Ciência & Saúde Coletiva
cienciaesaudecoletiva.com.br
ISSN 1413-8123. v.29, n.11
DOI: 10.1590/1413-812320242911.03382024EN

Male fertility and sexual and reproductive health in Brazil: opportunities using population databases

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Abstract *Scientific research on male reproductive and sexual aspects in Brazil is still in its early stages, mainly due to a lack of updated data to study these dimensions. This article aimed to present and discuss the main available population databases for studying this topic, highlighting their potentials and limitations. It is believed that with the release of the Brazilian Demographic and Health Survey in 2025, which will provide diverse current and unprecedented data, numerous research possibilities will open up. This will enable a new perspective on male fertility and sexual and reproductive health in Brazil, thus helping to better understand the fertility transition process in the country.*
Key words *Fertility, Reproductive preferences, Sexual health, Reproductive health, Men, Quantitative research, PNDS*

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Introduction

Among demographers, it is well-known that there is great negligence in the study of aspects related to male reproduction. This is due to several factors that would make this topic difficult to measure[1-4]. Zhang[2] boils these difficulties down to biological and methodological issues. In the first case, fertility and various reproductive stages (menarche, pregnancy, childbirth, breastfeeding, menopause) are exclusively female aspects and make men practically free from the closest determinants of fertility. Additionally, women's reproductive period is more limited and has less variability in terms of, for example, the number of children they can have in a given period and the spacing between them. Regarding methodological issues, Zhang[2] clarifies that, historically, information on fertility is collected from women, as they were the ones who, at first, spent more time at home and, due to the role they played within the family, it was believed that they could provide more accurate information on fertility. This is because, compared to men, they were more directly involved with reproductive events.

However, in the case of Brazil, as Alves and Cavenaghi[5] assessed for the 2010 Demographic Census, fertility information differs depending on the type of informant, as the other informant always declares lower fertility than the woman herself – if they are residents in the same household, the difference is even greater than if they are not. This difference does not seem to be related to financial status, but rather to another type of selectivity. What happens is that someone else would respond in a greater proportion instead of women without or with few children, as it would be more difficult to find them at home. Women with young children are those who stay home the most, so the probability of the interviewer finding them at home to answer the questionnaire is greater, and this would result in an overestimation of fertility. In the end, for the Census, the mixed information, regardless of the type of respondent, appears to be the one that provides the best fertility estimates.

Additionally, classical demographic theories and models, in most cases, work with information from females, leading to a large gap in knowledge regarding male fertility. Oliveira[6] demonstrated that this has not been different in Brazil, since research in demography focuses on understanding the determinants of fertility levels and patterns examined from women's perspective, considering that only their reproductive careers and fertility projects matter. This happens because, according to Greene and Biddlecom[1], there is the idea that spouses share identical reproductive interests and behaviors and that learning information from the woman would already provide an approximation of what happens with her partner.

This argument has long been challenged by studies[2,7] showing that men and women do not have the same number of children, do not have children at the same age, and their reproductive experiences can be very different. Among them, the motivations for having children and the determinants of their fertility may also differ, as demonstrated in several Western countries. Even if these arguments prevailed, fertility studies would be restricted to marital fertility, which, nowadays, would be quite limited, given the multiplicities of existing family and marital arrangements.

Data on male fertility are available in many Western countries through civil registration and vital statistics systems or through sample and longitudinal surveys, from which data has generated several interesting studies on male reproduction in developed countries[2,7-10]. However, registration systems are weak in many developing countries and the collection of fertility data in surveys – especially using complete birth histories – has only been carried out for women. But gradually studies on men have also reached developing countries, especially through research such as the DHS (Demographic and Health Survey) and focusing on African countries. These studies[4,11-13] indicate that the reproductive lives of men and women are also very different in the context of high fertility.

For the Brazilian context, Wong et al.[14] highlighted that the study of male fertility becomes even more relevant to the current demographic situation of the population, which is characterized by a continuous reduction in female fertility, increased longevity, and the emergence of new family arrangements throughout life cycles. In these new settings, understanding the different dimensions of male reproductive and sexual issues can make great contributions to understanding the behavior of fertility transitions in developing countries[2,15,16].

This study thus aims to discuss the main studies carried out on male reproduction in Brazil and the main data sources that allow the study of men's fertility, as well as other aspects related to the marital, sexual, and reproductive life of Brazilian men. It is believed that this survey will enable greater visibility of these data sources, as

well as an increase in the scientific production of this type of study in the country.

Studies on fertility and men's sexual and reproductive health in Brazil and their data sources

As previously mentioned, the most important data source for the study of male fertility would be the administrative record of live births, which would provide information disaggregated from the country's information on the date of the child's birth. In Brazil, this type of study has not been common, given that in 2023, according to the Civil Registry Transparency Portal[17], the number of records that do not have information about the father has reached 7%. To estimate fertility, it is essential to have the age of the parents at birth, and these data are even more underreported, which would lead to biased estimates and possibly highly distorted rates.

The few studies that have been willing to use birth registration have focused on the state of São Paulo, where coverage of birth data has traditionally been good. In this sense, the pioneering study on male fertility in Brazil was Wong and Perillo[18], who, using administrative data, calculated male fertility in the state of São Paulo in 1983, indicating a marked gap between the ages of fathers and mothers in birth records, with men's fertility peaking on average five years after women's.

In addition, the study[18] results pointed to the need for caution when analyzing the father's age stated in the birth record. At the time, in around 10.0% of birth records, the father's age appeared as "unknown", while the same occurred in only 0.5% of mothers' statements.

Thirty years later, Falcão[19] used microdata from the Live Birth Information System (Sistema de Informação sobre Nascidos Vivos – SINASC) and population information by sex and age groups made available by the SEADE Foundation, to analyze the scenario of some cities in the state of São Paulo, in which the results showed that, despite an underreporting of the father's age being high in several municipalities in the state (greater than 10%), using those with underreporting of less than 8%, when compared to female fertility, male fertility was later and more dispersed throughout life.

More recently, Yazaki[20,21], using data released by the SEADE Foundation itself, prepared a comparative analysis of male and female fertility for the state of São Paulo. The author does not present the percentage of underreporting of male information, but rather highlights the need to demonstrate differences by sex in data on live births. In both studies, she found that fathers are older than mothers, and their ages at their children's birth peak between 27 and 32 years. The average age of mothers was 28.6 years old and that of fathers was 31.7 years old in 2018, a statewide difference of three years. The distribution of fathers according to place of birth is similar to that of mothers, that is, 74.1% are from São Paulo and those from other states have the same characteristics as the mothers.

Studies involving the estimation of male fertility through Demographic Censuses are also rare, as male fertility is rarely investigated. Thus, the studies that exist are based on the application of indirect estimation techniques, such as the Own Children Method (OCM), already proven to be satisfactory in estimating male fertility based on the allocation of children within the household.[22]

This method was recently applied by Santos and Wong[23], who estimated the male Total Fertility Rate (TFR) for eight Latin American countries. The authors found that male fertility is distributed more widely throughout the course of life and the average age of fertility is higher for men than for women, with male fertility being higher than female fertility. They also identified that, in countries where the demographic transition began after the 1960s, there was a more pronounced drop in male fertility, and in these cases, the difference by sex in TFR decreased over the period analyzed (1970-2010). Brazil is a notable case, as the difference between male and female fertility went from 1.6 children to 0.2 children.

Another data source on male reproduction is sample surveys, which, in the case of Brazil, is represented by the National Survey of Demography and Health, the Brazilian version of the DHS and carried out in the years 1986 and 1996, in which a sample of men were selected to respond to a specific questionnaire. As this study focuses on analyzing the reproductive life of individuals, it may be considered a milestone in terms of information on fertility and the experience of reproduction for men in Brazil.

Unfortunately, despite the data availability at the time, few studies focused on men based on this data source. Brandão et al.[24] point out how approaching the topic of sexual and reproductive health based on men's narratives is a challenge since topics such as reproductive work and childcare are assumed among a large part of the population as "genuinely" feminine.

Studies on male sexual and reproductive health include that of Badiani and Camarano[25] with the 1996 DHS, which showed that 87% of married men reported having at least one child, and, overall, 56% reported never having had children, 27% having one or two children, and 17% having at least three children. When comparing the average parturition and progression rates per parturition of men and women, no major differences were found. There were also no major differences in the number of children that men and women would like to have, as well as in the desire to have one more child, for men and women who already have at least one[25].

Bonifácio and Nepomuceno[26] also used the 1996 DHS and, when studying the reproductive preferences of couples, they found a tendency towards regularization of reproductive behavior for all social strata and geographic regions, and few socioeconomic and demographic variables were statistically significant in explaining the variation in the ideal number of children declared by the spouses, suggesting that the context has little influence on the reproductive preference of each party.

They observed that the husband's reproductive preference tends to increase the final average number of children born to a greater extent than the wife's reproductive preference. When there is a discrepancy between the spouses' preferences, the ideal number declared by the husband has a greater effect on the couple's final parturition, when this number is greater than that declared by the wife. Therefore, it is possible to imagine that in case the husband wants to have more children than his wife, his reproductive preference will have more impact on the number of children the couple will have than in situations in which they both agree or in which the woman wants a greater number of children[26].

Unfortunately, the National Demographic and Health Survey (Pesquisa Nacional de Demografia e Saúde – PNDS) of 2006, a sequential survey to the DHS, did not include the male questionnaire in its sample, thus leaving a gap of another 13 years of investigations that included male reproduction.

Subsequently, the 2019 National Health Survey (NHS) was carried out, and, in an unprecedented manner, brought in its Module Z, a set of questions on the partner's paternity and prenatal care to be answered by men aged 15 years or older. This database also includes Module Y with information about sexual activity for men aged 18 and over, which, together with the set of questions on communicable diseases, has become a milestone for studies of male sexual and reproductive health in the country.

To expand knowledge about issues relating to men, Wong et al.,[14] using NHS data on male parturition, were able to endorse other trends, and highlighted, much like that found for women, that there are regional and racial differences in the average number of live births for men. Finally, the authors highlight that, although they express an advance in the data available on men's reproductive life, the quality of data on male fertility still requires improvement, and the information available needs to be expanded, especially about current male fertility, which is essential and cannot be calculated based on the PNDS[14].

With data from NHS 2019, the study by Barreto and Carvalho[27] shed light on male conjugality and parenthood in Brazil, in a comparison between the populations of heterosexual and same-sex couples. The authors concluded that there are important differences in the pattern of nuptiality between heterosexual and homosexual men, and they do not present the pattern of co-residence, with 72.4% of those who declared being in a marital relationship, the spouse living in a different household[27].

The experience of parenthood among homosexual men is not a normative event either, as observed among heterosexual men. There is a lower percentage of men who declared themselves to be fathers, as well as a lower percentage of child adoption among homosexual men. The authors also draw attention to the fact that, although the NHS was a pioneer in including the sexual orientation variable, it presents a restricted sample, and investigation based on this variable must be carefully considered[27].

From NHS 2019, Barreto and Carvalho[28] sought to compare the sexual health of heterosexual and homosexual men and show that, for the use of condoms, the highest prevalence among men, regardless of sexual orientation, is among those who never use condoms. The authors highlighted that the group of self-declared bisexual and homosexual men present the highest percentages among those who always use condoms (44% and 38%, respectively)[28].

Additionally, the authors discussed that the group of bisexuals and homosexuals has a higher diagnosis of Sexually Transmitted Infections (STIs), since culturally they are more exposed to testing, and of these, 100% had some type of treatment carried out by medical prescription. Among heterosexuals, 96% underwent treat-

ment, which indicates a significant difference between the type of guidance given after the diagnosis of a disease/infection and the sexual orientation of the man being treated. In general, recommendations for testing are much higher among homosexual men than among heterosexual men[28].

The possibilities of investigations on fertility and sexual and reproductive health of men in Brazil after PNDS 2023

Despite the advances in studies on masculinity made possible by the NHS, indicated in the previous section, there are still details of male sexual health, reproductive preferences, and fertility that have not been quantitatively studied, due to a lack of data. The 2023 PNDS is being conducted by the IBGE, and data collection will end by March 2024. It represents a new possibility for data sources to advance the study of these topics.

Module I of the PNDS provides information about the health and reproductive behavior of men between 15 and 59 years of age. To increase the quality of information in the study, it is ensured that men are interviewed by people of the same sex, with the belief that many of the embarrassments and/or discomforts caused by the questions to be investigated in the interviewees can be minimized. This module is subdivided into five parts, whose topics will be briefly presented here.

Part 1 covers the topic of reproduction, in which questions are investigated regarding the number of biological children, including current pregnancy, and adopted children, the age when the first child was born, as well as a record of each birth history. It presents unprecedented information, which is a question about all children having the same biological mother. This detailed information allows one to calculate several reproduction metrics, which are essential to understanding the pattern and level of male fertility over time. Crossing such information with the resident's characteristics set, such as age, income, education, region of residence, etc., enables the analysis of socioeconomic and regional differences.

Part 2 investigates information about prenatal care for the last child born alive. In this part, some reproductive preferences are questioned, such as the desire to be a father at the time of the child's birth, the desire to have waited, in addition to all the questions about prenatal care itself, such as the number of consultations, place of birth, and presence during birth. In an unprecedented manner, this set inquires about the consequence of the birth in men's routine, and respondents could indicate that: 1) They went on paternity leave; 2) They decided not to work for a few days on their own; 3) They did not or could not stop working; or 4) They were not working. This question expands studies on shared care and calls into question the limited right to paternity leave that exists in the country.

Part 3 investigates aspects related to contraception, asking about sexual activity, age at first sexual intercourse, use of condoms during sexual intercourse, and knowledge and use of different contraceptive methods, from modern to traditional ones. This section also has specific questions about having a vasectomy, including questioning satisfaction or regret regarding the procedure. Innovatively, it presents several phrases about perceptions of sexual behaviors between men and women to investigate traditional and/or modern attitudes concerning this topic. To indicate their position, respondents indicate whether they agree or disagree with the statements.

Planning for children is covered in Part 4, which asks about the existence of past and future desires to have children, how long they have wanted to have children, the number of desired children, and new questions regarding the impact of having been a father before 20 years of age, such as dropping out of school, beginning of work, and marital life. This information will enable more in-depth studies on the different effects of teenage parenthood for men and women, which are still largely restricted to qualitative research.

When researching young parents, Fonseca[30] encountered difficulties due to the lack of data and collection instruments for intervention. In his view, this absence accentuates a harmful relationship between adult society and young people, because, ignoring teenage fatherhood, it legitimizes paternal absence and makes it difficult for teenagers to undertake their role as fathers. The author believes that the silence regarding this topic is due to the perception that the baby belongs mainly to the mother and the lack of recognition of teenagers as fathers, since, even when they decide to take on their roles, they receive no support from social institutions.

Robinson[31] mentions several stereotypes used to characterize teenage fathers:

1) The ' Super Stud ' myth: he is worldly-wise and knows more about sex and sexuality than

most teenage boys. 2) The Don Juan myth: he sexually exploits unsuspecting and helpless adolescent females by taking advantage of them. 3) The macho myth: he feels psychologically inadequate, has no inner control, and, unlike other adolescent boys his age, has a psychological need to prove his masculinity. 4) The Mr. Cool myth: he usually has a fleeting, casual relationship with the young mother and has few emotions about the pregnancy. 5) The phantom father myth: absent and rarely involved in the support and rearing of his children; he leaves his partner and offspring to fend for themselves[30] (p. 47).

However, both Robinson and Fonseca highlight that these stereotypes cannot be applied to all teenagers, as some of them become physically and emotionally involved with the mother and baby[30,31]. In this sense, new questions about teenage fatherhood will make advancing this debate possible.

Finally, the module also contains information about the child's health and habits, with investigation of paternal perception about their children's development and their participation in school activities, as well as about their children's leisure and discipline, including questions about the use of violence as a way of educating children. Furthermore, it includes questions about the perception of responsibility for the care and education of children, which can open up a wide range of investigations into the role of men in the face of new masculinities.

In addition to this specific block for men, the PNDS also presents data regarding the characteristics of the household and the individuals, such as race/color, education, occupational status, sexual orientation, gender identity, etc., and presents the possibility of analysis through the formation of families and identification of couples. Adding these characteristics enhances investigations and analyses of male trajectories, as it enables an investigation of men and their different intersectionalities.

The innovations mentioned above are presented comparatively with the 2019 NHS and the data collected in administrative records in Chart 1. This table presents an organized presentation of the indicators that can be estimated according to the source.

Final considerations

This article aimed to discuss innovations in data sources for studies on men, sexual health, and reproduction in Brazil. As demonstrated, these experiences have been fully associated with female protagonism[24,29-31]. However, we defend the importance of unveiling, in addition to the behavior itself, the sociocultural constructions that shape male attitudes and practices related to reproduction.

Furthermore, there is an interest in knowing how men formulate their views on reproduction and paternity throughout their lives, on their ability or inability to interfere in this process, and on the practices that give life to their experiences in this area[6]. Thus, including both partners as an object of research allows one to include men in the context of marital and individual reproductive choices.

As demonstrated in this article, administrative records still do not make the study of the quality of male reproduction viable, and the last study on the subject was carried out in 1996. The NHS 2019 shed light on some aspects of this field, based on the possibility of estimating some indicators related to male sexual life and the exercise of fatherhood.

However, the greatest advances in this area of knowledge will be made possible through the availability of data from the PNDS 2023, whose microdata have great potential for the development of unprecedented studies on sexuality, contraception, childbirth and prenatal care, fertility, and male reproductive preferences in Brazil.

The presentation of the countless indicators that can be estimated should arouse the reader's concern so that the microdata can be released soon. The main goal is to learn a little more about the sexual, reproductive, marital, and family lives of Brazilian men in the coming years. Identifying power differences between men and women, social classes, and the ideals of femininity and masculinity is a valuable approach to understanding the dynamics within our society.[24]

Bringing traditionally feminist discussions to the world of men helps rethink how contradictions between fatherhood and professional obligations occur and how individuals experience tensions in balancing professional and family life. Uncovering these contradictions and differentiated responses given by individuals is essential in order to promote public family policies in the current low-fertility scenario.

Chart 1. Indicators according to data source.

Indicators		Administrative records	NHS 2019	PNDS 2023
Sexuality and sexual health	Age at first sexual intercourse		x	x
	Sexual activity in the last 12 months		x	x
	Diagnosis of sexually transmitted infections		x	
	Types of guidance and treatment for sexually transmitted infections		x	
Sexuality and sexual health	Preventive prostate exam	x	x	
	Gender identity			x
	Sexual orientation		x	x
	Perceptions about values related to sexual life			x
Prenatal care and childbirth	Participation in prenatal care		x	x
	Prenatal exams		x	x
	Presence at childbirth		x	x
Contraception	Use of contraceptive method during first intercourse		x	x
	Use of condoms in the last intercourse		x	x
	Use of different contraceptive methods			x
	Experience with vasectomy			x
	Access to information about family planning			x
	Perceptions about values related to contraception			x
Reproduction	Awareness of pregnancy risk			x
	Number of biological children		x	x
	Number of adoptive children		x	x
	Age at parenthood		x	x
	History of childbirths			x
	Total fertility rate	x		x
	Total fertility rate	x		x
	Average parturition		x	x
Reproductive preference and others	Desire to have children at childbirth		x	x
	Future fertility intention			x
	Ideal number of children			x
	Parenthood shared with different biological mothers			x
	Consequence of birth on male working life			x
	Impacts of teenage fatherhood			x
	Perceptions about child development			x
	Participation in the education and discipline of the child			x

Source: Authors.

Collaborations

The authors participated equally in all stages of the article's preparation. They read and approved the final version.

Acknowledgments

This work was conducted with the support of the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) – Financing Code 001.

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Article submitted 28/02/2024
Approved 17/04/2024
Final version submitted 19/04/2024

Chief editors: Maria Cecília de Souza Minayo, Romeu Gomes, Antônio Augusto Moura da Silva