

Survey of rubella knowledge and acceptability of rubella vaccination among Brazilian adults prior to mass vaccination

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ABSTRACT

Objective. Evaluate knowledge of rubella and acceptability of vaccination and identify sources of health information among Brazilian adults to inform communication strategies for a national vaccination campaign to eliminate rubella and congenital rubella syndrome (CRS).

Methods. From 5–8 July 2008 a qualitative telephone survey was conducted among a non-probabilistic sample of Brazilian adults 18 to 65 years of age ($n = 1\,023$) from all five geographic regions of Brazil to measure knowledge of rubella and willingness to receive the vaccine and to identify sources of health information. Frequencies of responses were stratified by respondents' sex, age, education, and income.

Results. Although 69.9% of respondents said they knew what rubella was, actual knowledge of the disease was limited, with only 29.9% answering affirmatively when asked if they would recognize symptoms of rubella infection. Self-reported knowledge increased with increasing age, education, and income, and was higher among women than men. A total of 94.5% of the respondents expressed willingness to be vaccinated for rubella elimination. The most frequently mentioned sources of health information were television and doctors.

Conclusions. Despite limited knowledge of rubella, Brazilian adults expressed willingness to be vaccinated for disease elimination.

Key words

Health knowledge, attitudes, practice; health communication; rubella; mass vaccination; Brazil.

Rubella, commonly known as German measles, is a viral illness characterized by fever and maculopapular rash. In the majority of cases, rubella is a mild, self-

limiting illness that resolves without sequelae. In pregnant women, however, infection with rubella virus can cause serious harm to the developing fetus, especially when the infection occurs during the first trimester of pregnancy. Rubella infection of the fetus may lead to deafness, blindness, heart defects, mental retardation, and other birth defects referred to collectively as congenital rubella syndrome (CRS). Infection may also result in fetal death and spontaneous abortion. Vaccination against ru-

bella is the best way to prevent rubella infections and the occurrence of CRS.

In 2003, member states of the World Health Organization (WHO) Regional Office for the Americas, the Pan American Health Organization (PAHO), established the goal of eliminating rubella and CRS from the region by 2010 (1). To meet this goal, countries in the region, including Brazil, introduced routine rubella vaccination of infants in national immunization programs to ensure high immunization coverage; instituted laboratory

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confirmation of suspected cases to strengthen surveillance; and conducted mass rubella vaccination campaigns to accelerate disease elimination (2). Between 1998 and 2008, more than 250 million adolescents and adults in 32 countries and territories in the region were vaccinated against rubella (3). New communication strategies were developed to reach the adult population—an uncommon target population for immunization programs.

In 2008, Brazil conducted a national rubella and CRS elimination campaign that immunized 69 million adolescents and adults or 95% of the target population (4). Prior to the mass immunization, to inform the development of social communication strategies for the campaign, formative research was conducted among persons in the target age group using the telephone survey method to evaluate knowledge about rubella and willingness to receive the vaccine and to identify sources of health information. This study describes the results of the survey.

MATERIALS AND METHODS

Since the 1990s, the Brazilian Ministry of Health has commissioned formative research to inform the design of health communications. In mass media, the Ministry favors the use of positive, healthy images to encourage vaccination and its association with well-being. Prior to the development of communication strategies for the rubella elimination campaign, the Ministry of Health's Communications Department (*Assessoria de Comunicação, ASCOM*), in collaboration with Propeg Communications (*Propeg Comunicação Ltda., Salvador, Brazil*), a private firm contracted by the Ministry in 2008, commissioned a qualitative survey of rubella knowledge and acceptability of rubella vaccination among the target population. Topics for the survey were identified by the Ministry of Health, which had previously decided not to use prevention of CRS as a theme for the national rubella vaccination campaign. For this reason, knowledge of CRS was not included in the survey. Checon Pesquisa, a private communications research firm based in Brasília, Federal District, was contracted by Propeg Communications to design the survey protocol and conduct the survey.

The survey was conducted among a non-probabilistic sample of Brazilian adults, stratified according to residence in one of Brazil's five geographic regions (North, Northeast, South, Southeast, and Central-West) to obtain a minimum of 200 participants per region. To create the sample, telephone numbers were randomly selected from a database representative of residential telephone numbers for all 27 states in Brazil, resulting in a sample that included numbers from 360 of Brazil's 5 564 municipalities.

Initial screening questions were used to obtain a sample of men and women between 18 and 65 years of age. While not part of the target population, persons 40 to 65 years of age were included in the survey due to their potential ability to influence family members' decisions about vaccination. Survey results were weighted to reflect the distribution of Brazil's adult population by region. Despite the use of non-probabilistic sampling, the number of participants was selected to provide a margin of error of $\pm 4\%$ for the national estimates.

From 5–8 July 2008, a semi-structured questionnaire was administered by telephone to individuals selected by the above-mentioned sampling method who provided consent to participate. Respondents were asked 1) if they knew what rubella was, 2) if they would recognize its symptoms, 3) which population groups should be vaccinated against it, 4) if they themselves would be willing to be vaccinated against it to help eliminate the disease from Brazil, 5) which categories of people they would listen to for advice on whether or not to be vaccinated against rubella, and 6) the communication medium most likely to call their attention to the need for the vaccination. Responses to open-ended questions were coded and grouped by similarity into categories. Demographic data were also collected.

All surveys were recorded and monitored by supervisors. Responses were reviewed, checked for errors, tabulated, and analyzed according to the code of ethics of the Brazilian Association of Research Companies (*Associação Brasileira das Empresas de Pesquisa, ABEP*) and the International Code on Market and Social Research established by the International Chamber of Commerce (ICC) and the European Society for Opinion and Marketing Research (ESOMAR). Identities of individual respondents were kept confidential.

RESULTS

The survey sample included 1 023 individuals aged 18 to 65 years distributed across Brazil's five regions, 57.0% of whom were men. Respondents reported a wide range of socioeconomic status, including education and income (Table 1), and a relatively low level of rubella vaccination: 51.3% (52.0% male and 48.2% female) said they were not vaccinated or did not know if they were vaccinated. Among respondents 18 to 35 years, only 44.6% of men and 54.8% of women believed that they had been vaccinated against rubella.

A total of 715 respondents (69.9%) answered affirmatively when asked if they knew what rubella was (Table 2). The remaining 30.1% included 134 (13.1%) who were unsure (answering "more or less") and 174 (17.0%) who had no knowledge of the disease or did not answer the question. Respondents 18 to 25 years of age had the lowest frequency of affirmative responses to the question, with only 56.3% of female and 61.3% of male respondents in that age group reporting knowledge of rubella. Frequency of positive responses to the question was higher among women aged 26 to 35 years (75.0%) versus men (62.9%) and was higher among older adults for both sexes. The proportion of respondents answering the question affirmatively was higher among those with some university education and those with monthly household income greater than US\$ 1 100 (BRL\$ 1 760) (83.7% and 77.7%–93.5% respectively) versus those with primary or secondary education (61.8% and 65.6% respectively) and monthly income of US\$ 1 100 or less (58.8%–60.8%), and the proportion of positive responses was higher (79.7%) among respondents who reported previous vaccination against rubella versus those who had not been vaccinated (61.5%) or did not know their vaccination status (59.2%).

Overall, only 29.9% of respondents answered affirmatively when asked if they would recognize the symptoms of rubella. Of the 69.9% (715 respondents) who answered affirmatively when asked if they knew what rubella was, only 27.1% reported being able to recognize its symptoms. The proportion of respondents reporting the ability to recognize symptoms of rubella infection was lower among males (20.1%) than females (43.0%); among persons with primary (25.7%) or

TABLE 1. Characteristics of non-probabilistic sample of adults aged 18–65 years (*n* = 1 023) in nationwide telephone survey on knowledge of rubella and acceptability of vaccination, Brazil, July 2008

Characteristic	Respondents	
	No.	%
Age (years)		
18–25	286	28.0
26–35	326	31.9
36–45	245	23.9
46–55	98	9.6
56–65	68	6.6
Sex		
Male	583	57.0
Female	440	43.0
Highest level of education completed		
Primary school	249	24.3
Secondary school	448	43.8
University	319	31.2
Did not respond	7	0.7
Monthly household income (US\$ ^a)		
≤ 307	153	15.0
308–660	308	30.1
661–1 100	143	14.0
1 101–1 825	139	13.6
1 826–3 443	122	11.9
≥ 3 444	46	4.5
Did not respond	112	10.9
Previously vaccinated against rubella		
Yes	498	48.7
No	312	30.5
Did not know	213	20.8

^a US\$1 = 1.60 Brazilian reais (1 July 2008).

secondary education (26.6%) versus those with some university education (38.6%); and among those with monthly household income ≤ US\$ 1 100 (25.0%–32.7%) versus those with higher household incomes (28.1%–45.9%). Only 20.0% of female and 16.7% of male respondents 18 to 25 years of age reported they were able to recognize symptoms of rubella. The frequency of positive responses was higher among women (50.0%–71.4%) than among men (12.5%–22.7%) for those older than 26 years of age.

When asked about their willingness to be vaccinated against rubella to help eliminate the disease from Brazil, 94.5% of respondents answered affirmatively versus only 1.6% that said “No” and 3.9% that said “It depends” or “I don’t know.” The proportion of affirmative responses to the question varied from 89.7% to 95.9% by age group, 93.2% to 95.9% by level of education, and 95.1% to 97.8% by income category, and was about equal among respondents reporting rubella vaccination and those who believed they had not been vaccinated.

TABLE 2. Number and proportion of affirmative responses to questions about knowledge of rubella and willingness to be vaccinated in nationwide telephone survey of adults aged 18–65 years, by respondent characteristic, Brazil, July 2008

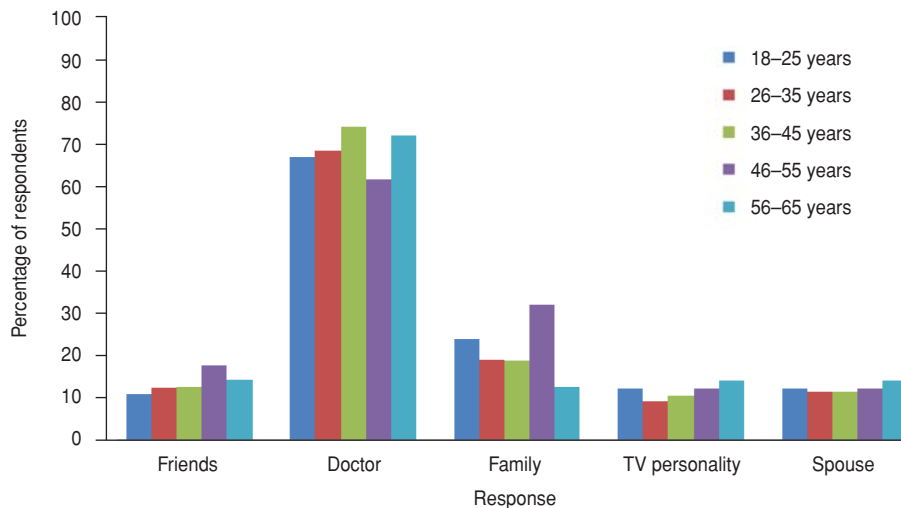
Characteristic	No. of respondents (<i>n</i> = 1 023)	Affirmative responses					
		“Know what rubella is”		“Would recognize symptoms of rubella”		“Willing to be vaccinated to help eliminate rubella in Brazil”	
		No.	%	No.	%	No.	%
Age (years)							
18–25	286	167	58.4	47	16.4	271	94.8
26–35	326	223	68.4	96	29.4	309	94.8
36–45	245	184	75.1	91	37.1	232	94.7
46–55	98	85	86.7	49	50.0	94	95.9
56–65	68	56	82.4	23	33.8	61	89.7
Sex							
Male	583	380	65.2	117	20.1	551	94.5
Female	440	335	76.1	189	43.0	416	94.5
Highest level of education completed							
Primary school	249	154	61.8	64	25.7	232	93.2
Secondary school	448	294	65.6	119	26.6	426	95.1
University	319	267	83.7	123	38.6	306	95.9
Monthly household income (US\$ ^a)							
≤ 307	153	90	58.8	50	32.7	147	96.1
308–660	308	194	63.0	77	25.0	296	96.1
661–1 100	143	87	60.8	37	25.9	139	97.2
1 101–1 825	139	108	77.7	39	28.1	136	97.8
1 826–3 443	122	105	86.1	56	45.9	116	95.1
≥ 3 444	46	43	93.5	17	37.0	44	95.7
Previously vaccinated against rubella							
Yes	498	397	79.7	192	38.6	476	95.6
No	312	192	61.5	80	25.6	295	94.6
Did not know	213	126	59.2	34	16.0	196	92.0

^a US\$1 = 1.60 Brazilian reais (1 July 2008).

TABLE 3. Responses to the question “Who should be vaccinated against rubella?” in nationwide telephone survey of adults aged 18–65 years, by respondent characteristic, Brazil, July 2008

Characteristic	No. of respondents (<i>n</i> = 1 023)	Responses							
		“Men”		“Women”		“Children”		“Elderly”	
		No.	%	No.	%	No.	%	No.	%
Highest level of education completed									
Primary school	249	105	42.2	134	53.8	164	65.9	105	42.2
Secondary school	448	233	52.0	296	66.1	323	72.1	228	50.9
University	319	163	51.1	236	74.0	211	66.1	144	45.1
Monthly household income (US\$ ^a)									
≤ 307	153	77	50.3	92	60.1	109	71.2	73	47.7
308–660	308	145	47.1	191	62.0	209	67.9	145	47.1
661–1 100	143	80	55.9	103	72.0	103	72.0	77	53.8
1 101–1 825	139	71	51.1	93	66.9	104	74.8	68	48.9
1 826–3 443	122	60	49.2	81	66.4	83	68.0	52	42.6
≥ 3 444	46	25	54.3	39	84.8	24	52.2	15	32.6
Previously vaccinated against rubella									
Yes	498	244	49.0	344	69.1	359	72.1	219	44.0
No	312	159	51.0	200	64.1	193	61.9	162	51.9
Did not know	213	102	47.9	124	58.2	151	70.9	102	47.9

^a US\$1 = 1.60 Brazilian reais (1 July 2008).

FIGURE 1. Proportion of respondents (*n* = 833) who mentioned one or more categories of people they would listen to for advice on whether or not to be vaccinated against rubella in nationwide telephone survey of adults aged 18–65 years, by respondent age group, Brazil, July 2008

In response to the question “Who should be vaccinated against rubella?”, 68.7% of respondents mentioned children, 65.3% mentioned women, 49.4% mentioned men, and 47.2% mentioned the elderly. Responses by age group and sex were similar (data not shown). There was little difference in the frequency of the various responses by level of education, family income, or previous vaccination history, with the exception of respondents with some university education and those with monthly household income above US\$ 3 444, of whom 74.0% and 84.8%, respectively, said women should be vaccinated (Table 3).

Data were available from 833 respondents for questions about sources of information or advice on vaccination against rubella. When asked to name categories of people they would listen to in deciding whether or not to be vaccinated against rubella, 69.0% of respondents said doctors and 19.9% said family members; fewer respondents listed spouses, friends, and TV personalities. Responses by age group (Figure 1) and sex (data not shown) were similar. When asked to list communication media likely to call their attention to the need to be vaccinated against rubella, the most common response in all age

groups was “television” (79.1%–89.1%; Figure 2). Older respondents tended to list radio, newspapers, and magazines more frequently than younger respondents. No trend by age group was observed for use of the Internet.

DISCUSSION

In Brazil, formative research studies of target populations are often conducted to develop health campaign messages and to test their effectiveness. This report describes formative research carried out to help guide communication strategies for mass vaccination campaigns. The information generated by this type of research was particularly useful in the national campaign to eliminate rubella because the immunization target population (adults 18 to 65 years old) was atypical and the disease was not well known (and often erroneously considered to be benign) (5).

The results support the need for substantial investment in TV advertising, which accounted for approximately 80% of the US\$ 10 million communications budget for the campaign. Because survey respondents in the target population expressed willingness to be vaccinated despite little knowledge of rubella, communication messages focused on the need for collective efforts by all Brazilians to eliminate the disease rather than on specific information about rubella and CRS. TV spots and print media featured TV and film celebrities, athletes, and musicians popular among the age

FIGURE 2. Proportion of respondents ($n = 833$) who listed communication media likely to call their attention to the need to be vaccinated against rubella in nationwide telephone survey of adults aged 18–65 years, by respondent age group, Brazil, July 2008

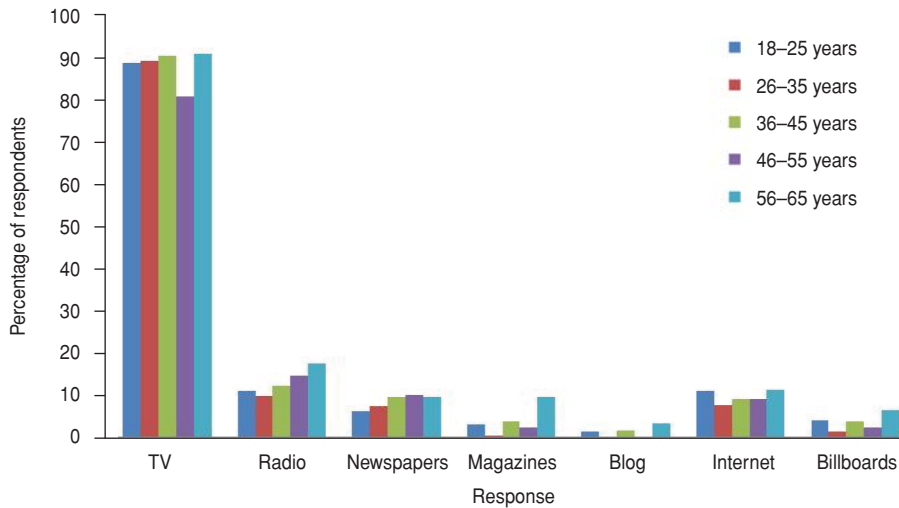


FIGURE 3A. National vaccination campaign poster calling for collective efforts to make Brazil a country “livre da rubéola” (“free of rubella”), Brazil, 2008



groups targeted for mass immunization inviting the public to “join them” in the vaccination campaign, and the slogan “*Juntos, vamos fazer do Brasil um país livre da rubéola*” (“Together we will make Brazil free of rubella”) (Figure 3A). Other campaign communication activities included presentations on the importance of eliminating rubella and CRS by the Ministry of Health to societies of health professionals, to gain support from doctors and opinion leaders; the dissemination of radio messages tailored to specific broadcast audiences throughout Brazil; the establishment of a dedicated website to provide access to information about rubella

infection and the rubella elimination campaign; the display of posters and billboards at fixed sites to increase campaign awareness; and the organization of interviews and press conferences involving the President of Brazil, the Minister of Health, and other public officials to reach a variety of audiences.

The recent experience with and success of efforts to eliminate poliomyelitis and measles in Brazil, where the last case of polio was recorded in 1989 (6), and the last case of measles linked to indigenous transmission occurred in 2000 (7), likely contributed to the high level of participation by the general population in the

national campaign to eliminate rubella, which was launched to coincide with the second annual National Immunization Day (NID) against polio for children under 5. Positive messages about the successful elimination of diseases such as poliomyelitis and measles were incorporated in the introduction of the strategy to eliminate rubella and CRS in Brazil. The initial campaign slogan, “*Vacinação virou programa família*” (“Vaccination has become a family program”) (Figure 3B), encouraged adults who were taking their children for the oral polio vaccine to be vaccinated against measles and rubella.

At the end of the five-week initial campaign period, only 85% of the total target population and less than 80% of the male target population had been vaccinated (4). To appeal to individuals who still hadn’t received the vaccine, celebrity TV spots featured the slogan “*Só falta você*” (“Only you are left [to vaccinate]”) (Figure 3C). The communication strategy was modified to provide specific information on the substantial risk of continued circulation of rubella and occurrence of CRS cases if people remained unvaccinated. Simultaneously, state and municipal immunization programs reprogrammed vaccination activities to identify groups that had not been vaccinated, and additional vaccination posts were provided to accommodate them during peak hours at soccer stadiums, concert halls, metro stations, bus terminals, and other venues with high concentrations of adults and adolescents. The final communication strategy included the use of a positive, motivational message to encourage people to get vaccinated to help reach the vaccination coverage target required for the elimination of rubella in Brazil.

Mass vaccinations of adults and adolescents in countries throughout the Americas often employ communication messages focusing on disease elimination (8). In contrast, communication themes for vaccination campaigns targeting women of childbearing age frequently highlight protection of the child, using slogans such as “*Proteja hoje o filho que você vai ter um dia*” (“Protect the child you will have one day”) (Brazil, 2001–2002) (9); “*Proteje una nueva vida*” (“Protect a new life”) (Chile, 1999) (10); and “*Vacunate contra la rubéola, por vos y por el futuro de los chicos*” (“Get vaccinated against rubella, for yourself and for the future of

FIGURE 3B. Poster used in simultaneous launch of rubella elimination campaign and second annual National Immunization Day against polio for children under 5 proclaiming vaccination as a “family program,” Brazil, 2008



children”) (Argentina, 2006) (8). Similarly, in countries that conducted mass vaccination of adult men, communication campaigns appealed to men’s sense of honor and *machismo* to encourage them to be vaccinated to protect women and children (11, 12).

The Brazilian experience demonstrates that as disease elimination strategies have evolved increasing use has been made of existing technology to reach target populations and unite politicians, health workers, and communities behind elimination efforts. During the smallpox era, the need for this type of social mobilization was limited as strategies evolved from mass vaccination to surveillance and containment.⁵ Polio eradication incorporated public awareness components in its three main strategies: the use of mass media and individualized health promotion, emphasis on community organization, and involvement of political and community leaders (6, 13, 14). In measles elimination, the use of mass media was further explored

⁵ Castillo-Solórzano C, Marsigli C, Bravo P, Collette G, Ruiz-Matus C. From smallpox to rubella: the evolution of innovative social communication strategies in the Americas. Abstract submitted to 2009 Meeting of the American Public Health Association, Washington, D.C.

FIGURE 3C. Rubella elimination campaign poster targeting non-immunized individuals with the message “Agora só falta você” (“Only you are left [to vaccinate]”), Brazil, 2008



in efforts to attract mothers and children to vaccination sites. Strategies for neonatal tetanus control included the use of existing community-based programs to educate families and increase the participation of midwives. Most recently, in rubella elimination programs, text messaging and the Internet have been used to engage adolescent and adult men and women and build political commitment.

For the campaign described in the current study, through partnerships with wireless communications companies, the Ministry of Health sent text messages (known colloquially as “torpedoes”) to millions of wireless subscribers with information about the rubella vaccination campaign. The website created for the campaign provided real-time updates on campaign progress by sex, age group, municipality, and state; information about rubella and CRS, and the reasons for the campaign; and a search engine for locating nearby vaccination posts. It also served as an interactive forum where a team of professionals from the Ministry of Health answered website visitors’ questions and debunked rumors circulating on the Internet, including claims that the vaccines contained toxic substances, and conspiracy theories about mass sterilization.

Limitations

The telephone survey of rubella knowledge and acceptability of rubella vaccination had several limitations. First, its use of non-probabilistic sampling, while advantageous for rapid generation of information to inform key campaign messages, did not allow for systematic sampling. Therefore, the survey results cannot be generalized to the Brazilian population as a whole. Second, self-reported willingness to be vaccinated against a specific disease

is not an indication of whether an individual will actually get vaccinated when the opportunity is presented, especially if that individual must actively seek vaccination at a health facility. This caveat may have particular significance for the results of this survey, which did not inform respondents that vaccination against rubella required an injection, or that it was contraindicated during pregnancy and for persons with certain medical conditions. Finally, the impact of the communication strategies was not evaluated during the campaign. Future research should include evaluations of the effectiveness of the communication messages to determine what works in practice.

Conclusion

Despite limited knowledge of rubella, Brazilian adults expressed willingness to be vaccinated for disease elimination. Like other campaigns to eliminate rubella and CRS from the Americas, the campaign in Brazil achieved high levels of vaccination coverage without using coercive strategies. The successful strategies and lessons learned in Brazil and elsewhere in the Americas may be useful in other regions as countries accelerate measles and rubella elimination efforts.

Acknowledgments. The telephone survey of rubella knowledge and acceptability of rubella vaccination was financed by the Brazilian Ministry of Health and commissioned by Propeg, a private communications firm contracted by the Ministry in 2008 to develop rubella elimination campaign communications strategies. The survey was designed and conducted by a private communications research firm (Checon Pesquisa) and approved by the Ministry of Health.

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RESUMEN

Encuesta sobre el conocimiento de la rubéola y la aceptabilidad de la vacunación antirrubéolica en los adultos brasileños antes de una campaña de vacunación masiva

Objetivo. Evaluar el conocimiento de la rubéola y la aceptabilidad de la vacunación antirrubéolica, y determinar las fuentes de información sanitaria en los adultos brasileños, con objeto de fundamentar las estrategias de comunicación de una campaña nacional de vacunación dirigida a eliminar la rubéola y el síndrome de rubéola congénita (SRC).

Métodos. Del 5 al 8 de julio del 2008 se llevó a cabo una encuesta telefónica cualitativa en una muestra no probabilística de adultos brasileños de 18 a 65 años de edad ($n = 1\ 023$) de las cinco regiones geográficas del Brasil, con objeto de evaluar el conocimiento de la rubéola y la disposición a recibir la vacuna antirrubéolica, y determinar las fuentes de información sanitaria. Las frecuencias de las respuestas se estratificaron según el sexo, la edad, el nivel educativo y los ingresos de los entrevistados.

Resultados. Aunque 69,9% de los entrevistados dijeron que sabían lo que era la rubéola, el conocimiento real de la enfermedad era limitado, ya que solo 29,9% respondieron afirmativamente cuando se les preguntó si reconocerían los síntomas de esta infección. El grado de conocimiento notificado por los propios entrevistados aumentó con la edad, el nivel educativo y los ingresos, y fue mayor en las mujeres que en los hombres. El 94,5% de los entrevistados expresaron su disposición a vacunarse con objeto de eliminar la rubéola. Las fuentes de información sanitaria mencionadas con mayor frecuencia fueron la televisión y los médicos.

Conclusiones. A pesar de tener un conocimiento limitado de la rubéola, los adultos brasileños expresaron su disposición a vacunarse con objeto de eliminar la enfermedad.

Palabras clave

Conocimientos, actitudes y prácticas en salud; comunicación en salud; rubéola; vacunación masiva; Brasil.