



Methodology:
Measuring the prevalence of
online violence against women

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About this study

Measuring the prevalence of online violence against women is a study produced by The Economist Intelligence Unit (EIU) and supported by Jigsaw. Underpinned by a multinational survey, country-specific estimation models, extensive literature reviews and expert interviews, this study measures the prevalence of online violence against women globally.

The study draws on data-driven insights generated across a global survey of 51 countries and interviews with policymakers, government officials, human rights advisors and experts on gender-based violence. We would like to thank the following experts for their insights:

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About The Economist Intelligence Unit

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About Jigsaw

Jigsaw is a unit within Google that explores threats to open societies, and builds technology that inspires scalable solutions.

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Research background

Defining online violence against women

The UN's Report of the Special Rapporteur on Violence Against Women defines online violence against women as "any act of gender-based violence that is committed, assisted or aggravated in part or fully by the use of ICT, such as mobile phones and smartphones, the internet, social media platforms or email, against a woman because she is a woman, or that affects women disproportionately".¹

While evidence suggests that online violence or abuse targeted at women often includes elements of sexism, racism, religious prejudice, homophobia and transphobia, the intent or motivations driving online violence against women tend to differ with every incidence. Common motivations for online violence against women include an attacker's intent to expose the targeted individual to humiliation, fear, retribution, coercion, and/or embarrassment.^{2,3}

Key factors that differentiate online violence from other forms of violence against women include:

- **anonymity** – the abusive person may remain unknown to victim;
- **action at a distance** – abuse can be done without physical contact and from anywhere;
- **automation** – abusive actions using technologies require less time and effort;
- **accessibility** – the variety and affordability of many technologies make them readily accessible to perpetrators;
- **impunity** – abusers and perpetrators have often escaped any form of punishment or accountability associated with the damaging consequences of their actions; and
- **propagation and perpetuity** – texts and images multiply and exist for a long time or indefinitely.⁴

Based on insights from sources including the UN's Special Rapporteur on Violence Against Women⁵, the International Center for Research on Women⁶ (ICRW) and Amnesty International, the EIU analyzed nine threat tactics (see Table 1) based on expert input and the following prioritization criteria:

- Occurs primarily on the internet, or through online channels
- Most women are vulnerable to the tactic, not limited purely to specific subsets of the population (i.e. activists, journalists, politicians)
- Occurs on the basis of gender or affects women disproportionately

1 United Nations (2018) Report of the Special Rapporteur on violence against women, its causes and consequences on online violence against women and girls from a human rights perspective. <https://undocs.org/A/HRC/38/47>

2 Women's Media Center. Online Abuse 101 <http://www.womensmediacenter.com/speech-project/online-abuse-101#doxing>

3 Daniel Daniele. Social Media Law Bulletin <https://www.socialmedialawbulletin.com/2019/06/doxing-the-age-of-social-media/>

4 Cyber Violence against women and girls: A wake up call informe de la Comisión de la Banda Ancha para el Desarrollo Digital de las Naciones Unidas.

5 United Nations (2018) Report of the Special Rapporteur on violence against women, its causes and consequences on online violence against women and girls from a human rights perspective. [A/HRC/38/47](https://undocs.org/A/HRC/38/47)

6 International Center for Research on Women (ICRW). 2018. Defining and measuring technology-facilitated gender-based violence Defining and measuring Technology-Facilitated Gender-Based Violence.

Table 1

Description of threat tactics

Threat tactics	Description
Astroturfing	The practice of engineering online support for an issue, while obscuring the coordinated aspect of the messaging and who is behind it.
Cyber-harassment	Repeated behavior using textual or graphical content with the aim of frightening and undermining someone's self-esteem or reputation.
Doxing	The unauthorized retrieving and publishing of an individual's personal information, including, but not limited to, full names, addresses, phone numbers, emails, spouse and children names, and financial details.
Hacking and stalking	Intercepting communications and data, and may involve stealing passwords, tracking someone's location using GPS or social media, and the use of Remote Access Tools (RATs) to spy on a computer from afar.
Hate speech	Covers all forms of expression that spread, incite, promote or justify racial or religious hatred, xenophobia, often also targeting gender/sexual orientation or other forms of hatred based on intolerance.
Impersonation	Crimes in which someone wrongfully obtains and uses another person's personal data in some way that involves fraud or deception.
Misinformation and defamation	Spreading fake or exaggerated news through rumors or falsehoods that aim to discredit women, and in particular public figures (for example, public officials, activists, journalists).
Video- and image-based abuse	Includes two key behaviors: (1) sexting coercion or engaging in unwanted sexual behavior via sexually explicit pictures or video, and (2) creation, distribution or threat of distribution of sexually explicit images of another person without their consent.
Violent threats	Threats of offline violence, including rape threats, injury or death threats, etc. directed at the victim and/or their offspring and relatives, or incitement to physical violence.

Geographic scope

Our study analyzes the 51 countries with the largest number of persons online, based on internet penetration rates (see Appendix A).

Estimating prevalence

A detailed survey questionnaire was developed (see Appendix B) and fielded in 45 countries through the months of April and May 2020. For six countries (Côte d'Ivoire, Ethiopia, Iran, Iraq, Sudan and Uzbekistan), due to logistical difficulties in developing a meaningful survey sample, we developed prevalence data estimates based on modelled data from comparable countries and insights from expert interviews.

Raw data gathered through primary research and expert input for all 51 countries was then scaled to reflect **country-specific demographic and ICT access and use characteristics**, which allowed us to account for differences between the survey sample and the national population. Further details on the prevalence modelling methodology (and its limitations) are included in Appendix C.

This study estimates the prevalence of online violence against women in the year preceding the completion of our survey (May 2019 to May 2020). In line with UN secretary-general António Guterres' definition of the prevalence of online violence against women⁷, the EIU's estimates of prevalence rates pertain to adult women (aged between 18-74), with access to the internet, categorized across three cascading⁸ levels of experience:

- **personal:** women who reported having personally experienced violence online;
- **community:** women who reported knowing someone who had been targeted, from across their personal or professional networks;
- **witnessed:** women who reported witnessing violence that they observed happening online to someone else (including from outside their networks).

⁷ UN News. A staggering one-in-three women experience physical, sexual abuse. 24 November 2019. A staggering one-in-three women, experience physical, sexual abuse

⁸ It is important to note that prevalence rates cascade across these three aforementioned levels, as women individually are members of their communities, and if an individual reports personal or community experience/s with online violence, they have witnessed the perpetration of online violence in some form.

Appendix: Methodology

A. Country scope

The EIU ranked countries around the world based on the size of their online populations, as determined by the total population size and the degree of internet penetration in each country (see table below). Of the 51 countries with the largest online populations, a survey was fielded in 45 countries (please see Appendix B for details on survey methodology). Estimates of prevalence of online violence against women in the remaining six countries were developed on the back of expert insights and comparator country analysis, and close consideration of demographic data, and geographical and developmental comparability.⁶⁶

Global rank	Country	Region	Internet access %	Population (m)	Total online population (m)
1	China	Asia Pacific	54.30%	1,379.00	748.80
2	India	Asia Pacific	34.50%	1,338.70	461.17
3	United States of America	Americas	87.30%	329.20	287.28
4	Brazil	Americas	67.50%	207.70	140.11
5	Russia	Europe	76.00%	148.80	113.08
6	Japan	Asia Pacific	84.60%	127.50	107.85
7	Indonesia	Asia Pacific	32.30%	260.60	84.15
8	Nigeria	Africa	42.00%	190.90	80.17
9	Mexico	Americas	63.90%	124.80	79.67
10	Germany	Europe	84.40%	82.80	69.84
11	Philippines	Asia Pacific	60.10%	105.20	63.16
12	United Kingdom	Europe	94.60%	66.70	63.14
13	Vietnam	Asia Pacific	58.10%	94.60	55.00
14	Turkey	Europe	64.70%	81.10	52.47
15	Iran*	Middle East	64.00%	81.80	52.39
16	France	Europe	80.50%	64.80	52.20
17	South Korea	Asia Pacific	95.10%	51.20	48.65
18	Egypt	Africa	45.00%	95.20	42.79
19	Spain	Europe	84.60%	46.70	39.47
20	Italy	Europe	63.10%	60.70	38.27
21	Thailand	Asia Pacific	52.90%	69.20	36.61
22	Canada	Americas	91.00%	36.70	33.43
23	Argentina	Americas	74.30%	43.90	32.65

⁶⁶ These six countries include Côte d'Ivoire, Ethiopia, Iran, Iraq, Sudan and Uzbekistan.

24	Pakistan	Asia Pacific	15.50%	207.90	32.25
25	South Africa	Africa	56.20%	57.00	32.02
26	Colombia	Americas	62.30%	48.90	30.45
27	Poland	Europe	76.00%	38.30	29.07
28	Saudi Arabia	Middle East	82.10%	32.60	26.78
29	Ukraine	Europe	58.90%	42.40	24.94
30	Malaysia	Asia Pacific	80.10%	31.10	24.93
31	Bangladesh	Asia Pacific	15.00%	159.70	23.95
32	Venezuela	Americas	72.00%	31.20	22.48
33	Morocco	Africa	61.80%	35.60	21.98
34	Taiwan	Asia Pacific	92.80%	23.60	21.89
35	Australia	Asia Pacific	86.50%	24.90	21.55
36	Algeria	Africa	47.70%	41.30	19.71
37	Ethiopia*	Africa	18.60%	105.00	19.54
38	Iraq*	Middle East	49.40%	38.30	18.89
39	Uzbekistan*	Europe	52.30%	32.00	16.72
40	Myanmar	Asia Pacific	30.70%	53.40	16.38
41	Netherlands	Europe	93.20%	17.20	16.01
42	Peru	Americas	48.70%	31.80	15.51
43	Chile	Americas	82.30%	18.70	15.42
44	Kazakhstan	Europe	76.40%	18.30	14.00
45	Tanzania	Africa	25.00%	54.70	13.67
46	Sudan*	Africa	30.90%	40.50	12.51
47	Romania	Europe	63.70%	19.50	12.43
48	Ghana	Africa	39.00%	28.80	11.24
49	Guatemala	Americas	65.00%	17.30	11.22
50	Côte d'Ivoire*	Africa	43.80%	24.90	10.93
51	Belgium	Europe	87.70%	11.50	10

*Prevalence estimates were constructed through expert input and comparator country analysis

B. Survey methodology and questionnaire

The survey specifications and full questionnaire are detailed below.

1. Survey specifications

Length: ~10-minute survey (23 questions)

Methodology: Online

Minimum sample size: 4,500 completes (100 completes per country)

Age: 18-74 years; Minimum 30% each GenZ/Millennials (born 1981-2002), Gen X (born 1965-1980), Baby Boomers (born 1946-1964); the remaining 10% to fall naturally [Nest within country]

Gender: 100% female

Geography: 45 countries (See table below)

Household income: 50/50 split above and below median by country

Community type: Mix of urban (major cities) and non-urban (suburban and rural) in each country

Online activity: Respondents must use the Internet or use social media at least several times a month

Languages/translations: Local language in each country (See table below)

2. Target countries

Country	Language	Region	Sample Size
Algeria	English, Arabic	Africa	100
Argentina	Spanish	Americas	100
Australia	English	Asia Pacific	100
Bangladesh	English/ Bangla	Asia Pacific	100
Belgium	French, English	Europe	100
Brazil	Portuguese	Americas	100
Canada	English	Americas	100
Chile	Spanish	Americas	100
China	Mandarin	Asia Pacific	100
Colombia	Spanish	Americas	100
Egypt	English, Arabic	Africa	100
France	French	Europe	100
Germany	German	Europe	100
Ghana	English	Africa	100
Guatemala	English	Americas	100
India	English	Asia Pacific	100

Indonesia	Bahasa	Asia Pacific	100
Italy	Italian	Europe	100
Japan	Japanese	Asia Pacific	100
Kazakhstan	Russian/Kazak	Europe	100
Malaysia	Malay	Asia Pacific	100
Mexico	Spanish	Americas	100
Morocco	English, Arabic	Africa	100
Myanmar	English	Asia Pacific	100
Netherlands	Dutch	Europe	100
Nigeria	English	Africa	100
Pakistan	English	Asia Pacific	100
Peru	Spanish	Americas	100
Philippines	Filipino	Asia Pacific	100
Poland	Polish	Europe	100
Romania	Romanian	Europe	100
Russia	Russian	Europe	100
Saudi Arabia	English, Arabic	Middle East	100
South Africa	English	Africa	100
South Korea	Korean	Asia Pacific	100
Spain	Spanish	Europe	100
Taiwan	Mandarin	Asia Pacific	100
Tanzania	English	Africa	100
Thailand	Thai	Asia Pacific	100
Turkey	Turkish	Europe	100
Ukraine	Russian	Europe	100
United Kingdom	English	Europe	100
United States	English	Americas	100
Venezuela	Spanish	Americas	100
Vietnam	Vietnamese	Asia Pacific	100

3. Questionnaire

[Demographic & screening questions]

1. In which country do you live? Select one.

2. Which best represents your gender? Select one.

- Male [TERMINATE]
- Female
- Other [TERMINATE]
- Do not care to answer [TERMINATE]

3. In what year were you born? Select one.

4. Which of the following ranges best represents your household income? Select one.

5. Including yourself, how many people live in your household?

6. Which of the following best describes the community in which you live? Select one.

- In a city/urban area
- Near but outside of a city/suburbs
- Far from a city, in a rural area
- Not sure

7. How often do you use the Internet? Select one.

- Several times a day
- Every day
- Several times a week
- Once a week
- Several times a month
- Once a month or less [TERMINATE]
- Not sure [TERMINATE]

8. How often do you use the Internet to access social media or social networking platforms? This includes Internet apps or sites where people share/receive information such as social networks, video/visual sharing apps, messaging apps, friendship/dating apps/websites, blogging platforms, and community forums/boards. Select one.

- Several times a day
- Every day
- Several times a week
- Once a week
- Several times a month
- Once a month or less [TERMINATE]
- Not sure [TERMINATE]

9. Which of the following devices do you most often use to connect to the Internet? Select one.

- Mobile phone (eg, smartphone or feature phone)
- Tablet computer
- Laptop computer
- Desktop computer
- Game system/television
- Other, please specify

10. Where do you most often use the Internet? Select one.

- At home
- At the home of a friend or family member
- At school
- At work
- Library
- Internet café or similar location with devices/computers you can use
- Public WiFi network (eg, coffee shops, malls, restaurants, etc.)
- Other, please specify

[Measurement questions]

11. To what extent are you aware of the following behaviours being used to target women online?

Select one for each row.

	Not at all aware	Slightly aware	Moderately aware	Very aware	Don't know/ Do not care to respond
Someone sharing or threatening to share private information about an individual online					
Someone sharing or threatening to share offensive or sexually explicit images/videos of an individual online					
Someone threatening physical violence online against an individual or their relatives					
Someone sending or posting messages to undermine an individual's self-esteem or reputation					
Someone stealing an individual's password and/or accessing their online accounts, Internet devices, etc.					
Someone using an individual's online accounts, or creating an account using their identity					
Someone, using sexist or hateful language toward an individual online					
Someone spreading false information about an individual and/or defaming them online					
Someone creating a large scale negative campaign about an individual online					

12. How often do you believe women are targeted online through the following behaviours? Select one for each row.

	Not at all often	Not very often	Somewhat often	Very often	Don't know/ Do not care to respond
Someone sharing or threatening to share private information about an individual online					
Someone sharing or threatening to share offensive or sexually explicit images/videos of an individual online					
Someone threatening physical violence online against an individual or their relatives					
Someone sending or posting messages to undermine an individual's self-esteem or reputation					
Someone stealing an individual's password and/or accessing their online accounts, Internet devices, etc.					
Someone using an individual's online accounts, or creating an account using their identity					
Someone, using sexist or hateful language toward an individual online					
Someone spreading false information about an individual and/or defaming them online					
Someone creating a large scale negative campaign about an individual online					

13. To what extent do you think the following behaviours used to target women online can be harmful? Select one for each row.

	Not at all harmful	Not very harmful	Somewhat harmful	Very harmful	Don't know/ Do not care to respond
Someone sharing or threatening to share private information about an individual online					
Someone sharing or threatening to share offensive or sexually explicit images/videos of an individual online					
Someone threatening physical violence online against an individual or their relatives					
Someone sending or posting messages to undermine an individual's self-esteem or reputation					
Someone stealing an individual's password and/or accessing their online accounts, Internet devices, etc.					
Someone using an individual's online accounts, or creating an account using their identity					
Someone, using sexist or hateful language toward an individual online					
Someone spreading false information about an individual and/or defaming them online					
Someone creating a large scale negative campaign about an individual online					

14. In the last 12 months, to what extent have you personally experienced and/or witnessed the following behaviours used to target women online? Select all that apply in each row.

	Have personally experienced it	Know someone who was targeted	Have witnessed it happening online to someone else	Have neither experienced nor witnessed it happening to someone else [EXCLUSIVE OPTION]	Don't know/ Do not care to respond
Someone sharing or threatening to share private information about an individual online					
Someone sharing or threatening to share offensive or sexually explicit images/ videos of an individual online					
Someone threatening physical violence online against an individual or their relatives					
Someone sending or posting messages to undermine an individual's self-esteem or reputation					
Someone stealing an individual's password and/or accessing their online accounts, Internet devices, etc.					
Someone using an individual's online accounts, or creating an account using their identity					
Someone, using sexist or hateful language toward an individual online					
Someone spreading false information about an individual and/or defaming them online					
Someone creating a large scale negative campaign about an individual online					

15. In the last 12 months, on what types of online platforms did you most often experience and/or see these kinds of behaviours being used to target women? Select all that apply.

- Social networks (Facebook, Twitter, LinkedIn, Snapchat, renren, etc.)
- Photo/Video sharing (Instagram, Pinterest, YouTube, TikTok, Douyin, etc.)
- Blogging/Community (Tumblr, Reddit, Sina Weibo, etc.)
- Messaging services (Instant/text messaging apps, WhatsApp, WeChat, etc.)
- Dating apps (Match, OKCupid, Bumble, Hinge, Tinder, Badoo, etc.)
- Email
- Other (please specify)
- Do not care to respond

16. [If Q14=personally experienced] Thinking of the last 12 months, how often did you personally experience these kinds of behaviours? Select one for each row.

	Every 6 months or less often	Monthly	Weekly	Daily	Hourly or more often	Don't know/ Do not care to respond
[FILTER LIST BASED ON Q14; SHOW ANY IF 'PERSONALLY EXPERIENCED']						

17. [If Q14=personally experienced] When you have personally experienced these kinds of behaviours, what kind of relationship did you have with the person or people targeting you? Select all that apply.

- Someone or people that I know from offline
- Someone or people that I know from online
- Someone or people previously unknown to me
- Anonymous user(s)
- Other, please specify
- Do not care to respond

18. [If Q14=personally experienced] What were the most significant impacts, if any, resulting from your experience(s) with these behaviours? Select all that apply.

- Thought twice about posting again
- Reduced my online presence
- Blocked contacts
- Created a new/private profile
- Stopped using that online platform
- Changed my mobile number
- Reported the behaviour to the online platform
- Reported the behaviour to an offline protective agency
- Felt unsafe
- Family felt unsafe
- Experienced mental health or emotional harm
- Experienced offline physical harm
- Felt embarrassed
- Lost or had to change my job
- Caused harm to a personal relationship
- Other (please specify)
- Do not care to respond

19. To what extent do you agree or disagree with the following statements? Select one for each row.

	Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree	Don't know/ Do not care to respond
I am more cautious about what I post online out of fear of being targeted					
The Internet is a safe place for me to share my opinions and ideas					
Social media platforms should do more to address women being negatively targeted online					
Women are more often targets of cyber harassment than men					
More needs to be done to protect women from being negatively targeted online					
There is little women can do once they are targeted online to get help or to put a stop to it					
I worry about negative online behaviour from others impacting my real life					
Women often don't know that these negative online behaviours are reportable					
Women have become accustomed to being negatively targeted online, because nothing is done to stop it					
I know where I can safely report negative online behaviour targeting women when I experience or observe it					
The Internet can be a helpful source of information and support for women dealing with these kinds of negative online behaviours					

20. What guidance would you give to other women like yourself about how to protect themselves against being negatively targeted online? Select all that apply.

- Keep your profile/information private
- Don't post information that allows someone to locate you
- Don't give out your phone number or email address
- Immediately report someone who makes you feel uncomfortable
- Tell others within your network(s) about the person targeting you and their behaviour
- Tell someone in your real life about the experience
- Seek help from an offline protection agency, if needed
- Keep records of the targeting, like messages, images, etc.
- Other (please specify)
- Do not care to respond

[OPEN-END] Has the recent outbreak of covid-19 impacted the frequency and/or ways by which women are negatively targeted online in your country? If so, how?

[Closing demographics]

21. Which of the following best describes your current employment status? Select one.

- Employed full-time or part-time, salaried
- Employed full-time or part-time, hourly
- Self-employed
- Student
- Unemployed, looking for work
- Not working by choice (homemaker, etc.)
- Disabled, not able to work
- Retired
- Other, please specify
- Do not care to respond

22. What is the highest level of education you have completed? Select one.

- Less than high school/secondary school
- High school / GED/ secondary school graduate
- College/university or technical degree
- Advanced degree (Master's, Doctoral, Professional degree)
- Do not care to respond

23. Which if any of the following apply to you? Select all that apply.

- Married or in a committed relationship
- Not married/single/divorced/widowed
- Parent of child(ren) ages 12 and younger
- Parent of child(ren) ages 13 to 17
- Parent of child(ren) 18+
- Caregiver to parents or other adults
- Home/apartment/condo owner
- Home/apartment/condo renter
- Automobile/car owner
- Transit commuter/metro taker
- Subscribe to streaming entertainment services (Netflix, Amazon Prime, Hulu, NowTV, iFlix, Tribe, ViKi, HOOQ)
- Use mobile payment apps (Apple Pay, Google Wallet, Venmo, Zelle, PayPal, Alipay, WeChat Pay)
- Use ridesharing apps (Uber, Lyft, BlaBlaCar, Grab, Go-Jek)
- None of these
- Do not care to answer

C. Model methodology notes

The EIU survey (detailed in Appendix B) generated raw data on the prevalence of online violence against women within the respondent pool across nine threat tactics, namely doxing, video- and image-based abuse, violent threats, cyber-harassment and cyberbullying, hacking, impersonation, hate speech, misinformation and defamation, and astroturfing in 45 countries. Across countries, the 4,561 respondents provided us with a rich dataset from which to extract insights around the prevalence of online violence against women at the overall sample level, the individual level by threat tactic, the community level by threat tactic, and the community and witness level by threat tactic.

At the country level, our survey sample of approximately 100 respondents per country is relatively small when compared to the addressable country samples (adult women with internet access). We imposed quotas to ensure a meaningful distribution of data by age, which allowed us to extract insights within age bands, but also means that the survey sample, on its own, is not statistically representative in its results for the overall population within and across countries. Using a survey sample of 100 respondents per country means that raw data emerging from the survey sample does not adequately reflect the characteristics of the actual country population sample (for example income levels, urbanization, household size, and access to and use of technology). Accordingly, these characteristics were incorporated through demographic and ICT access and use scaling factors, based on the difference in characteristics of the survey sample and the actual addressable population sample (all adult women in each country with access to the internet).

In order to narrow the margins of error associated with raw prevalence data from the survey program, we developed a modelling framework that uses an econometric approach which allowed us to overlay and scale the raw survey data with country-specific demographic and ICT (access and usage) scaling or adjustment factors (these are explained in more detail in the following sections of this guidance note). Resulting prevalence outputs from this econometric modelling exercise were then used as guidance for both the directionality and magnitude of online violence against women in each of the countries of scope, and are significantly more robust and statistically meaningful when compared to the raw prevalence data coming from the survey program.

To estimate prevalence of violence against women at the country level, we employed a seven step approach:

1. Gather data on raw prevalence rates of online violence against women based on the survey program
2. Computing and applying the demographic scaling factor to the raw survey prevalence data
3. Computing and applying the ICT access and use scaling factor to the demographically scaled results
4. Constructing and applying an attenuation factor to modelled prevalence rates
5. Computing and installing a statistical representativeness margin of error
6. Generating estimates for the six countries not included in the survey scope
7. Calibrations and checks: correlation between the prevalence of online violence against women and background indicators.

1. Gathering data on raw prevalence rates from survey program

Our starting point was to review survey responses within a country and to compute prevalence rate data points for the 45 countries where the survey program was conducted. Hence if a survey respondent has personally experienced online violence under tactic 1 and tactic 5, for example, then their response was recorded as “1=yes” under the prevalence rate for each of these two tactics, separately. For the remaining seven tactics, this individual’s response was recorded as “0=no” for the purposes of prevalence estimation by country, by threat tactic, at the individual experience level.

Each respondent of the survey program in each of the 45 countries provided input around online violence against women at three levels, including:

- a. Prevalence of personal experience of online violence (by country; by threat tactic): which tests whether the individual has personally experienced online violence through any of the nine threat tactics
- b. Prevalence of community experience of online violence (by country; by threat tactic): which tests whether anyone in an individual’s network or immediate community has personally experienced online violence through any of the nine threat tactics
- c. Prevalence of witness experience of online violence (nationally; at the tactic level): which tests whether the individual has witnessed another individual online (anyone, not necessarily a personal connection) experiencing online violence through any of the nine threat tactics.

In addition to building estimates of online violence against women by country, by threat tactic, we also constructed estimates of the prevalence of online violence against women at the aggregate country level, irrespective of threat tactic. Under these calculations, in order to avoid double counting prevalence rates for the same individual under various threat tactics, we adjusted the raw national prevalence rate across tactics by constructing binary variables that are a “yes” for calculation purposes if the respondent had experienced online violence through any tactic (or multiple tactics). Therefore, if a respondent had experienced multiple forms of online violence, at the national level, their response was counted only once. It is important to note that since the national total prevalence rates are aggregated across tactics, this means that these rates for online violence will be higher than national prevalence rates for individual threat tactics.

To build national estimates of online violence against women, we aggregated the responses of all survey takers in a country to construct the following indicators of total country-level prevalence of online violence against women:

- a. Total prevalence of personal experience of online violence (at the national level, combined across tactics)
- b. Total prevalence of community experience of online violence (at the national level, combined across tactics)
- c. Total prevalence of witness experience of online violence (at the national level, combined across tactics)

2. Computing and applying the demographic scaling factor

In order to ensure that the prevalence estimates generated from the survey program of this study are adequately representative of country-specific population characteristics, we employed a composite scaling factor to adjust or calibrate results emerging from our survey program for each country, by threat tactic. This scaling factor incorporates demographic differences between the survey sample and the actual country population sample across a list of key indicators, including:

- Rural-urban split (EIU data)
- Average household size (National statistical agency/census data)
- Employment status/labor-force participation (EIU data)
- Income inequality levels as measured through Gini data (World Bank data)

More specifically, we developed modelled estimates of prevalence of online violence against women by scaling the raw survey data (prevalence rates by country and by threat tactic) based on differences between the survey sample's demographic composition and each country's actual demographic composition across the set of indicators listed above. An important step here was to establish clear directionality of the relationship between these individual demographic indicators and exposure to online violence against women. Accordingly, we assigned directionalities to the relationships between these indicators and exposure to online violence against women, based on the expected impact of differences in these indicators on the prevalence of online violence, determined through extensive literature reviews and expert interviews.

Urbanization (*directly proportional relationship between urbanization and online violence against women*): This indicator affects gender-based violence (GBV) through two main pathways: intimate partner violence (IPV) and non-partner violence. In urban areas, women are at lower risk of IPV, but at a higher risk of non-partner violence (McIlwaine, 2008). While there is research that finds the converse to be true (lower non-partner violence and higher IPV), expert input collected under our initial project stages suggests that in the case of online violence in particular, the level of urbanization is expected to be positively correlated with the prevalence of such violence (Brudvig, 2020).

Household size (*directly proportional relationship between household size and online violence against women*): This indicator affects GBV through its relationship to a woman's decision-making ability. Larger household sizes are found to be positively correlated with weakened decision-making ability among women, making them vulnerable to violence (Krug et al., 2002). In addition, women who experience domestic violence are at higher risk of experiencing online and technology-facilitated violence (Pew, 2017).

Labor-force participation (*inversely proportional relationship between labor-force participation and online violence against women*): This indicator has been found to have an impact on GBV through increased autonomy among women. Research demonstrates that when women begin to participate in the labor force, their economic autonomy increases, reducing their risk of exposure to domestic violence while simultaneously challenging traditional power structures, conversely placing them at greater risk of domestic violence (Paul, 2016). This serves as a barrier to labor-force participation by women. However, once this barrier is overcome in a society, women's labor-force

participation improves, and a negative correlation between women's participation in the labor force and violence against women can then be observed (Siddique, 2018).

Income inequality level (*inversely proportional relationship between income level and online violence against women*): Broadly, as households move farther away from poverty and risk of poverty, the exposure of women to violence reduces (Abramsky et al., 2019). As increasing economic security is linked to lower GBV, we assess the differentials between household income levels of survey respondents (by constructing survey-level Gini values) and compare them to the differentials between income levels in a country as measured through the Gini coefficient.

The demographic scaling exercise follows the modelling logic defined below:

Equation (1):

$$demoScalingPrev_{country, tactic} = \sum_{(tactic=1)}^n \left[EIUsurveyPrev_{country, tactic} \times \sum_{i=1}^4 \frac{countryDemoScaling_i}{surveyDemoScaling_i} \right]$$

- **demoScalingPrev** represents the demographically scaled estimate of prevalence of online violence against women, by country, by threat tactic
- **EIUsurveyPrev** represents the primary data from the EIU survey program; prevalence of online violence against women, by country, by threat tactic
- **[tactic, n]** represents the summation series by country and threat tactic, across "n" threat tactics
- **[i, 4]** represents summation series by country, by threat tactic, across four demographic scaling indicators ("DemoScaling")

Equation (2):

$$DemoScaling_i = \sum_{i=1}^4 [rurUrbSplit', HHsize', GiniValue', LFP']$$

- **[i, 4]** represents summation series by country ("country"), by threat tactic ("tactic"), across four demographic scaling indicators ("DemoScaling")
- **rurUrbSplit'** captures differences between the rural-urban split in the EIU survey sample and the national population sample
- **HHsize'** captures differences between the average household sizes in the EIU survey sample and the national population sample
- **GiniValue'** captures differences between the level of income inequality in the EIU survey sample and the national population sample
- **LFP'** captures differences between the employment status or labor-force participation in the EIU survey sample and the national population sample

3. Computing and applying the ICT access and usage scaling factor

In addition to the demographic scaling exercise, we developed and applied composite scaling factors (for each country, by threat tactic) to account for the level of access to and utilization of information and communications technology (ICT) in each country, across the broader addressable population segment (adult women, with access to the internet).

The ICT scaling exercise is iterative, and considers indicators including the following (gender disaggregated, subject to data availability) to calibrate our demographically scaled estimates of prevalence of online violence against women:

- Number of women with access to the internet (International Telecommunication Union data)
- Active mobile-cellular subscriptions (International Telecommunication Union data)

We assigned directionalities to these indicators, based on the expected effect of these indicators on the prevalence of online violence against women, as determined through extensive literature reviews and expert interviews.

Internet access: We adjusted first for internet access; internet access among women varies by country, and access to the internet is a critical factor in determining women's exposure to online violence. As 100% of survey respondents are adult women with access to the internet, we adjusted prevalence rates downwards based on population-level internet penetration rate among women.

Mobile-phone access: We adjusted second for mobile-phone access; women who have access to both a mobile phone and the internet face greater exposure to online violence, as their frequency of usage is higher than that of someone who can only access the internet through a single, fixed device. Higher internet usage frequency increases a woman's risk of exposure to online violence (Pew, 2017). Hence, access to a mobile phone is expected to increase women's risk of exposure to online violence, conditional on their access to the internet.

Estimates of prevalence of online violence against women post the application of the ICT access and use scaling factor allowed us to calculate (with a lower margin of error) the percentage of all women in each country (adult women, with or without access to the internet) who have experienced online violence through any of the nine threat tactics in scope for this study.

The ICT access and usage scaling exercise follows the modelling logic defined below:

Equation (3):

$$finalPrev_{country, tactic} = \sum_{tactic=1}^n \left[demoScalingPrev_{country, tactic} \times InternetUse_{country} \times activeMobileSubs_{country} \right]$$

- **finalPrev** represents the estimates of prevalence of online violence against women, by country, by threat tactic after the application of the demographic and ICT scaling factors
- **demoScalingPrev** represents the demographically scaled estimate of prevalence of online violence against women, by country, by threat tactic
- **[tactic, n]** represents the summation series by country and threat tactic, across "n" threat tactics
- **InternetUse** calibrates demographically scaled estimates for the proportion of women with Internet access in the country

- **activeMobileSubs** then calibrates the demographically scaled estimates based on the number of active mobile-cellular subscriptions among women in the country

4. Constructing and applying an attenuation factor to modelled prevalence rates

The raw prevalence totals refer to the number of respondents who answered affirmatively to any of the nine tactic questions. Because this data is at the meta level (it is calculated using the other survey data points), we cannot use the same methodology for demographic and ICT adjustment that was used for each of the nine tactic questions.

For example, if each of the underlying tactic questions receives a 10% adjustment, it does not follow that the number of respondents answering affirmatively to any question would also increase by 10%. In fact, as this prevalence total is typically higher than the underlying tactic questions, it is mathematically inaccurate to expect one-for-one movement, especially as the prevalence total approaches 100%. In such a case, we would expect a diminishing marginal response for the prevalence total as it gets closer to the upper limit.

To provide a reasonable estimate of how much this adjustment response should be for the prevalence total, we used the following formula:

Adjusted prevalence total = Raw prevalence total * (Original adjustment rate * Attenuation factor)

The original adjustment rate is the same rate used to adjust each of the underlying nine threat tactic-specific questions. This provides a starting point in terms of the scale of the adjustment that is needed. The attenuation factor serves to tamp down on this original adjustment rate, so that it gets progressively weaker depending on how close the raw prevalence total is to 100%. For example, if the raw prevalence total is already at 99%, the attenuation factor will tamp down strongly on the original adjustment rate, so that the adjusted prevalence does not surpass 100%.

The effects of the attenuation factor are designed to adjust prevalence rates progressively as the raw prevalence total approaches 100%, ensuring that the model does not introduce artificial attenuation at lower percentages. The attenuation factor has limited to no effect in cases wherein the raw prevalence rate is at its lowest possible value (that is, equal to the highest of the nine underlying tactics). This is because any increase to that tactic will necessarily translate one-for-one into an increase in the prevalence total. The same process was also applied for prevalence totals that undergo negative adjustments, in reverse. In this case, raw prevalence totals close to 100% were not affected by the attenuation factor as much, whereas raw prevalence totals closer to their minimum experienced progressively more attenuation.

5. Computing and installing a statistical representativeness margin of error

In this step we computed and installed a margin of error on the prevalence estimates by country, coming from the survey program. This margin of error allowed us to statistically quantify the extent (as a percentage) to which the survey results differ from the actual prevalence of online violence against women in each country, by threat tactic. It is precisely this margin of error that the modelled estimates counter, therefore making final prevalence rate estimates for online violence against women statistically meaningful.

The margin of error is dependent on the following: survey sample size (100 respondents per country), selected confidence interval (set at 95% confidence interval for this survey), and the size of the relevant in-country population (the percentage of women over the age of 18, and with access to the internet).

The margin of error was computed using the modelling logic defined below:

Equation (4):

$$\text{marginOfError} = z \times \frac{\sigma}{\sqrt{n}}$$

- **n** represents the EIU survey sample size
- **σ** represents the country population standard deviation
- **z** is the z-stat score at 95% confidence level

6. Six countries in scope, in which the survey could not be fielded

The EIU conducted a targeted expert interview program to seek input from individuals who have experience studying and dealing with GBV with a focus on online or technology-enabled gender-based violence (where available) for the six countries where the survey could not be fielded owing to difficulties in achieving a representative sample of 100 relevant respondents, namely Côte d'Ivoire, Ethiopia, Iran, Iraq, Sudan and Uzbekistan.

Based on expert input, we gathered primary data for these countries (consistent with data gathering methodology employed by the survey program) and further identified countries within the survey scope that serve as meaningful comparators for each of the these six countries, taking into consideration demographic, ICT access and use, cultural and infrastructural commonalities. We then aggregated primary data gathered via expert interviews and scaled these prevalence rates of online violence by tactic and nationally based on prevalence results from comparator countries, to arrive at the estimated prevalence rates for each tactic and nationally for each of the six countries.

7. Calibrations and checks: correlation between the prevalence of online violence against women and background indicators

All outputs from this prevalence estimation workstream were carefully reviewed by EIU economists and country experts. To provide an additional foundation for calibration and sense checks, and to explore the relationship between the estimated prevalence of online violence against women (by country and threat tactic) and sentiment-related or trust-based indicators, we completed correlation analysis. We used three background indicators in this analysis:

- Gender Inequality Index (UN)
- Freedom on the Net (Freedom House)
- Crude birth rates (World Bank)

While useful for calibration, checks, and exploratory questioning, these background indicators were not directly integrated into the prevalence estimation model framework, as they do not share proven relationships with the prevalence rates of online violence against women.

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