Body Image Disturbance in Female Adolescents Using Online Learning Platforms: A Concept Analysis

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Abstract

Aim

To analyze the concept of body image disturbance in female adolescents using online learning platforms as a phenomenon of interest to nurse practitioners and other health care practitioners.

Background

With the declaration of the COVID-19 pandemic, the use of online learning platforms as a primary mode of learning has increased exponentially among adolescents. While research is still lacking in this field, the literature on traditional social media suggests that these online learning platforms may negatively influence body image and emotional outcomes. Particularly vulnerable to these outcomes are female adolescents, whose construction of own body image is highly influenced by their self-perceived evaluation from their peers. While the concept of body image disturbance is well defined in adolescent eating disorders, it has not been characterized in the context of online learning platforms. Defining the concept of body image disturbance in this context is crucial for recognizing its occurrence and providing early intervention.

Methods

The Walker and Avant method of concept analysis was used to analyze the concept.

Findings

The defining attributes of body image disturbance among female adolescents using online learning platforms are: (1) Feeling displeasure with the perceived appearance while using video streamed platforms; (2) Self-surveillance of one's appearance; and (3) Upward comparison of one's appearance with others and experiencing feelings of inadequacy.

Conclusion

As COVID-19 continues to disrupt the traditional school experience, nurse practitioners can use the presented scenarios, along with examples of questionnaires noted in this study, to recognize and delineate the occurrence of body image disturbance in female adolescents using online learning platforms. A development of a standardized definition of the concept will enable nurse practitioners to recognize its occurrence and to provide interventions in a timely manner.

Keywords

Adolescent, body image, social media, video chatting, nursing, nurse practitioner, psychological distress, online learning

Introduction

The topic of body image disturbance has garnered increasing attention especially since the declaration of the coronavirus disease 2019 (COVID-19) pandemic and a resulting shift to a new form of social media – online learning platforms (World Health Organization, 2020; United Nations Educational, Scientific and Cultural Organization, 2020). In response to the pandemic, Ontario public schools transitioned to Board-selected learning management systems, including D2L Brightspace Learning Platform, Google Classroom, Zoom, and Microsoft Teams (Government of Ontario, 2020; 2021; Paglinawan, 2020). These platforms all have a common feature of live synchronous classes which include live streamed videos of oneself that are displayed alongside their classmates (D2L, 2020). Unlike in-person interactions, students are now able to overtly, and yet discreetly, evaluate their own and classmates' appearances in real time as they interact with each other. Owing to the limitations of technology, webcams, as with smartphones, distort facial and body proportion providing inaccurate representation of individuals' appearance (Cristel et al., 2020; Třebický et al., 2016). The transition to online learning platforms has inadvertently exposed students to prolonged durations of digitally distorted-reflections of themselves.

While there are few studies on the effects of online learning on body image, its potential influence on students can be drawn from research in related fields, such as traditional social media. Literature suggests that social media can lead to a negative body image and emotional outcomes including depressive symptoms (Paxton et al., 2006; Siegel, 2002), and low self-esteem (Fox et al., 2021; Mills et al., 2018; Vall-Roqué et al., 2021). Adolescents are especially vulnerable to these effects as they are at a critical stage of developing their body image (Hogan & Strasburger, 2008). How they are perceived by their peers becomes an important part of their evaluation of self and construction of their body image (Elkind, 1967). Female adolescents appear to be especially susceptible, regardless of their race or ethnicity (Siegel, 2002). By the early adolescent years, up to half of all females' report concerns of being overweight despite many having a healthy weight (Hogan & Strasburger, 2008). Overall, video-based online learning platforms may have negative influences on female adolescents.

While body image disturbance may be a common issue among female adolescents using video-based online learning platforms, there is no consensus on its definition or how it manifests. Given the relationship among body image disturbance, social media, and negative emotional outcomes (Paxton et al., 2006; Pfund et al., 2020; Pikoos et al., 2021; Siegel, 2002), it is crucial for nurse practitioner's (NP) and other healthcare practitioners to recognize the occurrence of body image disturbance. Doing so will help to identify potential indicators and provide interventions in a timely manner.

Background

Presently, there is a lack of studies on body image disturbance in the context of online learning, especially in the adolescent population. Nonetheless, studies on traditional social media including Instagram, Facebook, and Snapchat, share common features with the online learning platforms. These features include selfie-viewing, distortion of digital images, and virtual

engagement with peers. Given these similarities, studies of traditional social media were included to enrich the understanding of the concept in the context of online learning (Burnette et al., 2017; Mills et al., 2018; Pikoos et al., 2021; Vall-Roqué et al., 2021). In this paper, the term, online learning platform, refers to video-based online communicative systems currently used by adolescents for learning. Related terms, video chatting or video-conferencing platforms, refer to similar and/or identical video-based communicative systems that are being utilized for the purpose of work or post-secondary education.

A literature search was performed using databases pertaining to multiple disciplines, including Nursing, Psychology, Sociology and Medicine. The following three descriptors were used in the search: Body image disturbance, social media, and adolescents (Appendix A; Appendix B). Articles were reviewed for relevance and transferability. While effort was made to include studies on only adolescents, those that recruited both adolescents and adults were also included if the authors performed statistical analysis to account for the age variable. Articles that were published following the year 2004 were selected as this period marks the time when Facebook became publicly available and introduced the modern-day social media (Facebook, 2021). News articles were also included in the analysis to capture the present challenges faced by adolescents. Interestingly, while there was abundance of quantitative research, there was paucity of qualitative research studies. The final analysis included 13 empirical quantitative research articles, one empirical qualitative research article, and two newspaper articles (Appendix B; Appendix C).

Although generally used in reference to adolescents experiencing negative appearance related to social media, the search of the term 'body image disturbance' retrieved a wide variety of related terms, with no consensus on a definition of this concept. The uses of the term ranged from appearance dissatisfaction or concern (Pikoos et al., 2021; Seekis et al., 2020; Teran et al., 2020), selfie harm (Mills et al., 2018), body dissatisfaction (Burnette et al., 2017; Kleemans et al., 2018; McLean et al., 2015; Muñoz & Ferguson, 2012; Pfund et al., 2020; Vall-Roqué et al., 2021), facial dissatisfaction (Wang et al., 2019; Yang et al., 2020), self-objectification (Fox et al., 2021; Yang et al., 2020), drive for thinness (McLean et al., 2015; Vall-Roqué et al., 2021), appearance comparisons (Burnette et al., 2017; Pfund et al., 2020; Yang et al., 2020), heightened awareness (Caltriders, 2021), self-esteem (Fox et al., 2021; Vall-Roqué et al., 2021), and zoom dysmorphia (Draksler, 2021; Pikoos et al., 2021). Further to the widely ranging definitions of body image disturbance, studies utilized a wide variety of outcomes measures, which calls for a need to harmonize the concept of body image disturbance in this newly emerged context.

The Canadian Paediatric Society (2019) recognizes the correlation between social media use and body image concerns, anxiety, and disordered eating in children and adolescents. The COVID-19 lockdown not only shifted in-school interactions to a virtual platform (Caltriders, 2021; Draksler, 2021; Pfund et al., 2020; Pikoos et al., 2021; Vall-Roqué et al., 2021), but also increased the overall use of social media sites such as Instagram, YouTube, TikTok, Twitter, and Facebook among adolescents (Vall-Roqué et al., 2021). Increased frequency of social media use was significantly correlated with body dissatisfaction, drive for thinness, and low self-esteem among adolescents and young adults (Vall-Roqué et al., 2021).

Online learning platforms and traditional social media share features of perceptual disturbances. Recent news articles and research studies on zoom conferences and online learning platforms introduced the term ‘(zoom) dysmorphia’, akin to ‘snapchat dysmorphia’ (Draksler, 2021; Pikoos et al., 2021), to highlight the perceptual disturbances that occur due to the limitations in the camera specifications (Bernetter et al., 2016; Cristel et al., 2020; Draksler, 2021; Pikoos et al., 2021; Třebický et al., 2016). Of those that used video chatting platforms over the past week, 37.4% reported noticing a new aspect of their appearance they disliked (Pikoos et al., 2021). These experiences are also shared in adolescent females using social media, as they report feeling “pretty in the mirror”, but “ugly” on camera (Burnette et al., 2017). Viewing a mirrored reflection of a digitally distorted image of self and internalizing these images could have negative consequences for adolescent body image.

The notion of self-surveillance has surfaced in various articles of video chatting platforms and social media (Burnette et al., 2017; Mills et al., 2018; Pfund et al., 2020; Pikoos et al., 2021; Teran et al., 2020; Wang et al., 2019). Self-surveillance is grounded in the objectification theory, which states that individuals tend to internalize idealized appearances, leading to the awareness of their bodies such as facial attractiveness and symmetry. Once individuals internalize the idealized beauty, self-objectification can manifest as self-surveillance, a habitual monitoring of one’s own appearance (Fredrickson & Roberts, 1997). In adolescents and adults using video chatting platforms, approximately 27% reported primarily looking at their own face and body during their video chatting session (Pikoos et al., 2021). This finding is concerning as it has been suggested that the percentage of time spent looking at oneself, rather than simply the hours of video chatting, correlate with self-objectification (Pfund et al., 2020). Even as few as five minutes of self-focused attention can endorse decreased satisfaction with appearance, self-esteem, perceived attractiveness, and increased urge to change appearance (Barnier & Collison, 2019). The awareness of one’s own appearance elicits behavioural changes such as hiding self-view with 8% reported active avoidance of video calls with one of the reasons relating to appearance concerns (Pikoos et al., 2021). Similarly, adolescents frequently mentioned social media and social comparison in their appearance concerns and reduced confidence in their appearance (Burnette et al., 2017). Their self-surveillance manifested as investing time editing and selecting selfies even if their pictures were not being shared (Teran et al., 2020). These behaviours suggest that rather than the act of sharing selfies, it may be the act of self-surveillance and comparison with an internal standard of beauty that poses a negative influence on body image (Mills et al., 2018; Teran et al., 2020; Wang et al., 2019).

Appearance comparison occurs when adolescents compare their physical appearance to an external image of another individual. Often occurring in an upward direction towards the beauty ideal, a phenomenon well described by the social comparison theory (Festinger, 1954; Guo & Wu, 2021; Jarman et al., 2021; Seekis et al., 2020); the theory posits that individuals strive to establish a position in their society by comparing themselves with others who are perceived to be similar on dimensions such as age and gender (Festinger, 1954; Seekis et al., 2020). Peer competition can be a stronger predictor of body dissatisfaction than symptoms of depression (Muñoz & Ferguson, 2012). Adolescents and adults using video chatting platforms are constantly exposed to comparison, with 53% of individuals reported focusing on both their own and others’ face (Pfund et al., 2020; Pikoos et al., 2021). In adolescents using traditional social media, the tendency for appearance comparison in adolescents viewing unfamiliar peers

on social media was higher than when viewing celebrities (Seekis et al., 2020), suggesting a potentially synergistic effect between social media and peers (Burnette et al., 2017; Kleemans et al., 2018). In both forms of social media, those who conveyed high tendency for appearance comparison expressed desire to change their appearance (Fardouly & Vartanian, 2016; Pikoos et al., 2021) and engaged in behaviours such as hiding self-view and using features that enhanced their appearances (Pfund et al., 2020).

Methods

A concept analysis of body image disturbance among female adolescents using online learning platforms was conducted using Walker and Avant (2014) method. The eight steps of the Walker and Avant (2014) method are as follows: 1) Select a concept; 2) Determine the aims or purpose of analysis; 3) Identify all the uses of the concept possible; 4) Determine the defining attributes; 5) Identify model case; 6) Identify borderline, related, and illegitimate cases; 7) Identify antecedents and consequences; and 8) Define empirical referents. These steps were used to explore the concept.

Concept Exploration

Current Uses of the Concept in the Literature

The term “body image” is defined by the Merriam-Webster online dictionary (n.d.) as “a subjective picture of one’s own physical appearance established both by self-observation and by noting reaction of others”. In the healthcare disciplines, body image disturbance is defined by the NANDA-I nursing diagnosis as, “confusion in mental picture of one’s physical self ... defined by characteristics such as the absence of body part, alteration in body function or structure, alteration in view of one’s body” (Ladwig & McKenzie, 2017, p. 167). The American Psychiatric Association (APA) describes body image disturbance as “a disturbance in the way in which body weight or shape is experienced” (APA, 2013, p. 242). This term is used in the Diagnostic and Statistical Manual of Mental Disorders 5 diagnosis of eating disorders such as anorexia nervosa, anorexia bulimia and eating disorders not otherwise specified (APA, 2013).

In the context of body dysmorphic disorder (BDD), body image disturbance has been primarily characterized as a debilitating preoccupation with self-perceived defect in appearance that ruminates as intrusive thoughts (Barnier & Collison, 2019). It is defined as a “dynamic failure between the subjective experience of one’s own body appearance with an objective appraisal of the body” (Espeset et al., 2011, p. 185).

In adults with previous treatment for cancer, body image disturbance is defined as the self-perception of and displeasure with a change in appearance, functional decline in an area, as well as the psychological distress that arise from these changes. It referred to the actual and sustained change in the appearance and function of their bodies (Rhoten, 2006).

In post bariatric surgery adult patients, body image disturbance was defined as the incongruencies in the experiences of the mind and the body manifested by changes in the body appearance that occurs faster than the mind can adapt. Individuals experienced negative

influence on quality of life, arising from the excess skin after their weight loss, and inability to accept their new bodies diminished both social and physical functioning (Perdue et al., 2018).

Determine the Defining Attributes

The analysis of the different uses of the concept revealed three attributes on body image disturbance among adolescents using video chatting platforms and traditional social media. These included 1) feeling displeasure with the perceived appearance while using video streamed platforms; 2) Self-surveillance of one's appearance; and 3) upward comparison of one's appearance with others and experiencing feelings of inadequacy.

Feeling displeasure with the perceived appearance while using video streamed platforms

While body image disturbances can be experienced without digital images, for this phenomenon to manifest specifically in the context of online learning, the platform must be such that it has live-streamed videos that mirror digitally distorted images (Burnette et al., 2017; Draksler, 2021; Pikoos et al., 2021). Furthermore, they must feel displeasure with the perceived appearance even when individuals are no longer able to view their self image. While others might not notice the difference between the real and these distorted images, adolescents must feel displeasure with the distorted image of oneself (Burnette et al., 2017; Pfund et al., 2020; Pikoos et al., 2021). If adolescents do not recognize this change or do not feel displeasure with the perceived appearance, then body image disturbance does not occur.

This attribute is distinguished from BDD by the presence of a true externally distorted image of oneself, rather than an altered cognitive psychological process in the absence of this external change (Espeset et al., 2011). It is also distinguished from post-bariatric surgery patients and cancer survivors by absence of a physical change in one's body (Perdue et al., 2018; Rhoten, 2016), but rather a digitally disturbed image of oneself.

Self-surveillance of one's appearance

For adolescents to experience body image disturbance, adolescents must exhibit vigilant monitoring of one's outward body appearance or self-surveillance, either by monitoring their own appearance (Caltriders, 2021; McLean et al., 2015) or engaging in activities to enhance their appearance even when these images are not being shared (Fox et al., 2021; Mills et al., 2018; Teran et al., 2020; Wang et al., 2019). Self-surveillance can also manifest as behavioural changes, such as adjusting the position of their camera to show the best angles on video (Burnette et al., 2017; Pfund et al., 2020; Pikoos et al., 2021). While adolescents still experience negative feelings and anxiety when editing their appearance (Mills et al., 2018; Teran et al., 2020), this behaviour may help them feel some degree of control over how they are viewed (Mills et al., 2018).

While this attribute is very similar to BDD, the difference is that the surveillance behaviour stops once the external triggers are halted, as opposed to the BDD, where their urge to self surveillance ruminates and manifests as intrusive thoughts (Barnier & Collison, 2019). This attribute also differs from body image disturbance from post-bariatric surgery (Perdue et al., 2018) and cancer survivors (Rhoten, 2016) as these populations have actual physical or

functional changes in their body. Their body disturbance is manifested rather by the grievance of their old selves, and unfamiliarity with the undesired changes.

Upward comparison of one's appearance with others and experiencing feelings of inadequacy

Body image disturbance in adolescents occur when they compare their appearances with other individuals whose appearance lies closer to the societal beauty ideals (Pfund et al., 2020; Pikoos et al., 2021; Seekis et al., 2020). This attribute does not occur when adolescents compare themselves with others whom the adolescent believes is downwards from the socio-culturally-defined beauty ideals (Yang et al., 2020). The degree to which this attribute manifests in the adolescent varies, where comparison with unfamiliar peers on social media has a greater effect than viewing celebrities (Burnette et al., 2017; Kleemans et al., 2018; Muñoz & Ferguson, 2012; Seekis et al., 2020).

This attribute is distinguished from BDD in that BDD – it is characterized by preoccupation with images that are distorted by their own cognitive-perceptual process. The comparison is made upwards with a perceptually disturbed ideal appearance of themselves (Espeset et al., 2011). Body image disturbance in post-bariatric surgery and cancer survivors occur due to comparison with their previous selves or function (Perdue et al., 2018; Rhoten, 2016), and not due to comparison with their peers.

Constructed Cases

Model Case

Clara is a 15-year-old girl who currently attends her classes through Zoom. She hates having her webcam on as she feels like her nose looks abnormally large compared to the other girls in class. Today, she catches herself monitoring her own face again, as she tries to adjust the lighting and the camera angle, hoping that it would improve her appearance. Not satisfied with her appearance, she turns off the video, while intermittently monitoring her classmates' appearances on video. After her class, she practices taking selfies, trying to figure out the best angle for her appearance. She takes multiple selfies before finding the perfect angle that improves the appearance of her nose.

A model case contains all the defining attributes of the concept (Walker et al., 2014). This is a model case as it contains the attributes of: Feeling displeasure with the perceived appearance while using video streamed platforms; conducting self-surveillance of one's appearance; and comparing one's appearance to those perceived as closer to the ideals and experiencing feelings of inadequacy. Clara views a digitally distorted reflection of herself and experiences negative emotions towards her appearance. She compares herself with other classmates whom she believes look better than her. She surveillances her own appearance on Zoom and becomes pre-occupied with the way she looks. Even when she turns off her video, she continues to feel self-conscious about her appearance and intermittently monitors other classmates' appearance. After her class, she takes multiple selfies at home to have the perfect image even though she does not share it.

Borderline Case

Mandy is a 15-year-old girl. She enjoys taking selfies and usually invests a lot of time editing them. However, she does not post them on her social media account. Usually, she also has a YouTube video playing on the side of her favourite influencer and tries to imitate her pose.

A borderline case contains most of the defining attributes of the concept but not all of them (Walker & Avant, 2014). This case exemplifies some defining attributes: Viewing a digitally distorted image of oneself; conducting self-surveillance of one's appearance; and comparing one's appearance to those perceived as closer to the ideals and experiencing feelings of inadequacy. Mandy may view a digitally distorted reflection of herself. However, note that she does not necessarily feel displeasure associated with the distorted images, which is one of the key attributes that endorses body image disturbance. She exhibits self-surveillance and appearance preoccupation, as demonstrated by taking multiple selfies and investing time on editing them without sharing them. She also engages in upward comparison by trying to emulate the social media influencer.

Related Case

Jody is a 15-year-old female, who is currently using zoom for her online high school. She has been feeling exceptionally down lately and Zoom seems to amplify the bags under her eyes. She compares herself to her classmates, who look refreshed, carefree, and happy. She has been struggling with depressive symptoms ever since her mom had passed away 6 months ago. Not wanting to be seen, she dims the light in her room and adjusts the webcam such that only a portion of her face is seen.

A related case is similar to the concept being studied, and may include some of the attributes that can be mistaken for the defining attributes of the concept (Walker & Avant, 2014). This case is a related case because it contains the attributes of: Viewing a digitally distorted image of oneself; conducts self-surveillance of one's appearance; and compares one's appearance to those perceived as closer to the ideal. Jody views a distorted image of herself on Zoom but does not internalize the defined standard of beauty. While she evaluates her own appearance and compares it with those of her classmates, this action is not conducted in a manner that compares herself to the beauty ideals. She compares herself to other students, but this is unrelated to beauty ideals. Rather, it compares the grievance of her mom's passing to other classmates who appear carefree in their seemingly ideal family life. The attributes present in this scenario can be mistaken for the defining attributes of the concept of body image disturbance, but in no way is related to body image disturbance.

Illegitimate Case

An illegitimate case uses the concept term out of context (Walker & Avant, 2014). Skipping stones on a large body of water disturbed a calm image of nearby cottages is an example of an illegitimate case.

Antecedents and Consequences

Antecedents are events that must occur prior to the occurrence of a concept (Walker & Avant, 2014). For body image disturbance to occur in this context, an individual must be an adolescent and using video-based online learning platforms that allow for potential interaction with others who can be identified as peers. Secondly, the individuals' image of themselves must be streamed live to their peers, with the potential to be mirrored back to them. The third antecedent is that adolescents need to have a peer with whom they perform upwards comparison.

Consequences are events that occur due to the occurrence of the concept (outcomes) (Walker & Avant, 2014). The main consequence of body image disturbance is alterations in mood and lowered self esteem (Fox et al., 2021; Mills et al., 2018; Vall-Roqué et al., 2021). This can take in the form of avoiding taking photos or self views, adjusting their camera, hiding self-views, and applying filters to alter their image (Castelli & Savary, 2021; Gherhes et al., 2021; Pikoos et al., 2021). Other potential events include utilizing avatars that are closer to the adolescents' beauty ideals or those that are simply "fun" and maintain their relative anonymity (de Gomes de Siqueira et al., 2021; Jun, 2021; Loewen et al., 2021). Those adolescents not employing avatars may choose to turn off their cameras and be asked repeatedly to turn on their videos.

Empirical Referents

Empirical referents are categories of actual phenomena that by their presence demonstrate the occurrence of the concept itself. Empirical referents are not tools to measure the concept, but the means by which you can recognize or measure the defining characteristics. The empirical referents relate directly to the defining attributes, not the entire concept itself (Walker & Avant, 2014). These may manifest as being concerned with aspect of body not recognized by others; preoccupation with their appearance, selfie editing, or video avoidance; and looking at images of others and expressing desire to change the appearance of their face, hair or skin (Fardouly & Vartanian, 2016; Pikoos et al., 2021). Adolescents who are concerned with their body image may subsequently experience psychological distress while engaging in online learning.

Concept Definition

For female adolescents using online learning platforms, body image disturbance can be experienced as primarily perceptual, cognitive, and behavioural changes. These include the displeasure with one's distorted appearance felt during live video streamed online learning platforms, self-surveillance of one's own appearance, and comparison of oneself with others who lies closer to the beauty ideals. These negative feelings about oneself leads to behavioural changes of selfie avoidance, video manipulation, and camera angle adjustment.

Discussion

This concept analysis establishes the defining attributes of body image disturbance among female adolescents in the context of online learning platforms. The nature of these

platforms allows direct comparison of digitally distorted images of oneself with others in real time, upon which female adolescents may start to experience disturbances in their body image. A standardized understanding of this concept will allow NPs and other healthcare providers to recognize its occurrence and intervene appropriately to support the adolescent and work with the teachers create a safe and supportive learning environment. The standardized concept is also relevant to clinical practice, education, research, and policy and leadership.

From a clinical standpoint, NPs can operationalize the definition of body image disturbance to screen for and recognize the occurrence of the event. While there is currently no validated tool in the detection of body image disturbance in this context, this definition can be operationalized with questionnaires that pertain to the defining attributes of the concept. The Dysmorphic Concern Questionnaire (DCQ) measures the concerns with physical appearance and beliefs about individual's body (Pikoos et al., 2021); the general attractiveness internalization subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-4-Revised (SATAQ-4R), which assesses a general desire to be attractive (Wang et al., 2019); and the physical appearance comparison scale, which addresses questions related to the video chatting appearance comparison (Pfund et al., 2020). A survey of European student and practising healthcare providers revealed that individuals varied in their ability to recognize and address their patients' appearance concerns (Williamson et al., 2018). There appears to be similar concerns in Canada with respect to NP mental health education (Creamer & Austin, 2017). As such, these tools can be a useful tool for NPs, as well as other healthcare providers that interact with adolescents. Furthermore, these attributes of body image disturbance can be shared with adolescents, parents, and teachers to educate them on ways to identify potential indicators of its occurrence.

COVID-19 continues to disrupt traditional educational experience, with components of online learning extending into the upcoming school year (Government of Ontario, 2021). Given the continued disruption, ongoing use of online learning platforms in adolescents must involve change. Body image disturbance can lead to not only social avoidance, drive for thinness, and lower self esteem (Guo & Wu, 2021; Pikoos et al., 2021; Seekis et al., 2020; Teran et al., 2020), but also pose as a risk factor to psychological disorders such as anorexia nervosa (APA, 2013, p. 338). NPs can educate their clients about cameras, such as webcams and phones, distorting facial appearances as a reality (Cristel et al., 2020; Ward et al., 2018). Increased use of social media and video filters seems to endorse higher levels of anxiety and self-scrutiny among post-secondary students (Silence et al., 2021). Furthermore, each encounter with adolescents can be used as an educational opportunity to discuss the unintended secondary effects of using extensive touch-up filters during video conferences (Silence et al., 2021). In a study of post-secondary students, video filter users displayed higher levels of anxiety with return to in-person school compared to non-filter users (85% vs. 58%, respectively) (Silence et al., 2021). Overall, adolescents should be counselled to be mindful of unintended consequences while engaging in video based online learning platforms.

Similarly, NPs can also educate teachers on refraining mandatory video-use among adolescents as well as hiding self-view features and providing an option to use avatars. Not only are the cameras digitally altering images, but staring at one's own reflection can lead to further worsening of one's perception of their appearance (Barnier & Collison, 2019). Even if the

images are not shared, there seems to be continued risk of self-surveillance (Teran et al., 2020). While the benefits of using avatars are not entirely known, current literature seems to suggest that it can maintain relative anonymity, give students opportunity to have fun, reinforce the experience of being in the virtual world (de Gomes de Siqueira et al., 2021), and lead to higher rate of class participation (Jun, 2021). Whether the avatar selection choice relates to adolescents' psychological well being is unknown in the context of online learning; studies of avatar selection for video games among post-secondary students suggest that the avatar can predict individuals' psychological well-being and self discrepancy. There may be larger perceived discrepancy in those who selected ideal versus realistic avatars (Loewen et al., 2021). Therefore, it may be worthwhile for future research to explore avatar selection choices as an indicator of psychological well-being.

In the context of virtual medicine, clients, especially those with eating disorders, discussing their health concerns while viewing themselves on the screen may pose an added layer of distress and even potentially hinder access to receiving health care. In such scenarios, minimizing their on-screen appearance or hiding clients' self-view appearance may alleviate some of the in-session distress (Matheson et al., 2020). Alternatively, NPs can utilize this technology as an opportunity for exposure therapy for gradual acceptance of viewing their selves on screen (Matheson et al., 2020). When such measures during virtual appointments are unsuccessful and pose as barrier to accessing healthcare, NPs can also advocate for in-person appointments, provided that it aligns with the current pandemic and organizational guidelines. Further research could seek ways to minimize potential detrimental effects of virtual medicine on adolescent body image. The working definition of body image disturbance can be used in the developmental phase of virtual medicine platforms to identify if these forms of healthcare are safe for client use.

Conclusion

While the issue of body image and social media was present before the COVID-19 pandemic, the extensive exposure to online learning platforms among adolescents is a newly emerged phenomenon, heightened by the COVID-19 pandemic. While there are limited studies on this phenomenon, NPs can use the scenarios presented in this study, along with examples of questionnaires, to recognize and delineate the occurrence of body image disturbance versus a borderline or a related case. Not only does this definition serve purpose directly in clinical practice, but also in research; NPs can further utilize the definition to develop a validated instrument that can accurately measure the occurrence of this concept; NPs can also be consulted in the research and development of online learning activities that are less psychologically harmful to female adolescents' sense of body image. Finally, the definition presented in this concept analysis will not only enable NPs, but also adolescents, parents, teachers, and other healthcare providers to recognize the occurrence of body image disturbance in female adolescents using virtual chatting platforms.

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Appendix A

Inclusion/ Exclusion criteria

Inclusion criteria

Date: Articles published after 2004 (introduction of first modern day social media - Facebook)

Language: English language

Population of interest: All literature which evaluates adolescent perception, feelings, behaviour with respect to social media

- Articles where adolescent and younger adults were included as a single sample population were included in this paper
- Adolescent: Defined as 13 – 18 years of age, as per CINAHL

Gender: Female gender

Type of publication: Peer reviewed journal articles from all disciplines of all study designs

- Grey literature (News articles, Blogs)
- Professional opinion

Appendix B

Search Strategy

Database	Search terms	Total # of retrieved articles	Total # included in the final analysis	
CINAHL	Body image or body dissatisfaction or body image disturbance or facial dissatisfaction AND social media or covid-19 AND adolescent	96	4	Burnette et al., 2017 Pfund et al., 2021 Salomon 2019 McLean, 2015
PsychINFO	((body image disturbance) OR (body dissatisfaction)) AND ("social media" or "online learning" or "distance learning" or "virtual learning") AND "adolescence"	133	3	Muñoz et al., 2012 Seekis et al., 2020 Kleemans et al, 2018
ProQuest – Sociology Collection	((body image disturbance) OR body dissatisfaction)) AND ("social media" or "online learning" or "distance learning" or "virtual learning") AND "adolescence"	13	0	
Ovid - EMBASE	("Body image disturbance" OR "self concept" OR "body dissatisfaction" OR "self-objectification") AND ("online-learning" or "e-learning" or "virtual learning" or "online school" or "social media" AND "adolescence"	96	2	Vall-Roqué 2021 Fox et al., 2021
Google	COVID19 adolescent body image news		2	Caltriders, 2021 Draksler, 2021
Related articles/ reference list			5	Teran et al., 2020 Mills et al., 2018 Yang et al., 2020

				Wang et al., 2019 Pikoos et al., 2021
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Appendix C

	Caltriders, 2021	Draksler, 2021
1. Is the source of the opinion clearly identified?	Yes, author of the newspaper article and the family psychologist interviewed is identified	Yes, author of the newspaper article and the psychiatrist interviewed is identified
2. Does the source of opinion have standing in the field of expertise?	yes	yes
3. Are the interests of the relevant population the central focus of the opinion?	Yes, seeks to understand the impact of zoom use on teenagers sense of control and appearance	Yes, seeks to understand the impact of zoom use on students perception of their appearance
4. Is the stated position the result of an analytical process, and is there logic in the opinion expressed?	Yes, the main point is that zoom classrooms pose a mental health risk to students	Yes, the main point is that zoom classrooms pose a mental health risk to students
5. Is there reference to the extant literature?	Yes, but not those that directly pertain to zoom and appearance	Reference made to a study but link/information not available
6. Is any incongruence with the literature/sources logically defended?	Yes, but only mentioned the study of body image and mental health	Yes, but only mentioned a study of dermatology that saw similar trends in appearance insecurity

Figure C1. Text and opinion papers (Joanna Briggs Institute, n.d.)

	Vall-Roque et al 2021	Teran et al., 2020	Yang et al., 2020	Muñoz & Ferguson, 2012
Were the criteria for inclusion in the sample clearly defined?	All Spanish women ages 14-35 yo	All girls 14-17 yo recruited through a private survey firm through their parents	Females and males from college between 17-22 years of age	Female students aged 14-34 yo. But doesn't describe the distribution of age
Were the study subjects and the setting described in detail?	Described place of residence, employment & relationship status, whether or not contracted covid or loved one infected/deceased from covid 19, and own space to relax at home Family income status, siblings were not explored which	No. Perhaps need more info regarding home environment, # computers at home etc.	Could benefit from more info about SES, relationship with parents, where the survey was completed etc.	Study setting was not described and the demographic info was not published

	could be important			
Was the exposure measured in a valid and reliable way?	Cronbach's alpha > 0.85 for all	Cronbach's alpha > 0.85, except for the selfie investment (0.62) d/t shortening of question to prevent participant fatigue	Cronbach's alpha > 0.84 for all	Coefficient alpha > 0.70
Were objective, standard criteria used for measurement of the condition?	see #7	See #7	See #7	See #7
Were confounding factors identified?	yes	Yes. Several identified	yes	yes
Were strategies to deal with confounding factors stated?	Measure of impact of COVID 19, current relationship status, home environment	Assessed BMI and social media use, race used as dichotomous variable due to restricted diversity	Assessed BMI, and analyzed missing data using pairwise deletion	Assessed BMI, perception of parental affection, media exposure, depression, verbal abuse, female competition
Were the outcomes measured in a valid and reliable way?	Likert scale self report of SNS site use frequency Eating disorders inventory (EDI-3) Rosenberg self esteem scale (RSES)	Selfie activities – sharing frequency, editing, and investment (5 pt scoring system); self objectification (self-objectification beliefs and behaviours scale); appearance concerns (social appearance anxiety scale); imaginary audience beliefs (New imaginary audience scale); social media duration	Selfie-viewing (3 item questions with 1x6pt and 2x7pt scale, standardized); appearance comparison (physical appearance comparison scale – PACS); self objectification questionnaire (SOQ); Facial dissatisfaction (Facial appearance concerns – FAC subscale of the Negative physical self scale (NPSS)	Body image dissatisfaction (Body esteem scale for adolescents and adults – BESAA); satisfaction with life scale (SLS)

Was appropriate statistical analysis used?	One way ANOVA, Heges' g Wilcoxon signed rank test Chi-square test of independence	Yes, used Analysis of Moment Structures (AMOS) program with model fit based on statistically calculated criteria. Used X^2 to investigate the fit of the model compare to alternate model	PROCESS macro model in SPSS	Pearson's correlation coefficient $P < 0.001$
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Figure C2. Cross sectional studies (Joanna Briggs Institute, n.d.)

Cross Sectional Studies

	Seekis et al., 2020	Wang et al., 2019	McLean et al., 2015	Pikoos et al., 2021
Were the criteria for inclusion in the sample clearly defined?	Female Australian undergraduate students enrolled in the 1 st year psych course	Boys and girls from middle school and high school in China	Female gr7 students from secondary school (mean age 13.13 yo)	Any adults 18 yo and over currently residing in Australia
Were the study subjects and the setting described in detail?	Yes, participants to complete questionnaire on secure website	Unsure where and how the survey was delivered	Yes, online survey completed during class time and was supervised by a researcher and class teacher	Online survey done at home
Was the exposure measured in a valid and reliable way?	Exploratory factor analysis using principal axis factoring and oblique rotation were conducted to establish structural validity for appearance related SNS use. Parallel analysis, velicer's minimum average partial test (MAP). Exclusion of factors with fewer than 3 items, a factor loading cut off, percentage of total variance explained by each factor	Selfie viewing as used by other studies. Cronbach alpha 0.65	Demographic info, media exposure (6-item version of a media use questionnaire), photo activity (self image taking frequency, self image sharing, photo investment, photo manipulation) Cronbach a = 0.72, coefficient > 0.82	Demographic info, video call usage (unknown validity of measurement)

Were objective, standard criteria used for measurement of the condition?	Upward physical appearance comparison scale (a=0.95), body surveillance subscale from the objectified body consciousness scale (a=0.89), social appearance anxiety scale (a=0.94), drive for thinness subscale from the eating disorders inventory 3 (a=0.83, body dissatisfaction subscale from the eating disorders inventory 3 (a=0.94)	General attractiveness subscale of the sociocultural attitudes towards appearance questionnaire, revised (SATAQ-4R), body appreciation scale-2 (BAS-2), facial appearance concern subscale of the negative physical self scale (Cronbach a > 0.80)	10-item body dissatisfaction subscale of the eating disorders inventory 3 (0.89); dietary restraint (10-item Dutch eating behaviour questionnaire restraint subscale. 0.94); internalization of the thin ideal (sociocultural attitudes towards appearance questionnaire-4. 0.84)	Dysmorphic concern questionnaire (DCQ); psychologic distress (depression, anxiety, and stress scale, DASS-21); desire to obtain future beauty services (5 scale questionnaire) No coefficient alpha noted
Were confounding factors identified?	Yes, evaluated type of SNS, BMI, race, attention. But not SES, family dynamics	Assesses the type of selfies reviewed and BMI but not other factors like SES, family dynamics etc.	Some were considered, ethnicity, parental ethnicity but not considered SES, family dynamics, relationship, etc.	occupation, gender, duration of video call use, should have included SES, relationship status
Were strategies to deal with confounding factors stated?	Yes, used data analysis to exclude participants who failed attention checks	Missing data was handled by pairwise deletion	No	Validity checks were conducted to ensure that groups completing the survey at each time point did not differ on variable of interest
Were the outcomes measured in a valid and reliable way?	Yes (see #4)	Yes (see #4)	Yes (see #4)	See #4
Was appropriate statistical analysis used?	SPSS	PROCESS macro SPSS	Descriptive statistics and correlation; independent samples t-test	Welch's ANOVA, Bonferroni corrected alpha, Pearson's correlation

Figure C3. Cross sectional studies (Joanna Briggs Institute, n.d.)

	Pfund et al., 2020
Were the criteria for inclusion in the sample clearly defined?	Yes

Were the study subjects and the setting described in detail?

Setting was not described in detail, as it was administered for home use

Was the exposure measured in a valid and reliable way?

Video chatting behaviours (Likert scale)

Were objective, standard criteria used for measurement of the condition?

Self-objectification (8-item body surveillance subscale from the objectified body consciousness scale; Cronbach's alpha 0.88); video chatting appearance comparison (physical appearance comparison scale; Cronbach's alpha 0.87); Appearance satisfaction (14-item body parts satisfaction scale-revised; Cronbach's alpha 0.73)

Were confounding factors identified?

Yes, attention check, reporting more than 24h/day of video chatting,

Were strategies to deal with confounding factors stated?

Exclusion and statistical correction

Were the outcomes measured in a valid and reliable way?

See #4 (not objective, but reliable and valid)

Was appropriate statistical analysis
used?

R studio

Figure C4. Cross sectional studies (Joanna Briggs Institute, n.d.)

Burnette et al., 2017

Is there congruity between the stated philosophical perspective and the research methodology?

Tripartite model, mixed methods but no mention of qualitative research methodology

Is there congruity between the research methodology and the research question or objectives?

No mention of research methodology, so unable to assess, however appears to be phenomenological (understand the social media use, social comparison)

Is there congruity between the research methodology and the methods used to collect data?

Yes. Qualitative study. Employed recorder and facilitator for a focus group

Is there congruity between the research methodology and the representation and analysis of data?

Yes – individual responses are shown

Is there congruity between the research methodology and the interpretation of results?

Yes – understanding the social media use and what it means for social comparison, body image

Is there a statement locating the researcher culturally or theoretically?

Yes – information about researcher ethnicity, age, background and experience is noted

Is the influence of the researcher on the research, and vice- versa, addressed?

It did not address

Are participants, and their voices, adequately represented?

Yes, a table representing qualitative themes by group

Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?

Yes, approved by REB

Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

Yes, but would have been nice to have individual interviews with students as well

Figure C5. Qualitative research (Joanna Briggs Institute, n.d.)

	Fox et al., 2021	Mills et al., 2018	Kleemans et al., 2018
Was true randomization used for assignment of participants to treatment groups?	Unknown. Randomization process was not described	Unknown. Randomization process not described	Unknown. Randomization process not described
Was allocation to treatment groups concealed?	Yes	Yes	Yes
Were treatment groups similar at the baseline?	Yes. People were recruited for course credit and received same instructions	Yes	Measured baseline characteristics are similar, but survey done independently, leaving room for variation
Were participants blind to treatment assignment?	No. Unable to blind treatment assignment due to the nature of the study	Unable to blind treatment assignment d/t the nature of the study, but all involved the use of iPads which could reduce participant bias	Yes, retouched vs. untouched image with all other factors equal
Were those delivering treatment blind to treatment assignment?	No	No	Unknown
Were outcomes assessors blind to treatment assignment?	unknown	unknown	Unknown
Were treatment groups treated identically other than the intervention of interest?	Yes. Everyone completed the same task except for the intervention itself	Yes, each went in a partition without personal belongings and used researcher provided iPad to complete task	Likely, the intervention was completed individually so there can be differences not accounted for

Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?

Yes, everyone was accounted for in the study

Yes, everyone was accounted for

yes

Were participants analyzed in the groups to which they were randomized?

Yes, two-way MANCOVA (test the main and interaction effect), ANCOVA (main effect of each dependent variable independently), two-way ANVOCA (for social aggression)

SPSS
Repeated measures MANOVA.
Significant multivariate 3-way interactions are further analyzed using repeated measures ANOVA

t-test

Were outcomes measured in the same way for treatment groups?

Yes. Pre-task mood using (positive and negative affect schedule, PANAS), # of pictures taken, state of self-objectification (twenty statements test TST), post task mood (PANAS), self-esteem (20-item state self-esteem scale), social aggression via derogatory tags

Yes, mood and body image (visual analogue scales)

Yes, body image (Body image state scale) and social comparison tendency (Iowa-Netherland's comparison orientation measure)

Were outcomes measured in a reliable way?

Yes (see above)

VAS is a well validated scale but no coefficient stated for the assessment tool

Methods have been used in previous studies. Cronbach alpha coefficient >0.83

Was appropriate statistical analysis used?

Yes, see #9

Yes, see #9

Yes, see #9

Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of

Unable to assess randomization process

Yes, although randomization process is unknown

Yes, but randomization process is unknown

Figure C6. Randomized control trial (Joanna Briggs Institute, n.d.)