

RESEARCH PAPER



## What is the most useful tool in HPV vaccine promotion? Results from an experimental study

Maria Rosaria Gualano, Robin Thomas, Michela Stillo, Maria Valentina Mussa, Francesca Quattrocchio, Alberto Borraccino, and Carla Zotti

Department of Public Health, University of Torino, Torino, Italy

### ABSTRACT

**Introduction:** Human papillomavirus infection (HPV) affects 70–80% of female population throughout the lifetime, exposing them to the risk of developing genital warts and cervical cancer. Despite these correlated risks and the demonstrated efficacy of the vaccine, coverage rates for two-three doses are around 70% in Italy and 67% in Piemonte (below the expected 95%). Aim of the study is to investigate whether this situation is due to a lack of information and awareness among young adults.

**Results:** Students showed increased knowledge after the intervention and more than 90% found the 3 informative materials as sources of useful information. After the intervention students would strongly recommend HPV vaccination (OR = 3.45;  $p < 0.001$ ).

**Discussion:** Higher rates of correct answers after the distribution of informative material underline the importance of knowledge delivery. Differences among the kind of material were reported; it appears that a combination of leaflet's positive features, such as clarity and intelligibility, and article's completeness of information represents the best solution to reach communication goals in vaccination campaigns targeted on educated populations.

**Methods:** Researchers conducted an experimental study on a large population of undergraduate students from University of Turin. Participants' knowledge about HPV was assessed with questionnaires before and after the examination of 3 different kinds of informative material (journal article describing HPV infection, gynecologist video-interview and institutional leaflet about HPV prevention) on HPV and vaccine. Differences among groups were explored by using univariate tests, differences in pre- post-knowledge were assessed with McNemar tests. Relevant associations were searched with logistic regression models.

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### Introduction

Human papillomavirus infection (HPV) is the most common sexually transmitted infection (STI), affecting around 70–80% of the female population throughout lifetime.<sup>1</sup> There are more than 100 different genotypes of the virus; of these, around 40 are responsible of both low-risk and high-risk genital HPV infections (including warts); in this group we can find both “high risk” genotypes, as HPV16 and HPV18, that cause 70% of cervical cancer reported cases, and “low risk” genotypes, like HPV6 and HPV11, responsible of 90% of genital warts cases. HPV vaccine was firstly licensed in the United States (US) and then in the European Union (EU) in 2006,<sup>2,3</sup> while in Italy the vaccine was introduced in 2007. Although, since the beginning of the vaccination campaign, the acceptance rate has been lower than expected, despite the demonstrated safety and reliability of the vaccine;<sup>4</sup> nowadays, the vaccination coverage for two-three doses is around 70% in Italy and 67% in Piemonte Region, versus an expected coverage of 95%.<sup>5–8</sup> This mediocre result could mainly be related to a general lack of information.<sup>9,10</sup> In fact, currently, the attention should be focused on the development of suitable communication strategies, involving both healthcare

professionals and citizens, in order to spread the most correct hints about the efficacy and safety of immunization tools.<sup>11</sup>

Currently, a number of different communication strategies concerning primary prevention and particularly vaccination can be found on internet web-sites, online forums and blogs, mass-reaching broadcast media advertising (television and radio programs), print-based materials, audiovisual materials, and the newest multimedia initiatives.<sup>12</sup> As reported,<sup>13</sup> these methods are also used in HPV vaccination campaigns. However, considering that the results are still unsatisfying at this date, it may be advisable to strengthen the development and promote the use of new instruments, such as information technology devices (audio, video, computer-based and mixed).<sup>14</sup> Therefore, some authors have studied the impact of paper<sup>15</sup> and video<sup>16</sup> information materials on the improvement of audience's knowledge, whereas Krawczyk and colleagues<sup>17</sup> showed that both paper and video materials can lead to a statistically significant increase of knowledge when compared to a control group. Moreover, the study by Kelly and colleagues demonstrated that general population's knowledge about the vaccine, proportionally increases with the exposure to scientific

articles and to television reports about HPV.<sup>18</sup> Furthermore, it is known that when topics like carcinogenicity of the virus and the free offer of a vaccine intervention are treated in media campaigns, the acceptance rate of the vaccination grows.<sup>19,20</sup>

Although, at the same moment, these new channels of information and their easy accessibility may also represent a vehicle for the spread of misleading information, which is usually delivered by anti-vaccination movements and that can often lead to harmful consequences for the whole population<sup>12,21,22</sup>

The present study aims to compare three different informative materials in order to assess which one is the most effective in increasing the awareness about the importance of immunization against HPV in a sample of university students.

## Results

### Characteristics of the sample

Since none of the students refused to take part to the research, the response rate was 100%.

Of the 565 participants who answered to the questionnaire, 437 were females (77.3%), with a mean age of 22.3 years (SD  $\pm$  3.74). The large majority of participants (93%) was born in Italy. Of the female sample, 58.8% was vaccinated for HPV. 418 (74%) participants were Nursing students (163 attending first year course, 150 second year, 105 third year), 88 (15.6%) participants were Education sciences students (67 attending second year, 18 third year) and 57 (10.5%) participants were Engineering students (attending first year course).

After the randomization process, the groups were divided in the following way: 187 students (33.1%) read the newspaper article, 194 (34.3%) examined the leaflet and 184 (32.6%) watched the video. Sample characteristics are reported in Table S1 (included in supplementary material).

### Assessment of sample knowledge

The first questionnaire outlined a good general knowledge regarding certain topics, such as sexual intercourse as way of transmission of HPV infection, the existence of a correlation between the virus infection and the presence of cervical cancer, the use of preventive screening and of methods of contraception even after vaccination. Although, the initial knowledge appears to be reduced when referring to other topics, such as HPV as

cause of genital warts, the existence of positive results of vaccine experiments, reduced incidence of vaccine's side effects and the duration of immunity (Table 1).

After the students received and viewed the informative material, the number of correct answers improved significantly, with peaks close to 100% for each group of students and received material; however, some exceptions are present (Table 1).

Figure 1 graphically displays the most significant knowledge improvements to some specific questions and the main differences occurring among the 3 different groups' percentages of improved correct answers.

For what concerns the question about the association between HPV infection and presence of genital warts, it is possible to observe that 14% of the students enrolled in the video group (V), 20% of those in the leaflet group (F) and 12% of the subjects in the article group (A) answered correctly during the first questionnaire. The percentages of correct answers at the same question rose to 65% for V group, 24% for F group and 82% for A group during the second questionnaire (after receiving and viewing the informative material); the differences between the percentages of correct answers pre- and post- distribution of informative material are statistically significant for the video and the article groups ( $p < 0.001$  McNemar test) but not for the leaflet one ( $p = 0.12$ ).

The percentages of correct answers to the question about the presence of experiments with satisfactory results at pre-questionnaire were: 25% video group, 16% leaflet and 15% article. After the material distribution the percentages changed as follows: 31% V, 19% F and 77% A. The differences between pre- and post-distribution correct answers percentages are statistically significant for the article ( $p < 0.001$  McNemar test) and the video groups ( $p = 0.03$  McNemar test), but not for the leaflet one ( $p = 0.25$  McNemar test).

The percentages of correct answers to the question "The vaccine can cause severe side effects" at pre-intervention were: 15% V, 20% F and 7% A. After the distribution of informative material among the three different groups the percentages changed to: 30% V, 74% F and 71% A. The difference between pre- and post-distribution correct answers percentages is statistically significant for all three groups ( $p < 0.001$  McNemar test).

All the results are resumed in Table 2.

**Table 1.** Percentages of correct answers pre-intervention.

	Pre-intervention			Post-intervention		
	Article	Leaflet	Video	Article	Leaflet	Video
a) HPV infection is rare	48%	50%	46%	81%	92%	92%
b) HPV infection is transmitted through sexual intercourses	79%	78%	77%	97%	100%	100%
c) HPV infection can cause cervical cancer	94%	78%	83%	97%	90%	100%
d) Genital warts are caused by HPV	12%	20%	14%	82%	24%	65%
e) Men cannot be infected with HPV	56%	55%	53%	79%	79%	78%
f) It is sufficient to use condom to avoid infection	32%	33%	32%	80%	74%	92%
g) After vaccination the use of condom can be reduced	79%	84%	81%	95%	89%	92%
h) Vaccine allows to avoid further Pap-tests in the future (screening)	73%	79%	68%	98%	100%	96%
i) A person may be infected with HPV and not be aware of it	71%	73%	70%	98%	94%	96%
j) Experiments gave satisfactory results	15%	16%	25%	77%	19%	31%
k) The vaccine provides a permanent immunity	26%	28%	29%	71%	57%	56%
l) The vaccine can cause severe side effects	7%	20%	15%	71%	74%	30%
m) HPV-related diseases are treatable/curable	46%	53%	46%	88%	68%	70%

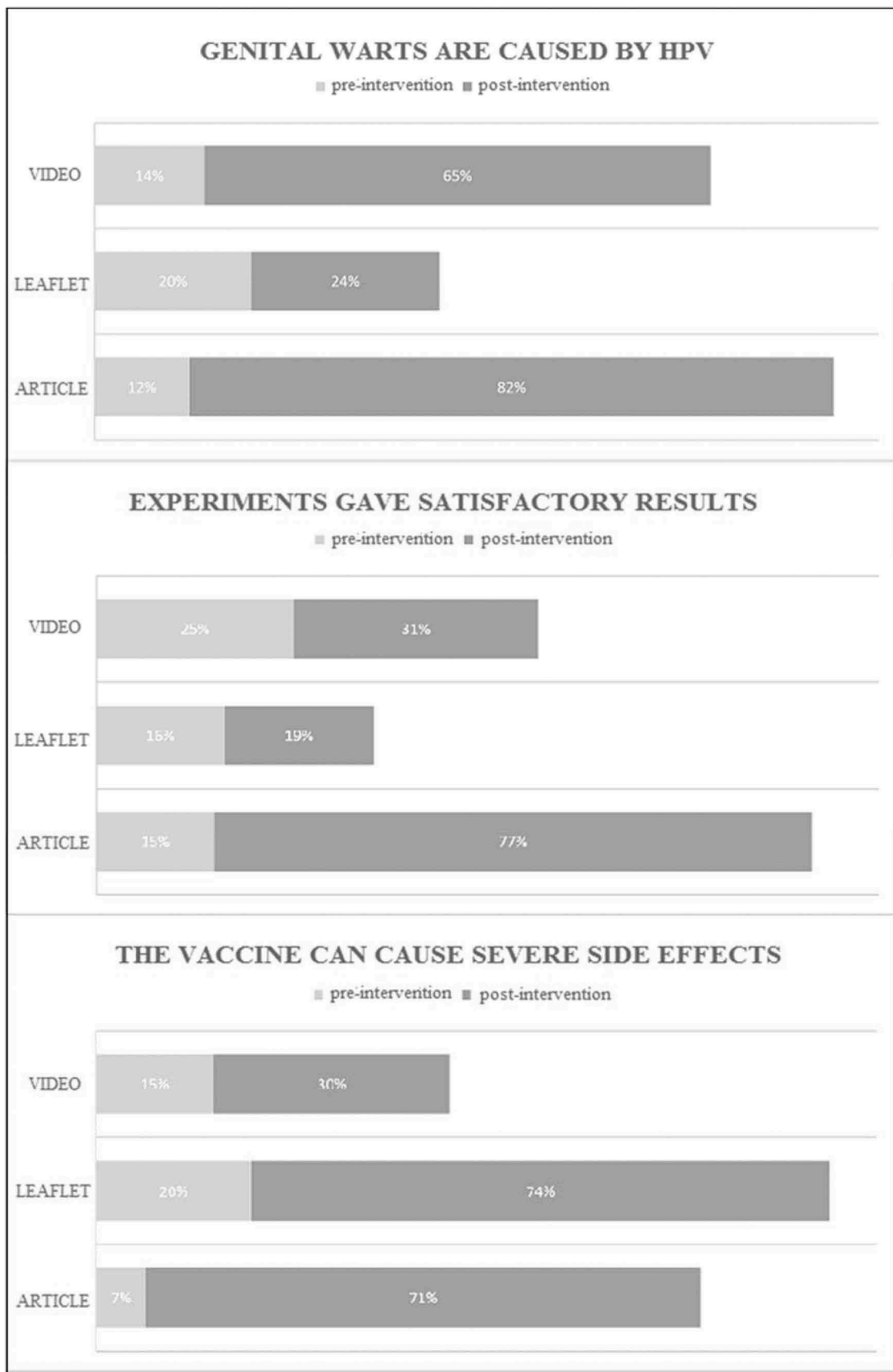


Figure 1. Differences among the percentages of correct answers pre- and post- intervention to three questions in the three different groups.

**Table 2.** Differences among the percentages of correct answers pre- and post- intervention to three questions in the three different groups.

	Material	Pre questionnaire (%)	Post questionnaire (%)	Difference (%)	p value*
Genital warts are caused by HPV	Article	12%	82%	+70%	p < 0.001
	Leaflet	20%	24%	+4%	P = 0.12
	Video	14%	65%	+51%	p < 0.001
Experimentations gave satisfactory results	Article	15%	77%	+62%	p < 0.001
	Leaflet	16%	19%	+3%	p = 0.25
	Video	25%	31%	+6%	p = 0.03
The vaccine can cause severe side effects	Article	7%	71%	+64%	<0.001
	Leaflet	20%	74%	+53%	<0.001
	Video	15%	30%	+15%	<0.001

\*McNemar test

### Opinions about material

After the consultation of the material we first asked to the students of each group what feelings the material spread to them; globally all the materials caused interest (A 69%, F 70%, V 75%), and about 50% of the students of each group declared that the materials increased their curiosity about the topic (A 44%, F 41.7%, V 39%). The video showed the worst results in terms of reported negative feelings (7.6%) and anxiety (15.2%). On the other hand, a feeling of relief was referred by 11.3% of the students who read the leaflet, by 7.5% of the students who received the newspaper article and by 0.5% of the students who watched the video. Complete results are reported in Table S2 (included in supplementary material).

In addition, we asked the students what they thought about the material in terms of quality of information, clarity, contents, understandability and quality of the used terms (Table 3). Statistically significant results suggest that the students found that the information was clear (A 90.8%, F 91.2%, V 82%; p = 0.041) and understandable (A 92.5%, F 97.4%, V 94.6%; p < 0.001). The best opinion results to the questions “Did the material include all the needed information?” “Did the material clarify my doubts about the topic?” and “Could the acquired information help me for personal choices?” were performed by the article, with statistically significant differences (Table 3). Finally, we asked if the technical terms included in the informative materials were also adequately explained, and the leaflet with 96.9% of affirmative answers obtained the higher result (A 86.6%, V 86.9%; p < 0.001).

The following step consisted of few questions asking the students if, in their opinion, further information should be included in the material, and, if so, to specify what kind of information; the students who answered “yes” were 23.5% for the newspaper article, 53.1% for the leaflet and 45.6% for the video. The topics that students from all groups would have preferred to more in-depth explore were risks and side effects of the vaccine, vaccination in male subjects, vaccination in older females with an active sex life and vaccination’s costs; in

**Table 3.** Answers to the question “In the material I found that” (%) in the three different groups.

	Article	Leaflet	Video	p-value
Precise and unambiguous information	90.9%	91.2%	82%	<b>0.041</b>
Clear information	92.5%	97.4%	94.6%	0.292
It contains all the necessary information	81.2%	53%	57%	<b>&lt;0.001</b>
Clarified my doubts	83.4%	71.6%	75%	<b>0.048</b>
Technical terms are understandable	86.6%	96.9%	86.9%	<b>0.001</b>
The information are useful to drive personal choices	92.5%	82.5%	86.9%	<b>0.018</b>

addition, the sample who received the leaflet also asked for more information about vaccine’s efficacy and safety data.

After this passage, the students had to give their overall utility evaluation of the informative tools, assigning a mark which ranged from 1 to 10 (1 was for “without utility” 10 was for “very useful”): the article scored 8.05 (SD ± 1.2), the leaflet 7.65 (SD ± 1.3) and the video 7.77 (SD ± 1.4). As already explained in the methods section, based on this last question about utility, we decided to dichotomize the results in “useful” if the vote was ≥8 and not useful if the vote was ≤7 (according to the average score of the answers). Finally, we performed a logistic regression to evaluate the impact of other factors on this answer (Table 4). Interestingly, this analysis shows how students who saw the video interview found their informative tools more useful than the students who received the other two materials (OR = 1.82, 95% CI: 1.12–2.95). Moreover, the students who were intended to recommend the HPV vaccination found materials more useful than the other students who would not recommend it (OR = 3.45, 95% CI: 2.04–5.84).

Gender, age and university course did not influence the perception of materials’ usefulness.

### Discussion

Overall, the sample showed a discrete knowledge about HPV infection and its related diseases. The higher rate of correct answers after the distribution of the informative material underlines the importance of information delivery in achieving better knowledge of the topic. In particular, three main themes appear to be worth of major focus and in-depth discussions when referring to information-delivery to young adults: HPV and genital warts, positive results from vaccine experiments and vaccine’s side effects. The differences

**Table 4.** Multivariate results on usefulness of materials.

	“Was the material useful?”			
		OR	95%CI	p-value
Gender	Female	1	-	-
	Male	1.33	(0.75–2.35)	0.33
Age <sup>a</sup>		0.95	(0.79–1.13)	0.55
University course	Nurse	1	-	-
	Education science	1.16	(0.60–2.01)	0.60
Would you recommend HPV vaccination	Engineering	0.60	(0.28–1.27)	0.18
	<b>Yes</b>	<b>3.45</b>	<b>(2.04–5.84)</b>	<b>&lt;0.001</b>
Type of informative material	No	-	-	-
	Leaflet	1	-	-
	Article	1.57	(0.98–2.51)	0.06
	<b>Video</b>	<b>1.82</b>	<b>(1.12–2.95)</b>	<b>0.02</b>

<sup>a</sup> “Age” is considered as continuous variable

between correct answers at pre- and post-informative questionnaires showed a significant lack of knowledge concerning these three issues.

Moreover, our analysis shows that the type and the composition of informative material in medical topics can differently motivate positive or negative feelings in a target population. Globally, all the materials examined obtained good judgment, and at the same time feelings like interest (all the materials have percentage nearby 70%) and curiosity (all materials valued around 40%) achieved great results, whereas negative feelings and anxiety were observed in fewer answers, respectively less than 10% and 15% (Table S2). However, some differences were already pointed out by previous papers, such as the preferences for brief written materials and webpages, which are worth of experts consideration for future information campaigns<sup>23,24</sup> that should also be tailored for each country and its most operational channels of communication.<sup>25</sup>

The main differences outlined by this paper start from the results concerning acquired knowledge of the topic: while the newspaper article represents the source of information more related to a gain of correct answers at the second questionnaire, the leaflet displayed lack of information, especially regarding the experiments results and the vaccine's reliability questions.

In addition, the leaflet seems to reach the best results in terms of comprehensibility and simple use of technical terms, but, at the same time, it scored the worst results in terms of completeness and need for more information, especially about efficacy and safety. In fact, more than 50% of the sample required additional information regarding possible side effects of vaccination, HPV infection symptoms and therapy, HPV transmission and prevention and the male role in vaccination programmes. The videotape collected the worst results, causing the lowest percentages of students feeling relief and also the highest rates of anxiety/concern among the three groups. Nevertheless, it appears to be better than the leaflet in terms of comprehensibility and completeness of information; such discrepancies among these two different kinds of material are probably explained by the presence of diverse emotional components, which might influence the approach to the topic through the video material. Moreover, the anxiety results could be attributed to the authority and strength with which the gynecologist explained HPV infection risks. These problems could be avoided using a more direct communication between common population and healthcare operators. In fact, it is demonstrated that the use of open questions incorporating psychological assessment, demonstrating empathy, discretion and politeness, are keys for a strong doctor-patient relationship,<sup>12,26</sup> and are essential for behavioral changes. However, other studies comparing this kind of informative method with others are needed, in order to better understand its effectiveness.

Finally, most of the students found the materials useful for personal choices and this result seems to be uninfluenced by confounders and suggests that health interventions could actually modify behaviors; for this reason it would be an appropriate choice to design better structured interventions that could also meet the need of more understandable health information.

## Limitations

Limitations of the study are the use of convenience sampling, the peer influence of opinions within classmates and the impossibility to check the reliability of the answers. Furthermore, the survey was conducted on a sample of university students with high education level and for this reason results could be different in other contexts.

Finally, another point of weakness of this study is the lack of a long-term assessment about the intention of the sample to get vaccinated.

## Conclusion

After our evaluation, it appears that an informative tool that can combine the leaflet's positive features, such as clarity, use of simple terms and intelligibility, with the newspaper article's completeness of information, could represent the best solution to reach relevant communication goals in vaccination campaigns. These results are valid especially for our target; in fact, university students are used to read complex information, and, for this reason, the newspaper article allows the students to spend higher focus on the content's information and more time to think about the treated issues, rather than the video or the leaflet. Furthermore, the results show a need for information concerning health arguments that must be considered by health operators, who need to better deal with communication strategies, using up-to-date methods and, at the same time, they must not underestimate the importance of face-to-face counselling between doctors and patients.

## Methods

### Population

Between February and June 2015 an experimental study was conducted by recruiting 565 undergraduate students attending different degree courses (nursing, engineering and professional education) at the University of Turin (Italy). All students present in classrooms during the days of the survey (which were different for the 3 courses) were considered eligible and decided to participate, therefore the response rate is based on this total number of students ( $n = 565, 100\%$ ). Two trained medical doctors attending the School of Public Health at the University of Torino administered questionnaires to students during regular class sections. Participation was voluntary, anonymous and without compensation. The study was approved by the Institutional Ethical Review Board of the Department of Public Health of University of Torino. The returning of the completed survey was accepted after the participants filled out a written consent form.

### The questionnaire

An ad hoc questionnaire, based on literature,<sup>27-29</sup> was realized. It was composed by 2 different sections administered in two different moments:

- The first one was comprised of 23 open and closed-ended questions, which investigated the sociodemographic

characteristics of the sample, current knowledge and attitudes towards HPV vaccination. This section was compiled by the students before the examination of the informative materials described in the following paragraph;

- The second one contains 27 open and closed-ended questions; a number of these were the same of the first section, assessing knowledge about HPV, while other questions were different from the first section, and explored the effects of the three different tools of information in terms of attitudes and behavior towards HPV vaccination. As these questions wanted to investigate the materials' characteristics and possible effects on students' HPV knowledge and feelings, the second section was compiled after the examination of the informative material.

### Randomization

After the administration of the first part of the questionnaire, each student was randomly assigned to one of the three groups. The randomization was made with a blind draw performed by one of the students of each classroom. The main objective of the randomization was to obtain an even sample size among the three different groups. The students, once divided, had the chance to examine the 3 different materials in 3 different classrooms. The video was projected in one of these classrooms.

The procedure is described in Figure 2.

### The informative materials

The three groups differed because of the kind of informative materials they had to examine before answering to the second section of the questionnaire. These materials were:

- (1) *Leaflet and invitation letter* (F) sent by Piemonte Region (as stated by Piemonte Region in the DGR n° 8–8167 (11/2/2008) to each Local Health Unit, which reached girls

aged 11–12 years with the purpose of inviting them to the vaccination center and providing basic information about HPV infection and vaccination.

- (2) *Newspaper article* (A), selected from one of the most commonly read Italian newspapers (*Corriere della sera*, [www.corriere.it](http://www.corriere.it)) heading: “HPV vaccine, the answers to parent’s most frequent questions”, concerning both the aspects of prevention and therapy of virus infection.
- (3) *Video interview* (V) with a gynecologist expert in HPV, focused on social and medical aspects of the HPV infection.

All the materials contain similar information regarding HPV prevention and vaccine characteristics. Each group had 20 minutes to view the material in the classroom; hereafter they filled in the second part of the questionnaire.

The students, once divided according to the draw, had the chance to examine the 3 different materials in 3 different classrooms. The video was projected in one of these classrooms.

### Opinions about materials

After the consultation of the material we also asked to the students of each group what feelings the material spread to them, in order to assess if the more instinctive reactions to the informative materials were positive or negative. Since this aspect may be analyzed as a proxy indicator of the quality of the information included in the material, we subsequently asked the students to also evaluate the clarity of information, the presence of understandable technical terms and the completeness of the delivered information.

### Statistical analysis

Firstly, a descriptive analysis of the sample was conducted, considering the distribution of gender, age, degree course and year of

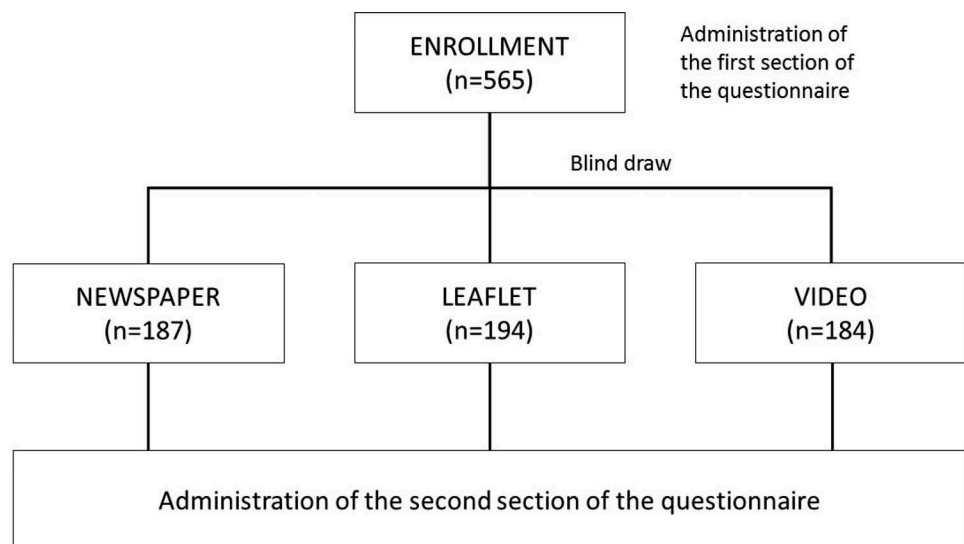


Figure 2. Randomization of the enrolled population.

course. Results were expressed in frequencies and percentages for dichotomous variables and mean with standard deviation (SD) for continuous variables. Differences among groups were explored using Chi Square tests. McNemar tests were also performed, in order to compare differences of percentages of the correct answers before and after the administration of the informative materials. Regarding the outcome based on the question about the utility of the 3 different informative materials, we examined the average score deriving from the answers and decided to dichotomize the results in “useful” if the vote was  $\geq 8$  and “not useful” if the vote was  $\leq 7$ . Logistic regression models were performed in order to obtain adjusted measures of association (Odds Ratios with the respective 95% Confidence Intervals). Results with a p-value below the threshold of 0.05 were considered statistically significant. The results were analyzed using the statistical software StataMP13 (Stata Corp., College Station, TX, 2013).

### Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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### References

- Organization WH. Guidelines to assure the quality, safety, and efficacy of recombinant human papillomavirus virus-like particle vaccines executive summary; 2006 [accessed 2018 Jul 18]. [http://www.who.int/immunization/sage/ECBSSummary\\_HPVP\\_vaccineGuidelines.pdf](http://www.who.int/immunization/sage/ECBSSummary_HPVP_vaccineGuidelines.pdf).
- Gold R, Naleway AL, Jenkins LL, Riedlinger KK, Kurosky SK, Nystrom RJ, Kurilo MB. Completion and timing of the three-dose human papillomavirus vaccine series among adolescents attending school-based health centers in Oregon. *Prev Med (Baltim)* [Internet]. 2011 Jun;52(6):456–458. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/21539853>.
- Speck LM, Tyring SK. Vaccines for the prevention of human papillomavirus infections. *Skin Therapy Lett* [Internet]. 2006;11(6):1–3. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/16912836>.
- Stillo M, Carrillo santistev P, Lopalco PL. Safety of human papillomavirus vaccines: a review. *Expert Opin Drug Saf* [Internet]. 2015 May;14(5):697–712. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/25689872>.
- Giambi C Stato di avanzamento della campagna vaccinale per l'HPV: dati di copertura vaccinale al 31/ 12/2014-Rapportosemestrale [Internet]. [accessed 2018 Jul 18]. [http://www.epicentro.iss.it/problemi/hpv/pdf/Aggiornamento\\_HPVP\\_31122014.pdf](http://www.epicentro.iss.it/problemi/hpv/pdf/Aggiornamento_HPVP_31122014.pdf).
- Liddon N, Hood J, Wynn BA, Markowitz LE. Acceptability of human papillomavirus vaccine for males: a review of the literature. *J Adolesc Heal* [Internet]. 2010 Feb;46(2):113–123. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/20113917>.
- Zimet GD, Weiss TW, Rosenthal SL, Good MB, Vichnin MD. Reasons for non-vaccination against HPV and future vaccination intentions among 19–26 year-old women. *BMC Womens Health* [Internet]. 2010 Dec 1;10(1):27. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/20809965>.
- Black LL, Zimet GD, Short MB, Sturm L, Rosenthal SL. Literature review of human papillomavirus vaccine acceptability among women over 26 years. *Vaccine* [Internet]. 2009 Mar 10;27(11):1668–1673. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/19195491>.
- Anhang R, Stryker JE, Wright TC, Goldie SJ. News media coverage of human papillomavirus. *Cancer* [Internet]. 2004 Jan 15;100(2):308–314. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/14716765>.
- Gualano MR, Bert F, Mannocci A, La Torre G, Zeppego P, Siliquini R. Consumption of antidepressants in Italy: recent trends and their significance for public health. *Psychiatr Serv* [Internet]. 2014 Oct;65(10):1226–1231. [accessed 2017 Jul 7]. <http://www.ncbi.nlm.nih.gov/pubmed/24981856>.
- Tafari S, Gallone MS, Gallone MF, Zorico I, Aiello V, Germinario C. Communication about vaccinations in Italian websites. *Hum Vaccin Immunother* [Internet]. 2014 May 8;10(5):1416–1420. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/24607988>.
- Tafari S, Gallone MS, Cappelli MG, Martinelli D, Prato R, Germinario C. Addressing the anti-vaccination movement and the role of HCWs. *Vaccine* [Internet]. 2014 Aug 27;32(38):4860–4865. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/24262311>.
- Marcus BH, Owen N, Forsyth LH, Cavill NA, Fridinger F. Physical activity interventions using mass media, print media, and information technology. *Am J Prev Med* [Internet]. 1998 Nov;15(4):362–378. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/9838978>.
- Lambert EC. College students' knowledge of human papillomavirus and effectiveness of a brief educational intervention. *J Am Board Fam Pract* [Internet]. 14(3):178–183. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/11355049>.
- Schreiber BE, Fukuta J, Gordon F. Live lecture versus video podcast in undergraduate medical education: A randomised controlled trial. *BMC Med Educ* [Internet]. 2010 Dec 8;10(1):68. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/20932302>.
- Chapman E, Venkat P, Ko E, Orezza JP, Del Carmen M, Garner EIO. Use of multimedia as an educational tool to improve human papillomavirus vaccine acceptability—A pilot study. *Gynecol Oncol* [Internet]. 2010 Aug 1;118(2):103–107. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/20457469>.
- Krawczyk A, Lau E, Perez S, Delisle V, Amsel R, Rosberger Z. How to inform: comparing written and video education interventions to increase human papillomavirus knowledge and vaccination intentions in young adults. *J Am Coll Heal* [Internet]. 2012 May;60(4):316–322. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/22559091>.
- Kelly BJ, Leader AE, Mittermaier DJ, Hornik RC, Cappella JN. The HPV vaccine and the media: how has the topic been covered and what are the effects on knowledge about the virus and cervical cancer? *Patient Educ Couns* [Internet]. 2009 Nov;77(2):308–313. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/19395221>.
- Leader AE, Weiner JL, Kelly BJ, Hornik RC, Cappella JN. Effects of information framing on human papillomavirus vaccination. *J Women's Heal* [Internet]. 2009 Feb;18(2):225–233. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/19183094>.
- Olshen E, Woods ER, Austin SB, Luskin M, Bauchner H. Parental acceptance of the human papillomavirus vaccine. *J Adolesc Heal* [Internet]. 2005 Sep;37(3):248–251. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/16109349>.
- Kata A. Anti-vaccine activists, Web 2.0, and the postmodern paradigm – an overview of tactics and tropes used online by the anti-vaccination movement. *Vaccine* [Internet]. 2012 May 28;30(25):3778–3789. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/22172504>.
- Kata A. A postmodern Pandora's box: anti-vaccination misinformation on the Internet. *Vaccine* [Internet]. 2010 Feb 17;28(7):1709–1716. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/20045099>.
- Gilkey MB, McRee A-L. Provider communication about HPV vaccination: A systematic review. *Hum Vaccin Immunother*

- [Internet]. 2016;12(6):1454–1468. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/26838681>.
24. McRee A-L, Gilkey MB, Dempsey AF. HPV vaccine hesitancy: findings from a statewide survey of health care providers. *J Pediatr Heal Care* [Internet]. 2014 Nov;28(6):541–549. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/25017939>.
  25. HPV vaccine communication. Special considerations for a unique vaccine: 2016 update. Geneva: World Health Organization; 2017 (WHO/IVB/17.02). Licence: CC BY-NC-SA 3.0 IGO. [Internet]. 2017 [accessed 2018 Jul 18]. <http://apps.who.int/iris/bitstream/handle/10665/250279/WHO-IVB-16.02-eng.pdf;jsessionid=B5CB69B3FD538F08C27B9E31401D39CD?sequence=1>.
  26. Booth K, Maguire P, Hillier VF. Measurement of communication skills in cancer care: myth or reality? *J Adv Nurs* [Internet]. 1999 Nov;30(5):1073–1079. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/10564406>.
  27. Signorelli C, Pasquarella C, Limina RM, Colzani E, Fanti M, Cielo A, Greco M, de' Somenzi CP, Chironna M, Quarto M. Third Italian national survey on knowledge, attitudes, and sexual behaviour in relation to HIV/AIDS risk and the role of health education campaigns. *Eur J Public Health* [Internet]. 2006 Oct 1;16(5):498–504. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/16524937>.
  28. Signorelli C, Odone A, Pezzetti F, Spagnoli F, Visciarelli S, Ferrari A, Camia P, Latini C, Ciorba V, Agodi A, et al. Human Papillomavirus infection and vaccination: knowledge and attitudes of Italian general practitioners. *Epidemiol Prev* [Internet]. 38(6 Suppl 2):88–92. [accessed 2018 Jul 18]. <http://www.ncbi.nlm.nih.gov/pubmed/25759351>.
  29. De Waure C, Mannocci A, Cadeddu C, Gualano MR, Chiaradia G, Vincitorio D, Di Stanislao F, De Vito E, Boccia A, Ricciardi W, et al. Knowledge, attitudes and behaviour about Sexually Transmitted Infections: a survey among Italian university female students. *Epidemiol Biostat Public Heal* [Internet]. 2015 Jun 19;12(2). [accessed 2018 Jul 18]. <https://ebph.it/article/view/11112>.