Socioeconomic and regional inequalities of pap smear coverage

Desigualdades socioeconômicas e regionais na cobertura de exames citopatológicos do colo do útero

Desigualdades socioeconómicas y regionales en la cobertura de exámenes citopatológicos del cuello uterino

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ABSTRACT

Objectives: To identify socioeconomic and regional inequalities of pap smear coverage in the state of Rio Grande do Sul.
Methods: An ecological study based on data of the 2011-2012 national health information system to estimate the annual coverage of pap smears for the overall female population of the state and for women without private health insurance. We estimated annual pap smear coverage according to the Municipal Social Vulnerability Index and health macro-regions and regions of the state.
Results: The percentage of women without private health insurance ranged from 38.1% to 94.2% in the health regions. Pap smear coverage was 17.3% for the overall female population and 23.8% for women without private health insurance. Pap smear coverage was higher in more socially vulnerable municipalities and regions with a higher percentage of women with private health insurance.
Conclusions: The prevalence of private health insurance should be considered in studies that address the coverage of the Brazilian Unified Health System (SUS).
Keywords: Health inequalities. Cervix neoplasms prevention. State healthcare coverage.

RESUMO

Objetivos: Identificar desigualdades socioeconômicas e regionais na cobertura de exames citopatológicos do colo do útero no Rio Grande do Sul.
Métodos: Estudo ecológico utilizou dados dos sistemas de informação em saúde de 2011-2012 para estimar coberturas anuais de exames para todas as mulheres residentes e para as não beneficiárias de planos privados de saúde. Desigualdades na cobertura foram estimadas conforme o Índice de Vulnerabilidade Social Municipal, macrorregiões e regiões de saúde.
Resultados: A prevalência de mulheres não beneficiarias de planos privados de saúde variou de 38,1% a 94,2% entre regiões de saúde. A cobertura estadual foi 17,3% para todas as residentes e 23,8% para as não beneficiárias de planos privados. As maiores coberturas ocorreram nos municípios em maior vulnerabilidade social e nas regiões com maior prevalência de planos privados.
Conclusões: A prevalência de planos privados de saúde deve ser considerada em estudos da cobertura de serviços pelo Sistema Único de Saúde.
Palavras-chave: Desigualdades em saúde. Prevenção de câncer de colo uterino. Cobertura de serviços públicos de saúde.

RESUMEN

Objetivos: Identificar desigualdades socioeconómicas y regionales en la cobertura de exámenes citopatológicos del cuello uterino en Rio Grande do Sul.
Métodos: Estudio ecológico utilizó datos de los sistemas de información en salud de 2011-2012 para estimar coberturas anuales de exámenes para la totalidad de mujeres residentes y para no beneficiarias de planes privados de salud. Se estimaron las desigualdades según el Índice de Vulnerabilidad Social Municipal, las macroregiones y las regiones de salud.
Resultados: La prevalencia de mujeres no beneficiarias de planes privados de salud tuvo una variación de 38.1% a 94.2% entre las regiones de salud. La cobertura del estado fue de 17.3% para la totalidad de residentes y el 23.8% para no beneficiarias de planes privados. Las mayores coberturas sucedieron en los municipios de mayor vulnerabilidad social y regiones con mayor prevalencia de planes privados.
Conclusiones: La prevalencia de los planes privados de salud debe ser considerada en los estudios de cobertura de servicios del Sistema Único de Salud (SUS).
Palabras clave: Desigualdades en la salud. Prevención de cáncer de cuello uterino. Cobertura de servicios públicos de salud.

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■ INTRODUCTION

Cervical cancer is the fourth most common form of cancer among women and the seventh most common in the world, with approximately 528 thousand new cases and 266 thousand deaths worldwide in 2012, which corresponds to 7.5% of deaths from cancer among women[1]. In Brazil and in Rio Grande do Sul, cervical cancer is among the four most common form of cancer among women and was one of the five leading causes of death among women in 2012[2-4].

Regular pap smears (PS) are the main strategy to track cervical cancer and its precursor lesions[5] due to the acceptable sensitivity and specificity, low cost, safety and wide acceptance by women[6]. The Brazilian ministry of health establishes triannual PS for women between the ages of 25 and 64, which is the equivalent annual coverage of 33.3%[7], with the fundamental monitoring and evaluation of the coverage of these tests among this population.

The Brazilian Unified Health System (SUS) has been providing this test to a large number of women, and the number of tests in Rio Grande do Sul in 2011 and 2012 totalled almost one million[8]. Moreover, around 25% of the population of this state has private health insurance[9], which can potentially make supplementary health a way of meeting the healthcare needs of the beneficiaries of private insurance. However, for the large majority of women who do not have private health insurance, the SUS is the only healthcare alternative, considering that almost all these women do not have resources to pay for these services elsewhere. Withal, we did not find studies that address the SUS coverage of PS among women who do not have health insurance in Rio Grande do Sul.

Universality is the fundamental principle of the SUS. Any inequality when accessing cervical cancer screening defined by residential region and socioeconomic condition is considered socially unjust. Consequently, the question is whether PS coverage of the SUS in Rio Grande do Sul reaches the rates established by the ministry of health and whether there are socioeconomic and regional equalities when accessing these tests.

The aim of this study is to identify socioeconomic and regional inequalities in the coverage of pap smears provided by the Unified Health System in Rio Grande do Sul. The identification of these inequalities is a fundamental aspect of monitoring and evaluating the policies of women's healthcare, and it is highly relevant for collective health, where the nursing practice is considered important.

■ METHODS

Epidemiological, ecological, descriptive study that was part of the qualitative field of a national study with a mixed outline titled "*Uso de tecnologias de integralidade no cuidado às mulheres no âmbito da rede de atenção básica: análise de cenários em relação à consulta ginecológica*". This research covered the final course work presented to the Escola de Enfermagem of the Universidade Federal do Rio Grande do Sul, from which this paper was extracted[10].

This study estimated PS coverage of the SUS in Rio Grande do Sul with special attention to the socioeconomic and regional inequalities of this state-wide coverage. PS coverage was calculated for all the resident women between the ages of 25 and 64 and, separately, for women that do not have private health insurance.

The target population of this study were women between the ages of 25 and 64 living in Rio Grande do Sul, from 2011 to 2012. This age group is also the target of the *Programa de Rastreamento do Câncer do Colo do Útero*[7], a Brazilian cervical cancer tracking programme. The years 2011 and 2012 were selected because they were the last years that the data used for this study were available in the Department of Informatics of the SUS (DATASUS) at the time of data collection - January 2014.

We used the following public domain data, by municipality of Rio Grande do Sul: (a) the number of PS among women between 25 and 64 years of age by the SUS in 2011 and 2012, and by municipality of residence obtained from the electronic database of the DATASUS; (b) the estimated number of women between 25 and 64 years old living in each municipality in 2011 and 2012, obtained from the electronic database of the Brazilian institute of geography and statistics (IBGE); (c) the number of women between 25 and 64 years old with private health insurance in 2011 and 2012, by municipality of residence, obtained from the electronic database of the national supplementary health agency (ANS).

PS coverage of the SUS for the total number of resident women was calculated using the ratio between the number of tests and the number of residing women between the ages of 25 and 64, resulting in the percentage of the resident population covered by the SUS. PS coverage of the SUS for women who do not have private health insurance was calculated using the ratio between the number of tests and the number of women who do not have private health insurance in the 25 to 64 age group. This last estimate of coverage is an indicator of access to PS among women whose main alternative for this test is the SUS.

The socioeconomic inequalities of PS coverage of the SUS were estimated in terms of range of variation of PS coverage among the groups of municipalities that are organized according to the social vulnerability of the population, measured by the Índice de Vulnerabilidade Social Municipal-5 (IVS-5), a municipal social vulnerability index, obtained from the state department of health of Rio Grande do Sul (SES/RS). The IVS-5 is an index of inequalities between municipalities that summarizes five aspects of social vulnerability of the population: per capita household income, sanitation, water distribution network, rubbish collection, and difficulty in providing public services related to the low population density, based on data from the 2010 Census of the IBGE. The IVS-5 measures the position of the municipality in terms of the number of standard deviations above or below the state average of social vulnerability. Thus, the municipalities were placed in order of increasing vulnerability, considering that negative values indicate a lower proportion of the population in a condition of social vulnerability than the state average (0.00) and positive values indicate a higher proportion of social vulnerability[11]. In this study, the municipalities were grouped into four vulnerability levels: <-0.50; -0.50 to 0.00; 0.01 to 1.00; >1.00.

The regional inequalities of PS coverage of the SUS were estimated using the range of PS coverage among the groups of municipalities arranged by health macro-regions and regions of the state. The health macro-regions were selected because they represent the geoeconomic scenario of the state and the thirty health regions were selected because they represent the healthcare service organization scenario[12-13]. This information was obtained from the electronic database of the DATASUS.

All the statistical analyses were carried out using IBM® SPSS® Statistics version 20. The research project was approved by the Comitê de Ética em Pesquisa of the Universidade Federal do Rio Grande do Sul, under number 376.543, on July 11, 2013.

■ RESULTS

Population distribution

The distribution of women between the ages of 25 and 64 in 2011-2012 according to municipal social vulnerability and state macro-regions shows that 78.1% of this population lives in the municipalities with a relatively low social vulnerability (IVS-5<-0.5) and 44.2% lives in the metropolitan macro-region. The percentage of resident women who do not have private health insurance varied from 66.7% in the less vulnerable municipalities (IVS-5 <-0.50) to 97.1% in the more vulnerable municipalities (IVS-5>1.00), and also differed between the seven macro-regions, ranging from 48.3% in the Serra macro-region to 88.5% in the Centre-West macro-region (Table 1).

The number of women varied between the 30 health regions. The most populated region was the Capital and Vale do Gravataí (n=1287522) with 21.7% of the women in this age group in the state. The least populated was Campos de Cima da Serra (n=4934), with 0.8% of the total women. The percentage of women without private health insurance varied from 38.1% in the Caxias and Hortênsias region to 94.2% in the Entre Rios region (Table 2).

Distribution of pap smears

In 2011-2012, the distribution of pap smears varied according to the municipal social vulnerability and the macro-regions. A total of 1021232 pap smears were performed in Rio Grande do Sul. The highest number of tests was in the municipalities with the lowest social vulnerability (IVS-5<-0.50; n=707667 tests) and in the Metropolitan macro-region (n=386521 tests). The lowest number of tests was in the municipalities with the highest social vulnerability (IVS-5 >1.00; n=50179 tests) and in the South macro-region (n=80203 tests) (Not shown in table).

Distribution of pap smear coverage

In Rio Grande do Sul, the average PS coverage was 17.3% for all the resident women and 23.8% for the women without private health insurance. The distribution of PS coverage, according to the municipal IVS-5, shows that the coverage tends to be higher when the municipal social vulnerability is higher, with a range of variation of 10.6% for all resident women (maximum of 25.9% and minimum of 15.3%) and 4.6% for women without private health insurance (maximum of 27.6% and minimum of 23.0%) (Table 1).

PS coverage also varied between the state macro-regions. The highest coverage among the resident women was in the North macro-region (23.5%), in the Missioneira macro-region (23.0%) and in the Vales macro-region (21.2%), while the lowest coverage was in the South (14.4%), Metropolitan macro-region (14.8%) and the Serra (15.2%), with a range of variation of 9.1% between the macro-regions (23,5-14,4 = 9.1%). The range of variation of the coverage was 14.6% for women without health insurance, with the highest coverage in the Sierra (31.5%), North (27.4%) and Missioneira (26.5%) macro-regions, and the lowest coverage in the South (16.9%), Centre-West (20.7%) and Metropolitan (23.0%) macro-regions (Table 1).

Table 1 – Distribution of resident women between the ages of 25 and 64 and PS coverage of the SUS for this age group according to the municipal social vulnerability and the health macro-regions. Rio Grande do Sul, 2011-2012

Municipal variables	Resident women between 25 and 64		PS coverage of the SUS	
	Total residents	Without private health insurance	Coverage of total resident women	Coverage of women without private health insurance
	N	%	%	%
IVS-5*				
< -0.50	4620799	66.7	15.3	23.0
-0.50 to 0.00	587756	90.8	22.1	24.3
0.01 to 1.00	517415	93.6	25.8	27.6
> 1.00	193984	97.1	25.9	26.6
Macro-region				
Serra	612186	48.3	15.2	31.5
Metropolitan	2611137	64.2	14.8	23.0
Vales	487314	82.5	21.2	25.7
South	558790	85.1	14.4	16.9
North	632332	85.9	23.5	27.4
Missioneira	483921	87.0	23.0	26.5
Centre-West	534274	88.5	18.3	20.7
Total State	5919954	72.4	17.3	23.8

Source: DATASUS, IBGE, ANS, SES/RS.

*IVS-5 - municipal social vulnerability index measured in standard deviation of the state average,

where <-0.50 indicates lower social vulnerability and >1.00 indicates higher social vulnerability.

The variation in PS coverage was even greater when we compared the 30 health regions. Among the resident women, the range of variation between the regions was 16.1%. The lowest coverage was in the Campos de Cima da Serra region (11%) and the highest coverage was in the Belas Praias region (27.1%). Among the women without private health insurance, the range of variation between the regions was 25.4%. The lowest coverage was in the Campos de Cima da Serra region (12.9%) and the highest coverage was in the region of Caxias and Hortênsias (38.3%) (Table 2).

DISCUSSION

This study estimated PS coverage of the SUS in Rio Grande do Sul with special attention to the socioeconomic and regional inequalities of access to these tests. Scientific literature shows that among the methods for detecting cervical cancer, the PS is considered the most effective and efficient method to collectively apply in tracking programmes[14]. In the groups that are most affected by the socioeconomic and regional disparities, ensuring access to PS is the primary tool to decrease the incidence and mortality rates of cervical cancer[15-16].

In the studied period, the SUS performed over than one million PS on women between the ages of 25 and 64 living in Rio Grande do Sul. However, this number of PS seems insufficient, as indicated by the coverage of 17.3% of total residents, and is a little more than half the number of tests recommended by the ministry of health. Among the women without insurance, that is, whose only healthcare alternative

Table 2 – Distribution of women between the ages of 25 and 64 and PS coverage of the SUS for this age group according to health regions. Rio Grande do Sul, 2011-2012

Health regions	Resident women between 25 and 64		PS coverage of the SUS	
	Total residents	Without private health insurance	Coverage of total resident women	Coverage of women without private health insurance
	N	%	%	%
Campos de Cima da Serra	49342	85.3	11.0	12.9
Pampa	97023	92.1	15.0	16.3
South Region	461767	83.6	14.2	17.0
Vale do Caí and Metropolitan	398612	62.1	11.3	18.1
Vale do Paranhana and Costa Serra	113845	85.6	15.8	18.4
Verdes Campos	229170	82.7	15.9	19.3
Western Border	240786	92.5	19.4	21.0
Carbonífera/Costa Doce	203154	83.1	18.6	22.4
Vale da Luz	64865	81.2	18.5	22.7
Portal das Missões	82728	90.6	20.9	23.1
Botucaraí Region	59744	93.4	22.0	23.5
Capital and Vale do Gravataí	1287522	55.7	13.2	23.7
Entre-Rios	66036	94.2	22.9	24.3
Jacuí Centre	106401	92.7	22.6	24.3
Vinte e Oito Region	181302	81.2	19.8	24.4
Bons Ventos	110475	92.2	22.5	24.4
Vale dos Sinos	424604	65.3	16.8	25.7
Sete Povos das Missões	152430	90.5	23.3	25.8
Rota da Produção	89257	89.6	23.4	26.1
Caminho das Águas	140733	92.4	24.7	26.8
Araucárias Region	69078	92.2	24.7	26.8
Diversidade Region	121800	81.2	22.4	27.6
Planalto Region	165607	75.0	21.0	28,0
Northeastern Border	125245	85.8	24.6	28.7
Belas Praias	75107	92.3	27.1	29.3
Vinhedos and Basalto	160867	58.2	17.1	29.3
Alto Uruguai Gaúcho	125036	84.4	25.0	29.6
Valleys and Mountains	115441	73.9	24.2	32.8
Uva and Vale	95568	45.2	16.3	36.1
Caxias and Hortênsias	306409	38.1	14.6	38.3
Total State	5919954	72.4	17.3	23.8

Source: DATASUS, IBGE, ANS.

is the SUS, the state-wide PS coverage was 23.8% or about two-thirds of the recommended percentage[7]. Since the women who have private health insurance also have greater access to PS provide by their insurance[17] and considering the scarcity of knowledge on the influence of private health insurance on the estimates of PS coverage of the SUS, this study should help qualify the planning process of actions that track cervical cancer in Rio Grande do Sul.

The coverage of PS provided by the SUS was estimated using the ratio between the number of tests and the number of resident women. The problem with this indicator is that the same women may have been subjected to more than one PS in a given period (over-tracking), which may lead to the overestimation of PS coverage by the SUS for the total of resident women[18]. Contrarily, the calculated coverage may be underestimated because the number of registered tests can be lower than the number of tests that were actually performed, since the database refers to the tests paid by the SUS and some tests may not have been paid or registered by the public services, which do not receive financial resources for volume of tests performed. Thus, the PS coverage calculated for the total number of resident women is probably greater than the real number because the number of over-tracked women is probably greater than the number of unregistered tests. Unfortunately, the extent of this bias in estimates of coverage cannot be established.

However, among women without private health insurance, it is impossible to specify whether there was bias in the coverage measurement. Due to over-tracking, the numerator of this coverage measurement is probably over-estimated. On the other hand, the denominator is affected in two opposite ways. There could be an overestimation of the number of women with private health insurance, since the ANS database is based on the number of contracts and the same woman can have more than one contract[19]. As the largest error is unknown, whether for the numerator or the denominator, it is not possible to determine the existence of bias in this coverage measurement. Regardless, it would not be possible to determine whether this bias is overestimated or underestimated.

In order to improve these measurements, the public domain information systems used in this study, DATASUS and ANS, would have to stop using the number of PS and the number of private health insurance contracts and consider the number of women who are tested and the number of women who have private health insurance. The registration of these procedures are expected to advance with the cancer information system (SISCAN) of the

ministry of health that was launched in 2012. This system identifies users who have PS according to the SUS card number. It then files and organizes the information in an individual record, which helps to establish the frequency with which the target population of cervical cancer tracking undergoes these tests[20].

Even with the limitations, the results of this study suggest that, for the total of resident women, the coverage of these tests ranged from 11.0% to 27.1% for the health regions, from 14.4% to 23.5% for the macro-regions and from 15.3% to 25.9% for the socially vulnerable groups. For women without private insurance, the variation was even greater; from 12.9% to 38.3% for the health regions and from 16.9% to 31.5% between the macro-regions, with a minor variation for the groups of municipal social vulnerability, from 23.0% to 27.6%.

Thus, the greatest inequalities in coverage of PS were regional and occurred between the 30 health regions, with a range of variation of up to 25.4% among women without private insurance and 16.1% for total resident women.

A justification for the increased difference in PS coverage estimates among women without insurance is the significant increase of PS in the health regions Caxias and Hortênsias and Uva and Vale. Both regions have the lowest percentages of women without private health insurance, which can justify the low number of PS by the SUS if compared to the target population of cervical cancer tracking. For the total resident women, these two regions presented a PS that was less than half the recommended percentage. However, these regions have the highest estimates of PS coverage among women without private insurance in the state. These low estimates of PS coverage by the SUS in regions with a highest prevalence of private health insurance were also found in an ecological study on the distribution of PS coverage in Brazilian regions, which showed that the low estimate of PS coverage was the result of less reliance on public healthcare services for the realization of these tests[16].

Inequalities in PS coverage were also observed when comparing the health macro-regions. In the macro-regions Metropolitan and Serra, PS coverage among women without private insurance increased 12.2% on average when this population was solely considered for the coverage estimates. However, in the other five macro-regions this increase represented only 3.4% on average. This statistic reveals that it is inappropriate to assume that 25% of women with private health insurance reside in all the macro-regions and health regions of the state[9]. After all, this figure is only an average and does

not measure the distribution of this type of insurance in these localities.

It should be noted that in the macro-regions Serra and Metropolitan, the prevalence of women with private insurance is much higher than in the other macro-regions, which can lead to an overestimation of the need for PS. However, other macro-regions, where the rate of women with private insurance is very low, the need for these tests can be underestimated.

The smallest inequalities in PS coverage for the SUS were the socioeconomic inequalities, with a range of variation of 10.6% for total resident women and 4.6% for women without private insurance. For the groupings of the municipalities according to social vulnerability, the differences in coverage dropped to about half among the women without private health insurance. It was noted that PS coverage grew as the municipal social vulnerability increased, which may represent a better distribution of SUS resources of the state of Rio Grande do Sul and the prioritizing of cities with greater socioeconomic needs, where the SUS is the main alternative for the realization of PS.

■ CONCLUSIONS

The calculation of PS coverage for the SUS should consider the prevalence of women with private health insurance. While these women tend to schedule their PS at the accredited services of their insurance providers, women who do not have private insurance must resort to the SUS to be tested.

It was noted that the coverage of PS for the SUS in Rio Grande do Sul was below the coverage recommended by the ministry of health for total resident women and for women without private insurance. In addition, there was evidence that the PS coverage presented socioeconomic and regional inequalities because the highest coverage occurred in the municipalities with greater social vulnerability and in the health macro-regions and regions with a highest prevalence of private health plans.

This study has presented important contributions to collective healthcare; a field in which nurses are important. Tracking cervical cancer is a highly relevant action in the healthcare routine of healthcare professionals. Moreover, nurses in the SUS scenario are responsible for performing the PS and other cervical cancer prevention activities with the healthcare team and the community. Low PS coverage is one of the greatest challenges to reduce morbidity and mortality from cervical cancer in Rio Grande do Sul, and the identification of inequalities in the coverage must be addressed to ensure equal access to these tests.

Limitations of this study are the varied consistency of the data provided by the information systems and the absence of public domain data on PS in supplementary care, which would enable the estimation of socioeconomic and regional inequalities in the coverage of these tests for the entire resident female population that is targeted for cervical cancer tracking.

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