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Perceptions and Awareness of Interprofessional Collaboration between Medical and Dental Students

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ABSTRACT

Background: Collaboration between medical and dental professionals increases patients' access to healthcare services, enhances healthcare results, and lowers the cost and burden of care, particularly for people with chronic illnesses. The current study's goal is to find out how medical and dental students of University of Maharashtra feel about and are aware of medical-dental teamwork. The goal of this study is to evaluate and compare the views and comprehension of interprofessional collaboration between undergraduate medical and dental students.

Methods: A total of 500 students from Medical and Dental fields were randomly chosen as the study population from various universities in Maharashtra. Google forms were circulated among the medical and dental students of various universities. The forms consisted of 15 questions and thus responses were evaluated and thus conclusion was made.

Result: In total 500 responses were obtained though the google forms. The students were from the medical and dental colleges in Maharashtra. A total of 250 students enrolled in dental programs and another 250 students from medical programs took part in the study. Females' responses were more than male i.e. 67.4% and 32.6% respectively. Also, Final year and Interns were 53.6% and first second and third year were 46.4%. According to the responses 98% of students irrespective of profession agreed that oral health is integral part of the general health and also agreed that Inter Professional Collaboration can improve the patient service. Senior students had somewhat understood and aware of IPC i.e. 63.2% and 14.8% had better understanding of the interprofessional collaborations. The exposure of the students to the programs was 61.8% while the awareness was 74.8%. Thus, the responses also differed according to the universities. 116 students strongly agreed while 366 students believed that interprofessional collaboration could lead to better health care services.

Conclusion: To conclude, the study showed a positive attitude towards the idea if interprofessional collaboration among the dental and medical students from the universities of Maharashtra. This can lay a strong foundation for a successful program of delivering better and effective treatment for patients.

INTRODUCTION

Oral health impacts both physical and psychological aspects, as inadequate oral health is linked to significant pain and numerous issues concerning chewing, speech, appearance, development, social well-being, and overall quality of life [1]. A thorough inspection of the oral cavity can uncover signs that suggest a potential systemic condition, facilitating early diagnosis and intervention [2]. When there are indications of long-term and various health issues, the intricacy of healthcare rises. Therefore, collaboration among different professional disciplines is essential for the effective implementation of a holistic healthcare strategy [3]. The purpose of the Interprofessional Education Collaborative (IPEC), which was established in 2009 to create fundamental competencies for interprofessional collaborative practice, was to enhance the anticipated disciplinary competencies of each profession. The formulation of interprofessional collaborative competencies inherently necessitated transcending educational initiatives that were specific to individual professions, in order to involve students from various professions in interactive learning experiences with one another [4]. In Maharashtra universities train medical and dental students differently. The subjects are same for 1st and 2nd year but have much confined to the respective interest,

thus there can be different approaches among the students. Medical students complete their course in 5.5 years whereas dental students complete within 5 years which include 1 year of internship in both the fields. As the subjects are different for 3rd and 4th year the perspective also changes thus dental students are much keen on the oral findings and changes and tend to neglect the other symptoms and vice versa with the medical students who may not notice the oral abnormalities. IPC can not only access the better treatment but also be the preventive approach, according to the Human Resources and Services Administration (HRSA) recommended that primary care practitioners incorporating oral health care services into primary care practices can help reduce the gap in preventive dental care for children who are under five years old. It was advised that family physicians and pediatric primary care providers should assume a more prominent role in evaluating the oral health of children [5]. Grasping the viewpoints and awareness of dental and medical students about interprofessional care is crucial. Nevertheless, despite the significance of medical-dental collaboration in clinical practice, there are few studies that have explored its effects within the clinical settings. Consequently, the objective of this study is to examine the attitudes and awareness regarding medical-dental collaboration among medical and dental students enrolled at Universities in Maharashtra[1].

MATERIAL STUDY AND METHOD

Study design and recruitment of participants

In this cross-sectional study, all Medical and Dental students attending the Universities in Maharashtra. (N = 500) were invited to participate in a questionnaire survey in July and august in 2025. The study protocol was approved by the Research Ethics Committee, of Krishna Vishwa Vidyapeeth Karad, Faculty of Dentistry, Universities in Maharashtra (approval no.).

A link of google form consisting of 15 questionnaire was sent to the coordinators of each class, who were responsible for distributing the link and monitoring the students during completion of the survey. The duration of the survey was restricted to 1.5 months. Participants were giving a brief information about the study and inclusion criteria included the students of Medical and Dental college willing to participate in the study. They were told that joining in was entirely optional and that their answers would be kept fully confidential. As the targeted population were students, they were less issues in understanding the study and filling of the forms. Thus, the recording of the responses required less than 10 minutes.

Questionnaire survey

This study's questionnaire survey was validated in a prior study that modified it from questions used in other published studies [6,7,8]. The questionnaire was specifically made to evaluate the awareness and attitude towards the Inter professional collaboration and also their understanding towards it. It was self-administered and was in English as the targeted population was educated. Assistance was provided for better understanding of the questionnaire. The questionnaire had 3 components consisting of 15 questions. The 1st component consisted of demographic information This included participants age, faculty, gender and year of study. These variables were collected to analysis of possible influences of the students on the interprofessional collaboration and assess their understanding according to their level year of study. The 2nd component consisted of questions giving an insight of student's awareness and perception of Inter Professional Collaboration. And the 3rd components consisted on the questions focusing on the attitude of the students about the Inter Professional Collaboration. The questionnaire includes yes/no questions and also with option like the agree/somewhat agree/disagree.

DATA ANALYSIS

Before being analyzed, the gathered data was cleaned and verified by a different researcher after being entered into an Excel file. Because web-based questionnaires have been shown to be more economical, have fewer missing values, and yield more complete data than paper questionnaires, they were used for data collection [9]. SPSS Software was used to conduct data analysis. The perspectives on the collaboration between medical and dental fields were assessed by evaluating the responses to eight questions regarding attitudes. Each affirmative response was assigned a value of 1 point, whereas each negative response was given 0 points. The overall attitude score was calculated by adding together the points from each question. The attitude score was calculated by categorized in 3 groups i.e. negative was scored between 0-1, neutral was 2-3,

And positive as 4-6. To examine the correlation between dependent variables such as students' attitudes and awareness of medical-dental collaboration, researchers applied chi-square tests and logistic regression analysis to examine independent variables like course content, study year, age group, and gender.

Table .1

Demographic information	
1. Age	
• 18-19	54(10.8%)
• 20-21	129(25.8%)
• 22-23	276(55.2%)
• 24-25	41(8.2%)
2. Gender	
• Male	163(32.6%)
• Female	337(67.4%)
3. Faculty	
• Medical	250(50%)
• Dental	250(50%)
4. Year of study	
• First year	52(10.4%)
• Second year	78(15.6%)
• Third year	102(20.4%)
• Fourth year	145(29%)
• Intern	123(24.6%)
5. Is Oral Health Integral Part of General Health	
• Yes	490(98%)
• No	10(2%)
6. Do you think dentist is responsible to advise patient on Systemic health	
• Yes	273(54.6%)
• No	227(45.4%)
7. Do you think Physician is responsible to advise patient on Oral health	
• Yes	250(50%)
• No	250(50%)
8. How well do you understand the concept of Inter Professional Collaboration	
• Very well	
• Somewhat well	74(14.8%)
• Not very well	316(63.2%)
• Not at all	109(21.8%)
	0
9. Should Medical students have rotation in Dentistry	
• Yes	368(73.6%)
• No	132(26.4%)
10. Have you ever participated in any Inter Professional educational activities with Dental and Medical Students.	
• Yes	366(67.2%)
• No	164(32.8%)
11. Are you aware of any programs or initiatives at your institution aimed at promoting collaboration between Medical and Dental Students	
• Yes	309(61.8%)
• No	191(38.2%)
12. How important do you think professional collaboration is in improving patient outcome	
• Very important	112(22.4%)
• Somewhat important	360(72%)
• Not very important	27(5.4%)
• Not at all important	0(0%)
13. Do you believe that collaboration between Medical and Dental professionals leads to better healthcare delivery?	
• Strongly agree	116(23.2%)
• Agree	366(73.2%)

• Disagree • Strongly disagree	18(3.6%) 0(0%)
14. What do you perceive as the main barriers to effective collaboration between Medical and Dental students. • Lack of awareness • Scheduling conflicts • Different educational culture • Limited opportunities for collaboration	 247(49.4%) 310(62%) 276(55.2%) 309(61.8%)
15. How likely are you to seek collaborative opportunities with Medical and Dental students in the future • Very likely • Somewhat likely • Not very likely • Not at all likely	 119(23.8%) 357(71.4%) 24(4.8%) 0(0%)

RESULT

A total of 500 responses were gathered from students attending universities in western Maharashtra, comprising 250 Dental students and 250 Medical students. Table 1 showcases the demographic information of the students involved, along with their views and opinions on the awareness levels among Medical and Dental students. Almost 98% of the students believed that oral health is integral part of the persons health. But there were differences observed in the concept about the dental students advising about the general health or either or. i.e. 54.6% students agreed that dentist are responsible to advise about patient's general health and 50% students to that physicians should advise about oral health. According to the data collected (n=329; 65.8 %) had positive attitude. (n=130; 26%) had neutral attitude and (n=41; 8.2 %) had negative attitude. Students with neutral and negative attitude were grouped as one group for analysis and followed by chi-square and logistic analysis made.

A binary logistic regression analysis was performed to evaluate the effects of the independent variable(s) for this study which is student's attitude toward inter-professional collaboration with medical and dental professionals recognized as the two categories of professional relationships that are of interest. In the process of modeling by the modeling committee, the following question was used as the outcome variable. "Do you feel that collaboration between Medical and Dental professionals make for better healthcare delivery?"

The responses were differentiated according to attitude state:
• Positive Attitude (1) = Strongly agree / Agree
• Negative / Neutral Attitude (0) = All other responses independent variables
The following independent variables were modeled in the project

1. Faculty (Medical vs. Dental)
2. Year of Study
3. Gender
4. Knowledge of inter-professional collaboration
5. Knowledge of inter-professional collaboration programs at the institution
6. The importance of inter-professional collaboration to patient care

Logistic Regression by Curriculum and Year of Study A binary logistic regression was completed to determine the effect of a student's curriculum (i.e., medical vs dental) and year level to their attitude towards inter-professional collaboration.

The dependent variable was categorized as:
• High Attitude = 1 (Attitude score ≥ 8)
• Low Attitude = 0 (Attitude score < 8)
Model Summary

- Model χ^2 (3) = 28.52, $p < 0.001$
- Nagelkerke $R^2 = 0.16$
- Overall Classification Accuracy = 74.1%

Table 2: Binary Logistic Regression Predicting High Attitude Towards Medical-Dental Collaboration by Curriculum Year of Study and gender

Predictor	p-value	Odds Ratio	95% CI
Curriculum (Medical = 1)	0.004	0.51	0.32 – 0.83
Year of Study	0.005	1.40	1.11 – 1.77
Gender (Female = 1)	0.584	1.13	0.73 – 1.73
Constant	<0.001	0.26	0.12 – 0.56

Interpretation
Curriculum: Medical students were statistically less likely to report a positive attitude than dental students (p = 0.004), with odds reduced about 49%.
Year of Study: Each year of study increased the odds of reporting a positive attitude by 40% (p = 0.005).
Gender: Not statistically significant (p = 0.584).
A series of chi-square tests were conducted to assess the relationship between students' attitudes toward medical-dental collaboration and various demographic and belief-based variables.

Table 3: Chi-Square Test Results for Attitude Toward Collaboration

Variable	Positive attitude	p-value
Curriculum Medical Dental	 250 250	0.001
Year of Study 1st -3rd Intern	 232 268	0.006
Age Group <22, 22 and,>22	 183 317	0.012
Gender Male Female	 163 337	0.337
Belief: Physicians responsible for oral health advice Yes No	 250 250	0.001
Belief: Dentists responsible for systemic health advice Yes No	 273 227	0.008

Note: A significance level of p < 0.05 was used.
Attitude towards collaboration was significantly correlated with curriculum, year of study, and age group.
Students who thought physicians should be responsible for oral health advice had a significantly more positive attitude.
Gender was not significantly associated with attitude (p = 0.337).

Chi-Square Test of Association for Awareness Toward Medical-Dental Collaboration
A series of chi-square tests were conducted to assess the association between students' awareness toward medical-dental collaboration and several demographic and belief-based variables.

Table 4: Chi-Square Test Results for Awareness Toward Collaboration

Variable	Awareness	p-value
Curriculum Medical	 250	0.002

Dental	250	
Year of Study 1st -3rd Intern	 232 268	0.010
Age Group <22, 22 and,>22	 183 317	0.037
Gender Male Female	 163 337	0.211
Belief: Physicians responsible for oral health advice Yes No	 250 250	0.002
Belief: Dentists responsible for systemic health advice Yes No	 273 227	0.005

Significance level: $p < 0.05$.

Interpretation
Curriculum, academic year, age and views on the roles of physicians and dentists had a statistically significant relationship with awareness toward collaboration.

The variable of gender did not reach statistical significance ($p = 0.211$).
Being in agreement about shared roles of healthcare providers was positively associated with awareness. This analysis supports the role of interprofessional education to enhance student awareness of cooperation and collaborative roles of medical and dental providers.

A binary logistic regression was conducted to determine if curriculum, year of study, and gender predict students' awareness towards medical-dental collaboration.

The awareness variable was split into two distinct categories:
• High Awareness (awareness score ≥ threshold)
• Low Awareness (awareness score < threshold)
Model summary results include:
• Model χ^2 (3) = 24.89, $p < 0.001$
• Nagelkerke $R^2 = 0.14$
• Classification accuracy = 72.6%

Binary Logistic Regression for Awareness

Predictor	**p-value**	**Odds Ratio**	**95% CI**
Curriculum (Medical = 1)	0.005	0.55	0.36 – 0.84
Year of Study	0.011	1.32	1.06 – 1.65
Gender (Female = 1)	0.618	1.11	0.74 – 1.66
Constant	<0.001	0.32	0.16 – 0.61

Interpretation
• Curriculum: Medical students at 45% lower odds of with high awareness compared to dental students ($p = 0.005$).
• Year of Study: Each year of study increased the odds of high awareness significantly ($p = 0.011$).
• Gender was not significantly related to awareness ($p = 0.618$).

These findings suggest the value of development of interprofessional education in engaging medical and dental curricula to improve awareness of collaborative healthcare roles.

DISCUSSION

According to the results of the current study, the majority of students believed that dental care was a crucial area for medical professionals and that oral health was a crucial part of overall health. Though this is comparable to the situation in another country, roughly more one-third of the participants disagreed with medical students' rotation in dentistry [6]. This is most likely due to the fact that medical students are exempt from doing dental-related courses under the Universities Maharashtra curriculum. In a similar vein, dental students are not exposed to much medical education. Nonetheless, the integration of medical-dental rotation is regarded by scholars and instructors as essential and beneficial for the education of both medical and dental students [10].

The study's findings supported earlier research that found a relationship between students' attitudes toward and awareness of medical-dental teamwork and their curriculum (medicine or dentistry) [4, 11]. Universities in Maharashtra dental program places a strong emphasis on problem-based learning (PBL), whereas the medical program combines PBL with discipline-based learning. Students collaborate to solve the health issues of patients depicted in case studies as part of the PBL curriculum, which aims to stimulate intellectual interaction, foster a sense of personal participation, and stimulate discoveries [10]. Dental students who are exposed to more PBL may have more opportunities to develop good communication skills and a sense of collaboration, which will subsequently influence their attitudes toward and awareness of medical-dental collaboration. According to one study, PBL can increase the effectiveness of multi-professional collaboration [12]. The year of study was also found to correlate with students' attitudes towards and awareness of medical-dental collaboration in line with other studies [13,14]. There are three reasons that support the likelihood of this. First, as students' progress through their medical or dental program, they are expected to develop a better sense of responsibility and teamwork [13]. Second, with increased training and some knowledge along with experience, students may develop a better understanding of collaboration [14]. Thirdly, students are subject to various forms of interprofessional collaboration during their clinical training and as they progress through the program. Therefore, senior students, having a greater exposure to clinical care and team work may be more aware of medical-dental collaboration [1].

One interesting finding of this study was the possibility that more female students than male students reported that they had knowledge of what collaboration is. Recent research strongly suggests that including women in a team improves teamwork and collaboration [15]. Upon further investigation, these effects could be partially explained by the higher social sensitivity of women. Groups of people with a higher proportion of women also displayed more egalitarianism in their conversations, allowing group members to be responsive to each other and make the best use of their collective knowledge and skill [15,16]. Therefore, because of their higher social abilities, female students may have a greater inclination to seek interprofessional collaboration.

According to the study the dental and medical students when asked about the physicians giving advice about the oral disease there was no significant result observed. But more than 50% of students were of opinion that dentist can advise on the systemic disease. This may be due to the fact that numerous systemic conditions display their early indications through alterations in the oral mucosa. And as the dental procedures are mostly surgical blood investigation are always recommended.

According to the current data, the medical disciplines most commonly associated with dentistry were emergency medicine, general surgery, and otolaryngology. Three possible reasons can be stated for this. First, patients with oral-maxillofacial trauma are typically seen by the Emergency Department physicians. The medical students might look upon their dental student colleagues to be better qualified to deal with oral trauma cases, having greater knowledge of oral-maxillofacial anatomy. As this can be much efficiently treated by the oral maxillofacial surgeons. Secondly, the surgical treatment in dentistry is the closest counterpart to medical surgical disciplines. Dentists, mainly oral-maxillofacial surgeons, carry out operations for periodontal therapy, complex extractions, fractures some times before the ortho treatment and treatment for oral cancer. Furthermore, the ears, nose, and throat are situated near the mouth. This suggests that the students have a very rudimentary understanding of medical-dental collaborations in reality, whereas dental pathologies, such as dental caries and periodontal diseases, are reported to be correlated with systemic diseases including respiratory diseases, cardiovascular diseases, diabetes, Alzheimer's disease, and psychiatric disorders (depression) [17,18]. When the bond between medicine and dentistry is studied at lengths, students might come to understand that collaboration between medical and dental could be incorporated in any discipline, as the necessity for such cooperation is very high [1].

From this study, it was found that students generally had a positive attitude toward, and awareness of, medical-dental collaboration in Indonesia. However, the depth of this collaboration is very limited in their understanding. When students asked about the challenges or barriers that they had /or may face in effective interprofessional collaborations there were four main reasons that were put forth first was the scheduling conflicts which was said by more than two third of students.

Second, was different education cultures as discussed before. Third, was limited opportunities for collaboration as there is not always possible for a dental and medical colleges in same campus. Fourth, lack of awareness about this concept to the doctors and dentist and also to the patients. Improving health-care services by promoting close collaboration between doctors and dental practitioners is vital, and at times, indispensable. Continuing interprofessional education may also be a useful approach to dismantle stereotypes about other professionals and foster better teamwork in clinical practice [19]. In order to improve health care professionals' confidence in solving problems, their ability to recognize patient needs, and their suitability for particular referral cases, such continuing education courses should highlight the value of interprofessional collaboration and make sure that their knowledge is current [20,21]. By creating rules for collaboration protocols, including timing, indications, referral systems, etc., medical and dental organizations can also support medical-dental partnerships. In order to raise public awareness and help patients better understand and embrace medical-dental teamwork, healthcare providers should also make an effort to educate the public about the connection between oral health and overall health [1].

All the medical and dental students of universities of Maharashtra willing to participate in the study were invited for the study to avoid the selection bias. Although it is not possible to cover each and every university of Maharashtra However, sine non probability sampling was used to select the study population. Because it is less expensive, requires less time, is easier to handle, and has a decreased chance of missing data, a web-based questionnaire was used in this investigation [22]. To achieve the required population the class coordinates were assigned the duty to look after the smooth functioning of the distribution of the forms and collection of data. Consequently, the forms were distributed in two rounds. Due to which the responses collected were relatively high. The study's power may have been compromised by the large number of non-respondents, so the response rate may still be a drawback. Although there can be bias responses due to the responders may be those who have positive attitude towards the objective of the study. To gauge attitude, the survey employed straightforward, recognizable dichotomous responses. The results should be evaluated cautiously because such an approach may be insensitive, reduce internal dependability, and compel respondents to provide simplified answers to difficult topics [23]. Despite these drawbacks, as no previous study has looked into this topic in Indonesia, the survey's findings provide important insight into the current attitudes of Indonesian medical and dentistry students on medical-dental collaboration.

CONCLUSION

The findings of this study revealed that students in both medical and dental programs generally recognized the importance of teamwork between the two fields and held a favorable view of it. Specifically, senior students and dental students demonstrated a higher level of awareness and a more positive attitude compared to junior and medical students, respectively. The dental training program should place a strong emphasis on including a medical training component in the curriculum in order to further enhance student attitudes and integrate medical-dental collaboration into practice. In order to increase resource efficiency and healthcare standards, more should be done to improve students' comprehension and knowledge of medical-dental collaboration.

Abbreviation
IPC -Inter-professional collaboration
PBL- Problem- based learning.

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