



Characteristics and Correlates of Cyber-control in Spanish Cases of Gender-Based Violence

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Título: Características y correlatos del cibercontrol en casos españoles de violencia de género

Resumen: Este estudio exploratorio pretendía identificar las características psicosociales del agresor y la víctima, así como la dinámica relacional y las distintas formas de control y violencia asociadas al cibercontrol. Los análisis se realizaron retrospectivamente sobre un conjunto de datos de $N = 368$ casos de Violencia de Género mortal y no mortal, recogidos por el Equipo Nacional de Revisión Pormenorizada de Homicidios por Violencia de Género entre 2006 y 2021 en España. Se realizaron procedimientos de comparación de medias entre casos con y sin cibercontrol, así como análisis de regresión logística binomial, para identificar asociaciones correlativas y predictivas. Las relaciones cibercontroladas se caracterizaban por un estilo de apego inseguro-ansioso del agresor, una edad inferior de ambos miembros de la pareja, aislamiento, celos y una menor duración de la relación. No se pudo confirmar ninguna asociación predictiva. El cibercontrol coincidió con varios comportamientos violentos y controladores. Debido a esta coocurrencia, el cibercontrol debe considerarse una señal de alarma de otras formas de violencia de género. Los correlatos identificados podrían ser un punto de partida para posibles intervenciones.

Palabras clave: Cibercontrol. Control digital. Ciberviolencia de género. Violencia de Género. Femicidio.

Abstract: This explorative study aimed to identify the psychosocial characteristics of the perpetrator and the victim, as well as the relationship dynamics and different forms of control and violence associated with cyber-control. Analyses were conducted retrospectively on a dataset of $N = 368$ cases of fatal and non-fatal gender-based violence, collected by the National Team for In-Depth Homicide Review of Gender Violence between 2006 and 2021 in Spain. Mean comparison procedures were performed between cases with and without cyber-control, as well as binomial logistic regression analyses, to identify correlative and predictive associations. Cyber-controlled relationships were characterized by an insecure-anxious attachment style of the perpetrator, a lower age of both partners, isolation, jealousy, and a shorter relationship duration. No predictive associations could be confirmed. Cyber-control co-occurred with several violent and controlling behaviors. Due to this co-occurrence, cyber-control should be considered an alarm signal for other forms of gender-based violence. The correlates identified could be a starting point for possible interventions.

Keywords: Cyber-control. Cyber monitoring. Electronic intrusion. Intimate partner violence. Femicide.

Introduction

The technological innovations of the last 30 years have created a digital social space that gives rise to new dimensions and means of violence (Equal Opportunities Advisory Committee, 2020, 2021, 2023, 2024). Although the new technologies undoubtedly have positive effects, such as the establishment, maintenance, satisfaction and strengthening of relationships or the widening of social circles (Burke et al., 2011; Gibbs et al., 2021; McEwan, 2013; Reed et al., 2017), new forms of perpetrating gender-based violence (GBV) and controlling behaviors in the cyber space have emerged (v.gr., Jiménez Sánchez et al., 2021; Molero et al., 2023). In addition, the relevance of studies on GBV in Ibero-American and UE research has become evident (see Alldred & Biglia, 2015; Burgos-Benavides et al., 2024; Estebarán-Viñas et al., 2021).

In Spain, GBV ("*Violencia de Género*") is a legally defined form of intimate partner violence by a man against a woman. It is defined according to Spanish Organic Law 1/2004, Article 1, as any act of violence by men against women who are or have been their spouses or those who are or have been

linked to them by similar relationships of affectivity, that may result in physical, sexual or psychological harm or suffering of the woman, as well as threats of such acts, coercion or arbitrary deprivation of liberty. With the emergence of the digital world, a new form of GBV arose: Gender-Based Cyber-Violence (GBCV). As the definition under Organic Law 1/2004 covers "any act of violence", it also refers to gender-based violence exercised by means of information and communications technology (ICT), hereinafter referred to as GBCV (García-Collantes & Garrido Antón, 2021). GBCV is based on the same social, economic and cultural structures that give rise to traditional offline GBV (United Nations General Assembly, 2018). Therefore, it is assumed that there is a continuum, as well as an interaction and co-occurrence between GBV and GBCV (European Parliament et al., 2021; García-Collantes & Garrido Antón, 2021; United Nations General Assembly, 2018).

Controlling one's (ex-)partner has been described as a form of GBV (García-Collantes & Garrido Antón, 2021; Martínez-Gómez et al., 2021) which can be exercised physically, psychologically and economically, in the school/work environment or by means of ICT. This paper focuses on cyber-control by a man towards his female (ex)partner as a form of GBV according to the Spanish Organic Law 1/2004. Cyber-control includes various strategies that allow the aggressor to monitor the behavior of his victim and to control her accordingly (Rodríguez-deArriba et al., 2021).

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These may include monitoring her location, last connection, read receipt, online social interactions and the content she shares on social media, monitoring and determining the clothing or makeup she wears, demanding proof photos, immediate responses, passwords, and access to social media accounts (Estébanez, 2018; García-Collantes & Garrido Antón, 2021; Ime et al., 2024; López-Sáez et al., 2024; Messinger et al., 2021; Muñoz-Rivas et al., 2023; Rodríguez-Castro et al., 2018; Thulin et al., 2021; Van Ouytsel et al., 2020). Often, these controlling behaviors can develop into other forms of GBCV such as cyberthreats, doxing or sextortion, especially in cases where the victim refuses to be controlled (Estébanez, 2018).

There are several aspects that make cyber-control a particular danger and challenge for women experiencing it through their partner. Cyber-control in romantic relationships is often perceived as normative by the victims, and most women are not aware of the risks or negative consequences related to it. Instead, it is perceived as a sign of trust in a healthy and committed relationship, as legitimate and merely irritating, frustrating, or unwarranted (Baker & Helm, 2010; Bonilla-Algovia et al., 2022; Burke et al., 2011; Lucero et al., 2014; Messinger et al., 2021; Sánchez-Hernández et al., 2020). Misguided notions about romanticism contribute to this false assessment of risk, as cyber-control is often presented as expressions of love or concern for the victim's safety (Estébanez, 2018; Rodríguez-Castro et al., 2018; Sánchez-Hernández et al., 2020), when in fact the motives are jealousy and mistrust (Rodríguez-Castro et al., 2018). The lack of risk perception leads to an underestimation of the controlling behaviors, an unwillingness to take countermeasures, and reduced support from the social environment (Messinger et al., 2021; Reed et al., 2017; Sanmartín-Andújar et al., 2023). Therefore, it is important to have appropriate assessment instruments (Arrojo et al., 2024; Rodríguez Domínguez et al., 2020).

The high prevalence of cyber-control in intimate relationships further contributes to its normalization and social acceptance (Sánchez-Hernández et al., 2020). At present, cyber-control is considered the most common form of GBCV, with relative frequencies of occurrence (victimization and/or perpetration) between 50% and 82% (Borrajo et al., 2015; Brem et al., 2019; Lara, 2020; Reed et al., 2016, 2017; Rodríguez-deArriba et al., 2021; Van Ouytsel et al., 2020). More specifically, following cyber-controlling behaviors have been reported: frequent questions about location or activities (46%), monitoring of conversations or private information in ICTs without permission (38-43%) and obligation to share passwords for SNS accounts or cell phones (16%) (Marganski & Melander, 2018; Reed et al., 2016). In a sample of men physically violent towards their partners, even higher relative frequencies are described: 66.5% of men monitored their partner's call histories, 57% monitored emails sent and received and 43% used her passwords to monitor her (Brem et al., 2019).

New technological advances, especially ICT with inte-

grated functions to share and monitor location or time of last connection, offer new possibilities for intrusion, surveillance and control behaviors without the need for technical expertise (Burke et al., 2011; Doucette et al., 2021; West, 2014). In addition, these technologies may put more pressure on the victims to be constantly present and available online, making it difficult to establish boundaries and rules for communication, which can lead to conflicts of autonomy (Duran et al., 2011) and reinforce gender roles (Antoñanzas et al., 2022; Gibbs et al., 2021). Cyber-control, unlike traditional GBV, can take place at any time and regardless of physical distance, making it more difficult for victims to escape from victimization (Lara, 2020; Van Ouytsel et al., 2020).

Numerous studies have shown strong correlational and predictive relationships between the occurrence of GBCV and offline forms of GBV in romantic relationships, including psychological or verbal violence, physical violence, and sexual violence or coercion (Brem et al., 2021; Epstein-Ngo et al., 2014; Granda-Vivas & Moral-Jiménez, 2025; Marganski & Melander, 2018; Moral & Pietro, 2022; Temple et al., 2016; Thulin et al., 2021; Wolford-Clevenger et al., 2016; Zweig et al., 2014). The few studies that have examined these associations with cyber-control report positive associations of cyber-control with psychological or verbal violence, physical violence, and sexual violence or coercion (Borrajo et al., 2015; Brem et al., 2019; Brem et al., 2015; Doucette et al., 2021; Reed et al., 2016; Thulin et al., 2021; Vinagre-González et al., 2023). Cyber-control and GBCV are reciprocal phenomena: Often, the victimization through cyber-control is accompanied by the own perpetration of such behaviors. Thus, people are often both perpetrators and victims of cyber-control. Also, cyber-control victimization and perpetration are associated with both victimization and perpetration of traditional GBV (Borrajo et al., 2015; Reed et al., 2016; Smith et al., 2018; Temple et al., 2016). As GBCV and cyber-control can be considered as warning signals for the co-occurrence of other forms of violence or dysfunctionality in the couple, they should trigger an assessment of other forms of GBV (Brem et al., 2019; Doucette et al., 2021; Galera et al., 2023; Messinger et al., 2021).

Moreover, GBCV in romantic relationships is associated with a number of adverse consequences for victims, including persistent stress, emotional exhaustion and low self-esteem (Brem & Fröschl, 2020), anxiety, depression and a poorer couple's adjustment (Borrajo & Gámez-Guadix, 2016; Molero et al., 2022). Cyber-controlled relationships are often characterized by jealousy (Baker & Carreño, 2016; Ligman et al., 2021), higher levels of insecure-anxious attachment (Reed et al., 2015), discrepancy in the mate value (Bhagal et al., 2019), substance abuse (Thulin et al., 2021) and lower age of the couple (Doucette et al., 2021).

In recent years, there has been a growing public, political and research interest in GBV in Spain (Delegación del Gobierno contra la Violencia de Género, 2022, 2024; Gomez-Pulido et al., 2024; Juarros-Basterretxea et al., 2022;

Medinilla-Tena et al., 2024; Marcos et al., 2024; Vinagre-González et al., 2023), and many studies have been conducted on GBCV and cyber-control (Borrajo & Gámez-Guadix, 2016; Domínguez et al., 2020; Durán & Rodríguez-Domínguez, 2020; Rodríguez-Castro et al., 2018). The present study highlights for the variety of psychosocial variables considered and the comprehensive data collection methodology based on file study of police and court records, as well as in-depth interviews.

The objective of this study is to explore the still relatively unknown phenomenon of cyber-control in a sample of couples affected by GBV (fatal and non-fatal) using an exploratory approach to expand the current state of knowledge and thus provide an empirical basis for possible interventions. We investigated the following research questions:

1. What socio-demographic, psychological and psychosocial characteristics of the perpetrator, victim, and relational dynamics distinguish cases of GBV in which cyber-control was perpetrated from those in which cyber-control was not perpetrated?
2. What forms of violence and control are related to cyber-control?

Method

Participants

The database consists of $N = 368$ cases reviewed by the National Team for In-Depth Homicide Review of Gender Violence (EHVdG) from 2006 to 2021, of which $n = 171$ (46.47%) are femicide cases; $n = 197$ (53.53%) are cases of attempted femicide, severe and mild GBV. All couples are heterosexual; the age of the victimized women was between 13 and 84 years ($M = 38.08$; $SD = 13.50$) and that of the male perpetrators between 18 and 89 years ($M = 41.18$; $SD = 13.77$). Cyber-control occurred in $n = 64$ of these cases (17.39%) and did not occur in $n = 304$ cases (82.61%).

Instruments

The data for this study come from systematized and detailed reviews of cases of homicides and violence due to GBV in Spain. They were collected by the National Team for In-Depth Homicide Review of Gender Violence (EHVdG), led by the Spanish Ministry of the Interior. The EHVdG is formed by a specialized and multidisciplinary group of experts in the analysis of criminal behavior from all over the national territory and from different professional groups, including psychologists, criminologists, law enforcement agents, legal operators, penitentiary operators, researchers, etc. (González et al., 2018). In addition to the Spanish Ministry of the Interior, different state institutions, law enforcement agencies and 21 Spanish universities were involved in the project. The included GBV cases were rated by the local teams, which had been trained, supervised and provided with uniform guidelines by the central coordination team.

Procedure

Case reviews were conducted retrospectively using standardized protocols. The data were obtained through an in-depth study of police documents (police reports, court documents and technical eye inspections), court documents (summaries and expert reports) and penitentiary material. The available documents identified individuals from the perpetrator's and victim's family, workplace, leisure activities, educational institutions, and circle of friends etc., who were contacted in the next step. A territorial delegation of the research team then went to the informants' place of residence to conduct semi-structured interviews (González & Manzanero, 2018) in order to collect sociodemographic and criminological data that were not available in the documents reviewed. If the victim and the perpetrator were still available, they were also interviewed. Prior to the interviews, participants were informed about the objectives, procedures, the professional background and institutional affiliation of the reviewers, as well as the handling of sensitive data in accordance with established protocols. They subsequently provided their written informed consent. Each territorial team wrote a comprehensive report for each case, and the relevant data were transferred to the main dataset in an anonymized and systematized manner. The database thus formed contains 700 variables, mostly covering psychosocial characteristics of the perpetrator, the victim, and the relational dynamics, previous violent incidents, crime scene, and police risk assessment. To ensure standardized data collection, these variables are defined and operationalized in a handbook available to the raters.

For the purpose of this study, the variable "cyber-control" is defined as follows: Cyber-control is the control and surveillance behavior of men towards women through the use of ICTs within a (current or past) romantic relationship. Furthermore, 78 of the psychosocial variables in the database were of interest, which included both perpetrator and victim variables of age, origin, belonging to ethnic minorities, socioeconomic level, educational level, employment status, recent job loss, cohabitation with victim / perpetrator, existence of children, number of children, number of children with one another, number of children with different partner, separation process, financial problems, existence of support, addictions, drug consume, alcohol consume, neuroticism, extroversion, psychoticism, attachment style, feelings of loneliness, maintained stress, refusal of treatment and/or help from the community, suicide attempt, dependency on victim / perpetrator, new relationship, previous delinquency of perpetrator against victim (not just GBV), previous denunciation of perpetrator by victim, number of victim's risk factors and victim's risk perception, as well as relational dynamics variables such as relationship duration, type of relationship, relationship status, initiator of separation, divorce, cohabitation at some point in time, on-off relationship, level of relationship satisfaction, jealousy, isolation and direction of the isolation.

In addition, variables on different types of control behavior (presence of any type, physical, psychological, school/work, economic) and violence (presence of any type, physical, psychological, sexual, coercive-controlling) by the perpetrator against the victim, as well as harassment behavior and threats were considered.

Data Analysis

Data were analyzed using IBM SPSS Statistics 26 statistical software and Microsoft Excel 2019 spreadsheet. The significance level was set at $\alpha < .05$. For post-hoc analyses, the significance level was corrected according to the Bonferroni method for multiple testing. Previous to the statistical analyses, a χ^2 test was used to test whether the two groups (femicide and non-femicide) differed significantly in terms of the frequency of occurrence of cyber-control. As the preliminary analyses showed no significant differences, the two groups were merged for subsequent analyses.

To answer question 1, cases with cyber-control and cases without cyber-control were compared by Student's *t*-tests for independent samples for continuous data and by χ^2 tests for categorical data with respect to all relevant variables collected. In contingency tables that included cells with expected cell frequencies of $n < 5$, Fisher's exact test was used instead of a χ^2 test. Relevant manifestations of significant variables were identified by means of *z*-standardized residuals, which

had to exceed or fall below a critical *z* value of ± 1.96 . Effect sizes were calculated for dichotomous variables using the phi coefficient, and for variables with more than two values using Cramer's V. Afterwards, three binary logistic regression analyses were performed with the variables found to be significant in the previous step. The models were estimated using the methods enter, forward stepwise and backward stepwise. Subsequently, the most economical model was identified, that is the model with the lowest number of predictors, with the highest overall percentage of cases correctly assigned to the subgroups (presence or absence of cyber-control), and with the highest goodness of fit.

To answer question 2 - following the procedure already described under question 1 - a χ^2 test was calculated, in case of significant results the corresponding post-hoc tests were performed in the next step.

Results

A priori, no differences in the frequency of occurrence of cyber-control were identified between the femicide cases and the non-fatal cases of attempted femicide, severe and mild GBV ($\chi^2 (1, N = 368) = 0.042, p = .838, \varphi = -.011$; Table 1), so the femicide and control cases were considered together in the following analyses.

Table 1

Results of χ^2 tests: frequency differences in the presence or absence of cyber-control behaviors in relation to case type (fatal or non-fatal).

Cyber-control	Fatal: <i>n</i> obs. (<i>n</i> exp.)	Non-fatal: <i>n</i> obs. (<i>n</i> exp.)	Total	χ^2	<i>df</i>	<i>p</i>	φ
Present	29 (29.7)	35 (34.3)	64	0.042	1	.838	-.011
Not Present	142 (141.3)	162 (162.7)	304				
Total	171	197	368				

Note. *n* obs. = observed subsample size, *n* exp. = expected subsample size, χ^2 = Pearson's χ^2 , *df* = degrees of freedom, φ = effect size.

Differences between cases with and without Cyber-control

To identify categorical variables associated with the presence of cyber-control, χ^2 -tests were performed (Table 2). Ten variables significantly differentiated between the two groups: perpetrator's attachment style ($\chi^2 (2, N = 147) = 9.617, p = .008, \varphi_c = .256$), recent job loss of the victim ($\chi^2 (1, N = 302) = 5.494, p = .028, \varphi = .135$), victim's psychopathology ($\chi^2 (1, N = 288) = 6.818, p = .009, \varphi = -.154$), victim's refusal of treatment or help from his or her environ-

ment ($\chi^2 (1, N = 262) = 4.326, p = .038, \varphi = .129$), suicide attempt by the victim ($\chi^2 (1, N = 313) = 5.762, p = .016, \varphi = -.136$), legal separation or divorce ($\chi^2 (1, N = 250) = 3.845, p = .050, \varphi = -.124$), new relationship of the victim ($\chi^2 (1, N = 311) = 12.332, p = .001, \varphi = .199$), jealousy ($\chi^2 (1, N = 337) = 8.055, p = .005, \varphi = .155$), isolation ($\chi^2 (1, N = 334) = 13.771, p < .001, \varphi = .203$), and direction of the isolation ($\chi^2 (3, N = 314) = 16.966, p < .001, \varphi_c = .232$). The other categorical variables studied did not become significant ([complete list of \$\chi^2\$ tests](#)).

Table 2Results of χ^2 tests: Frequency differences in significant categorical perpetrator, victim and relationship variables according to the presence or absence of cyber-control

Variables	Cyber-control (<i>n</i>)	No cyber-control (<i>n</i>)	χ^2 (<i>df</i>)	<i>p</i>	φ_c/φ	Exp. cell <i>n</i> < 5
Perpetrator characteristics						
Attachment Style**	26	121	9.617 (2)	.008	.256	16.7%
Insecure-Anxious	24	74				
Insecure-Avoidant	2	31				
Secure	0	16				
Victim characteristics						
Recent job loss*	55	247	5.494 (1)	.028	.135	25%
Yes	7	11				
No	48	236				
Psychopathology**	56	232	6.818 (1)	.009	-.154	
Yes	5	58				
No	51	174				
Refusal of treatment and/or help from the community*	51	211	4.326 (1)	.038	.129	
Yes	23	63				
No	28	148				
Suicide attempt*	59	254	5.762 (1)	.016	-.136	
Yes	1	31				
No	58	223				
Relationship characteristics						
Legal separation-divorce*	41	209	3.845 (1)	.050	-.124	
Yes	4	49				
No	37	160				
New relationship of the victim**	52	259	12.332 (1)	.001	.199	
Yes	22	51				
No	30	208				
Jealousy**	63	274	8.055 (1)	.005	.155	
Yes	61	227				
No	2	47				
Isolation**	57	277	13.771 (1)	< .001	.203	
Yes	39	115				
No	18	162				
Direction of the isolation*	56	258	16.966 (3)	< .001	.232	50%
By him to her	39	103				
By her to him	0	4				
Bidirectional	0	4				
Not present	17	147				

Note. *n* = observed subsample sizes, χ^2 = Pearson's χ^2 , *df* = degrees of freedom, *p* = asymptotic significance (in case of the cell's expected *n* < 5: Fisher's exact significance), **p* < .05, ***p* < .01, φ_c/φ = effect size: Cramér's V (Variables with > 2 expressions) / Phi (Variables with dichotomous expression).

Using subsequent post-hoc tests, the following characteristics of the perpetrator, victim, and relational dynamics were found to occur significantly more frequently in cyber-controlled relationships: insecure-anxious rather than insecure-avoidant or secure attachment style of the perpetrator (Adjusted standardized residual [ASR]: $\bar{z} = 3.1$; *p* = .008), the absence of psychopathology in the victim (ASR: $\bar{z} = -2.6$; *p* = .034), a new relationship of the victim (ASR: $\bar{z} = 3.5$; *p* = .002), jealousy (ASR: $\bar{z} = 2.8$; *p* = .019), isolation (ASR: $\bar{z} = 3.7$; *p* = .001), and the direction of isolation by him towards her (ASR: $\bar{z} = 4.1$; *p* < .000). After Bonferroni correction of the α -level for multiple testing, insecure-anxious attachment of the perpetrator, the existence of a new relationship of the victim, isolation and the direction of isolation by him towards her were still significant.

Independent samples t-tests were performed to identify continuous variables that significantly differed between cases with and without cyber-control (Table 3). Six variables showed significantly different manifestations as a function of the presence or absence of cyber-control. When cyber-control occurred, both perpetrators (*t* (112.28) = -4.531, *p* < .001, *d* = 13.371) and victims (*t* (125.57) = -4.764, *p* < .001, *d* = 13.032) were significantly younger, victims had fewer children (*t* (366) = -2.060, *p* = .020, *d* = 1.202) and fewer children with other partners (*t* (126.37) = -1.998, *p* = .024, *d* = .968), and also had more risk factors for traditional forms of GBV (*t* (366) = 2.919, *p* = .002, *d* = 2.007). Relationships had a significantly shorter mean duration (*t* (78.25) = -3.101, *p* = .001, *d* = 14.491).

Table 3
Results of *t*-tests: differences in continuous variables according to the presence or absence of cyber-control in the relationship

Variables	Ciber-control			No ciber-control			<i>t</i>	<i>df</i>	<i>p</i>	Cohen's (<i>d</i>)
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>				
Perpetrator characteristics										
Author's age **	64	35.22	10.781	300	42.32	13.855	-4.531	112.28	< .001	13.371
Nº author's children	45	1.60	1.053	232	1.63	1.456	-.147	275	.883	1.400
Nº author's children with victim	49	0.84	1.028	241	0.98	1.165	-.818	288	.207	1.144
Nº author's children w/ different partner	49	0.65	0.991	240	0.59	1.248	.346	287	.365	1.209
Victim characteristics										
Victim's age **	63	32.29	9.443	291	39.12	13.678	-4.764	125.57	< .001	13.032
Nº victim's children *	64	1.16	0.996	304	1.50	1.240	-2.060	366	.020	1.202
Nº victim's children w/ different partner *	64	0.36	0.698	304	0.57	1.016	-1.998	126.37	.024	0.968
Nº victim's risk factors **	64	4.88	1.890	304	4.07	2.031	2.919	366	.002	2.007
Relationship characteristics										
Relationship years **	29	9.159	8.112	137	15.375	15.482	-3.101	78.25	.001	14.491

Note. *n* = subsample size, *M* = mean, *SD* = standard deviation, *df* = degrees of freedom (adjusted for unequal variances), **p* < .05, ***p* < .01.

Through the procedures previously used, a total of sixteen variables were identified that significantly differentiate cases with and without cyber-control: the perpetrator's attachment style, the victim's recent job loss, the victim's psychopathology, the victim's refusal of treatment or help from her environment, a suicide attempt by the victim, a legal separation or divorce, a new partner relationship of the victim, jealousy, isolation and direction of isolation, the perpetrator's age, the victim's age, the victim's total number of children, the number of children with another partner of the victim, the victim's risk factors, and the duration of the relationship.

In the next step, these 16 variables were used as independent variables for three different binary logistic regres-

sion models. To calculate model 1, all variables were included in the analysis, model 2 was calculated by stepwise-backward procedure and model 3 by stepwise-forward procedure. Of the three models tested (enter, stepwise-forward, and stepwise-backward), the stepwise-backward approach yielded the best goodness of fit (Nagelkerke $R^2 = 1.000$) and was selected for subsequent interpretation. The Hosmer and Lemeshow test provided no reason to doubt its validity ($\chi^2_{(3)} = .000, p = 1.000$). The model can correctly identify all cases in the sample (100%) (see Table 4). In the stepwise-backward regression model, no significant predictor of cyber-control could be identified at the selected alpha level ($\alpha < .05$; Table 5).

Table 4
Model characteristics of the three estimated binary logistic regression analyses

Model 1: Enter			Model 2: Backwards stepwise			Model 3: Forward stepwise		
Variables in the equation: 16			Variables in the equation: 6			Variables in the equation: 2		
Omnibus test of model coefficients								
χ^2	<i>df</i>	<i>p</i>	χ^2	<i>df</i>	<i>p</i>	χ^2	<i>df</i>	<i>p</i>
43.967	16	< .001	43.967	7	< .001	29.097	2	< .001
Model summary								
-2 Log Likelihood	Cox & Snell R^2	Nagelkerke R^2	-2 Log Likelihood	Cox & Snell R^2	Nagelkerke R^2	-2 Log Likelihood	Cox & Snell R^2	Nagelkerke R^2
0.000	.585	1.000	0.000	.585	1.000	14.870	.441	.754
Goodness of fit, Hosmer-Lemeshow-Test								
χ^2	<i>df</i>	<i>p</i>	χ^2	<i>df</i>	<i>p</i>	χ^2	<i>df</i>	<i>p</i>
0.000	4	1.000	0.000	3	1.000	3.464	7	.839
Percentage accuracy in classification								
Cyber-control	No cyber-control	Total	Cyber-control	No cyber-control	Total	Cyber-control	No cyber-control	Total
100%	100%	100%	100%	100%	100%	75%	100%	96%

Note. χ^2 = Pearson's χ^2 , *df* = degrees of freedom, *p* = *p*-value of significance.

Table 5
Backward stepwise logistic regression. Variables in the equation

Variables	B	Standard error	Wald	df	p	Exp(B)	95% CI EXP(B)	
							Inferior	Superior
Author's age	4.947	396.779	.000	1	.990	140.743	.000	
Author's attachment style (secure)			.000	2	1.000		.000	
Insecure-anxious	169.054	24681.229	.000	1	.995	2.625E+73		
Insecure-avoidant	126.213	39863.585	.000	1	.997	6.508E+54		
Nº victim's children w/ different partner	-16.810	4151.642	.000	1	.997	0.000	.000	
Recent job loss victim	130.665	16396.641	.000	1	.994	5.588E+56	.000	
Isolation	45.445	10640.834	.000	1	.997	5.450E+19	.000	
New relationship victim	64.179	32667.078	.000	1	.998	7.454E+27	.000	
Constant	-482.806	55592.368	.000	1	.993	0.000		

Note. All variables that were found to be significant in the previous analyses (*t*-test and χ^2 test) were entered. B = regression coefficient, df = degrees of freedom, p = p-value of significance, Exp(B) = odds ratio.

Cyber-control and Other Forms of Violence or Control

We performed χ^2 tests to identify variables of different violent and controlling behaviors that significantly differentiate cases with cyber-control from those without cyber-control. Thirteen of the fifteen examined variables significantly differentiated the presence and absence of cyber-control: Presence of any type of violence (χ^2 (1, $N = 367$) = 4.340, $p = .037$, $\varphi = .109$), type of violence (χ^2 (3, $N = 243$) = 9.487, $p = .023$, $\varphi_c = .198$), psychological violence (χ^2 (1, $N = 350$) = 5.679, $p = .017$, $\varphi = .127$), sexual violence (χ^2 (1, $N = 364$) = 4.792, $p = .029$, $\varphi = .115$), coercive-controlling violence (χ^2 (1, $N = 239$) = 8.681, $p = .003$, $\varphi = .191$), threats (χ^2 (1, $N = 386$) = 5.634, $p = .018$, $\varphi = .124$), presence of any type of control (χ^2 (1, $N = 340$) = 9.912, $p = .002$, $\varphi = .171$), physical control (χ^2 (1, $N = 368$) = 31.826, $p < .001$, $\varphi = .294$), psychological control (χ^2 (1, $N = 368$) = 44.271, $p < .001$, $\varphi = .347$), school/work control (χ^2 (1, $N = 368$) = 19.628, $p < .001$, $\varphi = .231$) and economic control (χ^2 (1, $N = 368$) = 8.15, $p = .004$, $\varphi = .151$). The variables physical violence and harassment did not significantly differ between couples with and without cyber control.

Using post-hoc tests, the following forms of control or violence were found to occur with significantly higher frequency in relationships with cyber-control: control in general (ASR: $\zeta = 3.1$; $p = .008$), psychological control (ASR: $\zeta = 6.7$; $p = .000$), physical control (ASR: $\zeta = 5.6$; $p = .000$), economic control (ASR: $\zeta = 2.9$; $p = .015$), school/labor control (ASR: $\zeta = 4.4$; $p < .001$), dichotomous coercive controlling violence (ASR: $\zeta = 2.9$; $p = .015$), and as a type of violence (ASR: $\zeta = 3.1$; $p = .001$), maintained (as opposed to sporadic or nonexistent) control (ASR: $\zeta = 2.5$; $p = .044$), and direction of control by him towards her (ASR: $\zeta = 3.1$; $p = .008$). After Bonferroni correction of the α -level for multiple testing, only control in general and three subtypes of control – school/work, psychological, and physical – still accounted for differences between the presence and absence of cyber-control behaviors.

Discussion

Gender studies can be very diverse (v. gr., Cormos et al., 2023; Expósito-Álvarez et al., 2024; Fernández Álvarez et al., 2022; Ramírez-Rueda et al., 2022). The aim of the present work was to empirically explore the still little studied phenomenon of cyber-control in couple relationships marked by GBV. Sixteen variables were identified that could significantly differentiate between cases with cyber-control and cases without cyber-control. Of these sixteen variables cyber-control was related to six categorical variables that showed significant specific expressions in post-hoc tests and six continuous variables, including insecure-anxious attachment style and younger age of the male perpetrator, as well as younger age, absence of psychopathology, a new relationship, fewer children overall and with another partner (see Ríos Lechuga et al., 2024) and a higher number of risk factors for traditional GBV of the female victim, the existence of jealousy and isolation, the direction of his isolation towards her and a shorter mean duration of the relationship. However, these variables only showed correlational relationships with the occurrence of cyber-control and were not confirmed as significant predictors in the subsequent regression analysis. Possible reasons for this finding are explained in the Limitations section. Due to the exploratory nature of the study and the large number of variables examined, it is beyond the scope of this discussion to address all variables not significantly related to cyber control.

In line with the results reported by Doucette et al. (2021), a very large effect for the increased prevalence of cyber-control among younger couples was found, which could be explained by the increased use of ICT among younger generations, especially digital natives. The way in which digital natives communicate and establish relationships is more influenced by ICT than that of digital immigrants and, in general, older people (García-Collantes & Garrido Antón, 2021). Consequently, in these generations also more GBCV and cyber control occur (European Parliament et al., 2021; European Union Agency for Fundamental Rights, FRA, 2015). The lower age in cyber-controlled couple relationships is also a possible explanation for the negative correla-

tions of very large effect size found between cyber-control and the number of children of the victim as well as relationship duration.

In addition, relational dynamics appear to be relevant to the emergence of cyber-control. Several studies mention jealousy (Baker & Carreño, 2016; Ligman et al., 2021), higher levels of insecure-anxious attachment (Reed et al., 2015) and discrepancy in the mate value in this context (Bhogal et al., 2019). The significant correlations of cyber-control with jealousy and insecure-anxious attachment could be replicated in this work, but only manifested in small to moderate effect sizes. According to attachment theory, people with an anxious attachment style have less trust in their partner and often worry that their partner will be unloving, unpredictable, and unreliable (Simpson, 1990). Consequently, due to the permanent feeling of being abandoned or cheated on, they are more jealous and are more tempted to (cyber)control their partner. The relationship between jealousy and cyber-control can be explained in both causal directions, but they are likely to be mutually reinforcing behaviors (Brem et al., 2019). While jealousy leads to an increase in cyber-controlling behaviors (Deans & Bhogal, 2019), information obtained online through cyber-control and ICT use can fuel and increase jealousy (Baker & Carreño, 2016; Rueda et al., 2015). From an evolutionary perspective, (cyber)control represents an adaptive mate retention strategy – driven by jealousy and mistrust – to ensure partner fidelity and reduce insecurity about their social and romantic activities, monitor and, if necessary, eliminate real or imagined threats to the relationship, and secure reproductive potential (Branson & March, 2021; Brem et al., 2019; Graham-Kevan & Archer, 2009). Following this line of reasoning, it is also possible to explain the small effect found for cyber-control occurring more frequently in cases where the victimized woman had a new partner. If the victim has a lower mate value – consisting of physical attractiveness, personality, intelligence and career prospects etc. –, the use of these partner retention strategies, including cyber-control, is lower (Bhogal et al., 2019; Graham-Kevan & Archer, 2009). The victim's psychopathology might decrease her mate value and thus make (cyber)control by the victimizer less necessary, thus explaining the small negative correlation found between the existence of victim psychopathology and the occurrence of cyber-control.

Also, the social environment (or being isolated from it) seems to be of importance. The moderate effect for an association of isolation, particularly perpetrated by the author of GBV against his victim, with the occurrence of cyber-control is confirmed by the results of the study by Brown et al. (2022), who found that women described feelings of isolation in response to cyber-control. On the one hand, victim isolation represents a specific strategy of control (Lehmann et al., 2012) which would also explain its correlation with digitally perpetrated controlling behaviors. On the other hand, preexisting isolation could contribute to the occurrence of GBV and (cyber)control (Lanier & Maume, 2009).

Associations of small to moderate effect sizes were found between cyber-control and violence and its subtypes psychological, sexual and coercive-controlling violence, and control and its subtypes psychological, physical, economical and school/workplace control, and threats (see also, for example, Masciantonio et al., 2021). There is evidence that GBCV and cyber-control often occur together with other forms of GBV in relationships (Brem et al., 2021; Doucette et al., 2021; Marganski & Melander, 2018; Melander & Marganski, 2020; Zweig et al., 2014). Assuming that there is an offline-online continuum of controlling behaviors, a strong association between all controlling behaviors was to be expected. In addition, cyber-control could contribute to information acquisition, which in turn can lead to offline aggression and violence (Brem et al., 2015). Cyber-control may also be considered an indicator of an unhealthy relationship, characterized by mistrust and miscommunication, which would likewise favor the occurrence of GBV. In addition, it could be that discovering or resisting cyber-control triggers conflicts that are resolved violently (Doucette et al., 2021).

Limitations

In defining cyber-control as a form of GBV according to Organic Law 1/2004, the scope of the construct has been restricted to men as perpetrators. However, the literature has shown that both genders engage in cyber-control behaviors in romantic relationships (Branson & March, 2021; Brem et al., 2019; Burke et al., 2011; Reed et al., 2017; Rodríguez-Castro et al., 2018). Moreover, this definition ignores the bidirectionality of the phenomenon, i.e., the strong correlation between victimization and perpetrating cyber-control (Borrajo et al., 2015; Reed et al., 2016).

Several correlates of cyber-control have been identified. However, the direction of the connection of these factors could not be assessed and needs to be further investigated. Thus, longitudinal empirical studies are needed on the relationship between cyber-control and traditional forms of GDV, but also to explore the psychosocial triggers and consequences of cyber-control.

The sample composed exclusively of cases of fatal or non-fatal GBV recorded by the police results in the omission of unreported cases and limits the generalizability of the correlates of cyber-control to broader samples. Nevertheless, generalizability can be assumed, at least with caution, as the present work mostly replicated results identified across samples of different ages, sexual orientations, and both with and without a history of GBV (Brem et al., 2019; Doucette et al., 2021; Ligman et al., 2021; Zerach, 2016).

Although Bonferroni corrections were made for multiple testing to reduce type I error, correlates of the presence or absence of cyber-control, which were no longer significant after correction, were nevertheless reported and discussed because they are correlates of cyber-control supported by the literature, and an increase in type II error should also be avoided.

Due to the large number of variables considered in the regression analyses, there is a risk of overfitting of the final regression model: as the model is closely fitted to the underlying data set due to the large number of predictors, it may reproduce random deviations from the model. This leads to a possibly limited generalizability of the model and reduced predictive validity (Hawkins, 2004; Von der Hude, 2020). In addition, some predictors can falsely appear as non-significant because they may be interrelated with other conceptually similar variables, undermining the statistical significance of an individual independent variable.

Implications

The lack of risk perception of cyber-control created by normalization and romanticization is a fundamental problem, as risk perception is the first requirement for victims to initiate action steps, such as confrontation, blocking, disengagement, or a report (Messinger et al., 2021; Reed et al., 2017). On the one hand, suffering from cyber-control can be associated with numerous adverse psychological consequences, such as permanent stress, emotional exhaustion, low self-esteem, anxiety, depression or suicide attempt (Borrajó & Gámez-Guadix, 2016; Brem & Fröschl, 2020; Cano-Montalbán & Quevedo-Blasco, 2018; Quevedo-Blasco et al., 2023). On the other hand, normalization leads to ignoring the alarm effect of cyber-control, which, according to the findings of the present study and other researchers, often coexists with physical, psychological, and sexual violence, as well as with other controlling behaviors (Brem et al., 2021; Doucette et al., 2021; Marganski & Melander, 2018; Zweig et al., 2014). Therefore, interventions should aim to increase awareness and perception of risk and eliminate the romanticized perception of cyber control (Badenes-Sastre et al., 2023; Bonilla-Algovia & Rivas-Rivero, 2022; Doucette et al., 2021; Sánchez-Hernández et al., 2020; Van Ouytsel et al., 2020). They should target the correlates of cyber-control identified here and take them as intervention cues, including, for example, victim isolation, jealousy, and insecure-anxious attachment of the victimizer. It is essential to promote safe

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Internet use and educate about online risk behavior, including sexting, cyberbullying and oversharing (see Alonso & Romero, 2021; López-Barranco et al., 2022; Petre, 2021; Van Ouytsel et al., 2018). In addition, couples should be helped with adaptive strategies to express their concern about their partner's infidelity or intentions to break up and openly communicate connected feelings so that they do not have to resort to cyber-control (Van Ouytsel et al., 2020). Finally, this study is also to help in the elaboration of expert report (or counter-report); see, for example, Palomares-Rodríguez et al. (2024).

Conclusions

Cyber-control is still a fairly new and unexplored phenomenon. This explorative study extends the state of existing research by using a large Spanish sample of GBV thus providing the empirical basis for more in-depth research on the results found here. We identified several characteristics of the perpetrator, victim, and relational dynamics that occur more frequently in couple relationships in which cyber-control occurs, including an insecure-anxious attachment style and younger age of the perpetrator, as well as younger age, absence of psychopathology, a new relationship, fewer children, a greater number of risk factors for traditional GBV and isolation of the victim, the existence of jealousy, and a shorter average duration of the relationship. In addition to the direct negative effects on the victims, the phenomenon is of great relevance due to the frequent co-occurrence with other forms of violence and control in the couple relationship. Cyber-control should therefore be considered a warning signal of unhealthy and potentially violent relational dynamics, and the social perception of risks associated with cyber-control should be increased.

Complementary information

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