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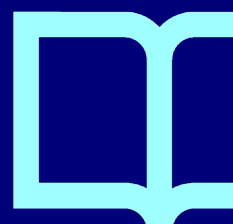
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# DETERMINANTS OF PARTICIPATION IN AN ONLINE FOLLOW-UP SURVEY AMONG NURSING STUDENTS

## ABSTRACT

**Introduction:** Determinants of participation in longitudinal studies are crucial for prevent attrition.

**Aim:** To analyze determinants of participation in a follow-up survey among nursing students.

**Materials and methods:** Prospective longitudinal study among nursing students. We examined individual and contextual determinants of participation in an online follow-up survey (2018) among nursing students that had completed the paper-and-pencil questionnaire in baseline (2015–2016), using a multilevel logistic regression models.

**Results:** From the 4,381 baseline participants, we identified 3,440 eligible persons. The number of participants in the follow-up survey was 1,252 (28.6%). Determinants of participation at follow-up were being female, aged  $\leq 19$  year-old in comparison with those older than 20, and being a never smoker compared with a current smoker.

**Conclusions:** Nursing students' participation at the online follow-up survey was moderate. Being female, aged  $\leq 19$  year-old, and being never smoker were determinants of participation. To boost participation in online surveys, some strategies such as adapted communications channels, the use of reminders and incentives should be included.

**Key Words:** Determinants, Participation, Follow up, Nursing students, Surveys and Questionnaires, Online.

## INTRODUCTION

The continuation of participation of the subjects over a prolonged period, thus avoiding attrition, is one of the biggest challenges in longitudinal studies (Hunt and White, 1998). Attrition occurs when the subjects studied drop out of the research for a variety of reasons, which can include unwillingness to continue to participate in the research, impossibility to do it due to death or serious illness or difficulties in contacting original responders (Eysenbach, 2005). Hence, longitudinal studies should include a wide of strategies to minimize loss to follow-up participants due to these reasons (Hunt and White, 1998).

The current evidence reports different general strategies that might reduce attrition such as (a) to exclude from the baseline those participants who could be lost to follow-up (e.g., individuals who have limiting health problems, individuals who plan to change their address, etc.); (b) to collect more than one type of contact information (e.g., email account, mobile phone or contacts of relatives); and (c) to establish periodic contact with the participants through the use of reminders (Garcia, et al., 2003). Nevertheless, other determinants related to the study design and characteristics of the participants can also influence participation rates.

Concerning study design, the method of data collection (e.g., face-to-face interviews, telephone interviews, paper-and-pencil questionnaires, online surveys, etc.) is a key factor that significantly determines participation rates. Previous investigations have reported differences in participation rates between studies that used one method of data collection (single-mode studies) and those who used more than one method (mixed-mode studies) (The American Association for Public Opinion Research, 2016). In this regard, mixed-mode studies generally had highest participation rate compared with single-mode studies (Medway and Fulton, 2012). Furthermore, it is reported a stronger preference for completing a paper-and-pencil version of the questionnaire than online questionnaire or telephone interview (Fekete et al., 2015).

Participants' sociodemographic determinants such as gender, age, level of education, and income are also reported as important influencers of the study's participation and attrition in longitudinal research (Fekete et al., 2015; Forcey et al., 2014; Loxton et al., 2019; Mutagoma et al., 2018). In this line, several studies have described higher participation rates among individuals who are older aged, higher educated, and with higher income (Fekete et al., 2015; Forcey et al., 2014; Loxton et al., 2019; Mutagoma et al., 2018). Regarding gender, there is not clear consensus on its influence in participation rates, for instance, Fekete et al., reported higher participation among males while Mutagoma et al., showed that male gender was associated with attrition. In addition of these factors, previous studies suggest that some behaviors related to the survey topic, such as substance use, could disrupt initial participation and the follow-up of the individuals of the study. Hence, smokers participate at lower rates in cohort studies, compared with never and former smokers (Forcey et al., 2014; McDonald et al., 2017).

In the academic year 2015–2016, it was carried out the “Study of Tobacco Consumption in Nursing Students of the Universities of Catalonia (ECTEC study)”, a cross-sectional study targeting all students enrolled in a nursing degree program in the 15 schools in Catalonia (a region of Spain), to investigate students' consumption of tobacco products (Martínez et al., 2019). This survey was planned as a baseline assessment for further follow-up. Three years later, the cohort was followed-up (ECTEC-S study). The general aim of the ECTEC-S study was to assess the changes in tobacco product consumption, knowledge, training, and in attitudes towards smoking among nursing students. Additionally, we aimed to explore the determinants of participation at follow-up since online surveys are increasingly used in research, especially due to COVID-19, and this information could provide insights about what early strategies might be introduced to avoid attrition (Hunt and White, 1998). Therefore, our aim was to analyze determinants of participation in a follow-up survey among nursing students.

## **MATERIALS AND METHODS**

### **Design and Participants**

The ECTEC-S is a prospective cohort study that started in 2015 in all nursing schools in Catalonia (Spain) and it is composed of participants from the baseline who provided their email account address, informed consent, and permission to be contacted in follow-up studies. In the baseline, nursing students were invited to complete a paper-and-pencil questionnaire during class time at their nursing schools, obtaining a total of 4,381 participants who filled in the questionnaire. Of them, 83.9% were female, 51.7% were 20–24 years old, 58.2% were first- and second-year students, 77.6% were born in Catalonia and 29.7% were current smokers at baseline. A detailed description of the baseline cross-sectional study is provided elsewhere (Martínez et al., 2019). Therefore, in this study we included all participants who (i) answered the baseline questionnaire, and (ii) provided informed consent to participate in a follow-up study.

### **Follow-up and Data Collection**

After the baseline study, we sent an email to participants to share the main findings of the survey and thank them for their participation, through which we also have checked the operability of their email addresses in view of the forthcoming follow-up. Two years later, in July 2018, we contacted all eligible participants through a personalized email inviting them to fill in a follow-up online questionnaire that included a fact sheet about the ECTEC-S study and a link to the survey platform.

To enhance participation in the follow-up questionnaire, several strategies were included such as the use of communication channels adapted for young adults, extending the dissemination of the study through official entities, the use of reminders, and providing incentives. Our main strategy was to use communication channels adapted to the participants' characteristics since

we used online tools (email, social media, and web) in the dissemination, recruitment, and data collection (Byaruhanga et al., 2019). Thus, in the dissemination and recruitment of the follow-up study we asked all the Catalan nursing schools and the four colleges of nursing in Catalonia to collaborate by sending two separate supporting emails. The first was sent by the deans of the nursing schools to third- and fourth-year students (who in the baseline study were first- and second-year students). The second email was sent by the colleges of nursing in Catalonia, addressed to nurses registered in 2016–2018 (who at the time of the baseline study were in their third or fourth year of studies at the schools of nursing). In this email, individuals were informed that they were going to receive an email from the ECTEC-S research team asking them to participate in the follow-up survey. Moreover, we used social media such as Twitter and our unit's blog to inform the nursing community about the follow-up study. The survey was active for 6 months (from July to December 2018) when eligible students had the opportunity to fill it in within a flexible period, as partial responses could be saved and continued later. Furthermore, participants were able to complete it from different devices, e.g., laptop, tablet and mobile phone. Other strategies to promote participation included sending periodic personalized reminders to email addresses of students who had not initiated the survey or who had initiated it but had not completed it. Up to six email reminders were sent including different formats of information, from text to video, and an infographic highlighting the importance of their participation: the first three reminders were sent every 15 days; the following reminders were sent in October of 2018 and the last in November of the same year. Finally, we launched a draw among participants to win a 300€ gift card for cultural activities to motivate the target students' response rate. After the survey was completed, an acknowledgement message was sent to each participant to promote interest in the study and facilitate participation in future waves. In addition, to assure future participation we asked for updated contact information including each participant's cell phone number and their current email address.

## **Instrument and Variables**

We used an online survey addressed to each eligible participant (The American Association for Public Opinion Research, 2016) launched through the LimeSurvey platform. It was based on the baseline questionnaire that explores four dimensions: (1) tobacco products, electronic cigarettes, and cannabis use, (2) knowledge, (3) attitudes towards tobacco use, and (4) formal training received about tobacco control during the degree. Some questions were added to adapt the questionnaire to the participants who were already working as nurses. We included questions regarding their area of work, their self-reported perception of the compliance with smoke-free policies in the working organizations, and their self-reported implementation of the 5As smoking cessation intervention (Ask, Advise, Assess, Assist, and Arrange) to ascertain their level of activity in providing smoking cessation support to their smoking patients. The survey was first tested on 20 collaborating researchers from different areas and then on 50 participants in the study.

For this study the main *dependent variable* was participation in the follow-up survey.

The *independent variables* explored were: (a) *individual characteristics* at baseline including (1) sociodemographic information such as gender, age ( $\leq 19$  years, 20–24 years, and  $\geq 25$  years), year of nursing studies (first, second, third, and fourth year) and (2) smoking status, which was classified into three categories (current smoker, former smoker, and never smoker) (Husten, 2009); and (b) *contextual characteristics* at baseline including: (1) type of nursing school in which they pursued their studies (public, private with public funding, or private), (2) province of the nursing school (Barcelona, Girona, Tarragona, or Lleida), and (3) email type used by the student: university email, Gmail, Hotmail, and others (which included all other service providers).

## **Data Analysis**

We calculated the follow-up rate considering the individuals at baseline who completed the survey at follow-up, and we used the chi-square test to analyze differences in follow-up caused by independent variables. In addition, to assess the determinants of follow-up, we performed multilevel logistic regression models to obtain both crude (cOR) and adjusted (aOR) odds ratios and their 95% confidence intervals (CI). The fully adjusted models included all the independent variables. Significance was set at  $p < 0.05$ . All analyses were performed using the statistical package IBM SPSS statistics version 21.

## **Ethical Considerations**

The study protocol was approved by the Ethics Committee of the Hospital Universitari de Bellvitge (PR239/18). Only the participants who agreed to participate and signed the written consent that included the permission to re-contact them were included in the invitation to the follow-up study. Moreover, in the fact sheet sent in the first follow-up email, we explained the aims of the follow-up study and we asked again for their acceptance, participants who agreed to participate were sent the link to the follow-up questionnaire. The linkage between the baseline and the follow-up databases was conducted through a code embedded in the questionnaire that was assigned to each participant. This code was linked to the student's email address that was used to send the invitation to each eligible participant and answers to the follow-up questionnaire were directly linked to this code, thus, all data were dissociated for data analysis. Additionally, in the quality review, we used the variable 'nursing school' to verify the correct linkage.

## **RESULTS**

From the overall 4,381 participants of the baseline, 941 (21.5%) were identified as non-eligible: 274 did not complete the personal information in the baseline questionnaire or did not provide



their email address, and for 667 the contact information was not operational at the moment of sending them the results of the baseline (Figure 1). As a result, 3,440 (78.5%) respondents to the baseline survey were invited to participate in the follow up. From them, a total of 1,252 subjects filled in the survey (participation rate of 28.6%; 1,252/4,381), this represents the 36.4% from the invited persons (1,252/3,440); 1,088 filled out the survey completely and 164 partially. From the current analyses we excluded 91 participants who initiated the survey but did not answer any questions and 64 other participants whose responses could not be linked to the baseline survey. Thus, the final participation rate of nursing students with complete information, taking into consideration the baseline participating number, was 25.0% (1,097/4,381).

**Figure 1 (here)**

#### **Characteristics of nursing students followed-up and not followed-up**

Table 1 displays the baseline characteristics of nursing students who participated in the follow-up survey: compared with the not followed-up individuals, the followed-up participants were more likely to be female ( $p < 0.001$ ) and to be first- or second-year students at enrolment ( $p < 0.001$ ), Table 1. The lower a student's degree year, the higher their participation was in the follow-up group ( $p$ -value for trend  $< 0.05$ ). Similarly, younger students ( $\leq 19$  year-old) were more likely to participate in the follow-up ( $p < 0.001$ ). Regarding smoking status, never smokers participated more in the follow-up compared with both current and former smokers ( $p < 0.001$ ). No other relevant differences were found in other studied variables such as type and location of nursing school and email type used by the student.

**Table 1 (here)**

## **Determinants of follow-up participation by independent variables at baseline**

According to the multivariate analyses (Table 2), female nursing students were more likely to participate than males (aOR= 1.76; 95% CI: 1.40–2.15). Age was inversely associated with participation; those who were  $\leq 19$  year-old were more likely to participate than those  $\geq 20$  year-old (aOR=1.43; 95% CI: 1.10–1.86). Never smokers were more likely to participate than current smokers (aOR=1.44; 95% CI: 1.21–1.75). No differences were found related to either the type or province of the nursing school and email type used by the student.

**Table 2 (here)**

## **DISCUSSION**

Our longitudinal study reports on determinants of participation in an online follow-up survey among nursing students, which, to our knowledge, have not been described in previous studies. The overall participation rate of nursing students with complete information at the baseline and the follow-up survey was 25.0% (1,097/4,381). The determinants of participation in the follow-up were female gender, being in the youngest age group ( $\leq 19$  year-old), and being a never smoker.

The participation rate reached is in line with previous single-mode studies that have used an online survey, with participation ranging from 5.0% to 52.9% (Turner et al., 2009; Emani et al., 2017; Loxton et al., 2019). Nevertheless, our participation rate is lower in comparison with mixed-mode studies, that have offered online survey as one of the modality options, and with other studies that have followed nursing students through a paper-and-pencil questionnaire. In both cases, their participation rates have reached up to 89.0% (Rübsamen et al., 2017; Ohida et al., 2001; Lai et al., 2008). As we have already appointed out, mixed-mode studies have greater participation in comparison with single-mode studies. Furthermore, participants may prefer a paper-and-pencil questionnaire than an online questionnaire (Fekete et al., 2015). These facts

may explain the lower participation rate in our study since it is a single-mode one and we have used an online survey. This assumption is also supported by the fact that the participation rate reached in our baseline study, which also used a paper-and-pencil questionnaire, was 21% higher than the online follow-up survey.

Otherwise, some longitudinal studies related to tobacco or electronic cigarette use in other populations have reported a greater participation rate than our panel (67.0%–86.0%) (Wills et al., 2016; McDonald et al., 2017). Since nursing students are supposed to have more interest in health issues, we have expected that their participation rate in tobacco-related surveys was higher than other populations. In addition, in our study, 29.7% of students were current smokers at baseline which is higher than the ones reported by other surveys conducted among nursing students in Europe in the last 5 years (Lehmann et al., 2014; Ordás et al., 2015). In this regard, several studies have agreed on the lower participation rate of current smokers in tobacco-related surveys (Forcey et al., 2014; McDonald et al., 2017). One of the most recurrent reasons cited to explain this loss in follow-up is the lower interest of smokers in the topic (Juranic et al., 2017). Moreover, the literature highlights that nurses who smoke feel the stigma and they are more reluctant to be asked about their attitudes, knowledge, and performance in tobacco control (McDonald et al., 2017). In addition to this, accentuated loss to follow-up of smokers' participants compared with studies in other populations, we consider that the differences in sociodemographic determinants of the participants of the cited studies such as age, quality of life, level of education, or social status could have influenced in this participation rate contrast.

Although the participation rate has long been used as one of the measures of survey quality, recent research has found that participation rate may not be as strongly associated with the quality or representativeness of the study as has been generally believed. The argument is based on the importance of the nonresponse bias (which is the degree to which sampled respondents

differs from the survey population as a whole), that is central to evaluating the representativeness of a survey, rather than response rates (Keeter et al., 2006).

In our study, female nursing students were more likely to participate in the follow-up than males, even though, a strong bias towards female gender is present given the nature of this cohort of Spanish nursing students, who are mostly female gender (Fernandez et al., 2020). These results are in line with a similar cohort study conducted among US college students in Georgia in which tobacco-related questions were the main area of interest (McDonald et al., 2017). Despite the existence of heterogeneity in the evidence regarding the influence of gender on participation, it appears that female college students are more likely to participate in cohort studies related to tobacco control than males.

Our results regarding age are in concordance with those from Fekete et al. and Zazpe et al., who have reported a higher participation rate of younger individuals in online surveys than older individuals. In contrast, older individuals usually participate more in paper-and-pencil surveys (Zazpe et al., 2019). This could be explained by the fact that younger people are generally more accustomed than older people to digital devices. Additionally, for this panel, we thought that once the students graduate, they usually lose contact with the university. This means they may be less predisposed to participate in surveys, projects, activities, etc., as they do not receive updated information related to the university or nursing degree. However, this is a hypothesis and should be tested in future studies. In addition, in Spain, the culture of research is rarely present in nursing professionals and, as well, that checking one's email is not considered an essential task in the majority of the centers.

The most unexpected result in our study was the fact that we did not observe a statistically significant difference in participation according to the email type used by the student. Since the majority of the baseline participants had finished their nursing degree at the time of the follow-

up, we expected they would not use university email and would use of their personal email accounts (Gmail, Hotmail, or other). However, it is likely that former students still use their university email accounts because they are either pursuing a postgraduate course or have redirected their university emails to a personal account. In any case, we were not able to monitor this aspect in our study.

We consider that the different strategies included in this study (the use of adapted communication channels, extending the dissemination of the study, the use of reminders, and incentives) were effective to boost a better participation rate. Nevertheless, we recommend future research expand these strategies through the use of SMS reminders, in addition of send them by email addresses, since other studies have proven their effectiveness for this purpose (Forcey et al., 2014). Another recommended strategy consists of tracking the reasons for attrition by either monitoring at each step whether or not the participants received the emails, opened them, or read them or directly ask non-responders for the reasons of their rejection through a brief questionnaire attached with the invitation of the survey (Garcia et al., 2003). These kinds of tracking may accurately facilitate determination of reasons for attrition and to carry out specific strategies in subsequent follow-ups. Finally, we expect that the use of small incentives for each participant could encourage participation rather than one draw to win one incentive since it will be a guaranteed gift for participants (Clendennen et al., 2019). We recommend that future cohort studies among college students take into consideration the reported determinants of participation to explore new strategies to increase participants' study adherence among male college students, those who are older and current smokers.

Additionally, we consider that college students should be educated to participate in research either by carrying out investigations or by being a study's subject. In the same manner, universities should provide the resources to maintain the contact with the alumni. Retaining the

access of the university email address once they have graduated and creating alumni programs may be an effective strategy.

## **Limitations**

Some limitations of this study must be considered. First, since the email addresses used to contact the students were the ones recorded in the baseline study (2015–2016), many of them may no longer have been in use at the time of the follow-up study (2018). Moreover, due to the platform used, it was not possible to ensure that all the students who were invited had received or read our emails and we cannot conclude that the reason for the non-participation of all eligible persons was a refusal to participate. Second, smoking status was a characteristic measured in the baseline study and it might have changed during the 3-year period. Third, we must consider that the data were collected through a self-reported survey and hence susceptible to recall bias. Fourth, the follow-up was carried out long after the baseline study, and the length of this period may have increased the attrition. Finally, the external validity of the study is limited to the nursing schools of Catalonia, although a priori these schools are not too different from other nursing schools in Spain or in Europe (Fernández et al., 2020). These limitations are balanced by several strengths. This is the first study to explore individual and contextual determinants of participation among a cohort of Spanish nursing students. Moreover, the study included students from all nursing schools in Catalonia and it recruited 4,381 students at baseline. In addition, we included the email type used by the student as one of the independent variables, which makes this study the first one to evaluate the influence of this variable on the follow-up participation rate. Finally, these findings are of importance in building a greater understanding of the factors that yield higher attrition in follow-up studies among college students, and specifically among nursing students.

## **CONCLUSIONS**

About 28.6% of students that participated in the baseline filled in the online follow-up questionnaire 3 years after their recruitment. Although the rates of participation were modest, we obtained complete data from 1,097 students. Determinants of participation at follow-up were being a female,  $\leq 19$  year-old, and a never smoker. Variables related to the nursing school affiliation (type and province) and the email type used by the student did not influence follow-up participation rates in this cohort. To boost participation in online surveys, some strategies such as adapted communications channels, the use of reminders, and incentives should be introduced.

### **Conflicts of Interest**

All the authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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