

ORIGINAL ARTICLE

The Usage and Attitude Towards Aspirating Dental Syringe, A Cross Sectional Study of Dental Practitioners in Khyber Pukhtunkhwa

TAJUD DIN¹, SOULAT JEHAN², RIDA UL HAYA³, TARIQ SARDAR⁴, MUHAMMAD SALMAN KHAN⁵, AYESHA ILYAS⁶^{1,2}Health Department KPK³Khyber College of Dentistry, Peshawar^{4,5}Khyber Medical University- Institute of Dental Sciences, Kohat⁶Khyber College of Dentistry, PeshawarCorrespondence to: Tariq Sardar Email: drtariq5611@gmail.com Phone: +923018004556**ABSTRACT****Objective:** The aim of the study was to determine the usage and attitude toward aspirating dental syringes among dental practitioners in Khyber Pakhtunkhwa province of Pakistan.**Study design:** Descriptive, cross sectional**Place and Duration:** Rural Health Centre Koghuzi, February 2021 to May 2022.**Methodology:** A cross sectional conducted on dental practitioners in Khyber Pakhtunkhwa. A purpose developed, self-administered questionnaire was used to collect data. It included both open and close ended questions. SPSS version 23 was used and data were analyzed using Chi-square test.**Results:** 40.7% of respondents were qualified as specialist and the 59.3% were general practitioners. Only 31.6% of the dental practitioners have dedicated aspirating syringe available to them. Overall only 6.9% of the dental practitioners practice aspiration in all injection types. Most respondents agree that use of aspirating syringes contributes to safety of local anesthesia but only few think they had complication in their practice resulting from use of non-aspirating syringes. Most respondents think they might consider using aspirating syringes in the future.**Conclusion:** Despite the generally positive attitude towards aspirating syringes, few dental practitioners have dedicated aspirating syringe available to them and even few actually practice aspiration during local anesthesia.**Keywords:** Attitude, Local anesthesia, Aspiration, Aspirating dental syringes.**INTRODUCTION**

Local anaesthetics are most commonly used drugs in dentistry. They have essential role in making dental procedures both acceptable and comfortable for patients. Local anesthetics are considered very safe and complications although uncommon may still occur.¹ Some of these possible complications may result from inadvertent intravascular injection of local anesthetics. Commercially available modern local anesthesia cartridges usually contain various combinations of vasoconstrictor, antioxidant, antifungal and preservatives in addition to local anesthetic agent itself. The complications resulting from intravascular injection are relevant to each of the above component but specially concerning with respect to vasoconstrictor and local anesthetic agent itself.²

Intravascular injection of local anesthesia results in sudden high concentration of the drugs in the blood. Both the central nervous system and cardiovascular system are particularly sensitive to components local anesthesia concoction, putting the patients at risk of toxicity and undesirable systemic side effects.^{3,4}

The concern of systemic toxicity is especially relevant in patient with medical comorbid conditions such as cardiovascular diseases, hypertension, hyperthyroidism and epilepsy, where tolerance to the sudden high concentration of components of local anesthesia is reduced and the risk of toxicity is increased.⁵⁻⁹ Intravascular injection of local anesthetic happens more often than realized. In fact, for inferior alveolar nerve block, which is most commonly administered nerve block in dentistry, 20% nerve block attempts may actually lead to intravascular injection.¹⁰

Aspiration before delivery of Local anesthesia can prevent inadvertent intravascular injections and the undesirable systemic effects that may ensue.¹¹ Despite the simplicity and efficacy of the techniques, aspiration is not universally accepted or practiced among dental practitioners. Considering the potential toxicity resulting from Intravascular injection, we conducted this study to assess the usage of aspirating dental syringe during local anesthesia and the attitude toward it among dental practitioners practicing in Khyber Pakhtunkhwa province of Pakistan.

MATERIAL AND METHODS

This was a cross sectional descriptive study conducted on dental practitioners practicing in Khyber Pakhtunkhwa province of Pakistan. The study was conducted at Rural Health Center

Koghuzi, Chitral from February 2021 to May 2022. Sample size was calculated by using WHO sample size calculator with the level of significance of 5% and confidence interval of 95%. The final sample size was calculated as 173. All dental practitioner domiciled in Khyber Pukhtukhwa, currently practicing in the province were included in the study. The study included practitioner from both private and public setups Practitioners practicing outside of the province were excluded from the study. A self-administered questionnaire was developed to assess usage and attitude toward aspiration during local anesthesia among dental practitioners. The questionnaire was entirely in English language. The questionnaire was purpose developed for this study. Expert opinion was sought for the review of the questionnaire. The questionnaire included close ended questions related to nature of practice, qualification, availability of dedicated aspirating dental syringe, the practice of aspiration during infiltration and nerve block. The questionnaire also included three bipolar five point Likert scale based questions enquiring practitioner's opinion of aspiration technique contribution towards safety of local anesthesia, any complication resulting from use of non-aspirating syringes as well as the consideration towards possible use of aspiration syringes in the future. Participants were informed about the nature of the study and assured of nondisclosure of their identity. The data were analyzed using SPSS version 23 and presented using descriptive statistics. Chi square test was used check the statistical significance.

RESULTS

A total of 200 questionnaires were distributed out of which 174 were returned with a response rate of 86%. Of all the respondents 55.7%(97) were male, 40.8%(71) of respondents were qualified as specialists and 32.6%(28) were working in public setup, 36%(31) in private setup and 31.4(27) were part of both public and private setups.

Table 1: Availability Of Dedicated Aspirating Dental Syringe

	Specialist	General practitioner	Total	percentage	P value .632
Available	21	34	55	31.6	
Unavailable	50	69	119	68.4	

A total of 31.6%(55) of dental practitioners have dedicated aspiring dental syringe available to them, 38.2% (21) of them are specialist and 61.8%(34) are general practitioners. Among the dentist who have dedicated aspiring syringe available, 29.1%(16), 47.3%(26), 23.6%(13) work in public, private and public/private setup respectively.

Table 2: Availability of Dedicated Aspiring Syringe in Different Setups

	Public	Private	Public/Private	P value
Available	16(28.6%)	26(41.3%)	13(23.6%)	.101
Unavailable	40(71.4%)	37(58.7%)	42(74.4%)	

Only 6.9%(12) of dental practitioners aspirate while giving infiltration in healthy patients. 17.8%(31) of dental practitioner use aspiring technique while giving nerve block. For patient with comorbidities, higher number of dental practitioners commit to aspiring technique. The frequency of dental practitioners using aspiration technique rises to 15.5%(27), 25.9%(45) for infiltration and nerve block respectively, in patient with comorbidities.

Table 3: Practice of Aspiration Technique

		Specialist	General dentist	P value
Healthy patients	Infiltration	6	6	.552
	Nerve block	11	20	.506
Patients with comorbidities	Infiltration	13	14	.398
	Nerve block	17	28	.631

An overwhelming majority 90.8% (158) of dental practitioners think (STRONGLY AGREE OR AGREE) with the statement that aspiration during local anaesthesia contributes to safe delivery of anaesthesia and only 5.7%(10) dental practitioners disagree with it.

Majority of the dental practitioners disagree with the statement that they had complication in their practice that they believe resulted from the use of non-aspiring syringe. 77.7%(55) of specialist and 55.3%(57) disagreed with the statement.

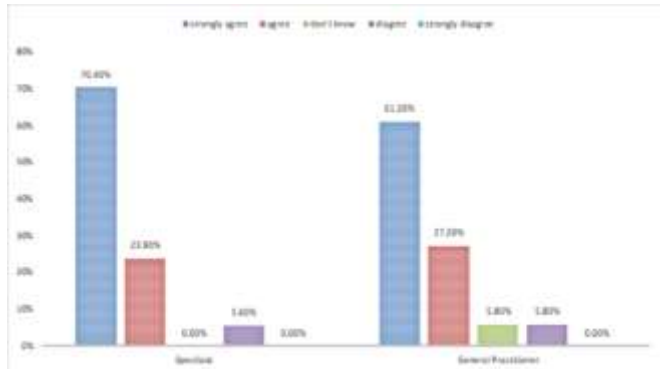


Fig 1: I think the use of aspiring syringes contributes to safe delivery of local anesthesia

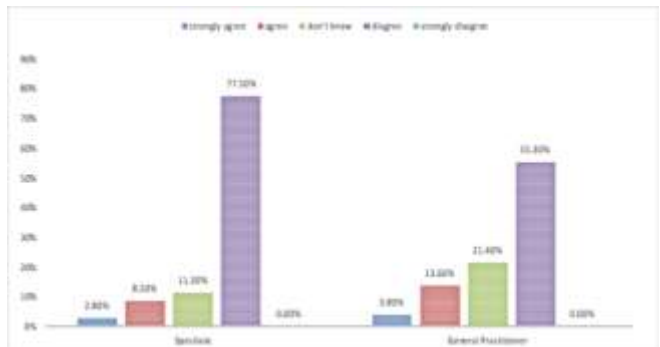


Fig 2.: I had complication(s) in my practice that i believe resulted from use of non-aspiring syringes?

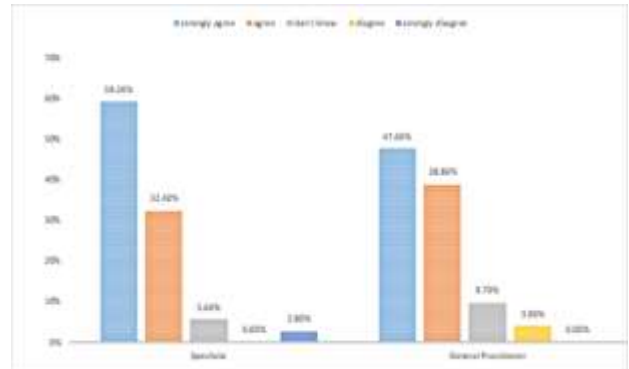


FIG 3. I would consider using aspiring syringes/would continue using aspiring syringes in future

88.5%(154) of dental practitioners think that they would consider using aspiring dental syringe in the future and 8%(14) are undecided about it. Specialist 91.6%(65) appear to be more inclined toward the use of aspiring syringes in the future compared to general practitioners 86.4%(89)

DISCUSSION

Aspiring syringes have been in use in dentistry since they were first introduced around the end of the first half of the 20th century.¹⁴ The development was meant to address the concern of possible complications resulting from inadvertent intravascular injection. Both local and systemic complication resulting from intravascular injection of local anesthetics have been reported in the literature.^{11 15 16 17} Despite this concerns the utility of aspiration techniques is not universally recognized and aspiration technique is not used by all practitioners without exception.

Many authors suggest that the incidence of intravascular injection is very low and even if it does happen, they content of single dental cartridge are not enough to cause grievous consequences. The need to aspirate actually makes local anesthesia injection more uncomfortable for patients and that aspiring type dental syringes are not effective at detecting every intravascular placement of the needle.^{10 18}

The incidence of positive aspiration has been reported to be in excess of 20%¹⁰ from some studies and there are case reports of complication resulting from single dental cartridge secondary to intravascular injection.^{11 15} Aspiring dental syringes have been shown to be at least as effective as conventional disposable hypodermic syringe at detecting intravascular placement of the needle.¹⁹ Considering this it is generally recommended to use aspiring type dental syringe.

The availability of dedicated aspiring dental syringe appears to be very low in our study population. Table 2 shows that a total of 31.6%(52) of dental practitioners have dedicated aspiring dental syringe available to them. Relatively higher percentage of general dentist have dedicated aspiring dental syringe (33%) available compared to specialist (29.6%). The difference, however is statistically not significant (p =.632). From the literature search we didn't find any studies on the use of aspiring syringes in the rest of country and in the region, even though use of aspiring syringes during local anaesthesia is considered a standard of care as advocated by American Dental Association.²⁰ Although aspiration can be done using syringe types not custom made for use in dental local anaesthesia, our study, however shows that significantly higher number (p=.000) of dental practitioners who have dedicated aspiring type dental syringe available, practice aspiration technique at least in some injection type. This goes to show that dental practitioners who make dedicated aspiring syringe available in their practice/who have dedicated aspiring syringe available in their practice are also more likely to practice the aspiration technique. The availability of dedicated aspiring type dental syringe doesn't differ markedly

among dental practitioners working in different setups (Table 3) and is statistically not significant based on the chi squared test ($p = .101$). Based on the above, the proclivity towards use of aspiration technique appears to depend more on personal preference rather than availability of the dedicated aspirating syringe.

The number of dental practitioners who practice aspiration technique is even lower as many dentist who have aspirating syringe available to them don't practice aspiration technique. Table 4 shows that only 6.9 % respondents aspirate during both infiltration and nerve block in all patients. The results are comparable to 4% of dental practitioners who practice aspiration in all injection types in a study conducted in Saudi Arabia.¹ Higher number of dental practitioners perform aspiration during nerve block (17.8%) in healthy patients. For patients deemed to have comorbid conditions even more dental practitioners perform aspiration (25.9%). The difference between specialist and general dentist with respect to aspiration is not statistically significant for all injection types according to chi-square test.

Surprisingly most dental practitioners (90.8%) in this study believe (STRONGLY AGREE OR AGREE) that the use of aspirating type dental syringe does contribute towards safety of local anesthesia. This however, doesn't motivates most of them to perform aspiration as only 6.9 % respondents commit to perform aspiration during all injections types.

The reluctance towards use of aspiration technique may stem from the assuring safety record of modern local anesthetics reported in literature^{12 13} and the low incidence of serious complications attributed to the use of local anesthetics that dental practitioners experience during their practice. In fact in our study, only 3.4% of respondents believe (STRONGLY AGREE) that they had complications in their practice that the believe resulted from use of non-aspirating type dental syringe. The welcoming trend from this study is perhaps the inclination of most dentist (89%) towards the possible use or continued use of aspirating type dental syringe in the future

Recommendation: Keeping in view the limited use, as apparent from this study, Improved regulation and motivation may help increase the usage of aspirating dental syringes among dental practitioners in the province.

Conflicts of interest: None declared

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CONCLUSION

Local anesthetics are incredibly safe and effective drugs. Complications however may still happen. The incredible safety record of modern local anesthetics doesn't absolve us of the responsibility to play our part towards patient safety. Aspirating technique is simple and aspirating type dental syringes are inexpensive and readily available. Although most dental practitioners favorably view the utility of aspirating dental syringe, they haven't been widely adopted into clinical practice in our region

and negligible number of dental practitioners routinely practice aspiration during local anesthesia.

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