

Persons with disabilities, cancer screening and related factors

Pessoas com deficiência, exames preventivos de câncer e fatores relacionados

Shamyr Sulyvan de Castro ¹

Alarcos Cieza ²

Chester Luiz Galvão Cesar ³

Abstract *The scope of this article is to describe persons with disabilities (PwD) being subjected to cancer screening and the relationship between some social variables and inequalities in performing these tests. A cross-sectional study of cancer screening among PwD was conducted in 2007 with 333 participants interviewed in residence in 4 cities of São Paulo. Variables in the practice of cancer screening, disabilities, gender, age, income of main family breadwinner, ethnicity, use of health services, assistance required, private health insurance, and coverage by the family health program were studied. Frequencies, χ^2 -test, trend χ^2 percentages and the Odds Ratios (OR) were used for data analysis. 44% of PwD attended at least one cancer screening at the appropriate time. Persons with visual disabilities and with hearing disabilities were subjected to more screening examinations than those with mobility disabilities and women were attended in screening exams more than men. Persons between the ages of 21 and 60 reported cancer screening more frequently than those between 80 and 97 years of age. The outcomes indicate that PwD have different attitudes toward cancer screening according to the type of disability, gender, and age, which were the variables that directly influenced cancer screening exams.*

Key words *Persons with disabilities, Early cancer detection, Health surveys*

Resumo *O objetivo deste artigo é descrever a realização de exames preventivos de câncer entre pessoas com deficiências (PD) e a relação entre algumas variáveis sociais e as desigualdades na realização dos exames. Estudo transversal sobre exames preventivos de câncer entre PD. Foram entrevistadas em domicílio 333 pessoas em quatro cidades de São Paulo, em 2007. Estudou-se variáveis relacionadas aos exames preventivos, deficiências, gênero, idade, renda do chefe da família, etnia, uso de serviços de saúde, assistência necessária, plano privado de saúde e cobertura pela Estratégia de Saúde da Família. Para a análise usou-se frequências, porcentagens, teste de χ^2 , χ^2 de tendência e Odds Ratio (OR). Dos entrevistados, 44% realizou pelo menos um exame preventivo na época correta. Pessoas com deficiência visual e com deficiência auditiva fizeram mais exames do que aqueles com deficiência física. Mulheres fizeram mais exames que os homens e pessoas com idade entre 21 e 60 anos relataram maior frequência de exames que aquelas entre 80 e 97 anos. Os achados indicam que as PD tiveram diferentes padrões de realização de exames preventivos segundo o tipo de deficiência, gênero e idade, sendo estas as variáveis de influência direta na realização de exames preventivos de câncer.*

Palavras-chave *Pessoas com deficiência, Detecção precoce de câncer, Inquéritos de saúde*

¹ Physiotherapy Department, Health Sciences Center, Universidade Federal do Triângulo Mineiro. R. Capitão Domingos 309, Abadia. 38.025-010 Uberaba MG Brasil. shamyrulyvan@gmail.com

² Institute for Health and Rehabilitation Sciences, Research Unit for Biopsychosocial Health, Ludwig-Maximilian University, Munich.

³ Epidemiology Department, Faculdade de Saúde Pública, USP.

Introduction

The incidence of cancer has increased worldwide¹. In São Paulo city, the cancer disease were the sixth cause of hospitalization in 2011 (6.22% of all hospital admissions)² and the second major cause of death in 2009 (14.9% of all death were caused by cancer)³. Considering this scenario the prevention and control of the oncological diseases is indispensable and requires a multidisciplinary approach, including the cancer screening exams⁴, which are recommended according to the gender and age. In Brazil, the women should perform the Pap smear exam older than 24 years old or with the beginning of the sexual life, according to the WHO suggestion⁵; mammography for those over 39 years⁶; the perform and age that the men should made a prostate screening exam (rectal touch, PSA dosage, biopsy, ultrasound) is not clear but this procedure is used in many countries⁷; and rectal screening cancer exam (fecal occult blood testing and colonoscopy) is suggested to all persons over 49 years old⁸.

The population group of the persons with disabilities are generally more vulnerable to further diseases^{9,10} and often have more difficulty using health services¹¹. In the US, people with disabilities attended cancer screening services less frequently than those without disabilities¹². The knowledge about the perform of the screening cancer exams among persons with disabilities and some related variables may improve the delivery of health services to these persons and lead to the early detection and treatment of cancer in this population group.

The objective of this research was to describe the frequency with which cancer screening is performed among a group of persons with disabilities and to what extent these data are related to selected social variables.

Methods

Study Design

The AceSS Study (Accessibility of Health Services to Persons with Disabilities) is a cross-sectional study of health and accessibility to health services among persons with disabilities and was carried out in Itapeverica da Serra, Embu, Taboão da Serra and São Paulo, 2007, all cities are located in the metropolitan area of São Paulo.

Study Sample

The original sample consisted of members of the general population participating in two other population-based health surveys conducted in the same city in 2001 and 2003¹³. From these two studies, 669 (age ranged 21 to 97 years old) persons who reported visual, hearing or mobility disabilities were selected. Visual disabilities include low vision, partial vision, and total blindness; hearing disabilities include low, partial, and complete hearing loss, mobility disabilities include paralysis and amputation of limbs or part of them. Four subgroups were formed: visual, hearing, mobility and multiple disabilities. How the final sample was obtained is described in Figure 1.

Data Collection

Data were collected by personal household interviews using a semi-structured questionnaire specially created for this survey. Different blocks of questions were provided for each of the four disability types. A block concerning cancer screen-

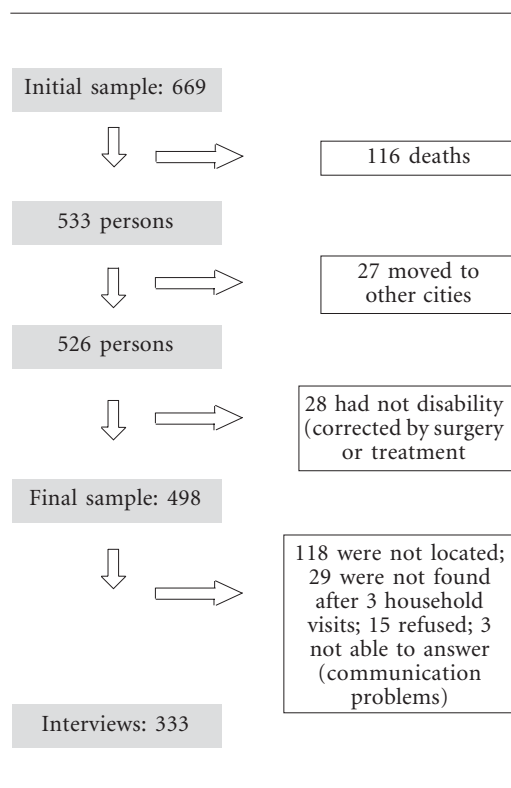


Figure 1. Description of the process of obtaining the final sample and interviews, AceSS, São Paulo, 2007.

ing was contained in all questionnaires, regardless of the disability.

This study was approved by the Ethics Committee of the Public Health Faculty, University of São Paulo, and all participants signed an informed consent form.

Analysis

Data Preparation

The item about participating in cancer screening is dichotomous. When at least one of the following screening procedures was performed on the persons in the respective age and gender group, the answer to this variable was considered affirmative (exam performed):

1. Pap smear for women over 19 years.
2. Mammography for women over 39 years.
3. Prostate exam (rectal touch, PSA dosage, ultrasound, biopsy) for men over 39 years.
4. Rectal cancer screening (fecal occult blood testing and colonoscopy) for women and men over 39 years.

If persons were not in the specified age range for the screening procedure, their data were deleted from the database.

Statistical Analysis

Descriptive statistics were used to analyze the frequencies with which the cancer screening procedures were performed on persons with disabilities. The number and percentages of persons from the four subsamples who participated in screening were related to demographic and health-service variables. Differences among subsamples according to categorical variables were calculated using the χ^2 -test, and χ^2 -test for trend was used when there were more than two categories for a variable, and a linear trend between the variables was assumed.

The relationship between attending cancer screening and social variables was explored by logistic regression analyses. In the field of epidemiology, logistic regression describes the relationship between an outcome (dependent variable or response) and a simultaneous set of explanatory variables (predictors or independent variables) using a model that has good fit (biologically plausible and conforms to the principle of parsimony)¹⁴. Whether the exam was performed or not was the dependent variable and social factors and health-service variables were studied as indepen-

dent variables. A bivariate logistic regression model was subsequently fitted with the dependent variable and each of the independent variables. Finally, the full logistic regression model was fitted using the *stepwise backward selection*, i.e., we progressed from a complex model to a more simple one, deleting the variables according to the significance level ($p > 0.20$). In the final regression model, the variables family head's income, private health insurance, and assistance required were identified as confounding variables because when they were in the model, they changed the Odds Ratio (OR) of other variables. They had a statistical significance between 5% and 20%. The confounding variables were only kept in the final model for adjustment.

The statistical significance adopted was 5%. Stata 9.2 was the statistical software used.

Results

Three hundred thirty-three persons with disabilities from a total of 498 disabled individuals were interviewed, resulting in a response rate of 67%. The analyses were eventually performed for 297 persons because 36 were not in the appropriate age range for cancer screening. Table 1 describes the sample according to the variables studied.

According to the analyzed data, 44.44% of the interviewed population participated in at least one cancer screening during the study period; 61.11% and 53.52% women had a Pap smear and mammography, respectively; 75.94% men participated in prostate screening; and 13.00% of all interviewed persons participated in rectal screening.

The smallest percentage of screening exams was recorded in persons with multiple disabilities (13.67%). Persons with visual disabilities had more screening exams than persons with other disabilities (55.17%), while 41.86% of those with hearing disabilities participated in screening, and 39.73% persons with multiple disabilities had the same exams. Women participated in cancer screening significantly more frequently (71.60%) than men (11.85%). Persons aged between 21 and 60 years more frequently participated in screening (66.67%), and persons between 74 and 79 years had the smallest percentage of cancer-screening procedures (30.15%).

Analyses of family head's income showed that cancer screening is performed more frequently among those who belong to families whose heads earn between 2 and 5 times the monthly minimum wage (50%). The group with less frequent

Table 1. Demographic characteristics of participants and variables studied in cancer screening, AceSS, São Paulo, 2007.

Variables	Preventive cancer exams						P
	No		Yes		Total		
	n (165)	% (55.56)	n (132)	% (44.44)	n (297)	% (100.00)	
Disability							
Visual	52	44.83	64	55.17	116	100.0	< 0.01 ^a
Hearing	50	58.14	36	41.86	86	100.0	
Mobility	19	86.36	3	13.64	22	100.0	
Multiple	44	60.27	29	39.73	73	100.0	
Gender							
M	119	88.15	16	11.85	135	100.0	< 0.01 ^a
F	46	28.40	116	71.60	162	100.0	
Age (years)							
21-60	21	33.33	42	66.67	63	100.0	< 0.01 ^b
61-68	35	57.38	26	42.62	61	100.0	
69-73	32	56.14	25	43.86	57	100.0	
74-79	41	69.49	18	30.51	59	100.0	
80-97	36	63.16	21	36.84	57	100.0	
Family head's income ^{c,d}							
< 1	100	54.95	85	45.05	182	100.0	> 0.05 ^b
1	19	54.29	16	45.71	35	100.0	
2-4.99	20	50.00	20	50.00	40	100.0	
5-7.99	12	63.16	7	36.84	19	100.0	
> 8	14	70.00	6	30.00	20	100.0	
Ethnicity ^e							
Caucasian	101	56.42	78	43.58	179	100.0	> 0.05 ^a
Blacks/Mulattoes	59	55.14	48	44.86	107	100.0	
Others	4	44.44	5	55.56	9	100.0	
Use of health service during the last year							
No	25	56.82	19	43.18	44	100.0	> 0.05 ^a
Yes	140	55.34	113	44.66	253	100.0	
Assistance required to bath and dress, eat, get up and/or walk							
No	138	52.67	124	47.33	262	100.0	< 0.01 ^a
Yes	27	77.14	8	22.86	35	100.0	
Private health insurance							
No	115	56.93	87	43.07	202	100.0	> 0.05 ^a
Yes	50	52.63	45	47.37	95	100.0	
Coverage by a family-health program							
No	150	56.39	116	43.61	266	100.0	> 0.05 ^a
Yes	15	48.39	16	51.61	31	100.0	

^a χ^2 -test; ^b χ^2 -test for trend; ^c 1 missing case; ^d monthly minimum wage; ^e 2 missing cases

cancer screening comprised persons whose family heads earn 8 or more times the monthly minimum wage (30%).

Regarding ethnicity, the prevalence of cancer screening performed was 43.58% among Caucasians, 44.86% among Blacks or Mulattoes and 55.56% among other ethnicities.

The comparison between those who used the health service during the study period and those who did not shows that the percentages of cancer-screening procedures according to use of health service in the last year were 44.66% and 43.18%, respectively. 22.88% of people with disabilities who needed help to bathe and dress, eat,

get up, and walk participated in cancer screening, while 47.33% of those that did not need help had the same procedures.

Regarding the use of private health insurance, 43.07% of those who lacked health insurance participated in screening, and 47.37% of the persons with disabilities and health insurance attended the screening exams. Among those covered by the family health program, the percentage of cancer screening exams was 51.61% compared to 43.16% among those who did not use the program

Table 2 shows the OR of the bivariate logistic model and of the full regression model. Variables associated with attending cancer-screening programs were: disability, gender, quintiles of age, family head's income, private health insurance, and assistance required to bathe and dress, eat, get up, and walk. Persons with mobility disability had the lowest rate of cancer screening. Persons with multiple disabilities had 3.17 times more

screening procedures; persons with hearing disabilities, 3.56 times more procedures; and persons with visual disabilities reported the highest frequency of procedures – 6.79 times more – always compared with persons with mobility disabilities.

A large gender difference was detected. Women had 17.75 times more screening procedures than men.

Family head's income did not show a defined pattern in cancer screening. Persons who lived in families whose heads earned between 2 and 4.99 times the monthly minimum wage had more screening procedures than others, and persons who lived in families whose heads earned at least 8 times the monthly minimum wage had fewer preventive exams.

Controlling for confounding variables (family head's income, private health insurance, and assistance required), the statistical significance (p

Table 2. Odds Ratio (OR) from bivariate analysis and final logistic regression model from the participation on cancer screening exams according to demographic characteristics and private health insurance, AceSS, São Paulo, 2007.

Variables	OR ^a	CI (95%)	p	OR ^b	CI (95%)	p
Disability						
Visual	7.79	2.18 – 27.79	< 0.01	5.00	1.05 – 23.67	< 0.05
Hearing	4.56	1.25 – 16.57	< 0.05	5.91	1.23 – 28.32	< 0.05
Mobility	1.00					
Multiple	4.17	1.13 – 15.38	< 0.05	3.75	0.76 – 18.32	(a)
Gender						
M	1.00					
F	18.75	10.0 – 34.9	< 0.01	20.24	10.00 – 40.80	< 0.01
Age (years)						
21-60	3.42	1.61 – 7.26	< 0.01	4.04	1.47 – 11.12	< 0.01
61-68	1.27	0.60 – 2.66	(a)	2.13	0.77 – 5.84	(a)
69-73	1.33	0.63 – 2.83	(a)	1.62	0.61 – 4.29	(a)
74-79	0.75	0.34 – 1.62	(a)	0.76	0.29 – 2.00	(a)
80-97	1.00					
Family head's income ^{c,d}						
<1	1.91	0.70 – 5.20	(a)	1.66	0.48 – 5.66	(a)
1	1.96	0.61 – 6.29	(a)	1.80	0.41 – 7.71	(a)
2-4.99	2.33	0.74 – 6.29	(a)	3.52	0.83 – 14.81	(a)
5-7.99	1.36	0.35 – 5.67	(a)	1.12	0.19 – 6.35	(a)
> 8	1.00					
Private health insurance						
No	1.00			1.00		
Yes	1.18	0.72 – 1.94	(a)	1.71	0.86 – 3.40	(a)
Assistance required ^e						
No	1.00			1.00		
Yes	0.32	0.14 – 0.75	<0.01	0.50	0.17 – 1.48	(a)

Source: Novaes et al.³⁵

(a) 5% < p < 20%; ^a bivariate analysis with logistic regression model; ^b adjusted for all variables from the logistic regression model; ^c monthly minimum wage; ^d 1 missing case; ^e Help required to bathe and dress, eat, get up and/or walk.

< 0.05) persisted for disability (visual or hearing disability as compared to mobility), gender and quintiles of age (from 21 to 60 years old compared with persons between 80 and 97 years old).

After all adjustments in the logistic regression model had been performed, persons with visual disabilities had 4 times more screening exams than persons with mobility disabilities, and persons with hearing disabilities had 4.91 times more preventive exams than those with mobility disabilities. Women had 19.24 times more exams than men, and persons between 21 and 60 years old had 3.04 times more exams than those between 80 and 97 years old.

Discussion

The results of this research showed a 44.44% prevalence of cancer screening among persons with disabilities. Since São Paulo now has approximately 11 million inhabitants, and nearly 11.8% of its total population has one or more disabilities⁹, this figure represents almost 1.2 million people. Applying this rate of cancer-screening procedures, 670,000 persons with disabilities had some form of cancer screening exam. Although everyone should participate in cancer screening, as this investigation shows, not everyone has access to them. This is surprising, since Brazil has a free public-health system which, according to the National Health Policy for Persons with Disabilities¹⁵, applies to persons with disabilities. In São Paulo, the General Guidelines for the Health Care of Persons with Disabilities¹⁶ also guarantees and supports the right to full health care provided by the federal policy.

The percentage of women with disabilities who had a Pap smear (65.11%) was close to that among women in the Brazilian general community (65.00%)¹⁷ and lower than that among the women from São Paulo city (90.30%)¹⁸. The rate from the persons with disabilities that reported the Pap smear in this study is higher than those reported to the Pernambuco state (58.5%)¹⁹, Estonia (44.1%)²⁰, Buenos Aires city (31.0%)²¹ and to Greece (41.1%)²². However, the percentage of Pap smear among women with disabilities was lower than that from Rio de Janeiro city (83.5%)²³, Puerto Rico (71.9%)²⁴, USA (84.0%)²⁵ and from Austria (83.0%)²².

Regarding to the mammography, women with disabilities had a higher percentage (53.52%) than women in the Brazilian general community (47.2%)¹⁷, Porto Velho (41.2%)²⁶ and Campinas

(49.2%)²⁷ cities, Korea (30.4%)²⁸ and Catalonia-Spain (40.39%)²⁹. But the percentage is lower than those from the general population in São Paulo city (82.10%)¹⁸, Porto Alegre (75.7%) and Florianópolis (82.2%) cities²⁶.

Men with disabilities had more prostate cancer screening (75.94%) than men in the general population of Southern Brazil (22.5%)³⁰, São Paulo city (55.30%)¹⁸, USA (52.0%)³¹, Canada (35.0%)³² and Croatia (13.7%)³³.

The rectal cancer screening rates among persons with disabilities (13.0%) were higher than those in the general population from São Paulo city (12.20%)¹⁸ and lower than the reported for U.S. citizens³⁴ (26.0% - faecal occult blood testing and 33.0% - sigmoidoscopy), Korean (36.6%)³⁵ and Canadian (30.1%)³⁶ citizens.

Factors related to the rate of cancer screening have been widely reported. Among women, factors like age^{37,38}, marital status^{39,40}, family income⁴¹, ethnicity¹⁷, social status⁴², use of public-health services⁴³, use of health services in the last year⁴³, functional limitations⁴⁴, and number of households members⁴⁵ are mentioned. The studies with male samples, although less frequent, reported education⁴⁶, ethnicity⁴⁷, age^{48,49}, poorer medical-insurance coverage⁵⁰, use of public-health services⁵⁰, and family income⁵¹ as factors influencing participation in cancer screening programs.

The analysis reported here also shows relationships among selected social variables and cancer screening among people with disabilities. While the family head's income, ethnicity, use of health services in the last year, and coverage by a family-health program were not statistically significant, disability, gender, quintiles of age, and the assistance required to bathe and dress, eat, get up and walk reached the 5% significance level. The variables family head's income, private health insurance, and assistance required were used for adjustment, i.e., these three variables had no influence on the dependent variable, although they should be considered due to their indirect influence on participation in cancer-screening programs. After adjustment, disability, quintiles of age and gender were still significant, showing a direct relationship with the screening procedures used.

Persons with mobility disabilities (paralysis or amputation) was the group with the lowest participation in cancer screening compared to persons with visual or hearing disabilities. This low participation among persons with mobility disabilities might be compared to the accessibility problems experienced by persons with paralysis or amputation⁵². Importantly, women had more

screening exams than men, which conflicts with the literature⁵³, which reports the opposite. For elderly persons in the US, men had more cancer-screening exams than women, and the decline with age was greater for women⁵³. There is, therefore, a difference in patterns of cancer screening between men and women that further distinguishes people with and without disabilities.

There were more people aged between 21 and 60 that had preventive cancer exams than those between 80 and 97 years. This may be the result of health campaigns on cancer screening that reach a younger population more readily than an older one. The fact that younger people have better access to health information than the elderly may explain this difference. The internet may account for easy access to information by younger persons⁵⁴.

A limitation of this study is that it is only exploratory and relies exclusively on cross-sectional data, identifying only association and the direction of association cannot be determined. A study with a larger sample needs to be conducted to confirm these results. Another limitation is that the data collected was self-reported, and confirmation of the screening exam by objective means, such as medical forms, and clinical assessment of reported disabilities by clinical examinations, would also improve the study. Recall bias and the report of Pap smear when in fact the women only had a pelvic exam⁵⁵ could be another weakness of this research.

The characteristics of people with disabilities linked to whether or not cancer screening was performed presented here are different from those already reported in the literature. Type of disability, gender, and age are directly associated with participation in screening programs, while family head's income, private health insurance, and the assistance required to bathe and dress, eat, get up, and/or to walk had only indirect influence and were, therefore, confounding factors.

The others variables studied were not statistically related to screening (ethnicity, use of health services in the last year, and coverage by the family health program).

The findings may be useful for the delineation and planning of health policies and programs for cancer prevention among persons with disabilities, as the study indicates that persons with disabilities have a different participation profile. Thus, specific health measures could be planned for this population group to increase the early detection of cancer and assistance offered by the health services.

Collaborations

SS Castro worked in the design, planning, data collection, monitoring, analysis and writing of the manuscript. A Cieza and CLG Cesar participated in the review and drafting of the paper.

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