

Social Uncertainty associated with Covid-19 and Fertility in Colombia

By Victoria San Juan Bernuy*, Fernando Ruiz-Vallejo[±] & Patrizio Lodetti[°]

The COVID-19 pandemic has brought unprecedented uncertainty to societies worldwide, with Latin America being no exception. In Colombia, the pandemic's arrival in March 2020 triggered a cascade of containment measures, including social distancing, border closures, and suspension of non-essential activities. This study investigates the impact of social uncertainty associated with COVID-19 on fertility in Colombia, based on a multi-method approach which combines digital demography tools with descriptive measures from birth and death records. Our research aims to contribute to the understanding of the pandemic's far-reaching consequences on demographic trends, highlighting the need for policymakers to address the complex interplay between health crises, social uncertainty, and fertility. By exploring the Colombian context, this study sheds light on the intricate relationships between COVID-19, social uncertainty, and fertility, providing valuable insights for policymakers and scholars alike.

Keywords: COVID-19, social uncertainty, fertility, Colombia, Latin America, demographic trends.

Introduction

Latin America a region, characterised by its diversity and dynamism encompasses over 20 countries with a total population of 650 million people (Celada, 2022). The onset of COVID-19 in this part of the world occurred in March 2020, marking the beginning of an unprecedented health crisis in the region. Governments implemented a series of containment measures such as social distancing, border closures, and the suspension of non-essential activities, aiming to curb the virus spread and prevent healthcare systems from becoming overwhelmed. In this context, fertility was affected, as social and economic uncertainty increased, impacting births negatively in most European countries (Aassve et al., 2021; Sobotka et al., 2021), China (Zhang & Li, 2021), and Japan (Ghaznavi et al., 2022) where low fertility scenarios were observed. In Latin America, while available studies identify a similar trend (Marteleteo et al., 2023; Cabella y Pardo, 2022; Castro et al., 2022; Lima et al., 2022; UNFPA, 2021; Montañó Mendoza et al., 2020), heterogeneous impacts at subnational levels and for different social classes were also observed (Castro et al., 2022).

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Moreover, during the COVID-19 pandemic, the media exerted a significant influence on the perception of uncertainty and its impact on fertility-related decisions. As the health crisis spread worldwide, the media became the primary source of information for the population, providing constant updates on the virus spread, containment measures, and potential treatments. However, this inundation of information also brought challenges such as the dissemination of fake news, conspiracy theories, and conflicting messages, contributing to increased uncertainty and anxiety in the population (Casino, 2022). This, in turn, may have affected motivations for parenthood, either by postponing (Zhao et al., 2024) or cancelling (Safdari-Dehcheshmeh et al., 2023) parenthood plans due to social isolation measures, feelings of distress, or uncertainty; or conversely, by accelerating the decision within stable partner relationships (Zhao et al., 2024).

Despite the influence of the media on social uncertainty associated with the Covid-19 pandemic and its impact on fertility, research exploring this relationship is scarce, as has been done in the study of economic uncertainty and the role of the media in reproductive intentions (Guetto et al., 2022). There are not much studies investigating this relationship in the Latin American context. Therefore, this article aims to contribute to filling this gap by studying the association between social uncertainty generated by the Covid-19 pandemic through the media and fertility. Taking the Colombian case, the research aims, on one hand, to identify the relationship between the increase in Covid-19 news and the birth behavior occurring between October 2020 and December 2022. On the other hand, to analyze if this relationship varies according to age group, marital status, educational level, and previous parity of mothers.

In addition to this introduction, the article includes a section on research background regarding the impact of Covid-19 on fertility and the role of the media. Subsequently, the methodology is described, highlighting the use of digital demography in combination with a descriptive approach to births reported in Colombia's vital statistics between 2020 and 2022. The last two sections correspond to the presentation of results and the discussion derived from the findings of the study.

Impact of Covid-19 on Fertility

Research on how the pandemic has affected reproductive behaviour has primarily focused on high-income countries, mainly in Western Europe and North America. Data suggest a decline in intentions to have children, in line with the findings proposed by Aassve et al. (2020). In most developed countries, a significant reduction in the number of births was observed between November 2020 and February 2021, approximately nine months after the pandemic began. For example, in Spain, Portugal, and Italy, there were reductions of 20%, 14%, and 12%, respectively. However, countries like Denmark, Finland, the Netherlands and Norway did not experience significant declines. On average, the reduction in developed countries was 5.1% in November, 6.5% in December, and 8.9% in January (Sobotka et al., 2021). In the United States, there was an 8% reduction in December 2020 compared to the same month the previous year, with greater reductions in areas most

affected by the pandemic in terms of infection rates and mobility restrictions (Cohen, 2021).

Wilde et al. (2020), in the United States, used Google search data to estimate a 15% year-on-year decrease in births for November 2020, reflecting changes in search trends related to pregnancy and contraception. It was observed that the decline would be even greater in low-income households and minority groups, aligning with the idea that economic concerns more heavily impact reproductive behavior among those with fewer resources. This decline in fertility would be considerably larger than that observed during the Great Recession of 2008.

Studies on reproductive intentions also show a decrease in the desire to have children in the short term. In countries like Moldova (Emery & Koops, 2022) and Germany (Lindberg et al., 2020), this decrease was approximately one-third. Luppi et al. (2020) demonstrated that intentions to have children had decreased in Spain, France, Italy, Germany, and the United Kingdom, manifesting differently in each context. In Italy, declines in intentions to have children were mainly observed among young people with high educational levels under 30 years old, while in Germany, patterns were concentrated in areas with higher COVID-19 infection rates. A study conducted in Shanghai by Zhu et al. (2020) found no significant effects on reproductive intentions, especially among couples who trusted government and public health measures. It was observed that those planning to postpone conception were particularly concerned about the virus's impact on maternal and fetal health.

In Latin America and the Caribbean, before the COVID-19 pandemic, a general trend of declining fertility was already being observed. In several countries in the region, fertility rates were approaching replacement levels, around 2.1 children per woman (ECLAC, 2022). However, economic and social differences generated a heterogeneous landscape, with significant variations in fertility rates among different socioeconomic groups and geographical areas. Since the onset of the pandemic in March 2020, speculation has arisen about the potential effects of COVID-19 on fertility. Available information suggests a downward trend in fertility rates in several countries in the region. For example, in Colombia, a study showed a significant decrease in births towards the end of 2020 (Montaño Mendoza et al., 2021). Similarly, in Brazil, research in six of the country's largest cities found a decline in births between October 2020 and March 2021, with reductions of up to 20% in some cities such as Curitiba and Belo Horizonte (Lima et al., 2022). Despite this general trend, heterogeneous impacts are also observed at the subnational level and among social classes (Castro et al., 2022).

Media, Uncertainty and Fertility

One of the most notable effects of media presence was the generation of a climate of widespread uncertainty. The constant exposure to alarming news about the rise in cases, hospital saturation, and high mortality rates not only affected the perception of the virus-associated risk but also instilled doubts about the future and stability of society as a whole. Striking images, sensational headlines, and the viral

spread of unverified information contributed to increased levels of stress and anxiety in many individuals, creating an emotionally charged environment (Casino, 2022).

In this context, uncertainty may have extended to multiple aspects of people's daily lives, particularly those in isolation, including family planning and reproductive decisions. Individuals faced an unstable economic and labor landscape due to restrictions imposed to contain the virus spread. This economic instability could translate into financial concerns that directly influenced decisions about having children or expanding the family, much like how fake news might have affected perceptions about the vaccine, which, as confirmed, has no concrete effect on fertility itself (Wesselink et al., 2022).

Furthermore, the media also contributed to exacerbating labor and economic uncertainty, which was particularly relevant in contexts like Italy, one of the European countries most affected by the pandemic. Studies conducted from 2016 to 2020 in Italy showed significant changes in perceptions and desires to have children among the young population. Labor instability, exacerbated by the economic crisis stemming from the pandemic, was directly associated with a lower intention to have children in the short term, especially among those with temporary, remote, or vulnerable jobs (Luppi et al., 2022). This relationship between job stability and reproductive desires underscored the importance of economic factors in family and reproductive decision-making during crises.

In addition to the economic aspect, the media also influenced public perception about health and safety related to the pandemic and its impact on fertility. Disinformation spread through various media channels generated unfounded concerns about the safety of the COVID-19 vaccine and its potential effects on fertility. Although scientific data support the safety of vaccines (Wesselink et al., 2022), the spread of conspiracy theories and myths undermined public trust and contributed to some people's reluctance to get vaccinated, which in turn had implications for family planning and the perception of risk associated with reproduction during the pandemic (Gromski et al., 2020; Ullah, 2020).

The influence of the media on these dynamics is multifaceted. On one hand, the dissemination of accurate and up-to-date information can empower individuals to make informed decisions about their reproductive and family health. However, the presence of misinformation and alarming news can generate anxiety and reluctance in the population, especially on sensitive topics like fertility and reproduction (Mejia et al., 2020).

Materials and Methods

The current study aims to explore the impact of covid-related media news (which directly or indirectly generate uncertainty) and fertility in Colombia. The use of online media data represents a particularly relevant innovation for studies that strive to correlate media and demographic phenomena and media narratives. This study adopts a quantitative descriptive methodology and also regression models to evaluate the existence of this association. The following are the details regarding the sources of data used:

- Online news press media: online articles from three national newspapers were consulted and collected, El Tiempo¹, El Espectador² and Portafolio³.

The first two are the most consulted print media in the country, and the third is significant in the business field. The period for searching news articles was from January 1, 2020, to December 31, 2022. A total of 412298 publications were collected, of which 54.8% were from El Tiempo, 36.1% from El Espectador, and 9.1% from Portafolio.

For the data collection, web scraping algorithms were developed to transcribe online news data into databases. These algorithms operated meticulously, scanning through online articles published in targeted newspaper websites on a daily basis: from January 1, 2020, to December 31 2022. By using the capabilities of these algorithms, both the textual content of the article and essential metadata were gathered systematically, including authorship, subject of reference, publication dates, and more. This approach ensured the comprehensive acquisition of relevant data, laying a robust foundation for the research and analysis. In the end, it was possible to identify 49539 news articles related to Covid-19 in the three consulted online newspaper. Subsequently, for each newspaper, a press coverage indicator was built by dividing the numbers of Covid related news to the total amount of news published on a monthly Base. The percentage was estimated over the total number of news articles and classified by month.

- Administrative data related to births and deaths: Micro data from the vital statistics of the National Statistics Bureau (Departamento Administrativo Nacional de Estadística, DANE), both mortality and births for the years 2020, 2021, and 2022 (last available year), were processed. These events were classified by month, and in the case of births, additionally by age, marital status, education, and number of previous children reported by the mother. Additionally, for the construction of the comparison parameter, records for the previous three years, i.e., from 2017 to 2019, were processed to calculate the average value of deaths and births for each month-year.
- Other sources: information of unemployment rates was taken from the official estimates of the DANE.

Regarding the methodology, in addition to descriptive analysis, panel regression models were used to provide an inferential perspective to the analysis, with the possibility to also take into account contextual variables, such as the weight of

¹Tiempo was founded on January 31, 1911 (Meneses, 2021). A report from 2020 indicates that it is the most consulted newspaper by the Colombian population, with a preference rate of 64.5%. (<https://mobimetrics.co/stats/los-periodicos-mas-leidos-por-los-colombianos/>, date accessed: April 13, 2024).

²El Espectador is the oldest media outlet in the country. It was founded on March 22, 1887 (Meneses, 2021). According to the Mobimetrics study, 41.4% of the population declared it as the most read newspaper (<https://mobimetrics.co/stats/los-periodicos-mas-leidos-por-los-colombianos/>, date accessed: April 13, 2024).

³Portafolio is a business and finance newspaper, founded in 1993. According to the aforementioned study, 9.6% of the population expresses their preference for it as their favorite newspaper (<https://mobimetrics.co/stats/los-periodicos-mas-leidos-por-los-colombianos/>, date accessed: April 13, 2024).

Covid-19 mortality on overall mortality and the unemployment rate, in explaining the emerging associations. In the current analyses, each observation corresponds to the month of the reference period and the models are elaborated in three progressive stages: i) including only media coverage, ii) adding socio-demographic variables to model i, iii) adding contextual variables to model ii. iv) This last full version of the model was used to explain variations in births for the most socio-demographic groups identified by the descriptive analysis. Throughout the process, special attention was paid to improving the model's goodness of fit and to changes in the direction and strength of the observed associations.

Variables

The dependent variable in this study is the increase in the number of births for each month during the reference period (January 2020 to December 2022) compared to the average number of births for the same month during the baseline period from 2017 to 2019, which serves as the reference value. Negative values indicate a reduction in births compared to this comparison value. From this point in the paper onwards, the dependent variable will be called the Weighted Variation In Births (WVB). Births were related nine months after the calendar year, under the assumption of the pregnancy period leading to a live birth. For example, births occurring in December 2020 correspond to conceptions in March 2020, the onset of the pandemic. Therefore, in the observation window of 2020-2022, the last month of observed births is December 2022, which accounts for conceptions in March of the same year. Additionally, calendar-birth months were classified into five sub-periods of the health emergency, defined based on measures taken by the national government (see Table 1). These periods were:

- Pre-Covid-19: the months immediately before confinement, corresponding to January and February 2020.
- Strict confinement: a period of restrictive and extreme confinement during March, April, and May 2020.
- Confinement with exceptions: confinement measures were relaxed for some essential functions other than healthcare personnel (June-August 2020).
- Selective confinement: a period of progressive opening, under a scheme of limited outing times. Corresponds to the months from September 2020 to February 2021.
- Reopening: generalized opening occurred in Colombia between March and June 31, 2022, when the President of Colombia, Iván Duque, declared the end of the pandemic.

Table 1. Relationship between Calendar and Birth Months during the Health Emergency in Colombia

Period	Month	Year	Month of Birth	Year of Birth
Pre-Covid	January	2020	October	2020
	February	2020	November	2020
Strict confinement	March	2020	December	2020
	April	2020	January	2021
	May	2020	February	2021
Confinement with exceptions:	June	2020	March	2021
	July	2020	April	2021
	August	2020	May	2021
Selective confinement	September	2020	June	2021
	October	2020	July	2021
	November	2020	August	2021
	December	2020	September	2021
	January	2021	October	2021
	February	2021	November	2021
Reopening	March	2021	December	2021
	April	2021	January	2022
	May	2021	February	2022
	June	2021	March	2022
	July	2021	April	2022
	August	2021	May	2022
	September	2021	June	2022
	October	2021	July	2022
	November	2021	August	2022
	December	2021	September	2022
	January	2022	October	2022
	February	2022	November	2022
March	2022	December	2022	

Source: own elaboration

Moreover, independent variables were included to analyze the variation of birth months compared to the average birth month during the period 2017-2019. The following table describes the independent variables (aggregated and monthly measured), and the source from which they were taken.

Table 2. Definition, Operation, and Source of Information for Independent Variables

Group of variables	Variable	Definition	Categories/Unit	Source
Press media	Covid-19 Press Coverage	Percentage of Covid-19 online news out of the total online news published	Percentage	Press media from El Tiempo, El Espectador y Portafolio. Data collection via web scraping algorithms.
Socio-demographic	Age groups	Five-year age groups of the mother of the live birth	10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54 years-old.	Vital Statistics. Births
	Marital status	Marital status of the mother of the live birth	Cohabitation of 2+ years, Cohabitation below 2 years, Separated/Divorced, Widow, Single, Married	Vital Statistics. Births
	Educational Attainment	Educational level of the mother of the live birth	Primary or less, Secondary, Technical/Technological, Higher Education	Vital Statistics. Births
	Previous Parity	Number of children prior to the reported birth	0, 1, 2, 3+	Vital Statistics. Births
Context	Percentage of Covid-19 Deaths	Percentage of deaths associated with Covid-19 out of the total deaths in the month	Percentage	Vital Statistics. Deaths
	Unemployment Rate	Percentage ratio of unemployed individuals to the labor force.	Rate	DANE Estimates

Source: own elaboration

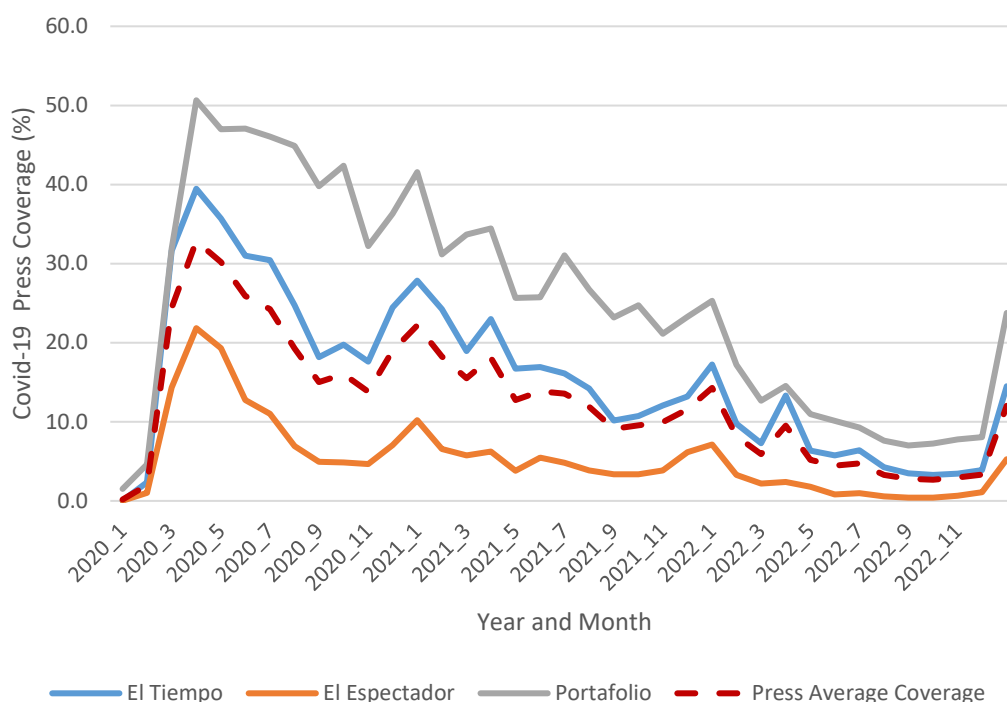
Results

The findings are presented in three sections. The first section describes the results about the news published by the three consulted media outlets and the press coverage of Covid-19 related news. The second section, analyzes press coverage trends related to births, based on the sociodemographic variables mentioned in the methodological section. Finally, the third section presents the findings of the regression models.

Press Coverage of Covid-19 Related News and Weighted Variation in Births

According to Figure 1, during the initial months of the lockdown, media coverage of COVID-19 surged dramatically, with Portafolio being the most prominent source at 50.6% in March 2020, followed by El Tiempo at 39.5%, and El Espectador in third place at 21.8%. From that point, a downward trend in media coverage is observed, interrupted by spikes that increased these percentages, such as in January 2021 during the selective isolation period, and in April 2021, January or April 2022, during the selective isolation stage. At the end of the period, following the end of the health emergency, very low coverage levels are observed.

Figure 1. *Press Coverage of COVID-19 news in the Three Online Media Outlets. Colombia, 2020-2022*

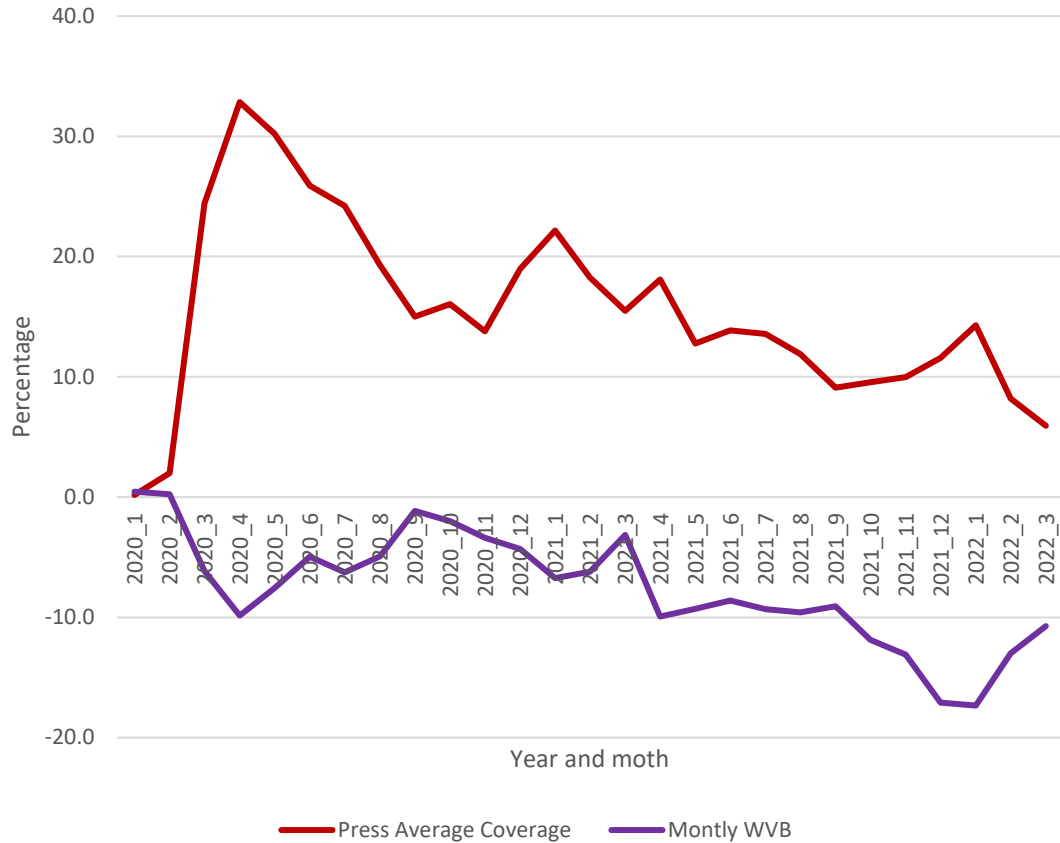


Source: own elaboration based on online press media data collected via webscraping (from El Tiempo, El Espectador and Portafolio) and data from DANE (vital statistics and unemployment indicators).

When comparing online press coverage (using the average) with the weighted variation in births, an interesting pattern emerges. Firstly, there is a widespread scenario of a reduction in the number of births throughout the observation period (see the violet line in Figure 2). Secondly, the trend shows an intensification of the reduction in births from October, as a result of the first month of lockdown (March 2020), paralleled with the significant increase of COVID-19 news. Moreover, the decrease in births slows down coincide with the reduction in the press coverage of COVID-19 news. In December 2020 and January 2021, again, the decrease in births intensifies simultaneously with a new peak in press coverage of COVID-19 news.

A similar pattern is observed in March/April 2021 and November/December of the same year, where press coverages exhibit small peaks.

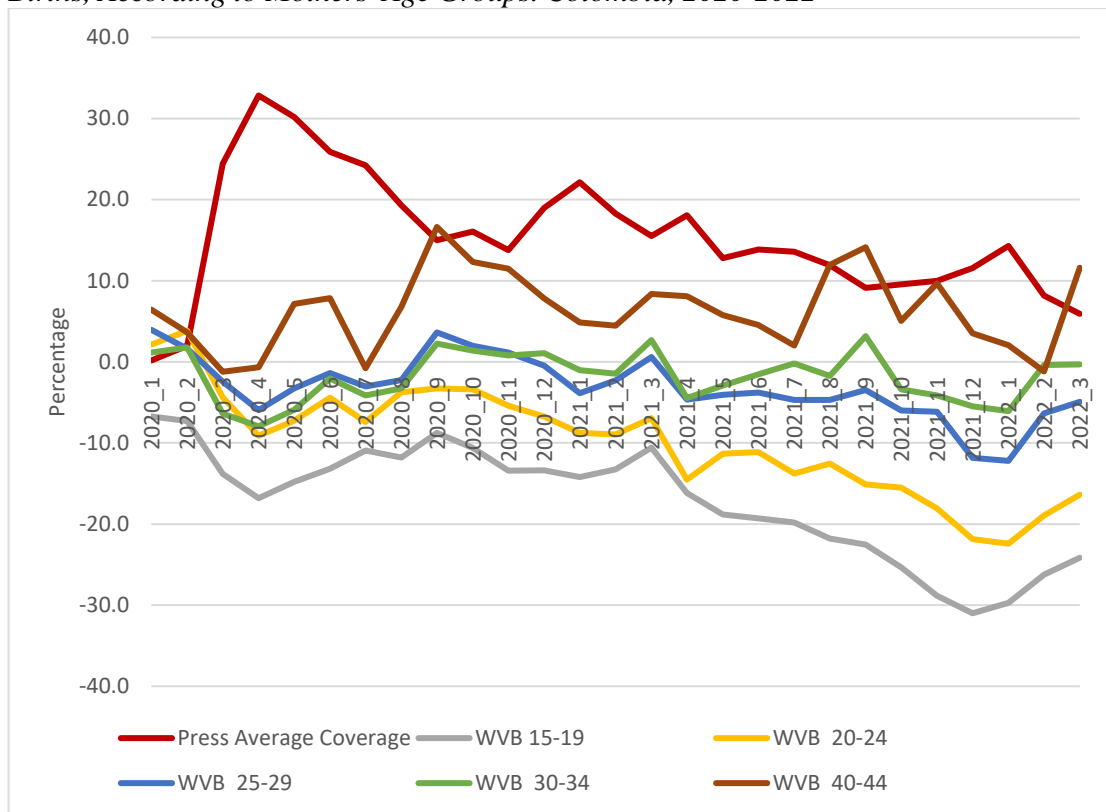
Figure 2. Press Coverage of COVID-19 News and Monthly weighted Variation in Births over the reference period. Colombia, 2020-2022



Source: own elaboration based on online press media data collected via webscrapping (from El Tiempo, El Espectador and Portafolio) and data from DANE (vital statistics and unemployment indicators). The Role of Sociodemographic Features

When including sociodemographic variables, variations in the shape and/or intensities of the previously described pattern are observed. Figures 3-6 display differentiated trends according to age (Figure 3), marital status (Figure 4), education level (Figure 5), and number of prior children (Figure 6). Regarding mothers' age, throughout the period, the greatest reductions are observed among those under 20 years old. Conversely, older age groups (40-44 years) exhibited positive values and did not show some correspondence with media coverage behavior (see red line).

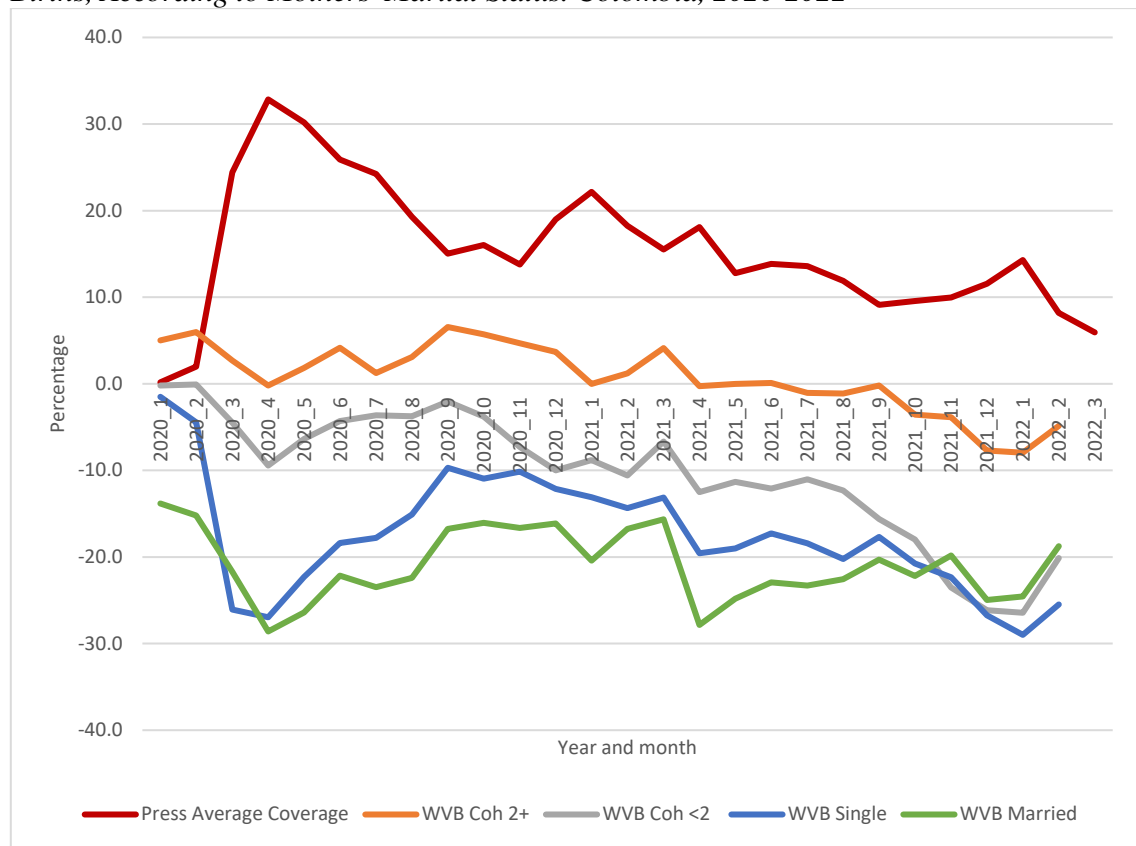
Figure 3. Press Coverage of COVID-19 News and Monthly weighted Variation in Births, According to Mothers' Age Groups. Colombia, 2020-2022



Source: own elaboration based on online press media data collected via webscraping (from El Tiempo, El Espectador and Portafolio) and data from DANE (vital statistics and unemployment indicators)

Marital status is another variable that moderates the parallelism between births and the media coverage of COVID-19. With the exception of mothers in a common-law union for more than two years, a reduction in births is reported in the other categories compared to the reference period (2017-2019). Among these, single and married mothers experienced the greatest decrease in births, especially during peaks of increased media coverage (for example, March 2020, March-April 2021, and December 2021 and January 2022).

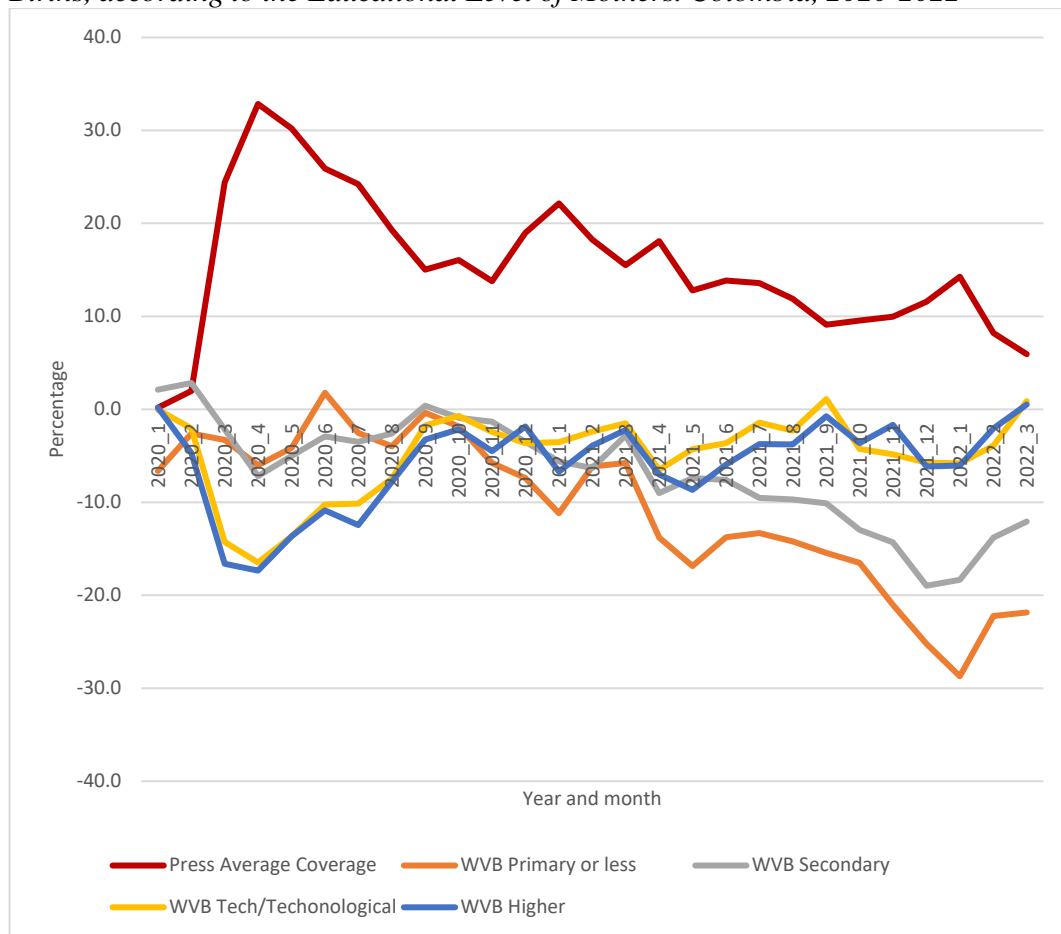
Figure 4. Press Coverage of COVID-19 News and Monthly weighted Variation in Births, According to Mothers' Marital Status. Colombia, 2020-2022



Source: own elaboration based on online press media data collected via webscraping (from El Tiempo, El Espectador and Portafolio) and data from DANE (vital statistics and unemployment indicators).

Analyzing education level in the relationship between media coverage and births is also revealing. A cross-cutting behavior is observed, as the onset of the health emergency and media coverage coincides with an intense reduction in births among mothers with technical/technological studies or higher education, followed by a deceleration of births during the period of reopening. On the other hand, in lower education groups (primary or less and secondary), the behavior is opposite; there is a lesser reduction in births at the beginning of the lockdown, but a significant reduction during the reopening period.

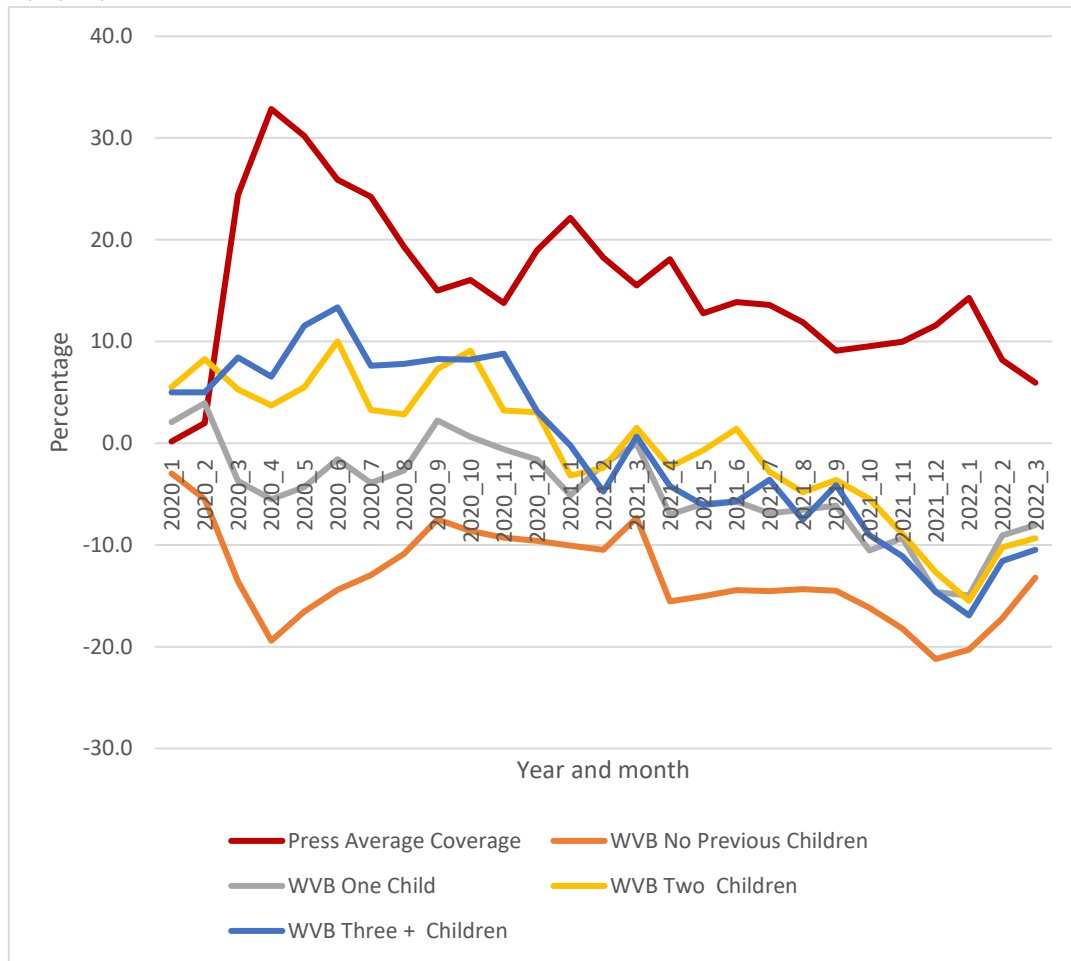
Figure 5. Press Coverage of COVID-19 News and Monthly weighted Variation in Births, according to the Educational Level of Mothers. Colombia, 2020-2022



Source: own elaboration based on online press media data collected via webscraping (from El Tiempo, El Espectador and Portafolio) and data from DANE (vital statistics and unemployment indicators)

Finally, the number of previous children also reveals an interesting pattern. During the confinement period, when media coverage was most intense, it was observed that women without previous children significantly reduced births, as did those with only one child (to a lesser extent). In contrast, women with 2 or 3 or more children increased births compared to the reference period-month. However, the trend in these groups of women changes starting in 2021, when a decline in births begins to be recorded, aligning with the trend of women without children or with one child, corresponding to a period of low media coverage of COVID-19. At the end of the observed period, a slight increase in the overall reduction of births is identified, between January and March 2022 (see Figure 6).

Figure 6. Press Coverage of COVID-19 News and Monthly weighted Variation in Births, according to the Number of Previous Children of the Mothers. Colombia, 2020-2022



Source: own elaboration based on online press media data collected via webscrapping (from El Tiempo, El Espectador and Portafolio) and data from DANE (vital statistics and unemployment indicators) Panel Regression Models Results.

Regression Model Results

To conclude the results section, the findings of the regression models are presented. Table 3 includes the first stage of the regression models, which aimed to explore the association between the total press coverage of Covid-19 news and the *monthly* weighted variation in births. Model 1 shows a positive coefficient (0.0014), but this association is not significant. However, this relationship begins to change when two fundamental contextual variables are included: the monthly percentage of COVID-19 deaths and the monthly unemployment rate. In the first case, although the coefficient for COVID-19 press coverage remains non-significant (model 2), it already exhibits a negative sign, which becomes significant in the second case when the unemployment rate is included (model 3). In this latter model, the coefficient for media coverage is -0.3453, significant at the

90% level (p-value of 0.0850), indicating an inverse association between the intensification of COVID-19 media coverage and births, after controlling for the impact of COVID-19 deaths and unemployment. The same way, the goodness-of-fit indicators (see the bottom of Table 3) show an improvement for model 3 with an R-squared of 0.1780, compared to the previous models (0.0036 for model 2 and 0.0000 for model 1), indicating the mediating role of the media coverage variable when finding its association with the birth pattern during the pandemic period.

Table 4 shows the findings of the complete model (m3) with the dependent variable selected for sociodemographic groups according to age (models 4-10), marital status (models 11-14), educational level (models 16-19), and the mothers' previous parity (models 20-23).

In relation to age groups, the inverse association between pandemic media coverage and births, already identified in the previous section, is only maintained in the 25-29 and 30-34 age groups (models 6 and 7, respectively). In the other age groups, the coefficients were not significant. However, it is noteworthy that in the under-20 age groups (M4 and M5), a significant association was observed with the unemployment variable, indicating a positive relationship; to be specific, higher unemployment corresponds to a greater increase in births. On the other hand, the 45-49 age group did not exhibit a significant association with pandemic media coverage, but it was positive, showing that for this age group, births increased compared to the reference period.

Marital status set significant results for single women (model 11) and married women (model 14). In these groups, after controlling for the impact of COVID-19 deaths and unemployment, a negative relationship was also found between pandemic media coverage and births, as indicated by the descriptive results (Figure 4). Regarding educational level, the findings show a trend similar to that found in the marital status groups, as births among women with higher education (models 18 and 19) are negatively related to pandemic media coverage. A similar pattern was identified for women without previous children (model 20) and those with one child before the reported birth during the pandemic (model 21), as a negative relationship was also identified in these groups, indicating that higher monthly media coverage of the pandemic was associated with a decrease in births compared to the reference period (average month-year 2017-2019).

Table 3. Regression models coefficients for the weighted variation of monthly births (WVB) during the Covid-19 pandemic. Colombia, 2020-2022

	M1					M2					M3				
	Coeff	Robust Std error	P> t	Low interval	Upper interval	Coeff	Robust Std error	P> t	Low interval	Upper interval	Coeff	Robust Std error	P> t	Low interval	Upper interval
Covid-19 Press Coverage	0,0014	0,1195	0,991 0	-0,2447	0,2474	- 0,0062	0,1244	0,961 0	-0,2629	0,2505	-0,3453	0,1920	0,085 0	-0,7426	0,0519
Covid-19 % cause of deaths						0,0218	0,0741	0,771 0	-0,1312	0,1748	0,0001	0,0695	0,998 0	-0,1436	0,1438
Unemployment rate											1,1073	0,5012	0,037 0	0,0705	2,1440
Const	- 7,6064	2,0617	0,001 0	-11,8526	-3,3601	- 7,8725	2,2868	0,002 0	-12,5922	-3,1528	- 18,8734	5,4124	0,002 0	-30,0698	-7,6770
Model fit															
Observations	27					27					27				
R-squared	0,0000					0,0036					0,1780				
Adj R-squared	- 0,0400					- 0,0794					0,0708				

Source: own elaboration based on press media data collected via webscrapping (from El Tiempo, El Espectador and Portafolio) and data from DANE (vital statistics and unemployment indicators)

Table 4. Regression Models Coefficients for the weighted Variation of Monthly Births for selected sociodemographic Groups (WVB) during the Reference Period. Colombia, 2020-2022

Dimension	Model	Group of WVB	Coefficient and significance			Model fit		
			Covid-19 Press Coverage	Covid-19 % cause of deaths	Unemployment rate	Observations	R-squared	Adj R-squared
Age groups	M4	15-19	-0,3960	0,0273	1,8685***	27	0,2844	0,1911
	M5	20-24	-0,4250	-0,0596	1,7490**	27	0,2265	0,1256
	M6	25-29	-0,3053*	0,0043	0,8371*	27	0,1540	0,0436
	M7	30-34	-0,3092**	0,0497	0,2445	27	0,3681	0,2857
	M8	35-39	-0,1549	0,0543	-0,0381	27	0,1264	0,0124
	M9	40-44	-0,2114	0,0243	0,1445	27	0,0753	-0,0453
	M10	45-49	0,2776	-0,0458	-1,5268	27	0,0562	-0,0669
Marital Status	M11	Single	-0,8447***	0,0847	1,6305**	27	0,3476	0,2625
	M12	Cohabitation 2+	-0,1972	0,0016	0,8232*	27	0,1564	0,0464
	M13	Cohabitation <2	-0,3903	0,0058	2,0338**	27	0,2936	0,2014
	M14	Married	-0,3309**	-0,0201	0,2226	27	0,2801	0,1862
Educational Attainment	M16	Primary or less	-0,0718	-0,0524	1,7690	27	0,3390	0,2493
	M17	Secondary	-0,3382	-0,0057	1,4220	27	0,2089	0,1057
	M18	Technical/Technological	-0,4826***	0,1122***	-0,0854	27	0,7420	0,7083
	M19	Higher	-0,4635***	0,0678	-0,1811	27	0,6885	0,6479
Previous Parity	M20	None	-0,4579**	0,0293	0,9104*	27	0,2208	0,1192
	M21	One	-0,3337*	-0,0077	1,1359**	27	0,1821	0,0755
	M22	Two	-0,1811	-0,0328	1,5680**	27	0,2791	0,1851
	M23	Three or more	-0,0328	-0,1044	2,0050	27	0,4272	0,3525

Source: own elaborations. * p<0.1, ** p<0.05, *** p<0.01

Discussion

In line with the emerging literature on the impact of COVID-19 on fertility in Latin America (Marteleto et al., 2023; Cabella and Pardo, 2022; Castro et al., 2022; Lima et al., 2022; UNFPA, 2021; Montaña Mendoza et al., 2020), the present study reports a reduction in births between October 2020 (corresponding to conceptions at the onset of the COVID-19 pandemic) and December 2022. However, this decline occurs within the context of a generalized reduction in births experienced by several countries in the region (ECLAC, 2022), even before the pandemic. Despite this, descriptive analysis established a similar trend between the weighted variation in births and the proportion of COVID-19 online news over the total online publications in three major Colombian newspapers: *El Tiempo*, *El Espectador*, and *Portafolio*.

The similarity of the two series showed an increase in the negative variation of births when the proportion of COVID-19 news increased (as observed in April 2020; in January, April, June, and November 2021, as well as in January 2024). Regression models also confirmed the association, showing that an increase in births during the pandemic is associated with a decrease in COVID-19 news coverage. It is important to note that this relationship is not direct, as it only appeared when contextual variables (COVID-19 deaths and unemployment rate) were included in the model, highlighting the mediating role of social uncertainty, expressed through intensified pandemic coverage, as found in studies on the media's effect during economic crises (Guetto et al., 2023).

The aforementioned association is heterogeneous across different social groups. In this regard, both descriptive analysis and regression models showed that the relationship is more robust for the 25-29 and 30-34 age groups, which currently have the highest specific fertility rates in Colombia (DANE, 2023). This suggests a potential impact on future births due to the reduction during the pandemic associated with greater social uncertainty transmitted by the media. A similar situation was identified for single and married women, and for women with higher education levels; unlike the 25-34 age groups, these do not correspond to the marital statuses with the most births, such as free unions (DANE, 2023). Conversely, the association was significant for women with no previous children or only one child, who significantly contribute to Colombia's total fertility rate (Pardo et al., 2024).

Addressing the research questions that motivated the study, a negative association was found between social uncertainty generated by the media and births during the COVID-19 pandemic. Additionally, it was demonstrated that this media influence is not received uniformly across all social groups, with certain groups, in terms of age, marital status, educational level, and previous parity, being more intensely impacted by social uncertainty in terms of fertility. These results are particularly relevant in low-fertility societies like Colombia, which has a TFR of 1.4 children per woman according to the 2024 estimate by DANE (2024), and is beginning to collectively discuss the challenges of demographic sustainability.

Conclusions

The current study corroborates existing literature on the impact of COVID-19 on fertility in Latin America, highlighting a reduction in births from October 2020 to December 2022 within a broader trend of declining birth rates. A notable correlation was found between decreased births and increased COVID-19 news coverage, suggesting that media-induced social uncertainty influenced fertility decisions. This effect was particularly pronounced among women aged 25-34, single and married women, and those with higher education levels. While the study's limitations prevent causal conclusions, the findings emphasize the need for future research to better understand media effects on fertility and reproductive health in low-fertility societies like Colombia.

Finally, the study's limitations should be noted, as it is not possible to establish causal relationships based on the sources and techniques used. Future research is recommended to generate data sources that allow for individual attribution of the media's contribution to social uncertainty and its impact on actual fertility, reproductive preferences, and social conditions for the full exercise of the right to family planning and sexual and reproductive health.

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