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Original Research

From directive to practice: are pictorial warnings and plain packaging effective to reduce the tobacco addiction?

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ABSTRACT

Objectives: Tobacco packaging represents an important form of promotion of tobacco products and for this reason plain packaging (PP) can be considered an additional tobacco control measure. In Italy the current tobacco packaging is branded with textual warnings. The study investigated the perception of PP with textual warnings (PPTWs) and pictorial warnings (PPPWs) in Italy.

Study design: Cross-sectional.

Methods: The study was conducted on adults who were current, never and former smokers. The participants watched out three types of packages (current packaging, PPTWs and PPPWs) and eight pictorial warnings, and indicated which they considered the most effective ones to motivate smoking cessation or reduction and to prevent the onset.

Results: 1065 subjects were recruited. The PPPWs were considered the most effective in motivating to quit, reduce and prevent the smoking habits (ranged 83.4%–96.1%) in all tobacco users and age groups (≤40/>40 years) ($P < 0.005$). In general PP does not seem to be very effective in quitting for three-quarters of the smokers and 60% declared that they would have still started smoking with PP. The younger group believed less than the older one that PP gives a motivation to quit (29.4% vs 39.1%, $P = 0.002$). The pictures perceived as most effective in communicating the smoking effects were lung cancer and gangrene (about one-third of the sample).

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Conclusions: The textual warnings on tobacco products are a measure of control now outdated. Countries still using them should consider the idea of replace them with pictorial warnings that seem to be more effective. It is also desirable in the near future that these countries introduce the PPPWs.

Introduction

Tobacco producers packaging is an important tool for developing market strategies and it is basically the only communication channel still available, since in many countries advertising on media and sponsorship of events have been banned.[1] Tobacco industries use packaging to spread the brand and to approach new targets (e.g. young women) and for these reasons packages of tobacco products rise to topic of discussion between tobacco companies and public health authorities.[2] In order to control tobacco consumption WHO pinpoints the interventions on packaging label as one of the most effective measures to be adopted.[3] Packaging may become the most effective tool in communicating health risk related to tobacco smoke and in promoting tobacco free behaviours through interventions targeted to inform the population and to limit the visibility of brands and symbols of tobacco companies.

In addition, the appeal standardization (plain packaging, PP) of tobacco product has contributed to improve the power of these messages. Thus PP might reduce acute (hedonic) craving and is associated with more negative perceptions than branded packaging with less prominent health warnings.[4–6]

Currently worldwide two main modalities are used to communicate the health warnings on the packages: textual and graphic. Even if the introduction of textual warning in Italy increased awareness of tobacco related diseases in the population, pictorial warnings seem to be more effective in communicating risks.[7,8]

The introduction of Pictorial Warnings (PWs), in fact, enhances the effect of textual warnings (TWs). Graphic depictions of tobacco-related disease are perceived by youth and adults as the most effective warning theme,[9,4] in particular for less known health effects such as gangrene, impotence, and stroke.[10]

In Italy the current tobacco packages are branded with textual warnings,[11] and this research focuses on the possibility to change the packaging look: plain packaging with health pictorial warnings (PPPWs) and plain packaging with textual warnings (PPTWs).

This study represents the conclusion, with an expanded sample size (N = 1065), of a project started in 2011 to fill a gap in the national research on this topic.

Aims of this research are to confirm the findings of the pilot study[12] thus evaluating:

- the perceived effectiveness of PPPWS in comparison with PPTWs for the outcomes assessed (avoid smoking start, motivate to quit and reduce tobacco consumption);
- the level of perceived effectiveness of PP without pictograms in preventing start smoking, motivating to quit and reducing consumption;
- the impact of demographic characteristics and of smoking habits on packaging label's perception;
- the perceived effectiveness of eight different pictograms in communicating the smoking-related health problems.

Methods

Study design and setting

The study design is cross-sectional. The STROBE guidelines were followed to conduct the research and to present the results.[13]

This study was carried out in 2012–2013 in eight Italian cities (Rome, Carrara, Cassino, Palermo, Siena, Salerno, Turin, Varese). Participants aged over 18 years were recruited on a voluntary basis. All participants were asked to complete a face-to-face interview by using a questionnaire, validated in a pilot study.[12] The interviews were conducted in waiting rooms of different clinics in the hospitals of the cities involved and university spaces (gardens, cafeterias, classrooms, etc.).

Questionnaire

Data on sociodemographic variables (age, gender, marital status, residence, educational level and occupation) were collected.

Smoking status was measured by asking whether participants had ever smoked. Participants were grouped into three categories; never smokers, current smokers and former smokers.

Smokers were defined as those who had smoked at least 100 cigarettes in their lifetime, and those who had smoked at least one cigarette per day at the time of the survey. Former smokers were defined as individuals who had quit smoking at least one month prior to the survey and those who had smoked at least one cigarette per day, prior to quitting. Those who did not meet the above criteria were categorized as never smokers.[14]

Participants were interviewed on their opinion on the impact of packaging look on smoking behaviours.

An image with three different types of packaging (Fig. 1) was shown to the participants and three questions were asked in other to measure the most effective images in convincing not to start smoking, to quit, and to reduce the consumption.

In addition, opinions on the possible impact of the plain package on smoking prevention and motivation to quit were asked:

- May help to prevent smoking start?
- May help to quit smoking?

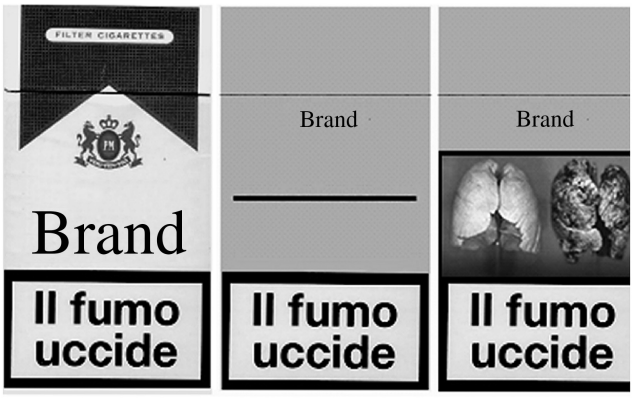


Fig. 1 – Three different types of packaging: currently packaging sold (left side), plain packaging with text warning (PPTWs) (centre) and plain packaging with pictorial warning (PPPWs) (right side).

- Would you have started to smoke if the plain packaging had been present? (only for smokers and ex-smokers)

Finally, eight pictograms were shown (Fig. 2). They were coded from 1 to 8. All English health warnings were translated into Italian during the interview. The participants chose the pictogram most likely to communicate the tobacco related health problems.

Statistical analysis

Quantitative variables are presented as mean and standard deviation (SD) and qualitative ones through frequencies and percentages.

The sample was categorized in smoker, non-smoker and ex-smoker. To evaluate possible differences between these three groups χ^2 test for qualitative variables and Anova test for quantitative variables were performed. A multinomial logistic analysis has been conducted in order to assess the role of demographic characteristics on the perceived impact of the cigarette packaging. Statistical significance level was fixed at $P < 0.05$. Data were analysed with the software Statistical Package for Social Sciences (SPSS) version 21.0 for Windows (SPSS Inc. Chicago, Illinois, USA).

Results

In total, 1065 questionnaires were administered to adult population (>18 years) in eight different Italian cities: Rome (262), Carrara (100), Cassino (103), Palermo (168), Siena (102), Salerno (126), Turin (108), Varese (96). 109 (9.3%) refused to participate.

Table 1 shows the characteristics of the sample, divided in to never smokers (32.5%), current smokers (32.9%) and former smokers (34.6%). Significant differences were found in the three different groups of tobacco users for gender, age, mean age, civil status, educational level and geographical area of residence.

Table 2 shows ratings of three different types of packages: current Italian packaging with brand and textual warnings, plain package with only text warnings (PPTWs) and plain package with pictorial warnings (PPPWs) (see Fig. 1).

The majority of the sample indicated PPPWs as the most effective in preventing start smoking (91.8%) followed by PPTWs (7%) and current package (1.2%). Concerning the most effective in motivating to quit 90.7% of participants answered PPPWs, 7.6% PPTWs and 1.7% the current one. Almost 90% of the sample indicated the PPPWs as the most effective in convincing smokers to reduce consumption, the 9.9% chose the PPTWs and 2.5% the current package.

Fig. 2 – Pictograms on health problems related to smoke. All English health warnings were translated into Italian during the interview.

Table 1 – Description of the sample, stratifying by tobacco users groups [n (%), unless stated otherwise].

Variables	Total	Smoking habits			P
		Never smokers	Current Smokers	Former smokers	
Age [mean (SD)]	43.2 (17.5)	42.4 (17.2)	37.7 (15.2)	49.3 (17.8)	<0.001[a]
Gender					
Male	500 (47.0)	131 (37.9)	172 (49.1)	197 (53.5)	<0.001[b]
Female	564 (53.0)	215 (62.1)	178 (50.9)	171 (46.5)	
Marital status					
Married	467 (44.3)	161 (47.4)	109 (31.5)	197 (53.7)	<0.001[b]
Single	586 (55.7)	179 (52.6)	237 (68.5)	170 (46.3)	
Educational level					
University degree	469 (44.3)	166 (48.3)	149 (42.9)	154 (42.0)	0.040[b]
High school diploma	400 (37.8)	125 (36.3)	144 (41.5)	131 (35.7)	
Primary school diploma	189 (17.9)	53 (15.4)	54 (15.6)	82 (22.3)	
Geographic distribution					
North	187 (17.7)	68 (19.8)	38 (11.0)	81 (22.2)	<0.001[b]
Centre	614 (58.3)	203 (59.0)	202 (58.6)	209 (57.3)	
South and islands	253 (24.0)	73 (21.2)	105 (30.4)	75 (20.5)	
Total		*346 (32.5)*	*350 (32.9)*	*369 (34.6)*	

[a] P-value ANOVA test.
[b] P-value χ^2 test.

In Table 2 the possible impact of PP in changing participant's behaviour is also shown. The effectiveness of the PP was considered mostly useful for not starting smoking (52%). About 53% of responders do not consider the PP useful for quit tobacco consumption (see total column).

Stratified analysis

Analyses were conducted to examine the potential differences in package ratings between non-smokers, current and former smokers. There are significant differences in packaging perception due to the smoking attitude. PPPWs are indicated as the most effective on a possible impact on smoking behaviour ($P = 0.006$ for no start and quit; $P = 0.025$ for modify habits). Percentages of smokers choosing PPPWs as most effective in the three outcomes are higher than in the other groups.

60% of non-smokers believe that PP 'may help to prevent smoking start' in contrast with smokers and ex-smokers (43% and 54% of them share this belief, respectively) ($P < 0.001$).

Approximately half of never-smokers (41.4%), a quarter of the smokers (25%) and one-third of ex-smokers (36.6%) think that PP 'may help to quit smoking' ($P < 0.001$). The former smokers' point of view is always in the middle between the no-smokers' and the smokers. Answering to question, 'If there had been just plain packages would you have started smoking?': approximately 60% of both smokers and former smokers said 'yes', but the former smokers were more confident than current smokers in PP impact (21% of them would not have started compared with 12% of current smokers) ($P = 0.006$).

There weren't significant differences due to gender in any questions on packaging perception and types of warnings (Table 2, control columns).

The younger group (<40 years) was significantly ($P < 0.05$) more likely to consider PPPWs the most effective packaging in preventing starting smoking (95%), motivating to quit (94%) and reduce tobacco consumption (92%) (Table 2).

On the other hand the young people have less confidence PP gives a motivation to quit (29.4% vs 39.1%, $P = 0.002$); moreover, in the smoking group the youngest do not consider the PP a defensive measure to start smoking, which is in line with the older group (63.6% vs 59%, $P < 0.001$).

Multinomial analysis

The multinomial analysis (Table 3) confirms the differences among age groups in the evaluation of packaging effectiveness showing the youngest (<40 years) as the most likely to indicate the PPPWs to be the most effective in preventing start smoking (AOR 4.6; 95%CI 1.3–16.4) and motivating to quit (AOR 4.95; 95%CI 1.7–14.8). Moreover, the multinomial analysis reveals that males compared with females are more likely to consider PPPWs effective in motivating reducing tobacco consumption.

Although stratified and multinomial analyses highlight the impact of demographic characteristics on the perceived impact of different labels the main finding of the research is that a wide majority of the sample indicates the PPPWs as the most effective in preventing start smoking (91.8%), motivating to quit (90.7%) and reducing tobacco consumption (87.6%).

Pictograms evaluation

Graph 1 shows the distribution of which of the pictograms appears to be more effective to communicate health damages caused by tobacco smoke. The pictograms number 1 (lung cancer) and 3 (gangrene) have the higher percentage of votes: 34.8% and 31.6% respectively and remained the most chosen

Table 2 – Comparison between different packaging opinion stratify by smoking habits, gender and age groups.

	Total (%)	Smoking habits				Gender			Age groups		
		Never (%)	Smokers (%)	Ex (%)	P[a]	Male (%)	Female (%)	P[a]	≤ 40 years (%)	>40 years (%)	P[a]
Comparison among the different packaging:											
The most effective to prevent smoking start:											
Current packaging	12 (1.2)	5 (1.5)	3 (0.9)	4 (1.1)	**0.006**	5 (1.1)	7 (1.3)	0.807	2 (0.4)	10 (1.9)	**0.001**
PPTWs	71 (7.0)	33 (10.1)	10 (3.0)	28 (8.0)		31 (6.6)	40 (7.4)		22 (4.5)	49 (9.3)	
PPPWs	930 (91.8)	289 (88.4)	323 (96.1)	318 (90.9)		437 (92.4)	492 (91.3)		464 (95.1)	466 (88.8)	
The most effective in motivating smokers to quit:											
Current packaging	17 (1.7)	6 (1.9)	4 (1.2)	7 (2.1)	**0.006**	6 (1.3)	11 (2.1)	0.381	3 (0.6)	14 (2.8)	**0.002**
PPTWs	74 (7.6)	38 (12.0)	17 (5.2)	19 (5.7)		31 (6.7)	43 (8.3)		26 (5.5)	48 (9.5)	
PPPWs	888 (90.7)	271 (86.1)	306 (93.6)	310 (92.3)		424 (92.0)	463 (89.6)		446 (93.9)	442 (87.7)	
The most effective in modifying smokers habits:											
Current packaging	24 (2.5)	11 (3.6)	3 (1.0)	10 (3.1)	**0.025**	9 (2.1)	15 (3.0)	0.501	4 (0.9)	20 (4.2)	**<0.001**
PPTWs	93 (9.9)	39 (12.9)	23 (7.3)	31 (9.5)		47 (10.7)	46 (9.2)		35 (7.5)	58 (12.1)	
PPPWs	825 (87.6)	252 (83.4)	289 (91.7)	284 (87.4)		383 (87.2)	441 (87.8)		425 (91.6)	400 (83.7)	
The opinions on PP:											
Do plain packages may help to prevent smoking start?											
Yes	550 (52.0)	205 (59.6)	148 (42.8)	197 (53.5)	**<0.001**	263 (53.0)	287 (51.7)	0.417	251 (49.2)	299 (54.6)	0.199
No	398 (37.6)	107 (31.1)	157 (45.4)	134 (36.4)		177 (35.7)	220 (39.2)		205 (40.2)	193 (35.2)	
Don't know	110 (10.4)	32 (9.3)	41 (11.8)	37 (10.1)		56 (11.3)	54 (9.6)		54 (10.6)	56 (10.2)	
Do plain packages may help to quit smoking?											
Yes	363 (34.4)	143 (41.4)	86 (25.0)	134 (36.6)	**<0.001**	175 (35.3)	188 (33.7)	0.175	150 (29.4)	213 (39.1)	**0.002**
No	557 (52.8)	158 (45.8)	210 (61.0)	189 (51.6)		249 (50.2)	307 (55.0)		284 (55.7)	273 (50.1)	
don't know	135 (12.8)	44 (12.8)	48 (14.0)	43 (11.7)		72 (14.5)	63 (11.3)		76 (14.9)	59 (10.8)	
If there were been just plain packages would you have started smoking?[b]											
Yes	343 (61.0)	[c]	201 (61.7)	142 (60.2)	**0.006**	182 (61.1)	162 (61.1)	0.997	168 (63.6)	177 (59.0)	**<0.001**
No	92 (16.4)	[c]	41 (12.6)	51 (21.6)		49 (16.4)	43 (16.2)		19 (7.2)	73 (24.3)	
Don't know	127 (22.6)	[c]	84 (25.8)	43 (18.2)		67 (22.5)	60 (22.6)		77 (29.2)	50 (16.7)	

[a] P-value of χ^2 test.
[b] Question only for smokers and ex-smokers.
[c] No observations.

Table 3 – Multinomial logit model to assess the role of demographic characteristics and smoking attitude on the perceived impact of different packaging (classic, PPTWs, PPPWs).

Variables		Which is the most effective in (own opinion):											
		Preventing start smoking				Motivating to quit				Reducing consumption			
		PPTWs[a]		PPPWs[a]		PPTWs[a]		PPPWs[a]		PPTWs[a]		PPPWs[a]	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age	≤40 years	2.35	0.61–9.13	**4.60**	**1.29–16.4**	2.81	0.88–9.03	**4.95**	**1.66–14.79**	1.09	0.31–3.82	1.18	0.36–3.80
	>40 years	1		1		1		1		1		1	
Gender	Males	1.49	0.49–4.52	1.69	0.61–4.68	1.75	0.69–4.45	1.42	0.60–3.34	2.51	0.50–12.66	**5.11**	**1.10–23.88**
	Female	1		1		1		1		1		1	
Smoking habits	Ex	0.44	0.13–1.54	1.10	0.36–3.39	0.91	0.33–2.46	1.45	0.59–3.55	1.16	0.28–4.86	1.66	0.43–6.40
	Current	0.60	0.15–2.43	1.40	0.39–5.06	1.92	0.48–7.67	3.64	0.99–13.29	0.47	0.09–2.33	1.60	0.37–6.83
	Never	1		1		1		1		1		1	
−2 Log likelihood intercept only		97.60				112.04				119.88			
−2 Log likelihood final		68.72				83.73				90.29			
Log Likelihood Ratio Test (P)		28.88 (<0.001)				28.31 (<0.001)				29.59 (<0.001)			
McFadden R^2		0.045				0.041				0.036			

[a] Reference: current Italian packaging.

by each group after stratification for smoking habits, gender and age. In addition it should be noted that the warning on the teeth (pictograms number 5) seems to be taken into consideration especially by females, youngers and ex-smokers (10.5%, 11.4% and 13%, respectively).

Discussion

This study aimed to measure the expected effect that plain packaging with textual or pictorial warnings could have on tobacco products.

The use of PP seems to be effective in communicating the harmful effects of smoking, but certainly the use of pictograms seems to be so much more.

Hammond et al.,[5] comparing text and pictorial warnings, found that packs bearing pictorial warnings were less likely to be appealing and less likely to trigger false health beliefs compared with packs with text warnings.

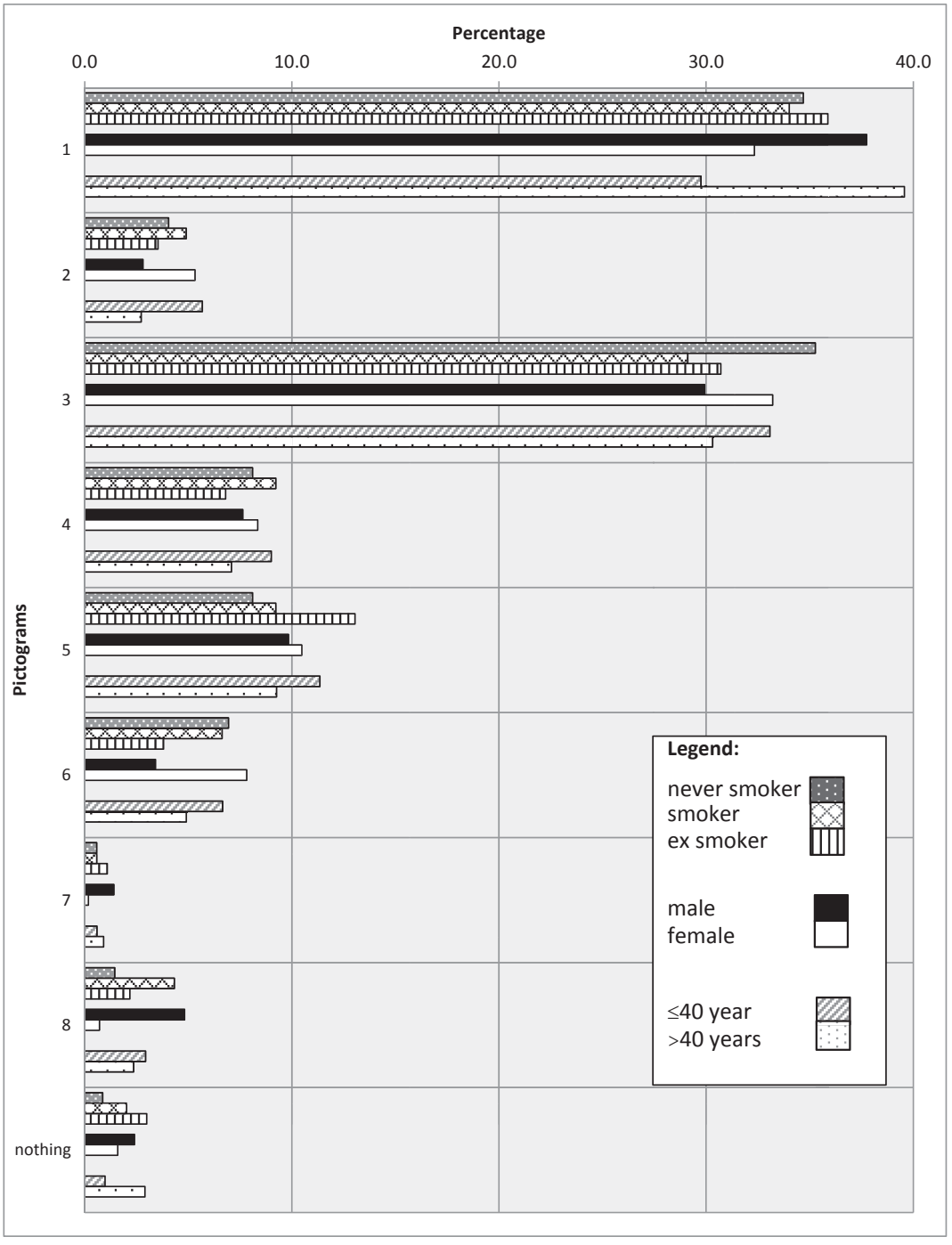
This study highlighted that the current packaging sold and PPTWs did not function differently across demographic groups; while overwhelming results have emerged both with respect to different categories of smoking and age classes regarding to the PPPWs, they are perceived without doubts, by the sample, as the most effective for the prevention of beginning smoking, reducing consumption and cessation of the habit, according to the literature.[8,15]

Some studies suggest that pictorial warnings are effective especially for women while they have a little impact on men,[7,16] according to our findings, however both genders identified PPPWs as the most effective label in preventing and motivating to quit tobacco consumption. According with results of the pilot study, pictograms with gangrenes and lung cancers are confirmed elicit strong emotional reactions and seem to be the most effective images for supporting the three outcomes investigated (quit, no start and reduce the consumption).[12]

The present study has some limitations. First of all, the measurement of the effect is based on the perception of the responders: perception of willing to stop smoking, to change habits, or do not start. Furthermore, many aspects besides those investigated sociodemographic (age, gender) may contribute on the impact of certain types of warnings, for example: smoking family, professional activity, comorbidities, body max index, diet, physical activity, etc.

Despite these limitations, the study sample size can be considered a good starting point to draw some preliminary considerations.

In accordance with the international literature the findings suggest that the Governments of the Countries that don't use pictorial health warnings should introduce them.[5] Moreover the PP with textual message has not a strong impact to fight the tobacco consumption. We recommend that the policy-makers of the countries where the warnings on tobacco product are still text based, as in Italy, consider the idea to introduce pictograms and to increase the effectiveness by standardizing the appearance of the packages with the PP.



Graph 1 – Graph bar of the percentage distributions of the more effective pictograms (see Fig. 2) to communicate the smoking related health damages, stratifying by smoking habits, gender and age groups.

Author statements

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Ethical approval

We asked for the approval of the local ethical committee and we obtained it from the Ethical committee of the Teaching Hospital Umberto I of Rome (Protocol number 586/11 [rif. 2201 7/2011]).

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Competing interests

There are no competing interests.

Contributorship statement

AM conceptualized and design the study and collected data, analysed data and drafted the paper. GLT conceived the idea for the study and made substantial contributions to interpretation of data. EDV and RS contribute to study planning. VC and DM contributed to data collection and data analysis. MRG, FG, GM, contribute to data collection and significant revision of the draft. NN, GV, EL, GB made substantial contributions to acquisition of data. RS, TA and AV participated in collecting data. All authors gave final approval of the version to be published.

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