Knowledge and attitudes toward vaccination: A survey of Serbian students

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Since vaccination coverage in Serbia has been decreasing and health professionals have been identified as the most important factor in making decisions about immunization, vaccination knowledge and attitudes of students, especially medical students, are of particular interest.

A cross-sectional survey was carried out on three groups of 509 Belgrade University students (medical, law and engineering students). The data were collected using an on-line questionnaire posted to student groups and included the Vaccine Knowledge Questionnaire and Attitudes Toward Vaccination Scale. This survey also included questions about demographic characteristics and perceived negative experiences. Multiple linear regression analysis was performed.

There was a significant difference in the Vaccine Knowledge score ($F=40.48$, $p<0.01$) among the three groups of students. Medical students ($N=251$, Mean = 4.47, SD = 1.71) had significantly higher mean knowledge scores than did law ($N=128$, Mean = 2.80, SD = 1.56) or engineering students ($N=130$, Mean = 3.98, SD = 1.81). Compared with the law (Mean = 49.77, SD = 10.23) and engineering students (Mean = 57.62, SD = 12.21), medical students (Mean = 59.52, SD = 9.62) also had significantly higher attitude scores ($F=37.65$, $p<0.01$). These findings demonstrate general positive attitudes of Serbian students toward immunization. However, some knowledge gaps were identified. Multivariate analysis showed that those who had better vaccine knowledge, those who studies medicine, those who attended at university for more years, and those who do not know someone who had a negative experience with vaccines were more likely to have positive attitudes toward vaccination.

Considering the growing vaccination hesitance in the general population, this is an important result that indicates that medical students are possible important participants in future public health campaigns. A strong association between vaccine knowledge and attitudes implies recommendations to introduce a specialized vaccination curriculum at both the undergraduate and graduate levels of medical study.

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Introduction

There is no need to emphasize the importance and efficacy of childhood vaccination as a public health intervention. However, public health authorities all over the world are facing growing reluctance and hesitation from parents to vaccinate their children, which is caused by concerns about safety and loss of trust in public authorities [1]. Although one of the important goals for the World Health Organization European Region (WHO-Euro) was to eliminate measles by 2015, this did not happen. Actually, measles outbreaks were detected in many European countries during July 2014–June 2015 [2]. The reasons for this were inadequate vaccination coverage below 95% in 22 European Union/European Economic Area member states and pockets of susceptible groups even in states with high coverage [2].

A similar situation exists in Serbia. Although Serbian health authorities have managed to maintain vaccination coverage at an acceptable level during the war and isolation years in the 1990s, the socio-economic transition after democratic changes in 2000 brought discontent and distrust in the population. A long tradition of immunization in Serbia led to the eradication of polio and elimination of diphtheria. Thanks to immunization coverage greater than 95%, the Serbian population experienced a great reduction in cases of measles, rubella and mumps. However, an analysis of the vaccination coverage in Serbia in 2014 showed that a significant number of children remain unvaccinated, with a trend

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toward increased rates of unvaccinated children compared with previous years [3]. The reasons for this lower coverage include activities of the anti-vaccination lobby and previously approved legislation giving the right to parents to decide whether their child is to be vaccinated. The aggressive anti-vaccination campaign that was established and consolidated during the swine flu epidemics (2009–2010) has influenced public opinion regarding vaccination and caused fear regarding serious adverse effects following vaccination [4]. Serbia also has a problem with high-risk populations, mostly of Roman ethnicity, who systematically remain outside the healthcare and immunization systems [5]. With these problems in mind, it is clear that the number of non-vaccinated persons could become critical in the near future and threaten the WHO’s aim for Serbia to eliminate measles and to maintain the status of a “state without poliomyelitis” [6].

Previous studies have shown that knowledge [7] and attitudes of the healthcare workers are correlated with higher vaccination coverage rates [8,9]. Additionally, other research has shown that parents and other individuals cite healthcare professionals as the most important factor influencing their decisions to vaccinate their children or themselves [10,11]. In Serbia, medical doctors, particularly pediatricians and general practitioners, recommend vaccination and thus are in a key position to communicate and promote the benefits of immunization. Having better knowledge and more positive attitudes would make healthcare professionals more successful in immunization promotion. Starting from Ajzen’s Theory of Planned Behavior (TPB), which states that an individual’s behavior is shaped by their attitude, subjective norms and perceived control [12], we presumed that more positive attitudes of medical students toward vaccination would lead to increased engagement in immunization promotion. Additionally, based on the theory that one of the crucial sources of attitude is cognitive information about the target topic [13], we presumed that better knowledge about immunization would predict positive attitudes. Therefore, adequate education about a particular topic may change attitudes toward a positive direction. Our goal was to explore the knowledge and attitudes of medical students regarding immunization in Serbia and compare these factors with those of their peers studying law and electrical engineering to determine predictors of positive attitudes. The results of this study may note the need for targeted interventions to modify knowledge and attitudes and prepare future healthcare workers for responsible roles in vaccination programs.

Method

Participants and procedures

A descriptive, explorative cross-sectional study was conducted during March–June 2016 in Belgrade, which is the capital of Serbia. The participants were students attending different faculties of the University of Belgrade, including the Faculty of Medicine, Faculty of Law and Faculty of Electrical Engineering. The University of Belgrade was selected for this study as it is the leading university of higher education in Southeastern Europe and is the main university in Serbia; this university has 31 faculties. We chose students from Law and Electrical Engineering, which are the most popular representatives of the humanistic and technical faculties and compared these students with medical students. The target population was students who were members of an official online student groups. The total numbers of students per group were 5030 for the Medical group, 3500 for the Law group and 4855 for the Engineering group.

An invitation message with the URL to the online questionnaire was posted to online student groups. The questionnaire was disseminated using OneClick Survey software, which automatically saves digital responses to a database. All responses were anonymous. The questionnaire required 5–7 minutes for completion. Informed consent was obtained in written form during the introductory portion of the survey. The purpose of the research was explained, and the participants were invited to confidently complete the survey. Their participation was entirely voluntary considering the fact that they did not receive any type of award or credit. We intentionally avoided sending questionnaires to personal e-mail to preserve student anonymity and privacy. The study protocol was approved by the Ethics Committee of the Medical Faculty, University of Belgrade.

Study instrument and measures

The study instrument was a self-administered questionnaire, which was constructed after a thorough literature review and using the findings of earlier qualitative studies and empirical literature [14–18]. Content validity testing was performed by sending the questionnaire to a panel of three experts. Expert opinions on the importance and intelligibility of the questionnaire content were considered before the final version was distributed. The instrument was divided into the following four sections:

Baseline questionnaire. The participants were asked to report their gender, age, year at university, and the faculty they attended. The knowing someone with a negative experience question was constructed to assess whether our respondents personally knew someone who had had a negative experience with vaccines.

Vaccine Knowledge Questionnaire. The purpose of the questionnaire was defined as a method for the assessment of vaccine knowledge in the student population. Accordingly, the knowledge domain was defined as empirically based vaccine-related information relevant to the awareness of vaccination as one of the greatest public health achievements. Further, the questionnaire included items assessing misconceptions about the potential vaccination risks. Based on these ideas, the questionnaire included 8 true/false questions with a “don’t know” option; a nominal scale (correct and incorrect/don’t know) was provided for the respondents’ convenience in disclosing their responses. The knowledge scores ranged from 1 to 8, and points were given for correct answers.

The Attitudes Toward Vaccination Scale consisted of 14 (five pro and eight contra-trait) items on five-point agreement scales (from 1 “Strongly disagree” to 5 “Strongly agree”). Reverse coding was applied for negatively worded statements. Scores from 14 to 32 was considered as a negative attitude, from 33 to 51 as moderate, and from 52 to 70 as positive. The scale psychometric analysis was evaluated on the pilot sample (N = 221). The Cronbach’s alpha for the 14 items was 0.90, which indicated high internal consistency. Examination of the inter-item correlation matrix revealed a predominance of correlations above 0.5 among the items supporting suitability for factoring. Additionally, structural validity factor analysis was applicable based on both the Kaiser–Meyer–Olkin measure value (KMO = 0.89) and the Bartlett’s test of sphericity result ($\chi^2 = 1684.210$, df = 91, $p < 0.01$). An exploratory factor analysis using principal components factoring with varimax rotation was carried out and resulted in a three-factor solution that accounted for 66% of the item variance (eigen values = 46.11, 12.22 and 7.85). The factor loadings for the 14 items are presented in Table 1.

Data analysis

Descriptive statistics were used to detail the sample characteristics and to summarize the variables. Chi-square tests were performed to examine the differences among medical, law and engineering students in all particular items of the Attitudes Toward Vaccination Scale and the Vaccine Knowledge Questionnaire. To
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