MALE INTENTION, BEHAVIOR AND ATTITUDES IN TIMES OF ZIKA

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The study aims to investigate how men are performing under the epidemics of Zika compared to their female counterparts in relations to reproductive behavior, abortion, fertility intentions and measures of self-protection against the virus. We used data from 150 urban residents of the city of Governador Valadares (GV), Minas Gerais, Brazil, and conducted descriptive analysis and multinomial logit regressions. Our results indicate that men and women hold similar beliefs in regarding to abortion. We also found that women have more chances of being actively delaying pregnancy because of Zika and adopting practices of self-protection that require immediate and consistent action. People who have previously been infected with Zika have fewer chances of adopting measure of protection. These results indicate that history of infection may change perceptions and actions in relation to disease prevention. By using a word cloud, we also explore the perceptions regarding Zika. These evocations were collected using the Free Word Association Technique (FWAT) applied to the answers to the question: “What are the first five words or expressions that come to your mind when you hear the word Zika”.

[WORK IN PROGRESS]

INTRODUCTION

The Zika epidemics in Brazil is to blame for the 2,366 cases of microcephaly confirmed in the country between the years of 2015 and 2016 (Brasil, 2017). The possibility of pregnant women contracting what is called the Congenital Zika Syndrome raised the alarm for the necessity of taking preventive actions that came in three different fronts: mosquito elimination, pregnancy prevention and measures of self-protection to avoid mosquito bites and/or sexual transmission (Brasil, 2017).

Generally, demographic studies on reproductive preferences and behavior focus on women, although preferences and behavior are not necessarily similar for partners. Literature shows how women´s behavior are highly shaped by those of their partners, for example in deciding about contraceptive use and desired number of children (Greene & Biddlecom, 2000; Dodoo 1998; Bankole & Singh, 1998). Nevertheless, the responsibility regarding pregnancy prevention continues to be on the women's shoulder. Likewise, most of the focus of mosquito breeding sites are located in households and the actions demanded for mosquito eradication need consistent attention of those who are responsible for the home (Brasil, 2017). Since well establish gender norms exists about the responsibility for the home, it is possible that once again women are given more responsibility for the task than are given to men.

The proposed study aims to investigate how men are performing under the epidemics of Zika compared to their female counterparts in relations to fertility intentions (delay pregnancy), use and type of contraceptive method, and abortion attitudes. It also seeks to verify if men report applying fewer measures of self-protection against the virus compared to women, as well as fewer actions of mosquito eradication. In addition, the study aims to identify if those distinct behaviors are mediated by education level, having a pregnant women in one's social network or having already acquired the Zika or Dengue infection. Answers to these questions will help guide policymakers in designing campaigns that are more effective.

LITERATURE REVIEW

Reproductive preferences have a significant impact on the number of children, and the reduction in ideal family size is an important determinant of fertility decline in developing countries (Benoga et al., 1999). The influence of males on their partner's reproductive health and, consequently, on their children's health stimulated interest in the study of sexual behavior and male perceptions about reproduction in the 1990s

(Collumbiem & Hawkes, 2000; Dudgeon & Inhorn, 2004). The 1994 International Conference on Population and Development in Cairo pioneered the research on the subject, indicating the importance of including men in fertility and sexual and reproductive health programs, especially in the context of increased incidence of HIV and other sexually transmitted diseases and of unequal gender and power relations.

Reproductive perceptions and behaviors vary according to sociodemographic characteristics, corroborating the occurrence of different levels of fertility among the various social groups, a phenomenon that is also associated with possible inequalities in access to programs and policies in the area of reproductive health. Although most studies focus on females, they point to differences by religion, race, marital status, schooling and income (Cavenaghi & Berquó, 2014, Perpétuo, 2016 and Verona, 2013). For example, while total fertility rates are around 1.24 for women of college education, they are still 3.14 for women of low education (De Miranda-Ribeiro & Garcia, 2016). Unwanted pregnancies are also three times higher among the economically disadvantaged (Cebrap, 2008) and the reason for that could be behind low SES women's barriers to accessing contraceptive methods (Potter, 1999) and their lack of autonomy and power in negotiating contraceptive use for pregnancy or STI's prevention (Chacam, 2007).

Regarding Zika, the disease is transmitted by the *Aedes aegypt* mosquito and through sexual intercourse, blood transfusions or amniotic fluid and therefore is transmissible from the mother to the fetus (Brito 2015; Petersen et al. 2016). For this reason and in order to stop the spread of the microcephaly, postponement of pregnancy was recommended by authorities of World Health Organization and women who wish to get pregnant should talk to their doctors (World Health Organization, 2016). In addition, there have been transformations in the norms and values regarding reproductive behavior as a result of the epidemic, leading to the creation of a stigma related to pregnancy, which could be associated with postponement of pregnancy or desires for abortion practices (Marteleto et al, 2017). In a context where high prevalence of unplanned pregnancies (Prietch et al, 2011), it seems like a challenge to stick to those recommendations.

Fighting an epidemics like Zika demands more than avoiding pregnancies. It also requires active involvements of the members of the household in eradicating standing water from mosquito common breeding sites, such as empty tires and bottles in the backyard, water drains, ornamental ponds, buckets, jars, swimming pools, plan vases, among many others as small as a bottle lid. The *Aedes aegypti* lay eggs on the inner sides of breeding sites and if dry, the eggs are still viable for

several months. Once the volume of clean water reaches the egg, they hatch and reach adult stage in 10 days, which requires constant and consistent attention.

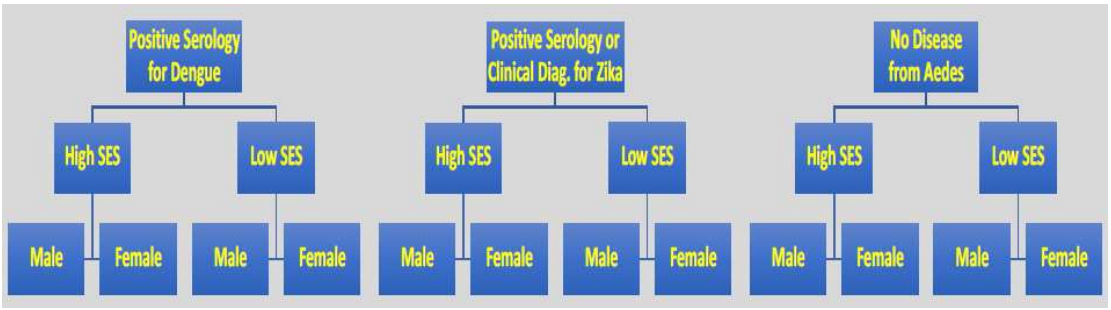
If mosquitoes are born, measures of self-protection are made necessary. Some of those measures consist of applying chemical repellents on the skin, using air conditioning at all times, avoiding areas of infestation, avoid going outside in certain periods of the day, among many others. Those measures, as well as those of mosquito eradication, have been constant reminded by radio, TV, flyers and other campaigns produced by the federal, state and municipal governments of the whole country (Da Silva & Henning, 2017). Since Dengue, another disease transmitted by the same mosquito, has been around in basically the whole territory in Brazil for over 3 decades and never ceased to exists (in fact, there currently is 4 sub-types for Dengue), it is expected that those measures of protection and of mosquito eradication are known, yet not practiced with insistence, representing one of the biggest public health challenges in Brazil (Lima-Camara, 2016). Part of the answer might be on the perceptions of man and women regarding care. On top of that, public health campaigns reinforce women's role in the epidemics, representing them as the solo responsible for prevention and care, alienating men from those same activities (Coutinho et al. 2017).

In this sense, this paper provides evidence for the scenario described above by analyzing male attitudes in the face of the epidemic. How are performing under the epidemics of Zika compared to their female counterparts in relations to fertility intentions (delay pregnancy), use and type of contraceptive method, and abortion attitudes? Are men applying fewer measures of self-protection against the virus compared to women, as well as fewer actions of mosquito eradication? Are those distinct behaviors mediated by education level (since education increases understanding and exposure to correct information), having a pregnant women in one's social network (might raise more attention to pregnancy related problems) or having already acquired the Zika or Dengue infection (previous study by Guedes et al 2017 found that those who have never been infected by Zika think of the disease with more diverse meanings, much through lay thinking. On the other hand, people who have been previously infected by Zika have perceptions related to the most common symptoms, such as pain and itching)?

DATA AND METHODS

We use data from the survey *Demografia da exceção: Intenções Reprodutivas*

e Migração em um contexto de Zika Vírus e Desastres Socioambientais (Guedes et al. 2017), which collected data from 150 urban residents of the city of Governador Valadares (GV), Minas Gerais, Brazil. The city ranks third (8.5%, above the minimum threshold of 3.9% that is considered high risk) in the state of Minas Gerais in the LIRAa index (Assessment of *Aedes aegypti* Infestation Index). The city was also hit by mud from a dam failure in November 2015, which created severe water shortage due to the contamination of the city's main river by heavy metals, leading residents to stock water at home, which contributed to the proliferation of the *Aedes aegypti* in the region, making the city a key social context for the study. Initially, 150 respondents were randomly drawn from another baseline probabilistic survey conducted one year prior to the Zika epidemics. They were first classified by gender and SES, contacted, interviewed and then classified according to their history of infection quotas, as shown below.



Due to the rarity of the ZIKV event, it was not possible to complete all quotas for Zika within the probability sample. Positive-Zika persons were actively sought in the same physical address (neighborhoods) of the other respondents. Post-survey weight adjustments were performed based on Dengue, Chikungunya, and ZIKV incidence in GV to balance the group's sizes. More information about the study's methodology can be found elsewhere (Guedes et al. 2017)

The survey asked respondents about desired family size, time that people intend to wait to have another child the reasons this decision depend on (qualitative question), use and type of contraceptive method, the consent (agree, disagree or don't want to give an opinion) about abortion in cases of rape, risk of death for the mother, mother's infection with Zika, fetus's malformation and in regardless with a cause. The respondents were also asked the measures of self-protection used against the virus: use chemical repellents in the body, use homemade repellents in the body, delay pregnancy, destroy mosquito breeding sites, use electric or chemical repellents at home, use electric or chemical repellents at work, kill mosquitoes with electric racket, stay in front of the fan, install screens in windows, install air

conditioning at home, use a condom during intercourse, install protections screens in the bed, install protections screens in windows at home, use long clothes, avoid places with mosquito focus, avoid leave home in early morning or late afternoon, avoid endemic regions when traveling, change place of residence and change city of residence. Finally, respondents were asked about been pregnant or having a pregnant woman in one's social network.

The sociodemographic and conjunctural variables collected were gender (male or female), history of infection (infected with Zika, Dengue, Chikungunya or none of these diseases) and education (no education, less than primary completed, primary completed, secondary incomplete, secondary completed, university incomplete, university completed or graduate). History of infection was self-report and no serological test was performed to confirm the diagnoses. Although this could potentially represent a bias in our analysis (because people who in fact had the disease might have had important symptoms that mediate their relationship with the disease as seen in Guedes et al. 2017), the presence of Zika or Dengue have similar results in our analysis. We conducted descriptive analysis and multinomial logit regressions.

We also collected people's perception surrounding the epidemics. These evocations were collected using the Free Word Association Technique (FWAT) applied to the answers to the question: "What are the first five words or expressions that come to your mind when you hear the word Zika". Evocations were coded according to their meaning, a procedure described in Bradley, Curry and Devers (2007). The words or expressions were coded as necessary to reduce amount of variation without losing each evocation's unique meaning, resulting 240 words or expressions. Evocations were then analyzed using the Word Cloud technique, which allows an intuitive and visually appealing overview of a text (Heimerl, 2014). Words that appear more often are chosen to be represented in the cloud, while the size of words represent those that are more salient, or more heavily cited.

RESULTS

Our male sample is slightly older (28.1 years old against 26.2 years old for female) and have more children ever born (1.25 male and 0.85 female). Desired family size is of 2.45 for men and of 2.09 for women. In spite of their lower average, women, more than men, report not wishing more children. In average, men who wish to have a (extra) child would like to wait 60.61 months, compared to 65.37 months of women (results not shown).

Men and women do not differ significantly in regards to condom use during the epidemics in order to avoid getting infected with Zika. When it comes to delaying pregnancy, women have about 4 times the chance of men of reporting being actively delaying pregnancy. Contrarily to what we expected, none of the interviewers mentioned Zika as a reason for delaying pregnancy in the qualitative question that followed the question about “timing until pregnancy”. This could explain why the medium time until desired pregnancy is beyond 60 months. The most common reason leading to a delay was lack of financial stability, followed by absence of partner with whom have a child.

Our results also indicate that men and women hold similar beliefs in regarding to abortion. While 40.9% of the men and 30.9% of the women are in favor of legalizing abortion because of Zika, only around 15% of them are in favor of legalization regardless of cause. Rape and risk of death for the mother are situations in which abortion is accepted by the majority (>60% for both genders). In cases of malformation, 41,2% of the men and 50% of women reported been in favor of legalizing abortion.

When it comes to measures of self-protection, differences for men and women become more tangible as Table 1 shows. Notice how practices that requires immediate and consistent actions like repellent (13% of men and 35% of women, $P<0.004$) and getting rid of mosquito breeding sites are more common for women (for example, 72% of women and 61% for men, $P<0.169$). Practices that requires action only once (such as screen installation) do not differ by gender, as expected since both genders live in the same household with a screen installation. These values remain significant even after controlling for socioeconomic status, history of infection, and presence of pregnant women in the social network.

Table 1 – Measures of self-protection by gender, frequency and odds ratio

Procedure	Male	Female	Chi square / P - value
Use chemical repellents in the body (freq) Odds ratio	13,33% Ref.	34,67% 3.42	10,27 / 0,004
Prevent / delay pregnancy (freq) Odds ratio	5,33% Ref.	18,67% 3.85	8,89 / 0,025
Destroy mosquito breeding sites (freq) Odds ratio	61.33% Ref.	72,0% 1.64	6,91 / 0,169
Use elec, or chem. repel. at home (freq) Odds ratio	20% Ref.	30,67% 1,74	3,66 / 0,150
Kill mosquitoes with elec. Racket (freq) Odds ratio	38,67% Ref.	29,33% 0,68	3,70 / 0,288
Stay in front of the fan (freq) Odds ratio	69,33% Ref.	68% 0,97	10,75/ 0,944
Install screens in windows (freq) Odds ratio	16% Ref.	14,67 0,83	0,98 / 0,704
Install air conditioning at home (freq) Odds ratio	12% Ref.	10,67% 0,9	2,79 / 0,844
Use a condom during intercourse (freq) Odds ratio	29,33% Ref.	30,67% 1.06	0,50 / 0,856

*Controlled for socioeconomic status, history of infection, and presence of pregnant women in the social network.

We also found that people who have previously been infected with Zika have 30% the chance of people who have not had of using the fan as a measure of protection (P<0.001), and 53% fewer odds of actively destroying mosquito breeding sites (P<0.087) (results not shown). Maybe this is an indication that once people get infected, they stop collaborating for the wellbeing of the household.

The word cloud reveals that respondent's perceptions about ZIKV are strongly linked with the disease symptoms, in accordance with previous study that investigate maps of meanings surrounding Zika (Guedes et al. 2017): pain (71 mentions), fever (45 mentions), itch (23 mentions) and rash (21 mentions) weakness (18 mentions), and headache (15 mentions). The words disease (47 mentions), mosquito (66 mentions), standing water (31 mentions), microcephaly (27 mentions), prevention (23 mentions), malaise (23 mentions) and hospital (23 mentions) were also between the most evocated words. These results show the absence of evocations related to prevention through contraceptives or the possibility of infection by sexual relationship.

Figure 1 – Respondents evocations about ZKV

Source: Demografia da exceção: Intenções Reprodutivas e Migração em um contexto de Zika Vírus e Desastres Socioambientais

CONCLUSION

This study has offered a description of men and women's reproductive behaviors and desires during the Zika Virus epidemic in Brazil, based on data collected from a socioeconomically diverse sample. Analysis of these data has allowed the identification of patterns related to gender, historic of infection and Zika prevention conducts. In 2015, on the beginning of the epidemic, Brazil was the most affected country in Americas by ZIKV reporting an increase by a factor of approximately 20 among newborns in the northeast region of the country according National Ministry of Health (European Centre for Disease Prevention and Control, 2015).

Our results indicate that men and women have similar beliefs in regarding to abortion. An expressive percentage of respondents believe abortion is acceptable in cases of malformation and Zika. In Latin American countries that issued warnings to pregnant women about complications associated with Zika virus infection, requests for abortion through Women on Web[1] increased significantly (Aiken, 2016), what shows a demand for politics to avoid insecure abortion. The illegality of abortion has not been an impediment to its occurrence in Brazil, but the occurrence of motherhood mortality is clearly selective by socioeconomic status (Olinto, 2004; Marteleto, 2017).

In regards to reproductive behavior, contrarily to what we expected, ZIKV was not considered as a reason for delaying pregnancy. Only six respondents intended to wait less than a year to have a (extra) child. For most respondents, waiting time was

[1] Women on Web (WoW), a nonprofit organization that provides access to abortion medications (mifepristone and misoprostol) outside the formal health care setting through online telemedicine in countries where safe abortion is not universally available.

around five years. This could also be a reflection of the young age of the respondents. Results could have been different for older married adults. For our sample, at least, Zika do not seem to be impeding any plan.

Among those few respondents who delayed pregnancy because of Zika, women were the majority. These results reflect that, although the process of decision making depends on communication, negotiation and the degree of men's influence on choices and outcomes related to fertility (Blanc, 1996), the task of contraception is still on women`s shoulders, especially due to normative beliefs and type of contraception (Lowe, 2005). In this sense, the development of programs to increase male involvement can have a positive influence on reproductive health.

When it comes to measures of self-protection, women have more probability to use chemical repellents in the body. These results reflect a female normative behavior to take care of body, what includes using creams and lotions. It may also reflect the gendered campaigns against Zika that consistently tell women to wear repellents, not men (Coutinho et al. 2017). Women also have more chances to destroy mosquitoes breeding sites, an action also reinforced by campaigns calling the attention of the housekeeper, which reinforces the major female concern about Zika.

Diferences in measures of self-protection between people who have previously been infected with Zika and other respondents can be an indication that once people get infected, they stop collaborating for the wellbeing of the household and this fact deserves special attention of policymakers designing campaigns because it could be an importante explanation of why Brazil has been leading with arbovirus for so long. Policymakers should either find a away to envolve previously infected individuals in camapigns, or should count with their absence when calling the population to conter act the epidemics.

Finally, the absence of evocations related to prevention through contraceptives or the possibility of infection by sexual relationship can express lack of information about Zika or few concerns about others possibilities of transmission beyond the mosquito vector, which should also be addressed by more campaigns.

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