

Prevalence of sexting in children and adolescents in Slovakia in the pandemic and post-pandemic period (in the context of demographic characteristics)

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Abstract. The aim of the study is to identify the prevalence of sexting among children and adolescents in Slovakia in 2021 and 2022. The study sample consisted of 1423 children and adolescents in 2021, and 1194 children and adolescents in 2022. Sexting was measured with questions focusing on sending and receiving sexts, the scales were taken from the EU Kids online study. The primary results of the analysis include the finding that there was a decrease in sexting in the post-pandemic year (2022) compared to the pandemic year (2021) at both the level of receiving and sending sexts. Compared to foreign countries, Slovak children and adolescents do not differ significantly in receiving sexts, but they do differ in sending sexts, which they do less. We also observed some differences with respect to gender, age, and family type.

1 Introduction

The paper deals with the prevalence of sexting in children and adolescents in Slovakia in the years 2021 and 2022. To simplify, we have called the individual periods the pandemic (year 2021) and post-pandemic (year 2022) periods.

For today's adolescents, cyberspace is an important source of information on a variety of topics, including sexuality and sexual interactions. Sexting is an activity in which an individual uses digital technology to send, receive, share messages with sexual content - photos, videos and/or texts. Motivations for sexting vary. It is perceived by young people as part of intimate relationships, it is also carried out of boredom, and a desire for fun. It can also arise in the result of social pressure (e.g. from a partner or peer group), and carried out as a form of self-presentation. Sometimes it can be an attempt to hurt someone, to get revenge.

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2 Prevalence of sexting

Currently, sexting is understood as a relatively widespread form of sexual expression among adolescents [1], predominantly performed for the purpose of exploring sexual identity and building a romantic, intimate relationship - so-called consensual sexting [2]. In some cases, however, it can take the form of coercion and constitute a form of sexual harassment and aggression - so-called non-consensual sexting [1, 2]. Many studies have investigated the prevalence of sexting, and here we present the results of two meta-studies published by Mori et al. [3, 4] in particular. They conducted the first one for the years 2009 to 2015, analysing 39 studies (110 280 adolescents). They found that the prevalence of sending messages with sexual content was at 14.8%, receiving at 27.4% and sharing without permission at 12% (the same values were also reached by the meta-analysis by Madigan et al. [5] consisting of 39 studies (110 380 children and adolescents).

Mori et al. [3] also found that there was a significant increase in the prevalence of sexting between 2009 and 2015, which they explain by the increase in smartphone ownership by adolescents. Subsequently, the cited authors conducted a second meta-analysis that examined the prevalence of sexting from 2016 to the early 2020s. In this one, they analysed 28 studies (48,024 adolescents). They found that the prevalence of sending messages with sexual content was at 19.3%, receiving at 34.8%, and sharing without permission at 14.5%. The authors conclude that the prevalence of sexting has not increased significantly from pre-2016 estimates, suggesting some stabilization in youth “sexting” behaviour. This can be explained by both the saturation of smartphone ownership and increased awareness of the potential risks of sexting. More recent studies show higher figures, e.g., 26% of Spanish adolescents have experienced sending, 58% receiving and 18% forwarding sexting [6].

In research studies, we can find mixed results regarding intersex differences in sexting. Some studies, e.g., [7-8] found that boys both received and sent more sexts than girls. Other studies have found that girls are more likely to both receive and send sexts in the context of an intimate relationship (i.e., consensual sexting) [9]. However, other research has not identified gender differences in receiving or sending sexts [5]. More findings have been identified in the relationship between sexting and age, with research suggesting that the prevalence of adolescent sexting increases with age [5, 6, 10]. Several factors can explain it, such as the opportunities offered by information and communication technologies, age-specific sexual needs, the desire to initiate first sexual relationships [6], and lower parental control of older adolescents [10]. Sexting peaks around the age of 17 according to research [11, 12], Beckmeyer et al. [10] speaks of a peak between the ages of 14 and 17.

The parent-child relationship is an important variable influencing sexting. Several studies have found that if adolescents grow up with only one parent, they are more likely to engage in sexting [13-16, 6]. Baumgartner et al. [17] found that adolescents from less cohesive families engage in riskier online activities, including sexting. Molla-Esparza et al. [6] report that children who live in single-parent environments have less support when it comes to discussing issues related to intimate and sexual relationships.

Most of the abovementioned analyses examined sexting in the period before the spread of Covid-19. The pandemic significantly affected the lives of individuals: people stopped meeting in person, there was social distancing, many people remained isolated from their romantic partner, so it can be assumed that there was an increase in sexting during this period. Social isolation from friends and romantic partners is challenging and especially so during adolescence, which is associated with a greater need for social contact and peer acceptance. Research on this issue was conducted by Maes, Vandenbosch [18] who found that 41% of Belgian adolescents engaged in at least one of four types of sexting during the

pandemic (type one was: did you text about sex?, type four was: did you send a picture/video or have a videochat in which you did something sexual?)

The above studies show that sexting is a relatively widespread phenomenon among adolescents in European countries, North American countries, Australia and New Zealand (Mori et al., 2018, 2022). The prevalence of sexting in Slovakia in 2018 was surveyed by the EU Kids online study (Izrael et al., 2020), which showed a significantly lower prevalence of both sending and receiving sexting compared to other countries. In our study, we use a representative research sample to test whether Slovak adolescents are sexting less, as found in the EU Kids online study, or whether this type of behaviour is closer to the values of other countries. The object of the research is sexting behaviour of children and adolescents in Slovakia.

In addition, we collected data during the Covid-19 pandemic (distance learning) and after the end of the pandemic (face-to-face teaching), and we were interested in whether there were any changes in prevalence and, if so, which ones. The primary aim of the research is to identify the prevalence of sexting in the pandemic and post-pandemic period in children and adolescents in Slovakia and to identify any changes. The analysis of research studies has also shown that there is no consensus on gender differences in sexting, so we are interested in whether Slovak girls and boys differ in this activity. The prevalence of sexting increases with age, and our study verifies this assumption. The family environment also influences the realization of this activity by adolescents, in our study we focus only on the comparison of sexting by relationship on whether the adolescent lives with both own parents or only with one.

Considering the main objective, we formulate 6 research questions:

RQ1: Is there a change in receiving of sexual messages in the pandemic (2021) and post-pandemic (2022) periods?

RQ2: Has there been a change in sending sexual messaging in the pandemic (2021) and post-pandemic (2022) periods?

RQ3: Is there a difference in sexting between the genders in the years studied?

RQ4: Is there a difference in sexting between children living with both their own parents and living with one of their own parents?

RQ5: Is there a relationship between age and sexting?

RQ6: Has there been a change in “asking for intimate information” in the pandemic (2021) and post-pandemic (2022) periods?

RQ7: Has there been a change in “asking for intimate information” in the pandemic (2021) and post-pandemic (2022) periods with respect to gender and family type?

3 Methods

3.1 Procedure and data collection

In this paper, we present findings based on representative data that were collected in two waves in Slovakia - 2021, 2022. Data collection was conducted in June 2021 and June 2022 through stratified sampling of school classes. The dataset was representative in terms of gender, age, and size of the region. Data collection was conducted by coordinators working at the Ministry of Labour, Social Affairs and Family through an online questionnaire during school classes. The questionnaire took approximately 45 minutes to complete.

3.2 Research sample

The research sample consisted of 1423 children and adolescents for the year 2021 and 1194 for the year 2022. In terms of gender, 48% were girls and 52% were boys in both years. The average age was 13.4 years in both years (2021: SD 2.74, 2022: SD 2.50); children and adolescents were aged between 9 and 18 years. We only asked questions about sexting to respondents aged 11+.

In 2021 and 2022, 74% of children and adolescents lived with both parents (1,947 for both years combined), and 21% of children and adolescents lived with one parent of their own (546 for both years combined). Others were 5% (124 respondents in total for both years), of these 23 adolescents lived with grandparents or other relatives, 22 answered “don’t know”, 21 with other people, 20 with siblings, 9 with stepfather, 8 lived alone and 2 with stepmother, 19 respondents did not answer. In the following analyses, we compare only the group of adolescents living with both parents (complete family) and adolescents living with only one parent of their own (incomplete family).

3.3 Research methods

The research method was adopted from the EU Kids Online project [18], in this paper we present the results regarding sexting, which we surveyed with the following questions:

- Have you received any sexual messages in the last year? This could be words, pictures, or videos.
- Last year, how often did you receive messages with sexual content over the internet?
- Have you sent or posted any sexual messages in the last year? It could be words/pictures/videos about you or someone else.
- In the last year, how often have you sent sexual messages on the internet?
- How often, if at all, in the last year has someone on the internet asked you for intimate information about yourself (text, photos or videos, e.g. what your body looks like without clothes on or what sexual experiences you have had), even if you did not want to answer such questions?

4 Results

Research questions

RQ1: Is there a change in receiving of sexual messages in the pandemic (2021) and post-pandemic (2022) periods?

As shown in Table 1, the prevalence of receiving sexual messages was 33.3% in 2021 and decreased to 28.3% in 2022. The differences are statistically significant ($X^2(1) = 5.714, p = 0.017$).

Table 1. Have you received any sexual messages in the last year? It could be words, pictures, or videos.

	No		Yes	
	N	%	N	%
2021	673	66.7%	336	33.3%
2022	667	71.7%	263	28.3%

The respondents who had received some sexual messages were then asked how often. Table 2 shows the results, with frequency not statistically significantly different across the years studied ($U = 40040.000, Z = -0.770, p = 0.441$).

Table 2. Last year, how often did you receive messages with sexual content over the internet?

	Several times		At least once a month		At least once a week		Daily or almost daily	
	N	%	N	%	N	%	N	%
2021	155	47.8%	86	26.5%	39	12.0%	44	13.6%
2022	130	50.8%	61	23.8	42	16.4%	23	9.0%

RQ2: Has there been a change in sending sexual messaging in the pandemic (2021) and post-pandemic (2022) periods?

As shown in Table 3, the prevalence of sexual messaging was 7.9% in 2021 and declined to 5.4% in 2022. The differences are statistically significant ($X^2(1) = 5.079, p = 0.024$).

Table 3. Have you sent or posted any sexual messages in the last year? It could be words/pictures/videos about you or someone else.

	No		Yes	
	N	%	N	%
2021	965	92.1%	83	7.9%
2022	926	94.6%	53	5.4%

The respondents who had sent some sexual messages were then asked how often. Table 4 shows the results, and the frequency did not differ statistically significantly across the years studied ($U = 1876.500, Z = -0.420, p = 0.674$).

Table 4. I have sent someone a sexual message (e.g., words, pictures, or video).

	Several time		At least once a month		At least once a week		Daily or almost daily	
	N	%	N	%	N	%	N	%
2021	30	41.1%	12	16.4%	20	27.4%	11	15.1%
2022	17	37.0%	11	23.9%	10	21.7%	8	17.4%

RQ3: Is there a difference in sexting between the genders in the years studied?

In Graph 1 we can see the prevalence of sexting in each year with respect to gender. Boys are visualized with the full line, girls with the dotted line.

In 2021, 35% of boys and 31% of girls had the experience of **receiving sexting** (the differences are not significant. $X^2(1) = 1.969, p = 0.161$). In 2022, 28% of boys and 29% of girls had experience of receiving sexts (differences are not significant $X^2(1) = 0.157, p = 0.692$). Thus, boys and girls did not differ in receiving a sext in either year.

Overall, the prevalence of receiving sexting declined in the years studied, as the analysis above showed, falling for both boys from 35% to 28% and for girls from 31% to 29%. This decline was more visible for boys than for girls, and was also statistically significant for boys ($X^2(1) = 6.720, p = 0.010$), but not for girls ($X^2(1) = 0.585, p = 0.444$).

In 2021, 10.2% of boys and 5.6% of girls had experience with sexting (differences are significant 2021: $X^2(2) = 7.372, p = 0.007$). In 2022, 5.8% of boys and 5% of girls sent sexts (differences are insignificant $X^2(2) = 0.290, p = 0.590$). Boys and girls differed in sending sexts only in 2021, when more boys sent them. The experience in 2022 was almost the same in terms of sex.

Overall, the prevalence of sexting declined year-on-year, more significantly for boys from 10.2% to 5.8%, and more slightly for girls from 5.6% to 5%. This decrease was

statistically significant only for boys ($X^2(1) = 6.823, p = 0.009$), but not for girls ($X^2(1) = 0.185, p = 0.667$).

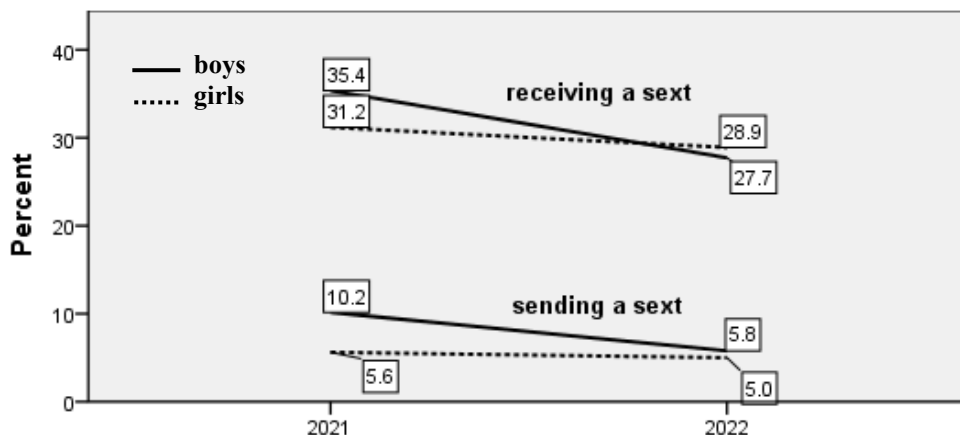


Figure 1. Sexting prevalence by gender.

RQ4: Is there a difference in sexting between children living with both their own parents and living with one of their own parents?

In Graph 2, we can see the prevalence of sexting in each year with respect to family type. Children living with both parents (complete family) are visualised by the full line, children living with one parent (incomplete family) by the dotted line.

In 2021, 31.9% of children from complete families and 37.7% of children from incomplete families **received** sext (the differences are not significant. $X^2(1) = 2.612, p = 0.106$). In 2022, almost identically 27.8% of children from complete families and 27.5% of children from incomplete families received sext ($X^2(1) = 0.009, p = 0.926$). Children from complete and incomplete families were not significantly different in receiving sext in either year.

The experience of receiving sexts fell in complete families from 31.9% to 27.8% and in incomplete families, it fell by 10%, from 37.7% to 27.5%. The decline is significantly more visible for children from incomplete families (incomplete families: $X^2(1) = 4.705, p = 0.030$; complete families: $X^2(1) = 2.821, p = 0.093$).

In 2021, 7.7% of children from a complete family and 8.7% of children from an incomplete family **sent** sext (the differences are insignificant. $X^2(1) = .258, p = 0.612$). In 2022, 4.4% of children from a complete family and 7.5% of children from an incomplete family sent a sext (differences are insignificant. $X^2(1) = 3.085, p = 0.079$). The experience of sending sexts was higher for children in incomplete families in 2022, but the difference was not significant.

The experience of sending sexts significantly dropped year-on-year in complete families from 7.7% to 4.4% and dropped very slightly in incomplete families 8.7% vs. 7.5%. The decline for children from complete families is statistically significant ($X^2(1) = 7.178, p = 0.007$), while there was no decline for children from incomplete families ($X^2(1) = 0.231, p = 0.631$).

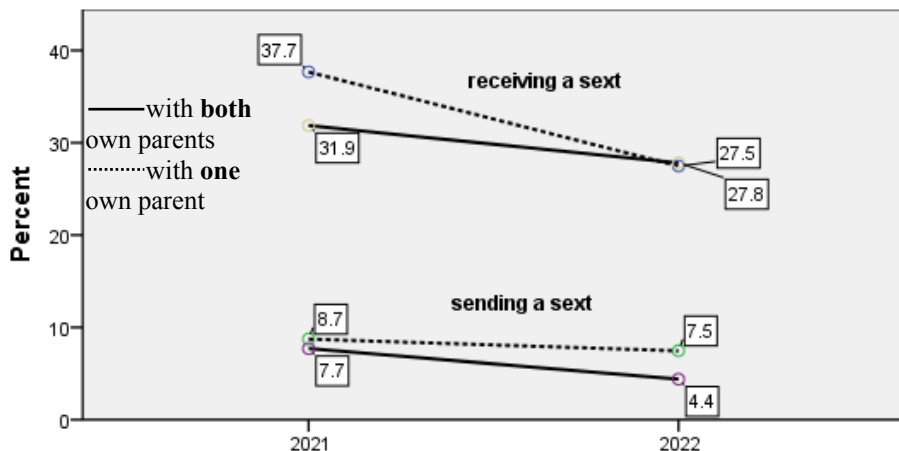


Figure 2. Prevalence of sexting in each year with respect to family type.

RQ5: Is there a relationship between age and sexting?

In Graph 3 we can see the prevalence of sexting with respect to age. The full line visualizes the year 2021 and the dotted line the year 2022.

We test the relationship between **receiving** sexting messages and adolescent’s age with the correlation coefficient Eta. For the year 2021, the correlation was at 0.397***, for the year 2022, it was at 0.302***. In both years, these were moderate relationships, slightly stronger in 2021.

We test the relationship between **sending** sexual messages and adolescent’s age with the Eta correlation coefficient. It was 0.284*** for 2021 and 0.216*** for 2022. In both years, these were rather weak relationships (it was slightly stronger in 2021).

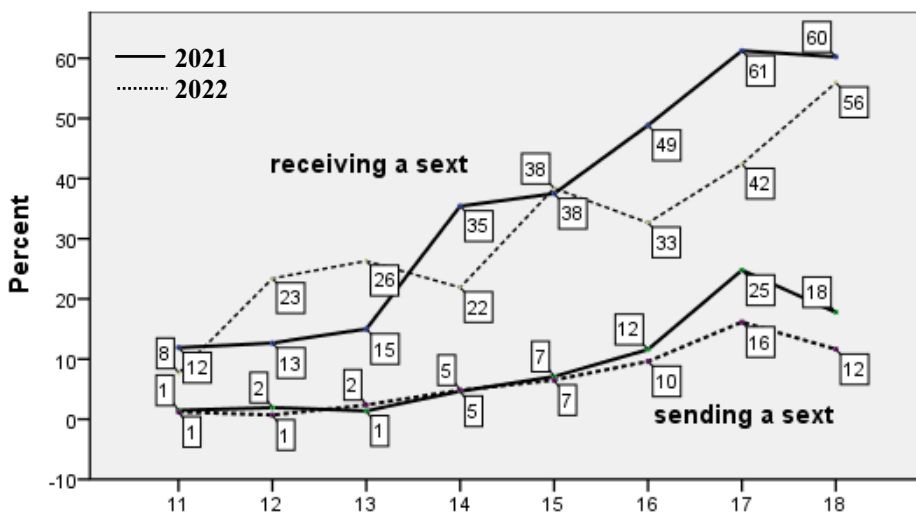


Figure 3. Evolution of the prevalence of sexting with respect to age.

RQ6: Has there been a change in “asking for intimate information” in the pandemic (2021) and post-pandemic (2022) periods?

The experience of asking for intimate information on the internet was measured by asking “In the past year, has anyone on the internet asked you for intimate information about yourself (text, photos, or videos, e.g., what your body looks like without clothes on or what sexual experiences you have had), even if you did not want to answer such questions?” (20% of children in 2021 and 17% of children in 2022 answered yes to this question). The differences in the given experience with respect to the years studied are not statistically significant ($\chi^2(1) = 2.529, p = 0.112$).

Table 5. Asking for intimate information.

	No		Yes	
	N	%	N	%
2021	819	80,0%	205	20,0%
2022	797	82,8%	166	17,2%

RQ7: Has there been a change in “asking for intimate information” in the pandemic (2021) and post-pandemic (2022) periods with respect to gender and family type?

The data in Graph 4 shows that:

- More girls than boys have this experience (2021: $\chi^2(1)=45,420, p=0,000$; 2022: $\chi^2(1)=49,068, p=0,000$);

- The experience of asking for intimate information is found among girls and especially those who live with only one own parent (around 33-34%) compared to those who live with both own parents (around 24-27%). (Difference is insignificant 2022: $\chi^2(1)=2,535, p=0,111$; 2021: $\chi^2(1)=3,135, p=0,074$);

- Boys have significantly less such experience compared to girls, with more boys from incomplete families (13-14%) having such experience compared to boys from complete families (8 - 11%) (Difference is insignificant. 2022 $\chi^2(1)=3,125, p=0,077$; 2021: $\chi^2(1)=0,764, p=0,382$).

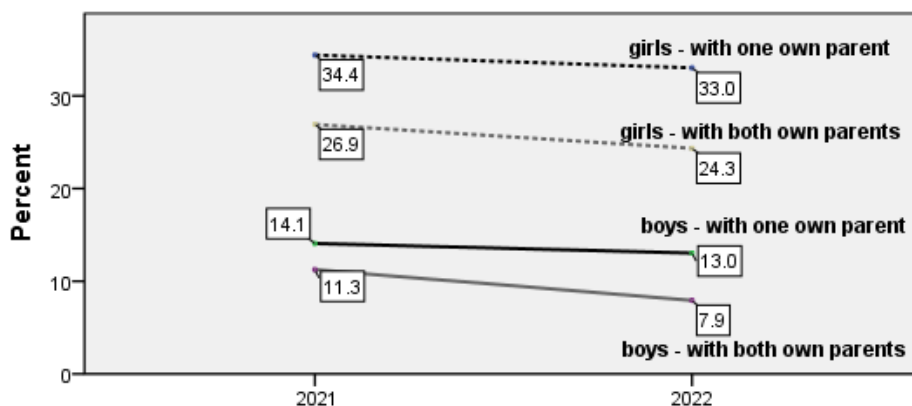


Figure 4. Asking for intimate information with regard to gender.

5 Discussion

The aim of the analysis was to determine the prevalence of sexting in Slovak children and adolescents in a representative study population and to determine whether there was a change in the pandemic [20] and post-pandemic [21] period.

The prevalence of receiving sexting messages was 33% in 2021 and then decreased to 28% in 2022. This decrease was statistically significant. Of those who received sexting, 12 to 16% had such an experience at least once a week and 9 to 14% daily or almost daily.

We did not identify inter-gender differences in receiving sexts in either of the years studied. The experience of receiving sexts declined in 2022 compared to 2021, and particularly for boys, from 35% to 28%, and the difference was significant. For girls, the decline was not as significant (from 31% to 29%).

With age, the receipt of sext increases, the relationship is of medium strength. Children under 14 years received more sexts in the post-pandemic period, in contrast, children aged 14+ received more sexts in the pandemic period.

More children from incomplete families received sexts in the pandemic year, but prevalence decreased in the post-pandemic year, bringing it to the level of adolescents from complete families. This means that in the post-pandemic year, around 28% of children from both complete and incomplete families received sext.

Comparing the data on sext receipt with the EU Kids Online Slovakia survey [19], which was conducted in 2018 and the prevalence was at 10%, there was a significant increase to 33% and 28% in both the pandemic and post-pandemic years. In the cited EU Kids online research, the researchers used the same questions and scales as well as the same method of scoring as we did, but the difference was in the data collection, it was a Random Walk method how interviewers collected data using a face-to-face interview with the help of a tablet. We believe that such a significant difference may have also occurred because interviewers in 2018 asked children personally about sensitive and intimate topics and because of this, respondents may have chosen answers in the direction of social desirability, which skewed the results towards lower numbers. This can also be inferred from the results of Hollá [6], according to which the prevalence of both receiving and sending sexts was higher in 2016 than in 2018 according to EU Kids Online (receiving 19%, sending 11%).

If we compare the prevalence of sexting in Slovakia with foreign countries (meta-analyses), the data obtained in 2021 and 2022 are consistent with these values; in a meta-analysis by Mori et al. [3], they state that 35% of adolescents have experience of receiving sexting.

We then measured the prevalence of sexting, which was 8% in 2021 and then declined to 5% in 2022. This decline was statistically significant. Of those who sexted, 22% to 27% did so at least once a week and 15% to 17% did so daily or almost daily. Analysis of the inter-sex differences showed that boys were significantly more active in sending sexts, but only in 2021, and only at 10%, with a significant drop for boys to 6% the following year. Girls sent sexts in both the pandemic and post-pandemic periods at around 5-6%.

With age, sexting increases, the relationship is of a weak to moderate level. Between 1% and 2% of children aged 11 to 13 years have experience of sexting, rising to between 5% and 7% at the age of 14 – 15. After the age of 15, there is a more significant increase with a peak at age 17 (16 to 25%). This is consistent with studies [12]. Comparing the prevalence of sexting year-on-year, we can see that children aged 11 to 16 years sent sexts at about the same rate, with a change in 16- to 18-year-olds that sent more sexts in the pandemic year compared to the post-pandemic year (16% in 2022, 25% in 2021).

The prevalence of sexting was higher in 2021 at roughly 8% and then declined to about 4-5%, but only among children who grow up with both parents. For children who grow up with only one parent of their own, it remained at pandemic levels of 8%. Our research and

the research cited above suggest that family is an important factor influencing children's online behaviour, including sexting. In our research, we limited ourselves to comparing adolescents growing up with both or one parent of their own, and some differences were noted. Of course, more important than the structure of the family are the relationships within it, opening up room for more detailed exploration here. Burén and Lunde [22], for example, find that those adolescents who experience less instrumental and emotional support from their parents are more likely to send sexts. Parenting style emerges as another important factor, with democratic (authoritative parenting) parenting being the most effective; authoritarian and benevolent parenting are related to dysfunctional communication about sexting. Authoritarian parents tend to conduct fewer family discussions and have more control over their content. Conversely, benevolent parents are more likely to avoid initiating discussions with their children [23].

If we compare the sexting data with the EU Kids online survey [19], we see that in 2018 sexting was at 3%, rising to 8% in the pandemic year, and then falling to 5% in the pandemic year. As mentioned above, the comparison with 2018 is only indicative, due to the different data collection methodology (face-to-face interview vs. online anonymous collection), which may have influenced respondents' answers. Compared to foreign research, we can state that the percentage of Slovak children and adolescents who send sext is lower. Abroad it is around 19% [3], in our country it was at most 8% in the pandemic year.

There is ambiguity in research studies so far about whether boys and girls differ in sexting [5, 9, 24, 8, 6,], with our study suggesting that boys are more active in sending sexts, but only in the pandemic year. Both boys and girls receive sexts in similar ways. In contrast, there is a consensus that sexting increases with age [11, 12, 5, 10, 2, 6,] which was confirmed in our research.

In addition, family situation turns out to be a significant factor. In our case, we focused only on family structure, with differences only in the more active form of sexting, namely sending sexts. In the pandemic period, the groups studied did not differ. In the post-pandemic period, there was a decrease in sexts among children, who lived with both parents. On the contrary, there was no decrease among those, who lived with only one parent.

In addition to the above receipt and receipt of sexual messages, we also investigated whether and to what prevalence they had experienced being asked for intimate information despite not wanting to answer such questions. In 2021, 20% of children and adolescents had such an experience, and in 2022, this experience dropped insignificantly to 17%. This phenomenon is particularly dangerous in the context of cyberbullying, where a sexual predator tries to get sensitive information from a victim. It is later used, for example, for blackmail. This is a significant increase compared to the EU Kids online survey [19], where 11% of children and adolescents have had such an experience, but as we have already mentioned, due to the different methodology, these changes should be interpreted with caution.

In terms of gender and family type, the experience of being asked for intimate information significantly more occurs among girls compared to boys (approximately 11% of boys and 29% of girls). Slightly more girls growing up in an incomplete family receive such requests (around 34%) compared to girls growing up in a complete family (around 26%), but the difference was not significant.

Recommendations for practice

Our study has shown that sexting is a relatively widespread phenomenon among Slovak children and adolescents; it can be said that information and communication technologies play a significant role in the sexual development of adolescents. The school social worker plays a very important role in prevention in the school environment at all levels - from

universal, selective to indicated - and in Slovakia, since May 2023, following an amendment to the School Act, the school social worker has become part of the team of professional staff working in schools and educational establishments. Of course, in addition to the school social worker, prevention in the school environment is also carried out by counselling staff, school prevention coordinators, and teachers themselves. We consider it very important to monitor the situation of risky behaviour related to sexting by conducting research and thus to implement prevention activities in accordance with the evidence base practice approach.

6 Conclusion

The aim of the study was to determine the prevalence of sexting in Slovak children and adolescents in a representative study population and to determine whether there was a change in the pandemic and post-pandemic period. Our research showed that in the post-pandemic year there was a decrease in sexting compared to the pandemic year at the level of both receiving and sending sexts. Compared to abroad, Slovak children and adolescents did not differ significantly in receiving sexts, but they did differ in sending sexts, which was admitted to by a smaller percentage of children than abroad. We did not observe significant differences with respect to gender, only in the pandemic period boys were more active in sending sext compared to girls, in the post-pandemic year it was equal. Sexting increased with age, with a peak in sexting occurring around age 17. Children from complete and incomplete families did not differ significantly in receiving sext, only in sending sext, sending it equally in the pandemic period, but there was a decline in the post-pandemic year for children from complete families, and not for children from incomplete families.

Another important finding is that around 17%-20% of children and adolescents are asked for intimate information online, even if they do not want to answer such questions, which is a particularly dangerous phenomenon in the context of cyberbullying. It happens more to girls than to boys does, and especially to girls from single-parent families. Our study resulted in identification of the prevalence of sexting among children and adolescents in Slovakia. It opens the way for the implementation of adequate prevention and intervention activities in line with evidence-based practice.

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