ORIGINAL ARTICLE

Awareness on D-dimer assay among dental students

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ABSTRACT

D-dimer molecules are formed by the degradation of cross-linked fibrin during the process of fibrinolysis. The formation of D-dimer requires the activity of activated factor XIII (factor XIIIa), plasmin, and thrombin. To assess the awareness about D-dimer assay among dental students. A cross-sectional study was done among 100 dental practitioners through an online survey. The survey consisted of 10 semiclosed prevalidated and reliable questionnaires based on the knowledge, attitude, and practice of the dentists on D-dimer assay. Descriptive and inferential statistics were performed to report the responses of the participants. Most participants did not know what a D-dimer assay is (55%). Forty-six percent of participants responded that the D-dimer assay is used to rule out serious blood clots. Fifty-four percent of the participants responded that fibrin D-dimers are formed when fibrin strands are formed. The current study shows that the knowledge about D-dimer assay is more in CRRI than in participants of junior year of study. Thus, more rigorous educational programs should be initiated to further enrich the knowledge among dental students.

Key words: Awareness, D-dimer, dental students, innovation

INTRODUCTION

Cross-linked fibrin is broken down into D-dimer molecules during fibrinolysis. Three enzymes are required to make D-dimers: activated factor XIII, plasmin, and thrombin.[1] The coagulation system's thrombin transforms soluble fibrinogen into fibrin monomers, which kicks off the process.[2] Noncovalent connections within the protein are created by the thrombin breakdown of peptides from the N-terminal region, resulting in allosteric alterations.[3] Fibrin is reinforced by interactions with factor XIII, which cross-links the D domains of the nearing fibrin monomers after thrombin activation. A D-dimer molecule is formed when plasmin digests the fibrin clot.[2]

D-dimer measurements are widely conducted with a variety of quantitative and qualitative cutoffs using central laboratory and point-of-care testing.[4] Because D-dimer molecules are formed only when thrombin is created and cross-linked fibrin is broken down, their presence implies intravascular coagulation.[5] Thus, D-dimer levels are taken as an indicator of thrombotic and thrombolytic activity, as well as a worldwide marker of blood coagulation and fibrinolytic system activation.[6]

In various clinical settings, the presence or lack of the D-dimer molecules has a range of effects. Deep-vein thrombosis (DVT), pulmonary embolism (PE), aortic dissection, and disseminated intravascular coagulation (DIC) require D-dimer testing for current triage and diagnosis.[7] D-dimer testing is most useful when the risk of thromboembolism is less, with a negative result

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surely ruling out thrombosis and a positive result indicating thrombosis.

Since the 1980s, the number of PubMed articles evaluating the use of the D-dimer test results in the diagnosis of clotting diseases has continuously increased. This study combines D-dimer with clinical data as part of a diagnosis, such as determining the duration of anticoagulant therapy and ruling out *venous thromboembolism* (VTE). Despite the large amount of data, the therapeutic value and importance of many of the findings are still being debated. Several efforts are undertaken to increase the use of the D-dimer test in various medical conditions and integrate it with other laboratory and clinical test results.

Our team has substantial research and knowledge, which has resulted in high-quality publications.[8-17] The study's goal was to see how well dentistry students knew about the D-dimer assay.

MATERIALS AND METHODS

This is a cross-sectional study done among 100 dental practitioners through an online survey. The survey consisted of 10 semiclosed prevalidated and reliable questionnaires based on the knowledge, attitude, and practice of the dentists on D-dimer assay. The ethical approval of the current study was obtained from the institutional ethical board (IHEC/SDC/PROSTHO/21/044). The consent of the participants has been obtained after explaining the need for the study. Prior approval to carry out the study has been obtained from the international research committee of the author's university. The pros of the study were that it was done through an online survey and was less time-consuming compared to manual methods or entering the responses of the participants. The cons of the survey were the limited geographical area in which data were collected and analyzed using SPSS software version 23.0 (IBM Corp, IBM SPSS Statistics for Windows, Armonk, NY). Descriptive and inferential analyses were performed to report the responses of the participants.

RESULTS

The current study equal number of students for first year to CRRI. It shows that most participants did not know what a D-dimer assay is (55%) [Figure 1]. Most participants in the study thought that the other name of the D-dimer assay was fibrin D-dimer and fibrin degeneration fragment (41%). Most participants knew that the D-dimer assay was a "plasma protein test" (55%) [Figure 2] and is used to rule out serious blood clots (46%) [Figure 3]. Most participants responded that fibrin D-dimers are formed when fibrin strands are formed (54%) and that the elevated level of D-dimer indicates the active formation of blood clots (51%) [Figure 4]. The participants were also aware that the normal level of D-dimer was <0.50 (47%) [Figure 5]. The participants responded that D-dimer is expressed as Fibrinogen Equivalent Units (FEU) (57%) [Figure 6]. It is evident from the association graph that the knowledge about D-dimer is more in senior participants than in juniors (21%) [Figure 7].

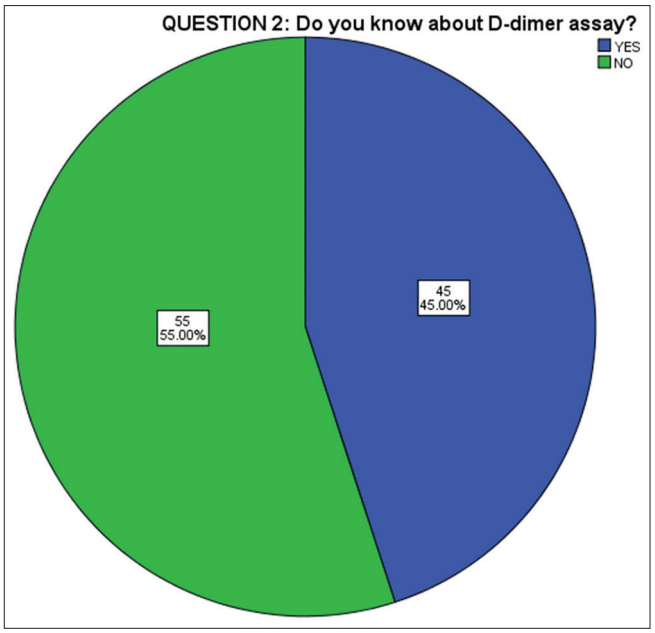

Figure 1: Do you know about D-dimer assay?

Figure 1 represents the number of participants who were aware of what a D-dimer assay is. Blue represents response "yes" and green represents response "no." It is evident that most participants did not know what a D-dimer assay is (55%).

Figure 2 represents the question: what is D-dimer assay used for? Blue represents response "blood tests" and green represents response "plasma protein test." It is evident that most participants answered "plasma protein test" (55%).

Figure 3 represents the question: What is D-dimer assay used for? Blue represents response "to rule out serious blood clots," green represents response "to rule out liver diseases," and brown represents response "to rule out pulmonary embolism." It is evident that most participants responded that D-dimer assay is used to rule out serious blood clots (46%)

Figure 4 represents the question: What does elevated level of D-dimer indicate? Blue indicates the response "active formation of blood clots" and green represents the response "degeneration of blood clots." It is evident that most participants responded that elevated level D-dimer indicates the active formation of blood clots (51%).

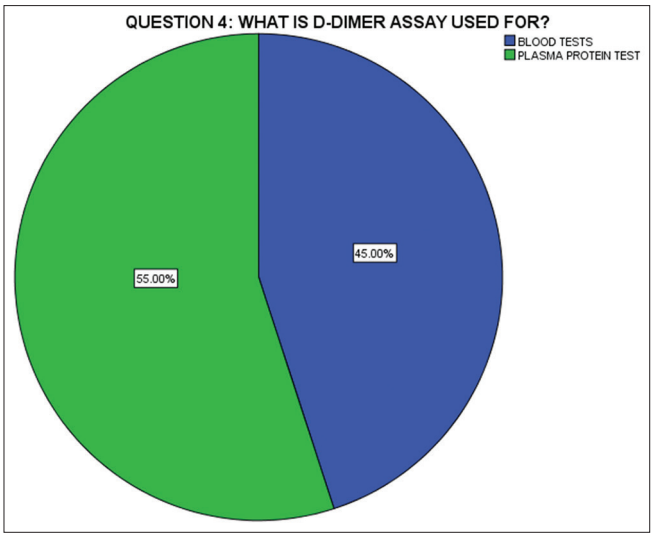

Figure 2: What is D-dimer assay used for?

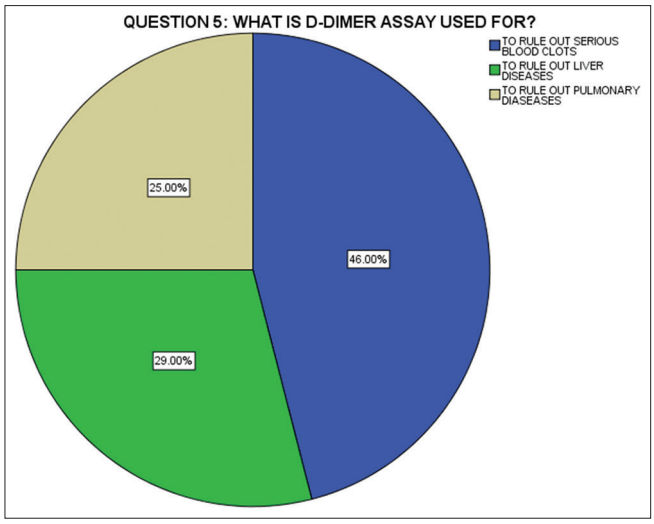

Figure 3: What is D-dimer assay used for?

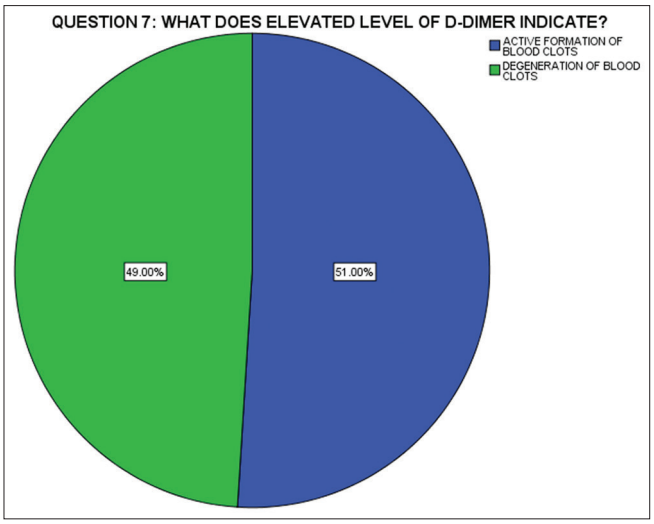

Figure 4: What does elevated level of D-dimer indicate?

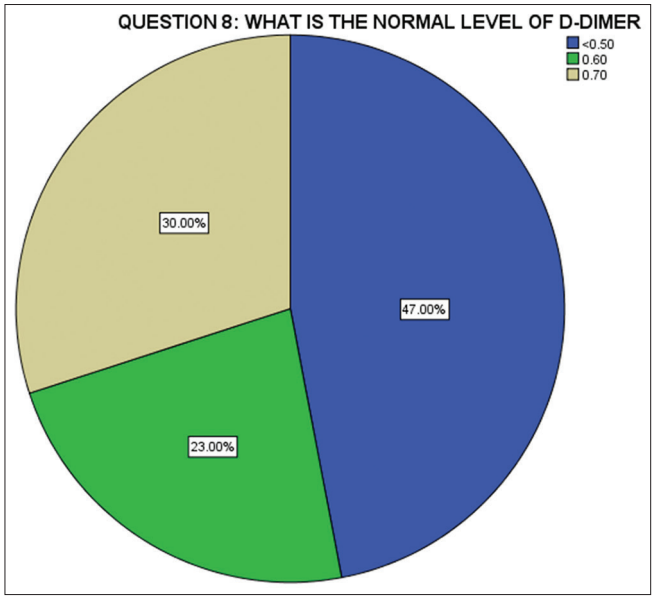

Figure 5: What is the normal level of D-dimer?

Figure 5 represents the question: What is the normal level of D-dimer? Blue represents <0.50, green represents 0.60, and brown represents 0.70. It is evident that most participants responded that the normal level of D-dimer <0.50 (47%).

Figure 6 represents the question: What causes the increase in D-dimer? Blue represents clotting problems, green represents pregnancy, and brown represents the response "both." It is evident that most participants responded to clotting problems (51%).

Figure 7 represents the year of study correlated with knowledge of students about D-dimer assay. Blue represents the response "yes" and green represents the response "no." The X-axis indicates the year of study and the Y-axis represents the number of responses of students. Participants responded that the D-dimer is expressed as FEU (57%). It is evident that the knowledge about D-dimer is more in senior participants than in juniors (21%).

DISCUSSION

The current study shows the knowledge about D-dimer assay among dental students.[18] The study reveals that the knowledge about D-dimer assay is more in CRRI than in participants in junior year. This result is in correlation with an article written by Favresse *et al*., who in his study revealed that senior dental practitioners had the most knowledge about D-dimer assay and its uses in clinical practice.[19] There were no studies done on assessing the knowledge about D-dimer assay among dental students.[20]

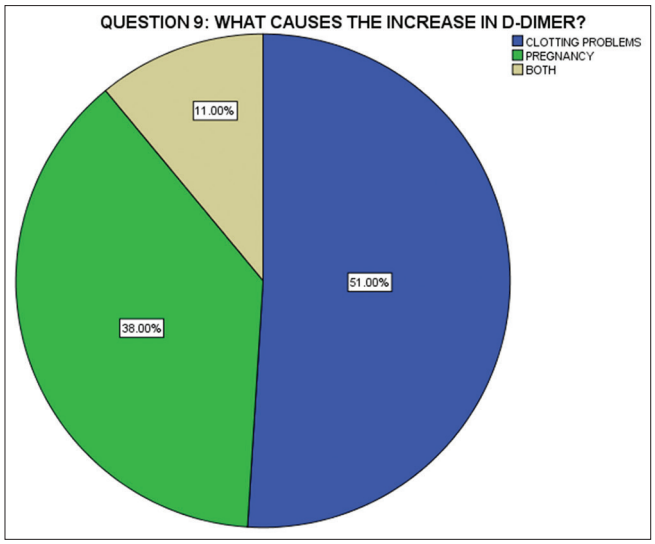

Figure 6: What causes the increase in D-dimer?

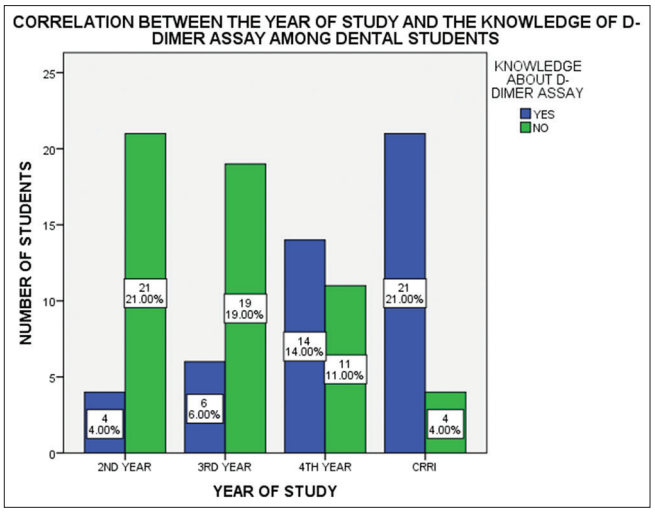

Figure 7: Correlation between the year of study and the knowledge about D-dimer assay

When a clot dissolves in the human body, one of the protein fragments generated is D-dimer. It is usually undetected or only noticeable at an extremely low level unless the body is creating and breaking down the clots.[21] D-dimer is a blood test that tests for it. When a clinician suspects that the symptoms are caused by anything other than DVT or a PE, the D-dimer test can help. It's a painless and rapid method to rule out irregular or excessive clotting as the source of the issue. However, if the danger of PE is substantial, as determined by a clinical evaluation, it should not be used.

A D-dimer result that is normal or "negative" (below a certain cutoff level) indicates that the person being tested is free of an acute disease or sickness that causes aberrant clot creation and breakdown.[22] A negative D-dimer, according to most doctors, is most valid and advantageous when performed on those who are at risk of thrombosis.[23-26]

High amounts of fibrin breakdown products could be indicated by a positive D-dimer test.[27] It indicates that a large blood clot (thrombus) has developed and broken down somewhere in the body, but it does not say where or why. VTE or DIC could be the cause of increased levels of D-dimer levels.[28]

CONCLUSION

The current study shows that the knowledge about D-dimer assay is more in CRRI than in participants of junior year of study. Thus, more rigorous educational programs should be initiated to further enrich the knowledge among dental students.

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Conflicts of interest

There are no conflicts of interest.

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