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Revista de cercetare și intervenție socială

ISSN: 1583-3410 (print), ISSN: 1584-5397 (electronic)
Selected by coverage in Social Sciences Citation Index, ISI databases

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Revista de cercetare și intervenție socială, 2017, vol. 58, pp. 166-177

The online version of this article can be found at:
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Published by:
Expert Projects Publishing House

On behalf of:
„Alexandru Ioan Cuza" University,
Department of Sociology and Social Work
and
Holt Romania Foundation
REVISTA DE CERCETARE SI INTERVENTIE SOCIALA
is indexed by ISI Thomson Reuters - Social Sciences Citation Index
(Sociology and Social Work Domains)

Educational Level Influence on Dental Patients Attitude towards Infection Control

Lucia BARLEAN[1], Magda BARLEAN[2], Cristina POPA[3], Carina BALCOS[4,] Ovidiu Stefanescu[5], Carmen STELEA[6]

Abstract

The procedures of high complexity performed today in the dental office are associated with an increased risk of infection transmission. The level of population's concerns and implication in their own health is rising due to the rich information and educational actions. A cross-sectional questionnaire-based epidemiological study was initiated including 384 patients who have accessed 52 dental offices in Iasi, Romania. The aim of this study was to asses patients' awareness, attitudes, knowledge, and requirements towards infection control in dentistry in relation to socioeconomic status evaluated by educational level. Statistical analysis was performed using SPSS version 20, ANOVA and Pearson's Chi-square tests. The results demonstrate that the overall patients concern regarding the risk of infection, protective equipment, and hand hygiene is affected by the educational level. More than half of the subjects consider appropriate to involve in infection control in the dental office. The high level of education confers a positive view on health behaviours and a superior access to information. The results of the study highlight the importance of the evaluation of patients' perception towards infection control in the dental office as a method to motivate medical staff to promote the safety and to increase the quality of dental treatment.

Keywords: patient awareness, dentistry, infection control, educational level.

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Introduction

The control of infection transmission represents an important challenge of the modern dentistry in order to ensure a safe environment for the patients and medical team. Just as important as applying the specific recommended protocols is the dental patient involvement in the evaluation of his own treatment safety in order to raise the public awareness and quality of the provided treatment. The complex protocols performed nowadays in the dental office are associated with an increased risk of infection transmission through direct contact with contaminated products like blood or saliva, by indirect way through contact with contaminated surfaces, instruments and equipment as well as through cross-infection (transmission from a patient to another through the medical staff). The infection control procedures applied today in dentistry are radically different from those used before 1986, the year in which the Centre for Disease Control and Prevention (CDC) published its first guide for infection control. The up-dated guidelines and recommendations published in 1987, 1993, 2003 recommend that Universal Precautions must be used for all patients regardless of their infectious status and the medical procedure is about to take place. (CDC Guidelines for environmental infection control in health-care facilities - MMWR 2003). Health-care associated infections, known as "nosocomial" infections when they occur in hospitals, are contracted during health care in medical establishments. Their incidence is high, representing a major problem for healthcare systems around the world with important medical, financial, social and ethical implications. (Laheij *et al.*, 2012). World Health Organization statistics show that seven out of a hundred patients in developed countries and ten out of a hundred patients in countries with low socio-economic level will contract at least one healthcare associated infection (Ducel, Fabry & Nicolle, 2002).

In the prevention of health-care associated infections it is essential to adopt the protocols imposed by the Universal/Standard Precautions concept, which refers to the proper use of protective equipment, hand hygiene protocols, surface disinfection, sterilization of reusable instruments and equipment, air and dental unit water decontamination . This concept must be applied for all the treated patients considering that not only blood but all body fluids are potential infectious (Molinari, 2003). The relationship between socio-economic status and health, including the oral health, is well demonstrated but not all the aspects have been analysed . Studies have confirmed that socio-economic indicators are sensitive to variations in knowledge and attitudes regarding risk factors for health and sanogenic behaviour and may be used to differentiate population groups. The socio-economic status (SES) is most often evaluated by determining education, occupation, income, or a combination of those factors. In the epidemiological studies at the population level education is one of the most commonly used external risk factors as a measure of SES in correlation with general and dental health. The

evaluation of the level of education which is different from the occupation, provides some advantages as compared with other measures of SES by the fact that 95% of individuals provide data on their level of education which can thus can be more accurately measured, remains constant for most people over the age of 25 and is not influenced by the income (Herd, Goesling & House, 2007). The level of education is appreciated according to the number of years spent in an educational institution (primary school, gymnasium, high school, college, post-graduate studies) in a direct correlation with the opportunity to obtain and understand information about sanogenic behaviours and promotion of oral health linked to the quality of life (Groot & Brink, 2007).

At the same time the level of population's concerns over their own health is rising due to the rich information and intense worldwise educational actions on the sanogenic behaviours and the prevention of diseases transmission. Assessing patients' attitudes and knowledge has proven to be particularly important in motivating the implementation of specific infection control procedures and the doctors compliance to them. The attitude according to which the patient is treated as a partner during the medical act offers important advantages in meeting his requirements and in achieving the expected outcomes of the treatments he has taken.

Material and methods

In order to assess the public perception regarding health care associated infections in dentistry it was initiated a questionnaire based study in Iasi, Romania. In order to accomplish the study objectives the statistically representative sample included 384 patients who have accessed 52 dental offices between February and December 2016. The patients voluntarily included in the study were asked to answer to a self-administrated questionnaire which comprised 20 questions. It was obtained the informed consent from each individual included in the study.

Questionnaire

The self-administrated questionnaire included a first section covering general information regarding the subject's sociodemographic data (name, age, gender and educational level as measure of socio-economic status). The second sector of the questionnaire included 20 questions referring to the participants' perception, attitudes, knowledge, awareness and requirements regarding the prevention of the infection control in dentistry. Patients' opinion regarding infection control in the dental office is presented in *Table 1*. Since a validated questionnaire on this subject was not found the used questionnaire relevance was verified by a preliminary study including 48 persons and adjustments to the questions were made if necessary. The response rate was 98%.

Table 1. Questionnaire on patients' opinion regarding infection control in the dental office

No	*Question*
1.	Are you concerned about the risk to be infected during the dental treatment?
2.	Which are the most threatening diseases which can be transmitted during dental treatment: hepatitis B, hepatitis C, HIV infection?
3.	Do you consider that you are protected by the medical staff against the infection transmission?
4.	Do you consider appropriate to get involved in infection control in the dental office?
5.	Do you really involve in assessing the safety protocols used for infection transmission prevention during dental treatments?
6.	Did you discuss with your dentist about the risk of diseases transmission?
7.	Do you consider you have the necessary knowledge in this domain?
8.	Do you avoid dental care due to the risk of getting infected?
9.	Do you think you may be infected by air in the dental office
10.	Should the dentist wear protective gloves?
11.	Should the dentist change gloves after each patient?
12.	Should dentist wear face masks?
13.	Should dentist wear protective gown?
14.	Should dentist wear protective goggles?
15.	Does the protective equipment really protect you against the infection transmission?
16.	Should an infected patient in a contagious stage be treated in the dental office?
17.	Will you accept to address a dental office in which an HIV infected patient was treated?
18.	Has the dentist the right to refuse to treat patients with infectious diseases?.
19.	Is the dentist' hand washing important for infection prevention
20.	Is hand washing absolutely necessary if the dentist wears gloves?

Statistical analysis

A cross-sectional epidemiological study was initiated. Statistical analysis was performed by using SPSS (IBM SPSS for Windows, Version 20.0; IBM Corp., Armonk, NY, USA). For the assessment of the correlations between the variables regarding gender and socio-economic level and the answers to the questionnaire the ANOVA and Pearson's Chi-square tests were used (statistical significance $p<0.05$).

Results

The study sample included 32% men and 68% women aged between 20 and 64 (average age 42.8 ±2,63 years). Regarding SES the 37.5% of patients belonged to the high educational level, 40,2% to the medium educational group and 22,3 to the low education group. (*Table 2*)

Table 2. The study group by gender and educational level

Study group	%
Age	42,8 ±2,63 years (range 20 – 64 years old)
Gender	
Female	32
Male	68
Socio-economic level (by educational level)	
High	37.5
Medium	40.2
Low	22.3

The data resulted from the questionnaire answers demonstrate that most of the subjects (72.5%) expressed their concern regarding the risk to be infected during the dental treatment. From those 68.4% were women and 31.6% were men. Most of those subjects belonged to the high-education group of patients (43.2%), compared with middle and low level (24.5%, and 32.3% respectively). 82.7% of subjects, mainly from the high education level group (39%), think that they are protected by the medical staff against the infection transmission. Regarding gender there were no significant differences between women (51.2%) and men (48.8%). Women (62.6%) and patients from medium level of education (67.3%) mostly expressed their desire to involve in assessing the implementation of safety protocols. Significantly more patients from the low educational level group (85.7%) do not consider appropriate to involve themselves in infection control in the dental office. Regarding the real involvement in the evaluation of safety protocols the medium educated subjects were also the more implicated (72.4%).

27.5% of the patients have discussed with their dentist about the risk of diseases transmission throughout the dental treatment and the methods to decrease this risk. The medium and high level educated patients were more implicated in communication on this topic (43.4%, 37.3% respectively) than those of low level of education. Only 17.3% of patients consider that they have the necessary knowledge in this domain. From those 35.1% were highly educated, 36.3% and 28.6% belonged to the medium and low level of education group, respectively.

2.4% of the investigated persons, from which 36.6% were from the medium level of education group, 52.2% women and 47.8% men, avoid dental care due to the risk of getting infected.

Only 33.6% of subjects, mainly men (65.7%), recognise the risk represented by the diseases transmitted by air in the dental office. From those 42.3% are from the high level of education group, 35.6% from medium level group and 22.1% from the low education group of patients. The subjects' answers regarding the infection risk in the dental office are presented in *Table 3* and *Table 4*.

Table 3. Patients' perception regarding the infection risk in the dental office

Question		Gender		Socio-economic level		
	Yes	Female	Male	Low level	Medium level	High level
Are you concerned by the risk to be infected during the dental treatment?	72.5	68.4	31.6	32.3	24.5	43.2
Do you consider that you are protected by the medical staff against the infection transmission?	82.7	51.2	48.8	28.6	32.4	39
Do you consider appropriate to involve in infection control in the dental office?	63.7	62.6	37.4	14.3	57.3	28.4
Do you really involve in assessing the safety protocols used for infection transmission prevention during dental treatments?	26.5	72.8	27.2	13.5	52.4	34.1
Did you discuss with your dentist about the risk of diseases transmission?	27.5	38.2	61.8	19.3	43.4	37.3
Do you consider you have the necessary knowledge in this domain?	17.3	49.8	50.2	28.6	36.3	35.1
Do you avoid dental care due to the risk of getting infected?	2.4	52.2	47.8	24.7	36.6	38.7
Do you think you may be infected by air in the dental office	33.6	34.3	65.7	22.1	35.6	42.3

Regarding the protective equipment almost all of the subjects appreciate its importance in infection transmission prevention during dental treatment (96%). Female patients reported a higher concern over the protective equipment worn by the dentist than men (62.3%, 37.7%, respectively). Patients' options are for protective gloves (89.6%) face mask (75.5%) and, to a lower interest, protective goggles (16.5%). Significantly more high educated patients wish the doctor to change gloves after each patient (72.4%) compared to those from medium educational level group (31.4 %) and from the group of low education level (16.2%) ($p<0.05$ ANOVA). 88.2% of the subjects , mainly from the high educational level with no significant differences by gender , appreciate that this equipment really protects them against the risk of infectious diseases transmission.

54.6% of patients accept an infected patient to be treated in the dental office. Most of them are men (68.7%) from medium level of education group (65.2%). Only 38.8% of subjects accept to address a dental office in which an HIV infected patient was treated. The patients who would accept this situation were mainly men (65.5%) and belonged to the medium level of education group (55.3%). A high percentage of patients (61.2%) mainly from the low level of education (84.7%) would avoid this dental office. More than one third of patients (32.1%), mostly from the low educational level group with significant differences compared

to the high level ($p<0.05$) considered that a dentist has the right to refuse to treat patients with infectious diseases.

4.5% of patients suffered accidental injuries caused by instruments during the dental treatment. All of the implicated subjects considered that they were put in danger to be infected by those injures.

Table 4. Patients' opinion regarding infection control in the dental office

Question		Gender		Socio-economic level		
	Yes %	**Female %**	**Male %**	**Low level**	**Medium level %**	**High level %**
Should the dentist wear protective equipment?	96	62.3	37.7	27.5	42.3	30.2
Should the dentist wear protective gloves?	89.6	58.1	41.9	16.4	36.4	47.2
Should the dentist change gloves after each patient?	86.4	68.2	31.8	16.2	31.4	72.4
Should dentist wear face masks?	75.5	57.6	42.4	14.5	34.1	51.4
Should dentist wear protective goggles?	16.5	48.2	51.8	7.4	62.1	30.5
Should dentist wear protective gown?	92.8	62.4	37.6	25.1	33.7	41.2
Does the protective equipment really protect you against the infection transmission?	88.2	46.7	53.3	27.4	28.4	44.2
Should an infected patient be treated in the dental office?	54.6	68.7	31.3	25.0	45.2	29.8
Will you accept to address a dental office in which an HIV infected patient was treated?	38.8	34.5	65.5	15.3	35.3	49.4
Has the dentist the right to refuse to treat infected patients?	32.1	72.5	27.5	52.2	30.7	17.1
Did you suffer injuries caused by sharp instruments during the dental treatment?	4.5	54.8	45.2	46.2	21.7	32.1
Do you consider that you were in danger to be infected by those injures. ?	100	32	68	37.5	40.2	22.3

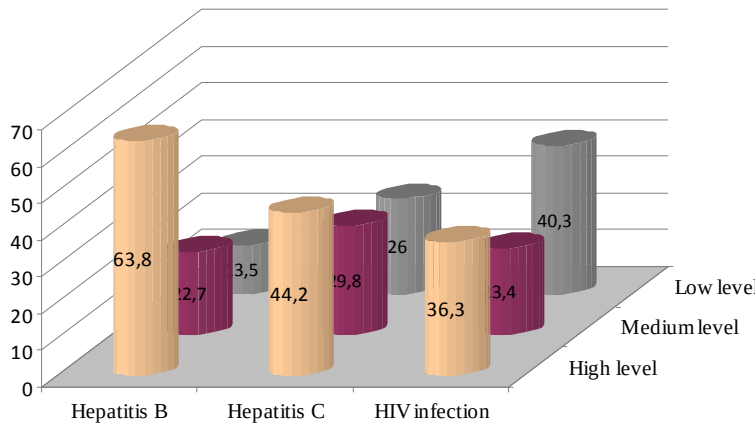
Hands hygiene is evaluated by the subjects as an important protocol for the prevention of infection transmission by 78.9% of patients. This percentage changes if the dentist wears protective gloves, in which situation 37.9% of patients think that hands washing is not absolutely necessary. From those 59.5% belong to the low educational level group and 57.2% from the medium level. Even in this situation most of the high educated patients (67.6%) consider that hand washing is necessary (*Table 5*).

Table 5. Patients' opinion on hand hygiene importance according to educational level

Educational level	Hand hygiene importance		In case of gloves wearing	
	Yes	No	Yes	No
High level	84.2	15.8	67.6	32.4
Middle level	66.8	33.2	42.8	57.2
Low level	46.5	53.5	40.5	59.5

The greatest threat of infection is considered to be represented by the diseases transmitted by blood as hepatitis B, hepatitis C and HIV infection. The highly educated subjects are mainly concerned by the risk to get infected with hepatitis B (63.8%) and C viruses (44.2%) while the patients with a low level of education give more importance to the HIV infection (40.3%).

Figure 1. Patient opinion on infectious diseases transmission risk by educational level



Discussion

In the context of current infectious pathology, concerns about the occupational exposure of oral health care staff as well as those related to patient safety are of particular importance, justifying rigorous rules of clinical behaviour in view of adherence to European standards on the safety in dentistry. Studies in the literature highlight the importance of patients' attitudes assessing in order to support the infection transmission risk management strategies to be used by oral health care personnel in making patient care safer **(**Black & Bowie, 2017). In order to improve the safety parameters Pemberton, Ashley, Saksena & Dickson proposed in 2017 four strategies as: identifying threats to patient safety, evaluating incidents and identifying best practice, communication and education about patient safety and building a safety culture. **A**lthough it was demonstrated that infection control and

decontamination play an important role in patient protection studies demonstrate the fact that there is no revealing evidence there is no evidence of this effect **(**Thusu, Panesar & Bedi 2012; Bayley *et al.*, 2015). In the classifications of patient safety incidents infection control represents a very important cause of adverse reactions experienced by the patient after difficult communication, equipment failure and external environmental factors (Thusu, Panesar & Bedi, 2012). Obtaining patient cooperation based on their trust in the responsibility and professionalism of the medical team is essential in increasing the quality of oral health care. It was demonstrated that dental patients' perception and satisfaction towards oral health care changes over time, and is influenced by factors as age and education level (ArRejaie *et al*., 2014).

Our findings demonstrate the patients' concern and interest towards infection control in the dental office. Thus majority of patients, especially men and high educated subjects, are concerned by the risk to get infected during the dental treatment. In the same time men are more confident in safety measures but women are more active and implicated in assessing the implementation of such protocols. However patients, most of them from medium educational level group, are generally reluctant in expressing their desire to get involved in the dental care as a consequence of their lack of knowledge in the domain of infection transmission risk. They also expressed their confidence in the professionalism and responsibility of the medical team. The present study on the patients' perception regarding infection transmission in the dental office was carried out in relation to socioeconomic groups evaluated by educational level of the participants so as to compare the relative status of awareness at each level. The results confirm the conclusions of the studies in literature regarding the significant influence of the socio-economic status, measured by educational level, on the patient's perception regarding the dental care associated infections and quality of life. The high level of education confers a positive view on health behaviours and a superior access to information. The psycho-social factors related to high education decrease the exposure to risk factors and, in the same time, provide the necessary knowledge regarding the prevention of health care associated infections. The educational level influences the patients inquire expectations and demands and it must be considered by the medical staff as an important factor in the management of their activity (Colet, Mayorga & Amador, 2010).

The dental medical personnel must take the proper measures in order to avoid the risk of infection transmission by applying the needed methods and protocols in the spirit of the Standard Precautions concept. The highly educated patients wish to be informed and to have the opportunity to evaluate the infection control protocols used in the dental office. In this context the patient must be considered as a partner in his own oral health care whose needs and opinions should be respected. The evaluation of the subjects' answers regarding the protective equipment, a major component of the Universal Precaution concept, revealed that it is

perceived to play an essential role in patient's safety by acting as a barrier against contaminated blood and saliva. The most efficient barriers are considered to be the rubber gloves but the facial mask and, the results of our study being similar to those reported in the literature. Articles published on patient attitudes regarding protective equipment by medical staff in dental practices reveal the firm choice for using these bariers of protection. Our results confirm the findings of Kadtane *et al.*, (2015) according to which most of the subjects (88.37%) whish that the dentist should wear the gloves while treating the patients, 67.54% opt for the face masks. Similar results regarding the patient option for protective gloves were reported by Baseer, Rahman & Yassin, 2013 (98.7%) and Azodo, Umoh & Ehizele in 2010 (98.3%). In their study, Barghout *et al*. (2012) reported that 83.5% of the respondents are of the opinion that the dentist must wear gloves and 74.8% want him to wear facial masks.

An effective communication with the dentist and a patient-dentist relationship based on sincerity, confidence and respect is considered, especially by the patients with a high level of education, to ensure an increased safety and quality level of the dental treatment. This doctor/patient relationship is particularly beneficial for both patients and the dentist in order to avoid unwanted effects and errors (Sofola, Uti & Onigbinde 2005). In our study only one quarter of subjects, mainly from the high education level group, have discussed with their dentist about the risk of diseases transmission either because of lack of knowledge in this domain or because of the reluctance to interfere the medical treatment and to disturb the medical staff.

The right of the dentist to refuse the treatment for an infected patient expressed by some of our study's subjects has important moral, ethical and social implications as it may be perceived as a form of unacceptable discrimination. In reality this attitude should be regarded as a consequence of the lack of knowledge about the aetiology, pathogen and prevention of infectious diseases associated mostly with the low level of education. Hand hygiene substantially reduces potential pathogens on the hands and is considered the most important measure for reducing the risk of transmitting pathogens in health care facilities. Hospital-based studies have demonstrated that non-compliance with hand hygiene practices is associated with health-care-associated infections and the spread of multiresistant organisms (Boyce & Pittet, 2002). In his study on patients' perception of infection prevention in dental practice, Smith *et al*. (2014) concluded that major concerns of patients revolved around hand hygiene practices rather than risks from blood borne viruses and Creutzfeldt-Jacob Disease. In our study, patients, especially those from the high education level group, are aware about this procedure importance but in case of gloves use they become less convinced of its necessity.

Conclusions

The results of the present study highlight the importance of the evaluation of patients' perception towards infection control in the dental office as a method to motivate medical staff to implement them in order to increase the safety and quality of dental treatment. The high levels of education of the subjects demonstrate to promote sanogenic knowledge, attitudes and behaviours. The interventions for population education for health must be adapted according to SES dimensions like educational level in order to achieve the persuaded effects. It is necessary to develop strategies targeted towards increasing the access to information, changing people lifestyle and raising awareness by engaging in activities that prioritize health promotion for achieving a better quality of life.

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