

Knowledge and Attitude of Undergraduate Dental Students Regarding Anaphylactic Reaction in Islamabad

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ABSTRACT

Objective: To evaluate the knowledge and attitude of undergrad dental students regarding anaphylactic reaction associated with local anesthesia used in the dental procedures.

Methodology: This cross sectional Questionnaire based study was conducted in School of Dentistry, Islamabad from June 2023 to September 2023. Questionnaire regarding knowledge and attitude of undergrad dental students toward handling the anaphylactic shock/reaction was distributed among these students. Independent T test was employed for statistical analysis where p. value for significance was <0.05.

Results: 250 undergrad dental students that participated in this study ranged between 20-23 years of age on average. These undergrad dental students worked in clinical wards and used local anesthesia for dental treatments of the patients in routine. Local anesthesia Lignocaine was preferred by 112 (91.8%) male undergrad dental students and 120 (93.8%) female undergrad dental students while other type of local anesthesia used by male and female undergrad dental students was 10 (8.2%) and 8 (6.3%). The overall knowledge of these undergraduate dental students regarding anaphylactic reaction was much better in comparison to their practical attitude that involved the adequate management of this disease (p value=0.001).

Conclusions: The current study concluded that undergrad dental students had enough theoretical knowledge regarding anaphylactic shock but lacked in the practical attitude to manage it adequately without any fear of severe consequences. This practical attitude can be enhanced by pursuing the undergrad dental students for undergoing manual hands on courses, workshops and awareness programs.

Key words: Anaphylactic reaction, Dental students, Knowledge, Lignocaine, Management.

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Introduction

Anaphylaxis is seriously fatal and life-threatening systemic allergic reaction which is a declared medical emergency and needs urgent medication. It can lead to death if not managed properly on the urgent basis.¹ Globally, it has been reported that anaphylaxis is increasing with every passing day and at some point of life about 00.2 % - 5.00% of population is influenced by it.² A total of about 99.7% got hospitalized because of the

anaphylaxis that is mentioned in a research conducted previously which shows the severity of this disease.³ The disease incidence rate is at its peak in low income and under developing countries of South Asia such as India, Bangladesh and Pakistan which is found to be 58.30% cases per 100000.00 persons every year.⁴ This disease could become a genuine cause of death in most of the regions of the South Asia if proper and adequate measures are not undertaken in the near future.

Basically, one of the common allergens enveloping immunoglobulin named as Ig-E is responsible for initiating the immunological response by activating the mast cells and basophils. These cells in turn start releasing the vaso-active inflammatory mediating stimulants including tryptases, prostaglandin, histamine and leukotriene. Anaphylaxis is originated by these mediators that mainly occludes the human airways thereby, adversely affecting their major organs of respiratory, cutaneous, circulatory, GIT and cardiovascular systems. Additionally, it causes itching, redness, swelling, warmth, and itching promoting bronchi/larynx inflammation and urticarial in the individuals.⁵ Severe response to the allergen sometimes induce quick onset of signs and symptoms related to death as a result of anaphylaxis [6]. This might be due to the lack of knowledge among the health care workers and general community that needs to be addressed in order to prevent its severity.

Different well known triggers that induce anaphylaxis are foods (peanut, wheat, nut, shellfish, milk, fruit, eggs), animal stings (kissing bugs, wasp, bee, ant) and medication (aspirin, NSAID, vancomycin, morphine, protamine, Penicillin) whereas less common triggers include latex, plastic, rubber, semen and hormonal changes. Local anesthetic agents used in Dentistry are also responsible for causing anaphylaxis in majority of the patients that undergo oral treatments on the regular basis.⁷ During routine dental procedures, these patients are at high risk of undergoing the anaphylactic shock/reaction at the most because of local anesthesia usage.⁸ The main constituent of local anesthesia that causes the anaphylaxis is either ester or amide chain linkage because their end-product is p-amino benzoic acid which is lethal to greater extent.^{9,10} Moreover, preservatives and additives could be the reason of inducing this severe reaction as well.¹¹ Certain skin tests especially prick test used to investigate the allergic response of the local anesthesia on any patient before performing any procedure and by keeping the proper history maintenance record.¹² Undergrad dental students should have sound knowledge attributing to the presentation, management and mechanism of anaphylactic reaction due to its variable and unpredictable responses. The dental surgeons need to have particular knowledge about the anaphylaxis in order to avoid its severely hazardous consequences and litigations.^{13,14} This knowledge and awareness need to be induced in the undergrad dental students before they become independent in treating the patients having oral issues. The focus of current study is to investigate the knowledge and attitude of undergrad dental students regarding anaphylaxis related

to the local anesthesia used in the routine dental procedures due to huge gap in the literature available for this specific topic in Pakistan that needs dire attention.

Methodology

This cross sectional Questionare based study was performed in School of Dentistry, Islamabad for the duration of four months Islamabad from June 2023 to September 2023 after getting the approval from the ethical board of the institution (SOD/ERB/2023/32-01). Undergrad dental students working in the clinical wards on rotation where local anesthesia was injected were contacted to answer the questions.

Undergrad dental students working in the clinical wards where local anesthesia was injected in the oral cavity of patient before performing the procedure were included whereas undergrad dental students working in the clinical wards where local anesthesia was not injected in the oral cavity of patient before performing the procedure were excluded from the study.

Questionare was distributed among 265 undergrad dental students working in the clinical wards on rotation to answer the questions but only 250 undergrad dental students provided the response after completing it within a week. Questionare was given to these undergrad dental students to gather the information about their demographic identity altogether with their knowledge and attitude towards handling the anaphylactic shock/reaction. These undergrad dental students provided their responses after completing it within a week. Some undergrad dental students did not submit their responses while others submitted them after more than four months. Independent T test was employed for the statistical analysis of the variables used in this study.

Results

250 undergrad dental students that participated in this study ranged between 20-23 years of the age on the average. These undergrad dental students worked in the clinical wards and used local anesthesia for dental treatments of the patients in routine. The knowledge and attitude of these undergrad dental students toward local anesthesia utilization was assessed. Total 122 (48.8%) were male undergrad dental students and 128 (51.2%) were female undergrad dental students who participated in our study. The local anesthesia Lignocaine/ Medicaine was preferred by 112 (91.8%) male undergrad dental students and 120 (93.8%) female undergrad dental students while other type of local anesthesia used by male

and female undergrad dental students was 10 (8.2%) and 8 (6.3%). The local anesthesia-oriented knowledge and attitude of undergrad dental students was given in the Table I and Table II.

that overall knowledge of these undergrad dental students was much better in comparison to their attitude that involved their practical application in the adequate management of this medical emergency oriented disease (p value=0.001) (Table III).

Table I: Knowledge assessment of undergrad dental students regarding the local anesthesia used for routine dental procedures.

Questions Asked for Checking the Knowledge of undergrad dental students regarding local anesthesia	Gender			
	Male		Female	
	Lignocaine/Medicaine	Other	Lignocaine/Medicaine	Other
Which LA you use in daily practice.	112 (91.8%)	10 (8.2%)	120 (93.8%)	8 (6.3%)
Do you prefer LA with adrenaline or Without adrenaline.	111 (91.0%)	11 (9.0%)	117 (91.2%)	11 (8.6%)
Do you take history of any drug Allergy before treatment.	94 (77.0%)	28 (23.0%)	104 (81.3%)	24 (18.8%)
Do you ask previous experience of LA for treatment.	71 (58.2%)	51 (41.8%)	67 (52.3%)	61 (47.7%)
Do you know signs and symptoms of Allergic reaction in patients after giving LA.	83 (66.4%)	41 (33.6%)	72 (56.3%)	56 (43.8%)
Do you know which group of LA is more likely to cause anaphylaxis.	36 (29.5%)	86 (70.5%)	36 (28.1%)	92 (71.9%)
Have you received any training / workshop attended to deal such emergency.	62 (50.8%)	60 (49.2)	60 (46.9%)	68 (53.1)
Do you know how to do allergic test.	36 (29.5%)	86 (70.5%)	47 (36.7%)	81 (63.3%)

Table II: Attitude assessment of undergrad dental students regarding the local anesthesia used for routine dental procedures.

Questions Asked for Checking the Attitude of undergrad dental students regarding local anesthesia	Gender			
	Male		Female	
	Yes	No	Yes	No
Do you check expiry date of LA.	108 (88.5%)	14 (11.47%)	113 (88.3%)	15 (11.7%)
Do you ask for any allergy from LA before injection.	105 (86.1%)	17 (13.9%)	102 (79.7%)	26 (20.3%)
Do you perform aspiration before injection.	83 (68.0%)	39 (32.0%)	75 (58.6%)	53 (41.4%)
Do you perform Allergy test of patient before treatment.	1 (0.8%)	121 (99.2%)	1 (0.8%)	127 (99.2%)
Is Medical emergency kit available in hospital.	69 (56.6%)	53 (43.4%)	73 (57.0%)	55 (43.0)
Do you know the use of emergency kit.	84 (68.9%)	38 (31.1%)	86 (67.2%)	42 (32.8%)
Do you know the preferred drug for Allergy.	60 (49.2%)	62 (50.8%)	70 (54.7%)	58 (45.3%)
Do you know the route of drug use.	34 (27.9%)	88 (72.1%)	32 (25.0%)	96 (75.0%)
Will you be able to manage emergency.	51 (41.8%)	71 (58.2%)	54 (42.2%)	74 (57.8%)
If u know patient is Allergic to LA, would you start treatment or can you handle such patient.	24 (19.7%)	98 (80.3%)	28 (21.9%)	100 (78.1%)

The local anesthesia oriented knowledge of undergrad dental students was sufficient regarding history taking about any drug allergy, previous experience of local anesthesia, signs and symptoms of allergic reactions, and training workshops. On the other hand, local anesthesia-oriented knowledge of undergrad dental students was insufficient regarding group of local anesthesia causing anaphylaxis and performing allergic test. The local anesthesia oriented attitude of undergrad dental students was sufficient regarding expiry date checking, allergy from local anesthesia, aspiration, medical kit availability, knowledge of medical kit usage, preferred drug of allergy. On the other hand, local anesthesia oriented attitude knowledge of undergrad dental students was insufficient regarding allergy test performance, preferred drug for allergy, route of drug use, emergency management and handling of allergic patient. The current study confirmed

Table II: T-test analysis for comparing Knowledge and Attitude of undergrad dental students regarding local anesthesia utilization.

Variables	Mean ±SD	95% confidence interval of the level		P value
		Lower	Upper	
		Comparison between knowledge and attitude of undergrad dental students	-0.10 ±0.01	

Discussion

There is intense need of undergrad dental students to have complete knowledge about signs and symptoms of anaphylactic shock / reaction and the ability/attitude for the proper management of the disease. Current study

revealed that undergrad dental students in Islamabad displayed sufficient knowledge about the signs and symptoms of anaphylactic reaction but insufficient ability to manage it appropriately to facilitate the reduction in its incidence.

The most commonly well-known drug used for the routine dental procedures is the local anesthesia. During the dental treatments, anaphylaxis is very uncommon and rare but can lead to severe consequences if occurred by any chance. Various studies conducted in the past revealed the rise in the anaphylactic shock /reaction ranging between 1.0 in 3500 to 1.0 in 20000 as a result of local anesthesia that might eventually become life threatening in some of the cases.¹⁵⁻¹⁸ Although, local anesthesia with vasoconstrictor is used in low concentration which can be misinterpreted for the anaphylaxis but in actual it could be either anxiety or toxicity.^{19,20} That might have been possible due to the lack of knowledge and training sessions among the undergrad dental students that needs an improvement on the larger extent.

The individual constituent in the main composition of the local anesthetic agents used for clinical dental procedures are increasingly responsible for the allergic reactions especially anaphylaxis. The Allergic reactions due to Ester-type anesthetic agents are more common in comparison to the Amide-type, metabisulfite preservatives and methyl-paraben added solutions.²¹ This current study revealed that undergrad students are well aware of signs and symptoms of anaphylaxis but are not confident enough to treat and handle this reaction very well. The knowledge of female undergrad dentists about local anesthesia was better than the male undergrad dentists while handling ability of the later was good than the former. The handling of undergrad dental students was not sufficient regarding allergy test performance, preferred ...drug for allergy, route of drug use, emergency management, and handling of allergic patient. The findings in our study did not match the literature where knowledge and attitude of dental surgeons was evaluated in comparison to our study where knowledge and attitude of undergrad dental students was investigated.²² This might be attributed to greater ignorance level and lack of hands on experience in the undergrad dental students who are just fresh learners that might be slow in their professional handling abilities. Thus, further training programs and workshops are required to be conducted to update the confidence, knowledge and working ability of these undergrad students that could play an integral key role in benefitting

the community population by maintaining their oral and general health in a positive manner.

The medical emergency of anaphylaxis can be treated by inducing the intramuscular IM injection in the lateral thigh of an individual that has underwent the anaphylactic shock.²³ The 60 (49.2%) male undergrad students and 70 (54.7%) female undergrad students were well aware of the fact that Epinephrine is the drug of choice for treating the anaphylactic reaction. Majority of male undergrad students 88 (72.1%) and 96 (75.0%) female undergrad students were ignorant of the route of the Epinephrine usage which is an alarming situation because without knowing the route of injection usage, no further management of anaphylactic shock in any patient is possible.

Additionally, antihistamine and corticosteroids are the alternative local anesthetic agents but they are not vastly used because of their extensive side effects that is their drawback.^{24,25} Still, Epinephrine usage is more easy for the undergrad students in comparison to the antihistamine and corticosteroids whose slight dose alternations could affect the oral health status of any individual more quickly with enhanced hazardous effects. The present study confirmed that 86 (70.5%) male undergrad dental students and 92 (71.9%) female undergrad dental students were having less knowledge about the type of local anesthesia that might produce anaphylaxis. This is an alarming situation where undergrad dental students who are working in the clinical settings and coming in contact directly with the patients need to have complete knowledge about the anaphylactic shock/reactions and its management which is essential. This anaphylactic shock/reaction is quite rare but still it should be taught both theoretically as well as clinically in hospitals more to the dentistry related personnel in order to deal efficiently with these unavoidable emergencies sometimes. Local anesthesia is commonly used by the dentists in the private clinics as well as hospitals on daily basis and in huge amounts for different dental procedures. Therefore, it is the basic requirement of the dental practitioner to deal with these anaphylactic emergencies in a better way for proper surveillance and management of such dentistry oriented problems to avoid any severe discrepancies. Thus, knowledge and management skills of dentists need to be upgraded and ameliorated in improving the oral health of the community in more advanced way.

Conclusion

Although anaphylactic reaction rarely occurs in the clinical dentistry but still it could be hazardous if not managed properly. The standard management requires appropriate knowledge and attitude among dental professionals to deal with this medical issue. The current study concluded that undergrad dental students had enough theoretical knowledge regarding anaphylactic shock but lacked in the practical attitude to manage it adequately without any fear of severe consequences. This practical attitude can be enhanced by pursuing the undergrad dental students for undergoing manual hands on courses, workshops and awareness programs.

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