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ORIGINAL ARTICLE

KNOWLEDGE ABOUT PARASITE INFECTIONS AMONG PREGNANT AND POSTPARTUM WOMEN WHO ATTENDED A UNIVERSITY HOSPITAL IN NITEROI, RIO DE JANEIRO, BRAZIL

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ABSTRACT

Parasite infections are frequent in Brazil during pregnancy. The aim of the present study was to assess the knowledge about parasite infections among pregnant and post-partum women, attending a public University Hospital in Niteroi, RJ, Brazil. Knowledge was assessed using a standardized interview and questionnaire. A total of 100 interviews were conducted (60 pregnant and 40 post-partum women). Educational achievement did not influence knowledge about parasites. The majority of the women interviewed stated that they habitually always washed hands after using the bathroom and before eating. Consumption of fruits and vegetables was prevalent, but 17% did not wash them before eating and 39% ate raw or undercooked meat. Educational achievement and number of pregnancies did not influence hygiene habits. Neither the late pre-natal care nor the number of pregnancies influenced knowledge about parasites. Also, there was no correlation between the initial date of pre-natal care and the number of correct answers in the questionnaire. Similarly, there was no association between the initial date of pre-natal care and receiving information about parasite infections. 79% of the women interviewed stated that they had never received any information about parasite infection and pregnancy, and the harm it could cause to them and/or their baby. Despite advances in pre-natal care assistance in the last decade, the lack of knowledge among pregnant and post-partum women regarding parasites and risk factors for infection still remains.

KEY WORDS: Parasite; knowledge; pregnancy.

RESUMO

Avaliação dos conhecimentos sobre parasitoses entre gestantes e puérperas atendidas em um hospital universitário de Niterói, RJ – Brasil

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As infecções parasitárias são frequentes no Brasil durante a gestação. O objetivo do presente estudo foi avaliar o conhecimento sobre parasitoses entre gestantes e puérperas atendidas em um Hospital Universitário Público de Niterói-RJ, Brasil. A avaliação foi realizada por meio de entrevista para preenchimento de um questionário padrão. Foram realizadas 100 entrevistas (60 gestantes e 40 puérperas). O grau de escolaridade não influenciou no conhecimento sobre parasitoses. Grande parte das entrevistadas afirmou possuir hábito de sempre lavar as mãos após ir ao banheiro e antes das refeições. O consumo de frutas e vegetais foi prevalente, mas 17% afirmaram não higienizá-los antes do consumo e 39% afirmaram consumir carne crua ou mal cozida. O nível de escolaridade e o número de gestações não influenciaram nos hábitos de higiene. O início tardio do acompanhamento pré-natal e o número de gestações não influenciaram no conhecimento sobre parasitos. Além disso, não se verificou correlação entre a data de início do pré-natal e o número de respostas corretas no questionário. Da mesma forma, não houve associação entre a data de início do pré-natal e o recebimento de informações sobre infecções parasitárias. Das entrevistadas, 79% afirmaram não ter recebido qualquer informação sobre parasitoses e os malefícios que poderiam causar a elas e/ou ao bebê. Apesar dos avanços na assistência pré-natal na última década, a falta de conhecimento entre gestantes e puérperas acerca de parasitoses e fatores de risco para infecção ainda persiste.

DESCRITORES: Parasito; conhecimento; gestação.

INTRODUCTION

Parasite infections are frequent in Brazilian women during pregnancy, and are directly related to habits and socioeconomic conditions of the population (Costa-Macedo & Rey, 1996; 2000; Einloft et al., 2010). Physiological changes in the mother's immune system during pregnancy also make the women more susceptible to parasite infections. In such cases, the infection may be more severe than when found in non-pregnant women. Parasite infection can occur only on a maternal level, or it may involve the placenta and/or fetus (Dotters-Katz et al., 2011).

Several studies have shown that education about preventive measures greatly contributed to the decrease in infection rates during pregnancy in several parts of the world (Gollub et al., 2008; Iriemenam et al., 2011; Pawlowski et al., 2001). However, it is important to note that before any educational intervention, an analysis of the population profile is imperative. This way, the methods and content of the intervention can be especially tailored to the needs of the target population (Launiala & Kulmala, 2006).

Maternal and child care are frequently interrupted or insufficient in Brazil (Costa-Macedo & Rey, 1996). Thus, the aim of the present study was to assess the knowledge about parasite infections among pregnant and post-partum women, attending a public University Hospital in Niteroi, RJ, Brazil.

METHODS

This study was approved by the ethics committee of the Hospital Universitário Antônio Pedro (HUAP) (CAAE 02192712.4.0000.5243). It is

an observational and descriptive study involving post-partum and pregnant women at different gestational periods, who attended the clinic and maternity of the Hospital Universitário Antônio Pedro of the Universidade Federal Fluminense (HUAP UFF).

HUAP is a reference hospital for high-risk pregnancy in the state of Rio de Janeiro, and it receives patients from Niterói and other nearby cities. Thus, patients treated in HUAP belong to a wide range of educational backgrounds, sanitary and financial conditions.

Pregnant and post-partum women were interviewed using a standardized questionnaire. Questions probed their social and economic profile and habits (e.g. age, education achievement, occupation, income, dwelling characteristics, food habits), and also the women's knowledge about parasite infections and their transmission forms. These were probed by objective simple questions, such as, "Do you know what a worm is?"; "Do you know what a tapeworm is?"; "Do you know what toxoplasmosis is?"; "Where are the worms/parasites located in the body?", "How can we catch worms/parasites?", "Do you think it is possible to get worms/parasites from another person?". The questionnaires were filled out between March 2012 and December 2013.

A total of 100 interviews were conducted in the HUAP (60 pregnant, 40 post-partum women). Most of the interviewed women (44%) were between 20 and 30 years old. The average number of children was 1.6 per woman. Seventy-one women lived with a companion and 58 had a family income of two minimum wages or less. Other socioeconomic aspects are summarized in Table 1.

Collected data were then tabulated using the Access® software and submitted to statistical analysis using the SPSS 10.0 software. Absolute and relative frequencies were calculated for each answer. Additionally, the chi-square test, Fisher's exact test, Kruskal Wallis and Mann-Whitney tests with a level of significance of 5% were used to compare the variables studied. In order to correct for multiple comparisons, the significance level adopted was 5% divided by the number of categories used in the global comparison.

RESULTS

In general, education level did not influence the women's knowledge about parasites. However, two statements (2/49), "It is important to not have worms to be healthy" and "It is important to not have worms because, if you do, you have to be treated and take medicine", showed statistically significant differences ($p=0.009$ and $p=0.039$, respectively).

Table 1. Socioeconomic aspects of pregnant and post-partum women who attended the Hospital Universitário Antônio Pedro of the Universidade Federal Fluminense, Niterói, RJ, Brazil.

Variables	Percentage (n=100)
Education	
Illiterate	1%
Basic schooling incomplete	27%
Basic schooling complete	10%
High school incomplete	16%
High school complete	43%
University degree incomplete or more	3%
Number of children	
None	13%
1 child	46%
2 children	24%
3 children	10%
4 children	5%
5 children	1%
6 children	1%
Has ever been pregnant?	
No	31%
Yes	69%
Has basic sanitation?	
Yes	87%
No	13%
Has waste disposal?	
Yes	85%
No	15%
The water that you drink is:	
Filtered	53%
Mineral	24%
Boiled	0
Tap water	19%
Well water	9%
Type of dwelling	
House	95%
Apartment	5%

The questionnaire also inquired about hygiene and eating habits, such as frequency of hand washing, origin of water for consumption and food handling methods. The results are summarized in Table 2.

Table 2. Eating and hygiene habits of pregnant and post-partum woman who attended the Hospital Universitário Antônio Pedro of the Universidade Federal Fluminense, Niterói, RJ, Brazil.

Variables	Percentage (n=100)
Do you wash your hands before eating?	
Always	40%
Often	13%
Sometimes	37%
Rarely	10%
Do you wash your hands when you arrive at home?	
Yes	60%
No	40%
Do you wash your hands after going to the bathroom?	
Always	87%
Often	7%
Sometimes	6%
Rarely	0
Do you eat fruit and vegetables?	
Yes	86%
No	14%
Do you properly wash fruit and vegetables before eating?	
Yes	83%
No	17%
Do you eat raw or undercooked meat?	
Yes, on an everyday basis	15%
Yes, only at barbecues or tasting the meat during the cooking process	24%
No	61%

Education level and the number of pregnancies did not influence hygiene habits ($p>0.05$). When questioned about washing hands before eating, 37% of women interviewed with incomplete basic schooling stated that they always wash their hands, in contrast to 41.9% of women that had completed high school. Regarding the habit of washing fruit and vegetables, 77.8% of the women that had incomplete basic schooling stated that they always washed fruits and vegetables, while 86% of the women with incomplete high school

made the same statement. Washing hands after arriving at home was a habit of 66.7% of women with incomplete basic schooling, but only 53.5% of women who completed high school.

In regard to pre-natal care, most women (66%) had their first pre-natal appointment within the first trimester of pregnancy, 28% within the second trimester and 2% within the third trimester. The interviewed women were also questioned about information received during pre-natal care regarding pregnancy and parasite infection, and how it could affect them or the baby. Seventy-nine of the interviewed women stated that they had not received any information on the topic.

The late pre-natal care did not influence their knowledge about parasites. However, two statements (2/49) showed statistically significant differences. The statement "the worms/parasites impair study, work, growth and the body" was chosen as correct significantly more by pregnant women that began their pre-natal care sooner (p=0.017) (Figure 1). The statement that "worms eat what we eat" was chosen as correct more frequently by pregnant women who initiated pre-natal care later in their pregnancy (p=0.032).

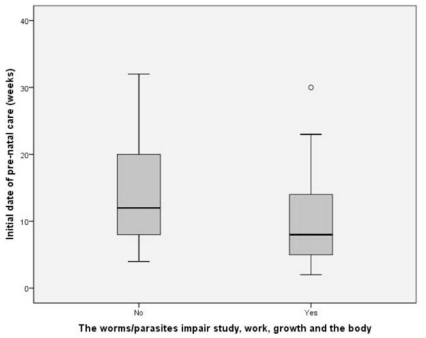

Figure 1. Association between the initial date of pre-natal care and knowledge about parasite infections from pregnant and post-partum women who attended the Hospital Universitário Antônio Pedro of the Universidade Federal Fluminense, Niterói, RJ, Brazil.

Questions about general knowledge regarding parasites, such as the impact of worm infection on health, were also part of the questionnaire. Ninety-eight percent of the interviewed women stated that worm infections affect health and 84% believe that worms can cause death if not treated. Regarding possible parasite locations, the gastrointestinal system was the most prevalent answer, and only a few women considered infection of other organs such as the brain (45%). Regarding infection routes, 95% stated that it occurs by the oral route, while 62% recognized the possibility of vertical transmission.

The number of pregnancies did not influence the general knowledge about parasites. However, three questions (3/49) showed statistically significant difference. The interviewed women who listed the brain as a possible parasite infection site had a higher average number of pregnancies than the women who had not (p=0.047) (Figure 2). Moreover, the interviewed women who listed transplants as a route of infection had a lower average number of pregnancies than women who had answered negatively (p=0.024). Although 82% of interviewed women stated that the elevated intake of sweets could be a way to acquire parasites, this statement was significantly more frequent in women with a smaller average number of pregnancies (p=0.008) (Figure 3).

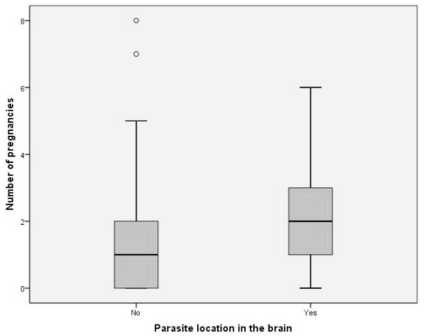

Figure 2. Correlation between the number of pregnancies and knowledge about parasite location in the brain from pregnant and post-partum women who attended the Hospital Universitário Antônio Pedro of the Universidade Federal Fluminense, Niterói, RJ, Brazil.

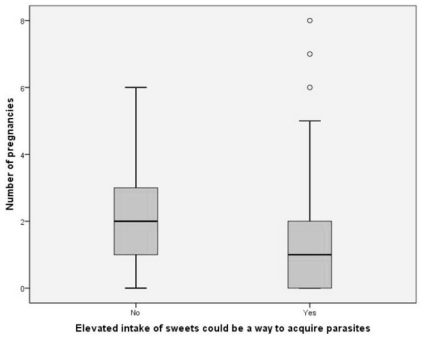

Figure 3. Correlation between the number of pregnancies and the statement that the elevated intake of sweets could be a way of acquiring parasites, from pregnant and post-partum women who attended the Hospital Universitário Antônio Pedro of the Universidade Federal Fluminense, Niterói, RJ, Brazil.

Among the four questions about hygiene habits, only one showed statistical significance when the influence of late pre-natal care on hygiene habits was analyzed. Women that answered "always" or "frequently" to the question "do you wash your hands after using the bathroom?" initiated pre-natal care earlier than the women that answered "sometimes" (p=0.043) (Figure 4). However, when comparing within these answers, a statistically significant difference was only observed in the comparison "always x sometimes" (p=0.011), and a trend to significance was observed in the comparison "frequently x sometimes" (p=0.034). There was no significant difference when comparing "always x frequently" (p=0.904).

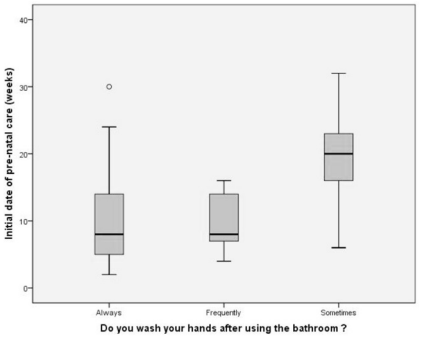

Figure 4. Association between the initial date of pre-natal care and the frequency of hand washing after using the bathroom, from pregnant and post-partum women who attended the Hospital Universitário Antônio Pedro of the Universidade Federal Fluminense, Niterói, RJ, Brazil.

The pregnant women's knowledge was also not influenced by the number of pregnancies. In other words, having more children did not lead to a better knowledge about parasites. Also, there was no correlation between the initial date of pre-natal care and an increase on the number of right answers in the questionnaire. Similarly, there was no association between the initial date of pre-natal care and receiving information about parasite infections that could be transmitted to the baby.

DISCUSSION

The paucity of knowledge among pregnant and postpartum women about parasites was clear during the interview process. It was also evident that the interviewed women did not act as agents of their own health. The lack of active search for knowledge could be explained by a paternalist health system, which does not encourage reflection about the autonomy of self-care (Soares, 2010).

Pinafo et al. (2011), in a study aimed to evaluate the concept of health education among professionals of a family health team from Santa Mariana, Paraná, showed that they recognized the importance of health education. However, the authoritative model of knowledge transmission, without considering the social and cultural context of each individual, still persists in the actions of those workers. This attitude contributes to the paternalism and the lack of autonomy of users.

Educational achievement did not influence knowledge about parasites in the present study. However, Pereboom et al. (2013) interviewed 1,097 pregnant women in Holland, and Millar et al. (2014) interviewed 400 pregnant and postpartum women in public health units of Niterói, and observed that educational level was directly related to knowledge about toxoplasmosis. It is noteworthy that those two studies, in addition to being restricted to the assessment of knowledge of toxoplasmosis also investigated a much bigger sample size than the present study.

However, educational level should not be treated as the only source of a lack of awareness about the issue and, hence, of the high levels of parasite infections. It is well known that hygiene and eating habits are part of conventional knowledge, and thus considered factors that affect parasite acquisition (Mello et al., 1988).

The present study demonstrated high frequencies of risk habits, such as no food sanitizing (17%), ingestion of uncooked or raw meat (39%) and not washing hands when arriving at home (40%). Similarly, in a study of 872 pregnant women in Saudi Arabia, Amin et al. (2013) observed that 32% of interviewed women ate raw or undercooked meat, and 44.2% ingested fruit and vegetables without washing or peeling.

Regardless, the findings of the present study do not demonstrate an influence of educational achievement and the number of pregnancies on hygiene habits. It is important to note that the acquisition of health habits does not necessarily correlate with higher knowledge about disease prevention, since those habits may be acquired in the family environment or through conventional knowledge in general society. Indeed, in a study with pregnant women from Poland, Pawlowskiet al. (2001) showed that women had preventive behavior even without knowledge of toxoplasmosis. The same was observed by Pereboom et al. (2013) in a study about the knowledge and behavior of pregnant women regarding toxoplasmosis, listeriosis and cytomegalovirus in Holland. Still, a bias that must be considered is the fact that many women might have answered the questions based on a general sense of "right and wrong" (Pereboom et al., 2013).

Seventy-nine of the women who were interviewed stated that they had never received any information about parasite infection and pregnancy, and the harm it could cause to them and/or the baby. Furthermore, 38% of the interviewed

women did not know that vertical transmission is a way of acquiring parasite infection, which is an elevated index of unawareness especially considering that the population studied is mostly comprised of women with high-risk pregnancy. In a study of 403 pregnant women in the USA, Jones et al. (2003) observed that only 48% of the women who were interviewed recalled receiving or reading any information about toxoplasmosis. Pereboom et al. (2013) observed that 794 out of 1,097 (75.3%) women recalled that they had heard, read or seen any information about toxoplasmosis.

The methods used in the present study did not allow an investigation of whether the statement of not receiving information about parasite infection during pregnancy was due to a lack of assimilation of the information received, or due to issues in the transmission of knowledge by the health professional.

Indeed, Contiero-Toniato et al. (2014), in a study of health professionals and pregnant women from Cascavel, Paraná, observed that 91.4% (53/58) of the health professionals stated that they had instructed pregnant women during pre-natal care. However, in the same study, the researchers observed that only 48.6% (54/111) of the susceptible and 45.2% (99/219) of the non-susceptible pregnant women recalled receiving information regarding toxoplasmosis prevention during pre-natal care.

The understanding of the social and cultural context by health professionals is imperative for the use of an understandable language that could result in a better understanding of the subject by the population (Launiala & Kulmala, 2006; Mello et al., 1988).

Moreover, the lack of knowledge (or updated information) among health professionals could also influence the transmission of knowledge to the population. In a study of 520 gynecologists and obstetricians in the USA about preventive measures for toxoplasmosis, Jones et al. (2010) showed that only 34.2% advised their patients to wash fruit and vegetables as a preventive measure. In Brazil, a study of health professionals from basic health units in Juiz de Fora, MG, regarding knowledge about toxoplasmosis showed that 44% of 112 interviewed correctly answered all questions, and the lower average of correct answers came from professionals with more than 10 years since graduation (Silva et al., 2011). Among the factors that could contribute to this scenario are the work overload, overspecialization of health professionals, lack of institutional incentive, and rapid evolution and transformation of knowledge and consequent delay of guidelines. On the other hand, the lack of transmission of the information to the patient could also occur because the health professional does not consider the importance of that information, even though it is actual and adequate.

Costa-Macedo and Rey (1996), in a study about intestinal parasites in pregnant and post-partum women in Rio de Janeiro, called attention to the fact that there was no project for controlling intestinal parasites in pregnancy during pre-natal care. Also, there were no guidelines for medical management of parasitized pregnant women.

The Technical handbook of pre-natal and puerperium care, issued by the *Ministério da Saúde* (2006), and the Book for basic care, also issued by the *Ministério da Saúde* (2012), have few recommendations about diagnosis and prevention of intestinal parasites, toxoplasmosis and malaria during pregnancy. Regarding toxoplasmosis, there are guidelines for serological examinations during pre-natal care, which vary according to the results of the examinations conducted in the first trimester of pregnancy. However, regarding diagnosis of intestinal parasites, there is only a recommendation for parasitological fecal examination in the first pre-natal care appointment in cases of clinical indication. However, there is no definition of what those indications actually are, and there are also no guidelines about sample number and minimal recommended techniques for diagnosis.

Although there are government programs aiming to improve the pre-natal care assistance, which includes other health professionals, the scenario is still of a fragmented care. This could be explained by the high turnover of health professionals in the basic health care units, and also by the difficulties of implementing the minimum number of pre-natal care appointments recommended by the Ministry of Health. Additional reasons for the precarious state of pre-natal care are the many problems with the reference and counter-reference system, and the low compliance of pregnant women with their own care (Anversa et al., 2012; Mendoza-Sassi et al., 2007; Serruya et al., 2004).

No correlation was observed between the initial date of pre-natal care and the acquisition of knowledge about parasites. Perhaps this was due to the quality of pre-natal care, where all the support and information given are the same regardless of the time that the pregnant woman begins her pre-natal care. It is important to note that the knowledge of pregnant and post-partum women does not necessarily come from health professionals. The increase in access to information by means of mass media, along with popular conventional knowledge, assists in the formation of personal habits and opinions (Mello et al., 1988). In fact, Jones et al. (2003) observed that 137/192 (71%) of interviewed pregnant women had heard about toxoplasmosis in magazines or books about pregnancy, while only 103/192 (53%) stated that they had received this information from health professionals. Pawlowski et al. (2001) in another study showed that 60% of 2,710 interviewed pregnant women had heard about toxoplasmosis on television or read information in magazines. However, it is known that not all the information propagated in the media is totally correct and, thus, the incentive for critical sense in this population is imperative.

Despite the advances in pre-natal care standardization and assistance in the last decade, the lack of knowledge among pregnant and post-partum women regarding parasites and risk factors for infection still remains. Thus, basic health education policies that aim to prevent parasite infection during pregnancy are imperative. Those actions should prioritize encouragement to search for information, autonomy of care and critical thinking.

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