

# An observational study of university students of healthcare area: knowledge, attitudes and behaviour towards vaccinations

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## Abstract

**Introduction.** Despite vaccines are the most successful public health interventions for prevention of infectious diseases “vaccine hesitancy” spreads today across the world. Despite attitudes of future generations of HCWs is fundamental, these aren’t much analysed in the literature. The aim of our research was a) to evaluate attitudes and behaviours reported towards vaccinations among a sample of university students in the health area, b) to know their vaccination status and intention to get vaccines and c) investigate their propensity to vaccinate (who and with which vaccines).

**Materials and methods.** we evaluated a sample of university students of the health area of University of Messina through an anonymous face to face questionnaires based on HProimmune survey appropriately modified, analysing presence of statistical difference between gender. All analyses were carried out using EPI INFO software.

**Results.** Our study showed a general lack of confidence and insecurity towards vaccination by future HCWs and absent perception of the risk of acquire a vaccine preventable disease as they also demonstrate low vaccination coverage in our sample. Their opinion about awareness of recommended vaccines for HCWs also was low, however, they thought that vaccinations should be a prerequisite for healthcare professionals to work in healthcare area. Also, we observed that 96% of respondents would recommend vaccinations to their patients, with a greater propensity of women.

**Conclusion.** the motivations of vaccine hesitancy are many and maybe other studies would help policymakers and stake-holders to shape programs to improve vaccination coverage among students and HCWs. *Clin Ter* 2019; 170(6):e448-453. doi:10.7417/CT.2019.2174

**Key words:** attitudes, future, HCWs, students, vaccinations, vaccines

## Introduction

Vaccines are the most successful public health interventions for the primary prevention of vaccine-preventable infectious diseases and since their introduction, they have

reduced morbidity and mortality proving to be a public health cost-effective measure. Despite this, one of the reasons of vaccine hesitancy is that they have been often perceiving as unsafe and unnecessary by the population (1-5). We must remember that vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence (6).

In fact, due to the success of this measure, most young people had not been knowing vaccine-preventable diseases and they could focus only on negative effects of immunization, such as adverse unexpected events (6,7).

So, it was therefore interesting to evaluate the vaccinations knowledge of young future HCWs, as they, in addition to parents and stakeholders, could be a strength in this practice. Young people, in fact, as such were more likely to overcome their doubts about vaccination than their parents (8). The benefits of vaccinations of HCWs were many: they reduced the risk of outbreaks in health care facilities, decreased staff illness and absenteeism and also reduced costs resulting from loss of productivity (9-12).

In literature many studies were available on knowledge, attitudes and behaviour towards vaccinations by parents and healthcare workers both only on one vaccine preventable disease or on many ones but few studies were present on young students (13-21).

In the Italian vaccine schedule was highlighted the importance both of the vaccination of adolescents and adults both for students of degree courses in the health area (for them are strongly recommended the same vaccinations indicated for healthcare workers such as anti-hepatitis B, anti-flu, anti-tetanus diphtheria pertussis and anti-measles-mumps- rubella and chickenpox)(22).

The aim of our research was a) to evaluate, attitudes and behaviours reported towards vaccinations among a sample of university students in the health area and b) to know their vaccination status and intention to get vaccines.

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## Materials and methods

We evaluated a sample of university nursing students of the health area of University of Messina through an anonymous face to face questionnaires based on HProimmune survey (cofounded by the Health Programme of the Europe Union). The survey was administered to all students (265) of Nursing Degree course of 19 to 29 years old of age first of the beginning of their lessons. The not responder were only the absent at the moment of the survey. We administered three times the survey in three different days in a period of three months (from March to May 2019). 73.96% of the investigated people joined the survey. No ethical committee approval was available because the study was not a clinical trial. After we obtained an individual informed consent, we investigated their attitudes, behaviours and knowledge towards vaccinations, vaccination status and intention to get recommended vaccines. In particular, the following items were asked to investigated people: convictions and opinions regarding vaccinations and about the need to be vaccinated, which vaccines they recommended and to which category of people (such as risk patients, other HCWs, relatives, children, older friends or to all people), which are recommended vaccinations for HCWs and their vaccination coverage and attitude to get vaccine in the next months.

Frequency distributions were prepared to summarize the results of all statistical variables provided by the 196 respondents. We evaluated statistical difference between male and female; only the dichotomic variable “agrees” or “not agrees” and “yes” or “not” was evaluated. The chi square test was used to detect any statistically significant correlations. Values of  $p < 0.05$  were considered statistically significant. All analyses were carried out using EPI INFO software.

## Results

A sample of 196 university students of the health area joined the survey, of these 39% were males and 61% females, with an age between 18 and 29 years. First, we investigated the opinions and attitudes to vaccination and the need to be vaccinated of the nursing students. 96% of those who answered the questionnaire were agree that vaccines are important for reducing or eliminating serious diseases, but despite this, a little percentage of respondents (12%) believe more in immunization acquired through illness and 31% are not sure. Generally the sample thought that vaccination were useful in certain situation, for example, in developing countries (4% unsure and 1% disagree). From analysis of the data we obtained a significant percentage (4% agreed and 17% uncertain) of young people who believe that vaccines were not effective and only 3% don't believe in the positive effect of vaccination (I don't believe in vaccinations. I think they do more harm than good) and 17% were unsure. Furthermore, we found “fear of side effects” in 29% of the sample while 34% is not sure about their opinion. Only 8% of respondents “believe that they are at risk of contracting an infectious disease” and 22% were not sure. Luckily only 1% were agree on non-necessity of vaccination for religious conviction. Surprisingly only 39% were not agree on possibility to contract any disease after vaccination.

As regard the necessity of vaccination in HCWs the high percentage of the sample were agree (90%) and also they thought that it is a duty of all HCWs (77%). Investigate items were reported in Table 1.

We evaluated statistical associations between sex and investigated items. Statistically significant differences are observed only in relation to claims related to “I believe more in the natural immunity acquired through disease than in vaccines” ( $\chi^2 = 9.8118$ ,  $p < 0.01$ ) and “I believe that vaccines of HCWs is their duty (they should be a model for their patient)” ( $\chi^2 = 4.06749$ ;  $p < 0.05$ ).

Table 1. Convictions and opinions regarding vaccinations and about the need to be vaccinated.

	Disagree	Agree	Unsure	No answer	P value
“I believe that vaccines are important for reducing or eliminating serious diseases”	0%	96%	4%	0%	NS
“I think vaccines are useful in certain situations, for example, in developing countries”	1%	95%	4%	0%	NS
“I believe more in natural immunity acquired through illness than in vaccines”	31%	12%	55%	2%	<0.01
“I don't believe in vaccinations: I think they do more harm than good”	80%	3%	17%	0%	NS
“I'm afraid of side effects”	37%	29%	34%	0%	NS
“My religious convictions are against vaccinations”	88%	1%	10%	1%	NS
I don't think I'm at risk of contracting any infectious disease	68%	8%	22%	2%	NS
“I'm afraid of getting sick after I get vaccinated”	39%	12%	48%	1%	NS
“I believe that vaccines are not effective”	78%	4%	17%	1%	NS
“I'm wary of the long-term effects by vaccines on health”	62%	21%	17%	0%	NS
“I believe that vaccinations are an indispensable requirement for working in the healthcare sector”	7%	90%	3%	0%	NS
“I believe that vaccines of HCWs is their duty (they should be a model for their patient)”	5%	77%	17%	1%	<0.05

NS: Not significative

### Attitude of physicians toward recommending vaccination to their patients

We analyzed the willingness to recommend the different vaccinations to their patients: from the analysis of our findings we observed that 96% of respondents would recommend vaccinations, 3% would not recommend them while 1% did not answer. In particular, 97% of females and 96% of males would recommend it especially hepatitis B or A, DTP or meningococcal vaccines. No statistical differences by sex were detected. The results were summarized in Table 2.

So, we analyzed the various recommended vaccinations by category of people, high risk patients, children, HCWs, etc... We observed that females would recommend vaccinations rather than males with statistical differences for two categories, HCWs ( $p<0.001$ ) and children ( $p<0.001$ ) but the males would recommend to all people too ( $p<0.05$ ).

### Knowledge about vaccination recommend for HCWs

In the next question we asked what were the vaccinations recommended for HCWs; the results were summarized into Table 3.

Table 2. Vaccines recommended \*and category of people ^

Recommended vaccinations	Males	Females	P value
Flu	21%	2%	NS
Chickenpox	0%	4%	NS
MMR	4%	21%	NS
Hepatitis B	79%	96%	NS
Hepatitis A	71%	66%	NS
Tdap or Td	18%	45%	NS
Pneumococcal vaccine	0%	9%	NS
Anti-meningococcal (tetraivalent) vaccine	21%	43%	NS
Anti-tuberculosis	7%	30%	NS
Category of people	Males	Females	
Risk patients	13%	15%	NS
HCWs	17%	42%	<0.001
Relatives	7%	11%	NS
Children	9%	46%	<0.001
Older	0%	31%	NA
Friends	4%	1%	NS
All	57%	40%	<0.05

\*Every person could express more preferences; we obtained a reply by 36 % (28/77) of males and 39% (47/119) of females. The percentages were calculated on the total of those who responded based on gender.

^ Every person could express more preferences; we obtained a reply by 70 % (54/77) of males and 68% (81/119) of females. The percentages were calculated on the total of those who responded based on gender.

NS: Not significative

Table 3. Recommended vaccinations for healthcare workers.

	Males			Females		
	Yes	No	Not sure	Yes	No	Not sure
Flu	38%	30%	32%	29%	39%	32%
Chickenpox	73%	21%	6%	54%	21%	24%
MMR	75%	18%	6%	83%	9%	8%
Hepatitis B	100%	0%	0%	89%	0%	11%
Hepatitis A	74%	19%	6%	48%	24%	28%
Tdap or Td	70%	12%	18%	61%	13%	24%
Pneumococcal vaccine	74%	6%	19%	75%	3%	22%
Anti-meningococcal (tetraivalent) vaccine	78%	3%	19%	86%	1%	13%
Anti-tuberculosis	82%	3%	16%	97%	0%	3%

Vaccination coverage in students and attitude to get vaccine

We evaluated then the percentage of vaccinated students and their intention to undergo vaccination in the following months if they aren't vaccinated (Table 4).

Statistical analysis of vaccination coverage in students between sex

We evaluated associations between sex and investigated vaccines. Statistically significant differences between "vaccinated" and "unvaccinated" were observed only for MMR ( $\chi^2 = 6.4585$ ;  $p < 0.05$ ) and hepatitis B ( $\chi^2 = 23.12178$ ;  $p < 0.001$ ).

## Discussion

Our study showed a general lack of confidence and insecurity towards vaccination by university students in the health care area such as described in literature also for other categories (7,23-26). In fact, despite most students were agree on importance of vaccine for reduction and elimination of serious diseases, 81% of the sample were unsure of the side effects or the real benefits of the vaccination and at the same time only 37% were not afraid of side effects and 34% were unsure. Furthermore, we must underline the data of absent perception of the risk of acquire a vaccine preventable disease, showing a potential role of this phenomena in vaccine hesitancy as indicated in literature by the SAGE working group and this could contribute to increase distrust and uncertainty about the usefulness of vaccines (7). In fact, in our sample we found low vaccination coverage for many vaccines required in HCWs despite we analysed young HCWs. In contrast, when we asked to the sample if vaccinations should or should not be a must or a prerequisite for healthcare professionals, most of the respondents were agree according to international literature (27,28). In fact, we must underline the importance of vaccination in this category because they should be an importance source of infection for many patients so much so that in Apulia, Emilia Romagna and Marche to work all HCWs must be vaccinated for hepatitis B, flu, pertussis and if they would work in some high risk wards the must be vaccinated for MMR and chickenpox (29-31).

Also, we evaluated the knowledge of the vaccinations recommended for healthcare professionals: so, we observed that, although hepatitis B vaccination is mandatory for all

born since 1979, it is considered necessary only by 93% of the sample, while 7% of the sample is hesitant (especially in female gender). Only 32% and respectively 65% of the sample would recommend flu and DT vaccination to HCWs. Awareness of recommended vaccines for HCWs in our sample was low and this reflects the international literature (32,33).

Also, we obtained a higher prevalence of positive attitude towards vaccination in health care workers in males with some exception (measles, mumps, rubella and anti-meningococcus) in which the females recommend more this public health measure (34).

We highlighted other important differences between sex, in part according to literature (35,36) by comparing recommended vaccinations and category of people to whom respondents recommended them: higher percentage were obtained in males only for some vaccine for example flu vaccination (21% of them against 2% of females) and hepatitis A and no one of males would recommend vaccination against chickenpox and pneumococcus (also among females we obtained low percentage of respectively 4% and 9%). As regard gender we obtained for recommending hepatitis B vaccination for other people that only 79% of males would recommend it compared to 96% of females. Moreover, while the female sex would recommend the vaccination to most of the investigated category, but especially to HCWs and children while males focus their attention to all population and didn't consider children and the elderly as primary targets.

We must remember the necessity to immunize some particular categories such as children, elderly, HCWs such as described by National immunization plan 2017-2019. Another important data that we underlined in our study is the low vaccination coverage for some diseases (i.e. for seasonal influenza, only 17% of males and 15% of females were vaccinated, for MMR 66% of females and 46% of males, for HBV only 47% of males against 73% of females) and the reluctance to get vaccinated in the future and so the lack of perception of the risk of contracting an infectious disease during the course of one's profession such as described elsewhere in scientific literature.

A limitation of our study is the lack of a serological evaluation and vaccination coverage is evaluated only on the basis of the students' anamnestic answers: this can lead to an underestimation or overestimation of the value. Another limit of the study could be the idealistic distortion or the central tendency especially because it is a face to face survey

Table 4. Vaccination coverage in students and attitude to get vaccine in the next months ^

	Males				Females			
	Vaccinated	Not Vaccinated	Natural Immunity	*Get vaccine in the next months	Vaccinated	Not Vaccinated	Natural Immunity	*Get vaccine in the next months
Flu	17%	52%	30%	4%	15%	74%	10%	3%
Chickenpox	27%	5%	68%	5%	33%	3%	61%	6%
MMR	46%	8%	42%	3%	66%	2%	24%	4%
Hepatitis B	47%	45%	0%	42%	73%	13%	2%	12%
Tdap o Td	84%	13%	0%	3%	80%	10%	3%	3%

\* in not vaccinated students

^ the lack of response is not shown in the table.



administered to young people. Luckily these biases could be limited in our study by anonymity. Additionally we didn't choose to administer the survey online in order to obtain a higher adherence. Other possible bias of our study were cross sectional bias because we didn't have a population based study, the sample would have prone to non-response bias but not to volunteer bias because we administered to all students of the Nurses Degree course. We administered three times the survey in three different days.

One of the reasons for the low coverage of people could be the lack of trust in vaccination. Fundamental in this regard is the training and informing of future healthcare workers by the university and also scientific societies. An additional effective tool to increase vaccination coverage among HCWs could be the offer of information and an active vaccination promotion by the occupational doctor and hygienist and especially the institution of mobile vaccination points across wards such as described in literature.

## Conclusion

Our study underlines the low VC rates among nurses' students for all the vaccinations. Measures to increase VC are therefore necessary in order to prevent that HCWs could become a source of infections with high morbidity and/or mortality both within hospitals and outside. Our work stressed the importance of offering correct information and vaccine until degree course. This could be, in future years, one of the possible solutions to increase vaccination adherence together with mandatory vaccinations. Vaccine hesitancy spread today in all people with many behind motivations. Maybe other studies would help policymakers and stake-holders to shape programs to improve vaccination coverage among students and healthcare workers: this is fundamental for the control of infectious diseases through the correct application of guidelines on prevention and also to the fight of antimicrobial resistance for some vaccine preventable disease (37-54).

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