

Perspectives on sexual and reproductive health among women in an ancient mining area in Brazil

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ABSTRACT

The purpose of this study was to describe the reproductive profile and frequency of genital infections among women living in the Serra Pelada, a former mining village in the Pará state, Brazil. A descriptive study of women living in the mining area of Serra Pelada was performed in 2004 through interviews that gathered demographics and clinical data, and assessed risk behaviors of 209 randomly-selected women. Blood samples were collected for rapid assay for HIV; specimens were taken for Pap smears and Gram stains. Standard descriptive statistical analyses were performed and prevalence was calculated to reflect the relative frequency of each disease. Of the 209 participants, the median age was 38 years, with almost 70% having less than four years of education and 77% having no income or under 1.9 times the minimum wage of Brazil. About 30% did not have access to health care services during the preceding year. Risk behaviors included: alcohol abuse, 24.4%; illicit drug abuse, 4.3%; being a sex worker, 15.8%; and domestic violence, 17.7%. Abnormal Pap smear was found in 8.6%. Prevalence rates of infection were: HIV, 1.9%; trichomoniasis, 2.9%; bacterial vaginosis, 18.7%; candidiasis, 5.7%; Chlamydial-related cytological changes, 3.3%; and HPV-related cytological changes, 3.8%.

Women living in this mining area in Brazil are economically and socially vulnerable to health problems. It is important to point out the importance of concomitant broader strategies that include reducing poverty and empowering women to make improvements regarding their health.

Key words

Women's health; mining; genital diseases; women; vulnerable groups; health services accessibility; Brazil.

Nearly a quarter of a century ago, in Serra Pelada, Brazil, the discovery of some of the largest gold nuggets on

record started a gold rush that produced great wealth for a fortunate few and great sacrifice and suffering for others (1). More than 110 000 prospectors flocked to the site, which at its peak was said to be not only the largest open-air gold mine in the world, but also the most violent and chaotic (1). Today, the Serra Pelada mine area, located in the state of Pará, is home to no more than 7 000 people, mostly prospectors who have no other place to go or cannot afford to leave (2).

Primitive mining activities frequently produce extensive environmental degradation and deplorable socioeconomic conditions during, as well as after, mining (3, 4). Lack of sanitation, widespread disease (malaria, cholera, sexually transmitted diseases (STDs), cancer, etc.), and limited access to health care providers have resulted in poor health conditions in primitive mining communities (5–8).

In general, the women in mining areas face serious obstacles in terms of their

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basic human rights, including inequitable access to health care, lack of food and nutrition, and use of customary practices that are detrimental to their health and well-being. All problems related to health and practices that are harmful to women violate their fundamental human rights (9). Many of these women suffer from reproductive tract infections. These problems often cause discomfort and loss of economic productivity (10, 11). The most serious long-term sequelae that arise in women are pelvic inflammatory disease, cervical cancer, infertility, spontaneous abortion, and ectopic pregnancy, the latter of which may lead to maternal death (12, 13).

The integration of sexual health into existing primary health care services, including reproductive health programs, has been a priority for Brazil since the International Conference on Population and Development in 1994 (14). The government of Brazil has been implementing the Family Health Program (FHP) as a strategy for improving primary health care. This program provides a comprehensive range of preventive and curative health care services delivered by a team composed of a physician, a nurse, a nurse-assistant, and several community health workers (CHW). Each team is assigned to a geographic area and is responsible for enrolling and monitoring the health status of its population, providing primary care services that include reproductive care, and making referrals to higher levels of care as needed (15). Despite government efforts, health care services are not part of the reality in some parts of the country. In Serra Pelada, two nurse-assistants and 10 CHW provide health care services to the community; a physician is available only once a week. FHP is not completely implemented in this area.

The goal of this study was to describe the reproductive profiles of, the frequency of vaginal infections and abnormal Pap smears among, and the access to health care facilities for women living in the Serra Pelada mining area. The idea for this project came from relationships formed during a previous assessment conducted in the area and the desire to understand the needs and problems of these women before implementing a single health strategy. The data collected will be used to plan prevention and health care assistance programs designed specifically for reaching this population.

MATERIALS AND METHODS

A health team went to the Serra Pelada village in state of Pará, located in the Amazon region of Brazil, to perform health diagnoses, prevention planning, and health care strategies for the population. The team attended to patients in the district's primary health care facility. This study was carried out by the women's assistance branch of a project designed to evaluate accessibility of the area's health facilities. The study was performed in March 2004 when approximately 1 500 women of reproductive age were living in the area. All women living in the village were invited to take part in the study; a health care representative went house-to-house inviting them. Of the women who attended the clinic, the first of each group of five was selected for the study. The study included 209 women, 14% of the adult female population. A structured interviewer-administered survey was conducted to gather data on sociodemographic characteristics, sexual behaviour, drug abuse, medical history, health facilities access, and other health-related factors. Blood samples and vaginal specimens were collected and the following tests performed: rapid assay for HIV by the Núcleo de Doenças Infecciosas (Infectious Diseases Unit, Vitória, Brazil); and Pap smear and Gram stain analyzed at the Universidade Federal do Espírito Santo, Brazil. Diagnosis of *Chlamydia trachomatis* and Human Papilloma Virus (HPV) infection were based on cytological signs. ELISA and fluorescence assay confirmed HIV-positive tests.

Standard descriptive statistical analyses were performed, including frequency distributions for categorical data and calculation of means and standard deviations for continuous variables. Prevalence was calculated to reflect the relative frequency of each disease, with corresponding 95% confidence intervals (95%CI).

The ethics committee from the Universidade Federal do Espírito Santo, in Vitória, Brazil, approved the protocol for the study. Written, informed consent was obtained from all participants in compliance with the legal guidelines of Brazil.

RESULTS

All of the women who were randomly selected agreed to participate in the study.

TABLE 1. Sociodemographic characteristics of women living in a mining area in Brazil (n = 209), 2004

Characteristics	No.	%
Age (years)		
<19	10	4.8
20–39	108	51.4
40–59	86	41.0
60+	6	2.9
Schooling (years)		
None	37	17.7
1–4	109	52.2
5–8	50	23.9
9–11	113	6.2
Family income (measured in number of times the minimum wage) ^a		
0–1.9	161	77.0
2–4	46	22.0
>4.1	2	1.0
Marital status		
Single	49	23.4
Married/living together	137	65.6
Separated/divorced	11	5.3
Widow	12	5.7
Employed in the mine	13	6.2
Family still employed in the mine	67	32.1

^a The 2004 minimum wage in Brazil was US\$ 83 per month.

A total of 209 were enrolled. About 30% reported that they did not have access to health care during the preceding year. The median age was 38 years old (interquartile range (IQR) 28, 47) and mean years of schooling was 3.6 (standard deviation (SD) 2.9). Demographic characteristics are described in Table 1. Almost 70% had four or fewer years of schooling and 6.2% worked for the mining industry. For 77% of the women, the monthly family income was between 0 (no income) and 1.9 times the minimum wage of Brazil.

Table 2 shows behavioral, clinical, and gynecological characteristics. Illicit drug abuse was not common (4.3%), but alcohol abuse was reported by 24.4%. Of the total, 112 participants (53.6%) reported previous information about sexuality, sexually-transmitted diseases (STDs), and AIDS. Median age of first intercourse was 16 (IQR 14, 18) years. Twenty-two women (10.5%) reported first sexual intercourse at 14 years of age or younger; 79 (37.8%) had five or more children. Frequent use of condoms was reported by 9.1%. Regarding clinical and gynecological characteristics, 34.4% reported chronic diseases (hypertension, diabetes, and depression) and 11%, a previous blood transfusion. Although 71.8% re-

TABLE 2. Behavioral, clinical, and gynecologic characteristics of women living in a mining area in Brazil (n = 209), 2004

Characteristics	No.	%
Tobacco use	75	35.9
Alcohol abuse	51	24.4
Illicit drug use	9	4.3
Prostitution	33	15.8
Previous STDs	22	10.5
Imprisonment	7	3.3
Oral contraception	118	56.5
Consistent condom use	19	9.1
Regular condom use with regular partner	29	13.9
Domestic violence	37	17.7
Rape	21	10.0
Any symptoms	145	69.4
Any chronic disease	72	34.4
Previous surgery	135	64.6
Blood transfusion	23	11.0
Abortion	61	29.2
Pregnancy at interview	6	2.9
Previous Pap smear (in the last three years)	150	71.8
Pap smear results		
Normal	8	3.8
Benign cellular changes	183	87.6
Atypical squamous cells	9	4.3
Low-grade squamous intraepithelial lesion (LSIL)	3	1.4
High-grade squamous intraepithelial lesion (HSIL)	6	2.9

ported a previous Pap smear within the last three years, 38.0% did not have access to the test result (the result was not returned to the clinic or the result took so long to return, it was considered lost). Abnormal Pap smears—atypical squamous cells of undetermined significance (ASCUS) and cervical intraepithelial neoplasia (CIN)—were found in 8.6%. Mild or severe inflammations were described in 42.1% of squamous cells and in 13.4% of columnar cells.

Prevalence rates of genital infections and HIV among women living in the Serra Pelada mining area in Brazil were: candidiasis, 5.7% (95%CI 2.6–8.8); bacterial vaginosis, 18.7% (95%CI 13.4–24.0); *Chlamydia trachomatis* infection, 3.3% (95%CI 0.9–5.7); gonorrhea, 2.4% (95%CI 0.3–4.5); trichomoniasis, 2.9% (95%CI 0.6–5.2); HPV infection, 3.8% (95%CI 1.2–6.4); and HIV infection, 1.9% (95%CI 0.1–3.7).

DISCUSSION

This was the first study reporting data on sexual and reproductive health conditions of women living in a mining area in Brazil, a population at high risk for

poverty, social exclusion, and unemployment. A significant prevalence of reproductive problems in this population has been observed and this fact concurs with the long-recognized statement that the conditions in which people work and live affect their health (16).

Sociodemographic data described in this study show a high number of people under 30 years of age, with a low level of education, low monthly income, and living in a stable relationship. Few of the women still work in the mine. Other studies have also shown bad health effects due to poverty, low education level, and minority status (17, 18). These data demonstrate that economic inequalities and social injustices continue to deny good health to many and that obstacles to health still persist in poor regions. Poverty has various manifestations, including: a lack of income and limited opportunities for ensuring a sustainable livelihood; hunger and malnutrition; poor health; limited or lack of access to education and other basic services; increasing morbidity and mortality from illness; homelessness and inadequate housing; unsafe environments; and social discrimination and exclusion. It is also characterized by a lack of participation in decision making and in the civil, social, and cultural life of the community (9).

The study results showed that risk behaviors were frequent and can be responsible as correlated risk factors for serious health conditions: regular tobacco use (35.9%), alcohol abuse (24.4%), previous STD (10.5%), chronic diseases (34.4%), illicit drug abuse (4.3%), and domestic violence (17.7%). A study performed in Pelotas, southern Brazil, reported a higher prevalence of smoking among young women during the month prior to the study, while alcohol consumption was more common among young men. Meanwhile, the proportion of young people that reported drug use in the month prior was unrelated to gender (19). Alcohol, cocaine, and cannabis are the most commonly misused psychoactive substances in Brazil (19). One of the biggest public health problems is the interface between the misuse of psychoactive substances and the prevalence of HIV and other STDs.

Domestic violence was an important aspect observed in this study and frequently reported by participants. Though not a primary objective of the study, it is important to point out this

problem and investigate its association with other health problems in women. Other authors in Brazil have reported the effects of domestic, sexual, and racial violence on the physical and mental health of women (20). A study on violence conducted in São Paulo identifies the following domestic violence triggers: a lack of family structure, precarious social and economic conditions, unstable marriages, mental disorder, alcoholism, as well as the absence of social policies to meet social demands (21). The realities of women's lives put them at high risk for health problems, including, for example, marriage of adolescent girls to older, sexually experienced men; husbands who engage in extramarital sex; violence and sexual coercion inside and outside marriage; prostitution; unequal access to education and employment; and taboos against giving girls factual information about sexuality and reproduction.

Although in this study 54% of the women reported receiving information about sexuality, STDs, and AIDS, and 56.6% had used oral contraception, 37.8% had more than five children and 29.2% had had at least one abortion. Regarding first intercourse, the mean age was 16 years, with 10.5% occurring before 14 years of age. Brazil has conducted widespread condom promotion campaigns throughout the country for HIV prevention. These results are consistent with findings from a Brazilian national study (22) and suggest that the information approach is not enough to change the situation. The women in this study had access to information, but did not change their behavior regarding STDs, AIDS, and pregnancy.

Of great relevance and in need of further discussion is the fact that although these women have access to information, they do not have access to adequate health care, nor do they have the money to buy condoms or other contraceptives. They receive information, but cannot obtain the tools needed to practice what they've been taught. If the health system does not pay attention to this fact, it will be difficult to change the reality of these women.

Also of importance is that nearly 70% of the women reported some symptom during the interview and while 71.8% had had a previous Pap smear, 38.0% did not know the results. Women who receive Pap smears at this clinic must return to the clinic to receive their results.

They are asked to do so, but many never do, and so, they are not informed of treatment that might be necessary. In general, the less knowledgeable women are about Pap testing, the less likely they are to make a screening visit (23) and to adhere to recommended follow-up for an abnormal result (24–26). In this special population, the situation was more serious because there is no organized health care service. Since a Pap smear is an inexpensive screening method for cervical cancer, if health services were improved, the number of women receiving early diagnoses and treatment could be increased.

In this study, more than 90% of the 209 women had normal or benign cellular changes in their Pap smear, with bacterial vaginosis as the most frequent genital infection. It is important to point out that bacterial vaginosis may be a cofactor for HIV transmission, especially among younger women (27).

Limitations of this study include a modest sample size and the unique nature of the sample, which could limit in-

ference to other women in similar conditions in Brazil. However, both the sampling methods and the high response rate are strengths that could outweigh this potential limitation. Regarding the high response rate, it's important to note that these women do not normally have access to laboratory services. In this type of primary care setting, a clinical diagnosis of Candida and bacterial vaginosis may be based on symptoms and signs (28). The participation rate significantly demonstrates that prevention and health care programs can successfully implement confidential and private services for women of minority groups. This high participation rate may also can be explained by the lack of health care services in the community; the women were offered medical assistance and treatment for any diagnosed problems. Also, it is important to say that the possibility of response bias, due to the tendency to provide socially acceptable responses, cannot be excluded.

To plan efficient strategies for prevention, associated causes must first be

identified through improved surveillance of this population. The health of women is not only unique from a biological point of view; it is linked to human behavior and culture, making it a biological and sociocultural event. It is important to identify additional innovative interventions that might address the social, cultural, and environmental factors that impact the health of these women. There is also a need to find better ways of disseminating evidence-based approaches to pregnancy prevention, so that effective interventions are more widely used. These findings reinforce the need for qualitative and quantitative implementation of the FHP in this area, focusing on education and intervention programs that pay special attention to issues related to the sexual and reproductive health of this vulnerable population.

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REFERENCES

- Monteiro-Filho M. Órfãos de Serra Pelada. Available from www.reporterbrasil.com.br/reportagens/serrapelada. Accessed on: 1 June 2004–24 May 2005.
- Beinhoff C. Global mercury project: removal of barriers to introduction of cleaner artisanal gold mining and extraction technologies. *Global Mercury Project News*. United Nations: 2003;1(3):1–4. [Project EG/GLO/01/G34].
- Santos EO, Loreiro ECB, Jesus IM, Brabo E, Silva RSU, Soares MCP, et al. Diagnóstico das condições de uma comunidade garimpeira em uma região do Rio Tapajós, Itaituba, Pará, Brasil. *Cad Saude Publica* 1995;11:212–25.
- Rigina O. Environmental impact assessment of the mining and concentration activities in the Kola Peninsula, Russia by multirate remote sensing. *Environ Monit Assess* 2002;75(1):11–31.
- Dondon MG, de Vathaire F, Quenel P, Frery N. Cancer mortality during the 1968–1994 period in a mining area in France. *Eur J Cancer Prev*. 2005;14(3):297–301.
- Souto FJ, Fontes CJ, Gaspar AM. Prevalence of hepatitis B and C virus markers among malaria-exposed gold miners in Brazilian Amazon. *Mem Inst Oswaldo Cruz* 2001;96(6):751–5.
- Couto AA, Calvosa VS, Lacerda R, Castro F, Santa Rosa E, Nascimento JM. Control of malaria transmission in a gold-mining area in Amapá State, Brazil, with participation by private enterprise. *Cad Saude Publica* 2001;17(4):897–907.
- Pang L, Alencar FE, Cerutti C Jr, Milhous WK, Andrade AL, Oliveira R, et al. Short report: hepatitis E infection in the Brazilian Amazon. *Am J Trop Med Hyg*. 1995;52(4):347–8.
- United Nations. Platform for action. Proceedings of the United Nations fourth world conference on women, Beijing, China, September 1995. Available from: <http://www.un.org/womenwatch/daw/beijing/platform/poverty.htm>. Accessed on: 14 October 2008.
- Piot P, Rowley J. Economic impact of reproductive tract infections and resources for their control. In: Germain A, et al., eds. *Reproductive tract infections: global impact and priorities for women's reproductive health*. New York: Plenum Press; 1992:227–49.
- Over M, Piot P. Human immunodeficiency virus infection and other sexually transmitted diseases in developing countries: public health importance and priorities for resource allocation. *J Infect Dis*. 1996;174 (suppl 2):S162–75.
- World Health Organization. *Global prevalence and incidence of selected curable sexually transmitted infections: overview and estimates*. Geneva: WHO; 2001.
- Cates W, Rolfs RJ, Aral SO. Sexually transmitted diseases, pelvic inflammatory disease, and infertility: an epidemiologic update. *Epidemiol Rev*. 1990;12:199–221.
- United Nations Population Fund. *Gender equality, equity and empowerment of women*. Proceeding of: the international conference on population and development. Available from: <http://www.unfpa.org/icpd/summary.cfm#chapter4>. Accessed on 14 October 2008.
- Ministerio da Saude, Secretaria de Assistencia a Saude, Departamento de Atenção Básica. *Evolução do credenciamento e implantação da estratégia Saúde da Família*. Available from: http://dtr2004.saude.gov.br/dab/localiza/localiza_cadastro. Accessed on 11 April 2008.
- Frank JW, Mustard JF. The determinants of health from a historical perspective. *Daedalus*. 1995;123(4):1–17.
- Morris JN, Donkin AJ, Wonderling D, Wilkinson P, Dowler EA. A minimum income for healthy living. *J Epidemiol Community Health*. 2000;54:885–9.
- Prasad JH, Abraham S, Kurz KM, George V, Lalitha MK, John R, et al. Reproductive tract infections among young married women in Tamil Nadu, India. *Int Fam Plan Perspect*. 2005;31(2):73–82.
- Horta RL, Horta BL, Pinheiro RT, Morales B, Strey MN. Tobacco, alcohol, and drug use by teenagers in Pelotas, Rio Grande do Sul State, Brazil: a gender approach. *Cad Saude Publica*. 2007;23(4):775–83.
- Taquette SR, Ruzany MH, Meirelles Z, Ricardo I. Violent relationship in young people and STD/AIDS risk. *Cad Saude Publica*. 2003;19(5):1437–44.
- Roque EM, Ferriani MG. Unveiling domestic violence against children and adolescents under the point of the legal professionals in

- the municipality of Jardinópolis, São Paulo, Brazil. *Rev Latino-Am Enfermagem*. 2002;10:334-44.
22. Sociedade Civil Bem-estar Familiar no Brasil. Pesquisa nacional sobre demografia e saúde: uma análise do nível de conhecimento e comportamentos de vulnerabilização. Rio de Janeiro: Sociedade Civil Bem-estar Familiar no Brasil; 1997.
 23. Dignan M, Michielutte R, Blinson K, Wells HB, Case LD, Sharp P, et al. Effectiveness of health education to increase screening for cervical cancer among Eastern-Band Cherokee Indian women in North Carolina. *J Natl Cancer Inst*. 1996;88(22):1670-6.
 24. Schofield MJ, Sanson-Fisher R, Halpin S, Redman S. Notification and follow-up of Pap test results: current practice and women's preferences. *Prev Med*. 1994;23(3):276-83.
 25. Yabroff KR, Kerner JF, Mandelblatt JS. Effectiveness of interventions to improve follow-up after abnormal cervical cancer screening. *Prev Med*. 2000;31(4):429-39.
 26. Abercrombie PD. Improving adherence to abnormal Pap smear follow-up. *J Obstet Gynecol Neonatal Nurs*. 2001;30(1):80-8.
 27. Sewankambo N, Gray RH, Wawer MJ, Paxton L, McNaim D, Wabwire-Mangen F, et al. HIV-1 infection associated with abnormal vaginal flora morphology and bacterial vaginosis. *Lancet*. 1997;350(9083):546-50.
 28. Mitchell H. Vaginal discharge—causes, diagnosis and treatment. *Br Med J*. 2004;328:1306-8.

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RESUMEN

Perspectiva de la salud sexual y reproductiva en mujeres de una antigua zona minera de Brasil

El propósito de este estudio fue describir el perfil reproductivo y la frecuencia de infecciones genitales en mujeres que viven en la población minera Serra Pelada en el Estado de Pará, Brasil. Se realizó un estudio descriptivo de las mujeres que vivían en la zona minera de Serra Pelada en 2004 mediante entrevistas en las que se recabaron datos demográficos y clínicos y se examinaron las conductas de riesgo de 209 mujeres seleccionadas aleatoriamente. Se tomaron muestras de sangre para pruebas rápidas de detección de anticuerpos contra el VIH y muestras de tejido para análisis citológico y tinción de Gram. Se calculó la prevalencia y se utilizaron pruebas estadísticas descriptivas estándares para caracterizar la frecuencia relativa de cada enfermedad. La mediana de la edad de las 209 participantes fue de 38 años; 70% tenía menos de cuatro años de escolaridad y 77% no tenía ingresos o estos eran inferiores a 1,9 veces el salario mínimo en Brasil. Alrededor de 30% no tuvo acceso a servicios de salud durante el año previo. Entre las conductas de riesgo estaban: consumo de bebidas alcohólicas (24,4%) y de drogas ilícitas (4,3%), ser trabajadora sexual (15,8%) y violencia doméstica (17,7%). Se encontraron resultados anormales a la prueba citológica en 8,6% de las participantes. Las prevalencias de infección fueron: 1,9% de VIH, 2,9% de tricomoniasis, 18,7% de vaginosis bacteriana y 5,7% de candidiasis; 3,3% presentó alteraciones citológicas asociadas con la infección por clamidia y 3,8% alteraciones citológicas asociadas con el virus de papiloma humano.

Las mujeres de esta zona minera de Brasil son económica y socialmente vulnerables a problemas de salud. Es importante señalar la importancia de estrategias concomitantes más amplias que abarquen la reducción de la pobreza y el empoderamiento de las mujeres para lograr mejoras en su salud.

Palabras clave

Salud de la mujer, minería, enfermedades de los genitales femeninos, comunidades vulnerables, accesibilidad a los servicios de salud, Brasil.