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Evaluation of Health Education Material Used on Cigarette Packs for Anti-Smoking Campaigns

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Research Article

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Abstract

Objective: To assess the quality and effectiveness of visual/printed health education material on cigarette packs for the Colombian anti-smoking campaigns.

Methods: Evaluative study, with a quantitative, descriptive, cross-sectional approach; 171 smokers assessed 21 warning images found on packs of cigarettes used in Colombia through an instrument of the Pan American Health Organization-PAHO. This study analyzed the arithmetic means for continuous and discontinuous variables, as well as proportions for the nominal or categorical variables with their corresponding confidence intervals (CI). In the analytical phase, a Pearson's Chi-Square parametric test was performed; A statistical significance of $p < 0.05$ was accepted.

Results: The smokers assessed that the images need reforms, indicating that the advertisement partially fulfills its objective as health education material. The 21 images are assessed as unattractive, accepted, and understood and they do not persuade people to stop smoking. There is a statistical association between the criterion of acceptance of the images and the gender of the participants in the study ($p=0.05$), as well as the criterion of induction to action of the images and the education level of the population intervened ($p=0.03$).

Conclusion: Reforms to the educational material that is shown on cigarette packs are suggested; in such a way that they respond to the guidelines defined at an international level as well as achieving the objective of becoming an effective method in order to spread public health messages in terms of risk perception and real behavioral changes towards cigarette consumption.

Keywords: Warnings; Product Labeling; Health Policy; Effectiveness

Abbreviations: CI: Confidence Intervals.

Introduction

Cigarette smoking is one of the main public health issues in the world [1] since it affects not only people's health, but it has significant economic and social costs [2]. Various cost-effective measures for the tobacco consumption control have been proposed, highlighting the prohibitions of direct and indirect tobacco advertising, increases in taxes and prices of tobacco products, creation of smoke-free spaces in public places and clear health messages on tobacco packages [3,4]. The World Health Organization-WHO, within the Framework Convention on Tobacco Control-FCTC, establishes a series of

guidelines for the implementation of advertisements in which "each unit packet and package of tobacco products and any outside packaging and labeling of such products also carry health warnings describing the harmful effects of tobacco use, and may include other appropriate messages". These printed health warnings are an effective strategy to induce behavioral changes in smoking habits, so the population can receive significant information about the risks that this practice represents for people's health, reducing the attractiveness of the package as well as the product, thus generating a benefit in terms of life expectancy, well-being, and the reduction in morbidity and mortality associated with smoking [5,6].

Despite these guidelines, several member countries of the convention do not meet these minimum requirements [7]. In Colombia, article 11 of WHO-FCTC was implemented through the bill: Ley 1335 del 2009 and from that date until today, a series of images have been shown on cigarette packs, as a way to display the risks of cigarette smoking; nonetheless, there is little scientific evidence that this type of educational health material had been tested (pre-test) before its final elaboration and that its educational impact had also been measured through an evaluation or validation process, as it is defined normatively. The aim of this research was to evaluate the quality and effectiveness of the visual health education material used on the packages of cigarettes for the anti-smoking campaigns with a sample of people from the town of Paipa-Boyacá (Colombia).

Materials and Methods

An evaluative study, with a quantitative, descriptive, cross-sectional approach was developed; 21 images or pictograms displayed on the cigarette packages were evaluated, as part of the anti-smoking policy implemented in Colombia between the years 2009 and 2014. For the calculation of the sample, the Epidat® software was used, with a confidence level of 5% and reliability of 95%. The sample was calculated from the prevalence of cigarette consumption in the Department of Boyacá with a 12.9%, as reported on the national psychoactive substances study in Colombia, 2013 [8], yielding a sample of 171 people. The sampling of the target population was performed with a non-probabilistic method, and it was done with those who agreed to participate in the study through the informed consent as well as fulfilling all the requirements: residing in the town of Paipa, being in the life cycle of youth and adulthood (18-59 years) and they had to have smoked in the last month any number of cigarettes on a daily basis [9].

As evaluation tools, those suggested by the Pan American Health Organization – PAHO were used, in order to assess the health educational visual/printed material [10,11], with some modifications and adaptations previously validated (Cronbach alpha 0,90). A 13-item questionnaire, with a scale value of 1 to 5 points, which evaluates 5 criteria: attraction, understanding, identification, acceptance, and induction to action were implemented. According to the sum of the scores, the decision in terms of value was determined as follows: Use as it is (50-65 points), Needs reforms (31-49 points) and Rejected (less than 30 points).

The instrument was completed by the target population, upon the completion of the informed consent by the participants and the approval from the Bioethics Committee of Universidad Autónoma de Manizales. For the data analysis, Kolmogorov-Smirnov tests for normality were implemented for each sample of the analyzed variables; the variables were evaluated descriptively and analytically according to the relationship of each of them; arithmetic means for continuous and discontinuous variables, proportions for categorical or nominal variables, with their respective confidence intervals (CI). During the analytical phase, in order to determine the statistical significance of the association of sociodemographic variables as well as the evaluation of the educational material criteria, the Pearson's Chi-Square parametric test was used and a statistical significance of $p < 0.05$ was accepted.

Results

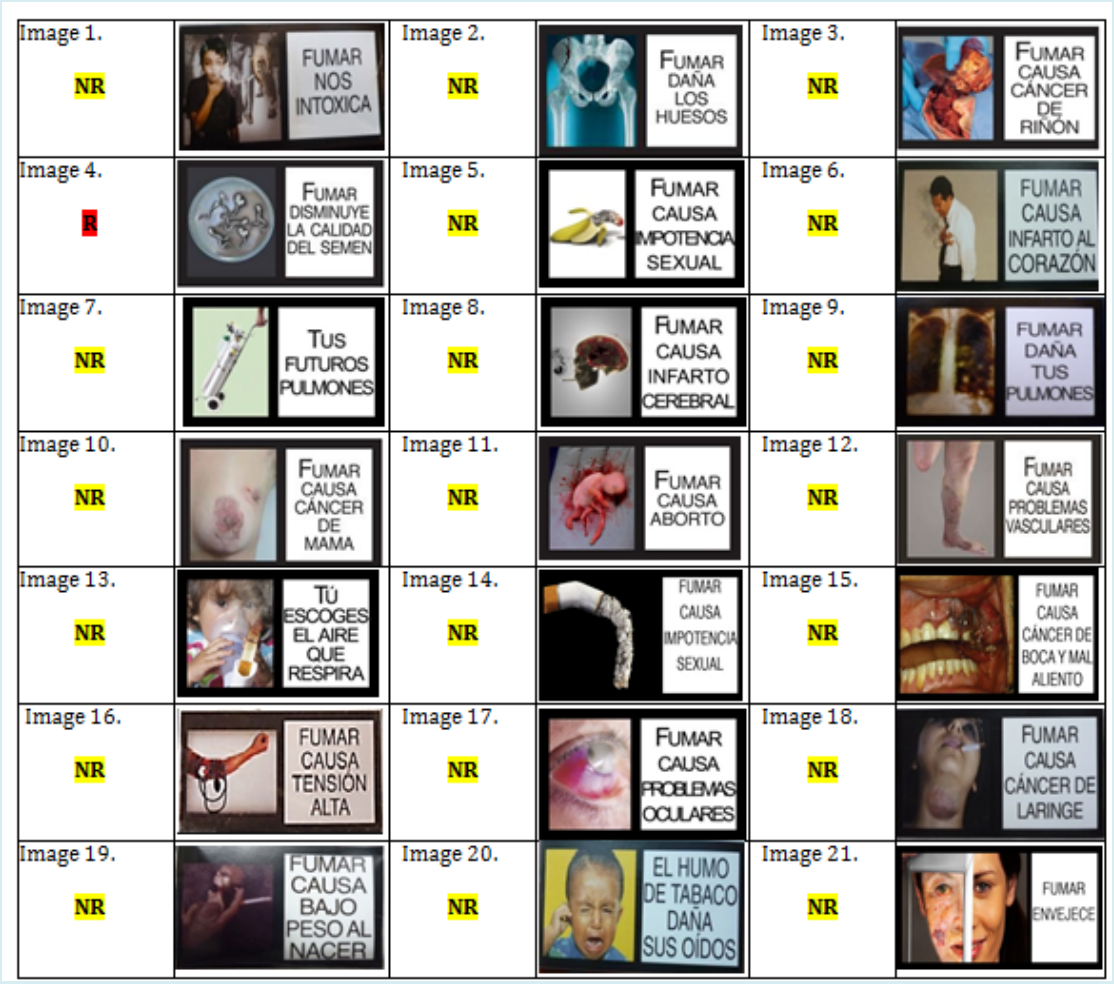
Sociodemographic Aspects of the Sample

The average age of the target population was 34.4 years (SD ± 10.3) with a clear predominance of older adults between 30 and 60 years (72.5%). The majority of the target population was men (62.2%). Among the education levels, there are very few people who have a postgraduate degree and consume cigarettes (9.9%); there is a prevalence of population with basic education levels. Based on the socioeconomic stratum our participants belonged to the lower and middle class, in which, the consumption was higher in the lower strata (56.1%).

Evaluation of the Educational Material

Levels of attraction, understanding, identification/ acceptance, and induction to the action of educational material: According to the analysis of the instrument used, the 21 images assessed showed minimum scores of 13 and maximum scores of 65 according to the assessment scale, with a general average of 35 points (± SD 10.3) for all the images. It is highlighted that, from the 21 images, 12 of them obtained the highest score, while 6 showed the lowest score possible according to the assessment scale. Regarding the average score for each image, it was observed that image 4 has the lowest score (28 points) and number 10 and 11 have the highest score (38 points) (Tables 1 & 2). From the

obtained scores for each image and according to the decision ranges of the instrument, it can be stated that 20 images located on the cigarette packages need reforms and 1 is rejected (Figure 1).



Source: research database. R: Rejected (Minus 30 points); NR: Needs reform (31-49 points); UCE: Use as is (Greater than 50 points).

Figure 1: Coding of the decision for each image based on the scores obtained.

	n	%	DE±	IC (95%)
Gender				
Male	103	62.2		(52 - 67)
Female	68	39.8		(32 - 47)
Stratus socioeconomic				
1	11	6.4		(2 - 10)
2	85	49.7		(42 - 57)
3	72	42.1		(34 - 49)
4	3	1.8		(0 - 0)
Stratus socioeconomic				
Low	96	56.1		(48 - 63)

Medium	75	43.9		(36 - 51)
Scholarship				
Primary	22	12.9		(7 - 18)
high school	44	25.7		(19 - 32)
Technology	41	24		(17 - 30)
University	47	27.5		(21 - 34)
Postgraduate	17	9.9		(5 - 14)
Education				
Medium low	107	62.6		(55 - 70)
High	64	37.4		(26 - 41)
Age				
Young Adult (18 to 26 years old)	47	27.5		(21 - 34)
Mature adult (27-60 years old)	124	72.5		(66 - 79)
	n	**x**	**DE±**	**IC (95%)**
Age	171	34.4	± 10.3	(33 - 36)

Source: research database

Table 1: Sociodemographic characteristics of the Population.

	Minimum	Maximum	Mean	Standard deviation
Image 1	18	63	35	10,8
Image2	18	62	35	9,9
Image 3	13	64	36	10,5
Image 4	28	28	28	,000
Image 5	17	63	36	10,2
Image 6	17	65	36	10,8
Image 7	13	65	36	10,9
Image 8	15	62	35	10,7
Image 9	13	65	36	11,0
Image 10	13	65	38	12,1
Image 11	17	65	38	11,8
Image 12	17	65	37	11,2
Image 13	17	62	35	9,9
Image 14	16	65	35	10,2
Image 15	15	65	35	11,0
Image 16	17	60	35	10,0
Image 17	15	64	36	11,1
Image 18	16	65	35	11,3
Image 19	13	65	36	10,7
Image 20	13	65	34	10,9
Image 21	15	65	34	12,7

Source: research database

Table 2: Means scores for each image.

Regarding the evaluation frequencies of the sample in each one of the decision ranges for the 21 images, it is observed that according to the coherence of the average scores obtained for each of them, and the highest percentages are given under two categories: Needs to be reformed and rejected. The decision that the image needs reforms has frequencies in ranges between 52% to 64%, reaching the highest percentage as for this decision, images 7, 2 and 19; for the decision of rejection the frequencies of opinion of the sample ranged from 31% to 100%, finding that the images with the highest percentage for this decision are 4, 21 and 1. It is possible to show that the evaluation of frequencies for the images used the way they are now are low (0% to 8.2%); Image 4 reports the lowest frequency of use (0%) and image 10 reaches the highest frequency in this decision (8.2%) (Table 3).

IMAGE	Use as is			Needs Reforms			Rejected		
	n	%	IC95%	n	%	IC95%	n	%	IC95%
Image 1	6	3,5	(0,7 – 6,2)	95	55,6	(47 – 62)	70	40,9	(33 – 48)
Image 2	4	2,3	(0,05 – 4,5)	108	63,2	(55 – 70)	59	34,5	(26 – 41)
Image 3	8	4,7	(1,5 – 7,8)	103	60,2	(52 – 67)	60	35,1	(27 – 42)
Image 4	0	0,0	(0 – 0)	0	0,0	(0 – 0)	100	100	(-)
Image 5	6	3,5	(0,7 – 6,2)	109	63,7	(55 – 70)	56	32,7	(25 – 40)
Image 6	5	2,9	(0,3 – 5,4)	100	58,5	(50 – 65)	66	38,6	(31 – 46)
Image 7	7	4,1	(1,1 – 7,0)	110	64,3	(56 – 71)	54	31,6	(25 – 38)
Image 8	6	3,5	(0,7 – 6,2)	104	60,8	(52 – 67)	61	35,7	(27 – 42)
Image 9	6	3,5	(0,7 – 6,2)	105	61,4	(53 – 68)	60	35,1	(27 – 42)
Image 10	14	8,2	(4,0 – 12,3)	99	57,9	(50 – 65)	58	33,9	(25 – 40)
Image 11	12	7,0	(3,1 –10,8)	104	60,8	(52 – 67)	55	32,2	(25 – 38)
Image 12	9	5,3	(1,9 – 8,6)	107	62,6	(54 – 69)	55	32,2	(25 – 38)
Image 13	4	2,3	(0,05 – 4,5)	99	57,9	(50 – 65)	68	39,8	(32 – 47)
Image 14	2	1,2	(-0,04 – 2,8)	101	59,1	(51 – 66)	68	39,8	(32 – 47)
Image 15	3	1,8	(-0,01 – 3,7)	107	62,6	(54 – 69)	61	35,7	(27 – 42)
Image 16	1	0,6	(-0,05 – 1,7)	107	62,6	(54 – 69)	63	36,8	(32 – 47)
Image 17	7	4,1	(1,1 – 7,0)	105	61,4	(53 – 68)	59	34,5	(26 – 41)
Image 18	9	5,3	(1,9 – 8,6)	95	55,6	(47 – 62)	67	39,2	(32 – 47)
Image 19	4	2,3	(0,05 – 4,5)	109	63,7	(55 – 70)	58	33,9	(25 – 40)
Image 20	4	2,3	(0,05 – 4,5)	101	59,1	(51 – 66)	66	38,6	(31 – 46)
Image 21	6	3,5	(0,7 – 6,2)	89	52,0	(44 – 59)	76	44,4	(36 – 51)

Table 3: Frequency of evaluation of the images according to the decision versus scores for each image.
Source: research database.

According to the evaluation criteria the instrument takes into account: attraction, acceptance, understanding/ identification and induction to action; the highest opinion frequencies of the surveyed population are centered on the opinion that the 21 images are not attractive, are not accepted, are not understandable and do not induce to stop smoking (Table 4). The averages of evaluation frequencies for the 21 images, in the four criteria, are attraction 22.6%, no attraction 77.3%; acceptability 21.3% and non-acceptability 78.6%; understanding 19.8% and non-understanding 80.1%; induction to stop smoking 21.8% and non-induction to quit smoking 78.1% (Table 4).

Imagen	Attraction				Acceptance				Understanding / identification				Induction to action			
	Attractiveness		Not attractive		Acceptable		Not Acceptable		Understandable		Not understandable		Induces to quit smoking		Does not induce smoking cessation	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Image 1	41	24,0	130	76,0	36	21,1	135	78,9	39	22,8	132	77,2	42	24,6	129	75,4
Image 2	42	24,6	129	75,4	27	15,8	144	84,2	37	21,6	134	78,4	27	15,8	144	84,2
Image 3	40	23,4	131	76,6	30	17,5	141	82,5	33	19,3	138	80,7	41	24,0	130	76,0
Image 4	0	0	171	100	0	0	171	100	0	0	171	100	0	0	171	100
Image 5	42	24,6	129	75,4	35	20,5	136	79,5	36	21,1	135	78,9	35	20,5	136	79,5
Image 6	41	24,0	130	76,0	40	23,4	131	76,6	31	18,1	140	81,9	43	25,1	128	74,9
Image 7	45	26,3	126	73,7	36	21,1	135	78,9	35	20,5	136	79,5	45	26,3	126	73,7
Image 8	40	23,4	131	76,6	42	24,6	129	75,4	33	19,3	138	80,7	37	21,6	134	78,4
Image 9	44	25,7	127	74,3	36	21,1	135	78,9	32	18,7	139	81,3	40	23,4	131	76,6
Image 10	60	35,1	111	64,9	50	29,2	121	70,8	49	28,7	122	71,3	55	32,2	116	67,8
Image 11	49	28,7	122	71,3	48	28,1	123	71,9	48	28,1	123	71,9	53	31,0	118	69,0
Image 12	40	23,4	131	76,6	42	24,6	129	75,4	38	22,2	133	77,8	50	29,2	121	70,8
Image 13	33	19,3	138	80,7	37	21,6	134	78,4	35	20,5	136	79,5	31	18,1	140	81,9
Image 14	31	18,1	140	81,9	37	21,6	134	78,4	29	17,0	142	83,0	38	22,2	133	77,8
Image 15	36	21,1	135	78,9	42	24,6	129	75,4	36	21,1	135	78,9	43	25,1	128	74,9
Image 16	39	22,8	132	77,2	33	19,3	138	80,7	33	19,3	138	80,7	35	20,5	136	79,5
Image 17	40	23,4	131	76,6	41	24,0	130	76,0	34	19,9	137	80,1	39	22,8	132	77,2
Image 18	36	21,1	135	78,9	37	21,6	134	78,4	35	20,5	136	79,5	34	19,9	137	80,1
Image 19	40	23,4	131	76,6	42	24,6	129	75,4	36	21,1	135	78,9	37	21,6	134	78,4
Image 20	34	19,9	137	80,1	34	19,9	137	80,1	29	17,0	142	83,0	26	15,2	145	84,8
Image 21	39	22,8	132	77,2	42	24,6	129	75,4	34	19,9	137	80,1	35	20,5	136	79,5

Source: research database.

Table 4: Image evaluation frequencies according to the criteria to be evaluated.

The image that reports the highest percentage of attraction is 10 (35.1%) and the image that reports the highest percentage of non-attraction is 4 (100%). The image with the highest percentage of acceptance is 10 (29.2%) and 2 reporting non-acceptance (84.2%). In terms of understanding/identification, images 10 and 11 are the most understandable (28%) and the least understandable images are 14 and 20 (83%). Regarding the induction to stop smoking, image 10 reported the highest percentage (32.2%) and images 2 and 20 have the highest percentage for non-induction to stop smoking (84.2%) (Table 4).

Association of Sociodemographic Variables and Receptivity of Educational Material

Data obtained in the association of sociodemographic variables with the levels of evaluation in the four criteria defined by the instrument, showed statistical significance between the criterion of acceptance of the images and gender of the participants in the study (p=0.05); likewise, association between the criterion induction to action and the educational level of the sample (p=0.03) was observed, as shown in Table 5.

	Attraction					Acceptance					Understanding / identification					Induction to action				
	Attractiveness		Not attractive			Acceptable		Not Acceptable			Understandable		Not understandable			Induces to quit smoking		Does not induce smoking cessation		
	n	%	n	%	P*	n	%	n	%	P*	n	%	n	%	P*	n	%	n	%	P*
Gender																				
Male	32	31.1	71	68.9	0.59	23	22.3	80	77.7	0.05	32	31.1	71	68.9	0.59	21	20.4	82	79.6	0.86
Female	25	36.8	43	63.2		14	20.6	54	79.4		25	36.8	43	63.2		18	26.5	50	73.5	
Age																				
Young Adult (18 to 26 years old)	25	53.2	22	46.8	11.5	17	36.2	30	63.8	8	24	51.1	23	48.9	9.1	16	34	31	66	4.6
Mature adult (27-60 years old)	32	25.8	92	74.2		20	16.1	104	83.9		33	26.6	91	73.4		23	18.5	101	81.5	
Stratus socioeconomic																				
Low	36	37.5	60	62.5	1.7	25	26	71	74	2.5	38	36.6	58	60.4	3.8	27	28.1	69	71.9	3.5
Medium	21	28	54	72		12	16	63	84		19	25.3	56	74.7		12	16	63	84	
Education																				
Medium low	32	29.9	25	39.1	1.5	19	17.8	88	82.2	2.5	33	30.8	74	69.2	0.7	26	24.3	81	75.7	0.03
High	75	70.1	39	60.9		18	28.1	46	71.9		24	37.5	40	62.5		13	20.3	51	79.7	

Table 5: Association of evaluation variables of educational material and sociodemographic aspects.

Discussion

Smoking represents the second leading cause of death worldwide, which accounts for almost five million deaths per year and it is projected to account for nearly ten million deaths by 2020 [12]. Additionally, this substance generates economic and social costs in the countries where there are high consumption rates [13].

The images printed on cigarette packs are intended to transmit information, seeking to raise awareness and generate behavioral changes against smoking. However, this material requires a normative evaluation and validation which assess the quality and effectiveness of the latter under standardized instruments.

The age of the surveyed population revealed similar figures to those reported in a systematic review, where 71% of the analyzed studies included young adults and adults [14]. Other research shows similarities in the sample (adults) [15-19]. However, the average age for these studies exceeds those found in this study (40, 35 and 39 years respectively). The analyzed age group differs significantly from the qualitative study with a phenomenological approach carried out by Sánchez JP, et al. [18], where young people between 16 and 23 years old analyzed the same images used in this study by means of an interview. Based on the sociodemographic variables of the studied population, it can be concluded that people who consume more cigarettes are male, data similar to that reported by other authors [14-17]. Regarding education level, differences with Mexican studies were found, in which there are greater percentages for higher education levels [15-17]. As reported in other studies, it was found that most of the participants were from low socioeconomic strata [16,17].

The general average score of the images printed on the cigarette packs was 35.2 (± SD 11), with a low prevalence to continue with the images as they are (0% to 8.2%), indicating that all of them must be reformed; The majority of

the sample commented that these figures are not attractive (77.3%), are not accepted (78.6%), are not understandable (80.1%) and they do not induce to stop smoking (78.1%). When contrasting the data with the study of Hammond D, et al. [20], it revealed a certain similarity since it reported that only 19% of smokers stated that graphic warnings on cigarette packs had made them smoke less. Similarly, Sánchez [18, reports that the images printed on cigarette packs are not important, particularly for the young smoker. Additionally, it was observed that images 4 and 21 have the lowest rating because those pictures are the most rejected. Pictures 2, 5 and 19 have a greater need to be reformed, while figure 12 has the highest score (37 points).

The aforementioned data for the analyzed images along the study reinforce the conclusions presented in a study by Goodall C, et al. [21], who showed that the shocking warning labels seem to have a positive influence on the attitudes and behaviors related to the smoking habits of adolescents. It is considered that shocking images have a larger impact and greater probabilities of generating behavioral changes in the smoker [22] but their effectiveness may decrease behavioral changes related to quitting consumption when people avoid contact with the images, it may even increase consumption [20,23]. Conversely, it is important to mention that the results obtained in this study visualize partially and perhaps, linked to an influence of the cultural environment, what has been exposed by Brazilian, Canadian and Irish studies, where it is shown that the sharpest images were those which showed injuries or physical suffering in a more graphic way [19,24] and produced unpleasant emotions, ensuring a greater impact on the behavior of smokers [25]; the images with more votes were those that showed more graphically the negative effects on health [26]. Graphic warnings that arouse fear or other emotions are the most effective and even more if they are associated with information about how to help smokers stop smoking and create the necessary conditions for them to quit smoking [27].

When assessing the association, data coinciding with that reported by Fong GT [28] was found, they concluded in their study that once the graphic warnings were implemented, low-income smokers who did not read the text warnings in detail got perceptually closer to high-income smokers who read them in detail and significantly increased the probability that low-income smokers may quit smoking. These data confirm the perception raised by Ortiz JC [29] when he states that educational campaigns on cigarettes designed in Colombia differ greatly with those used in other countries and that poorly produced images do not generate an impact on the smoker. On the contrary, they induce mockery, they have little credibility and do not induce to stop smoking; hence, it is considered that images should reinforce positive messages that are more remarkable in terms of reducing consumption and provide better information to the general public [18,30].

The research experiences in the international context report that graphic warnings on cigarette packages with images and text reported reliable results regarding the repercussions of this type of warnings [6], a fact that is confirmed by the Datafolha Research Institute, the American Commission for health promotion and the international project for smoking control. They certify the influence of these messages on smokers in the sense that they change their opinion about the consequences and effects of smoking on health and think at the moment of the intention to quit or reduce cigarette smoking [31-34]; However, those studies contradict in some way what was stated by Chang FC, et al. [35] who demonstrated that in China the implementation of a smoke-free law, in combination with the graphic warning labels on cigarettes, has been effective in raising thoughts about of the health dangers of smoking and quitting smoking [35].

Different researches have suggested that support through telephone numbers in the packs of cigarettes makes the printed warnings in them much more effective [36,37]. It reinforces the need for reforms in these images, as proposed in this study. Similar to the data found in the studies of Thrasher, Murray, Strahan, Health Warnings and Health Canada, where it was established that the size of the graphic warnings is relevant; as long as they are larger and have more space in the pack, it will reduce the attractiveness of the package, as a result, it could increase the risk that represents smoking and make them more reliable [38-42]. Related to what has been stated in this study, the reports made by Sussenbach P, et al. [43] state that aversive images attract attention, however, they do not promote health knowledge, for this reason, changes in the images that were evaluated in the study are required.

The information offered in this study compared with the results of Kees J, et al. [44] indicates that the pictorial graphic representations of warning support the intentions of smokers to quit smoking. Even though highly graphic images may limit the direct effect on the intentions of quitting, they may increase the intentions to quit smoking through evoked fear. It is important to mention that although the advantages of this study lies in being one of the few works that evaluate this educational material, the methodology used differs in its approach with other research conducted especially in Canada and Europe; nevertheless, with the results achieved, inferences can be made in general terms about the conclusion, since the educational images in the cigarette packs used in Colombia need adjustments, in such a way that it becomes a simple, effective and persuasive strategy in the mitigation of cigarette consumption, with the consequent reduction of costs for the country's health system [45-47],

and take advantage in a more efficient way as it was stated by Gantiva C, et al. [48] when they affirm that these images activate the appetitive motivational system and generate a significant level of activation, so they can be used to evaluate the emotional response in tobacco users.

In the advertising field, educational strategies must be carried out, extending the message through different media in order to face this public health problem. Regarding the images exhibited in cigarette packs, they work in a certain way but they should be more informative since they take the initiative to quit smoking but without results. In addition, campaigns should be generated towards younger audiences from different socio-cultural sectors, raising awareness about health-related issues caused by cigarette consumption, bearing in mind the objective of raising awareness about its harmful effects and ending the perceptions that have been generated through the times about cigarettes.

Finally, it is necessary to recognize that the limitations of the study are related to the type of sampling performed; despite the fact that the instrument is user-friendly, many images had to be evaluated, which entailed the use of considerable time, which could lead to non-objective answers from the participating population and thus having assessments with elements of subjectivity. The project developed, provides an important baseline, which visualizes the need to make reforms to the educational material that is exposed in cigarette packs, likewise, it is necessary to monitor and evaluate the impact of this educational material, in order to correct or reinforce its effectiveness in the smoking population.

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