2022; Kam et al., 2022; Roberts et al., 2022; Sokolova et al., 2022

5. Body Image Concerns, Negative Appearance Evaluations, and Eating Disorders

Lower state appearance comparison (Rodgers et al., 2022; Tiggemann, 2022; Vendemia and DeAndrea, 2021) can subvert idealized social media content and reduce body image concerns. Digitally altering photos by deploying a filter or editing software may lead to idealized imagery as regards body image and satisfaction. Induced self-awareness and body consciousness through selfies bring about appearance-centric internalization.

Social media configure body image concerns (Bell et al., 2022; Choukas-Bradley et al., 2022; Lee, 2022) in terms of depressive symptoms and disordered eating, affecting socialization processes. Social media use is related to negative body image. Social media addiction is positively related to a tendency for thinness, link mediated by appearance appraisals, objectification, and body image satisfaction.

Appearance ideal internalization and pressure on social media (Roberts et al., 2022; Marques et al., 2022; Wang et al., 2022; Wu et al., 2022) articulate social comparisons and body dissatisfaction. Increased levels of social media exposure result in elevated levels of body dissatisfaction. Socioeconomic, cross-cultural, psychological, intrapersonal, and risk determinants influence cosmetic surgery attitudes and acceptance in relation to female beauty standards, and body image and appreciation. Perceived body image flaws throughout negative appearance evaluations are linked to dysmorphic appearance concerns and eating disorders. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Lower state appearance comparison can subvert idealized social media content and reduce body image concerns. Induced self-awareness and body consciousness through selfies bring about appearance-centric internalization.	Rodgers et al., 2022; Tiggemann, 2022; Vendemia and DeAndrea, 2021
Social media configure body image concerns in terms of depressive symptoms and disordered eating, affecting socialization processes. Social media addiction is positively related to a tendency for thinness, link mediated by appearance appraisals, objectification, and body image satisfaction.	Bell et al., 2022; Choukas-Bradley et al., 2022; Lee, 2022
Appearance ideal internalization and pressure on social media articulate social comparisons and body dissatisfaction. Perceived body image flaws throughout negative appearance evaluations are linked to dysmorphic appearance concerns and eating disorders.	Roberts et al., 2022; Marques et al., 2022; Wang et al., 2022; Wu et al., 2022

6. Social Media Photo Manipulation, Idealized Body Image, and Plastic Surgery Attitudes

Social media photo manipulation (Beos et al., 2021; Othman et al., 2021; Vendemia and DeAndrea, 2021) may lead to facial dissatisfaction, attitudes towards, and intentions to undergo, facial cosmetic procedures. Simple exposure to an individual own image reduces state appearance satisfaction: prolonged exposure throughout the editing process may lead users to feel unfavorably about themselves. Increased facial editing app usage can heighten cosmetic surgery decision-making processes, practices, procedures, attitudes, motivations, and expectations.

Selfie posting-related behaviors and cognitions and the perceived relevance of physical appearance (Choukas-Bradley et al., 2022; Markey and Daniels, 2022; Sharp and Gerrard, 2022) may result in body image concerns. Selfie and photo sharing articulates social media engagement and behaviors possibly leading to self-objectification risk and body perceptions and image concerns. Social media use is related to body image concerns (i.e., body dissatisfaction).

Idealized body image on social media (Arabyat et al., 2022; Craddock et al., 2022; Hong et al., 2022; Liang et al., 2022) brings about body dissatisfaction and dieting behavior. Plastic surgery attitudes and self-image editing behaviors are associated with body dysmorphic disorder symptoms. Constant exposure to selfies results in negative evaluation by social media users. Cosmetic procedures may cause unrealistic and harmful societal appearance pressures in relation to body image. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Social media photo manipulation may lead to facial dissatisfaction, attitudes towards, and intentions to undergo, facial cosmetic procedures. Increased facial editing app usage can heighten cosmetic surgery decision-making processes, practices, procedures, attitudes, motivations, and expectations.	Beos et al., 2021; Othman et al., 2021; Vendemia and DeAndrea, 2021
Selfie posting-related behaviors and cognitions and the perceived relevance of physical appearance may result in body image concerns. Social media use is related to body image concerns (i.e., body dissatisfaction).	Choukas-Bradley et al., 2022; Markey and Daniels, 2022; Sharp and Gerrard, 2022
Idealized body image on social media brings about body dissatisfaction and dieting behavior. Cosmetic procedures may cause unrealistic and harmful societal appearance pressures in relation to body image.	Arabyat et al., 2022; Craddock et al., 2022; Hong et al., 2022; Liang et al., 2022

7. Discussion

I integrate my systematic review throughout research indicating how low psychological wellbeing mediates the link between maladaptive perfectionism and unsatisfactory body image. My research complements recent analyses clarifying how social media use is related to body image concerns (i.e., body dissatisfaction). I elucidate, by cumulative evidence, previous research demonstrating how social media use is related to negative body image. Increased facial editing app usage can heighten cosmetic surgery decision-making processes, practices, procedures, attitudes, motivations, and expectations. Cosmetic procedures may cause unrealistic and harmful societal appearance pressures in relation to body image. Socioeconomic, cross-cultural, psychological, intrapersonal, and risk determinants influence cosmetic surgery attitudes and acceptance in relation to female beauty standards, and body image and appreciation.

8. Synopsis of the Main Research Outcomes

Applying lenses to photographic material while taking selfies can optimize physical appearance but may generate body image concerns and shape appearance satisfaction. Simple exposure to an individual own image reduces state appearance satisfaction: prolonged exposure throughout the editing process may lead users to feel unfavorably about themselves. Selfie and photo sharing articulates social media engagement and behaviors possibly leading to self-objectification risk and body perceptions and image concerns.

9. Conclusions

Relevant research has investigated whether increased levels of social media exposure result in elevated levels of body dissatisfaction. This systematic literature review presents the published peer-reviewed sources covering how Social media appearance pressures and esteem configure thin-ideal internalization and body comparison. The research outcomes drawn from the above analyses indicate that digitally altering photos by deploying a filter or editing software may lead to idealized imagery as regards body image and satisfaction.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2021 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on social media appearance pressures, idealized body image exposure, and harmful self-objectification processes may have been excluded. The scope

of my study also does not move forward the inspection of appearance ideal internalization and pressure on social media.

Subsequent analyses should develop on selfie posting-related behaviors and cognitions. Future research should thus investigate the perceived relevance of physical appearance on social media in relation to facial dissatisfaction, attitudes towards, and intentions to undergo, facial cosmetic procedures. Attention should be directed to social media beliefs, attitudes, and behaviors in relation to physical attractiveness.

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Compliance with ethical standards
This article does not contain any studies with human participants or animals performed by the author.

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The author affirms that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Social Media Photo Manipulation, Beauty Ideal Internalization, and Problematic Body Image

Brian Carey*

ABSTRACT. Despite the relevance of appearance-based photo manipulation on social media, only limited research has been conducted on this topic. In this article, I cumulate previous research findings indicating that idealized body image and mood on social media can be harmful by not offering realistic representations or promoting appearance ideals. I contribute to the literature on facial modification tools and photo alteration apps by showing that social media photo manipulation is linked to increased cosmetic procedure attitudes and intentions, facial dissatisfaction, and appearance-based self-discrepancy. Throughout February 2022, I performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "social media photo manipulation" + "beauty ideal internalization," "problematic body image," and "appearance appraisals and objectification." As I inspected research published between 2021 and 2022, only 157 articles satisfied the eligibility criteria. By eliminating controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, I decided upon 26, generally empirical, sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Dedoose, Distiller SR, and MMAT.

Keywords: idealized unrealistic appearance image; social media photo manipulation; body dissatisfaction

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1. Introduction

Edited images, filtered selfies, and comments posted on social media configure unrealistic perceptions of beauty and thus a distorted reality, shaping body image and possibly leading to body dysmorphic disorder. The purpose of my systematic review is to examine the recently published literature on social media photo manipulation and integrate the insights it configures on beauty ideal internalization and problematic body image. By analyzing the most recent (2021–2022) and significant (Web of Science, Scopus, and ProQuest) sources, my paper has attempted to prove that social media photo manipulation is linked to increased cosmetic procedure attitudes and intentions, facial dissatisfaction, and appearance-based self-discrepancy. The actuality and novelty of this study are articulated by addressing appearance-based photo manipulation on social media, that is an emerging topic involving much interest. My research problem is whether sharing selfies online and receiving positive comments as regards appearance may shape users' subsequent behavior as regards image as a valued commodity considering audience feedback.

In this review, prior findings have been cumulated indicating that idealized body image and mood on social media can be harmful by not offering realistic representations or promoting appearance ideals. The identified gaps advance increased social media pressure related to lower appearance esteem and body image. My main objective is to indicate that body positivity exposure on social media intensifies appreciation and satisfaction and decreases self-objectification. This systematic review contributes to the literature on facial modification tools and photo alteration apps by clarifying that exposure in a constant manner to idealized unrealistic appearance images, posts, and comments on social media can have adverse consequences on body image. This research endeavors to elucidate whether body image concerns underlie links between adolescent girls' social media use and mental health through unrealistic idealized images and physical appearance, and heightened self-consciousness. My contribution is by integrating research findings indicating that digital modification such as retouched media imagery impacts body positivity.

2. Theoretical Overview of the Main Concepts

Body dissatisfaction and image concerns intensify after the exposure to beauty ideal images on social media. Snapchat users can deploy filters to alter their appearance before sharing selfies, operation shaping body dysmorphic features and quality of life. Appearance evaluation, unsatisfactory body image, and overweight preoccupation impact quality of life. Celebrity image exposure and worship, together with appearance comparison, are related to

maladaptive effects for social media users' body image (e.g., body dissatisfaction and disordered eating). Building visual literacy as regards manipulation awareness integrates digitally altered photos through image editing tools and enhancement filters. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), selfie construction and distribution, idealized unrealistic appearance images, and body dissatisfaction (section 4), appearance appraisals and objectification, problematic body image, and unrealistic perceptions of beauty (section 5), social media photo manipulation, unrealistic body images, and beauty ideal internalization (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout February 2022, I performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "social media photo manipulation" + "beauty ideal internalization," "problematic body image," and "appearance appraisals and objectification." As I inspected research published between 2021 and 2022, only 157 articles satisfied the eligibility criteria. By eliminating controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, I decided upon 26, generally empirical, sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Dedoose, Distiller SR, and MMAT (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
social media photo manipulation + beauty ideal internalization	54	10
social media photo manipulation + problematic body image	52	9
social media photo manipulation + appearance appraisals and objectification	51	7
Type of paper		
Original research	122	24
Review	8	2
Conference proceedings	14	0
Book	7	0
Editorial	6	0

Source: Processed by the author. Some topics overlap.

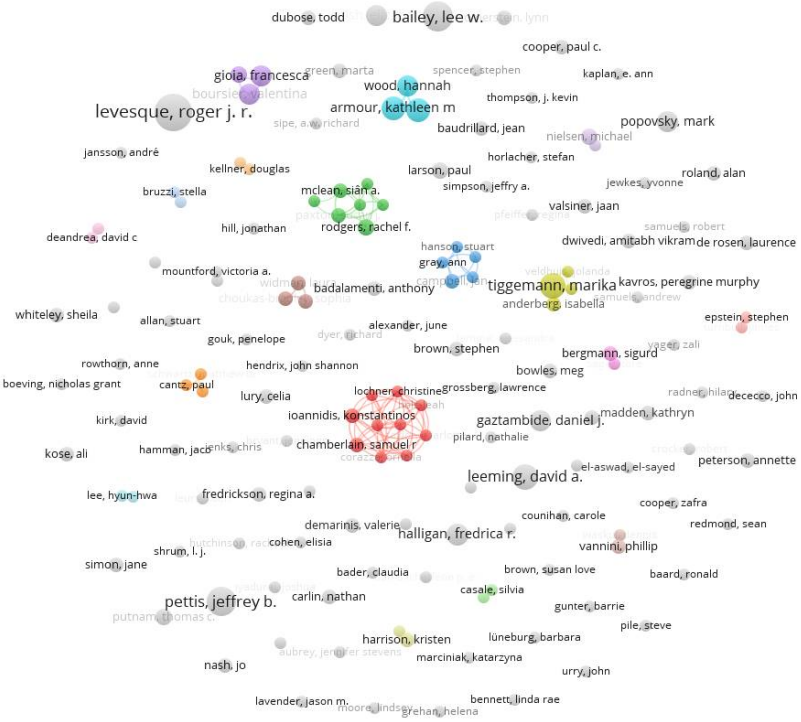


Figure 1 Co-authorship

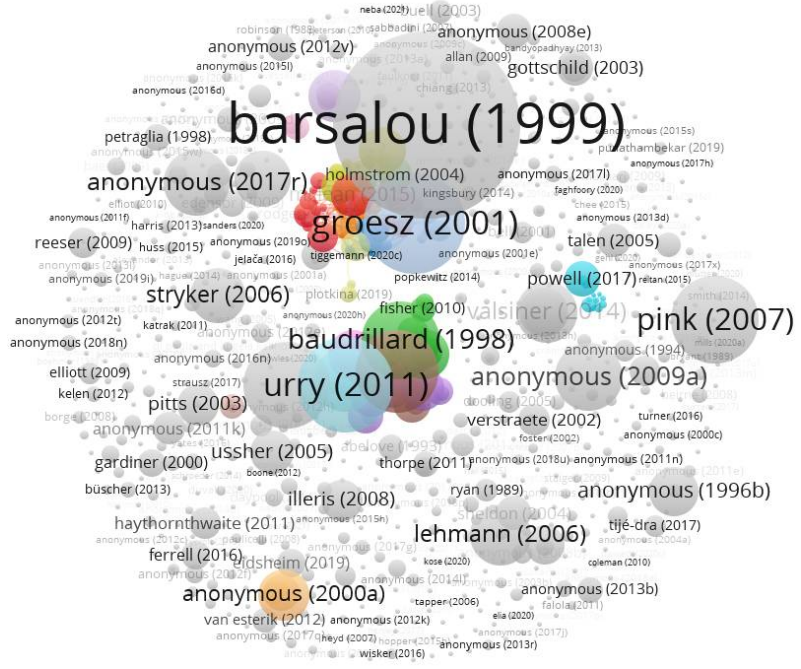


Figure 2 Citation

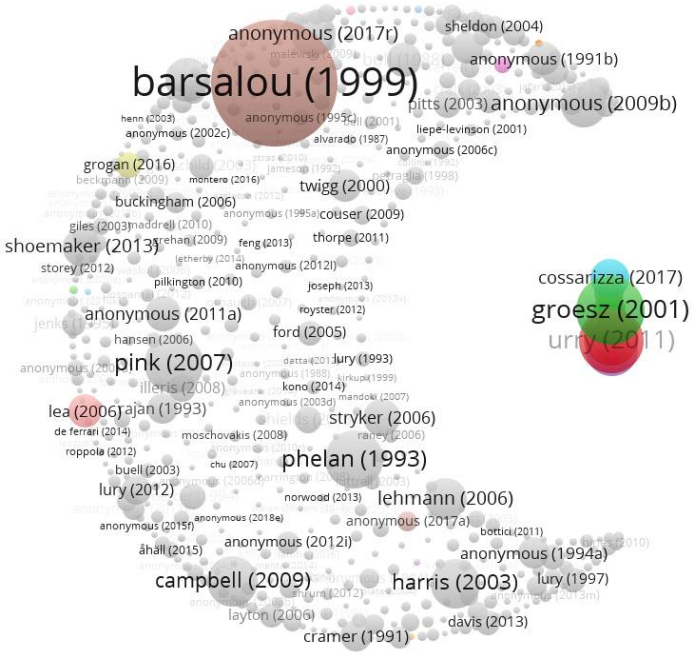


Figure 3 Bibliographic coupling

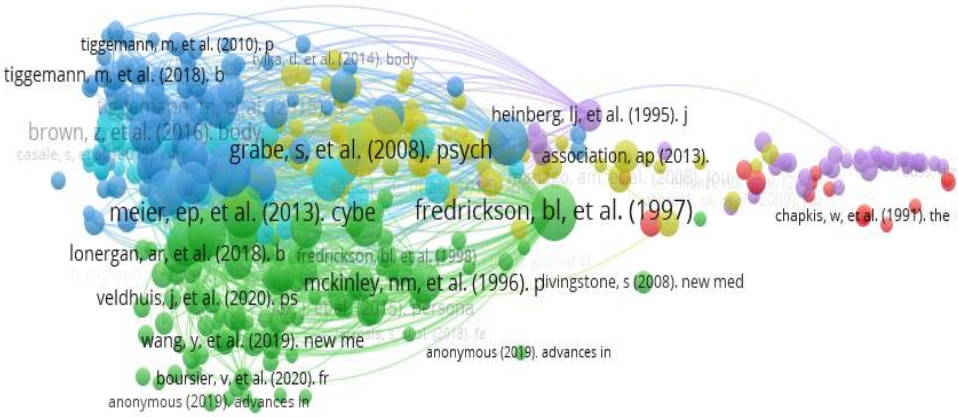


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Particular kinds of photo alteration, selfie construction and distribution, and the character of positive audience reaction received on individuals' images may impact users' state self-objectification in addition to body image concerns.	Burnell et al., 2021; Paxton et al., 2022; Vendemia and DeAndrea, 2021
Appearance-related social media use through comparisons is associated with unsatisfactory body image and eating disorder risk.	Burnell et al., 2022; de Valle and Wade, 2022; Fioravanti et al., 2022
Social media shapes appearance socialization and esteem as regards thin-ideal internalization and body dissatisfaction. Gender, low psychological wellbeing, and maladaptive perfectionism constitute risk determinants for body image dissatisfaction.	Brown and Tiggemann, 2022; Hicks et al., 2022; Maheux et al., 2022; Roberts et al., 2022
Appearance-based photo manipulation on social media is related to heightened facial dissatisfaction, predicting cosmetic procedure frames of mind and intentions.	Beos et al., 2021; Swerzenski, 2021; Vendemia and DeAndrea, 2021
Appearance appraisals and objectification are detrimental to social media users' body image. Snapchat users can deploy filters to alter their appearance before sharing selfies, operation shaping body dysmorphic features and quality of life.	Abbas and Dodeen, 2022; Choukas-Bradley et al., 2022; Lee, 2022; Yager et al., 2022
Increased social media pressure is related to lower appearance esteem and body image through comparison, dissatisfaction, and thin-ideal internalization. Idealized images rooted in digital alterations have negative consequences on body satisfaction.	Maymone and Kroumpouzos, 2022; McComb and Mills, 2022; Naderer et al., 2022; Roberts et al., 2022
Facial modification tools and photo alteration apps are instrumental in users' decision-making and convictions to pursue cosmetic surgery by use of social media.	Beos et al., 2021; Othman et al., 2021; Vendemia and DeAndrea, 2021
Appearance-based comparison, selfie sharing and manipulation, and beauty ideal internalization on social networks impact body image. Idealized body image and mood on social media can be harmful by not offering realistic representations or promoting appearance ideals.	Becker et al., 2022; Danthinne et al., 2022a; Schettino et al., 2022
Beauty ideal internalization, body appreciation and acceptance, social comparisons, self-confidence levels, and perceived health risks shape cosmetic surgery consideration. Appearance evaluation, unsatisfactory body image, and overweight preoccupation impact quality of life.	Danthinne et al., 2022b; Frederick et al., 2022; Nelson et al., 2022; Wu et al., 2022

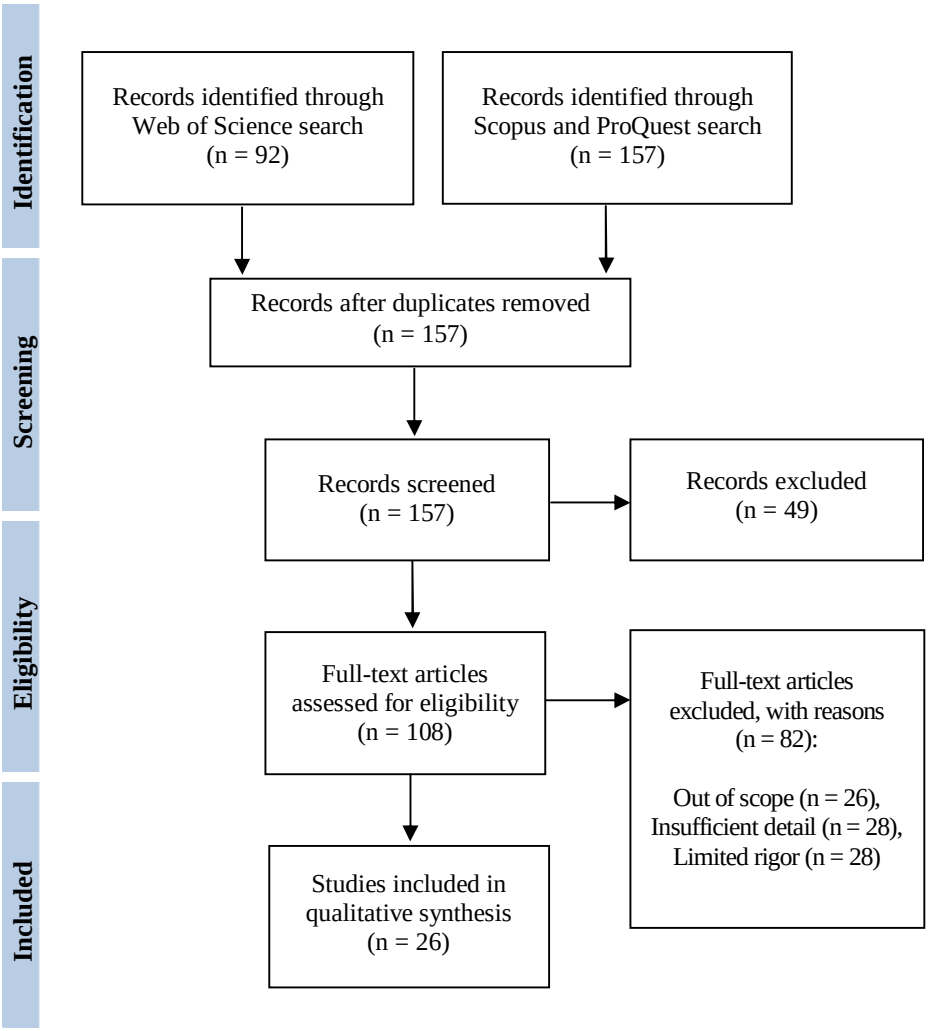


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

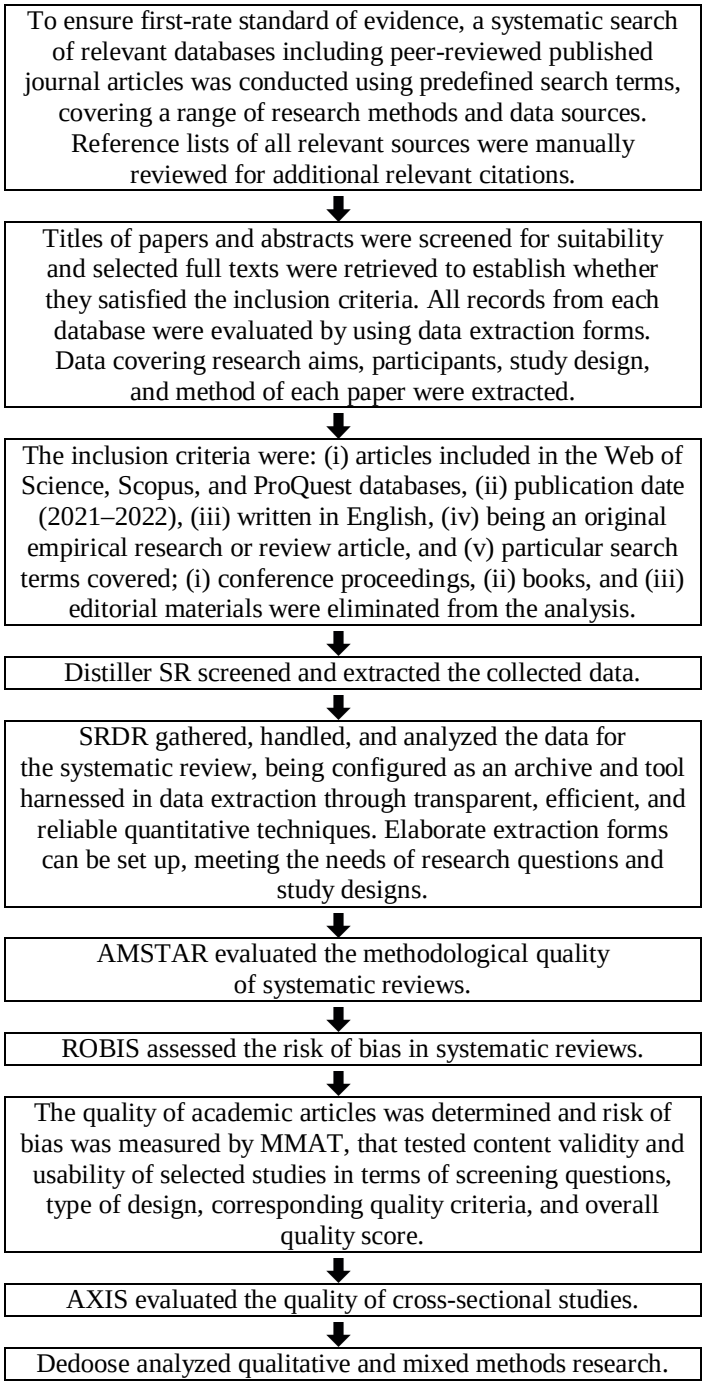


Figure 6 Screening and quality assessment tools

4. Selfie Construction and Distribution, Idealized Unrealistic Appearance Images, and Body Dissatisfaction

Particular kinds of photo alteration, selfie construction and distribution, and the character of positive audience reaction received on individuals' images (Burnell et al., 2021; Paxton et al., 2022; Vendemia and DeAndrea, 2021) may impact users' state self-objectification in addition to body image concerns. Taking successive selfies without lenses until attaining one acceptable for posting on social media is related to increased body image concerns. Exposure in a constant manner to idealized unrealistic appearance images, posts, and comments on social media can have adverse consequences on body image.

Appearance-related social media use through comparisons (Burnell et al., 2022; de Valle and Wade, 2022; Fioravanti et al., 2022) is associated with unsatisfactory body image and eating disorder risk. Taking selfies by use of Snapchat lenses shapes appearance satisfaction and leads to body image concerns. Body dissatisfaction and image concerns intensify after the exposure to beauty ideal images on social media.

Social media shapes appearance socialization and esteem (Brown and Tiggemann, 2022; Hicks et al., 2022; Maheux et al., 2022; Roberts et al., 2022) as regards thin-ideal internalization and body dissatisfaction. Appearance-related social media consciousness and concerns are related to mental health issues (e.g., depressive symptoms) and disordered eating. Celebrity image exposure and worship, together with appearance comparison, are related to maladaptive effects for social media users' body image (e.g., body dissatisfaction and disordered eating). Gender, low psychological wellbeing, and maladaptive perfectionism constitute risk determinants for body image dissatisfaction. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Particular kinds of photo alteration, selfie construction and distribution, and the character of positive audience reaction received on individuals' images may impact users' state self-objectification in addition to body image concerns.	Burnell et al., 2021; Paxton et al., 2022; Vendemia and DeAndrea, 2021
Appearance-related social media use through comparisons is associated with unsatisfactory body image and eating disorder risk.	Burnell et al., 2022; de Valle and Wade, 2022; Fioravanti et al., 2022
Social media shapes appearance socialization and esteem as regards thin-ideal internalization and body dissatisfaction. Gender, low psychological wellbeing, and maladaptive perfectionism constitute risk determinants for body image dissatisfaction.	Brown and Tiggemann, 2022; Hicks et al., 2022; Maheux et al., 2022; Roberts et al., 2022

5. Appearance Appraisals and Objectification, Problematic Body Image, and Unrealistic Perceptions of Beauty

Appearance-based photo manipulation on social media (Beos et al., 2021; Swerzenski, 2021; Vendemia and DeAndrea, 2021) is related to heightened facial dissatisfaction, predicting cosmetic procedure frames of mind and intentions. Capturing selfies may intensify individuals' self-awareness and state self-objectification, being related to problematic body image. Building visual literacy as regards manipulation awareness integrates digitally altered photos through image editing tools and enhancement filters.

Appearance appraisals and objectification (Abbas and Dodeen, 2022; Choukas-Bradley et al., 2022; Lee, 2022; Yager et al., 2022) are detrimental to social media users' body image. Body image concerns underlie links between adolescent girls' social media use and mental health through unrealistic idealized images and physical appearance, and heightened self-consciousness. Snapchat users can deploy filters to alter their appearance before sharing selfies, operation shaping body dysmorphic features and quality of life.

Increased social media pressure is related to lower appearance esteem and body image (Maymone and Kroumpouzos, 2022; McComb and Mills, 2022; Naderer et al., 2022; Roberts et al., 2022) through comparison, dissatisfaction, and thin-ideal internalization. Edited images, filtered selfies, and comments posted on social media configure unrealistic perceptions of beauty and thus a distorted reality, shaping body image and possibly leading to body dysmorphic disorder. Idealized body image causes appearance and weight dissatisfaction. Idealized images rooted in digital alterations have negative consequences on body satisfaction. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Appearance-based photo manipulation on social media is related to heightened facial dissatisfaction, predicting cosmetic procedure frames of mind and intentions.	Beos et al., 2021; Swerzenski, 2021; Vendemia and DeAndrea, 2021
Appearance appraisals and objectification are detrimental to social media users' body image. Snapchat users can deploy filters to alter their appearance before sharing selfies, operation shaping body dysmorphic features and quality of life.	Abbas and Dodeen, 2022; Choukas-Bradley et al., 2022; Lee, 2022; Yager et al., 2022
Increased social media pressure is related to lower appearance esteem and body image through comparison, dissatisfaction, and thin-ideal internalization. Idealized images rooted in digital alterations have negative consequences on body satisfaction.	Maymone and Kroumpouzos, 2022; McComb and Mills, 2022; Naderer et al., 2022; Roberts et al., 2022

6. Social Media Photo Manipulation, Unrealistic Body Images, and Beauty Ideal Internalization

Facial modification tools and photo alteration apps (Beos et al., 2021; Othman et al., 2021; Vendemia and DeAndrea, 2021) are instrumental in users' decision-making and convictions to pursue cosmetic surgery by use of social media. Social media photo manipulation is linked to increased cosmetic procedure attitudes and intentions, facial dissatisfaction, and appearance-based self-discrepancy. Sharing selfies online and receiving positive comments as regards appearance may shape users' subsequent behavior as regards image as a valued commodity considering audience feedback.

Appearance-based comparison, selfie sharing and manipulation, and beauty ideal internalization on social networks (Becker et al., 2022; Danthinne et al., 2022a; Schettino et al., 2022) impact body image. Constant exposure to unrealistic body images on social media leads to detrimental appearance-based comparisons in terms of body appreciation and thin-ideal internalization. Idealized body image and mood on social media can be harmful by not offering realistic representations or promoting appearance ideals.

Beauty ideal internalization, body appreciation and acceptance, social comparisons, self-confidence levels, and perceived health risks (Danthinne et al., 2022b; Frederick et al., 2022; Nelson et al., 2022; Wu et al., 2022) shape cosmetic surgery consideration. Digital modification such as retouched media imagery impacts body positivity. Body positivity exposure on social media intensifies appreciation and satisfaction and decreases self-objectification. Appearance evaluation, unsatisfactory body image, and overweight preoccupation impact quality of life. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Facial modification tools and photo alteration apps are instrumental in users' decision-making and convictions to pursue cosmetic surgery by use of social media.	Beos et al., 2021; Othman et al., 2021; Vendemia and DeAndrea, 2021
Appearance-based comparison, selfie sharing and manipulation, and beauty ideal internalization on social networks impact body image. Idealized body image and mood on social media can be harmful by not offering realistic representations or promoting appearance ideals.	Becker et al., 2022; Danthinne et al., 2022a; Schettino et al., 2022
Beauty ideal internalization, body appreciation and acceptance, social comparisons, self-confidence levels, and perceived health risks shape cosmetic surgery consideration. Appearance evaluation, unsatisfactory body image, and overweight preoccupation impact quality of life.	Danthinne et al., 2022b; Frederick et al., 2022; Nelson et al., 2022; Wu et al., 2022

7. Discussion

I integrate my systematic review throughout research indicating how idealized body image causes appearance and weight dissatisfaction. My research complements recent analyses clarifying how taking selfies by use of Snapchat lenses shapes appearance satisfaction and leads to body image concerns. I elucidate, by cumulative evidence, previous research demonstrating how gender, low psychological wellbeing, and maladaptive perfectionism constitute risk determinants for body image dissatisfaction. Social media photo manipulation is linked to increased cosmetic procedure attitudes and intentions, facial dissatisfaction, and appearance-based self-discrepancy. Body dissatisfaction and image concerns intensify after the exposure to beauty ideal images on social media.

8. Synopsis of the Main Research Outcomes

Taking successive selfies without lenses until attaining one acceptable for posting on social media is related to increased body image concerns. Constant exposure to unrealistic body images on social media leads to detrimental appearance-based comparisons in terms of body appreciation and thin-ideal internalization. Sharing selfies online and receiving positive comments as regards appearance may shape users' subsequent behavior as regards image as a valued commodity considering audience feedback. Body image concerns underlie links between adolescent girls' social media use and mental health through unrealistic idealized images and physical appearance, and heightened self-consciousness.

9. Conclusions

Relevant research has investigated whether appearance-related social media consciousness and concerns are related to mental health issues (e.g., depressive symptoms) and disordered eating. This systematic literature review presents the published peer-reviewed sources covering how capturing selfies may intensify individuals' self-awareness and state self-objectification, being related to problematic body image. The research outcomes drawn from the above analyses indicate that idealized images rooted in digital alterations have negative consequences on body satisfaction.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2021 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on social media photo manipulation, unrealistic body images, and

beauty ideal internalization may have been excluded. The scope of my study also does not move forward the inspection of appearance appraisals and objectification detrimental to social media users' body image.

Subsequent analyses should develop on appearance-related social media use through comparisons. Future research should thus investigate appearance-based comparison, selfie sharing and manipulation, and beauty ideal internalization on social networks. Attention should be directed to particular kinds of photo alteration, selfie construction and distribution, and the character of positive audience reaction received on individuals' images.

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Compliance with ethical standards
This article does not contain any studies with human participants or animals performed by the author.

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Author contributions
The author confirms being the sole contributor of this work and approved it for publication. The author takes full responsibility for the accuracy and the integrity of the data analysis.

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

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The author affirms that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Menstrual Cycle and Fertility Apps, Body Management Tools, and Female Sexual and Reproductive Health

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ABSTRACT. This article reviews and advances existing literature concerning digital health devices articulating the sexual and reproductive body. In this research, previous findings were cumulated showing that ovulation and fertility apps articulate a female body that is predisposed to dynamic data gathering and self-surveillance aiming to supply suitable knowledge concerning users' reproductive cycles and ovulation symptoms, and we contribute to the literature by indicating that smartphone apps that supply women with data as regards their daily fertility status throughout their periods can assist users in preventing pregnancy. Throughout January 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "menstrual cycle and fertility apps" + "body management tools," "female sexual and reproductive health," and "intimate digital technologies." As research published between 2015 and 2022 was inspected, only 151 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, we selected 17 mainly empirical sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, MMAT, ROBIS, and SRDR.

Keywords: fertility awareness apps; women's reproductive health; bodily autonomy

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1. Introduction

Intimate digital technologies and devices can articulate intrusive kinds of commercial surveillance and the controlling commodification of the subjective being and intimate affect, while increasing social connections. The purpose of our systematic review is to examine the recently published literature on menstrual cycle and fertility apps and integrate the insights it configures on body management tools and female sexual and reproductive health. By analyzing the most recent (2015–2022) and significant (Web of Science, Scopus, and ProQuest) sources, our paper has attempted to prove that science-based menstrual cycle tracking apps can assist women in grasping the link between precise and purposeful menstrual predictions and in having a comprehensive, constant, and instantaneous data tracking behavior through active self-management. The actuality and novelty of this study are articulated by addressing menstrual cycle monitoring apps instrumental in pregnancy avoidance, that is an emerging topic involving much interest. Our research problem is whether digital reproductive health technologies optimize user potentiality for self-appraisal by assessing intimate data.

In this review, prior findings have been cumulated indicating that prenatal life and fertility technologies configure quantified biocapital, psychological well-being, and digital reproductive health by automated algorithmic operations of body data. The identified gaps advance menstrual cycle and fertility tracking apps assisting women in preventing pregnancy. Our main objective is to indicate that ovulation and fertility apps articulate a female body that is predisposed to dynamic data gathering and self-surveillance (Ford, 2021) aiming to supply suitable knowledge concerning users' reproductive cycles and ovulation symptoms. This systematic review contributes to the literature on digital health devices articulating the sexual and reproductive body by clarifying that smartphone apps that supply women with data as regards their daily fertility status throughout their periods can assist users in preventing pregnancy. This research endeavors to elucidate whether cycle-tracking calendar apps designed to elucidate ideal fertility may not provide accurate data as regards how the predictions are quantified as regards ovulation. Our contribution is by integrating research findings indicating that menstrual cycle and fertility apps aim enhancement, automation and consistency of assisted reproductive processes (Bailey, 2021) in manners that resort to, generate, and inspect massive data sets with cutting-edge computational technologies (e.g., predictive analytics and machine learning).

2. Theoretical Overview of the Main Concepts

Users of period trackers and fertility apps as body management tools are dissimilar in identity, demands, and sociocultural practices and thus tailoring of the device interface, data fields, and objectives should be configured.

Assimilating knowledge as regards their menstruation and when ovulation manifest by use of fertility awareness apps enable women to unlock information in relation to their own body while questioning coherent pregnancy prevention and long-term contraceptive effectiveness. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), menstrual cycle and fertility apps, women's reproductive health, and body management tools (section 4), fertility awareness apps, intimate digital technologies, and assisted reproductive processes (section 5), prenatal life and fertility technologies, female sexual and reproductive health, and bodily autonomy (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout January 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "menstrual cycle and fertility apps" + "body management tools," "female sexual and reproductive health," and "intimate digital technologies." As research published between 2015 and 2022 was inspected, only 151 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, we selected 17 mainly empirical sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, MMAT, ROBIS, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
menstrual cycle and fertility apps + body management tools	52	6
menstrual cycle and fertility apps + female sexual and reproductive health	50	6
menstrual cycle and fertility apps + intimate digital technologies	49	5
Type of paper		
Original research	101	17
Review	7	0
Conference proceedings	24	0
Book	11	0
Editorial	8	0

Source: Processed by the authors. Some topics overlap.

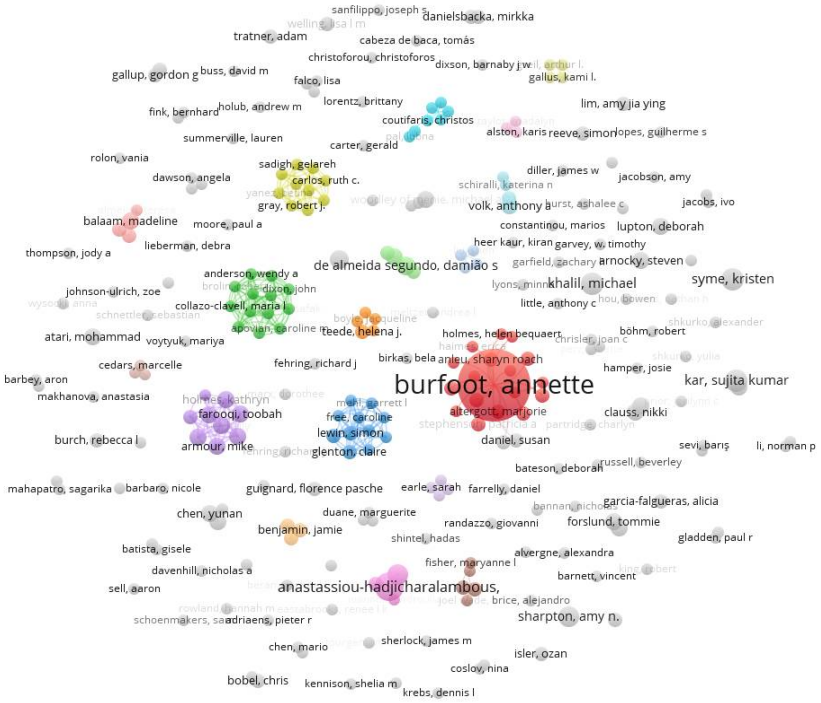


Figure 1 Co-authorship

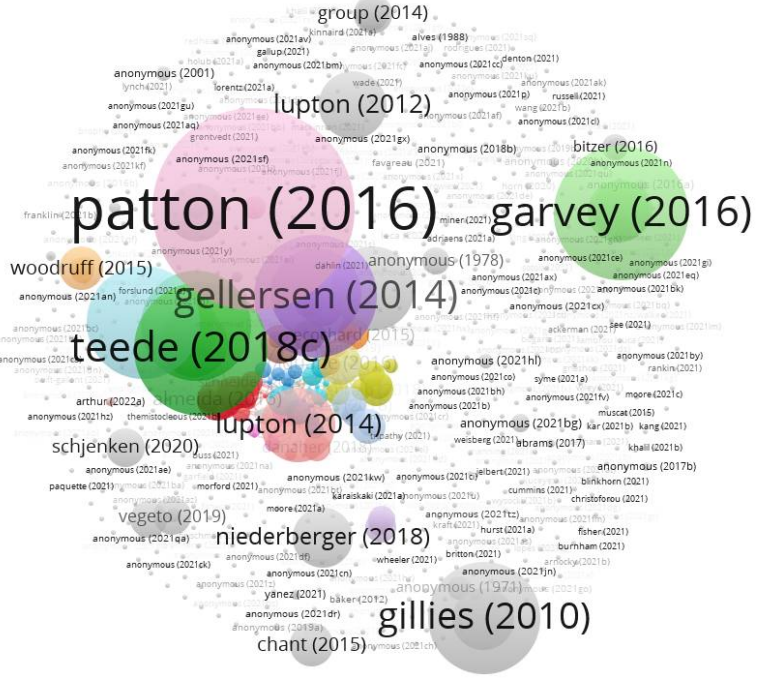


Figure 2 Citation

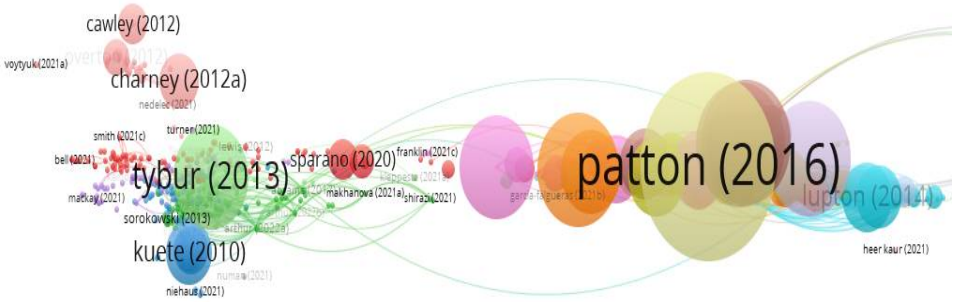


Figure 3 Bibliographic coupling

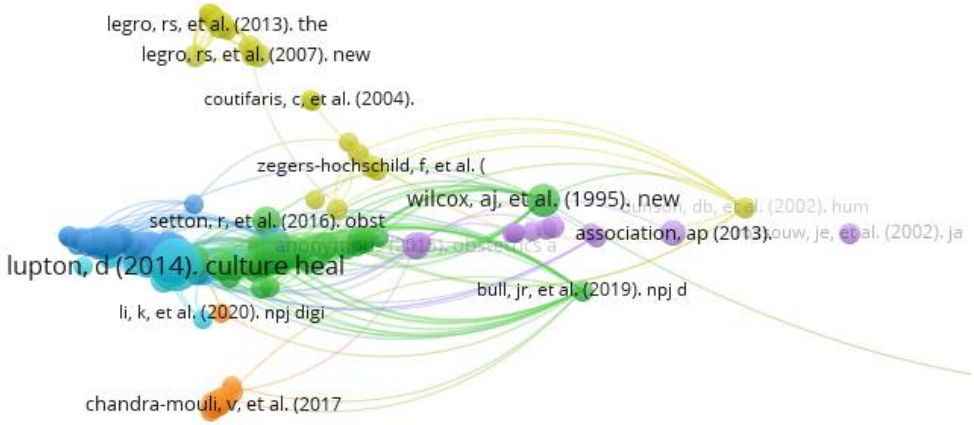


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Mobile health apps attempt to predict the fertility window as regards preventing pregnancy or maximizing conception chances. Ovulation and fertility apps articulate a female body that is predisposed to dynamic data gathering and self-surveillance aiming to supply suitable knowledge concerning users' reproductive cycles and ovulation symptoms.	Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Menstrual cycle and fertility apps enable users to monitor their reproductiveness while being intimately intertwined in intricate contraceptive decision-making mechanisms.	Dudouet, 2022; Broad et al., 2022; Pichon et al., 2021; Shattuck et al., 2018
Fertility tracking apps determine body temperature to establish the physiologic fertile window and can prevent pregnancy by analyzing cervical mucus.	Broad et al., 2022; Manhart and Duane, 2022; Pichon et al., 2021
Fertility awareness apps enable women to monitor their fertility, their use being established in individuals' practices which influence and characterize contraceptive decision-making.	Dudouet, 2022; Peterson and Fok, 2019; van de Wiel, 2019
Menstrual cycle monitoring apps can be instrumental in pregnancy avoidance, configuring behavioral contraceptive methods. Fertility tracking mobile apps should assist women in acting towards the embodied awkwardness of their cycle with eagerness and self-discovery to enable developing body and menstrual knowledge.	Pichon et al., 2021; Silvestre Santos Gonçalves et al., 2021; Wilson-Barnao and Collie, 2018
Period trackers and fertility apps monitor and predict periods, pre-menstrual symptoms, ovulation, and reproductiveness by leveraging physical parameters and body temperature registered by the user.	Lupton, 2015; Mishra and Suresh, 2021; Starling et al., 2018; Worsfold et al., 2021
Menstrual cycle and fertility tracking apps assist women in preventing pregnancy, articulate a predictable menstrual cycle, and maintain bodily autonomy.	Dalessandro et al., 2022; Dudouet, 2022; van de Wiel, 2019
Fertility tracking mobile apps connect sexuality chiefly to intercourse so as to articulate family planning and manage reproductiveness. Science-based menstrual cycle tracking apps can assist women in grasping the link between precise and purposeful menstrual predictions.	Broad et al., 2022; Johnson et al., 2018; Pichon et al., 2021; Sanchez and Maresh, 2021
Digital health devices articulate the sexual and reproductive body, as regards practices and functions, by use of self-tracking apps, integrating intimate data.	Lupton, 2015; Pichon et al., 2021; Stanford, 2019

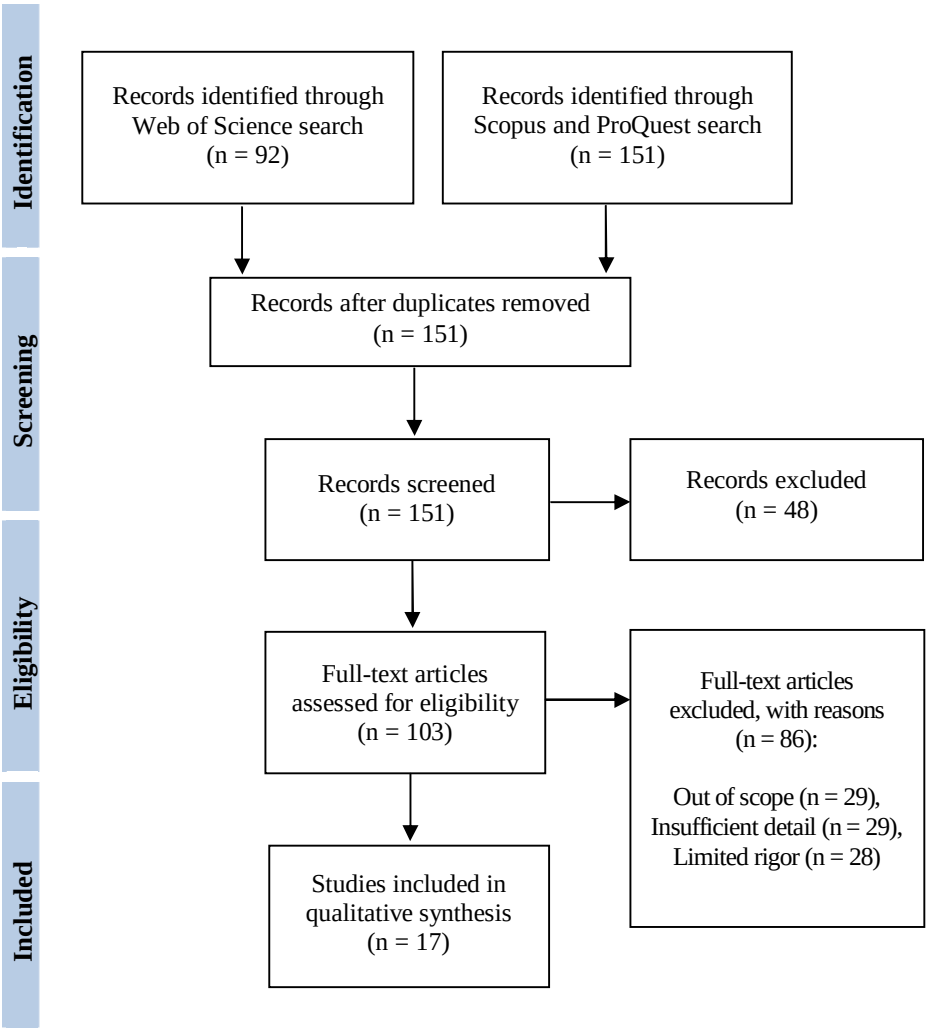


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

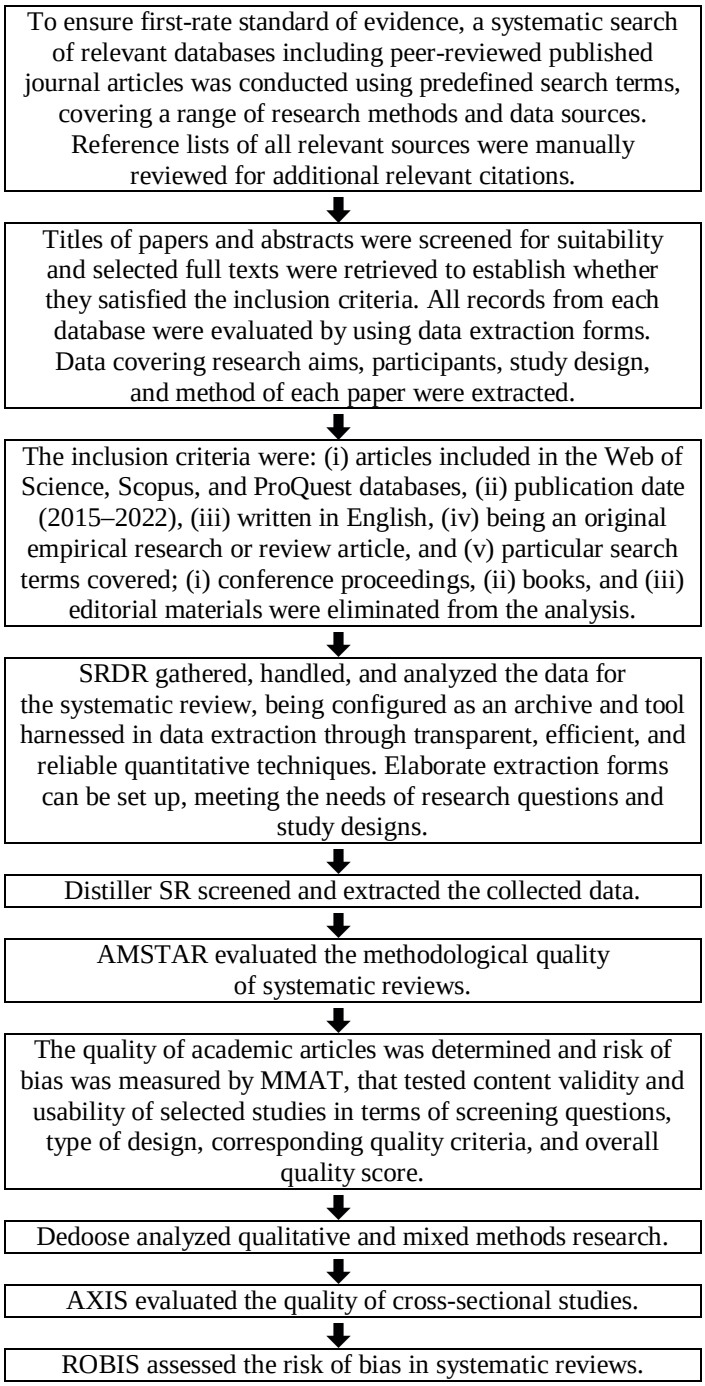


Figure 6 Screening and quality assessment tools

4. Menstrual Cycle and Fertility Apps, Women's Reproductive Health, and Body Management Tools

Mobile health apps attempt to predict the fertility window (Dudouet, 2022; Lupton, 2015; Pichon et al., 2021) as regards preventing pregnancy or maximizing conception chances. Assimilating knowledge as regards their menstruation and when ovulation manifest by use of fertility awareness apps enable women to unlock information in relation to their own body while questioning coherent pregnancy prevention and long-term contraceptive effectiveness. Ovulation and fertility apps articulate a female body that is predisposed to dynamic data gathering and self-surveillance aiming to supply suitable knowledge concerning users' reproductive cycles and ovulation symptoms.

Menstrual cycle and fertility apps enable users to monitor their reproductiveness (Dudouet, 2022; Broad et al., 2022; Pichon et al., 2021; Shattuck et al., 2018) while being intimately intertwined in intricate contraceptive decision-making mechanisms that transcend coherent pregnancy prevention. Fertility tracking apps reduce the menstrual practice to computable data points. Smartphone apps that supply women with data as regards their daily fertility status throughout their periods can assist users in preventing pregnancy. Women's attitudes in relation to deploying period tracker apps for accurate period start dates and ovulation prediction shape their feelings and behaviors.

Fertility tracking apps determine body temperature to establish the physiologic fertile window (Broad et al., 2022; Manhart and Duane, 2022; Pichon et al., 2021) and can prevent pregnancy by analyzing cervical mucus. Period tracker apps may shape women's lives, if users are familiar with the deficiencies of digital reproductive health technologies and can grasp the signs, symptoms, and disparities of their distinct menstrual cycle and reproductive health. Users of period trackers and fertility apps as body management tools are dissimilar in identity, demands, and sociocultural practices and thus tailoring of the device interface, data fields, and objectives should be configured. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Mobile health apps attempt to predict the fertility window as regards preventing pregnancy or maximizing conception chances.	Dudouet, 2022; Lupton, 2015; Pichon et al., 2021
Menstrual cycle and fertility apps enable users to monitor their reproductiveness while being intimately intertwined in intricate contraceptive decision-making mechanisms.	Dudouet, 2022; Broad et al., 2022; Pichon et al., 2021; Shattuck et al., 2018
Fertility tracking apps determine body temperature to establish the physiologic fertile window and can prevent pregnancy by analyzing cervical mucus.	Broad et al., 2022; Manhart and Duane, 2022; Pichon et al., 2021

5. Fertility Awareness Apps, Intimate Digital Technologies, and Assisted Reproductive Processes

Fertility awareness apps enable women to monitor their fertility (Dudouet, 2022; Peterson and Fok, 2019; van de Wiel, 2019), their use being established in individuals' practices which influence and characterize contraceptive decision-making. Mobile health apps can provide users' with accurate, evidence-based intimate data to support contraception and abortion care, natural family planning methods, and unintended pregnancy prevention. Menstrual cycle and fertility apps aim enhancement, automation and consistency of assisted reproductive processes in manners that resort to, generate, and inspect massive data sets with cutting-edge computational technologies (e.g., predictive analytics and machine learning).

Menstrual cycle monitoring apps can be instrumental in pregnancy avoidance (Pichon et al., 2021; Silvestre Santos Gonçalves et al., 2021; Wilson-Barnao and Collie, 2018), configuring behavioral contraceptive methods. Intimate digital technologies and devices can articulate intrusive kinds of commercial surveillance and the controlling commodification of the subjective being and intimate affect, while increasing social connections. Fertility tracking mobile apps should assist women in acting towards the embodied awkwardness of their cycle with eagerness and self-discovery to enable developing body and menstrual knowledge.

Period trackers and fertility apps monitor and predict periods, pre-menstrual symptoms, ovulation, and reproductiveness (Lupton, 2015; Mishra and Suresh, 2021; Starling et al., 2018; Worsfold et al., 2021) by leveraging physical parameters and body temperature registered by the user. Predictions of period tracker apps cover period dates, ovulation day, and the fertile window, configuring menstrual cycle health. Digital reproductive health technologies optimize user potentiality for self-appraisal by assessing intimate data. To prevent pregnancy, women wish to use scientifically sound apps offering personalized information as regards their potential fertility. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Fertility awareness apps enable women to monitor their fertility, their use being established in individuals' practices which influence and characterize contraceptive decision-making.	Dudouet, 2022; Peterson and Fok, 2019; van de Wiel, 2019
Menstrual cycle monitoring apps can be instrumental in pregnancy avoidance, configuring behavioral contraceptive methods.	Pichon et al., 2021; Silvestre Santos Gonçalves et al., 2021; Wilson-Barnao and Collie, 2018
Period trackers and fertility apps monitor and predict periods, pre-menstrual symptoms, ovulation, and reproductiveness by leveraging physical parameters and body temperature registered by the user.	Lupton, 2015; Mishra and Suresh, 2021; Starling et al., 2018; Worsfold et al., 2021

6. Prenatal Life and Fertility Technologies, Female Sexual and Reproductive Health, and Bodily Autonomy

Menstrual cycle and fertility tracking apps assist women in preventing pregnancy (Dalessandro et al., 2022; Dudouet, 2022; van de Wiel, 2019), articulate a predictable menstrual cycle, and maintain bodily autonomy. Harnessing menstrual tracking apps for pregnancy prevention provides users with a significant sense of control in relation to their reproductive bodies and intentions, while furthering customized knowledge and self-interpretation. Prenatal life and fertility technologies configure quantified biocapital, psychological well-being, and digital reproductive health by automated algorithmic operations of body data.

Fertility tracking mobile apps connect sexuality chiefly to intercourse (Broad et al., 2022; Johnson et al., 2018; Pichon et al., 2021; Sanchez and Maresh, 2021) so as to articulate family planning and manage reproductiveness. Period tracker apps should predict ovulation dates only by harnessing physiological evidence recorded by the users. Cycle-tracking calendar apps designed to elucidate ideal fertility may not provide accurate data as regards how the predictions are quantified as regards ovulation. Science-based menstrual cycle tracking apps can assist women in grasping the link between precise and purposeful menstrual predictions and in having a comprehensive, constant, and instantaneous data tracking behavior through active self-management.

Digital health devices articulate the sexual and reproductive body, as regards practices and functions (Lupton, 2015; Pichon et al., 2021; Stanford, 2019), by use of self-tracking apps, integrating intimate data. To mirror the intricate realities of users, digital reproductive health technologies can integrate the dynamic menstrual cycle, beyond monitoring and predicting bleeding and ovulation. Mobile computing apps have been designed to monitor the menstrual cycle and fecundability by harnessing user-provided big data. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Menstrual cycle and fertility tracking apps assist women in preventing pregnancy, articulate a predictable menstrual cycle, and maintain bodily autonomy.	Dalessandro et al., 2022; Dudouet, 2022; van de Wiel, 2019
Fertility tracking mobile apps connect sexuality chiefly to intercourse so as to articulate family planning and manage reproductiveness.	Broad et al., 2022; Johnson et al., 2018; Pichon et al., 2021; Sanchez and Maresh, 2021
Digital health devices articulate the sexual and reproductive body, as regards practices and functions, by use of self-tracking apps, integrating intimate data.	Lupton, 2015; Pichon et al., 2021; Stanford, 2019

7. Discussion

We integrate our systematic review throughout research indicating how Predictions of period tracker apps cover period dates, ovulation day, and the fertile window, configuring menstrual cycle health. Our research complements recent analyses clarifying how period tracker apps may shape women's lives, if users are familiar with the deficiencies of digital reproductive health technologies and can grasp the signs, symptoms, and disparities of their distinct menstrual cycle and reproductive health. We elucidate, by cumulative evidence, previous research demonstrating how fertility tracking mobile apps should assist women in acting towards the embodied awkwardness of their cycle with eagerness and self-discovery to enable developing body and menstrual knowledge.

8. Synopsis of the Main Research Outcomes

Fertility tracking apps reduce the menstrual practice to computable data points. Harnessing menstrual tracking apps for pregnancy prevention provides users with a significant sense of control in relation to their reproductive bodies and intentions, while furthering customized knowledge and self-interpretation. To mirror the intricate realities of users, digital reproductive health technologies can integrate the dynamic menstrual cycle, beyond monitoring and predicting bleeding and ovulation.

9. Conclusions

Relevant research has investigated whether mobile health apps can provide users' with accurate, evidence-based intimate data to support contraception and abortion care, natural family planning methods, and unintended pregnancy prevention. This systematic literature review presents the published peer-reviewed sources covering how period tracker apps should predict ovulation dates only by harnessing physiological evidence recorded by the users. The research outcomes drawn from the above analyses indicate that women's attitudes in relation to deploying period tracker apps for accurate period start dates and ovulation prediction shape their feelings and behaviors.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2015 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on menstrual cycle and fertility apps, women's reproductive health, and body management tools may have been excluded. The scope of our

study also does not move forward the inspection of intimate digital technologies and devices articulating intrusive kinds of commercial surveillance.

Subsequent analyses should develop on digital reproductive health technologies. Future research should thus investigate comprehensive, constant, and instantaneous data tracking behaviors through active self-management. Attention should be directed to the controlling commodification of the subjective being and intimate affect.

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This article does not contain any studies with human participants or animals performed by the authors.

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Author contributions
All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication. The authors take full responsibility for the accuracy and the integrity of the data analysis.

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Transparency statement
The authors affirm that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Social Media-related Body Dissatisfaction, Beauty Ideal Internalization, and State Self-Objectification

Susan Beckett*

ABSTRACT. Based on an in-depth survey of the literature, the purpose of the paper is to explore algorithmic comparisons amplifying the link between social media usage and body dissatisfaction. In this research, previous findings were cumulated showing that constant exposure to idealized media content on social media affects beauty standard perceptions and positive body image, and I contribute to the literature by indicating that communication technologies impact individuals' self-image and social interactions through online shared photos. Throughout February 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "social media-related body dissatisfaction" + "beauty ideal internalization," "state self-objectification," and "negative psychological and behavioral well-being." As research published between 2021 and 2022 was inspected, only 143 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, I selected 26 mainly empirical sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Dedoose, Distiller SR, and SRDR.

Keywords: appearance-focused social media; body image concerns; negative psychological and behavioral well-being

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1. Introduction

Negative body image among social media users affects individuals' mental health. The purpose of my systematic review is to examine the recently published literature on social media-related body dissatisfaction and integrate the insights it configures on beauty ideal internalization and state self-objectification. By analyzing the most recent (2021–2022) and significant (Web of Science, Scopus, and ProQuest) sources, my paper has attempted to prove that appearance comparison processing clarifies the adverse consequences of being exposed to idealized images on social media in relation to body satisfaction. The actuality and novelty of this study are articulated by addressing algorithmic comparisons amplifying the link between social media usage and body dissatisfaction, that is an emerging topic involving much interest. My research problem is whether social media-related body dissatisfaction and selfie behaviors enable constant self-presentation, increasing concerns as regards physical appearance and attractiveness (e.g., idealized images).

In this review, prior findings have been cumulated indicating that body image disturbance is considerably related to increased depression symptoms and unsatisfactory quality of life. The identified gaps advance photo- and video-editing apps enabling misrepresentations of reality and articulate negative psychological and behavioral well-being. My main objective is to indicate that communication technologies impact individuals' self-image and social interactions through online shared photos. This systematic review contributes to the literature on social media related to beauty ideal internalization and social appearance pressures and comparisons by clarifying that constant exposure to idealized media content on social media affects beauty standard perceptions and positive body image. This research endeavors to elucidate whether modifying and sharing selfies on social media may lead to reduced appearance satisfaction and heightened cosmetic surgery interest. My contribution is by integrating research findings indicating that body image concerns and shame are associated with dietary restraint and self-objectification.

2. Theoretical Overview of the Main Concepts

Receiving persistent appearance comments on individuals' selfies increases state self-objectification in relation to photo modification, articulating taking and sharing selfies on social media. Body positive content on social media impedes harmful appearance ideals. Misinterpreted happiness, internalization of beauty ideals and of fictitious life presentation and satisfaction, and validation seeking behavior affect mental wellbeing in terms of perceived appearance and social connectivity and acceptance. Destructive behaviors and maladaptive perfectionism result from appearance evaluation and per-

ceived body image issues. Taking increasingly selfies without Snapchat lenses until reaching an acceptable photo for posting on social media is related to increased body image concerns. Photo quality enhancement is associated with increased body image concerns. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), beauty ideal internalization, body image concerns, and appearance comparison processing (section 4), social media-related body dissatisfaction, state self-objectification, and negative psychological and behavioral well-being (section 5), beauty ideals, perceived body image, and appearance-focused social media (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout February 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "social media-related body dissatisfaction" + "beauty ideal internalization," "state self-objectification," and "negative psychological and behavioral well-being." As research published between 2021 and 2022 was inspected, only 143 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, I selected 26 mainly empirical sources (Tables 1–2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Dedoose, Distiller SR, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
social media-related body dissatisfaction + beauty ideal internalization	49	9
social media-related body dissatisfaction + state self-objectification	46	8
social media-related body dissatisfaction + negative psychological and behavioral well-being	48	9
Type of paper		
Original research	121	25
Review	7	1
Conference proceedings	9	0
Book	3	0
Editorial	3	0

Source: Processed by the author. Some topics overlap.

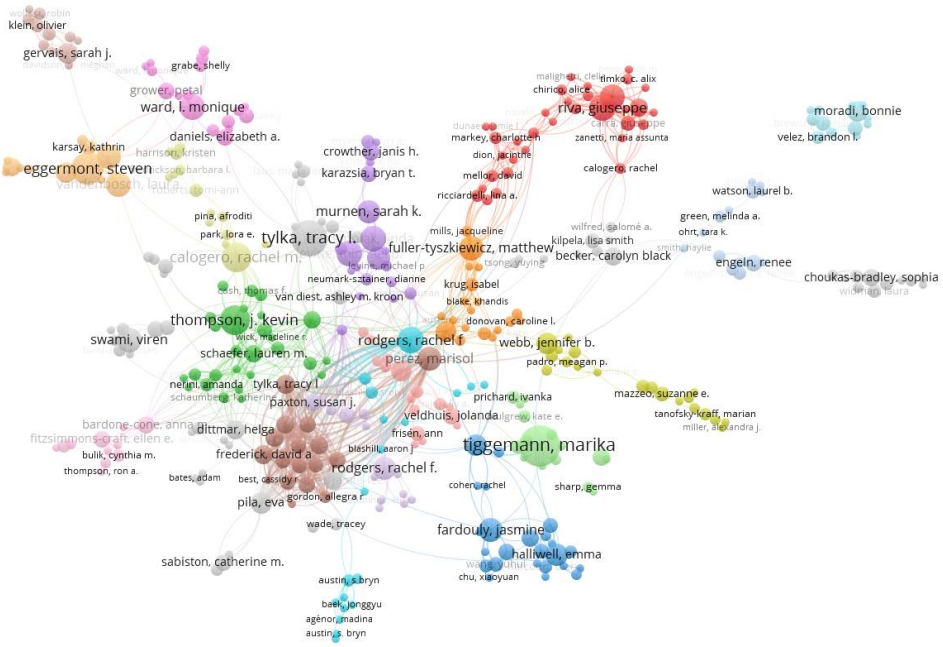


Figure 1 Co-authorship

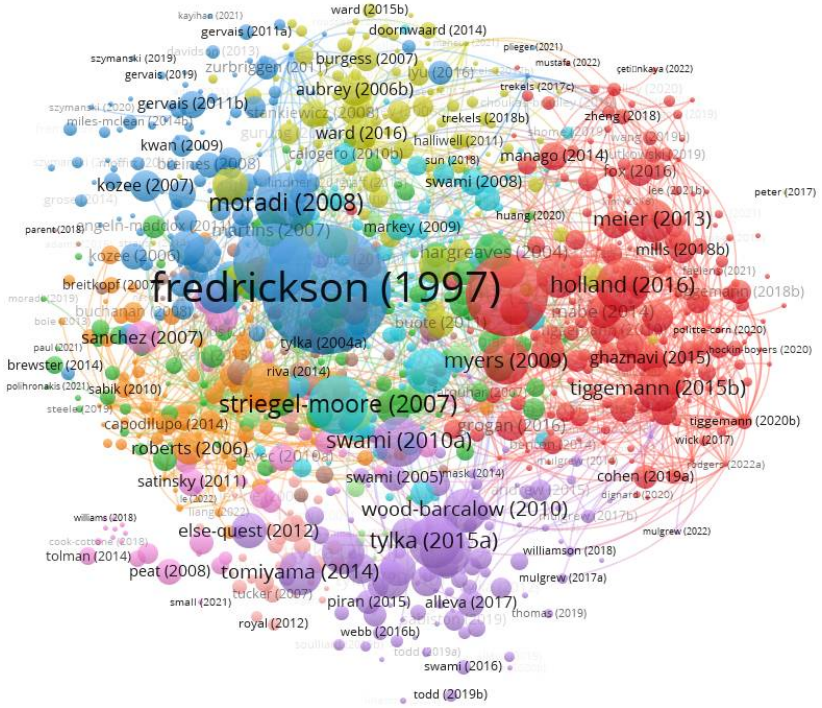


Figure 2 Citation

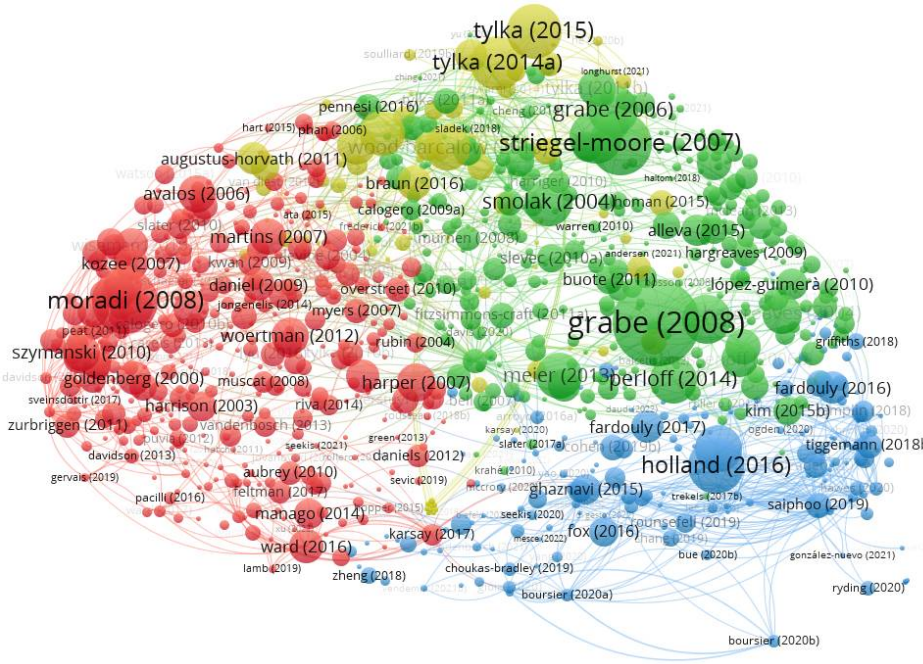


Figure 3 Bibliographic coupling

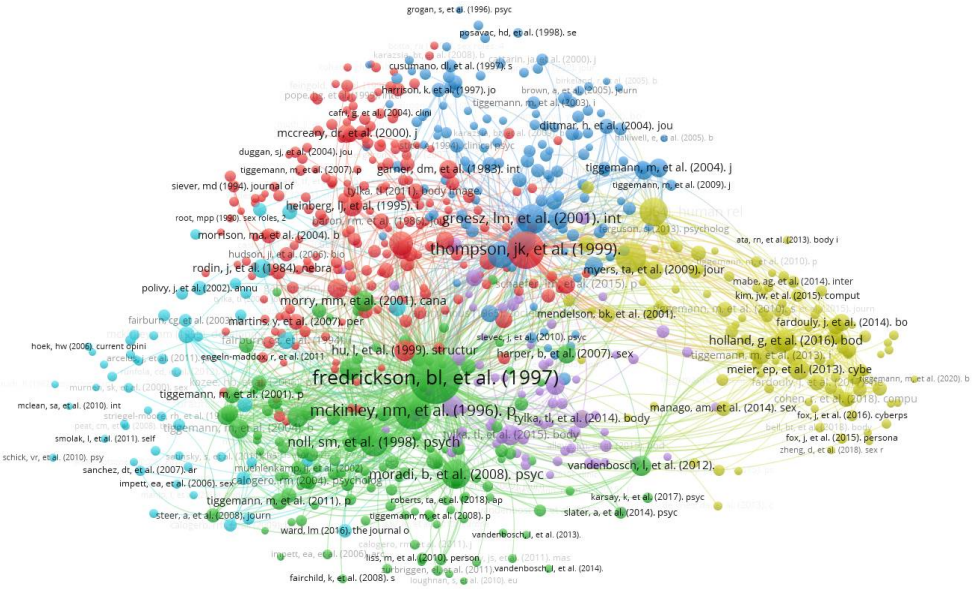


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Digital alteration and manipulation on social media have adverse consequences on body image through idealized and unrealistic representation. Body positive content on social media impedes harmful appearance ideals.	Rodgers et al., 2022; Tiggemann, 2022; Vendemia and DeAndrea, 2021
Lower body image satisfaction is associated with appearance ideal internalization, dietary restraints, eating disorders, and unsatisfactory psychological well-being.	Burnell et al., 2022; Fioravanti et al., 2022; McComb and Mills, 2022a
Social media is related to beauty ideal internalization and social appearance pressures and comparisons in terms of body dissatisfaction. Body image concerns and shame are associated with dietary restraint and self-objectification.	de Lenne et al., 2022; Plummer et al., 2022; Roberts et al., 2022; Yager et al., 2022
Photo- and video-editing apps enable misrepresentations of reality and articulate negative psychological and behavioral well-being, while possibly configuring addictive behaviors.	Beos et al., 2021; Vendemia and DeAndrea, 2021; Wang and Gu, 2022
Body functionality, as a positive body image construct, assist women in appraising how their body operate, not how it looks, through their social media feed in terms of social comparison in relation to appearance.	Choukas-Bradley et al., 2022; Markey and Daniels, 2022; Mulgrew and Courtney, 2022
Objectified self-presentation and attractiveness on social media shape users' perceptions and attitudes. Awareness, self-compassion, perceptual actual–ideal weight incongruity, and social media activity impact body image satisfaction.	Daniels et al., 2022; Jansen et al., 2022; Masselman et al., 2022; McComb and Mills, 2022b
Algorithmic comparisons can amplify the link between social media usage and body dissatisfaction, affecting individuals' psychological well-being. Modifying and sharing selfies on social media may lead to reduced appearance satisfaction and heightened cosmetic surgery interest.	Harriger et al., 2022; Moreton and Greenfield, 2022; Vendemia and DeAndrea, 2021
Using social media apps may result in increased body image dissatisfaction through constant comparisons. Social media can bring about appearance pressure and body dissatisfaction.	Fioravanti et al., 2022; Gobin et al., 2022; Roberts et al., 2022
Body image concerns (e.g., low body esteem), appearance self-evaluation, and poor psychological wellbeing affect quality of life. Destructive behaviors and maladaptive perfectionism result from appearance evaluation and perceived body image issues.	Hicks et al., 2022; Jones and Kimble, 2022; Schreurs and Vandenbosch, 2022; Waite et al., 2022

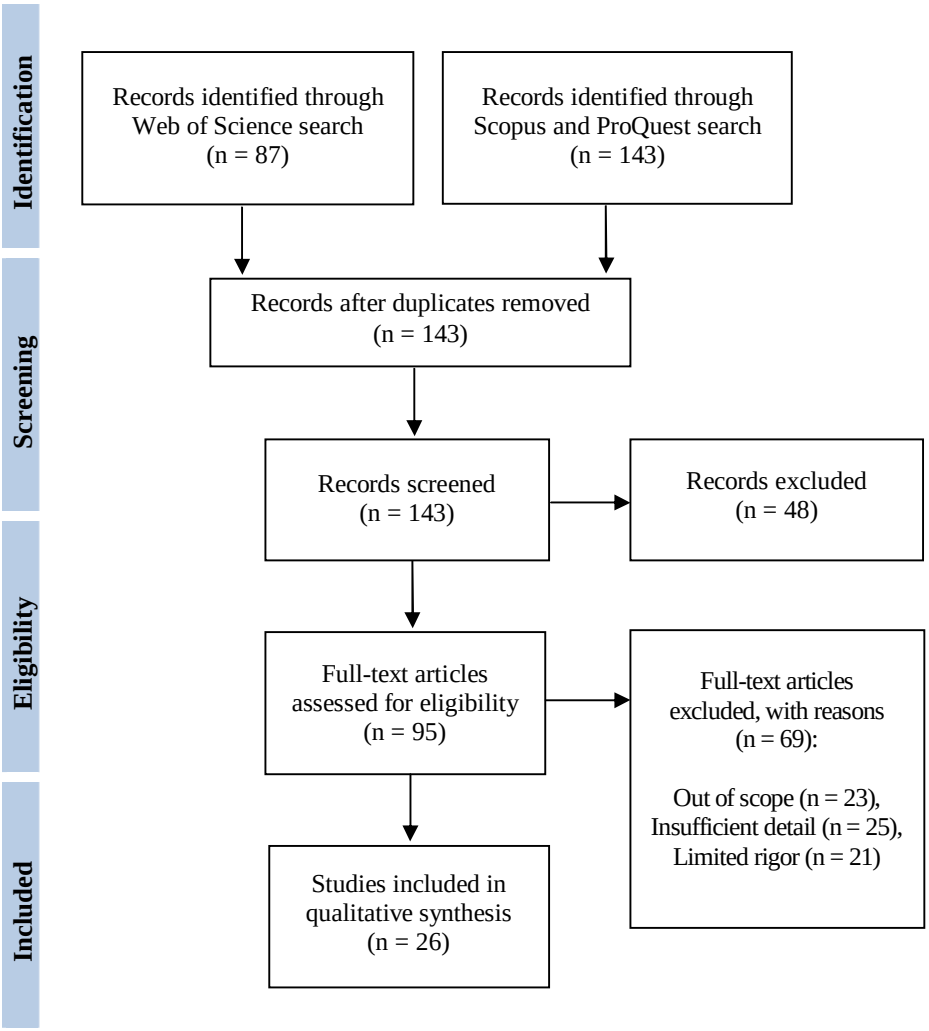


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

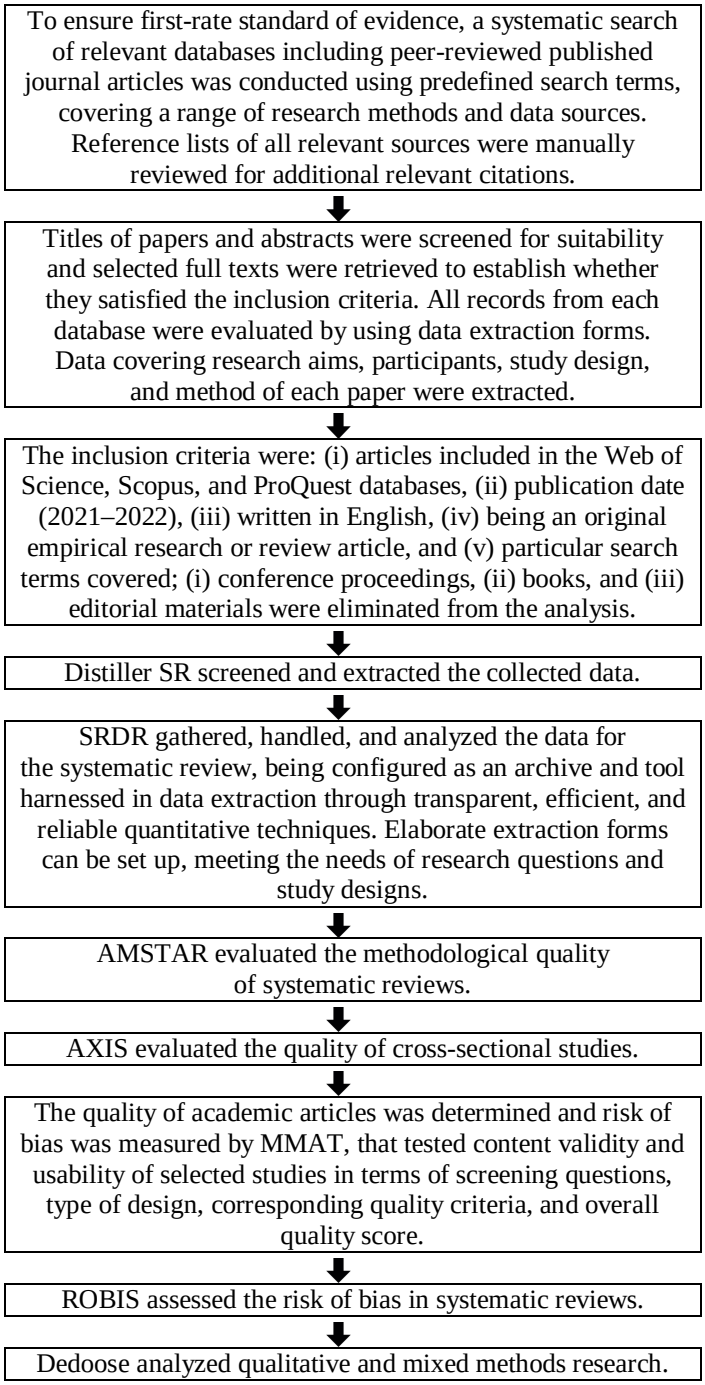


Figure 6 Screening and quality assessment tools

4. Beauty Ideal Internalization, Body Image Concerns, and Appearance Comparison Processing

Digital alteration and manipulation on social media (Rodgers et al., 2022; Tiggemann, 2022; Vendemia and DeAndrea, 2021) have adverse consequences on body image through idealized and unrealistic representation. Communication technologies impact individuals' self-image and social interactions through online shared photos. Body positive content on social media impedes harmful appearance ideals.

Lower body image satisfaction (Burnell et al., 2022; Fioravanti et al., 2022; McComb and Mills, 2022a) is associated with appearance ideal internalization, dietary restraints, eating disorders, and unsatisfactory psychological well-being. Taking increasingly selfies without Snapchat lenses until reaching an acceptable photo for posting on social media is related to increased body image concerns. Appearance comparison processing clarifies the adverse consequences of being exposed to idealized images on social media in relation to body satisfaction.

Social media is related to beauty ideal internalization and social appearance pressures and comparisons (de Lenne et al., 2022; Plummer et al., 2022; Roberts et al., 2022; Yager et al., 2022) in terms of body dissatisfaction. Constant exposure to idealized media content on social media affects beauty standard perceptions and positive body image. Weight stigma and unsatisfactory body image lead to negative health outcomes and constant self-directed appearance appraisals. Body image concerns and shame are associated with dietary restraint and self-objectification. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Digital alteration and manipulation on social media have adverse consequences on body image through idealized and unrealistic representation. Body positive content on social media impedes harmful appearance ideals.	Rodgers et al., 2022; Tiggemann, 2022; Vendemia and DeAndrea, 2021
Lower body image satisfaction is associated with appearance ideal internalization, dietary restraints, eating disorders, and unsatisfactory psychological well-being. Appearance comparison processing clarifies the adverse consequences of being exposed to idealized images on social media in relation to body satisfaction.	Burnell et al., 2022; Fioravanti et al., 2022; McComb and Mills, 2022a
Social media is related to beauty ideal internalization and social appearance pressures and comparisons in terms of body dissatisfaction. Body image concerns and shame are associated with dietary restraint and self-objectification.	de Lenne et al., 2022; Plummer et al., 2022; Roberts et al., 2022; Yager et al., 2022

5. Social Media-related Body Dissatisfaction, State Self-Objectification, and Negative Psychological and Behavioral Well-Being

Photo- and video-editing apps enable misrepresentations of reality and articulate negative psychological and behavioral well-being (Beos et al., 2021; Vendemia and DeAndrea, 2021; Wang and Gu, 2022), while possibly configuring addictive behaviors. Receiving persistent appearance comments on individuals' selfies increases state self-objectification in relation to photo modification, articulating taking and sharing selfies on social media. Photo quality enhancement is associated with increased body image concerns.

Social media behaviors online articulate body esteem and appreciation (Choukas-Bradley et al., 2022; Markey and Daniels, 2022; Mulgrew and Courtney, 2022), in addition to self-objectification. Social media-related body dissatisfaction and selfie behaviors enable constant self-presentation, increasing concerns as regards physical appearance and attractiveness (e.g., idealized images). Body functionality, as a positive body image construct, assist women in appraising how their body operate, not how it looks, through their social media feed in terms of social comparison in relation to appearance.

Objectified self-presentation and attractiveness on social media (Daniels et al., 2022; Jansen et al., 2022; Masselman et al., 2022; McComb and Mills, 2022b) shape users' perceptions and attitudes. Negative body image among social media users affects individuals' mental health. Achieving body ideals can be detrimental to social media users, resulting in appearance dissatisfaction. Awareness, self-compassion, perceptual actual–ideal weight incongruity, and social media activity impact body image satisfaction. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Photo- and video-editing apps enable misrepresentations of reality and articulate negative psychological and behavioral well-being, while possibly configuring addictive behaviors. Photo quality enhancement is associated with increased body image concerns.	Beos et al., 2021; Vendemia and DeAndrea, 2021; Wang and Gu, 2022
Body functionality, as a positive body image construct, assist women in appraising how their body operate, not how it looks, through their social media feed in terms of social comparison in relation to appearance.	Choukas-Bradley et al., 2022; Markey and Daniels, 2022; Mulgrew and Courtney, 2022
Objectified self-presentation and attractiveness on social media shape users' perceptions and attitudes. Awareness, self-compassion, perceptual actual–ideal weight incongruity, and social media activity impact body image satisfaction.	Daniels et al., 2022; Jansen et al., 2022; Masselman et al., 2022; McComb and Mills, 2022b

6. Beauty Ideals, Perceived Body Image, and Appearance-focused Social Media

Algorithmic comparisons can amplify the link between social media usage and body dissatisfaction (Harriger et al., 2022; Moreton and Greenfield, 2022; Vendemia and DeAndrea, 2021), affecting individuals' psychological well-being. Misinterpreted happiness, internalization of beauty ideals and of fictitious life presentation and satisfaction, and validation seeking behavior affect mental wellbeing in terms of perceived appearance and social connectivity and acceptance. Modifying and sharing selfies on social media may lead to reduced appearance satisfaction and heightened cosmetic surgery interest.

Using social media apps may result in increased body image dissatisfaction (Fioravanti et al., 2022; Gobin et al., 2022; Roberts et al., 2022) through constant comparisons. Sharing and viewing photos and selfies as idealized images on social media are related to heightened body dissatisfaction. Social media can bring about appearance pressure and body dissatisfaction.

Body image concerns (e.g., low body esteem), appearance self-evaluation, and poor psychological wellbeing (Hicks et al., 2022; Jones and Kimble, 2022; Schreurs and Vandenbosch, 2022; Waite et al., 2022) affect quality of life. Positive comments and posts articulating appearance-focused social media content predict decreased body dissatisfaction. Body image disturbance is considerably related to increased depression symptoms and unsatisfactory quality of life. Destructive behaviors and maladaptive perfectionism result from appearance evaluation and perceived body image issues. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Algorithmic comparisons can amplify the link between social media usage and body dissatisfaction, affecting individuals' psychological well-being. Modifying and sharing selfies on social media may lead to reduced appearance satisfaction and heightened cosmetic surgery interest.	Harriger et al., 2022; Moreton and Greenfield, 2022; Vendemia and DeAndrea, 2021
Using social media apps may result in increased body image dissatisfaction through constant comparisons. Social media can bring about appearance pressure and body dissatisfaction.	Fioravanti et al., 2022; Gobin et al., 2022; Roberts et al., 2022
Body image concerns (e.g., low body esteem), appearance self-evaluation, and poor psychological wellbeing affect quality of life. Destructive behaviors and maladaptive perfectionism result from appearance evaluation and perceived body image issues.	Hicks et al., 2022; Jones and Kimble, 2022; Schreurs and Vandenbosch, 2022; Waite et al., 2022

7. Discussion

I integrate my systematic review throughout research indicating how weight stigma and unsatisfactory body image lead to negative health outcomes and constant self-directed appearance appraisals. My research complements recent analyses clarifying how awareness, self-compassion, perceptual actual–ideal weight incongruity, and social media activity impact body image satisfaction. I elucidate, by cumulative evidence, previous research demonstrating how Social media can bring about appearance pressure and body dissatisfaction. Destructive behaviors and maladaptive perfectionism result from appearance evaluation and perceived body image issues. Photo quality enhancement is associated with increased body image concerns. Receiving persistent appearance comments on individuals' selfies increases state self-objectification in relation to photo modification, articulating taking and sharing selfies on social media.

8. Synopsis of the Main Research Outcomes

Achieving body ideals can be detrimental to social media users, resulting in appearance dissatisfaction. Appearance comparison processing clarifies the adverse consequences of being exposed to idealized images on social media in relation to body satisfaction. Modifying and sharing selfies on social media may lead to reduced appearance satisfaction and heightened cosmetic surgery interest. Social media-related body dissatisfaction and selfie behaviors enable constant self-presentation, increasing concerns as regards physical appearance and attractiveness (e.g., idealized images).

9. Conclusions

Relevant research has investigated whether body functionality, as a positive body image construct, assist women in appraising how their body operate, not how it looks, through their social media feed in terms of social comparison in relation to appearance. This systematic literature review presents the published peer-reviewed sources covering how sharing and viewing photos and selfies as idealized images on social media are related to heightened body dissatisfaction. The research outcomes drawn from the above analyses indicate that positive comments and posts articulating appearance-focused social media content predict decreased body dissatisfaction.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2021 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant

sources on beauty ideals, perceived body image, and appearance-focused social media may have been excluded. The scope of my study also does not move forward the inspection of social media behaviors online articulating body esteem and appreciation.

Subsequent analyses should develop on objectified self-presentation and attractiveness on social media. Future research should thus investigate digital alteration and manipulation on social media. Attention should be directed to social media-based appearance ideal internalization, dietary restraints, eating disorders, and unsatisfactory psychological well-being.

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This article does not contain any studies with human participants or animals performed by the author.

Data availability statement
All data generated or analyzed are included in the published article.

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Author contributions
The author confirms being the sole contributor of this work and approved it for publication. The author takes full responsibility for the accuracy and the integrity of the data analysis.

Conflict of interest statement
The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Disclosure by the editors of record
The editors declare no conflict of interest in the review and publication decision regarding this article.

Transparency statement
The author affirms that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Menstrual Cycle Tracking Apps, Fertility and Reproductive Data, and Mobile Health Care Management

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ABSTRACT. This paper provides a systematic literature review of studies investigating maternal and infant health apps assisting digital health-based maternity care. The analysis highlights that fertility data tracking and monitoring can be pivotal in reproductive health. Throughout January 2022, we performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "menstrual cycle tracking apps" + "fertility and reproductive data," "mobile health care management," and "technological self-surveillance." As we inspected research published between 2013 and 2022, only 144 articles satisfied the eligibility criteria. By eliminating controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, we decided upon 21, generally empirical, sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Distiller SR, MMAT, and ROBIS.

Keywords: fertility tracking app; women's sexual and reproductive health; technological self-surveillance

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1. Introduction

Evidence-based maternal and infant health apps can provide valid and accurate information to assist in mobile health care management. The purpose of our systematic review is to examine the recently published literature on menstrual cycle tracking apps and integrate the insights it configures on fertility and reproductive data and mobile health care management. By analyzing the most recent (2013–2022) and significant (Web of Science, Scopus, and ProQuest) sources, our paper has attempted to prove that Mothers use pregnancy apps to comfort themselves in relation to normal experiences or to seek help. The actuality and novelty of this study are articulated by addressing maternal and infant health apps assisting digital health-based maternity care, that is an emerging topic involving much interest. Our research problem is whether health and pregnancy apps can support users in configuring and preserving healthy habits..

In this review, prior findings have been cumulated indicating that pregnancy apps and wearables attempt to further a healthy fetal development resulting in improved pregnancy outcomes. The identified gaps advance digital devices and apps tracking women's sexual and reproductive health. Our main objective is to indicate that pregnant women can harness evidence-based mobile apps for health, self-management and care, and early childhood parenting information. This systematic review contributes to the literature on evidence-based fertility tracking apps should assist in family planning and behavioral contraceptive and abortion counseling by clarifying that health apps can supply emotional support at full length of parenthood transition. This research endeavors to elucidate whether fertility data tracking and monitoring can be pivotal in reproductive health. Our contribution is by integrating research findings indicating that evidence-based pregnancy apps assist in parenting service provision and engagement.

2. Theoretical Overview of the Main Concepts

Sharing pregnancy data by use of mobile apps is quite restrictive rather than contiguously and socially boundless, across the digitally mediated arrangement of connecting performance in the configuration of relations. Non-time-consuming pregnancy apps that provide reliable diet and practical lifestyle advice in a concise format are pivotal particularly for lower socioeconomic groups. Fertility awareness apps should articulate specific spaces of intimacy, bodily and social processes, embodied knowledge, and identities and needs. Pregnancy apps integrate spatially contiguous and close socialities through shared bodily experiences and intergenerational encounters, optimizing interaction and relationships between family members. Pregnancy apps aim to interact the lived practice of pregnancy as a biological and social process and the incomprehensible interiority of foetal growth through developing and

putting into action massive constantly updated arrays of foetal development images. Women can use mobile apps to share pregnancy data with their male partner, thus foster paternal bonding and stimulating the latter's assistance and commitment in the responsible and emotional activity of childcare, articulating a shared parenting ideal. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), menstrual cycle tracking apps, fertility and reproductive data, and technological self-surveillance (section 4), evidence-based fertility tracking apps, women's sexual and reproductive health, and intimate surveillance (section 5), fertility data tracking and monitoring, mobile health care management, and spaces of intimacy (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout January 2022, we performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "menstrual cycle tracking apps" + "fertility and reproductive data," "mobile health care management," and "technological self-surveillance." As we inspected research published between 2013 and 2022, only 144 articles satisfied the eligibility criteria. By eliminating controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, we decided upon 21, generally empirical, sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Distiller SR, MMAT, and ROBIS (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
menstrual cycle tracking apps + fertility and reproductive data	51	8
menstrual cycle tracking apps + mobile health care management	48	7
menstrual cycle tracking apps + technological self-surveillance	45	6
Type of paper		
Original research	92	18
Review	14	3
Conference proceedings	21	0
Book	8	0
Editorial	9	0

Source: Processed by the authors. Some topics overlap.

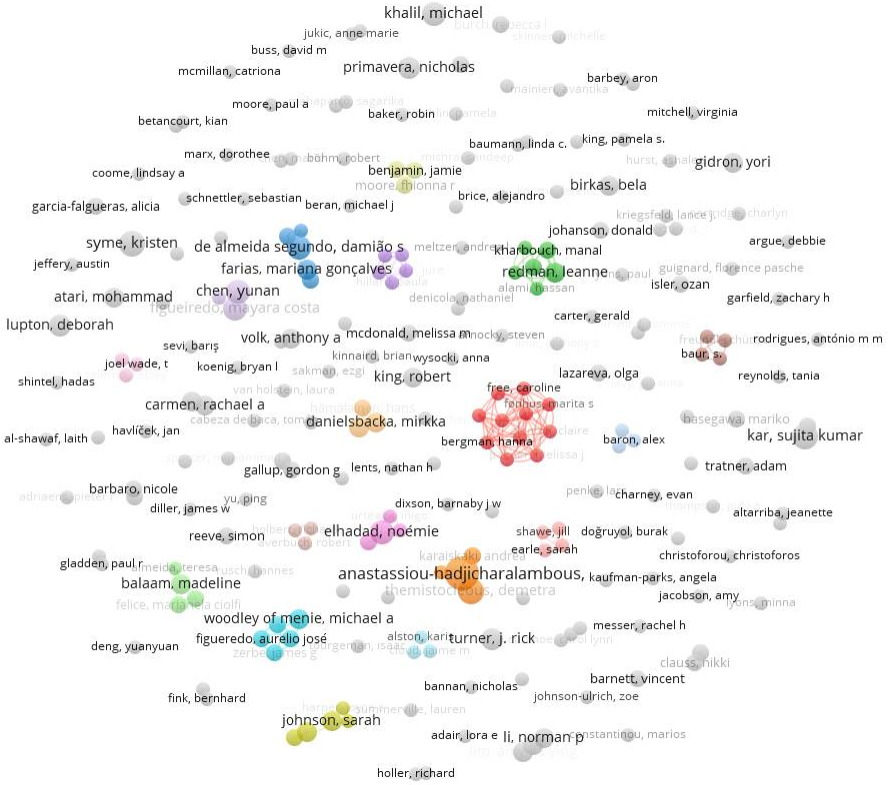


Figure 1 Co-authorship

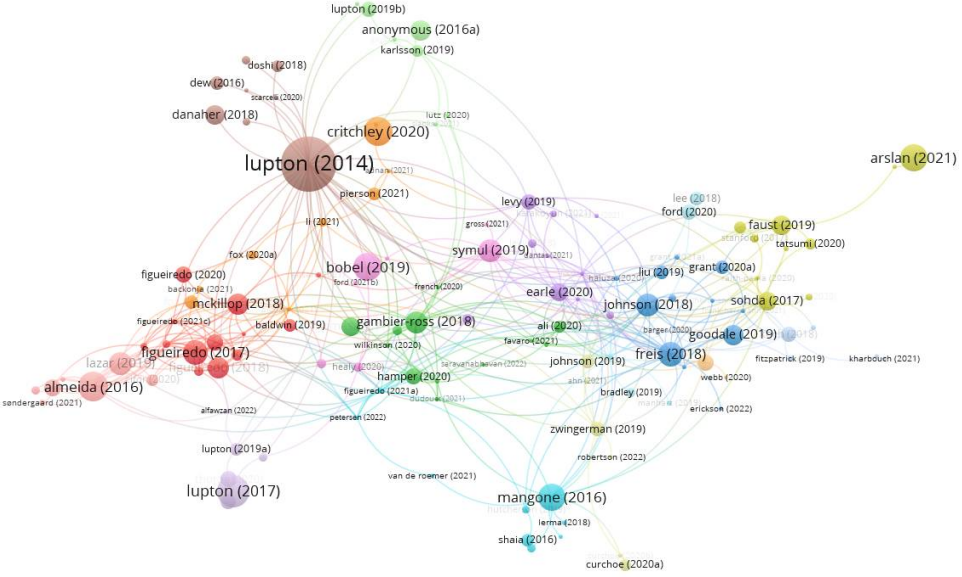


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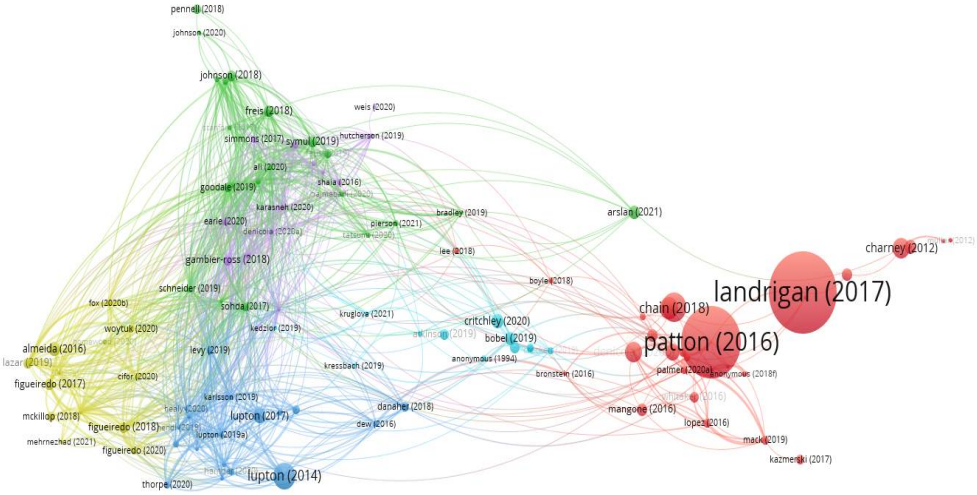


Figure 3 Bibliographic coupling

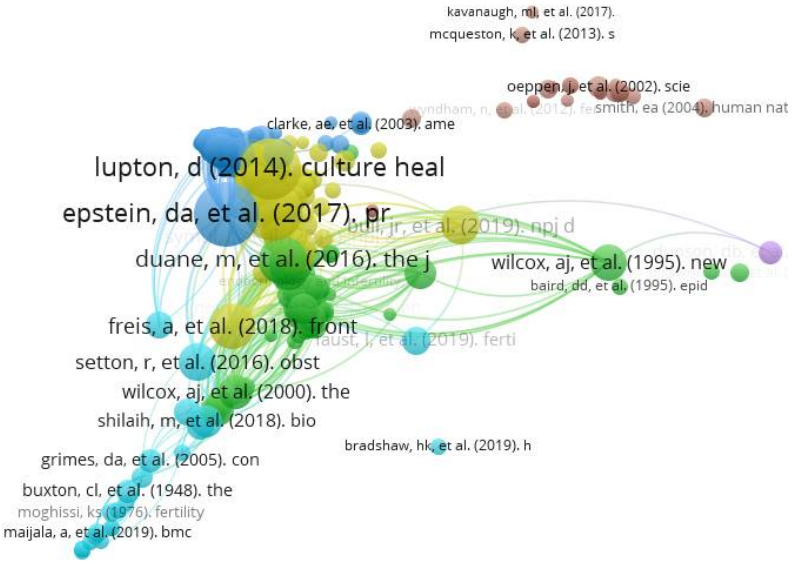


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Maternal and infant health apps assist digital health-based maternity care during conception, pregnancy, and reproductive journeys. Health apps can support pregnant women having anxiety symptoms.	Evans et al., 2022; Hamper and Nash, 2021; Mackintosh et al., 2021
Menstrual cycle tracking apps articulate technological self-surveillance by integrating fertility and reproductive data. Mothers use pregnancy apps to comfort themselves in relation to normal experiences or to seek help.	Byrt and Dempsey, 2022; Donelle et al., 2021; Hamper and Nash, 2021; McMillan, 2022
Pregnancy apps can offer mothers practical means to access trustworthy health data from heterogeneous sources, influencing users' perceived need to self-monitor. Pregnancy apps and wearables attempt to further a healthy fetal development resulting in improved pregnancy outcomes.	Donelle et al., 2021; Hamper and Nash, 2021; Segers et al., 2021
Pregnant women can harness evidence-based mobile apps for health, self-management and care, and early childhood parenting information that can lead to enhanced maternal and birth outcomes.	Buchanan et al., 2022; Hayman et al., 2022; Shorey et al., 2021
Digital devices and apps tracking women's sexual and reproductive health resort to basal body temperature, with fertility algorithms enabling the detection of ovulation and predicting pregnancy risks.	Dudouet, 2022; Hamper and Nash, 2021; Sandborg et al., 2021; Trahan et al., 2021
Evidence-based fertility tracking apps should assist in family planning and behavioral contraceptive and abortion counseling, preventing unintended pregnancy through interactive decision aids and birth control reminders, thus optimizing reproductive health.	Greene et al., 2021; Lyall, 2021; Mangone et al., 2016
Evidence-based period/fertility trackers can improve health behaviors. Evidence-based maternal and infant health apps can provide valid and accurate information to assist in mobile health care management.	Biviji et al., 2021; Derbyshire and Dancey 2013; McMillan, 2022; Ngo et al., 2022
Pregnancy apps can further physical activity behavior in women through engaging and effective self-monitoring, in addition to feedback on performance. Pregnancy apps as bonding devices configure the emotional and perceptual engagement that enticing visual images and data offer.	Hamper and Nash, 2021; Hayman et al., 2021
Femtech apps and devices, by tracking menstrual cycles, can assist in contraception and conception by shaping reproductive decisions, fertility, and pregnancy.	Grenfell et al., 2021; Hamper and Nash, 2021; McMillan, 2022

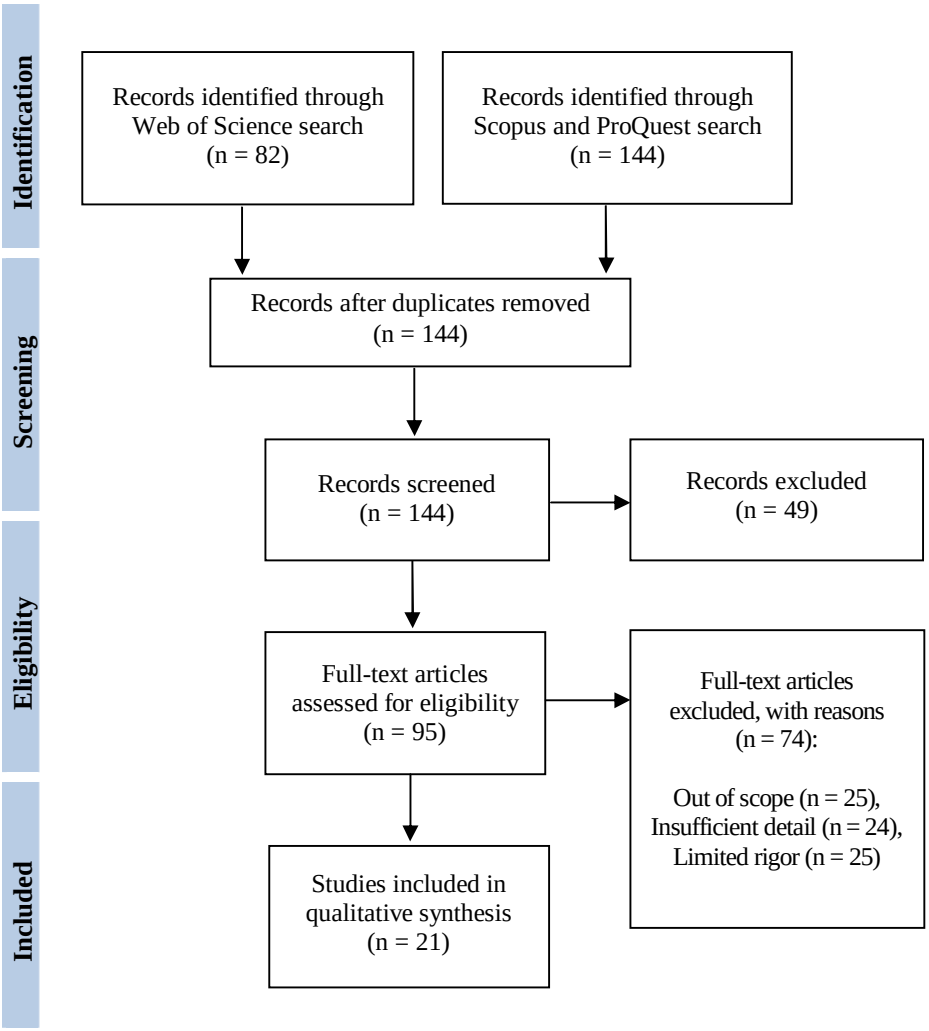


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

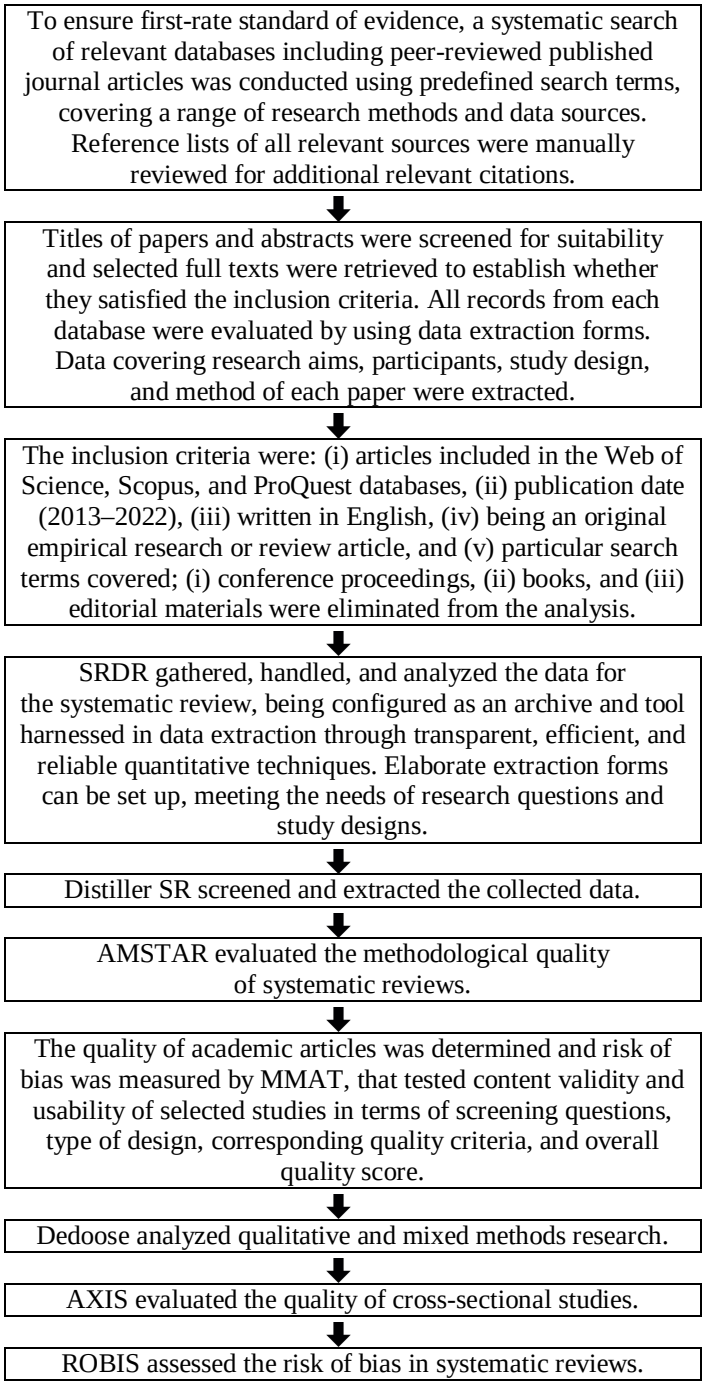


Figure 6 Screening and quality assessment tools

4. Menstrual Cycle Tracking Apps, Fertility and Reproductive Data, and Technological Self-Surveillance

Maternal and infant health apps assist digital health-based maternity care (Evans et al., 2022; Hamper and Nash, 2021; Mackintosh et al., 2021) during conception, pregnancy, and reproductive journeys. Women can use mobile apps to share pregnancy data with their male partner, thus foster paternal bonding and stimulating the latter's assistance and commitment in the responsible and emotional activity of childcare, articulating a shared parenting ideal. Health apps can support pregnant women having anxiety symptoms.

Menstrual cycle tracking apps articulate technological self-surveillance (Byrt and Dempsey, 2022; Donelle et al., 2021; Hamper and Nash, 2021; McMillan, 2022) by integrating fertility and reproductive data. Health apps can supply emotional support at full length of parenthood transition. Sharing pregnancy data by use of mobile apps is quite restrictive rather than contiguously and socially boundless, across the digitally mediated arrangement of connecting performance in the configuration of relations. Mothers use pregnancy apps to comfort themselves in relation to normal experiences or to seek help.

Pregnancy apps can offer mothers practical means to access trustworthy health data from heterogeneous sources (Donelle et al., 2021; Hamper and Nash, 2021; Segers et al., 2021), influencing users' perceived need to self-monitor. Pregnancy apps integrate spatially contiguous and close socialities through shared bodily experiences and intergenerational encounters, optimizing interaction and relationships between family members. Pregnancy apps and wearables attempt to further a healthy fetal development resulting in improved pregnancy outcomes. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Maternal and infant health apps assist digital health-based maternity care during conception, pregnancy, and reproductive journeys. Health apps can support pregnant women having anxiety symptoms.	Evans et al., 2022; Hamper and Nash, 2021; Mackintosh et al., 2021
Menstrual cycle tracking apps articulate technological self-surveillance by integrating fertility and reproductive data. Mothers use pregnancy apps to comfort themselves in relation to normal experiences or to seek help.	Byrt and Dempsey, 2022; Donelle et al., 2021; Hamper and Nash, 2021; McMillan, 2022
Pregnancy apps can offer mothers practical means to access trustworthy health data from heterogeneous sources, influencing users' perceived need to self-monitor. Pregnancy apps and wearables attempt to further a healthy fetal development resulting in improved pregnancy outcomes.	Donelle et al., 2021; Hamper and Nash, 2021; Segers et al., 2021

5. Evidence-based Fertility Tracking Apps, Women's Sexual and Reproductive Health, and Intimate Surveillance

Pregnant women can harness evidence-based mobile apps for health, self-management and care, and early childhood parenting information (Buchanan et al., 2022; Hayman et al., 2022; Shorey et al., 2021) that can lead to enhanced maternal and birth outcomes. Systematically regulated evidence-based tailored apps can decrease possible wounds, complications, and detrimental pregnancy results for both mother and child. Pregnancy-related mobile health apps should improve self-efficacy in parent–child bonding.

Digital devices and apps tracking women's sexual and reproductive health resort to basal body temperature (Dudouet, 2022; Hamper and Nash, 2021; Sandborg et al., 2021; Trahan et al., 2021), with fertility algorithms enabling the detection of ovulation and predicting pregnancy risks, while reducing contraceptive effectiveness concerns. Pregnancy apps can configure bonds between the unborn child and prospective parents, shaping emotional, embodied, and relational closeness. Health and pregnancy apps can support users in configuring and preserving healthy habits. Evidence-based pregnancy apps assist in parenting service provision and engagement.

Evidence-based fertility tracking apps should assist in family planning and behavioral contraceptive and abortion counseling (Greene et al., 2021; Lyall, 2021; Mangone et al., 2016), preventing unintended pregnancy through interactive decision aids and birth control reminders, thus optimizing reproductive health. Non-time-consuming pregnancy apps that provide reliable diet and practical lifestyle advice in a concise format are pivotal particularly for lower socioeconomic groups. Evidence-based pregnancy apps articulate intimate surveillance, datafication, and self-tracking technologies as regards users' activities and behaviors, and parenting and caregiving practices. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Pregnant women can harness evidence-based mobile apps for health, self-management and care, and early childhood parenting information that can lead to enhanced maternal and birth outcomes.	Buchanan et al., 2022; Hayman et al., 2022; Shorey et al., 2021
Digital devices and apps tracking women's sexual and reproductive health resort to basal body temperature, with fertility algorithms enabling the detection of ovulation and predicting pregnancy risks.	Dudouet, 2022; Hamper and Nash, 2021; Sandborg et al., 2021; Trahan et al., 2021
Evidence-based fertility tracking apps should assist in family planning and behavioral contraceptive and abortion counseling, preventing unintended pregnancy through interactive decision aids and birth control reminders, thus optimizing reproductive health.	Greene et al., 2021; Lyall, 2021; Mangone et al., 2016

6. Fertility Data Tracking and Monitoring, Mobile Health Care Management, and Spaces of Intimacy

Evidence-based period/fertility trackers (Biviji et al., 2021; Derbyshire and Dancey 2013; McMillan, 2022; Ngo et al., 2022) can improve health behaviors. Mobile apps can empower pregnant women to identify, administer, and seek appropriate treatment for nausea and vomiting that can considerably decrease quality of life, while taking place before the initial maternal care visit. Fertility data tracking and monitoring can be pivotal in reproductive health. Evidence-based maternal and infant health apps can provide valid and accurate information to assist in mobile health care management.

Pregnancy apps can further physical activity behavior in women through engaging and effective self-monitoring (Hamper and Nash, 2021; Hayman et al., 2021), in addition to feedback on performance. Pregnancy apps aim to interact the lived practice of pregnancy as a biological and social process and the incomprehensible interiority of foetal growth through developing and putting into action massive constantly updated arrays of foetal development images. Pregnancy apps as bonding devices configure the emotional and perceptual engagement that enticing visual images and data offer.

Femtech apps and devices, by tracking menstrual cycles, can assist in contraception and conception (Grenfell et al., 2021; Hamper and Nash, 2021; McMillan, 2022) by shaping reproductive decisions, fertility, and pregnancy. Pregnancy apps assist users in connecting to the unborn child, articulating a visual culture of developing infants that is customized through prompt notifications and consolidated as headway through pregnancy. Fertility awareness apps should articulate specific spaces of intimacy, bodily and social processes, embodied knowledge, and identities and needs. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Evidence-based period/fertility trackers can improve health behaviors. Evidence-based maternal and infant health apps can provide valid and accurate information to assist in mobile health care management.	Biviji et al., 2021; Derbyshire and Dancey 2013; McMillan, 2022; Ngo et al., 2022
Pregnancy apps can further physical activity behavior in women through engaging and effective self-monitoring, in addition to feedback on performance. Pregnancy apps as bonding devices configure the emotional and perceptual engagement that enticing visual images and data offer.	Hamper and Nash, 2021; Hayman et al., 2021
Femtech apps and devices, by tracking menstrual cycles, can assist in contraception and conception by shaping reproductive decisions, fertility, and pregnancy.	Grenfell et al., 2021; Hamper and Nash, 2021; McMillan, 2022

7. Discussion

We integrate our systematic review throughout research indicating how fertility data tracking and monitoring can be pivotal in reproductive health. Our research complements recent analyses clarifying how evidence-based maternal and infant health apps can provide valid and accurate information to assist in mobile health care management. We elucidate, by cumulative evidence, previous research demonstrating how evidence-based pregnancy apps assist in parenting service provision and engagement. Evidence-based pregnancy apps articulate intimate surveillance, datafication, and self-tracking technologies as regards users' activities and behaviors, and parenting and caregiving practices. Pregnancy apps as bonding devices configure the emotional and perceptual engagement that enticing visual images and data offer.

8. Synopsis of the Main Research Outcomes

Mothers use pregnancy apps to comfort themselves in relation to normal experiences or to seek help. Health apps can supply emotional support at full length of parenthood transition. Pregnancy apps assist users in connecting to the unborn child, articulating a visual culture of developing infants that is customized through prompt notifications and consolidated as headway through pregnancy.

9. Conclusions

Relevant research has investigated whether health and pregnancy apps can support users in configuring and preserving healthy habits. This systematic literature review presents the published peer-reviewed sources covering how pregnancy apps and wearables attempt to further a healthy fetal development resulting in improved pregnancy outcomes. The research outcomes drawn from the above analyses indicate that pregnant women can harness evidence-based mobile apps for health, self-management and care, and early childhood parenting information.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2013 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on evidence-based fertility tracking apps, women's sexual and reproductive health, and intimate surveillance may have been excluded. The scope of our study also does not move forward the inspection of pregnancy apps offering mothers practical means to access trustworthy health data from heterogeneous sources.

Subsequent analyses should develop on pregnancy apps furthering physical activity behavior in women through engaging and effective self-monitoring. Future research should thus investigate femtech apps and devices shaping reproductive decisions, fertility, and pregnancy. Attention should be directed to evidence-based period/fertility trackers improving health behaviors.

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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication. The authors take full responsibility for the accuracy and the integrity of the data analysis.

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

Disclosure by the editors of record
The editors declare no conflict of interest in the review and publication decision regarding this article.

Transparency statement
The authors affirm that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Online Visual Self-Presentation: Augmented Reality Face Filters, Selfie-Editing Behaviors, and Body Image Disorder

Mary Rowland*

ABSTRACT. The present study systematically reviews the existing research on socially acceptable appearance-enhancing products and beauty filters. My findings indicate that photo-sharing social networks, virtual space engagement, and selfie filtering apps articulate maladaptive internalization of unrealistic body images and unattainable appearance standards. I contribute to the literature by clarifying that augmented reality-based beauty apps can provide immersive experiences to social media users, articulating selfie-editing behaviors as regards biometric facial data. Throughout February 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "online visual self-presentation" + "augmented reality face filters," "selfie-editing behaviors," and "body image disorder." As research published between 2017 and 2022 was inspected, only 145 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, I selected 22 mainly empirical sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Dedoose, Distiller SR, and SRDR.

Keywords: beauty app and filter; body image disorder; online self-presentation

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1. Introduction

Beauty apps and filters impact perceived physical appearance and configure fictional online identities. The purpose of my systematic review is to examine the recently published literature on online visual self-presentation and integrate the insights it configures on augmented reality face filters, selfie-editing behaviors, and body image disorder. By analyzing the most recent (2017–2022) and significant (Web of Science, Scopus, and ProQuest) sources, my paper has attempted to prove that incessant exposure to filtered images and compulsive selfie-taking configure body image representations and distortions, affecting perceptual body image. The actuality and novelty of this study are articulated by addressing socially acceptable appearance-enhancing products and beauty filters, that is an emerging topic involving much interest. My research problem is whether augmented reality-based beauty apps can provide immersive experiences to social media users, articulating selfie-editing behaviors as regards biometric facial data.

In this review, prior findings have been cumulated indicating that individuals proceed with social comparisons and ensuing selfie-editing not due to their dissatisfaction as regards appearance, but as a consequence of the predisposition for flawless online self-presentation. The identified gaps advance face-altering apps and beauty filters shaping self-perceived body image through idealized depictions of attractiveness. My main objective is to indicate that photo-sharing social networks, virtual space engagement, and selfie filtering apps articulate maladaptive internalization of unrealistic body images and unattainable appearance standards. This systematic review contributes to the literature on appearance-altering photo-filters shaping media imagery and visual representations by clarifying that increased interpersonal uncertainty may give rise to body dysmorphic disorder and associated body image misrepresentations when selfie filters and image-centered social media apps are involved. This research endeavors to elucidate whether body dysmorphic disorder and associated body image distortions entail dysfunctional self-modeling as regards physical appearance which leads to self-destructive internalization of sociocultural choices through artificial intelligence-filtered images. My contribution is by integrating research findings indicating that digital beauty filters increase physical attractiveness.

2. Theoretical Overview of the Main Concepts

Online visual self-presentation through photo manipulation and editing may lead to body image-related issues, detrimental identity construction processes, and self-objectification routines. Low self-esteem is positively related to selfie editing: body comparison predispositions with peers result in increased selfie editing that is positively linked to social media addiction and detrimentally

associated with life satisfaction for individuals having increased body-image discrepancy. Induced body dissatisfaction does not result in increased selfie taking and editing, the latter bringing about heightened negative mood and facial dissatisfaction, while magnitude of selfie editing predicts growing facial dissatisfaction. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), beauty apps and filters, online visual self-presentation, and body image disorder (section 4), augmented reality-based beauty apps, selfie-editing behaviors, and unattainable appearance standards (section 5), image-centered social media apps, augmented reality face filters, and flawless online self-presentation (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout February 2022, a quantitative literature review of the Web of Science, Scopus, and ProQuest databases was performed, with search terms including "online visual self-presentation" + "augmented reality face filters," "selfie-editing behaviors," and "body image disorder." As research published between 2017 and 2022 was inspected, only 145 articles satisfied the eligibility criteria. By taking out controversial or ambiguous findings (insufficient/irrelevant data), outcomes unsubstantiated by replication, too general material, or studies with nearly identical titles, I selected 22 mainly empirical sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AMSTAR, Dedoose, Distiller SR, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
online visual self-presentation + augmented reality face filters	51	8
online visual self-presentation + selfie-editing behaviors	49	7
online visual self-presentation + body image disorder	45	7
Type of paper		
Original research	109	21
Review	7	1
Conference proceedings	16	0
Book	6	0
Editorial	7	0

Source: Processed by the author. Some topics overlap.

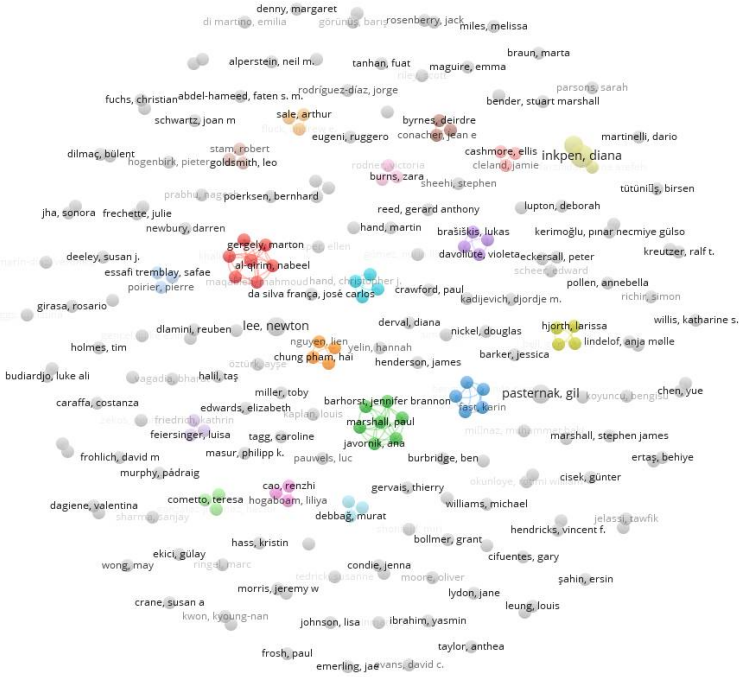


Figure 1 Co-authorship

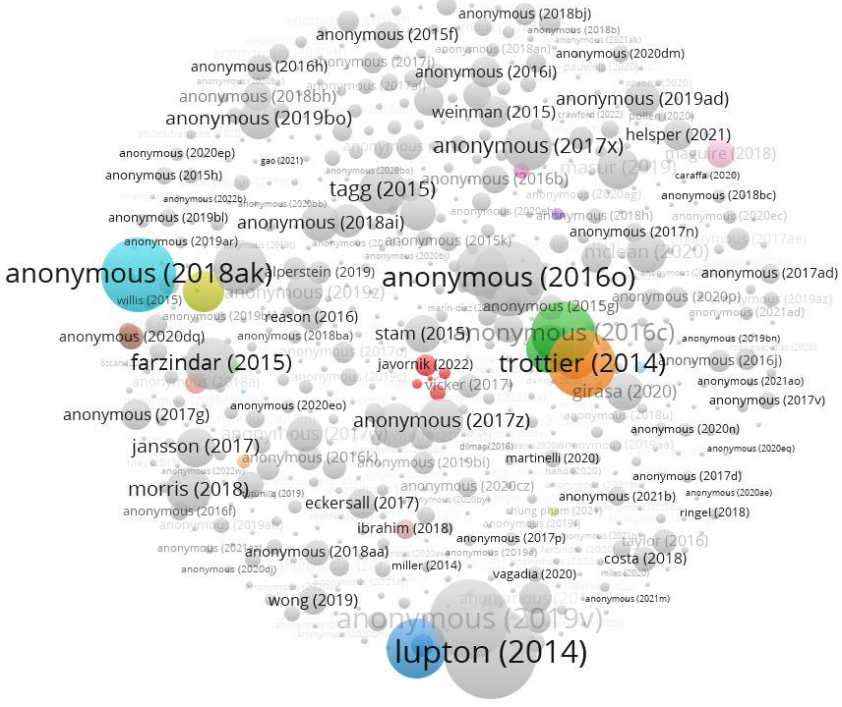


Figure 2 Citation

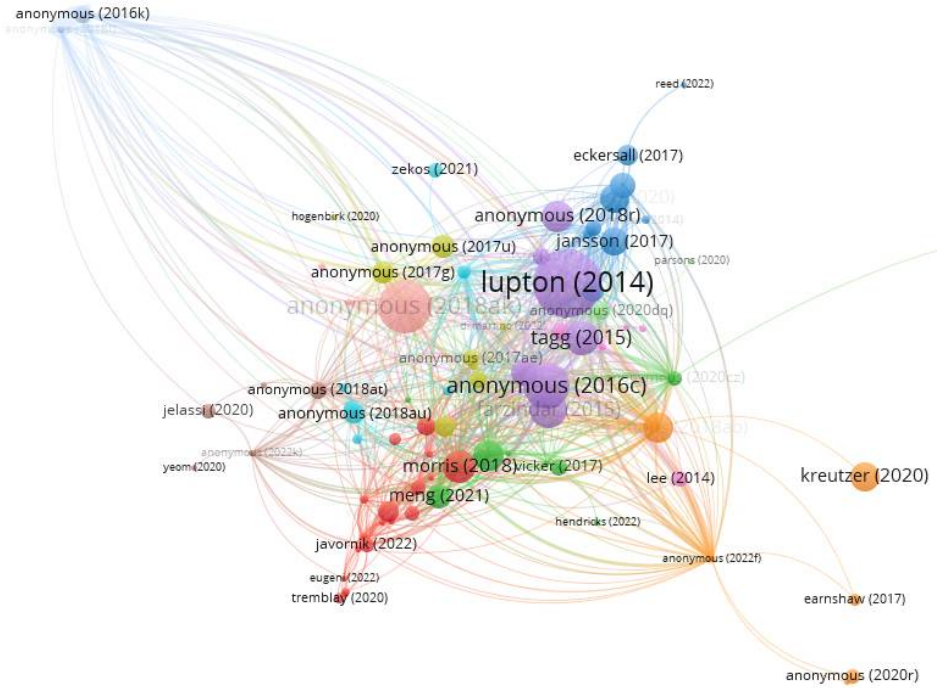


Figure 3 Bibliographic coupling

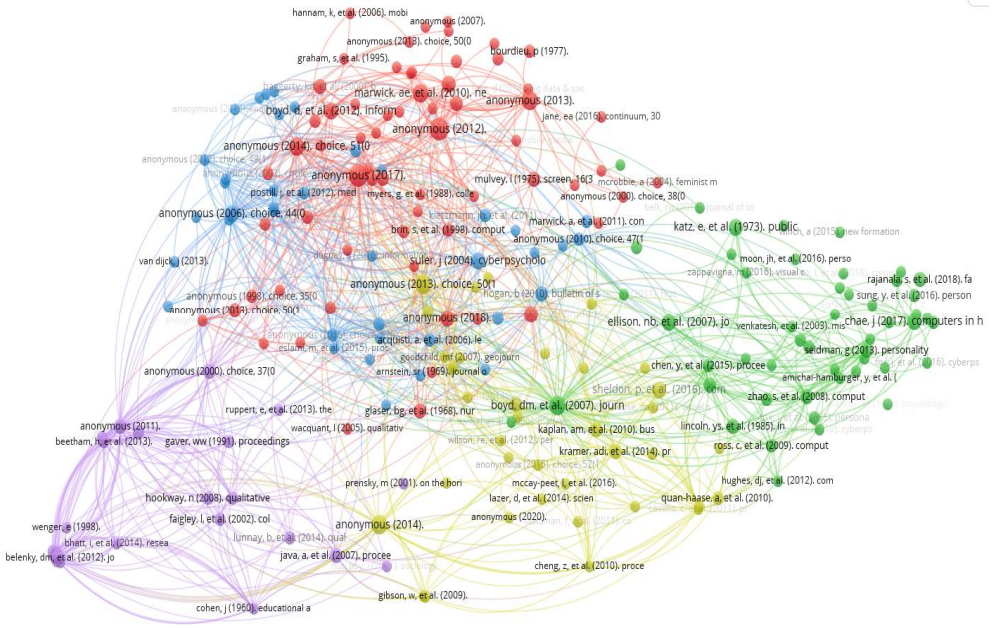


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Augmented reality face-tracking filters enable users to effortlessly make their photos more satisfactory, thus enhancing physical appearance. Online visual self-presentation through photo manipulation and editing may lead to body image-related issues, detrimental identity construction processes, and self-objectification routines.	Eliseev and Marsh, 2021; El-Shamandi Ahmed et al., 2022; Gioia et al., 2021; Tremblay et al., 2021
Beauty apps develop on augmented reality, immersive, and virtualization technologies. Face and body filters shape self-esteem, social benefit perceptions, and cosmetic surgery acceptance.	Hsuan-Yu Hsu et al., 2021; Maes and de Lenne, 2022; Tremblay et al., 2021
Appearance-altering photo-filters shape media imagery and visual representations, in addition to social stereotypes, through photo editing and manipulation.	Butkowski et al., 2022; Jarzyna, 2021; Kunst et al., 2022; Tremblay et al., 2021
Socially acceptable appearance-enhancing products and beauty filters articulate impression and appearance management behaviors. Augmented reality-based beauty apps can provide immersive experiences to social media users, articulating selfie-editing behaviors as regards biometric facial data.	Butt et al., 2022; Millière, 2022; Wang and Yu, 2022
Photo enhancement technology, software editing tools, and artificial intelligence-powered filter-based social media apps impact users' body image.	Butt et al., 2022; Ponseti et al., 2022; Tremblay et al., 2021
Face-altering apps and beauty filters shape self-perceived body image through idealized depictions of attractiveness and may lead to undergoing cosmetic procedures.	Fastoso et al., 2021; Frieiro et al., 2022; Thai et al., 2020; Tremblay et al., 2021
Constant and prolonged social media and image editing tool use negatively affects self-esteem and mental well-being by integrating enhancement filters in relation to unrealistic standards of beauty.	Chae et al., 2017; Staniewski and Awruk, 2022; Tremblay et al., 2021
Beauty and virtual try-on apps, together with augmented reality face filters, impact body-image affective judgments in relation to physical attractiveness and self-image management. Egocentricity, sociability, body-esteem in terms of attribution, and social comparison orientation are associated with selfie-editing frequency.	Chae et al., 2017; Tawira and Ivanov, 2022; Tremblay et al., 2021; Wang, 2019
Image-centered social media content and artificial intelligence-filtered pictures may result in maladaptive sociocultural appearance standard internalization, body image insecurities, interpersonal uncertainty, and cosmetic procedures.	Chow, 2022; Tiggemann et al., 2020; Tremblay et al., 2021

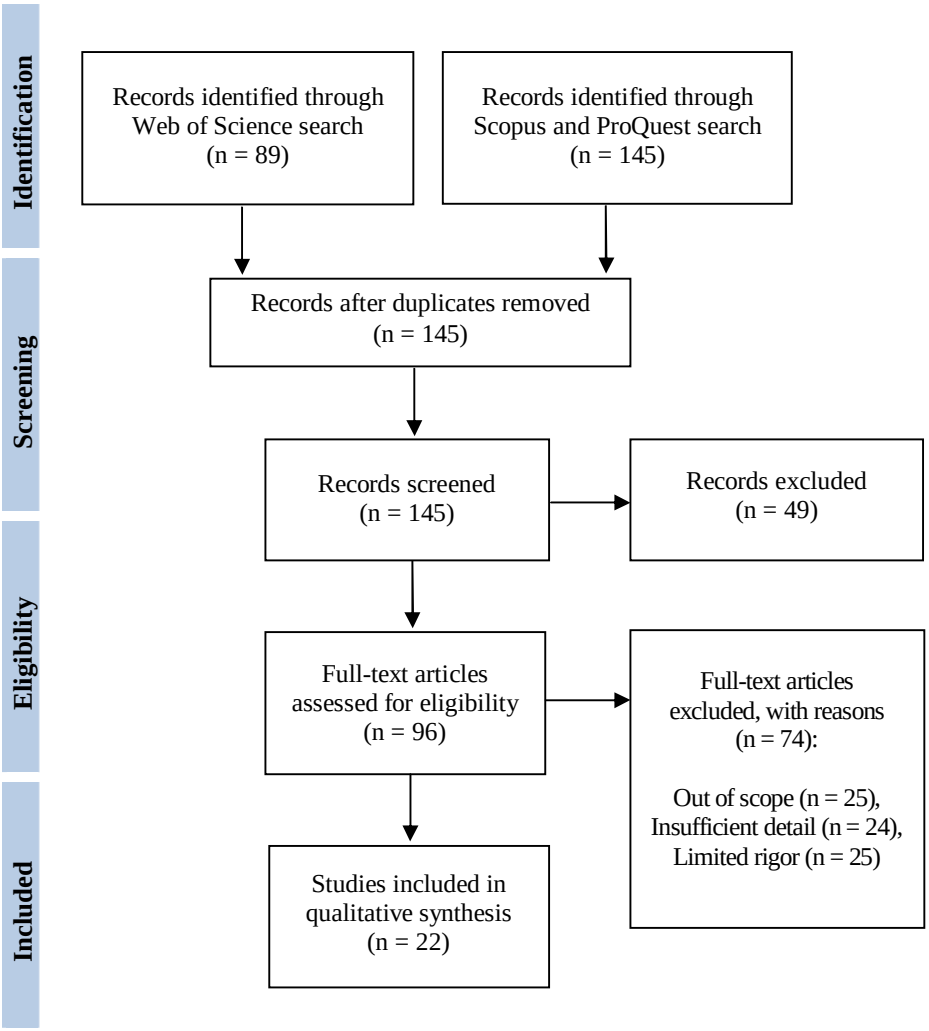


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

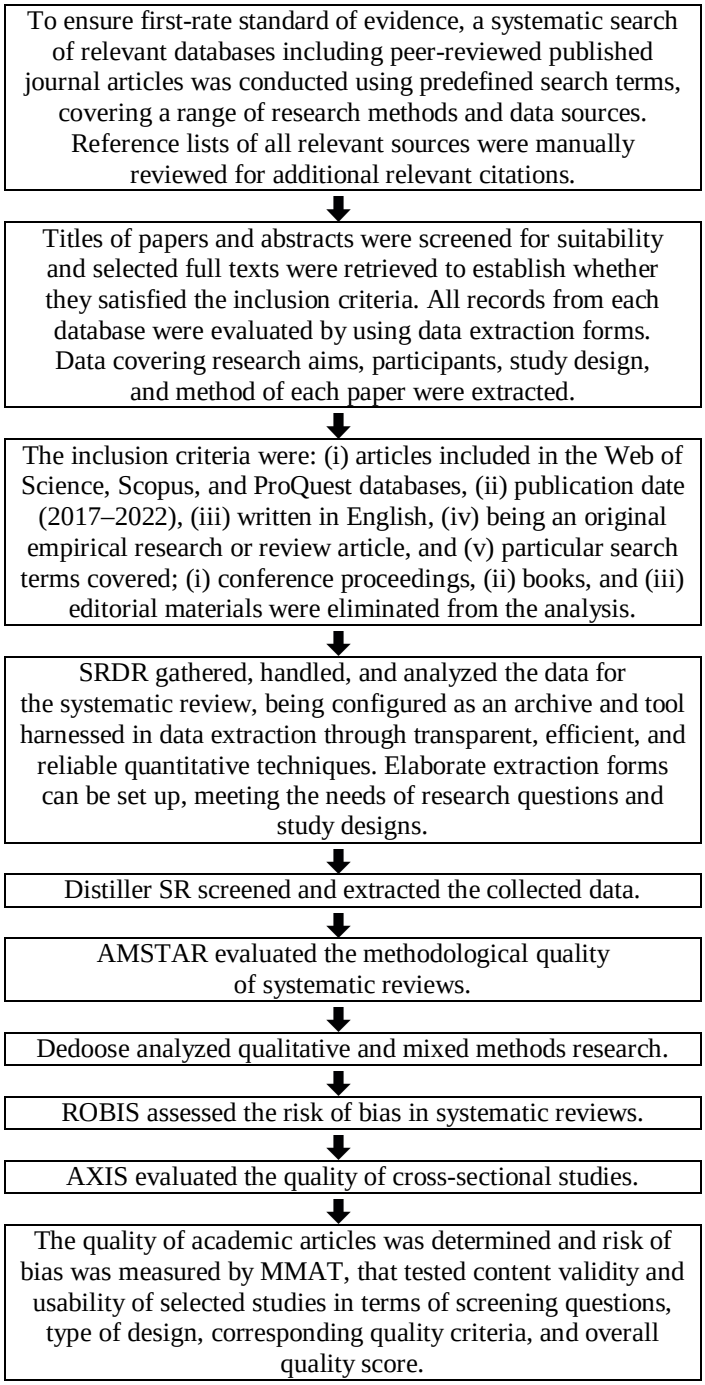


Figure 6 Screening and quality assessment tools

4. Beauty Apps and Filters, Online Visual Self-Presentation, and Body Image Disorder

Augmented reality face-tracking filters enable users to effortlessly make their photos more satisfactory (Eliseev and Marsh, 2021; El-Shamandi Ahmed et al., 2022; Gioia et al., 2021; Tremblay et al., 2021), thus enhancing physical appearance. Incessant exposure to filtered images and compulsive selfie-taking configure body image representations and distortions, affecting perceptual body image. Augmented reality makeup tools, together with beauty apps and filters, shape perceived authenticity and social rejection. Online visual self-presentation through photo manipulation and editing may lead to body image-related issues, detrimental identity construction processes, and self-objectification routines.

Beauty apps develop on augmented reality, immersive, and virtualization technologies (Hsuan-Yu Hsu et al., 2021; Maes and de Lenne, 2022; Tremblay et al., 2021) in relation to sensory perceptions, emotional embodiment, experiential value, and cognitive and affective attitudes. Body dysmorphic disorder and associated body image distortions entail dysfunctional self-modeling as regards physical appearance which leads to self-destructive internalization of sociocultural choices through artificial intelligence-filtered images. Face and body filters shape self-esteem, social benefit perceptions, and cosmetic surgery acceptance.

Appearance-altering photo-filters shape media imagery and visual representations, in addition to social stereotypes (Butkowski et al., 2022; Jarzyna, 2021; Kunst et al., 2022; Tremblay et al., 2021), through photo editing and manipulation, leading to social capital inconsistencies. Body dissatisfaction may be the result of immoderate exposition to artificial intelligence-filtered self-portrait pictures, prolonging body image disorder through interpersonal active inferences, weakened cognitive control, and impaired self-modeling. Beauty apps and filters impact perceived physical appearance and configure fictional online identities. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Augmented reality face-tracking filters enable users to effortlessly make their photos more satisfactory, thus enhancing physical appearance.	Eliseev and Marsh, 2021; El-Shamandi Ahmed et al., 2022; Gioia et al., 2021; Tremblay et al., 2021
Beauty apps develop on augmented reality, immersive, and virtualization technologies.	Hsuan-Yu Hsu et al., 2021; Maes and de Lenne, 2022; Tremblay et al., 2021
Appearance-altering photo-filters shape media imagery and visual representations, in addition to social stereotypes, through photo editing and manipulation.	Butkowski et al., 2022; Jarzyna, 2021; Kunst et al., 2022; Tremblay et al., 2021

5. Augmented Reality-based Beauty Apps, Selfie-Editing Behaviors, and Unattainable Appearance Standards

Socially acceptable appearance-enhancing products and beauty filters articulate impression and appearance management behaviors (Butt et al., 2022; Millière, 2022; Wang and Yu, 2022) in terms of appearance self-esteem and public self-consciousness, and possibly bringing about cosmetic procedure interest. Deep learning-based synthetic audiovisual media tools and beauty filters enhance user appearance through image and video manipulation. Augmented reality-based beauty apps can provide immersive experiences to social media users, articulating selfie-editing behaviors as regards biometric facial data.

Photo enhancement technology, software editing tools, and artificial intelligence-powered filter-based social media apps (Butt et al., 2022; Ponseti et al., 2022; Tremblay et al., 2021) impact users' body image and self-esteem, and the identity formation process in terms of exploration and commitment. Digital beauty filters increase physical attractiveness. Attitudes and behaviors as regards body shaming and cosmetic surgery procedures configure a persistent beauty culture online through biometric data, automated digital beauty technologies and photo editing tools, augmented reality face filters, and computer vision algorithms.

Face-altering apps and beauty filters shape self-perceived body image through idealized depictions of attractiveness (Fastoso et al., 2021; Frieiro et al., 2022; Thai et al., 2020; Tremblay et al., 2021) and may lead to undergoing cosmetic procedures. Photo-sharing social networks, virtual space engagement, and selfie filtering apps articulate maladaptive internalization of unrealistic body images and unattainable appearance standards. Augmented reality face filters and retouched images on social networks influence self-esteem and articulate eating disorder behaviors. Low self-esteem is positively related to selfie editing: body comparison predispositions with peers result in increased selfie editing that is positively linked to social media addiction and detrimentally associated with life satisfaction for individuals having increased body-image discrepancy. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Socially acceptable appearance-enhancing products and beauty filters articulate impression and appearance management behaviors.	Butt et al., 2022; Millière, 2022; Wang and Yu, 2022
Photo enhancement technology, software editing tools, and artificial intelligence-powered filter-based social media apps impact users' body image.	Butt et al., 2022; Ponseti et al., 2022; Tremblay et al., 2021
Face-altering apps and beauty filters shape self-perceived body image through idealized depictions of attractiveness and may lead to undergoing cosmetic procedures.	Fastoso et al., 2021; Frieiro et al., 2022; Thai et al., 2020; Tremblay et al., 2021

6. Image-centered Social Media Apps, Augmented Reality Face Filters, and Flawless Online Self-Presentation

Constant and prolonged social media and image editing tool use negatively affects self-esteem and mental well-being (Chae et al., 2017; Staniewski and Awruk, 2022; Tremblay et al., 2021) by integrating enhancement filters in relation to unrealistic standards of beauty, appearance, likability, and lifestyle, in addition to idealized digitally altered photos. Snapchat dysmorphia is driven by automated selfie filters and image-centered social media apps that mirror idealistic sociocultural standards, obliterating perceived imperfections in physical appearance and intensifying body image issues.

Beauty and virtual try-on apps, together with augmented reality face filters, impact body-image affective judgments (Chae et al., 2017; Tawira and Ivanov, 2022; Tremblay et al., 2021; Wang, 2019) in relation to physical attractiveness and self-image management. Increased interpersonal uncertainty may give rise to body dysmorphic disorder and associated body image misrepresentations when selfie filters and image-centered social media apps are involved. Selfie-taking, social media use, and public self-consciousness are positively related to social comparison in terms of appearance. Egocentricity, sociability, body-esteem in terms of attribution, and social comparison orientation are associated with selfie-editing frequency.

Image-centered social media content and artificial intelligence-filtered pictures (Chow, 2022; Tiggemann et al., 2020; Tremblay et al., 2021) may result in maladaptive sociocultural appearance standard internalization, body image insecurities, interpersonal uncertainty, and cosmetic procedures. Augmented reality face filters lead to cosmetic surgery procedures, bodily interventions, and beautification practices. Induced body dissatisfaction does not result in increased selfie taking and editing, the latter bringing about heightened negative mood and facial dissatisfaction, while magnitude of selfie editing predicts growing facial dissatisfaction. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Constant and prolonged social media and image editing tool use negatively affects self-esteem and mental well-being by integrating enhancement filters in relation to unrealistic standards of beauty.	Chae et al., 2017; Staniewski and Awruk, 2022; Tremblay et al., 2021
Beauty and virtual try-on apps, together with augmented reality face filters, impact body-image affective judgments in relation to physical attractiveness and self-image management.	Chae et al., 2017; Tawira and Ivanov, 2022; Tremblay et al., 2021; Wang, 2019
Image-centered social media content and artificial intelligence-filtered pictures may result in maladaptive sociocultural appearance standard internalization, body image insecurities, interpersonal uncertainty, and cosmetic procedures.	Chow, 2022; Tiggemann et al., 2020; Tremblay et al., 2021

7. Discussion

I integrate my systematic review throughout research indicating how augmented reality makeup tools, together with beauty apps and filters, shape perceived authenticity and social rejection. My research complements recent analyses clarifying how body dissatisfaction may be the result of immoderate exposition to artificial intelligence-filtered self-portrait pictures, prolonging body image disorder through interpersonal active inferences, weakened cognitive control, and impaired self-modeling. I elucidate, by cumulative evidence, previous research demonstrating how Snapchat dysmorphia is driven by automated selfie filters and image-centered social media apps that mirror idealistic sociocultural standards, obliterating perceived imperfections in physical appearance and intensifying body image issues.

8. Synopsis of the Main Research Outcomes

Augmented reality face filters and retouched images on social networks influence self-esteem and articulate eating disorder behaviors. Deep learning-based synthetic audiovisual media tools and beauty filters enhance user appearance through image and video manipulation. Egocentricity, sociability, body-esteem in terms of attribution, and social comparison orientation are associated with selfie-editing frequency.

9. Conclusions

Relevant research has investigated whether attitudes and behaviors as regards body shaming and cosmetic surgery procedures configure a persistent beauty culture online through biometric data, automated digital beauty technologies and photo editing tools, augmented reality face filters, and computer vision algorithms. This systematic literature review presents the published peer-reviewed sources covering how selfie-taking, social media use, and public self-consciousness are positively related to social comparison in terms of appearance. The research outcomes drawn from the above analyses indicate that face and body filters shape self-esteem, social benefit perceptions, and cosmetic surgery acceptance.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2017 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on beauty apps and filters, online visual self-presentation, and body image disorder may have been excluded. The scope of my study also does

not move forward the inspection of augmented reality face-tracking filters enabling users to effortlessly make their photos more satisfactory.

Subsequent analyses should develop on beauty apps developing on augmented reality, immersive, and virtualization technologies. Future research should thus investigate constant and prolonged social media and image editing tool use. Attention should be directed to beauty and virtual try-on apps, together with augmented reality face filters, impacting body-image affective judgments.

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This article does not contain any studies with human participants or animals performed by the author.

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Author contributions
The author confirms being the sole contributor of this work and approved it for publication. The author takes full responsibility for the accuracy and the integrity of the data analysis.

Conflict of interest statement
The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Disclosure by the editors of record
The editors declare no conflict of interest in the review and publication decision regarding this article.

Transparency statement
The author affirms that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Appearance-focused Social Media Use, Unrealistic Beauty Ideals, and Body Image Dissatisfaction

Robert Watson*

ABSTRACT. In this article, I cumulate previous research findings indicating that social media articulates appearance pressures, thin-ideal internalization, and beauty ideals. I contribute to the literature on unrealistic beauty ideals configured by social media by showing that thin-ideal and attractiveness internalization and appearance comparison lead to body dissatisfaction. Throughout January 2022, I performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "appearance-focused social media use" + "unrealistic beauty ideals," "body image dissatisfaction," and "social comparison processes." As I inspected research published between 2021 and 2022, only 162 articles satisfied the eligibility criteria. By eliminating controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, I decided upon 29, generally empirical, sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Dedoose, ROBIS, and SRDR.

Keywords: beauty ideal internalization; physical appearance-based social comparison; body image

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1. Introduction

Appearance-focused social media use and engagement display body image risks. The purpose of my systematic review is to examine the recently published literature on appearance-focused social media use and integrate the insights it configures on unrealistic beauty ideals and body image dissatisfaction. By analyzing the most recent (2021–2022) and significant (Web of Science, Scopus, and ProQuest) sources, my paper has attempted to prove that increasingly visual social media content is linked to body image concerns, as appearance is significantly associated with attractiveness and self-worth. The actuality and novelty of this study are articulated by addressing unrealistic beauty ideals configured by social media, that is an emerging topic involving much interest. My research problem is whether thin-ideal and attractiveness internalization and appearance comparison lead to body dissatisfaction.

In this review, prior findings have been cumulated indicating that social media articulates appearance pressures, thin-ideal internalization, and beauty ideals. The identified gaps advance engagement in social comparison processes on social media. My main objective is to indicate that sharing selfies is positively related to body shame by appearance-based comparison, and to beauty ideal internalization. This systematic review contributes to the literature on harnessing filters and editing tools for digitally altering photos and perfecting selfies by clarifying that visual processing and deployment of idealized computer-based female images on social media bring about lower body satisfaction and damaging self-perceptions and social comparisons. This research endeavors to elucidate whether selfies are associated with appearance dissatisfaction and cosmetic surgery acceptance while predicting positive assessment such as increased self-esteem and narcissism. My contribution is by integrating research findings indicating that image alteration technology affects visual content credibility and meaning, resulting in visual manipulation and misinformation.

2. Theoretical Overview of the Main Concepts

Drive for thinness as a sociocultural pressure contributes to body dissatisfaction and disordered eating in terms of thin-ideal internalization, fear of fatness, and shape and weight beliefs. Appearance comparison is related to negative emotions (possibly leading to anxiety and depression), influencing body image and self-esteem through overweight and cosmetic surgery preoccupations. Taking systematically photos by use of Snapchat lenses is related to increased body image concerns. Social media use leads to body image dissatisfaction and decreased self-esteem, having adverse mental health effects. Selfies may be detrimental to users who edit their photos as

continuous photo alteration can decrease appearance satisfaction, while heightening cosmetic procedure interest and self-objectification. Beauty social media engagement and internalization, dysmorphic appearance comparisons and concerns, and cosmetic surgery consideration articulate attractiveness internalization on social media. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), thin-ideal internalization, appearance pressures and dissatisfaction, and social comparison processes (section 4), body image and self-esteem, unrealistic beauty ideals, and appearance-focused social media use (section 5), beauty ideal internalization, physical appearance-based social comparisons, and body image dissatisfaction (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout January 2022, I performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "appearance-focused social media use" + "unrealistic beauty ideals," "body image dissatisfaction," and "social comparison processes." As I inspected research published between 2021 and 2022, only 162 articles satisfied the eligibility criteria. By eliminating controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, I decided upon 29, generally empirical, sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Dedoose, ROBIS, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
appearance-focused social media use + unrealistic beauty ideals	56	10
appearance-focused social media use + body image dissatisfaction	54	10
appearance-focused social media use + social comparison processes	52	9
Type of paper		
Original research	134	28
Review	7	1
Conference proceedings	14	0
Book	3	0
Editorial	4	0

Source: Processed by the author. Some topics overlap.

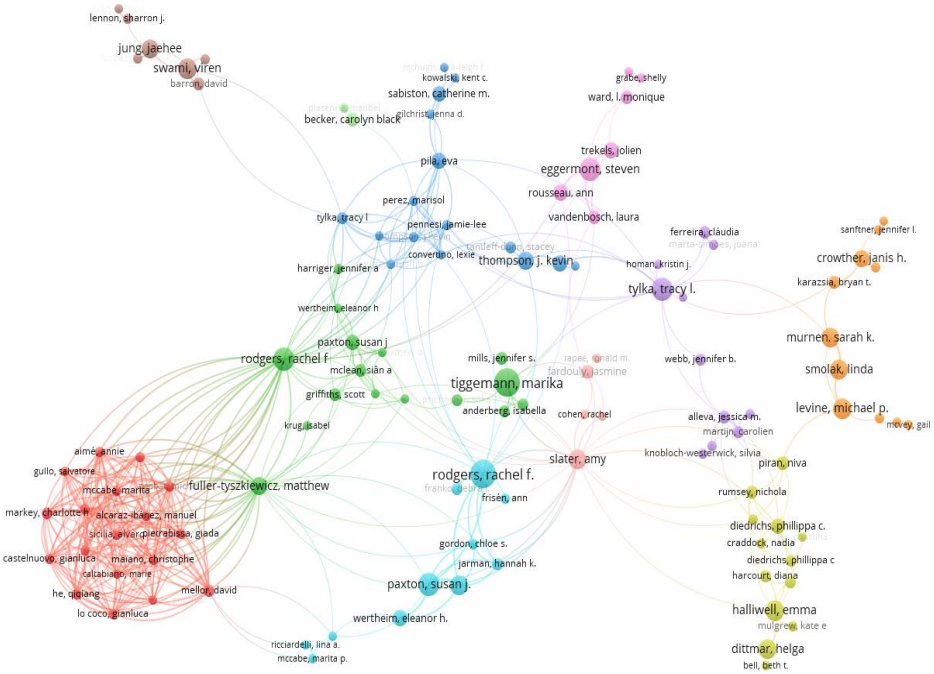


Figure 1 Co-authorship

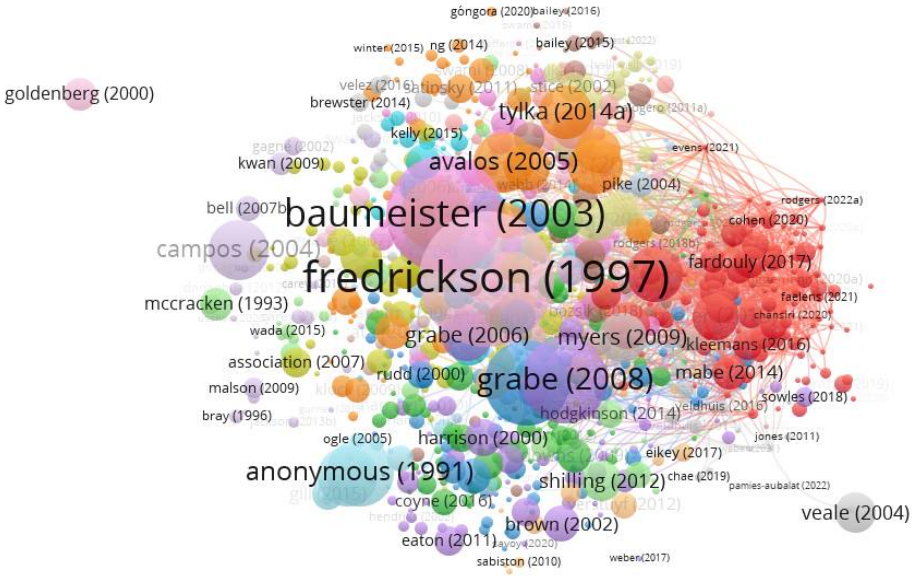


Figure 2 Citation

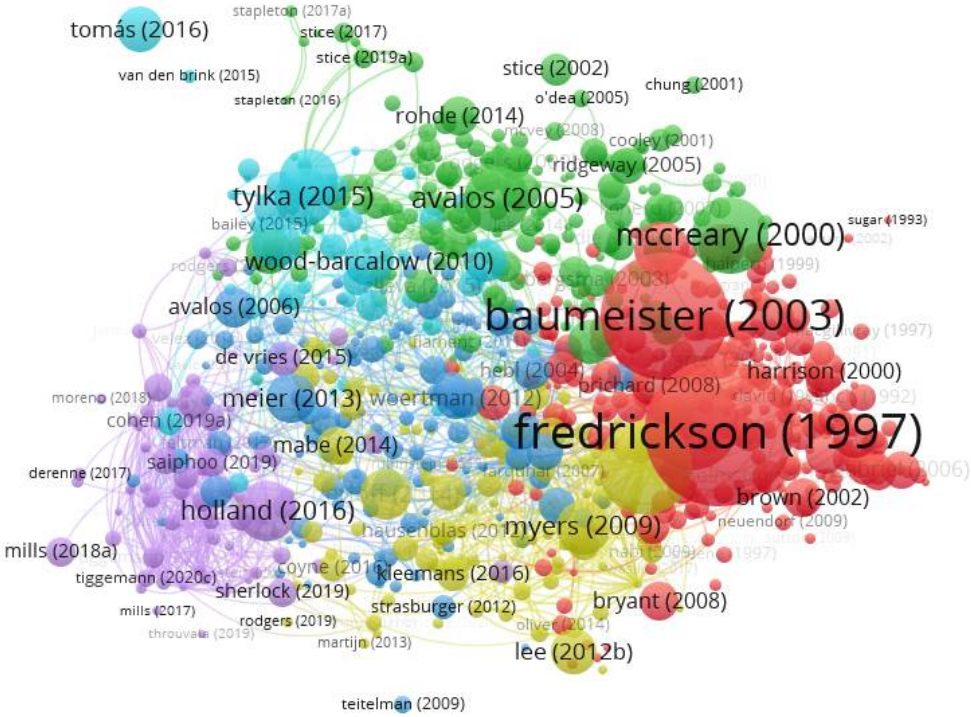


Figure 3 Bibliographic coupling

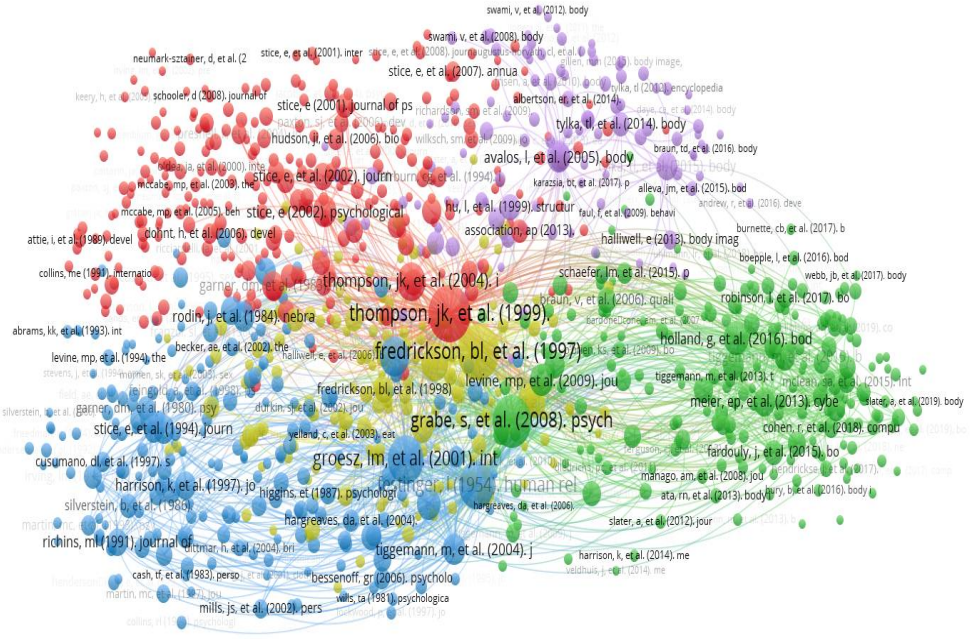


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Harnessing filters and editing tools for digitally altering photos and perfecting selfies is boosting, articulating both aesthetic goals and unrealistic expectations.	Parsa et al., 2021; Rodgers and Rousseau, 2022; Vendemia and DeAndrea, 2021
Viewing images on social media displaying unattainable beauty ideals detrimentally impacts body image. Selfies are associated with appearance dissatisfaction and cosmetic surgery acceptance while predicting positive assessment.	Burnell et al., 2022; Chae, 2022; Fioravanti et al., 2022
Engagement in social comparison processes on social media affects body esteem, appearance, and confidence. Drive for thinness as a sociocultural pressure contributes to body dissatisfaction and disordered eating in terms of thin-ideal internalization, fear of fatness, and shape and weight beliefs.	Di Gesto et al., 2022; Roberts et al., 2022; Rodgers et al., 2022; Vendemia and Robinson, 2022
Appearance-based self-discrepancy is pivotal for facial dissatisfaction. Image alteration technology affects visual content credibility and meaning, resulting in visual manipulation and misinformation.	Beos et al., 2021; Swerzenski, 2021; Vendemia and DeAndrea, 2021
Physical appearance and mental health concerns lead to body dissatisfaction and inadequate social comparisons through photo-editing techniques. Selfie behavior is positively associated with cosmetic surgery consideration.	Choukas-Bradley et al., 2022; Lyu et al., 2022; Markey and Daniels, 2022; Yager et al., 2022
Unrealistic beauty ideals are configured by social media through digitally altered images. Physical appearance perfectionism leads to negative body image through social comparisons.	Hai and Yang, 2022; McComb and Mills, 2022; Naderer et al., 2022; Seekis and Barker, 2022
Appearance-based photo manipulation constitutes a relevant determinant of cosmetic procedure attitudes and intentions. Visual processing and deployment of idealized computer-based female images on social media bring about lower body satisfaction and damaging self-perceptions and social comparisons.	Beos et al., 2021; Boeriis, 2021; Scott et al., 2022
Social comparison in terms of appearance ideal internalization mediates the link between social media usage and body image esteem. Social media content is generally harmful as regards body appreciation.	Becker et al., 2022; Jung et al., 2022; Schettino et al., 2022
Social comparisons linked with digitally modified images influence body positive content, mood, appreciation, acceptance, and satisfaction. Thin-ideal and attractiveness internalization and appearance comparison lead to body dissatisfaction.	Manning and Mulgrew, 2022; Mendes et al., 2022; Molina Ruiz et al., 2022; Wang et al., 2022

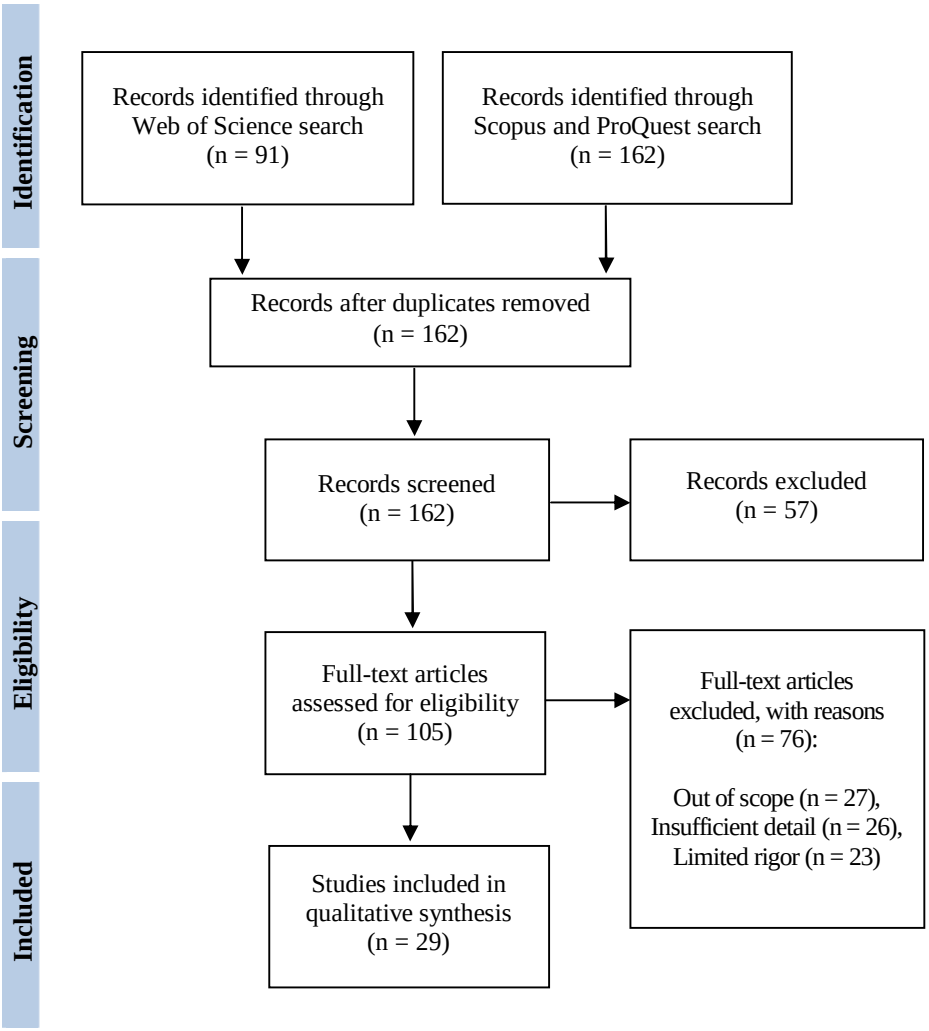


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

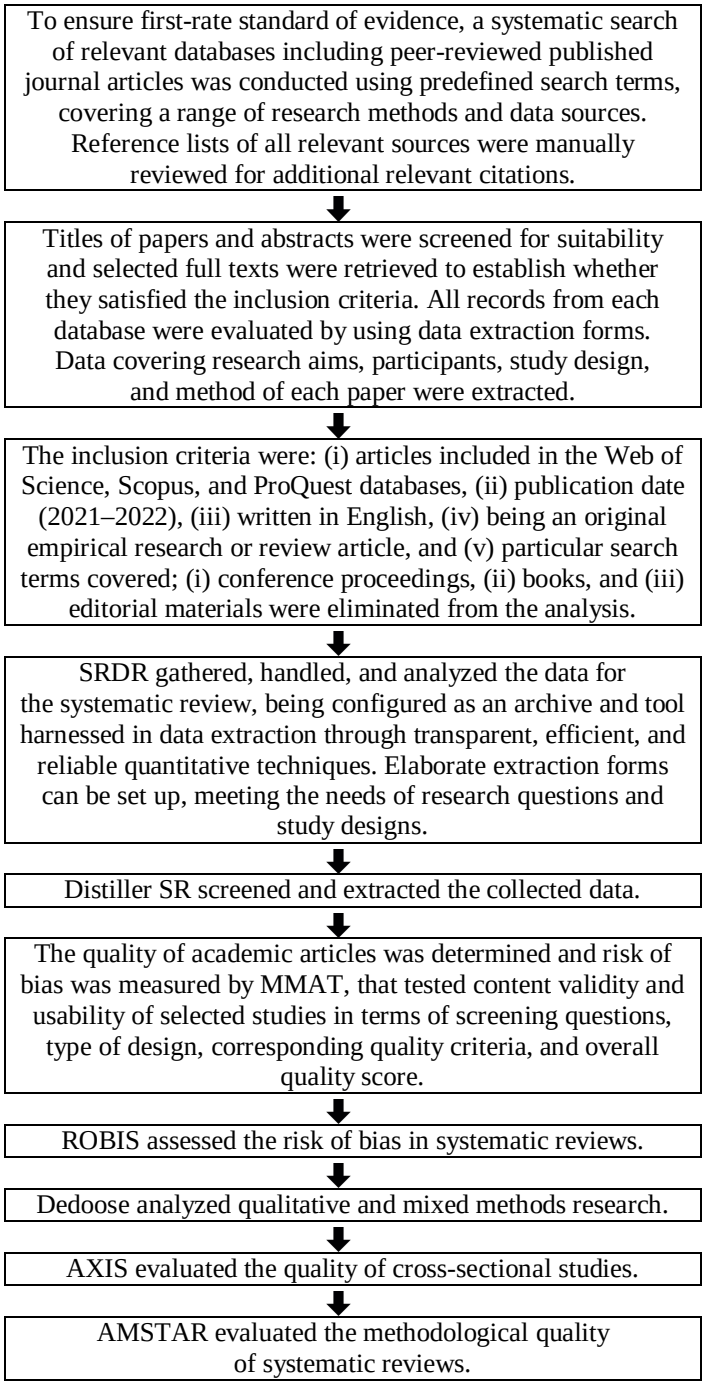


Figure 6 Screening and quality assessment tools

4. Thin-Ideal Internalization, Appearance Pressures and Dissatisfaction, and Social Comparison Processes

Harnessing filters and editing tools for digitally altering photos and perfecting selfies is boosting (Parsa et al., 2021; Rodgers and Rousseau, 2022; Vendemia and DeAndrea, 2021), articulating both aesthetic goals and unrealistic expectations. Modifying selfies results in reduced appearance satisfaction and decreased pro-cosmetic surgery attitudes. Increasingly visual social media content is linked to body image concerns, as appearance is significantly associated with attractiveness and self-worth.

Viewing images on social media displaying unattainable beauty ideals (Burnell et al., 2022; Chae, 2022; Fioravanti et al., 2022) detrimentally impacts body image. Taking systematically photos by use of Snapchat lenses is related to increased body image concerns. Selfies are associated with appearance dissatisfaction and cosmetic surgery acceptance while predicting positive assessment such as increased self-esteem and narcissism.

Engagement in social comparison processes on social media (Di Gesto et al., 2022; Roberts et al., 2022; Rodgers et al., 2022; Vendemia and Robinson, 2022) affects body esteem, appearance, and confidence. Social media articulates appearance pressures, thin-ideal internalization, and beauty ideals. Cosmetic surgery acceptance is linked with physical appearance comparison, sociocultural processes, and body dissatisfaction. Drive for thinness as a sociocultural pressure contributes to body dissatisfaction and disordered eating in terms of thin-ideal internalization, fear of fatness, and shape and weight beliefs. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Harnessing filters and editing tools for digitally altering photos and perfecting selfies is boosting, articulating both aesthetic goals and unrealistic expectations.	Parsa et al., 2021; Rodgers and Rousseau, 2022; Vendemia and DeAndrea, 2021
Viewing images on social media displaying unattainable beauty ideals detrimentally impacts body image. Selfies are associated with appearance dissatisfaction and cosmetic surgery acceptance while predicting positive assessment such as increased self-esteem and narcissism.	Burnell et al., 2022; Chae, 2022; Fioravanti et al., 2022
Engagement in social comparison processes on social media affects body esteem, appearance, and confidence. Drive for thinness as a sociocultural pressure contributes to body dissatisfaction and disordered eating in terms of thin-ideal internalization, fear of fatness, and shape and weight beliefs.	Di Gesto et al., 2022; Roberts et al., 2022; Rodgers et al., 2022; Vendemia and Robinson, 2022

5. Body Image and Self-Esteem, Unrealistic Beauty Ideals, and Appearance-focused Social Media Use

Appearance-based self-discrepancy (Beos et al., 2021; Swerzenski, 2021; Vendemia and DeAndrea, 2021) is pivotal for facial dissatisfaction. Selfies may be detrimental to users who edit their photos as continuous photo alteration can decrease appearance satisfaction, while heightening cosmetic procedure interest and self-objectification. Image alteration technology affects visual content credibility and meaning, resulting in visual manipulation and misinformation.

Physical appearance and mental health concerns lead to body dissatisfaction and inadequate social comparisons (Choukas-Bradley et al., 2022; Lyu et al., 2022; Markey and Daniels, 2022; Yager et al., 2022) through photo-editing techniques. Appearance-focused social media use and engagement display body image risks. Selfie behavior is positively associated with cosmetic surgery consideration.

Unrealistic beauty ideals are configured by social media (Hai and Yang, 2022; McComb and Mills, 2022; Naderer et al., 2022; Seekis and Barker, 2022) through digitally altered images. Beauty social media engagement and internalization, dysmorphic appearance comparisons and concerns, and cosmetic surgery consideration articulate attractiveness internalization on social media. Appearance comparison is related to negative emotions (possibly leading to anxiety and depression), influencing body image and self-esteem through overweight and cosmetic surgery preoccupations. Physical appearance perfectionism leads to negative body image through social comparisons. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Appearance-based self-discrepancy is pivotal for facial dissatisfaction. Image alteration technology affects visual content credibility and meaning, resulting in visual manipulation and misinformation.	Beos et al., 2021; Swerzenski, 2021; Vendemia and DeAndrea, 2021
Physical appearance and mental health concerns lead to body dissatisfaction and inadequate social comparisons through photo-editing techniques. Selfie behavior is positively associated with cosmetic surgery consideration.	Choukas-Bradley et al., 2022; Lyu et al., 2022; Markey and Daniels, 2022; Yager et al., 2022
Unrealistic beauty ideals are configured by social media through digitally altered images. Physical appearance perfectionism leads to negative body image through social comparisons.	Hai and Yang, 2022; McComb and Mills, 2022; Naderer et al., 2022; Seekis and Barker, 2022

6. Beauty Ideal Internalization, Physical Appearance-based Social Comparisons, and Body Image Dissatisfaction

Appearance-based photo manipulation (Beos et al., 2021; Boeriis, 2021; Scott et al., 2022) constitutes a relevant determinant of cosmetic procedure attitudes and intentions. Sharing photographic images can be considered bodily experiences, articulating through visual manipulation a distributed cognitive system on social media and practices. Visual processing and deployment of idealized computer-based female images on social media bring about lower body satisfaction and damaging self-perceptions and social comparisons.

Social comparison in terms of appearance ideal internalization (Becker et al., 2022; Jung et al., 2022; Schettino et al., 2022) mediates the link between social media usage and body image esteem. Sharing selfies is positively related to body shame by appearance-based comparison, and to beauty ideal internalization. Social media content is generally harmful as regards body appreciation.

Social comparisons linked with digitally modified images (Manning and Mulgrew, 2022; Mendes et al., 2022; Molina Ruiz et al., 2022; Wang et al., 2022) influence body positive content, mood, appreciation, acceptance, and satisfaction. Social media use leads to body image dissatisfaction and decreased self-esteem, having adverse mental health effects. Shame feelings and unfavorable physical appearance-based social comparisons may lead to disordered eating behaviors. Thin-ideal and attractiveness internalization and appearance comparison lead to body dissatisfaction. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Appearance-based photo manipulation constitutes a relevant determinant of cosmetic procedure attitudes and intentions. Visual processing and deployment of idealized computer-based female images on social media bring about lower body satisfaction and damaging self-perceptions and social comparisons.	Beos et al., 2021; Boeriis, 2021; Scott et al., 2022
Social comparison in terms of appearance ideal internalization mediates the link between social media usage and body image esteem. Social media content is generally harmful as regards body appreciation.	Becker et al., 2022; Jung et al., 2022; Schettino et al., 2022
Social comparisons linked with digitally modified images influence body positive content, mood, appreciation, acceptance, and satisfaction. Thin-ideal and attractiveness internalization and appearance comparison lead to body dissatisfaction.	Manning and Mulgrew, 2022; Mendes et al., 2022; Molina Ruiz et al., 2022; Wang et al., 2022

7. Discussion

I integrate my systematic review throughout research indicating how modifying selfies results in reduced appearance satisfaction and decreased pro-cosmetic surgery attitudes. My research complements recent analyses clarifying how physical appearance perfectionism leads to negative body image through social comparisons. I elucidate, by cumulative evidence, previous research demonstrating how social media content is generally harmful as regards body appreciation. Increasingly visual social media content is linked to body image concerns, as appearance is significantly associated with attractiveness and self-worth. Image alteration technology affects visual content credibility and meaning, resulting in visual manipulation and misinformation. Thin-ideal and attractiveness internalization and appearance comparison lead to body dissatisfaction. Social media articulates appearance pressures, thin-ideal internalization, and beauty ideals.

8. Synopsis of the Main Research Outcomes

Cosmetic surgery acceptance is linked with physical appearance comparison, sociocultural processes, and body dissatisfaction. Appearance-focused social media use and engagement display body image risks. Selfies are associated with appearance dissatisfaction and cosmetic surgery acceptance while predicting positive assessment such as increased self-esteem and narcissism. Visual processing and deployment of idealized computer-based female images on social media bring about lower body satisfaction and damaging self-perceptions and social comparisons.

9. Conclusions

Relevant research has investigated whether shame feelings and unfavorable physical appearance-based social comparisons may lead to disordered eating behaviors. This systematic literature review presents the published peer-reviewed sources covering how sharing photographic images can be considered bodily experiences, articulating through visual manipulation a distributed cognitive system on social media and practices. The research outcomes drawn from the above analyses indicate that selfie behavior is positively associated with cosmetic surgery consideration.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2021 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on beauty ideal internalization, physical appearance-based social

comparisons, and body image dissatisfaction may have been excluded. The scope of my study also does not move forward the inspection of social comparison in terms of appearance ideal internalization.

Subsequent analyses should develop on the link between social media usage and body image esteem. Future research should thus investigate social comparisons linked with digitally modified images. Attention should be directed to appearance-based photo manipulation in relation to cosmetic procedure attitudes and intentions.

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This article does not contain any studies with human participants or animals performed by the author.

Data availability statement
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Author contributions
The author confirms being the sole contributor of this work and approved it for publication. The author takes full responsibility for the accuracy and the integrity of the data analysis.

Conflict of interest statement
The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Disclosure by the editors of record
The editors declare no conflict of interest in the review and publication decision regarding this article.

Transparency statement
The author affirms that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Idealized Online Identities, Social Appearance Comparisons, and Negative Body Image

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ABSTRACT. The aim of this systematic review is to synthesize and analyze social media appearance-related pressures. With increasing evidence of self-destructive body image and unrealistic bodily ideals leading to body image pathologies through inconsistent visual evaluations and decisions, there is an essential demand for comprehending whether appearance-based self-discrepancy moderates the link between photo manipulation and facial dissatisfaction. In this research, prior findings were cumulated indicating that self-dissatisfaction in relation to body image may result in low self-esteem, anxiety, and depression. I carried out a quantitative literature review of ProQuest, Scopus, and the Web of Science throughout February 2022, with search terms including "idealized online identities" + "social appearance comparisons," "negative body image," and "state self-objectification." As I analyzed research published between 2021 and 2022, only 156 papers met the eligibility criteria. By removing controversial or unclear findings (scanty/unimportant data), results unsupported by replication, undetailed content, or papers having quite similar titles, I decided on 29, chiefly empirical, sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Distiller SR, ROBIS, and SRDR.

Keywords: body image dissatisfaction; social appearance comparison; state self-objectification

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1. Introduction

Increased appearance-focused social media use is related to decreased body satisfaction and psychological well-being. The purpose of my systematic review is to examine the recently published literature on idealized online identities and integrate the insights it configures on social appearance comparisons and negative body image. By analyzing the most recent (2021–2022) and significant (Web of Science, Scopus, and ProQuest) sources, my paper has attempted to prove that social media posts can heighten appearance preoccupation and negative body image. The actuality and novelty of this study are articulated by addressing social media appearance-related pressures, that is an emerging topic involving much interest. My research problem is whether self-dissatisfaction in relation to body image may result in low self-esteem, anxiety, and depression.

In this review, prior findings have been cumulated indicating that exposure to attractive ideal images on social media brings about body dissatisfaction. The identified gaps advance self-destructive body image and unrealistic bodily ideals leading to body image pathologies through inconsistent visual evaluations and decisions. My main objective is to indicate that appearance-based self-discrepancy moderates the link between photo manipulation and facial dissatisfaction. This systematic review contributes to the literature on sociocultural and appearance pressures as regards thin-ideal internalization by clarifying that negative emotional expression, self-image, thoughts, and feelings affect homogenized value authenticity construction and blur social boundaries, constructing idealized online identities and articulating unsatisfying social performances on social media. This research endeavors to elucidate whether selfie taking and photo editing are related to appearance-based beliefs notwithstanding individuals' perception of their own body. My contribution is by integrating research findings indicating that body image dissatisfaction is associated with thin ideal beauty internalization.

2. Theoretical Overview of the Main Concepts

Manipulated images shared online can shape individuals' beliefs and behaviors, undermining trust and decisions as accurate psychological processes and mechanisms and impairing social performance. Body-ideal imagery assessments cause increased weight and appearance dissatisfaction and decreased body satisfaction. Social media appearance ideals and pressures, in addition to body dissatisfaction, can lead to psychiatric concerns. Elevated appearance-ideal internalization and social comparisons shape the links between increased social media engagement and decreased body satisfaction and psychological well-being. Social comparisons and physical appearance ideals and concerns shape attitudes toward body image and cosmetic surgery

procedures. Receiving appearance comments as regards selfies increases state self-objectification, notwithstanding the type of photo alteration. Intensified posting and increased exposure online may predict body dissatisfaction and configure appearance-focused social media interactions. Positive body image may improve and be optimized by intuitive eating. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), social appearance comparisons, body image dissatisfaction, and idealized online identities (section 4), appearance-ideal internalization, body dissatisfaction, and state self-objectification (section 5), negative body image, thin-ideal internalization, and cosmetic surgery consideration (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

I carried out a quantitative literature review of ProQuest, Scopus, and the Web of Science throughout February 2022, with search terms including "idealized online identities" + "social appearance comparisons," "negative body image," and "state self-objectification." As I analyzed research published between 2021 and 2022, only 156 papers met the eligibility criteria. By removing controversial or unclear findings (scanty/unimportant data), results unsupported by replication, undetailed content, or papers having quite similar titles, I decided on 29, chiefly empirical, sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Distiller SR, ROBIS, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
idealized online identities + social appearance comparisons	55	11
idealized online identities + negative body image	52	10
idealized online identities + state self-objectification	49	8
Type of paper		
Original research	129	28
Review	6	1
Conference proceedings	14	0
Book	3	0
Editorial	4	0

Source: Processed by the authors. Some topics overlap.

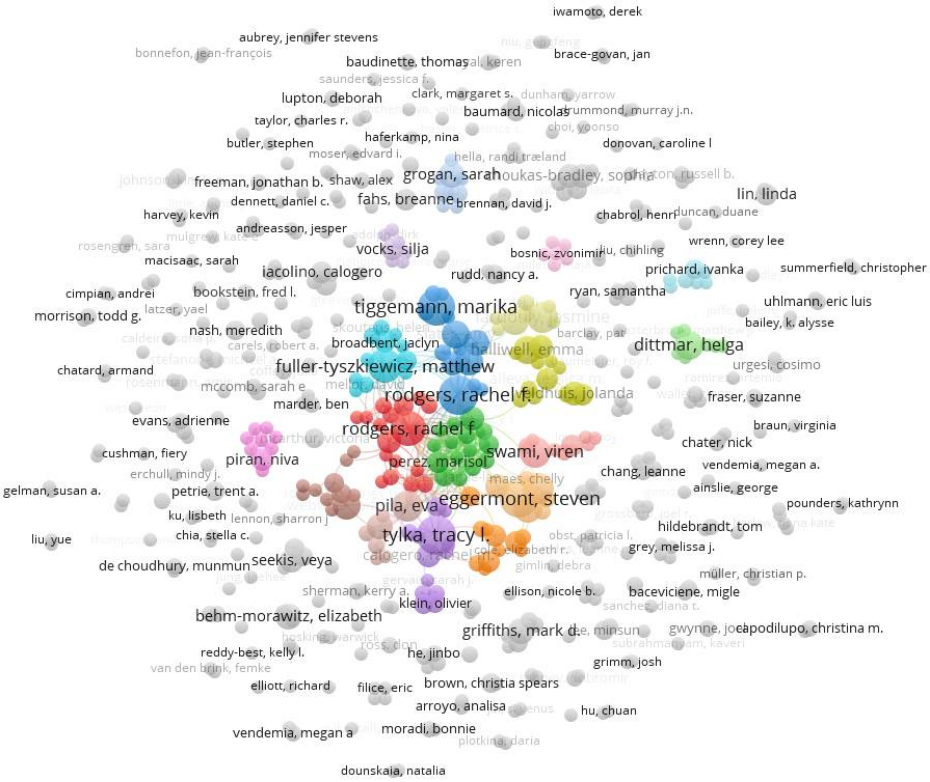


Figure 1 Co-authorship

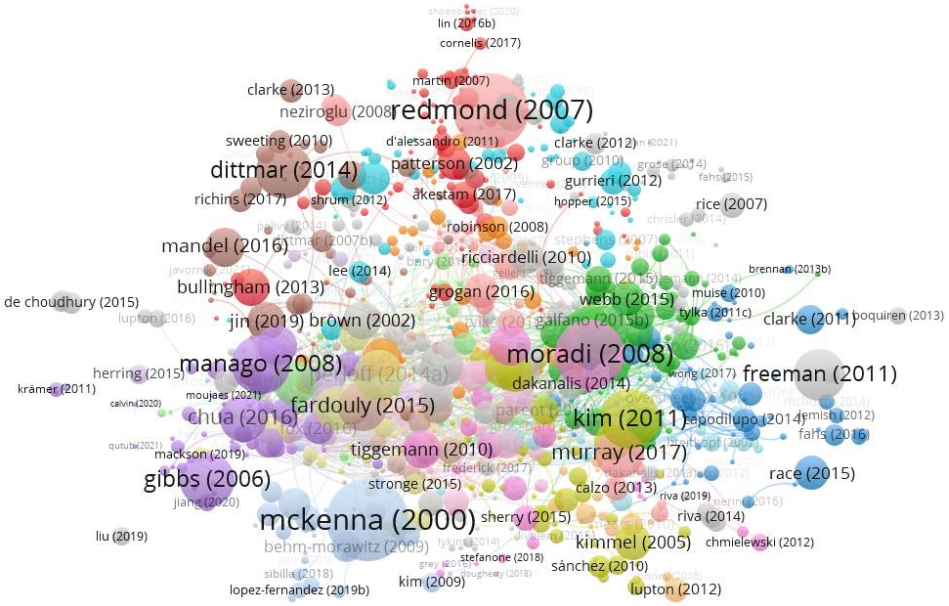


Figure 2 Citation

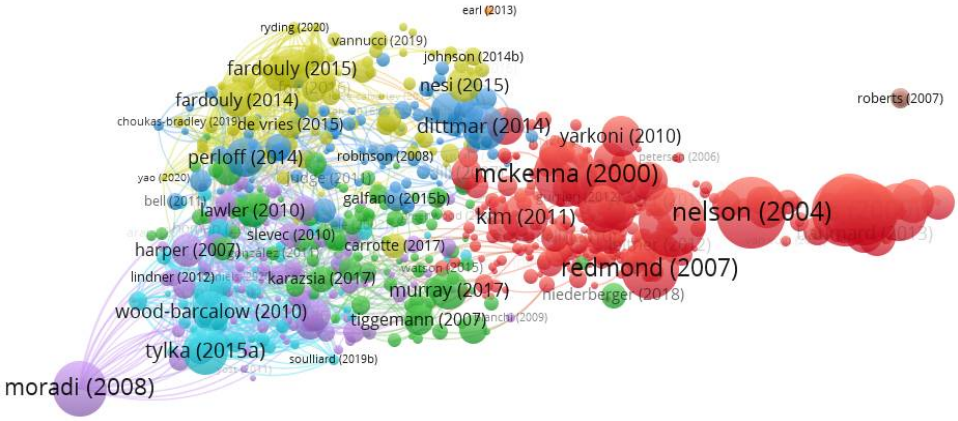


Figure 3 Bibliographic coupling

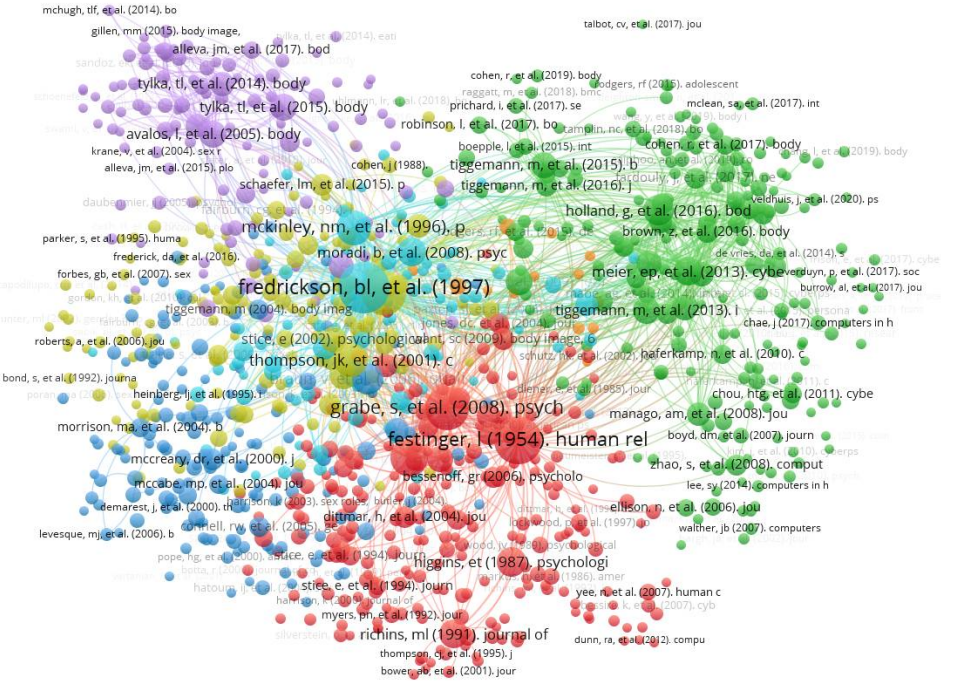


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Body image dissatisfaction is associated with thin ideal beauty internalization deriving from social media appearance-related pressures. Appearance-based self-discrepancy moderates the link between photo manipulation and facial dissatisfaction.	Beos et al., 2021; Frederick et al., 2022a; Jarman et al., 2021; Nightingale et al., 2022
Body image dissatisfaction is intensified by exposure to, and comparison with, idealized images on social media. Selfie manipulation is negatively related to body shame.	Darr and Doss, 2022; Schettino et al., 2022; Tremblay et al., 2022
Social appearance comparisons, pressures, and thin-ideal internalization lead to body dissatisfaction. Body-ideal imagery assessments cause increased weight and appearance dissatisfaction and decreased body satisfaction.	McComb and Mills, 2022; Roberts et al., 2022; Schreurs and Vandenbosch, 2022; Waling et al., 2022
Social media usage and exposure to increasingly visual and appearance-focused material leads to an unsatisfactory body image. Receiving appearance comments as regards selfies increases state self-objectification, notwithstanding the type of photo alteration.	Parsa et al., 2021; Rodgers and Rousseau, 2022; Vendemia and DeAndrea, 2021
Appearance-related social media consciousness, comments, and edited images may bolster cultural norms and highlight physical beauty. Selfie taking and photo editing are related to appearance-based beliefs notwithstanding individuals' perception of their own body.	Chae, 2022; Choukas-Bradley et al., 2022; Fioravanti et al., 2022; Yager et al., 2022
Self-destructive body image and unrealistic bodily ideals can lead to body image pathologies through inconsistent visual evaluations and decisions, impacting psychological well-being by use of cognitive processes associated with social media imagery.	Di Gesto et al., 2022; Krogh, 2022; Lovell and Banfield, 2022; Roberts et al., 2022
Simply getting involved in photo alteration results in less appearance satisfaction, while nonappearance modifications generate diminished pro-cosmetic surgery attitudes. Social media posts can heighten appearance preoccupation and negative body image.	Beos et al., 2021; Jarman et al., 2021; Lucibello et al., 2021; Vendemia and DeAndrea, 2021)
Individuals getting involved in appearance-focused social media use experience body image concerns. Self-dissatisfaction in relation to body image may result in low self-esteem, anxiety, and depression.	Burnell et al., 2022; Jarman et al., 2021; Lyu et al., 2022; Markey and Daniels, 2022; Yurtsever et al., 2022
Sociocultural and appearance pressures as regards thin-ideal internalization shape quality of life and negative body image.	Frederick et al., 2022b; Linardon, 2022; Pink et al., 2022

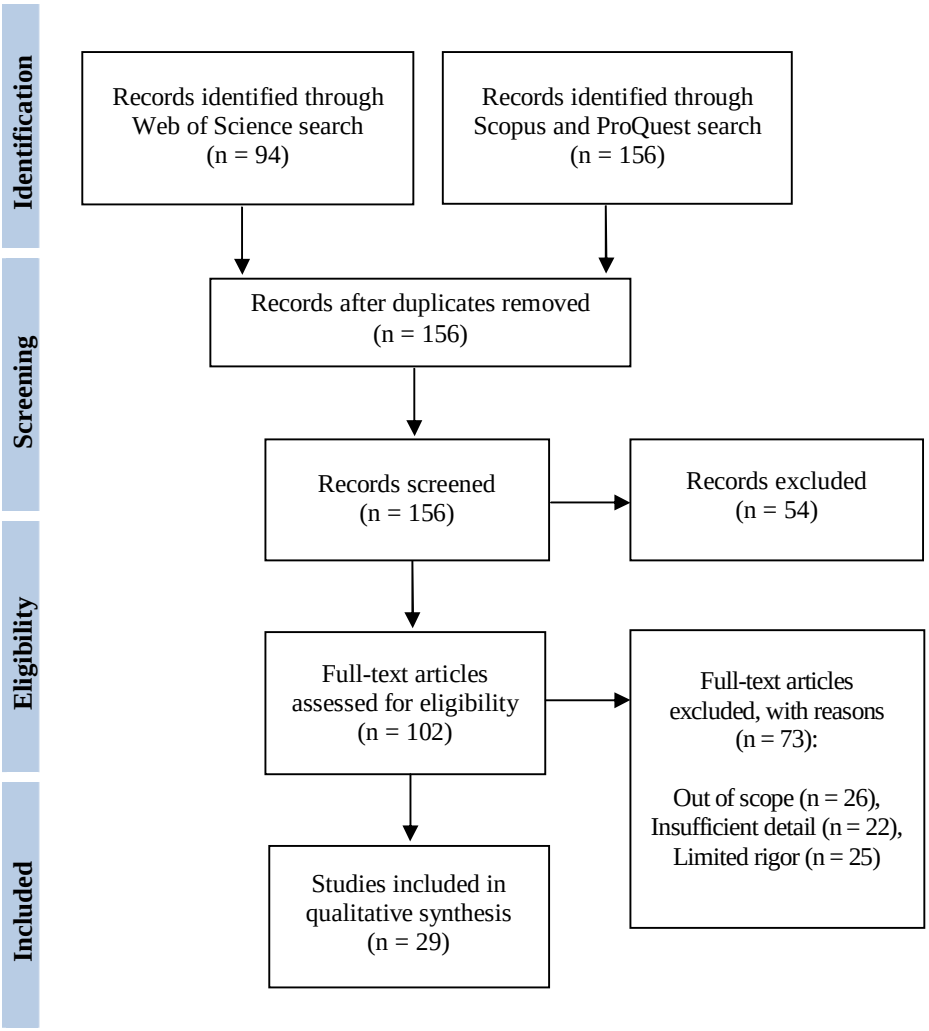


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

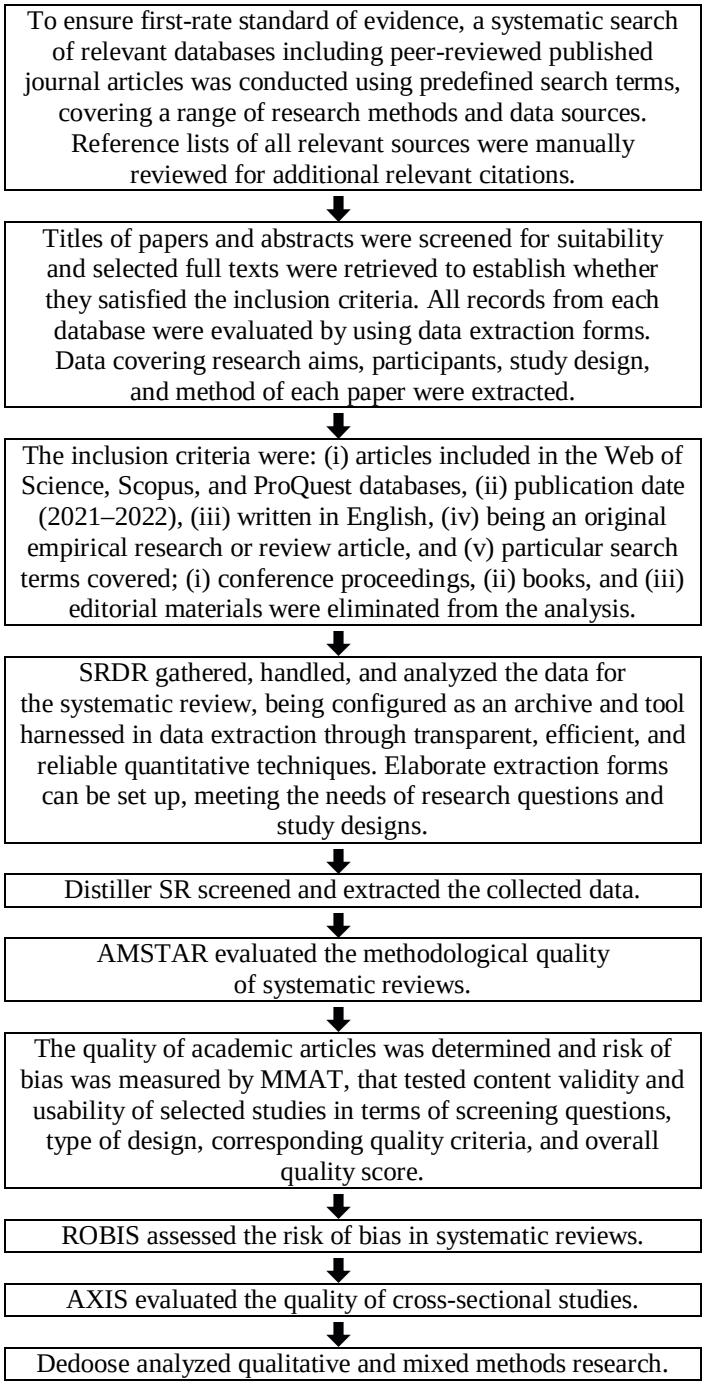


Figure 6 Screening and quality assessment tools

4. Social Appearance Comparisons, Body Image Dissatisfaction, and Idealized Online Identities

Body image dissatisfaction is associated with thin ideal beauty internalization (Beos et al., 2021; Frederick et al., 2022a; Jarman et al., 2021 Nightingale et al., 2022) deriving from social media appearance-related pressures. Manipulated images shared online can shape individuals' beliefs and behaviors, undermining trust and decisions as accurate psychological processes and mechanisms and impairing social performance. Appearance-based self-discrepancy moderates the link between photo manipulation and facial dissatisfaction. Social media use is positively related to unsatisfactory body satisfaction and psychological well-being, with social comparisons and appearance-ideal internalization serving as mediators.

Body image dissatisfaction is intensified by exposure to, and comparison with, idealized images (Darr and Doss, 2022; Schettino et al., 2022; Tremblay et al., 2022) on social media. Negative emotional expression, self-image, thoughts, and feelings affect homogenized value authenticity construction and blur social boundaries, constructing idealized online identities and articulating unsatisfying social performances on social media. Selfie manipulation is negatively related to body shame.

Social appearance comparisons, pressures, and thin-ideal internalization (McComb and Mills, 2022; Roberts et al., 2022; Schreurs and Vandenbosch, 2022; Waling et al., 2022) lead to body dissatisfaction. Intensified posting and increased exposure online may predict body dissatisfaction and configure appearance-focused social media interactions. Self-presentation and authenticity impact perceptions of ideal bodies on social media. Body-ideal imagery assessments cause increased weight and appearance dissatisfaction and decreased body satisfaction. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Body image dissatisfaction is associated with thin ideal beauty internalization deriving from social media appearance-related pressures. Appearance-based self-discrepancy moderates the link between photo manipulation and facial dissatisfaction.	Beos et al., 2021; Frederick et al., 2022a; Jarman et al., 2021; Nightingale et al., 2022
Body image dissatisfaction is intensified by exposure to, and comparison with, idealized images on social media. Selfie manipulation is negatively related to body shame.	Darr and Doss, 2022; Schettino et al., 2022; Tremblay et al., 2022
Social appearance comparisons, pressures, and thin-ideal internalization lead to body dissatisfaction. Body-ideal imagery assessments cause increased weight and appearance dissatisfaction and decreased body satisfaction.	McComb and Mills, 2022; Roberts et al., 2022; Schreurs and Vandenbosch, 2022; Waling et al., 2022

5. Appearance-Ideal Internalization, Body Dissatisfaction, and State Self-Objectification

Social media usage and exposure to increasingly visual and appearance-focused material (Parsa et al., 2021; Rodgers and Rousseau, 2022; Vendemia and DeAndrea, 2021) lead to an unsatisfactory body image. Tools for enhancing appearance and selfies can lead to attractive edited photos and image adjustments. Receiving appearance comments as regards selfies increases state self-objectification, notwithstanding the type of photo alteration.

Appearance-related social media consciousness, comments, and edited images (Chae, 2022; Choukas-Bradley et al., 2022; Fioravanti et al., 2022; Yager et al., 2022) may bolster cultural norms and highlight physical beauty. Exposure to attractive ideal images on social media brings about body dissatisfaction. Selfie taking and photo editing are related to appearance-based beliefs notwithstanding individuals' perception of their own body.

Self-destructive body image and unrealistic bodily ideals can lead to body image pathologies through inconsistent visual evaluations and decisions (Di Gesto et al., 2022; Krogh, 2022; Lovell and Banfield, 2022; Roberts et al., 2022), impacting psychological well-being by use of cognitive processes associated with social media imagery. Social media appearance ideals and pressures, in addition to body dissatisfaction, can lead to psychiatric concerns. Social comparisons and physical appearance ideals and concerns shape attitudes toward body image and cosmetic surgery procedures. Negative perceptual body image on social media contributes to low mental health and psychological well-being. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Social media usage and exposure to increasingly visual and appearance-focused material leads to an unsatisfactory body image. Receiving appearance comments as regards selfies increases state self-objectification, notwithstanding the type of photo alteration.	Parsa et al., 2021; Rodgers and Rousseau, 2022; Vendemia and DeAndrea, 2021
Appearance-related social media consciousness, comments, and edited images may bolster cultural norms and highlight physical beauty. Selfie taking and photo editing are related to appearance-based beliefs notwithstanding individuals' perception of their own body.	Chae, 2022; Choukas-Bradley et al., 2022; Fioravanti et al., 2022; Yager et al., 2022
Self-destructive body image and unrealistic bodily ideals can lead to body image pathologies through inconsistent visual evaluations and decisions, impacting psychological well-being by use of cognitive processes associated with social media imagery.	Di Gesto et al., 2022; Krogh, 2022; Lovell and Banfield, 2022; Roberts et al., 2022

6. Negative Body Image, Thin-Ideal Internalization, and Cosmetic Surgery Consideration

Simply getting involved in photo alteration results in less appearance satisfaction (Beos et al., 2021; Jarman et al., 2021; Lucibello et al., 2021; Vendemia and DeAndrea, 2021), while nonappearance modifications generate diminished pro-cosmetic surgery attitudes. Reduced self-discrepancy and increased photo manipulation on social media predicts elevated dissatisfaction. Social media posts can heighten appearance preoccupation and negative body image. Increased appearance-focused social media use is related to decreased body satisfaction and psychological well-being.

Individuals getting involved in appearance-focused social media use (Burnell et al., 2022; Jarman et al., 2021; Lyu et al., 2022; Markey and Daniels, 2022; Yurtsever et al., 2022) experience body image concerns. Taking selfies by use of Snapchat lenses impacts state appearance satisfaction. Body surveillance and body shame shape selfie behavior, self-objectification, and cosmetic surgery consideration. Self-dissatisfaction in relation to body image may result in low self-esteem, anxiety, and depression. Elevated appearance-ideal internalization and social comparisons shape the links between increased social media engagement and decreased body satisfaction and psychological well-being.

Sociocultural and appearance pressures as regards thin-ideal internalization (Frederick et al., 2022b; Linardon, 2022; Pink et al., 2022) shape quality of life and negative body image. Excessive social media use impacts body dissatisfaction and eating behavior, resulting in swift body image disruptions. Positive body image may improve and be optimized by intuitive eating. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Simply getting involved in photo alteration results in less appearance satisfaction, while nonappearance modifications generate diminished pro-cosmetic surgery attitudes. Social media posts can heighten appearance preoccupation and negative body image.	Beos et al., 2021; Jarman et al., 2021; Lucibello et al., 2021; Vendemia and DeAndrea, 2021)
Individuals getting involved in appearance-focused social media use experience body image concerns. Self-dissatisfaction in relation to body image may result in low self-esteem, anxiety, and depression.	Burnell et al., 2022; Jarman et al., 2021; Lyu et al., 2022; Markey and Daniels, 2022; Yurtsever et al., 2022
Sociocultural and appearance pressures as regards thin-ideal internalization shape quality of life and negative body image. Positive body image may improve and be optimized by intuitive eating.	Frederick et al., 2022b; Linardon, 2022; Pink et al., 2022

7. Discussion

I integrate my systematic review throughout research indicating how taking selfies by use of Snapchat lenses impacts state appearance satisfaction. My research complements recent analyses clarifying how increased appearance-focused social media use is related to decreased body satisfaction and psychological well-being. I elucidate, by cumulative evidence, previous research demonstrating how social media use is positively related to unsatisfactory body satisfaction and psychological well-being, with social comparisons and appearance-ideal internalization serving as mediators. Selfie taking and photo editing are related to appearance-based beliefs notwithstanding individuals' perception of their own body. Social media posts can heighten appearance preoccupation and negative body image. Exposure to attractive ideal images on social media brings about body dissatisfaction.

8. Synopsis of the Main Research Outcomes

Negative perceptual body image on social media contributes to low mental health and psychological well-being. Excessive social media use impacts body dissatisfaction and eating behavior, resulting in swift body image disruptions. Self-dissatisfaction in relation to body image may result in low self-esteem, anxiety, and depression. Negative emotional expression, self-image, thoughts, and feelings affect homogenized value authenticity construction and blur social boundaries, constructing idealized online identities and articulating unsatisfying social performances on social media.

9. Conclusions

Relevant research has investigated whether body surveillance and body shame shape selfie behavior, self-objectification, and cosmetic surgery consideration. This systematic literature review presents the published peer-reviewed sources covering how reduced self-discrepancy and increased photo manipulation on social media predicts elevated dissatisfaction. The research outcomes drawn from the above analyses indicate that tools for enhancing appearance and selfies can lead to attractive edited photos and image adjustments.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2021 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on social appearance comparisons, body image dissatisfaction, and idealized online identities may have been excluded. The scope of my study

also does not move forward the inspection of social appearance comparisons, pressures, and thin-ideal internalization.

Subsequent analyses should develop on social media usage and exposure to increasingly visual and appearance-focused material. Future research should thus investigate appearance-related social media consciousness, comments, and edited images. Attention should be directed to body image dissatisfaction intensified by exposure to, and comparison with, idealized images on social media.

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Compliance with ethical standards
This article does not contain any studies with human participants or animals performed by the author.

Data availability statement
All data generated or analyzed are included in the published article.

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The author confirms being the sole contributor of this work and approved it for publication. The author takes full responsibility for the accuracy and the integrity of the data analysis.

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

Disclosure by the editors of record
The editors declare no conflict of interest in the review and publication decision regarding this article.

Transparency statement
The author affirms that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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Fertility Awareness Apps, Bodily Self-Tracking Devices, and Gynecological Health Monitoring

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ABSTRACT. The purpose of this study is to examine menstrual cycle tracking apps integrating sexual and reproductive processes and self-care practices. In this article, we cumulate previous research findings indicating that fetal development tracking apps assist expecting parents in health information seeking. We contribute to the literature on fertility trackers and birth control reminders assisting in unintended pregnancy prevention, family planning, and abortion counseling by showing that mobile health apps may preserve users' satisfaction throughout their prenatal care. Throughout January 2022, we performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "fertility awareness apps" + "bodily self-tracking devices," "gynecological health monitoring," and "sexual and reproductive processes." As we inspected research published between 2016 and 2022, only 177 articles satisfied the eligibility criteria. By removing controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, we decided upon 24, generally empirical, sources. Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Dedoose, MMAT, and SRDR.

Keywords: self-tracking pregnancy app; women's reproductive health; self-management and care

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1. Introduction

Pregnant women as dynamic mobile app users can enhance self-monitoring of health-related conditions. The purpose of our systematic review is to examine the recently published literature on fertility awareness apps and integrate the insights it configures on bodily self-tracking devices and gynecological health monitoring. By analyzing the most recent (2016–2022) and significant (Web of Science, Scopus, and ProQuest) sources, our paper has attempted to prove that pregnancy and mothering apps assist users in embodied experience sharing and healthcare provision. The actuality and novelty of this study are articulated by addressing menstrual cycle tracking apps integrating sexual and reproductive processes and self-care practices, that is an emerging topic involving much interest. Our research problem is whether maternal and infant health apps can further healthy behavior changes and provide decision-making support to users.

In this review, prior findings have been cumulated indicating that fetal development tracking apps assist expecting parents in health information seeking. The identified gaps advance fertility trackers and birth control reminders assisting in unintended pregnancy prevention, family planning, and abortion counseling. Our main objective is to indicate that mobile app-based misinformation is associated with unsatisfactory health outcomes for pregnant users. This systematic review contributes to the literature on smartphone pregnancy apps as digitally-mediated types of intimacy enabling women to track a pregnancy systematically and providing advice synchronizing with each stage by clarifying that users' deployment of pregnancy apps can articulate intimate relationships by use of digital technologies and patterns of parenting and child-bearing. This research endeavors to elucidate whether mobile health apps may preserve users' satisfaction throughout their prenatal care. Our contribution is by integrating research findings indicating that fertility tracking device algorithms should adjust to alterations of the menstrual cycle, assisting in gynecological health monitoring through body temperature readings.

2. Theoretical Overview of the Main Concepts

Pregnancy apps have thoroughly integrated smartphone and prenatal imaging devices, reconfigured how pregnancy data can be accessed and articulated robust socio-technical features of pregnant instantiation, family, and consanguinity patterns. Accurately informative mobile health apps can offer compatible clinical support for users throughout the postpartum period, enabling quality information delivery to mothers. Mindfulness meditation-based mobile apps can further mental health and psychological well-being in pregnancy. Pregnancy apps offer heterogeneous extending functionalities for

self-management, interaction, and information-seeking routines, while identities and relations are incessantly incorporated during pregnancy in terms of embodied intimacy. Pregnancy and motherhood are related to a thoroughly naturalized consistency of physical, contiguous, genetic, and emotional intimacy, with pregnancy apps enabling unpredictable engagements with pregnancy. The manuscript is organized as following: theoretical overview (section 2), methodology (section 3), fertility awareness apps, women's reproductive health, and bodily self-tracking devices (section 4), smartphone pregnancy apps, sexual and reproductive processes, and self-management and care (section 5), self-tracking pregnancy apps, menstruation and female fertility, and gynecological health monitoring (section 6), discussion (section 7), synopsis of the main research outcomes (section 8), conclusions (section 9), limitations, implications, and further directions of research (section 10).

3. Methodology

Throughout January 2022, we performed a quantitative literature review of the Web of Science, Scopus, and ProQuest databases, with search terms including "fertility awareness apps" + "bodily self-tracking devices," "gynecological health monitoring," and "sexual and reproductive processes." As we inspected research published between 2016 and 2022, only 177 articles satisfied the eligibility criteria. By removing controversial findings, outcomes unsubstantiated by replication, too imprecise material, or having similar titles, we decided upon 24, generally empirical, sources (Tables 1 and 2). Data visualization tools: Dimensions (bibliometric mapping) and VOSviewer (layout algorithms). Reporting quality assessment tool: PRISMA. Methodological quality assessment tools include: AXIS, Dedoose, MMAT, and SRDR (Figures 1–6).

Table 1 Topics and types of scientific products identified and selected.

Topic	**Identified**	**Selected**
fertility awareness apps + bodily self-tracking devices	62	9
fertility awareness apps + gynecological health monitoring	60	7
fertility awareness apps + sexual and reproductive processes	55	8
Type of paper		
Original research	140	20
Review	15	4
Conference proceedings	14	0
Book	4	0
Editorial	4	0

Source: Processed by the authors. Some topics overlap.

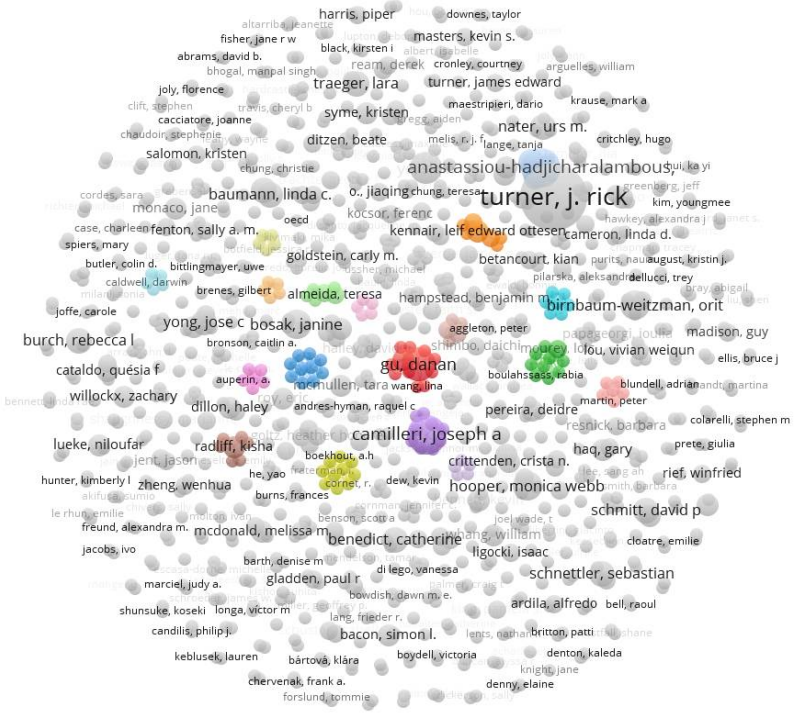


Figure 1 Co-authorship

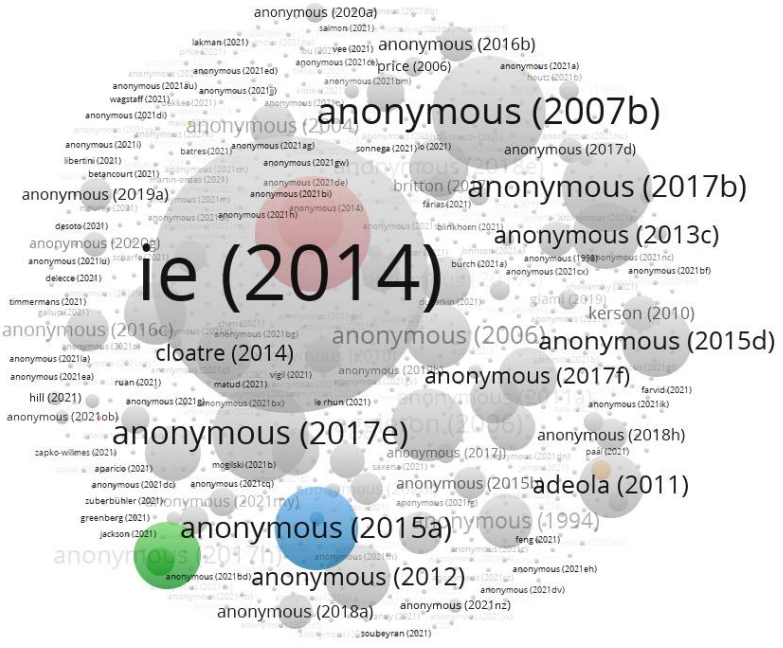


Figure 2 Citation

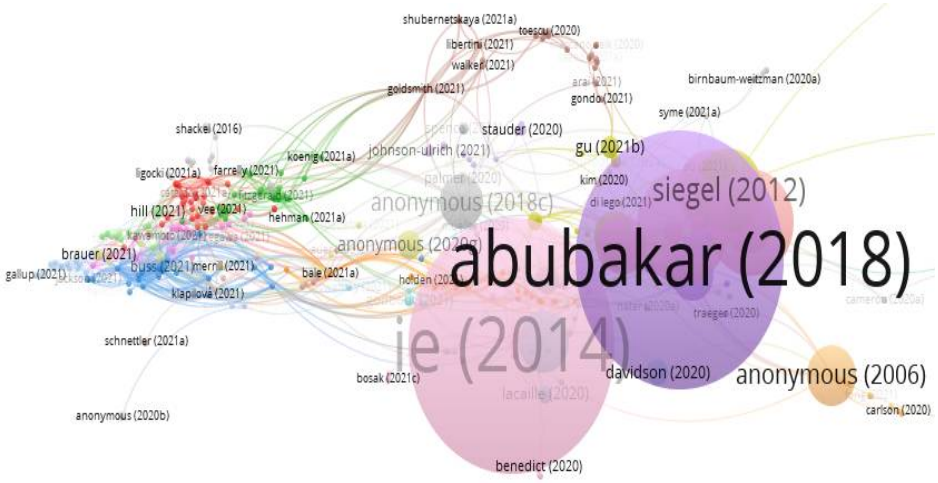


Figure 3 Bibliographic coupling

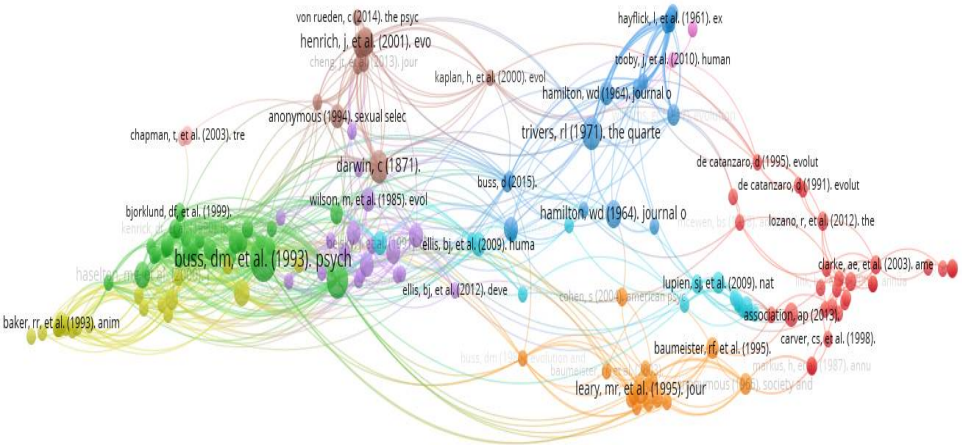


Figure 4 Co-citation

Table 2 General synopsis of evidence as regards focus topics and descriptive outcomes (research findings).

Fertility trackers and birth control reminders assist in unintended pregnancy prevention, family planning, and abortion counseling, optimizing sexual and reproductive health by use of pregnancy risk and contraceptive use information.	Biviji et al., 2021; Carissoli et al., 2022; Chen and Mangone, 2016; Frid et al., 2021
Mobile health apps develop on their content, behavior alteration procedures, and operational quality as harmonizing tools throughout pregnancy. Users' deployment of pregnancy apps can articulate intimate relationships by use of digital technologies and patterns of parenting and child-bearing.	Hamper and Nash, 2021; Muñoz-Mancisidor et al., 2021
Fertility awareness apps can determine the fertile window, possibly refashioning women's reproductive health when attempting to conceive in terms of bodily self-tracking and planning pregnancy support.	Faessen et al., 2022; Grenfell et al., 2021; Hamper and Nash, 2021
Pregnancy apps optimize users' mental health and assist women in connecting and share information as regards experiences of pregnancy.	Donelle et al., 2021; Kodama and Takaki, 2022; Ortiz Juarez-Paz et al., 2021
Smartphone pregnancy apps as digitally-mediated types of intimacy enable women to track a pregnancy systematically and provide advice synchronizing with each stage, and thus configuring substantiated, emotional, and relational pregnancy patterns.	Hamper and Nash, 2021; Tinius et al., 2021; Wang, 2021
Menstrual cycle tracking apps integrate sexual and reproductive processes and self-care practices to prevent unwanted pregnancies. Pregnancy apps can promote healthy acts of consuming food and physical activity habits.	Hiebert et al., 2021; Iyawa et al., 2021; McMillan, 2022; Rhodes et al., 2021
Female health and wellbeing apps, together with cycle and fertility trackers, can provide gynecological and reproductive education, integrating ovulation and pregnancy test outcomes.	Jain et al., 2021; Ngo et al., 2022; Tucker et al., 2021; van de Roemer et al., 2021
Self-tracking pregnancy apps and healthcare devices can be pivotal in menstruation and female fertility by integrating menstrual symptom and cycle data, thus assisting in reproductive health disorders and bodily performance in terms of menstrual health and reproductive outcomes.	Anderson et al., 2022; Critchley et al., 2020; Hamper and Nash, 2021
Evidence-based pregnancy apps and mobile health technology may comprise communicating features to engage users in assimilating knowledge about and self-monitoring their pregnancies, assisting in self-care tasks.	Hamper and Nash, 2021; Leziak et al., 2021; McMillan, 2022

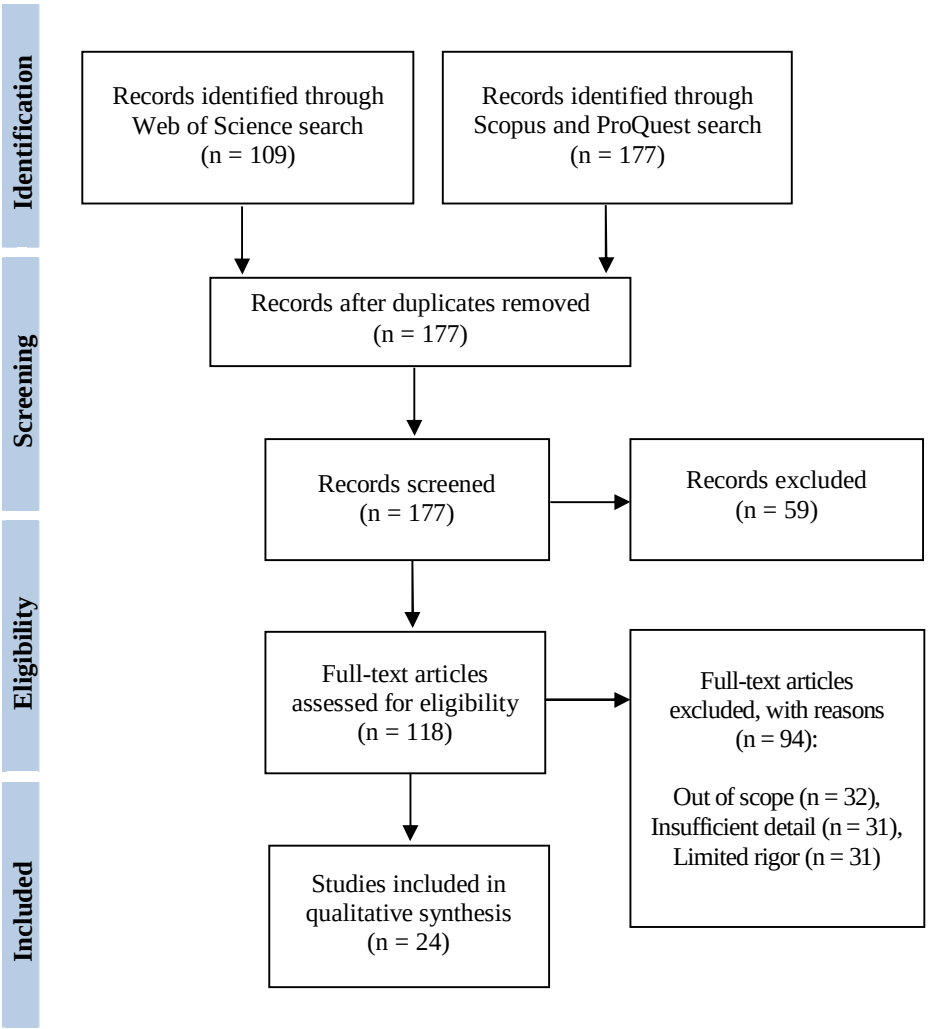


Figure 5 PRISMA flow diagram describing the search results and screening.

Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were used that ensure the literature review is comprehensive, transparent, and replicable. The flow diagram, produced by employing a Shiny app, presents the stream of evidence-based collected and processed data through the various steps of a systematic review, designing the amount of identified, included, and removed records, and the justifications for exclusions.
To ensure compliance with PRISMA guidelines, a citation software was used, and at each stage the inclusion or exclusion of articles was tracked by use of custom spreadsheet. Justification for the removal of ineligible articles was specified during the full-text screening and final selection.

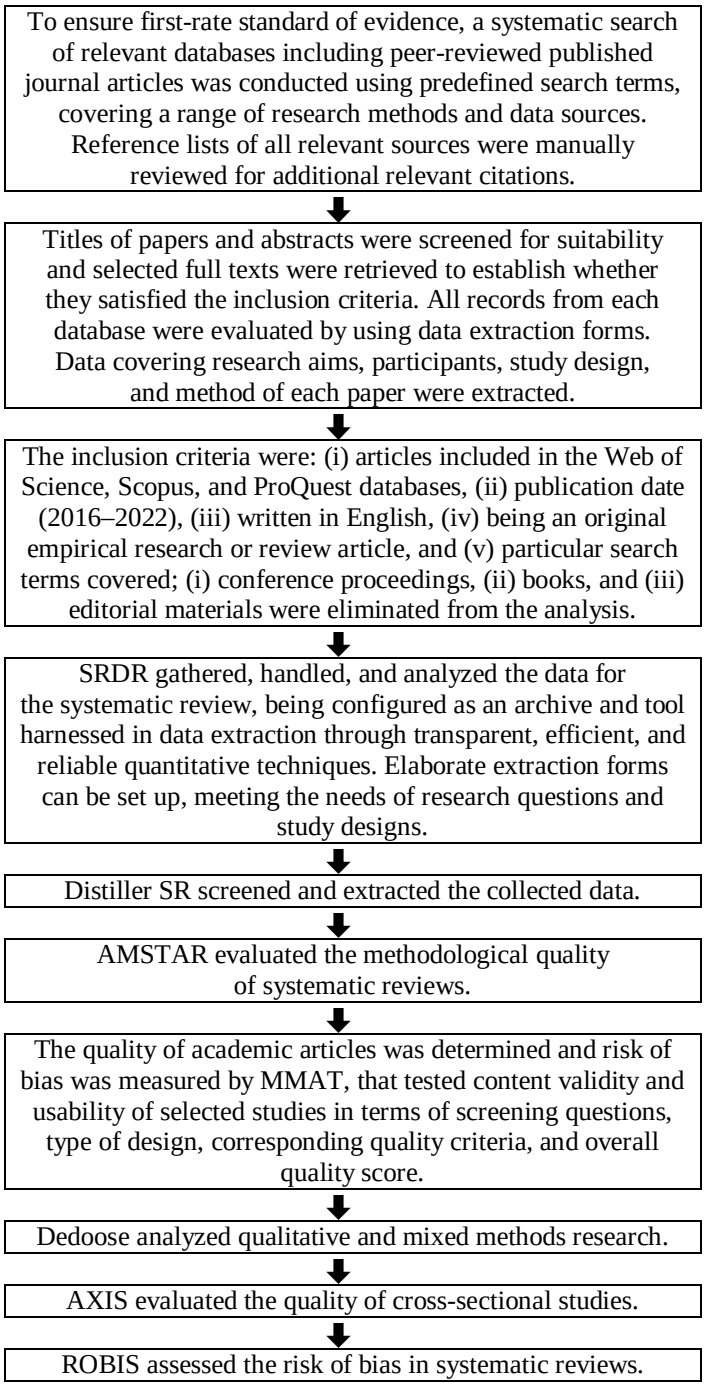


Figure 6 Screening and quality assessment tools

4. Fertility Awareness Apps, Women's Reproductive Health, and Bodily Self-Tracking Devices

Fertility trackers and birth control reminders assist in unintended pregnancy prevention, family planning, and abortion counseling (Biviji et al., 2021; Carissoli et al., 2022; Chen and Mangone, 2016; Frid et al., 2021), optimizing sexual and reproductive health by use of pregnancy risk and contraceptive use information. Mindfulness meditation-based mobile apps can further mental health and psychological well-being in pregnancy. Mobile health apps may preserve users' satisfaction throughout their prenatal care. Maternal and infant health apps can further healthy behavior changes and provide decision-making support to users.

Mobile health apps develop on their content, behavior alteration procedures, and operational quality (Hamper and Nash, 2021; Muñoz-Mancisidor et al., 2021) as harmonizing tools throughout pregnancy. Pregnancy apps have thoroughly integrated smartphone and prenatal imaging devices, reconfigured how pregnancy data can be accessed and articulated robust socio-technical features of pregnant instantiation, family, and consanguinity patterns. Users' deployment of pregnancy apps can articulate intimate relationships by use of digital technologies and patterns of parenting and childbearing.

Fertility awareness apps can determine the fertile window (Faessen et al., 2022; Grenfell et al., 2021; Hamper and Nash, 2021), possibly refashioning women's reproductive health when attempting to conceive in terms of bodily self-tracking and planning pregnancy support. Mobile apps can further a healthy diet throughout pregnancy. Pregnancy and motherhood are related to a thoroughly naturalized consistency of physical, contiguous, genetic, and emotional intimacy, with pregnancy apps enabling unpredictable engagements with pregnancy. (Table 3)

Table 3 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Fertility trackers and birth control reminders assist in unintended pregnancy prevention, family planning, and abortion counseling, optimizing sexual and reproductive health by use of pregnancy risk and contraceptive use information.	Biviji et al., 2021; Carissoli et al., 2022; Chen and Mangone, 2016; Frid et al., 2021
Mobile health apps develop on their content, behavior alteration procedures, and operational quality as harmonizing tools throughout pregnancy.	Hamper and Nash, 2021; Muñoz-Mancisidor et al., 2021
Fertility awareness apps can determine the fertile window, possibly refashioning women's reproductive health when attempting to conceive in terms of bodily self-tracking and planning pregnancy support.	Faessen et al., 2022; Grenfell et al., 2021; Hamper and Nash, 2021

5. Smartphone Pregnancy Apps, Sexual and Reproductive Processes, and Self-Management and Care

Pregnancy apps optimize users' mental health and assist women (Donelle et al., 2021; Kodama and Takaki, 2022; Ortiz Juarez-Paz et al., 2021) in connecting and share information as regards experiences of pregnancy. Pregnancy apps can be harnessed by users to (i) track menstrual cycles throughout preconception, (ii) monitor, keep a record, and communicate a pregnancy all along the prenatal phase, (iii) make preparations for delivery in the course of labor/birth stage, (iv) and assist in babies' sleep, report their birth, and network with parenting resources for the duration of the postpartum phase.

Smartphone pregnancy apps as digitally-mediated types of intimacy enable women to track a pregnancy systematically and provide advice synchronizing with each stage (Hamper and Nash, 2021; Tinius et al., 2021; Wang, 2021), and thus configuring substantiated, emotional, and relational pregnancy patterns. Pregnancy apps should provide women with data and guidance throughout the particularly relevant postpartum stage. Pregnancy and mothering apps assist users in embodied experience sharing and healthcare provision.

Menstrual cycle tracking apps integrate sexual and reproductive processes and self-care practices (Hiebert et al., 2021; Iyawa et al., 2021; McMillan, 2022; Rhodes et al., 2021) to prevent unwanted pregnancies. Mobile apps can support self-management and care throughout pregnancy even in terms of complications. Fetal development tracking apps assist expecting parents in health information seeking. Pregnancy apps can promote healthy acts of consuming food and physical activity habits. (Table 4)

Table 4 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Pregnancy apps optimize users' mental health and assist women in connecting and share information as regards experiences of pregnancy.	Donelle et al., 2021; Kodama and Takaki, 2022; Ortiz Juarez-Paz et al., 2021
Smartphone pregnancy apps as digitally-mediated types of intimacy enable women to track a pregnancy systematically and provide advice synchronizing with each stage, and thus configuring substantiated, emotional, and relational pregnancy patterns. Pregnancy and mothering apps assist users in embodied experience sharing and healthcare provision.	Hamper and Nash, 2021; Tinius et al., 2021; Wang, 2021
Menstrual cycle tracking apps integrate sexual and reproductive processes and self-care practices to prevent unwanted pregnancies. Pregnancy apps can promote healthy acts of consuming food and physical activity habits.	Hiebert et al., 2021; Iyawa et al., 2021; McMillan, 2022; Rhodes et al., 2021

6. Self-Tracking Pregnancy Apps, Menstruation and Female Fertility, and Gynecological Health Monitoring

Female health and wellbeing apps, together with cycle and fertility trackers, can provide gynecological and reproductive education (Jain et al., 2021; Ngo et al., 2022; Tucker et al., 2021; van de Roemer et al., 2021), integrating ovulation and pregnancy test outcomes. Pregnant women as dynamic mobile app users can enhance self-monitoring of health-related conditions. Accurately informative mobile health apps can offer compatible clinical support for users throughout the postpartum period, enabling quality information delivery to mothers. Fertility tracking device algorithms should adjust to alterations of the menstrual cycle, assisting in gynecological health monitoring through body temperature readings.

Self-tracking pregnancy apps and healthcare devices can be pivotal in menstruation and female fertility by integrating menstrual symptom and cycle data (Anderson et al., 2022; Critchley et al., 2020; Hamper and Nash, 2021), thus assisting in reproductive health disorders and bodily performance in terms of menstrual health and reproductive outcomes. Spatialities and routines of intergenerational and parental relationship articulation indicate how app users react to physical and relational closeness in pregnancy. Mobile app-based misinformation is associated with unsatisfactory health outcomes for pregnant users.

Evidence-based pregnancy apps and mobile health technology may comprise communicating features (Hamper and Nash, 2021; Leziak et al., 2021; McMillan, 2022) to engage users in assimilating knowledge about and self-monitoring their pregnancies, assisting in self-care tasks. Pregnancy apps offer heterogeneous extending functionalities for self-management, interaction, and information-seeking routines, while identities and relations are incessantly incorporated during pregnancy in terms of embodied intimacy. Fertility tracking apps can bring about inaccurate predictions and unwanted pregnancies. (Table 5)

Table 5 Synopsis of evidence as regards focus topics and descriptive outcomes (research findings)

Female health and wellbeing apps, together with cycle and fertility trackers, can provide gynecological and reproductive education, integrating ovulation and pregnancy test outcomes.	Jain et al., 2021; Ngo et al., 2022; Tucker et al., 2021; van de Roemer et al., 2021
Self-tracking pregnancy apps and healthcare devices can be pivotal in menstruation and female fertility by integrating menstrual symptom and cycle data.	Anderson et al., 2022; Critchley et al., 2020; Hamper and Nash, 2021
Evidence-based pregnancy apps and mobile health technology may comprise communicating features to engage users in assimilating knowledge about and self-monitoring their pregnancies.	Hamper and Nash, 2021; Leziak et al., 2021; McMillan, 2022

7. Discussion

We integrate our systematic review throughout research indicating how mobile apps can support self-management and care throughout pregnancy even in terms of complications. Our research complements recent analyses clarifying how pregnant women as dynamic mobile app users can enhance self-monitoring of health-related conditions. We elucidate, by cumulative evidence, previous research demonstrating how fertility tracking device algorithms should adjust to alterations of the menstrual cycle, assisting in gynecological health monitoring through body temperature readings. Pregnancy and mothering apps assist users in embodied experience sharing and healthcare provision. Fetal development tracking apps assist expecting parents in health information seeking. Mobile app-based misinformation is associated with unsatisfactory health outcomes for pregnant users. Users' deployment of pregnancy apps can articulate intimate relationships by use of digital technologies and patterns of parenting and child-bearing.

8. Synopsis of the Main Research Outcomes

Pregnancy apps should provide women with data and guidance throughout the particularly relevant postpartum stage. Spatialities and routines of intergenerational and parental relationship articulation indicate how app users react to physical and relational closeness in pregnancy. Fertility tracking apps can bring about inaccurate predictions and unwanted pregnancies.

9. Conclusions

Relevant research has investigated whether maternal and infant health apps can further healthy behavior changes and provide decision-making support to users. This systematic literature review presents the published peer-reviewed sources covering how mobile health apps may preserve users' satisfaction throughout their prenatal care. The research outcomes drawn from the above analyses indicate that pregnancy apps can promote healthy acts of consuming food and physical activity habits.

10. Limitations, Implications, and Further Directions of Research

By analyzing only articles published between 2016 and 2022 in journals indexed in the Web of Science, Scopus, and ProQuest databases, relevant sources on fertility awareness apps, women's reproductive health, and bodily self-tracking devices may have been excluded. The scope of our study also does not move forward the inspection of evidence-based pregnancy apps and mobile health technology.

Subsequent analyses should develop on self-tracking pregnancy apps and healthcare devices pivotal in menstruation and female fertility by integrating menstrual symptom and cycle data. Future research should thus investigate Mobile health apps developing on their content, behavior alteration procedures, and operational quality. Attention should be directed to female health and wellbeing apps, together with cycle and fertility trackers, providing gynecological and reproductive education.

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Compliance with ethical standards
This article does not contain any studies with human participants or animals performed by the authors.

Data availability statement
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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication. The authors take full responsibility for the accuracy and the integrity of the data analysis.

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

Disclosure by the editors of record
The editors declare no conflict of interest in the review and publication decision regarding this article.

Transparency statement
The authors affirm that the manuscript represents an honest, accurate, and transparent account of the research being reported, that no relevant aspects of the study have been left out, and that any inconsistencies from the research as planned (and, if significant, registered) have been clarified.

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