Gender Differences in Sending Nude Pictures and Videos Across Multiple Relationship Contexts in the Adult Norwegian Population

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Abstract
This article aims to determine the prevalence of sending nude pictures/videos in the Norwegian population and investigates gender differences regarding consensual, unsolicited, and coerced experiences. Data were obtained from a probability-based web survey of 2181 men and 1967 women between 18 and 89 years old. The majority of participants expressed relatively accepting attitudes toward sending nude pictures/videos, and men expressed more positive attitudes than women. Twenty-nine percent of participants reported having lifetime experience with sending nude pictures/videos, and sending nude pictures/videos was more common in younger individuals than older individuals. More women than men claimed that they sent their most recent nude picture to a committed partner, and twice as many men than women had sent a nude picture to a stranger or a person they only had contact with on the Internet. In addition, more than twice as many women than men reported consensual sending nude pictures/videos, and more men than women sent unsolicited pictures/videos. Consensual sending nude pictures/videos was characterized by the presence of men and women within committed relationships. In Norway, sending nude pictures/videos seems to be a way of being sexual in the context of committed relationships.

Keywords Sending nude pictures/videos · Sexting · Gender differences · Adults

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Introduction

Background

Sending nudes, which is the focus of this paper, is part of sexting, which is broadly defined as the exchange of self-produced sexual texts, photos, and videos through mobile phones or social media channels (Klettke et al., 2014). Although sexting has mostly been studied in adolescents, evidence suggests that sexting behavior is more widespread among adults than among adolescents (Courtice & Shaughnessy, 2017; Döring, 2009; Döring & Mohseni, 2018). While the literature on sexting in adults is increasing, the focus still remains predominantly on younger adults, and few studies have included adults above the age of 50 (see e.g. Burkett, 2015; Falconer & Humphreys, 2019; Garcia et al., 2016; Parker et al., 2013; van Ouytsel et al., 2020). For example, a review by Courtice and Shaughnessy (2017) found the prevalence of sending self-created sexual photos/videos by mobile phone in young adults to be between 34.5% and 40.8%. In addition to investigating the age and gender differences in sending nude images in the adult Norwegian population, the current study also sought to expand knowledge about the social context of sending nudes by examining factors that differentiated sending consensual, unsolicited, and coerced nude images.

Experience of Sending Nudes among Adults

For the Norwegian cultural context, a comparable study may be a German study conducted in 2015, where 41% of a representative sample of adult Internet users reported ever having sexted (Döring & Mohseni, 2018), most often by sending sexual text messages (40%), self-created sexual photo messages (25%), and sexual video messages (14%). Some studies indicate that the prevalence of both sexting and sending nude images becomes lower with increasing age (Currin et al., 2022; Garcia et al., 2016). For example, McDaniel and Drouin (2015) found that while about 20–30% of young adults had sent a nude (or semi-nude) image to their partner, approximately 12% of older adults had done so. In contrast to studies finding it to be more common that young adult men send nude images than women (see Mori et al., 2020), the study by Currin et al. (2022) found no gender difference in different types of sexting in an adult sample. Age and gender differences in sexting among adults may be better understood by outlining how sending nude images can vary according to relationship and social contexts of the behavior.

Context of Sending Nudes

Sending nudes takes place within a specific situation or context. Sending nudes can be categorized as consensual, unsolicited, unwanted, or coerced (Amundsen, 2022; Bond, 2016). When mutually consented, sending nudes is most likely harmless, but can be problematic or illegal when such content is forwarded to people without consent (Mori
et al., 2020). On this topic, the research focus has shifted from focusing on sending nudes as a risky behavior that has negative consequences (Döring, 2009; Greer et al., 2022) to also focus on sending nudes as an act that may have benefits within specific contexts (Bonilla et al., 2020; Greer et al., 2022; Hasinoff, 2013).

Consensual sending of nudes implies permission from the recipient to do so and often occurs within a partner relationship, for example, for flirtation, as foreplay, to initiate or maintain intimacy (Dodaj & Sesar, 2020; Drouin & Tobin, 2014). Falconer et al. (2021) conducted a survey of 640 married people (between the ages of 40 and 59) in Canada. They found that almost 43% of the respondents sexted to communicate sexual interest, 37% sexted to initiate sexual activity, and 18% sexted pictures of themselves. Unsolicited sending nudes involves sending nude or sexual images without invitation and consent from the recipient, which may be motivated by flirting, the hope of receiving sexual images or favors in return, or sexual gratification for the sender (Karasavva et al., 2022). According to Drouin and Tobin (2014), unwanted sending nudes is not necessarily forced or pressured. It can be consented to with a committed partner to fulfill a partner’s needs or as a type of “sexual compliance” to maintain the relationship (Dodaj & Sesar, 2020). Coerced sending nudes may be engaged with because of pressure from a partner or a potential partner, or peer pressure, particularly among adolescents (Drouin & Tobin, 2014). In the present study, both unwanted and pressured sending nudes are included in the category of coerced sending nudes.

An additional important social context to take into account is whether sending nudes takes place in the context of a committed relationship, as different relationships vary in terms of, for example, sexual intimacy and reciprocity. For example, in a meta-analysis of 50 studies on sexting prevalence among 18–30 year-olds, Mori et al. (2020) found that reciprocal sexting was more common among single emerging adults than partnered individuals; this may thus be interpreted as a modern way of flirting. Women are also reported to be more likely to sext within a committed partner relationship than men, possibly due to women trusting a primary partner more than a casual partner (Drouin et al., 2017; Garcia et al., 2016). It may also be assumed that attitudes toward sending nudes are more positive and accepting when it occurs in the context of a committed relationship (Matthues, 2019). However, while Brodie et al. (2019) found that sexting in general within romantic relationships decreased with age in adults, perhaps reflecting decreased sexual engagement or not being used to sexting as a communication tool, Garcia et al (2016) did not detect any age effects in sexting behavior due to relationship context. Hence, the likelihood of consensual, unsolicited, or coerced sending nudes will vary across different relationship contexts, and a closer examination of adult men and women’s behavior of sending nudes in different relationship contexts may thus improve our understanding of this phenomenon’s gendered, non-gendered, and age-related aspects.

Research has shown that girls/women are more often coerced into sending nudes than men (Laird et al., 2021; Ross et al., 2019). This gender difference may reflect differences in the sexual scripts of men and women (Gagnon & Simon, 2005), which prescribe a more sexually passive or restrained role to women and a more sexually active or assertive role to men. Following this sexual script, it can be assumed that women more often send nude pictures of themselves in agreement with their partners. In contrast, men more often send
nude pictures without receiving prior agreement from the recipient. Oswald et al. (2020) argued that men might overestimate the expected positive reaction of women when sending unsolicited nude pictures as they are projecting their own interest in sexual images to the recipient. A picture of an erect penis expresses the sender’s (man’s) desire and arousal. Kutchinsky (1988) argued that for a woman, an erect penis is not sexually arousing in itself, a reaction often found in studies of women receiving unsolicited dick pic’s (e.g. Karasavva et al., 2022; Matthews et al., 2018). A woman needs to be attracted to the man who is sending her the nude, which is in accordance with Kutchinsky’s (1988) analysis.

Consensual, Unsolicited, and Coerced Sending of Nude Images

Several motivational factors may be related to sending nudes. Sexual purposes are the most common motive for sexting in general among young adults (Currin & Hubach, 2019). As such, sending nudes may be inspired by the use of pornography, particularly given that it is fairly widespread and accepted in the Norwegian context (Kvalem et al., 2014; Træen et al., 2004), with men using more pornography than women. It can be assumed that pornography may inspire some people to act on their sexual arousal by sending nude pictures, and it may be exciting to imagine the reaction of the recipients (Karasavva et al., 2022). This is possibly associated with a positive attitude toward sending nudes in adults, although evidence of the association between pornography use and sending nudes in young adults is still inconclusive (Raine et al., 2020). Sending a nude may also be a way to demonstrate control and power (Karasavva et al., 2022; Oswald et al., 2020). In addition, the frequent use of pornography may contribute to normalizing watching sexualized content, thereby making it more acceptable to send nude and sexualized images. Furthermore, pornography use may also be associated with fewer normative barriers toward sending pictures to others, as well as to someone who has not asked for it.

Currin et al. (2022) found that body image reinforcement was a central motivation for sending nude photos/videos among adults. For example, Falconer et al. (2021) found that adult Canadian women with less self-consciousness regarding their body were more likely to send all types of sexts (to communicate sexual interest, initiate sexual activity, and send nude pictures), while men with less body image self-consciousness were more likely to only send sexy pictures. Thus, a positive body image may increase the likelihood to send a nude picture of oneself to another person. For women, and for gay men (Kvalem et al., 2016), it may also be a way to obtain positive feedback on sexual attractiveness or one’s appearance from partners and friends (Burkett, 2015). Sending nudes often focus on the appearance of the genitals, and it is thus likely that those who send nudes are more satisfied with the appearance of their own genitals.

Aims

The scarce availability of data in the adult population’s attitudes toward, and prevalence of, sending nudes has been identified as a research gap in previous literature reviews (Döring, 2009; Klettke et al., 2014; Kosenko et al., 2017). To bridge this gap, the research questions addressed in this paper are:
R1 What are the attitudes toward sending nudes among adults in Norway? What is the prevalence of consensual, unsolicited, or coerced sending nudes in the Norwegian population?

R2 Does consensual, unsolicited, or coerced sending nudes differ between men and women, between age groups, and between different relationship contexts?

R3 What separates men and women in terms of their consensual, unsolicited, or coerced sending nudes experiences?

Methods

Participants and Recruitment

The Norsk Gallup (a subsidiary of Kantar in Norway) collected data based on its web panel, which has approximately 40,000 active members (https://www.galluppanelet.no/). These members were randomly recruited through national phone registries, and there was no possibility of self-recruitment. The panel represents Norway’s population of Internet users (98% of the population has access to the Internet; see http://www.medienorge.uib.no/english/). All Gallup Panel members were contacted regularly to fill out online questionnaires, and Kantar developed a program with small incentives (e.g., lotteries or occasional surprises of varied quality) to motivate participation. It is believed that these incentives were insufficient for participation in the study. Participation was voluntary, and anonymity was guaranteed. This research complies with the Personal Data Act and the guidelines of the Norwegian Data Protection Authority and also follows the ethical guidelines developed for market and poll organization surveys (Norway’s Market Research Association and the European Society for Opinion and Market Research [ESOMAR]).

In March 2020, 11,685 Gallup Panel members were randomly invited to participate in an online survey on sexuality. Of those asked to participate, 4160 individuals (18–89 years) completed the questionnaire, with a response rate of 35.6%. Fifty-one percent of the participants completed the online survey on their mobile phones.

The mean age of women and men were 44.4 (SD = 16.8) and 48.4 (SD = 17.1) years old, respectively. Most participants identified as heterosexual (93.5%), while 2.6% identified as homosexuals/lesbians, 3.3% identified as bisexual, 0.6% identified as asexual, and 0.1% identified as “other.” Approximately 60% of the participants were not religious, and most of those who reported religious affiliation were Christian (18.1% = Christians with no particular denomination, 17.1% = Protestants). Most respondents lived in urban areas (56.8%), and only 16.3% lived in rural areas. The majority of participants also had a bachelor’s degree or similar educational qualification (41.4%), while 22.8% reported having a master’s degree, Ph.D., or similar. More than six in ten participants (63.4%) reported being married, cohabiting, or being in a registered partnership; 25.4%, 8.4%, and 2.8% reported being unmarried,
separated or divorced, and widowed, respectively. Of those, 28.8% reported being in a relationship currently.

**Measures**

*Attitudes toward sending nude pictures* were assessed under the heading “People are sexually stimulated by different things. Is this something you personally would be stimulated by, something you don’t think you would be stimulated by, but can accept that others (for instance, your partner) might be, or do you think it’s completely unacceptable?” (originally derived from Lewin et al., 2000). One new item was added to the eight previously listed attitude items: “Being sexually stimulated by sending nude pictures.” The response categories were: *Can think of doing this myself* (1), *Cannot think of doing this myself, but would accept my partner doing it* (2), *Cannot think of doing this myself, and would not accept it in my partner, but accept that others function that way* (3), and *Unacceptable* (4).

*Lifetime experience of sending nudes* was measured by the question, “Have you ever sent pictures or videos of yourself, where you are completely or partly naked, to others via the Internet/digital media channels (e.g. SMS, mail, apps, chatting services)?” The response categories were *Yes* (1) and *No* (2).

*Sending nudes context* was addressed by asking, “Which of the following best describes the situation where you most recently sent a picture/video clip of yourself to someone else?” The response categories were: *I sent the picture because the recipient asked for it and I wanted to* (consensual sending nudes) (1), *I sent the picture without the recipient having asked for it because I wanted to* (unsolicited sending nudes) (2), *I sent the picture because the recipient asked for it, even though I did not want to do it* (3), and *I felt pressured into sending the picture* (4). Responses on category 3 and 4 were combined into a new category: “Coerced sending nudes” (3).

*Relationship context* was assessed by the question: “The most recent time you sent a picture or video where you were completely or partly nude, who did you send it to?” The response categories were: *My committed partner* (1), *A friend or acquaintance that I’m attracted to* (2), *A friend or acquaintance that I’m not attracted to* (3), *A stranger or a person I am only in contact with through the Internet or digital media channels (e.g. SMS, mail, apps or chatting services)* (4), *Someone else* (5), and *I don’t know/remember* (6). All three questions on sending nudes were developed specially for this study.

*Genital appearance satisfaction* was measured by a single question adapted from studies on body image (Frederick et al., 2016; Sandhu & Frederick, 2015; Swami et al., 2020), “How dissatisfied or satisfied are you with the appearance of your genitals?” The respondents evaluated satisfaction on a 7-point scale ranging from *very dissatisfied* (1) to *very satisfied* (7), with higher scores indicating greater satisfaction.

*Sexual problems* were assessed by asking the participants if they had experienced any of the following in the past 12 months: (1) a lack of interest in having sex, and (2) a lack of enjoyment in sex over a period of 3 months or longer. The response categories were *yes* (1) or *no* (2). This measure was adapted from
the British NATSAL study (https://www.natsal.ac.uk/sites/default/files/2020-11/ final-questionnaire_technical-report-appendix-b.pdf), and has been used in several publications from this study (see Fischer & Træen, 2021; Mitchell et al., 2013).

**Frequency of pornography** use was assessed by the question, “How often have you seen pornography in the past 12 months?”. The response options ranged from never (1), once (2), a couple of times (3), several times a year (4), about once a month (5), about once a week (6), several times a week (7), and daily (8). Pornography was defined as follows: “Pornography is any type of material that depicts genitals, and clear and distinct sexual acts. Please note that nude presentations of men and women (such as those in Playboy or Playgirl, mainstream movies, etc.) that do not contain clearly depicted and explicit sexual acts are not considered pornography” (Hald, 2007). In this study, respondents who said they had never been exposed to pornography were included in response Category 1 (never).

**Gender** was coded as man (1) and woman (2).

**Age groups** were assessed by year of birth and recoded into five categories: 18–29 years (1), 30–39 years (2), 40–49 years (3), 50–59 years (4), and 60+ years (5).

**Sexual orientation** was described by completing the phrase ‘Do you currently regard yourself as’, with response categories homosexual/lesbian (1), heterosexual (2), bisexual/pansexual (3), asexual (4), and other (5). Response options 1, 3–5 were recoded as LGBT+ (1) while response option 2 was recoded as Heterosexual (2).

**Level of education** was assessed as the highest level of formal education. The response categories were Primary school (6–8 years at school) (1), Lower secondary school (9–10 years at school) (2), Higher secondary school, high school (12–13 years at school) (3), College, lower university level (Bachelor degree level or similar) (4), and Higher university level (Master degree, Ph.D. level or similar) (5).

**Religious affiliation**—This was measured by the question “Do you currently regard yourself as belonging to any particular religion?” The categories were No (1), Christian—no particular denomination (2), Roman Catholic (3), Protestant (4), and Other (Free Church/Non-conformist/Evangelical, Hindu, Jew, Islam/Muslim, Buddhist, Other) (5). The variable was dichotomized to no religious affiliation (0) and religious affiliated (1).

**Number of sex partners in life** was constructed from two questions (www.gesid.eu): “In your lifetime, how many men/women have you had vaginal, oral or anal intercourse with—even if it was only once?” A new variable was calculated as the sum of the number of female and male partners in life.

**Statistical Analysis**

All data analyses were performed using IBM SPSS Statistics for Windows version 26.0. We used a contingency table analysis to test for group differences, and the chi-square test and t-test were applied. We then used a binary logistic regression
to calculate the adjusted odds ratios (ORs) and to investigate how the reporting of sending nudes varied according to sociodemographic predictors.

Discriminant analysis is a well-suited tool to explore which factors that separate different categories of people. Therefore, discriminant analyses were performed, separately for the two genders, to explore the differences in attitudes toward sending nude pictures, use of pornography, presence of sexual problems and genital appearance satisfaction between three groups: consensual, unsolicited, and coerced sending nude images. The variables were analyzed using Wilks’ lambda (Klecka, 1980); A lambda value of 1 occurred when the mean of the discriminant scores was the same in all groups, and there was no between-group variability. Wilks’ lambda provides a test for the null hypothesis that the population means are equal. The larger the lambda value, the lower the discriminating power. Furthermore, the standardized canonical discriminant function coefficients show the relative association between the discriminating variables and the discriminant functions. To focus on group differences, the group centroids—the mean discriminant scores for each group on the respective functions—were also studied. Centroids summarize the group locations in space, as defined by the discriminant functions.

Results

Attitudes Toward Sending Nudes

Men were more positive than women about being sexually stimulated by sending nude pictures ($\chi^2 = 63.97; p < 0.001$). A total of 27.1% of men and 17.2% of women would consider doing this themselves; 16.3% of men and 14.6% of women would not consider doing this themselves but would accept it in their partner; 23.2% of men and 29.1% of women would not consider doing this themselves and would not accept it in their partner, but would accept other people sending nudes; and 33.4% of men and 39.2% of women thought it was unacceptable.

Lifetime Prevalence of Sending Nudes

Of the total sample (see Table 1), 29.3% reported ever having sent a nude, with no significant gender difference.

The bivariate contingency tables show that age group, religious affiliation, and sexual orientation were all significantly related to the lifetime experience of sending nudes. The multiple logistic regression analysis showed that compared to 18–29 year-olds, the likelihood of sending nudes decreased as age increased: 52% lower likelihood in the age group 30–39 years, 73% lower likelihood in the age group 40–49 years, 90% lower likelihood in the age group 50–59 years, and 98% lower likelihood in the age group 60+ years. Compared with heterosexual participants, LGBT+ participants had a 36% lower likelihood of sending nudes. Compared to participants with no religious affiliation, participants with religious affiliation had a 27% lower likelihood of sending nudes.
Compared to participants with lower levels of education, those with higher education levels had a 23% lower likelihood of sending nudes. Lastly, regarding the number of sexual partners, the likelihood of having sent a nude picture increased by a factor of 1.02 for each sexual partner the respondents had had in their lives.

**Recipient and Context of Most Recent Sent Nude Image**

Table 2 shows to whom the nude image was sent to most recently and the context of sending nudes by gender. More women (73.6%) than men (59.0%) claimed that they sent their most recent nude picture to their committed partner, and more men (13.0%) than women (6.1%) reported that they sent a nude picture to a stranger or a person they had contact with on the Internet ($\chi^2 = 56.93$, $p = 0.000$). Additionally, more women (36.2%) reported having sent an unsolicited nude image than men.
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(19.8%), and more men (77.1%) reported sending consensual nudes than women (57.3%) ($\chi^2 = 54.07, p = 0.000$).

Table 3 shows the recipient of the most recent nude image and the context of sending nudes by gender and age group. In men, the proportion who sent the picture to a committed partner ranged from 65.5% among 18–29 year-olds to 48.0% among 60+ year-olds. The same pattern emerged for women (75.0% among 18–29 year-olds and 55.6% among women 60+ years). One in four men over the age of 40 reported they sent a nude picture to a stranger they were in contact with on the Internet, compared to about 16% among men younger than 40 years. Most men and women reported consensual sending of nudes, with no significant variation across age groups.

What Separated those Having Sent Consensual, Unsolicited and Coerced Nude Images?

Among all the respondents, 27.9% reported having sent consensual nudes, 67.3% unsolicited sent nudes, and 4.8% coerced sent nudes. We wanted to explore that separates these three groups regarding attitudes toward sending nude pictures, sexual function problems (lacking enjoyment in sex/lacking interest in sex), satisfaction with genital appearance, and frequency of watching pornography. For this purpose, discriminant analysis is well-suited.

The distribution of variables later included in the discriminant analysis was as follows. Regarding genital appearance satisfaction, slightly more men ($M$ (mean) = 4.82, $SD$ (standard deviation) = 1.30) expressed relative satisfaction with their genital appearance than women ($M = 4.74$, $SD = 1.34$) ($F = 4.401$, $p = 0.036$). A total of 21.8% of men and 36.9% of women reported having experienced a lack of interest in having sex ($\chi^2 = 104.97; p < 0.001$), and 7.5% of men and 13.3% of

Table 2  Recipient and Context of the Most Recent Sent Nude Image, by Gender (Percent)

| Sent to most recently | All | Men | Women | $\chi^2$ | $p$ |
|-----------------------|-----|-----|-------|---------|-----|
| My committed partner  | 66.2| 59.0| 73.6  | 56.93   | 0.000|
| A friend/acquaintance I’m attracted to | 16.0| 15.3| 16.6  |
| A friend/acquaintance I’m not attracted to | 1.8| 1.8| 1.7  |
| A stranger or a person I only am in contact with through internet | 13.0| 19.8| 6.1  |
| Someone else | 1.8| 2.3| 1.2  |
| Don’t know/remember | 1.3| 1.7| 0.8  |

| Sending nudes context most recently | Consensual sending | Unsolicited sending | Coerced sending |
|-------------------------------------|-------------------|-------------------|---------------|
| All | 27.9 | 67.3 | 4.9 |
| Men | 19.8 | 77.1 | 3.2 |
| Women | 36.2 | 57.3 | 6.5 |

($n = 1191$) ($n = 600$) ($n = 591$) ($n = 1180$) ($n = 597$) ($n = 583$)
Table 3  Lifetime Experience of Sending a Nude Image, and Recipient and Context of the Most Recent Sent Nude Image, by Gender and Age Groups (Percent)

| Men | Lifetime experience of sending nudes | 18–29 | 30–39 | 40–49 | 50–59 | 60+ | $\chi^2$ | $p$ |
|-----|-------------------------------------|-------|-------|-------|-------|-----|--------|-----|
|     |                                     | $n = 366$ | $n = 420$ | $n = 335$ | $n = 408$ | $n = 622$ |       |     |
| Men | Lifetime experience of sending nudes | 55.7 | 42.9 | 36.4 | 18.4 | 4.0 | 392.08 | 0.000 |
|     | Sent to most recently               |       |       |       |       |     |        |     |
|     | Committed partner                   | 65.5  | 62.4  | 46.7  | 56.8  | 48.0 | 90.13  | 0.000 |
|     | A friend attracted to               | 11.8  | 16.9  | 23.3  | 13.5  | 0    |        |     |
|     | A friend not attracted to           | 3.0   | 2.8   | 0     | 0     | 0    |        |     |
|     | A stranger on the Internet          | 16.3  | 15.7  | 27.5  | 24.3  | 28.0 |        |     |
|     | Someone else                        | 0.5   | 1.7   | 0.8   | 4.1   | 24.0 |        |     |
|     | Don’t know/remember                 | 3.0   | 0.6   | 1.7   | 1.4   | 0    |        |     |
|     | (n = 203)                           |       |       |       |       |     |        |     |
|     | Sending nudes context most recently|       |       |       |       |     |        |     |
|     | Consensual sending                  | 20.0  | 19.6  | 11.1  | 24.0  | 14.17| 0.290  |     |
|     | Unsolicited sending                 | 75.0  | 79.3  | 87.5  | 68.0  |      |        |     |
|     | Coerced sending                     | 5.0   | 1.1   | 1.4   | 8.0   |      |        |     |
|     | (n = 200)                           |       |       |       |       |     |        |     |
| Women| Lifetime experience of sending nudes| 55.7 | 45.2 | 29.1 | 14.8 | 2.4 | 396.66 | 0.000 |
|      | Sent to most recently               |       |       |       |       |     |        |     |
|      | Committed partner                   | 75.0  | 75.3  | 70.9  | 66.7  | 55.6 | 37.32  | 0.011 |
|      | A friend attracted to               | 15.9  | 13.7  | 19.0  | 28.9  | 11.1 |        |     |
|      | A friend not attracted to           | 2.9   | 0.5   | 1.3   | 0     | 0    |        |     |
|      | A stranger on the Internet          | 4.3   | 6.6   | 8.9   | 4.4   | 33.3 |        |     |
|      | Someone else                        | 0.4   | 3.3   | 0     | 0     | 0    |        |     |
|      | Don’t know/remember                 | 1.4   | 0.5   | 0     | 0     | 0    |        |     |
|      | (n = 276)                           |       |       |       |       |     |        |     |

| Women| Lifetime experience of sending nudes| 18–29 | 30–39 | 40–49 | 50–59 | 60+ | $\chi^2$ | $p$ |
|-----|-------------------------------------|-------|-------|-------|-------|-----|--------|-----|
|     |                                     | $n = 497$ | $n = 403$ | $n = 282$ | $n = 311$ | $n = 459$ |       |     |
|     | Lifetime experience of sending nudes | 55.7 | 45.2 | 29.1 | 14.8 | 2.4 | 396.66 | 0.000 |
|     | Sent to most recently               |       |       |       |       |     |        |     |
|     | Committed partner                   | 75.0  | 75.3  | 70.9  | 66.7  | 55.6 | 37.32  | 0.011 |
|     | A friend attracted to               | 15.9  | 13.7  | 19.0  | 28.9  | 11.1 |        |     |
|     | A friend not attracted to           | 2.9   | 0.5   | 1.3   | 0     | 0    |        |     |
|     | A stranger on the Internet          | 4.3   | 6.6   | 8.9   | 4.4   | 33.3 |        |     |
|     | Someone else                        | 0.4   | 3.3   | 0     | 0     | 0    |        |     |
|     | Don’t know/remember                 | 1.4   | 0.5   | 0     | 0     | 0    |        |     |
|     | (n = 276)                           |       |       |       |       |     |        |     |
Table 3 (continued)

| Women       | Lifetime experience of sending nudes |           |           |           |           |            |           |
|-------------|--------------------------------------|-----------|-----------|-----------|-----------|------------|-----------|
|             |                                      | 55.7 ($n = 497$) | 45.2 ($n = 403$) | 29.1 ($n = 282$) | 14.8 ($n = 311$) | 2.4 ($n = 459$) | 396.66    | 0.000     |
| Sending nudes context most recently |                                      |           |           |           |           |            |           |
| Consensual sending                  |                                      | 35.8      | 38.9      | 40.0      | 25.6      | 11.1       | 15.89     | 0.196     |
| Unsolicited sending                 |                                      | 57.6      | 57.2      | 51.2      | 62.8      | 77.8       |           |           |
| Coerced sending                     |                                      | 6.7       | 3.9       | 8.8       | 11.6      | 11.1       |           |           |
|                                         |                                      | ($n = 271$) | ($n = 180$) | ($n = 80$) | ($n = 43$) | ($n = 9$)  |           |           |
women had lacked enjoyment in sex ($\chi^2 = 34.50; p < 0.001$) over a period of three months or longer in the past year. Men had used pornography more frequently than women during the last 12 months: 17.6% of men and 58.8% of women reported no pornography use, 1.9% of men and 4.7% of women reported watching pornography “once,” 12.3% of men and 15.6% of women reported watching pornography a couple of times, 8.9% of men and 6.2% of women responded “several times a year,” 9.7% of men and 8.1% of women watched pornography about once a month; 18.5% of men and 5.0% of women watched pornography about once a week, 25.8% of men and 1.6% of women watched pornography several times a week, and 5.2% of men and 0.1% of women reported daily use ($\chi^2 = 1148.754; p < 0.001$).

Among men, the analysis resulted in two discriminant functions, although only one was statistically significant (Wilk’s lambda, Table 4). The first discriminant function was dominated by negative attitudes about being sexually stimulated by sending nude pictures and lacking enjoyment in sex, which was labeled as sexually restrained. The second discriminant function was dominated by having sexual interest, being satisfied with one’s genital appearance, and having a higher frequency of pornography use, which was labeled as sexually interested.

Among women, the discriminant analysis resulted in two statistically significant discriminant functions (Table 5). The first discriminant function was dominated by negative attitudes toward being stimulated by sending nude pictures, dissatisfaction with genital appearance, and lack of sexual enjoyment, which was labeled as “sexually restrained”. The second discriminant function was dominated by a

| Table 4 | Attitudes, Sexual Problems, Genital Appearance Satisfaction, and Pornography Frequency According to Three Distinct Groups of Men with Experiences of Sending Consensual, Unsolicited and Coerced Nudes (Discriminant Analysis) ($n = 540$) |
|-------------------|-----------|-----------|
| Discriminating factors $^a$ | 1 | 2 |
| Attitudes towards being sexually stimulated by sending nudes | 0.592* | −0.238 |
| Lacking enjoyment in sex the last 12 months | 0.589* | 0.006 |
| Lacking sexual interest the last 12 months | −0.009 | −0.705* |
| Satisfaction with genital appearance | 0.304 | 0.565* |
| Frequency of watching pornography in the last 12 months | −0.444 | 0.476* |
| Canonical corr coeff | 0.178 | 0.130 |
| Wilk’s lambda | 0.952 | 0.130 |
| $p = 0.003$ | $p = 0.059$ |
| Group centroids | | |
| Consensual sending nudes | −0.143 | −0.238 |
| Unsolicited sending nudes | 0.004 | 0.071 |
| Coerced sending nudes | 1.086 | −0.271 |

$a$ Pooled within group correlations between discriminating variables and standardized canonical discriminant functions; $^*$ Largest absolute correlation between each variable and any discriminant function.
higher frequency of pornography use and sexual interest, which was called sexually interested.

To illustrate the differences between the three groups, the group centroids for both men and women are plotted on a graph defined by two discriminant functions in Fig. 1. Respondents who had sent consensual nudes grouped in the direction of the negative pole on the “Sexually restrained” dimension and negative but close to zero on the “Sexually interested” dimension. This indicates that consensual sending of nudes was characterized by not being sexually restrained, particularly among women, and neutrally sexually interested for both genders. Respondents who had sent unsolicited nude pictures were grouped in the direction of the positive pole but close to zero both on the “sexually restrained” dimension and on the “sexual interest” dimension. This indicates that unsolicited sending of nudes was characterized by neither being particularly sexually restrained nor sexually interested for both genders. Conversely, respondents who had reported being coerced into sending nudes were grouped in the direction of the positive pole on the “sexually restrained” dimension and negatively on the “sexually interested” dimension. This indicates that coerced sending of nudes was characterized by being sexually restrained and less sexually interested for both genders, although this was more prominent among men than women.

Table 5  Attitudes, Sexual Problems, Genital Appearance Satisfaction, and Pornography Frequency According to Three Distinct Groups of Women with Experiences of Sending Consensual, Unsolicited and Coerced Nudes (Discriminant Analysis) (n = 503)

| Discriminating factors ... | 1         | 2         |
|---------------------------|-----------|-----------|
| Attitudes towards being sexually stimulated by sending nudes | 0.886* | 0.043 |
| Satisfaction with genital appearance | −0.429* | −0.396 |
| Lacking enjoyment in sex the last 12 months | −0.212* | 0.133 |
| Frequency of watching pornography in the last 12 months | −0.438 | 0.632* |
| Lacking sexual interest the last 12 months | 0.058 | 0.469* |
| Canonical corr coeff | 0.259 | 0.139 |
| Wilk’s lambda | 0.915 | 0.139 |
| p < .001 | p = 0.044 |

| Group centroids |
|-----------------|-----------|-----------|
| Consensual sending nudes | −0.248 | −0.134 |
| Unsolicited sending nudes | 0.061 | 0.117 |
| Coerced sending nudes | 0.862 | −0.293 |

*a Pooled within group correlations between discriminating variables and standardized canonical discriminant functions; * Largest absolute correlation between each variable and any discriminant function.
Discussion

The majority of Norwegians expressed a relatively accepting attitude toward being sexually stimulated by sending nudes. Men expressed significantly more positive attitudes toward sending nude pictures than women, but one in three men and two in five women thought it was unacceptable. Thirty percent of the participants reported ever having sent nudes, and sending nudes was more common in younger than in older individuals. Compared to Döring and Mohseni’s (2018) findings from Germany in 2015, where 25% of the adult population reported having sent self-created sexual photo messages, this indicates that Norwegians’ behavior of sending nudes is fairly consistent with the prevalence among adults in Germany. Furthermore, that younger adults were more likely than older adults to have sent nude pictures is also consistent with previous research (Currin et al., 2022; Garcia et al., 2016; McDaniel & Drouin, 2015). In addition, this study provides new data on age- and gender differences in sexting context which has been a gap in the research literature.

More women than men claimed that they sent their most recent nude picture to their committed partner, and twice as many men as women had sent a nude picture to a stranger or a person they only had contact with on the Internet. In addition, more than twice as many women than men reported unsolicited sending nudes, and more men than women reported consensual sending nudes. The majority of both male and female participants who conducted unsolicited sending nudes sent it to a committed
partner, a friend they were attracted to, or someone they were in contact with on the Internet, perhaps someone with whom they intended on becoming committed.

There may be different mechanisms underlying men and women’s motivations for sending a nude picture. First, the sexual script prescribes that men should be active and take initiative, whereas women are expected to be passive and accept or reject a man’s initiative (Gagnon & Simon, 2005). Based on this context, it can reasonably be expected that more men than women send nude pictures to someone they are interested in, and more women than men send such pictures to a committed partner. When a nude picture is sent to a woman by a committed partner or someone she is attracted to, it is likely that she perceives his desire as directed toward her, and it is therefore welcomed (see Kutchinsky, 1988). Conversely, if someone that she is not attracted to (or does not know) sends it to her, it is unlikely to arouse her or be welcomed.

Consensual sending nudes was be characterized by men and women within committed relationships. Sending pictures is often an expression of flirting, and arousal before having sex later. Previous research has shown that among men, a common motive for sending images of their genitals is the hope of receiving images in return, and the most commonly desired reaction from recipients of the picture is sexual excitement (Oswald et al., 2020). This means that the exchange of nude pictures is similar to giving each other a gift. Mauss (1969) described the exchange of material and non-material gifts as a fundamental process that connects members of society. As mutuality is the central norm in exchanging gifts, sending someone a nude picture can be seen as giving the person a gift. However, gifts may create inequality, requiring a reply of the same order, which may be implicitly intended to re-establish balance. When a person sends a nude picture to his/her partner, the partner replies to his gift by giving her/him attention, confirmation of the partner’s erotic value, or a nude picture in return, and in this way, the exchange comes full circle. Within this line of reasoning, consensual sending nudes may be regarded as a wanted gift; however, in the case of unsolicited sending nudes, it may be an unwanted gift. We found that those who reported unsolicited sending nudes were grouped close to those who reported consensual sending nudes (see Fig. 1). When these two kinds of people are grouped so close to each other, this is most likely because established couples take turns sending nude pictures, and the partners have a previous agreement that this is accepted and desirable within the couple.

Unsolicited sending nudes was characterized by sexually interested individuals who were not particularly sexually restrained. However, their partner may be sexually interested and they may send a picture in the hope of sexually arousing their partner. There were negligible gender differences, precisely because there is a mutual exchange of gifts. Women who send unsolicited nude pictures may be rated as more appropriate than men who send such messages, and women and men who send consensual messages are perceived as being equally appropriate (Matthews et al., 2018). This means that when a man sends an unsolicited sext to a woman, it is more likely to be assessed as sexual harassment, which makes the female recipient feel uncomfortable or threatened. In contrast, when women send sexual images of themselves to men, cultural ideals prescribe that the man should react positively to
her sexual advances, regardless of whether such advances are consensual or unsolicited (Karasavva et al., 2022; Matthews et al., 2018).

Finally, coerced sending nudes was characterized by people who were not particularly sexually interested or sexually restrained. We found that this group of individuals grouped toward sexually restrained in one dimension and was close to being neutral in the sexually interested dimension. However, within this group, only a handful of participants reported they had felt pressured into sending a nude picture. This means that most people in this category sent the picture with consent, although this was unwanted. Drouin and Tobin (2014) examined the extent to which 93 women and 62 men consented to unwanted sending nudes within committed relationships and the attachment characteristics and motivations associated with the behavior. They found that when sending the picture to the committed partner, the common motives were flirtation, foreplay, fulfilling a partner’s needs, or intimacy. Among women, anxious attachment was significantly associated with the frequency of consenting to unwanted sending nudes. Consenting to avoid an argument was a mediator in the relationship between anxious attachment and consenting to unwanted sending nudes.

Limitations

The strength of this study is a large number of participants. However, this study has some limitations. In recent years, collecting data from web samples has become increasingly common. Due to high dropout and low response rates, selecting samples that mirror the real population is a challenge. An alternative to the traditional method of selecting samples through population registers is using random samples drawn from web panels (Danielsson, 2002), as in this study. Whether or not there was a response bias between this web sample and a random sample drawn from the population register in the same age range cannot be verified. It could be that participants in sex surveys are more interested in sex, have more favorable attitudes towards sex and pornography, and more sexual experience than general public and are more politically liberal (Morokoff, 1986; Strassberg & Lowe, 1995; Wolchik et al., 1985). Whether or not participants from the web sample were different from the general population with regard to sending nudes cannot be determined in this study. It has been claimed that the Internet population may be more sensation-seeking, willing to take risks, and less traditional than the general population (Træen & Stigum, 2010). However, as only 2% of the general population has no access to the Internet, it is likely that this difference leveled out.

Our sample is supposedly a national probability sample, but the low response rate may suggest a selection bias and affect the generalizability of the results. Two decades ago, Hellevik (1999) claimed that a drop in the response rate seems to be a trend in surveys of all topics. In the current study, we did not record why people did not want to participate, and the extent to which a systematic bias was introduced by the low participation rate is unclear. Other Nordic sex surveys have concluded that non-response is fairly random with respect to sexual behavior (Haavio-Mannila & Kontula, 2003; Kontula & Haavio-Mannila, 1995; Lewin et al., 2000; Stigum,
It should also be noted that a low response rate does not necessarily imply a selection bias (Søgaard et al., 2004). Despite the limitations mentioned, we do not believe that our probability sample was severely biased.

The measures of sending nudes were developed specifically for this survey and were, therefore, not previously validated. It is possible that the “unsolicited sending nudes” category did not tap into what it was intended to measure, as most of the participants sent pictures to a committed partner and not to someone they were not in a relationship with. This potential gap should be addressed in future studies. Furthermore, lifetime experience with sending nudes was recorded only as a dichotomous variable. This represents a limitation, as it would have been better to measure the frequency of sending nudes. Another limitation is the use of one single question to measure genital appearance satisfaction. Several of the measurements in this project were based on single questions as an effort to maximize response rates and reduce participant burden. According to Gardner et al. (1998), this is generally accepted and widely used in the field of sex research, as single-item questions are believed to capture many constructs to a satisfactory degree. It could also be argued that the response options to some of the questions are not mutually exclusive. When the participant answered the question about the context when sending the most recent nude picture, it could have been difficult to choose between I sent the picture because the recipient asked for it, even though I did not want to, and I felt pressured into sending the picture. This is also why we chose to recode them into one category in the analyses.

This study was conducted in March 2020 during the early stages of the COVID-19 pandemic. The lockdown limited the options for physical intimacy, and the prevalence of sending nudes may, therefore, have increased the need for sending nudes in some groups. According to Thomas et al. (2022), younger men and women may have used sending nudes to cope with the unprecedented COVID-19-related situation.

Conclusions

In conclusion, the findings of this study suggest that the majority of Norwegian adults have relatively accepting attitudes toward sending nudes, and a substantial proportion of adults have tried sending nudes (particularly the younger generation). Most sending nudes is consensual, takes place between committed partners, and is likely to serve the function of flirting, arousal, or foreplay. Unsolicited sending nudes is also common within committed relationships. The individuals involved in unsolicited sending nudes were characterized as sex-positive but neither sexually playful nor sexually restrained. Individuals who have experienced coerced sending nudes could be characterized as being neither sexually playful nor sexually restrained. It should be noted that only a handful of individuals felt pressured to send a nude picture, which means that most people in this category sent the picture with consent, although this was unwanted.

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Declarations

Conflict of interest  The authors do not have any conflicts of interest to report.

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