

The impact of mass media on the access to oral care and hygiene information in Peru, 2013-2016

Impacto de los medios de comunicación en el acceso a información sobre el cuidado e higiene bucal en el Perú, 2013-2016

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ABSTRACT

Introduction: mass media are new ways of transmitting health information, making it easily available to the public. The aim of the present study was to determine the impact of mass media on the access to oral care and hygiene information among the Peruvian population in the period 2013-2016. **Methods:** longitudinal observational study using databases of the Demography and Family Health Survey (Encuesta Demográfica y de Salud Familiar, ENDES) from 2013 to 2016 and the following variables: access to information, organism and sector supplier of information, geographic area, natural region, and year. This study also involved a descriptive, bivariate (chi-squared) and multivariate analysis (Poisson Loglinear Regression) with a confidence level of 95% and $p < 0.05$. **Results:** the proportion of access to oral care and hygiene information in the mass media by children under 12 years of age was 12.8% in 2013, decreasing to 8.94% in 2016. There was a positive impact of mass media as providers of information on oral health care adjusted by geographic area and natural region: 2013 with prevalence ratio (PR) 1.96 (1.89-2.02); 2014 with PR 1.85 (1.82-1.87); 2015 with PR 1.61 (1.60-1.63); 2016 with PR 1.62 (1.60-1.64) and 2013-2016 with PR 1.69 (1.68-1.79). **Conclusions:** access to oral care and hygiene information provided by the media has been declining in Peru; however, the media generally have an increased positive impact in this regard, compared to other information suppliers, even considering users' geographic area and natural region.

Keywords: oral health, mass media, access to health services

RESUMEN

Introducción: los medios de comunicación son nuevas formas para transmitir información en salud debido al fácil acceso en la población. El objetivo del presente estudio consistió en determinar el impacto de los medios de comunicación en el acceso a la información sobre el cuidado e higiene bucal en la población peruana entre 2013 y 2016. **Métodos:** estudio longitudinal y observacional. Se utilizaron las bases de datos de las Encuesta Demográfica y de Salud Familiar (ENDES) de 2013 a 2016, siendo las variables el acceso a información, entidad y sector proveedor de información, ámbito geográfico, región natural y año. Se realizó un análisis descriptivo, bivariado (Chi-cuadrado) y multivariado (Regresión Loglineal de Poisson), con un nivel de confianza de 95% y un $p < 0.05$. **Resultados:** el acceso a información sobre el cuidado e higiene bucal por los medios de comunicación en menores de 12 años de edad fue 12.8% en 2013 y disminuyó hasta 8.94% en 2016. Se encontró un impacto positivo de los medios de comunicación para obtener información sobre el cuidado en salud bucal ajustado por ámbito geográfico y región natural: 2013 con RP: 1,96 (1,89-2,02); 2014 con RP: 1,85 (1,82-1,87); 2015 con RP: 1,61 (1,60-1,63); 2016 con RP: 1,62 (1,60-1,64) y 2013-2016 con RP: 1,69 (1,68-1,79). **Conclusiones:** el acceso a la información sobre el cuidado e higiene bucal brindado por los medios de comunicación ha ido disminuyendo en el Perú; sin embargo, tienen un impacto positivo en el acceso, aumentado la probabilidad de quienes usan este medio en comparación con los otros proveedores de información, inclusive considerando el ámbito geográfico y la región natural.

Palabras clave: salud bucal, medios de comunicación, accesibilidad a los servicios de salud.

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INTRODUCTION

Mass media are instruments used in society to transmit information and communicate messages in a textual, aural, visual, or audiovisual way. They are often used in massive communications as in television, radio, newspapers, and the like.¹

The influence of media on people is currently on the rise, changing or modifying their lifestyles, choices, and customs, altering the way they operate in their environment, and even promoting new habits that may have a positive or negative influence depending on the way information impacts their lives.²

As technology advances, mass media evolve mainly because of the use of internet, mobile telephony, and the combination of both. The use of these new communication technologies continuously experiences a tremendous increase, including its use in health, providing the public with both healthy and unhealthy messages via traditional means like TV, radio, and billboards, as well as new means like mobile phones, websites, and social networks.³

Despite all these technological changes, it is worth mentioning that television and radio continue to be the main suppliers of information in developing countries, where internet use is limited due to low levels of broadband penetration among the population, as opposed to developed countries.⁴

On the other hand, oral health education is an endeavor that must be undertaken by everyone, especially health professionals and institutions such as Ministries of Health, non-governmental organizations (NGOs), and the like. These should be the most concerned with the provision of information about healthy habits among the population,

and all should be well informed and prepared for this task, using adequate strategies for effective dissemination of knowledge, in order to improve healthy habits among the population.⁵

The aim of the present study was to determine the impact of mass media on the access to oral care and hygiene information among the Peruvian population in the period 2013-2016, since information in this regard is still scarce despite the increasing new forms of communication. The results will support decision-making for new health education strategies, increasing knowledge and promoting healthy habits.

METHODS

This was a longitudinal retrospective study. The study data comes from a probabilistic sample of Peruvians under 12 years of age obtained in databases of the Demographic and Family Health Survey (Encuesta Demográfica y de Salud Familiar, ENDES) from 2013 to 2016.^{6,9} These are open access databases on the official website of Perú's National Institute for Statistics and Information Technology (Instituto Nacional de Estadística e Informática, INEI). The study sample included 73,581 records of Peruvian participants under 12 years of age, corresponding to 3,637 records in 2013; 15,972 records in 2014; 27,820 records in 2015, and 26,152 in 2016.

Access to information was used as dependent variable, which was a qualitative, nominal dichotomous variable with "Yes/No" values, whether survey respondents had or had not received information regarding care and hygiene of teeth, tongue, and mouth. The independent variables were the organism

and sector suppliers of information. The former was a qualitative, nominal polytomous variable with the following values: MINSA (Peru's Ministry of Health or Ministerio de Salud), EsSalud (Peru's Social Security organism), Armed Forces and Police Forces (known in Peru as FF. AA. or FF. PP.), local government, private sector, NGO/church, grassroots organizations, mass media, education institutions, and family/neighbors/friends. This yielded the information supplier sector, a qualitative, polytomous variable with the following categories: mass media, public sector (MINSA, Social Security, FF. AA. or FF. PP. and local government), private sector (private institutions, NGO/church and education institutions), and community (grassroots organizations and family/neighbors/friends).

Concerning co-variables, geographic area was qualitative, nominal dichotomous with "urban" and "rural" as values. Natural region was a qualitative, nominal polytomous variable with "coast", "highlands" and "jungle" as values [note that Peru has three major natural regions known as Costa (Coast), Sierra (Highlands) and Selva (Jungle)]. Finally, the year was a qualitative, nominal polytomous variable with 2013, 2014, 2015, and 2016 as values.

The databases were obtained from the INEI's official website, specifically from the "Databases" module, followed by "Microdata" and finally "Consult Surveys", downloading the ENDES survey by year in an SPSS sheet and choosing the "Health Survey" section.⁶⁻⁹ These downloaded databases helped consolidate the information according to the specified variables and

create a single database which was later refined, eliminating incomplete records in each year.

A descriptive analysis was carried out by obtaining absolute and relative frequencies of the qualitative variables. In addition, chi-squared statistical tests were used to determine associations. For associations with values of $p < 0.05$, a multivariate analysis was conducted using robust-variance Poisson Log-linear Regressions to obtain raw and adjusted prevalence ratios (PR), with a 95% confidence level and $p < 0.05$. The SPSS Statistical Package v. 24.0 was used.

This study was approved by the Institutional Ethics Committee of the Universidad Peruana Cayetano Heredia (CIE-UPCH) on July 10, 2018, with SIDISI code No. 102335, and registered in the Office for Human Research Protections – OHRP (USA) and Peru's National Health Institute.

RESULTS

In recent years, access to oral care and hygiene information has been increasing among children under 12 years of age in Peru, jumping from 53.70% ($n=1,953$) in 2013 to 61.68% ($n=16,130$) in 2016; however, this access has always been limited in rural areas. Concerning natural region, access to information in 2013 and 2014 was lower in the Highlands, a trend that changed in 2015 and 2016, with higher levels of access in the Highlands compared to the Jungle. Please Note that the percentages correspond to individual samples, which vary in each study year (Table 1).

Table 1. Access to oral care and hygiene information among the Peruvian population in the period 2013-2016

Area	2013		2014		2015		2016	
	n	%	n	%	n	%	n	%
Geographic area								
Urban	1,273	54.36	6,653	57.27	12,090	64.28	11,227	62.47
Rural	680	52.51	2,390	54.88	5,344	59.30	4,902	59.93
p*	0.15		<0.01		<0.01		<0.01	
Natural region								
Coast	796	56.86	4,711	58.73	8,423	63.84	7,858	62.00
Highlands	792	50.48	2,539	52.43	6,259	70.15	5,781	71.41
Jungle	365	54.64	1,792	57.69	2,752	48.24	2,491	46.28
p*	<0.01		<0.01		<0.01		<0.01	
Nationwide	1,953	53.70	9,043	56.62	17,434	62.67	16,130	61.68

n: Absolute frequency

%: Relative frequency

* Chi-squared test

Over the years, the role of MINSA as information supplier has been increasing, from 59.81% (n=1,067) in 2013 to 62.24% (n=9,114) in 2016, unlike mass media, which have progressively dropped from

12.88% (n=211) to 8.94% (n=1,221) in the same period. However, access to information through the MINSA is greater in rural areas and in regions like the Highlands and the Jungle (Tables 2 and 3).

Table 2. Access to oral care and hygiene information according to supplier organism and sector among the Peruvian population in the period 2013-2016

ORGANISM / SECTOR	2013		2014		2015		2016		p*
	n	%	n	%	n	%	n	%	
Information supplier organism									
Mass media	211	11.83	911	11.15	1,579	9.81	1,221	8.34	<0.01
MINSA	1,067	59.81	4,699	57.50	10,024	62.25	9,114	62.24	
Social Security	164	9.19	794	9.72	1,657	10.29	1,572	10.74	
FF. AA. or FF. PP.	6	0.34	24	0.29	41	0.25	31	0.21	
Local government	11	0.62	45	0.55	63	0.39	34	0.23	
Private sector	133	7.46	800	9.79	1,507	9.36	1,425	9.73	
NGO/church	13	0.73	37	0.45	61	0.38	47	0.32	
Grassroots organization	2	0.11	6	0.07	8	0.05	4	0.03	
Education institution	146	8.18	685	8.38	938	5.82	986	6.73	
Relatives/neighbors/friends	31	1.74	171	2.09	226	1.40	209	1.43	
Information supplier sector									
Mass media	211	12.88	911	12.17	1,579	10.41	1,221	8.94	<0.01
Public sector	1,248	76.19	5,562	74.29	11,785	77.71	10,751	78.72	
Private sector	146	8.91	837	11.18	1,568	10.34	1,472	10.78	
Community	33	2.01	177	2.36	234	1.54	213	1.56	

n: Absolute frequency

%: Relative frequency

* Chi-squared test

Table 3. Access to oral care and hygiene information according to information supplier organism among the Peruvian population in the period 2013-2016.

YEAR /AREA	Mass media (%)	MINSA (%)	Social Security (%)	FF. AA. or FF. PP. (%)	Municipality (%)	Private sector (%)	NGO/Church (%)	Grassroots organization (%)	Education institution (%)	Relatives/ neighbors /friends (%)	p*
2013											
Geographic area											
Urban	11.81	58.79	9.31	0.43	0.78	8.28	1.03	0.09	8.02	1.47	0.22
Rural	11.86	61.70	8.97	0.16	0.32	5.93	0.16	0.16	8.49	2.24	
Natural region											
Coast	13.36	56.34	10.88	0.41	0.41	8.95	0.69	0.00	7.30	1.65	<0.01
Highlands	11.42	57.80	9.47	0.28	0.70	6.96	1.11	0.14	9.75	2.37	
Jungle	9.41	71.47	5.00	0.29	0.88	5.29	0.00	0.29	6.76	0.59	
2014											
Geographic area											
Urban	11.00	56.73	9.56	0.35	0.64	10.36	0.45	0.08	8.91	1.92	<0.01
Rural	11.56	59.62	10.14	0.14	0.32	8.22	0.46	0.05	6.94	2.56	
Natural region											
Coast	11.78	57.62	9.11	0.31	0.72	9.68	0.55	0.05	8.27	1.93	<0.01
Highlands	10.81	54.33	10.47	0.30	0.47	11.20	0.26	0.13	9.18	2.84	
Jungle	10.02	61.65	10.21	0.24	0.24	8.09	0.48	0.06	7.55	1.45	
2015											
Geographic area											
Urban	12.29	52.01	13.85	0.35	0.42	12.65	0.28	0.04	6.27	1.84	<0.01
Rural	4.26	85.10	2.35	0.04	0.32	2.01	0.60	0.06	4.84	0.42	
Natural region											
Coast	12.43	51.43	12.88	0.35	0.51	14.17	0.31	0.05	6.09	1.78	<0.01
Highlands	7.13	74.32	6.83	0.07	0.19	4.76	0.35	0.03	5.16	1.17	
Jungle	7.84	68.04	10.17	0.39	0.47	5.05	0.66	0.08	6.52	0.78	
2016											
Geographic area											
Urban	10.30	52.13	14.61	0.29	0.28	13.23	0.25	0.04	7.12	1.75	<0.01
Rural	3.98	84.67	2.13	0.04	0.13	1.98	0.48	0.00	5.87	0.70	
Natural region											
Coast	10.27	51.76	14.00	0.31	0.35	14.60	0.23	0.04	6.70	1.74	<0.01
Highlands	7.01	72.95	6.86	0.08	0.11	5.19	0.42	0.00	6.19	1.19	
Jungle	5.40	70.29	9.46	0.22	0.13	5.01	0.39	0.04	8.07	0.99	

%: Relative frequency

* Chi-square test

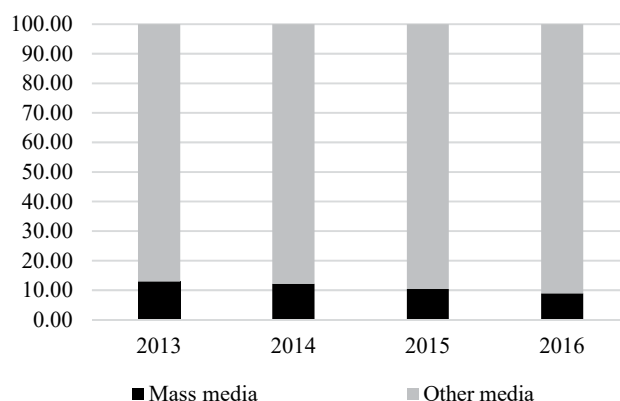
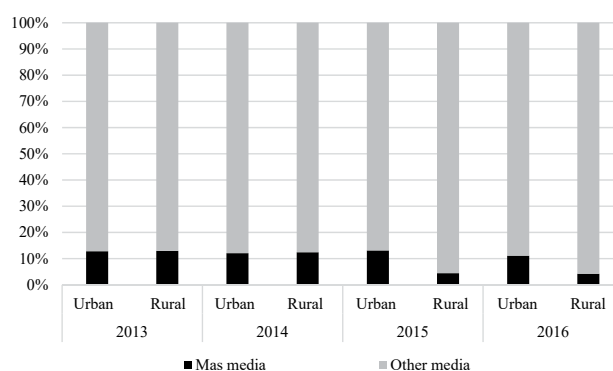
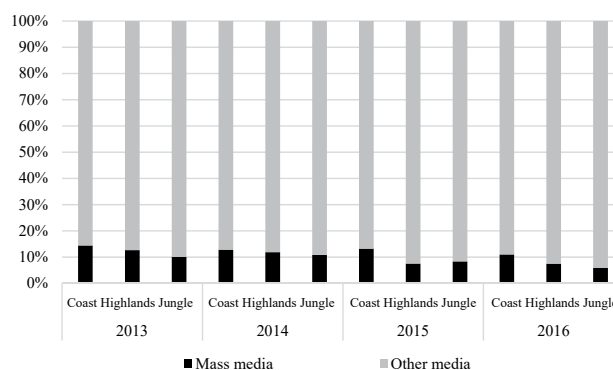
The percentage of access to information is always higher in the public sector, followed by mass media; on the opposite, the private sector and the community remain with low percentages over the years. In 2016, access

to information in the urban area via mass media was 11.09% while in the rural area was 4.23%. The Coast, the Highlands, and the Jungle had 11.01%, 7.48% and 5.87% respectively (Table 4, figures 1, 2 and 3).

Table 4. Access to oral care and hygiene information according to information supplier sector among the Peruvian population in the period 2013-2016

YEAR/AREA	Media	Public	Private	Community	p*
2013					
Geographic area					
Urban	12.84	75.35	10.12	1.69	0.07
Rural	12.96	77.76	6.65	2.63	
Natural region					
Coast	14.41	73.40	10.40	1.78	0.02
Highlands	12.65	75.62	8.95	2.78	
Jungle	10.09	83.28	5.68	0.95	
2014					
Geographic area					
Urban	12.07	73.85	11.87	2.20	<0.01
Rural	12.42	75.45	9.33	2.80	
Natural region					
Coast	12.84	73.86	11.15	2.16	<0.01
Highlands	11.91	72.20	12.62	3.27	
Jungle	10.84	78.25	9.27	1.63	
2015					
Geographic area					
Urban	13.11	71.08	13.79	2.01	<0.01
Rural	4.47	92.28	2.74	0.51	
Natural region					
Coast	13.23	69.39	15.42	1.95	<0.01
Highlands	7.51	85.84	5.38	1.27	
Jungle	8.39	84.59	6.11	0.91	
2016					
Geographic area					
Urban	11.09	72.47	14.51	1.93	<0.01
Rural	4.23	92.41	2.62	0.75	
Natural region					
Coast	11.01	71.19	15.89	1.91	<0.01
Highlands	7.48	85.27	5.98	1.27	
Jungle	5.87	87.13	5.87	1.13	

%: Relative frequency
 * Chi-squared test

**Figure 1.** Media coverage on access to oral care and hygiene information among the Peruvian population in the period 2013-2016**Figure 2.** Media coverage on access to oral care and hygiene information by geographic area among the Peruvian population in the period 2013-2016**Figure 3.** Media coverage on access to oral care and hygiene information by natural region among the Peruvian population in the period 2013-2016

The multivariate analysis showed that mass media have a positive impact on the access to oral care and hygiene information, as they increase the likelihood of accessing information among their users, compared to other suppliers of similar information: 2013 with PR 1.97 (1.90-2.03); 2014 with PR 1.85 (1.83-1.88); 2015 with PR 1.66 (1.64-1.67); 2016 with PR 1.67 (1.66-1.69) and 2013-2016 with PR 1.71 (1.70-1.73). Similarly, when considering geographic area and natural region as co-variables, the positive impact remained: 2013 with PR 1.96 (1.89-2.02); 2014 with PR 1.85 (1.82-1.87); 2015 with PR 1.61 (1.60-1.63); 2016 with PR 1.62 (1.60-1.64) and 2013-2016 with PR 1.69 (1.68-1.79) (Table 5).

Table 5. Impact of media use on the access to oral care and hygiene information among the Peruvian population in the period 2013-2016

YEAR	Access to information via mass media (Yes)	
	PR (CI95%)	PRa (CI95%)
2013	1.97 (1.90-2.03)	1.96 (1.89-2.02)
2014	1.85 (1.83-1.88)	1.85 (1.82-1.87)
2015	1.66 (1.64-1.67)	1.61 (1.60-1.63)
2016	1.67 (1.66-1.69)	1.62 (1.60-1.64)
2013-2016	1.71 (1.70-1.73)	1.69 (1.68-1.79)

PR: Prevalence ratio

a: Adjusted by geographic area and natural region

DISCUSSION

Access to health information is essential to achieve the well-being of populations; it is a right for all and a means to promote adequate health, mainly from the preventive approach. Access is determined by social, economic, cultural, and geographical barriers, with information suppliers like institutions and individuals affiliated or non-affiliated to such institutions. Currently, this access can be facilitated by mass media such as television,

fixed and mobile telephony, internet, and the like.¹⁰

In 2016, television coverage at the nationwide in Peru was approximately 93%, mainly by state television. This increases in Lima Metropolitan Area up to 98%. Similarly, radio coverage reaches 91%, mainly by privately owned radio stations.¹¹ However, even though access to information on oral hygiene care nationwide was 61.68% among children under 12 years of age, only 8.94% of this was via mass media; more importantly, this information supplier has been declining since 2013, when it reached 12.88%.

According to the INEI, in 2016 mobile telephony coverage in Peruvian homes reached 79.7% and only 20.2% of households had internet connection.¹² And according to Peru's Supervisory Agency for Private Investment in Telecommunications (Organismo Supervisor de Inversión Privada en Telecomunicaciones, OSIPTEL), internet connection via smartphones has increased in the country, from 19.8% in 2012 to 39.5% in 2014, with the highest increase in Lima Metropolitan Area, where it jumped from 54.9% to 61% in the same period; however, access in rural areas is still low, with a coverage of 13.5% compared to the urban area, with 38.7% coverage.¹³

The findings of the present study show that access to information via mass media is always lower in rural areas and in regions like the Highlands and the Jungle in all the study years. In Peru, this level of access may be due to a number of factors that can be explained by historical geographic, economic, cultural, and administrative barriers, which are generally more marked in rural areas or regions other than the coast where limitations are more noticeable than in the country's more developed areas.¹⁴

Another related aspect has to do with availability, accessibility, acceptance, contact, and effective coverage of mass media.^{15,16} While it is true that access to mass media like television and radio nationwide is generally high, these media do not convey appropriate oral health messages to the population—and in many cases such information is absent—, not to mention that telephony and internet coverage is still limited in the country.¹⁰ This means that by improving connectivity nationwide, health programs could be implemented using these technologies with more effective health messages.

An important factor is access to dental care in children under 12 years of age in Peru, which increased from 49.2% to 57.9% in the period 2013-2016.⁶⁻⁹ It is generally accepted that this increase is the result of information provided by the public sector's health centers and dental services, which offer general information on oral health care; however, these do not include the media. The public sector, mainly MINSA and Social Security, are the main information suppliers, with greater coverage in rural areas and regions of the Highlands and the Jungle. In 2016, health coverage in Peru was only 61.9%,¹² a low proportion considering that access to health is a right of every Peruvian, as stated in the 1993 Constitution of Peru¹⁷ and the 1997 General Health Act (Ley General de Salud N.º 26842 de 1997),¹⁸ endorsed by the Legal Framework on Universal Health Assurance (Ley Marco de Aseguramiento Universal en Salud N.º 29344) and its Regulation DS No. 008-2010-SA.¹⁹

Mass media play a key role as part of the political-ideological structure of a society, often becoming a hegemonic power that can transform the way a country develops. This prominence of the media also

influences health, with the corporations-media-government triad modifying values at the individual and collective levels by means of media messages that can be favorable or harmful to health.²⁰

While the population has access to oral health care information from the media, the messages should be effective, capturing the recipients' interest; this requires professionals trained in the design and transmission of messages, as well as the implementation of strategies to facilitate the sender-receiver interaction.²¹ All this is key to achieving effective messages; otherwise, the efforts to implement a health education program with such technologies would be in vain.

Several interventions have been made in the oral health field to evaluate the use and applicability of various health education programs or to increase access to services. The use of social networks has previously been described as a source of information for oral health care, with Twitter, Instagram, and YouTube among the most commonly used,²² highlighting the need to implement public policies using these new tools to convey positive health messages.²³

Television is one of the most common mass media. A video offering information on periodontal disease was made in Iran and broadcast on the country's national TV channel. In a one-month follow-up in a population of 524 adults, a greater knowledge of the disease was reported in those who watched the video.²⁴ However, sending messages alone is not enough, it is also important to know whether the information provided is relevant to improving the population's oral health. A study in Australia showed that messages on television, newspapers, magazines and other media dealt mainly with consumer products

(like toothpastes and mouthwashes) but lacked specific preventive messages.²⁵

One of the main difficulties in the implementation of programs using media for health purposes is the lack of professionals with this knowledge, as well as the institutions where they work.²⁶ Few communicators and health professionals are familiar with these tools that have been constantly advancing in certain countries, particularly in European nations, where the use of internet and mobile telephony is massive, reaching almost the entire population; it is therefore necessary to build these capacities from education institutions, searching for new ways of understanding health education.²¹

It is worth mentioning that the present study has some limitations, including the heterogeneity of sample sizes over the various years and the loss of records due to inconsistencies of the available data. Another important factor is that the “media” category makes no difference among television, radio, internet, telephony, and others, which would have been important for further analysis of their impact on access to information on oral health.

Finally, health technologies—mass media in this case—have been implemented not only to provide health care messages; on the contrary, several advances have been

made ranging from the systematization of health information, diagnostic techniques, treatments, and adherence (ICTs).²⁷ It becomes important to implement these strategies with the participation of citizens—the direct beneficiaries of these programs—as they reduce health risks and improve quality of life.

In conclusion, access to oral care and hygiene information provided by mass media has been declining in Peru; however, the media have a positive impact on access, increasing the opportunities for their users compared to other information suppliers, even considering geographic area and natural region.

CONFLICTS OF INTEREST

The authors state that they have no conflict of interest.

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