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RESEARCH ARTICLE
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VASOVAGAL SYNCOPE: A STUMBLING BLOCK FOR MEDICAL STUDENTS ASPIRING TO BECOME SURGEONS

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ABSTRACT

Objective: The objective was to identify the trends of vasovagal syncope in medical students of the Shalamar Medical and Dental College and to determine the association of vasovagal syncope episode with surgical career choice among medical students.

Methodology: A quantitative, descriptive cross-sectional study was carried out at Shalamar medical and dental college. Students of clinical years i.e., 3rd, 4th, and final year MBBS were invited to participate in the study.

Statistical analysis: Statistical analysis was performed using IBM SPSS 21 for Windows. Data is expressed as mean values, mean ± standard deviation, and frequency trends. The p-value is calculated using the chi- squared test. Two-sided p values <0.05 is considered statistically significant. Chi-square tests for comparison categorical variables is applied. Association is noted between independent variables. (Age and gender) with dependent variable (syncope episode)

through application of chi square test of significance. Association of the syncope event with career choice is noted by application of chi square test.
Results: A total of 202 students took part in the study out of these a total of 50 (24.75%) students reported one or more episode of syncope. Gender and age have no statistically significant bearing on occurrence of syncope episodes. 67 students were influenced by presyncope or syncope event and decided to switch their choice of career path from surgery. Long periods of standing, smell of cautery, hot temperature, were among leading trigger factors.

Keywords: vasovagal syncope, presyncope, medical students, career choice, operation theatre

INTRODUCTION:

Syncope is a prevalent but often ignored clinical problem among students of medical school. Vasovagal syncope is transient fainting episode due to arteriolar dilation (Vaso) and cardiac slowing (vagal) causing hypotension and loss of conciousness.[1] It is form Of reflex syncope arbitrated by emotional and orthostatic stress.[2] Medical school is a place where students are equipped with knowledge and set of skills required to cope up with their professional life.[3] They are rotated through various medical and surgical specialties and sub specialties during their clinical and clerkship years.[4] They learn operative skills and instrumental techniques which are deployed in surgical practice. Witnessing surgeries in progress is fruitful for educational and practical purposes. This learning opportunity, however, can be tarnished by negative experiences as syncope.[5] Frequent episodes of vasovagal syncope can reduce the quality of life of students who wish to become surgeons by affecting their emotional well-being, social functioning and by decreasing their morale to pursue their career in surgery.[6] Syncope is caused due to hypotension, which may be aggravated by emotional and environmental factors.[6] The theater experience can be intimidating for certain students and they may encounter negative emotions as anxiety, stress and apprehension.[7] Syncopal episodes and emotions may impact students' attendance, their learning capabilities and their career choices .[8] The purpose of this study is to assess the prevalence of vasovagal syncope, its triggers and its impact on surgery as a career option.

OBJECTIVES:

- To identify the patterns of vasovagal syncope in medical students of the Shalamar Medical and Dental College.
- To determine the association of vasovagal syncope episodes with career choice among medical students.

RATIONALE:

There is a limited number of literature available on this topic. Only a few number of the previous studies done, have tried to quantify the vasovagal syncope related to the operation theater among medical students.
The purpose of this study is to assess the patterns of vasovagal syncope among medical students in the selected medical college, since they have to go to operation theatre for training purposes during their clinical years i.e., 3rd year, 4th year, final year. Furthermore, researchers will also determine if this event has any impact on the students' choice of surgical specialty as career in the future.

SIGNIFICANCE OF STUDY:

The study will help us to understand the patterns of vasovagal syncope in the students during surgical procedures inside the operation theater. It will also allow us to understand the association of vasovagal syncope with the choice of career (if any). This will help us to give recommendations to improve the experience of students during their surgical rotations.

LITERATURE REVIEW:

Operation theatre (OT) related vasovagal syncope can be seen as a big obstacle for undergraduate

medical students who wish to pursue a career in surgery.[6] A cross sectional study of 632 medical students of which 356 (57%) female and 274 (43%) male students was conducted.[6] 77 (12%) had at least one actual episode of syncope.[6] To verify the detrimental effect of syncope in pursuance of surgery as a career option statistic showed that 44 out of 77 (57%) had an intention to become surgeons and 7 (9%) were dispirited by syncope episodes.[6] Important risk factors included hot temperature (n = 61, 79%), increased surgical hours (n = 56, 73%), and a face mask (n = 36, 47%).[6] The essential preventive measures included eating, coming hydrated and having some kind of mobility of legs while standing in OT.[6] Another research was done to determine the OT related syncope and pre-syncope episodes among medical students. 180 medical students participated from all four years of medical college.[7] 75 out of 180 (42%) medical students reported an episode of syncope with symptoms of sweating, nausea and blurry vision.[7] Attitude and perception of being in OT also effects the prevalence ratio as 21 out of 75 (28%) had feelings of anxiety before going in OT.[7] Gender also plays an important role as 106 females who participated were more likely to experience syncope ($p= 0.011$) and less likely to pursue surgery as a career option ($p<0.001$).[7] Some students faced the problem of not having sufficient exposure as only 28% had information on how to avoid it and 59% had this source of information from their classmates, lack of professional training in OT.[7] A research conducted in 2006 suggested that gender of an individual and parental history are important determinants of syncope in their children.[9] The study had 3 tools, time dependent analysis, and diagnostic score relied on subject's history and obtaining the data from the subject only.[9] Calgary syncope symptom score and Kaplan meter were used to confirm the incidence of vasovagal syncope and relation of parental history and probability of fainting in offspring.[9] The probability of fainting was 32% with a median age of 14 years.[9] The ratios of fainting in females were (42%), more as compared to males (19%).[9] An individual having a history of syncope in both parents was more susceptible to faint than a person having no history [P, 0.0001; HR 3.4 (95% CI 1.7–7.03)].[9] Research was conducted on 170 students out of which 107(62.9%) were female and 63(37.1%) were males[5]. 48 (85.7%) out of these 56 experienced fainting in operation theatre environment while 8(14.28%) experienced it outside operation theatre[5]. There were certain predisposing factors for fainting which included bleeding 18(10.5%), incision 8(4.7%), blades and scalpel 4(2.3%), use of surgical masks 2(1.1%), operating environment 18(10.5%) and busy environment 4(2.3%) individuals[5]. As a result, 23(13.5%) wanted to pursue surgical profession while 43(25.3%) did not.[5] Another research was conducted to assess incidence of syncope among 330 medical students out of which 52 students reported with near or actual operation theatre and 2 students responded with the actual loss of consciousness[10]. Out of 52 responding students, the majority responded to pursue the surgical carrier.[10] According to the students the predisposing factors included assisting in operations, hot temperature, length of standing time and being scrubbed.[10] Subjects reported with some preventive measures taken to prevent syncope episodes which included drinking or eating prior to operation, sitting down, moving legs during operation and taking short breaks. [10] Another research was conducted to assess the prevalence, triggers, and recurrence rate of syncope in medical students.[11] It included 394 students out of which 253(64%) were female and 124(31%) were male. [11]Triggers for syncope included warm environment 47(31%), prolonged standing 41(27%), pain 38(25%), illness 27(18%), alcohol 20(13%), emotions 17(11%), venipuncture/Seeing blood 16(10%), standing 13(8%), food intake 10(6%), tiredness 8(5%), drugs 8(5%), menstruation 7(NA) others included 16(10%) whereas some unknown factors 5(3%). [11] 84(55%) students listed multiple triggers. Pain, emotions and venipuncture/seeing blood were mentioned by 39 % of the students in which female prevalence was greater than male.[11] Conclusion was made that syncope is quite common amongst medical students and care physicians should be aware of its high prevalence.[11]

METHODOLOGY:

- **Study design and type:**

Quantitative, descriptive cross-sectional study.

- **Study Setting:**

Shalamar medical and dental college.

- **Study Duration:**

June 2021 to November 2021.

- **Study universe:**

All medical students of Shalamar Medical and Dental College.

- **Study population:**

It will include medical students of 3rd, 4th and final year from Shalamar Medical and Dental College.

- **Sample size:**

The sample size was calculated using Open Epi and selecting default population 1 million, prevalence 12%[6], confidence interval 95%, sample size is 163. Keeping in view 20% nonresponse rate sample size will be 200.

- **Inclusion Criteria:**

Students of 3rd, 4th and final year MBBS, who give consent to participate in the research will be included in the study**.**

Students who have gone through surgery and allied rotation at least once in their clinical training.

- **Exclusion Criteria:**

Students who have not attended surgery rotation in any of the clinical years at the time of filling the questionnaire.

Incomplete questionnaires.

- **Sampling Technique:**

Convenient sampling technique was applied.

- **Study instrument:**

A questionnaire was developed from the previous studies.[5,6] Outcome variables include impact on career choice.

- **Data collection procedure:**

Data was collected via Google Forms. The confidential link to Google Forms was shared with the students through WhatsApp. The link was shared in WhatsApp group of each class along with a motivational message asking them to fill the questionnaire. A reminder to fill the form was sent for the next two days asking students to fill the questionnaire. The message was sent via class representatives.

Collected data was automatically gathered in a google sheet, which was later transferred to an excel spreadsheet. After which statistical analysis was done.

The study was carried out in Shalamar Medical and Dental College, Lahore.

- **Data analysis plan:**

Statistical analysis was performed using IBM SPSS 21 for Windows. Data is expressed as mean values, mean ± standard deviation and frequency trends. The p value is calculated using chi-squared test. Two-sided p values

<0.05 is considered statistically significant. Chi-square tests for comparison categorical variables is applied.

Association is noted between independent variables. (Age and gender) with dependent variable (syncope episode) through application of chi square test of significance.

Association of the syncope event with career choice is noted by application of chi square test.

- **Ethical Considerations:**

The confidentiality of the participants was maintained and data was accessed by the research team only.

RESULTS:

A total of 202 students participated in the study. The demographic variables of the study included gender, residential status and monthly income. Our study has a 34.2% male representation whereas

65.8% female representation in data. On the basis of residential status, there are 105 (52.0%) hostelites; whereas, 97 (48%) of responders were day-scholars. Our study found that age and gender had no statistical bearing on the occurrence of vasovagal syncope.

Out of 202 people, 148 (73. 26%) didn't experienced vasovagal syncope. 45 (22. 27%) persons had had experienced one or more episodes of syncope. While 9 (4.45%) had experience more than three episodes of syncope.

127 (63%) had less than one presyncope episode. 65 (32%) people had 1-3 presyncope episodes. Only 10 (5%) people add greater than three presyncope episodes.

Cross comparison of the vasovagal syncope events provides the following results. 52(25%) males and 100(49%) females had no episodes of syncope a total of 152(75%) whereas 17(8%) males and 33(16%) females had one or more events of syncope a total of 50(24%). The grand total being 202 having P value 1.0.

On the basis of age less than 22 years, 84(42%) people had no syncope events while 26(13%) did. A total of 110(56%). On the other hand, in people aged greater than 22 years, 63(32%) had no such episodes while 23(11%) had one or more episodes of vasovagal syncope a total of 86(43%). The grand total being 196 having P value 0.623.

Triggers of the vasovagal syncope included hot temperature 25(12%), length of time standing 34(16%), menstruation 15(7%). 36(17%) mentioned smell of cautery as trigger factor.18(8%) were triggered by sight of body viscera. Wearing a surgical mask was trigger in 23(11%). Other triggers were sight of blood or venipuncture 27(13%), smell of disinfectant 24(11%), observing incision on body27(13%). Only 1(0.5%) mentioned hypoglycemia as trigger. Many mentioned more than one trigger factor causing their syncope episode.

67 (33%) students said their career choice was affected by their presyncope or syncope episode. Out of 50 (24.75%) people who experienced at least one episodes of syncope only 32(15.84%) people had influence on career choice. The p-value using chi-square test was calculated to be <0.01 indicating a statistically significant impact of vasovagal syncope on the career choice.

Tables and figures:

Table1: demographic variables

Variables		**Frequency**	**Percentage**
Gender	Female	133	65.8
	Male	69	34.2
Residential status	Day scholars	97	48.0
	Hostelites	105	52.0
Monthly income	Less than 500,000	149	73.8
	More than 500,000	53	26.2

Table 2: Occurrence of Vasovagal Syncope and Presyncope

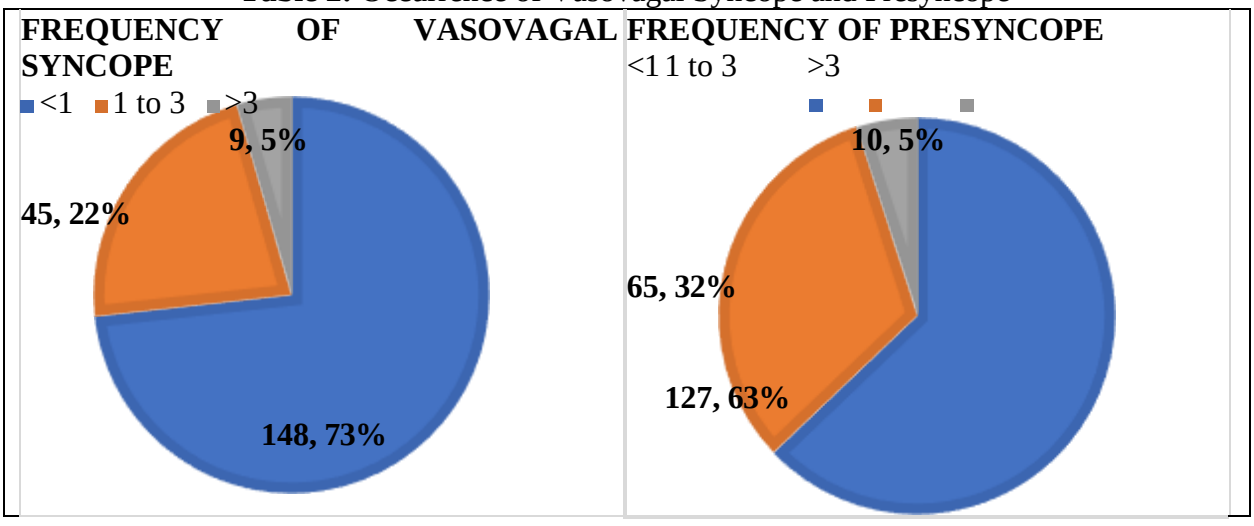

Table 3: Cross Comparison of Vasovagal Syncope Variables

		Syncope Event		Total	P value
		No	Yes		
Gender	Female	100	33	133	1.000
	Male	52	17	69	
Total		152	50	202	
		Syncope Event		Total	P value
		No	Yes		
Age	<= 22 years	84	26	110	0.623
	>22 years	63	23	86	
Total		147	49	196	

Table 4: Trigger Factors of Vasovagal Syncope

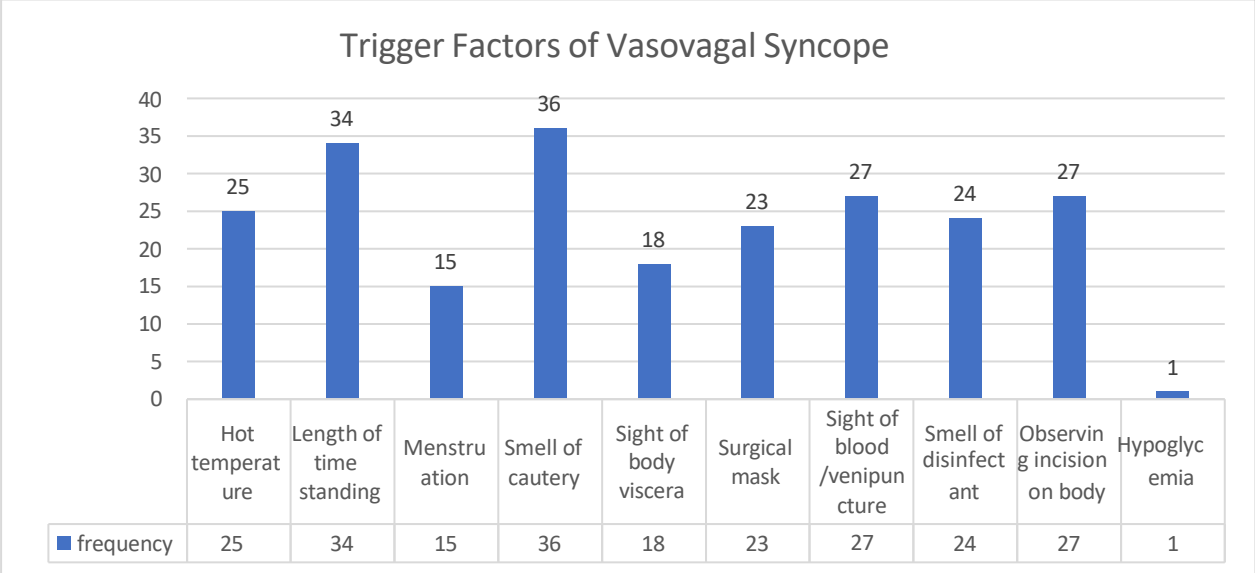

Table 5: Influence of Vasovagal Syncope Episode on Career Choice

		Influence on career choice		Total	P value
		No	Yes		
Syncope Event	No	117	35	152	<0.01
	Yes	18	32	50	
Total		135	67	202	

DISCUSSION:

Vasovagal syncope or neurocardiogenic syncope is a condition in which patient experiences a collage of symptoms caused by vagal stimulation triggered by an array of triggers. This study focuses on the effect of vasovagal syncope on the medical students attending their surgical rotations in the operating theaters. It also focuses on the effect it has on the career choice of medical students. In this study, we have investigated the occurrence of syncope and presyncope across medical students of different age groups and genders. Different triggers leading to a syncopal episode have been investigated and this information has been used to explore the effect of syncope on the choice of a surgical career.

A population pool of 202 medical students took part in this study. 65.8% of them were females while 34.2% of them were males. In our study, a total of 50 students out of 202 experienced a syncope event. 24.8% females experienced a syncopal attack while 24.6% males experienced vasovagal syncope. A significantly high prevalence of syncope among female students has been seen across different studies conducted before. In a study by Hassan *et al* 62.9% of females and 37.1% of males experienced vasovagal syncope[5]. In previous studies, a statistically high occurrence

of vasovagal syncope among females was observed as compared to the male participants.[6,10,11]
An association of vasovagal syncope with the age of participants was also observed. In our study, out of 49 participants who experienced vasovagal syncope, 26 participants were 22 years old or younger. 23 of the reactors were older than 22 years. The same trend has also been observed in the existing literature. In Shaikh *et al* the mean age of participants who experienced syncope was 20-years-old[10]. Jamjoom *et al* reported Mean age of 23-years[6] while Ganzeboom *et al* reported mean age of 21 years[11].
A lot of triggers that are thought to initiate a syncopal attack have been reported in the literature. In our study hot temperature, length of time standing, menstruation, smell of cautery, sight of body viscera, surgical mask, sight of blood /venipuncture, smell of disinfectant, observing incision on body and hypoglycemia were the triggers that initiated a vasovagal attack. In our study the most prevalent predisposing factor was length of time standing, smell of cautery and hot temperature. Similar trend was observed in Jamjoom *et al* their most reported contributory factors were hot temperature, prolonged standing, wearing a surgical mask and the smell of diathermy .[6] Ganzeboom *et al* reported warm temperature, prolong standing and pain as the most prevalent trigger.[11]Similar triggers were reported by Shaikh *et al*[10] while Hassan *et al* reported sight of bleeding, scalpel, blades and incision were the most prevalent predisposing factors for the participants.[5]
We also investigated the influence vasovagal syncope had on the career choice of the students. In our study, 64% participants said that their career choice was influenced by the syncopal event while 36% participants said that there was no impact of vasovagal syncope on their career choice. In Hassan *et al* 25.3% of the participants who had syncope, had a negative effect on their choice of surgery as a career while 13.5% participants who had syncope reported that they still wanted to pursue surgery as a career.[5]

CONCLUSION:

Our study clearly shows that operation theatre related syncope is common among medical students. It has discouraging effects on morale of medical students especially those who are aspiring to become surgeons. Through our study we have established that there are effective preventive measures against it and we have identified risk factors and practical steps to avoid its recurrence. Our results suggest that syncope episodes do effect surgical career choice among medical students.

RECOMMENDATIONS:

- One should stay hydrated and take good meals before any procedure.
- Try to keep changing your body position from time to time.
- Do not tie the surgical mask too tight.
- If you are feeling like having an episode, tell someone.
- If having an episode try lying down with foot end elevated or try sitting with head between your legs to allow good blood flow to the brain.
- Evaluate your trigger and precipitating factors. Try to avoid those factors next time.
- Exposure therapy and psychological therapy has proved very beneficial in overcoming such undesirable situations.

LIMITATIONS:

- Convenient sampling technique was used to collect data. Therefore, some students experiencing syncope might have been left out. A larger sample size can be used for more in- depth study.
- Since this was a retrospective study, therefore recall bias may be present.

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