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An Investigation in to Dental Graduates Views on Problem-Based Learning: A Knowledge and Perception Study

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Abstract: Background: Problem-based learning (PBL) is a learner-centered educational strategy widely adopted in medical and dental education to enhance critical thinking, integration of knowledge, and clinical reasoning.

Aim: To assess the knowledge and perception of dental graduates regarding PBL and to compare responses based on gender and year of study.

Objectives: To assess the knowledge and perception of dental graduates regarding problem-based learning (PBL) To compare knowledge levels regarding PBL among dental graduates based on gender. To compare perception toward PBL across different academic years (I BDS, II BDS, III BDS, IV BDS, and Interns). To evaluate students' views regarding the strengths and limitations of PBL in dental education.

Material and Methods: A cross-sectional questionnaire-based study was conducted among 201 dental graduates. A structured, self-administered questionnaire consisting of 15 items was distributed online. Descriptive statistics were used to summarize demographic characteristics. Chi-square test was applied to determine the association between responses and demographic variables. Statistical significance was set at $p \leq 0.05$.

Keywords: Problem-based learning, Dental education, Knowledge, Perception, Curriculum, Undergraduate students.

INTRODUCTION

Problem-based learning (PBL), defined by Howard S. Barrows and Robyn M. Tamblyn as learning that occurs through the process of working toward the understanding or resolution of a problem, represents a significant transformation in health professions education. Introduced in North America in 1969, PBL has

been widely adopted across medical and dental institutions worldwide as a learner-centered strategy.

Unlike traditional lecture-based learning (LBL), PBL promotes active engagement, self-directed learning, integration of basic and clinical sciences, and collaborative problem-solving. It emphasizes the 3C principles—constructive,

collaborative, and contextual learning—thereby enhancing communication skills, critical thinking, and clinical reasoning.

In dental education, where clinical decision-making and patient-centered care are fundamental, PBL offers an innovative approach to bridge theoretical knowledge with practical application. Several studies have reported improved retention of knowledge, better teamwork skills, and enhanced student motivation in PBL-based curricula.

However, perceptions toward PBL may vary depending on gender, academic exposure, and clinical experience. Evaluating dental graduates' knowledge and perception is essential to refine curriculum strategies and ensure effective professional competency development. Therefore, this study aimed to investigate dental graduates' views on PBL and analyze variations across gender and academic years.

METHODOLOGY

Study Design and Setting

A cross-sectional questionnaire-based study was conducted among undergraduate dental students and interns at a dental institution.

Study Duration

The study was carried out over a defined academic period after obtaining institutional approval.

Study Population and Sample Size

A total of 201 dental students participated in the study.

Mean age: 22.65 ± 1.536 years

Age range: 21–26 years

Study Instrument

A structured, self-administered questionnaire was used. It consisted of 15 items assessing knowledge and perception of PBL. Responses were categorized using multiple-choice options and Likert scale-based statements.

The questionnaire evaluated:

Understanding of PBL principles

Perceived advantages and disadvantages

Impact on communication, teamwork, and decision-making

Confidence enhancement

Integration of basic and clinical knowledge

Inclusion Criteria

Undergraduate dental students (I BDS to IV BDS) and interns.

Students willing to participate and provide complete responses.

Exclusion Criteria

Incomplete questionnaire responses.

Students unwilling to participate

Statistical Analysis

Data were analyzed using SPSS software.

Descriptive statistics: frequency, percentage, mean, standard deviation

Inferential statistics: Chi-square test

Level of significance: $p \leq 0.05$

Associations between demographic variables (gender and year of study) and responses were evaluated

RESULTS

A total of 201 students took part in this with females (68.2%) and male of (31.8%). Age of the participants ranging from 21-26years.

Gender-Based Comparison

Female participants demonstrated comparatively more positive perceptions toward PBL, particularly regarding:

Improvement in confidence

Enhancement of communication skills

Better integration of clinical and theoretical knowledge

Active participation in discussions

Year-Wise Comparison

Interns and IV BDS students showed more favorable responses compared to junior students.

Overall findings indicate that senior students and interns exhibited greater acceptance and understanding of PBL methodology.

Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|-----|-----|---------|---------|-------|----------------|
| Age | 201 | 21 | 26 | 22.65 | 1.536 |

Gender

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|-----------|---------|---------------|--------------------|
| Valid | Male | 64 | 31.8 | 31.8 | 31.8 |
| | Female | 137 | 68.2 | 68.2 | 100.0 |
| | Total | 201 | 100.0 | 100.0 | |

Year of study

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---------|-----------|---------|---------------|--------------------|
| Valid | I BDS | 9 | 4.5 | 4.5 | 4.5 |
| | II BDS | 33 | 16.4 | 16.4 | 20.9 |
| | III BDS | 33 | 16.4 | 16.4 | 37.3 |
| | IV BDS | 52 | 25.9 | 25.9 | 63.2 |
| | INTERNS | 74 | 36.8 | 36.8 | 100.0 |
| | Total | 201 | 100.0 | 100.0 | |

Distribution and comparison of responses based on gender:

| Item | Response | Males | | Females | | Chi-Square value | P value | Total | |
|------|----------|-------|------|---------|------|------------------|---------|-------|------|
| | | n | % | n | % | | | n | % |
| Q1 | 1 | 48 | 35.6 | 87 | 64.4 | 11.534 | 0.05* | 135 | 67.2 |
| | 2 | 10 | 22.2 | 35 | 77.8 | | | 45 | 22.4 |
| | 3 | 2 | 22.2 | 7 | 77.8 | | | 9 | 4.5 |
| | 4 | 4 | 33.3 | 8 | 66.7 | | | 12 | 6 |
| Q2 | 1 | 4 | 21.1 | 15 | 78.9 | 2.436 | 0.07 | 19 | 9.5 |
| | 2 | 5 | 41.7 | 7 | 58.3 | | | 12 | 6 |
| | 3 | 26 | 23.6 | 84 | 76.4 | | | 110 | 54.7 |
| | 4 | 29 | 48.3 | 31 | 51.7 | | | 60 | 29.9 |
| Q3 | 1 | 8 | 38.1 | 13 | 61.9 | 5.219 | 0.156 | 21 | 10.4 |
| | 2 | 10 | 31.2 | 22 | 68.8 | | | 32 | 15.9 |
| | 3 | 19 | 44.2 | 24 | 55.8 | | | 43 | 21.4 |
| | 4 | 27 | 25.7 | 78 | 74.3 | | | 105 | 52.2 |
| Q4 | 1 | 18 | 24.7 | 55 | 75.3 | 4.230 | 0.238 | 73 | 36.3 |
| | 2 | 18 | 42.9 | 24 | 57.1 | | | 42 | 20.9 |
| | 3 | 18 | 34 | 35 | 66 | | | 53 | 26.4 |
| | 4 | 10 | 30.3 | 23 | 69.7 | | | 33 | 16.4 |
| Q5 | 1 | 8 | 20.5 | 31 | 79.5 | 14.237 | 0.003* | 39 | 19.4 |
| | 2 | 10 | 35.7 | 18 | 64.3 | | | 28 | 13.9 |
| | 3 | 17 | 60.7 | 11 | 39.3 | | | 28 | 13.9 |
| | 4 | 29 | 27.4 | 77 | 72.6 | | | 106 | 52.7 |
| Q6 | 1 | 11 | 26.2 | 31 | 73.8 | 3.231 | 0.357 | 42 | 20.9 |
| | 2 | 14 | 36.8 | 24 | 63.2 | | | 38 | 18.9 |
| | 3 | 10 | 45.5 | 12 | 54.5 | | | 22 | 10.9 |
| | 4 | 29 | 29.3 | 70 | 70.7 | | | 99 | 49.3 |
| Q7 | 1 | 8 | 20.5 | 31 | 79.5 | 7.713 | 0.05* | 39 | 19.4 |
| | 2 | 14 | 51.9 | 13 | 48.1 | | | 27 | 13.4 |
| | 3 | 10 | 27 | 27 | 73 | | | 37 | 18.4 |
| | 4 | 32 | 32.7 | 66 | 67.3 | | | 98 | 48.8 |
| Q8 | 1 | 16 | 25 | 48 | 75 | 3.201 | 0.362 | 64 | 31.8 |
| | 2 | 11 | 44 | 14 | 56 | | | 25 | 12.4 |
| | 3 | 16 | 32 | 34 | 68 | | | 50 | 24.9 |
| | 4 | 21 | 33.9 | 41 | 66.1 | | | 62 | 30.8 |

| | | | | | | | | | |
|-----|---|----|------|----|------|--------|--------|-----|------|
| Q9 | 1 | 11 | 30.6 | 25 | 69.4 | 2.874 | 0.411 | 36 | 17.9 |
| | 2 | 12 | 30.8 | 27 | 69.2 | | | 39 | 19.4 |
| | 3 | 12 | 46.2 | 14 | 53.8 | | | 26 | 12.9 |
| | 4 | 29 | 29 | 71 | 71 | | | 100 | 49.8 |
| Q10 | 1 | 17 | 28.3 | 43 | 71.7 | 1.515 | 0.679 | 60 | 29.9 |
| | 2 | 11 | 31.4 | 24 | 68.6 | | | 35 | 17.4 |
| | 3 | 16 | 29.6 | 38 | 70.4 | | | 54 | 26.9 |
| | 4 | 20 | 38.5 | 32 | 61.5 | | | 52 | 25.9 |
| Q11 | 1 | 21 | 53.8 | 18 | 46.2 | 12.665 | 0.005* | 39 | 19.4 |
| | 2 | 8 | 33.3 | 16 | 66.7 | | | 24 | 11.9 |
| | 3 | 24 | 22.9 | 81 | 77.1 | | | 105 | 52.2 |
| | 4 | 11 | 33.3 | 22 | 66.7 | | | 33 | 16.4 |
| Q12 | 1 | 22 | 53.7 | 19 | 46.3 | 18.048 | 0.001* | 41 | 20.4 |
| | 2 | 14 | 41.2 | 20 | 58.8 | | | 34 | 16.9 |
| | 3 | 19 | 19 | 81 | 81 | | | 100 | 49.8 |
| | 4 | 9 | 34.6 | 17 | 65.4 | | | 26 | 12.9 |
| Q13 | 1 | 24 | 52.2 | 22 | 47.8 | 13.654 | 0.003* | 46 | 22.9 |
| | 2 | 7 | 33.3 | 14 | 66.7 | | | 21 | 10.4 |
| | 3 | 23 | 21.9 | 82 | 78.1 | | | 105 | 52.2 |
| | 4 | 10 | 34.5 | 19 | 65.5 | | | 29 | 14.4 |
| Q14 | 1 | 27 | 50.9 | 26 | 49.1 | 13.722 | 0.03* | 53 | 26.4 |
| | 2 | 10 | 34.5 | 19 | 65.5 | | | 29 | 14.4 |
| | 3 | 23 | 22.1 | 81 | 77.9 | | | 104 | 51.7 |
| | 4 | 4 | 26.7 | 11 | 73.3 | | | 15 | 7.5 |
| Q15 | 1 | 27 | 43.5 | 35 | 56.5 | 12.426 | 0.006 | 62 | 30.8 |
| | 2 | 13 | 43.3 | 17 | 56.7 | | | 30 | 14.9 |
| | 3 | 24 | 22.0 | 85 | 78.0 | | | 109 | 54.2 |

P<0.05 is statistically significant

Distribution and comparison of responses based on year of the study:

| Item | Response | I BDS | | II BDS | | III BDS | | IV BDS | | INTERN | | Chi-Value | P-Value | Total | |
|------|----------|-------|------|--------|------|---------|------|--------|------|--------|------|-----------|---------|-------|------|
| | | n | % | n | % | n | % | n | % | n | % | | | N | % |
| Q1 | 1 | 6 | 4.4 | 24 | 25 | 26 | 16.7 | 35 | 16.7 | 44 | 16.7 | 11.545 | 0.04'' | 135 | 67.2 |
| | 2 | 0 | 0 | 4 | 22.2 | 3 | 22.2 | 14 | 44.4 | 24 | 44.4 | | | 45 | 22.4 |
| | 3 | 0 | 0 | 2 | 8.9 | 2 | 6.7 | 1 | 53.3 | 4 | 53.3 | | | 9 | 4.5 |
| | 4 | 3 | 25 | 3 | 17.8 | 2 | 19.3 | 2 | 32.6 | 2 | 32.6 | | | 12 | 6 |
| Q2 | 1 | 3 | 15.8 | 5 | 26.3 | 1 | 5.3 | 1 | 5.3 | 9 | 47.4 | 4.435 | 0.04* | 19 | 9.5 |
| | 2 | 0 | 0 | 3 | 25 | 1 | 8.3 | 4 | 33.3 | 4 | 33.3 | | | 12 | 6 |
| | 3 | 3 | 2.7 | 17 | 15.5 | 14 | 12.7 | 30 | 27.3 | 46 | 41.8 | | | 110 | 54.7 |
| | 4 | 3 | 5 | 8 | 13.3 | 17 | 28.3 | 17 | 28.3 | 15 | 25 | | | 60 | 29.9 |
| Q3 | 1 | 2 | 9.5 | 7 | 33.3 | 3 | 14.3 | 4 | 19 | 5 | 23.8 | 9.727 | 0.640 | 21 | 10.4 |
| | 2 | 1 | 3.1 | 7 | 21.9 | 4 | 12.5 | 9 | 28.1 | 11 | 34.4 | | | 32 | 15.9 |
| | 3 | 2 | 4.7 | 7 | 16.3 | 7 | 16.3 | 10 | 23.3 | 17 | 39.5 | | | 43 | 21.4 |
| | 4 | 4 | 3.8 | 12 | 11.4 | 19 | 18.1 | 29 | 27.6 | 41 | 39 | | | 105 | 52.2 |
| Q4 | 1 | 4 | 5.5 | 11 | 15.1 | 10 | 13.7 | 18 | 24.7 | 30 | 41.1 | 5.351 | 0.945 | 73 | 36.3 |
| | 2 | 2 | 4.8 | 10 | 23.8 | 7 | 16.7 | 10 | 23.8 | 13 | 31 | | | 42 | 20.9 |
| | 3 | 2 | 3.8 | 7 | 13.2 | 8 | 15.1 | 15 | 28.3 | 21 | 39.6 | | | 53 | 26.4 |
| | 4 | 1 | 3 | 5 | 15.2 | 8 | 24.2 | 9 | 27.3 | 74 | 30.3 | | | 33 | 16.4 |
| Q5 | 1 | 3 | 7.7 | 4 | 10.3 | 7 | 17.9 | 8 | 20.5 | 17 | 43.6 | 14.106 | 0.294 | 39 | 19.4 |
| | 2 | 0 | 0 | 7 | 25 | 6 | 21.4 | 10 | 35.7 | 5 | 17.9 | | | 28 | 13.9 |
| | 3 | 1 | 3.6 | 5 | 17.9 | 7 | 25 | 8 | 28.6 | 7 | 25 | | | 28 | 13.9 |
| | 4 | 5 | 4.7 | 17 | 16 | 13 | 12.3 | 26 | 24.5 | 45 | 42.5 | | | 106 | 52.7 |

| | | | | | | | | | | | | | | | |
|-----|---|---|------|----|------|----|------|----|------|----|------|--------|-------|-----|------|
| Q6 | 1 | 1 | 2.4 | 7 | 16.7 | 9 | 21.4 | 12 | 28.6 | 13 | 31 | 7.743 | 0.805 | 42 | 20.9 |
| | 2 | 2 | 5.3 | 8 | 21.1 | 7 | 18.4 | 8 | 21.1 | 13 | 34.2 | | | 38 | 18.9 |
| | 3 | 0 | 0 | 5 | 22.7 | 4 | 18.2 | 7 | 31.8 | 6 | 27.3 | | | 22 | 10.9 |
| | 4 | 6 | 6.1 | 13 | 13.1 | 13 | 13.1 | 25 | 25.3 | 42 | 42.4 | | | 99 | 49.3 |
| Q7 | 1 | 1 | 2.6 | 7 | 17.9 | 7 | 17.9 | 12 | 30.8 | 12 | 30.8 | 9.985 | 0.617 | 39 | 19.4 |
| | 2 | 2 | 7.4 | 3 | 11.1 | 3 | 11.1 | 7 | 25.9 | 12 | 44.4 | | | 27 | 13.4 |
| | 3 | 4 | 10.8 | 8 | 21.6 | 4 | 10.8 | 9 | 24.3 | 12 | 32.4 | | | 37 | 18.4 |
| | 4 | 2 | 2 | 15 | 15.3 | 19 | 19.4 | 24 | 24.5 | 38 | 38.8 | | | 98 | 48.8 |
| Q8 | 1 | 4 | 6.2 | 8 | 12.5 | 11 | 17.2 | 15 | 23.4 | 26 | 40.6 | 15.342 | 0.223 | 64 | 31.8 |
| | 2 | 0 | 0 | 6 | 24 | 2 | 8 | 4 | 16 | 13 | 52 | | | 25 | 12.4 |
| | 3 | 4 | 8 | 9 | 18 | 6 | 12 | 12 | 24 | 19 | 38 | | | 50 | 24.9 |
| | 4 | 1 | 1.6 | 10 | 16.1 | 14 | 22.6 | 21 | 33.9 | 16 | 25.8 | | | 62 | 30.8 |
| Q9 | 1 | 1 | 2.8 | 7 | 19.4 | 7 | 19.4 | 12 | 33.3 | 9 | 25 | 7.847 | 0.797 | 36 | 17.9 |
| | 2 | 2 | 5.1 | 6 | 15.4 | 7 | 17.9 | 6 | 15.4 | 18 | 46.2 | | | 39 | 19.4 |
| | 3 | 2 | 7.7 | 3 | 11.5 | 4 | 15.4 | 9 | 34.6 | 8 | 30.8 | | | 26 | 12.9 |
| | 4 | 4 | 4 | 17 | 17 | 15 | 34.6 | 25 | 25 | 39 | 39 | | | 100 | 49.8 |
| Q10 | 1 | 2 | 3.3 | 11 | 18.3 | 11 | 18.3 | 14 | 23.3 | 22 | 36.7 | 7.788 | 0.801 | 60 | 29.9 |
| | 2 | 1 | 2.9 | 8 | 22.9 | 4 | 11.4 | 9 | 25.7 | 13 | 37.1 | | | 35 | 17.4 |
| | 3 | 3 | 5.6 | 10 | 18.5 | 8 | 14.8 | 17 | 31.5 | 16 | 29.6 | | | 54 | 26.9 |
| | 4 | 3 | 5.8 | 4 | 7.7 | 10 | 19.2 | 12 | 23.1 | 23 | 44.2 | | | 52 | 25.9 |
| Q11 | 1 | 2 | 5.1 | 6 | 15.4 | 7 | 17.9 | 11 | 28.2 | 13 | 33.3 | 2.828 | 0.997 | 39 | 19.4 |
| | 2 | 1 | 4.2 | 6 | 25 | 4 | 16.7 | 5 | 20.8 | 8 | 33.3 | | | 24 | 11.9 |
| | 3 | 4 | 3.8 | 15 | 14.3 | 17 | 16.2 | 27 | 25.7 | 42 | 40 | | | 105 | 52.2 |
| | 4 | 2 | 6.1 | 6 | 18.2 | 5 | 15.2 | 9 | 27.3 | 11 | 33.3 | | | 33 | 16.4 |
| Q12 | 1 | 2 | 4.9 | 9 | 22 | 10 | 24.4 | 9 | 22 | 11 | 26.8 | 15.577 | 0.211 | 41 | 20.4 |
| | 2 | 1 | 2.9 | 4 | 11.8 | 3 | 8.8 | 12 | 35.3 | 14 | 41.2 | | | 34 | 16.9 |
| | 3 | 5 | 5 | 17 | 17 | 11 | 11 | 26 | 26 | 41 | 41 | | | 100 | 49.8 |
| | 4 | 1 | 3.8 | 3 | 11.5 | 9 | 34.6 | 5 | 19.2 | 8 | 30.8 | | | 26 | 12.9 |
| Q13 | 1 | 2 | 4.3 | 7 | 15.2 | 9 | 19.6 | 12 | 26.1 | 16 | 34.8 | 9.977 | 0.618 | 46 | 22.9 |
| | 2 | 1 | 4.8 | 3 | 14.3 | 6 | 28.6 | 7 | 33.3 | 4 | 19 | | | 21 | 10.4 |
| | 3 | 5 | 4.8 | 16 | 15.2 | 12 | 11.4 | 29 | 27.6 | 43 | 41 | | | 105 | 52.2 |
| | 4 | 1 | 3.4 | 7 | 24.1 | 6 | 20.7 | 4 | 13.8 | 11 | 37.9 | | | 29 | 14.4 |
| Q14 | 1 | 3 | 5.7 | 9 | 17 | 8 | 15.1 | 13 | 24.5 | 20 | 37.7 | 13.938 | 0.305 | 53 | 26.4 |
| | 2 | 2 | 6.9 | 5 | 17.2 | 6 | 20.7 | 11 | 37.9 | 5 | 17.2 | | | 29 | 14.4 |
| | 3 | 3 | 2.9 | 19 | 18.3 | 14 | 13.5 | 26 | 25 | 42 | 40.4 | | | 104 | 51.7 |
| | 4 | 1 | 6.7 | 0 | 0 | 5 | 33.3 | 2 | 13.3 | 7 | 46.7 | | | 15 | 7.5 |
| Q15 | 1 | 4 | 6.5 | 9 | 14.5 | 10 | 16.1 | 17 | 27.4 | 22 | 35.5 | 8.121 | 0.776 | 62 | 30.8 |
| | 2 | 0 | 0 | 5 | 16.7 | 8 | 26.7 | 9 | 30 | 8 | 26.7 | | | 30 | 14.9 |
| | 3 | 5 | 4.5 | 19 | 17.4 | 15 | 13.7 | 26 | 23.8 | 44 | 40.3 | | | 109 | 47.8 |
| | | | | | | | | | | | | | | | |

P<0.05 is statistically significant

DISCUSSION:

The present study investigated dental graduates' knowledge and perception regarding problem-based learning (PBL), with emphasis on gender-based and academic year-based comparisons. The findings demonstrate a generally positive orientation toward PBL, with statistically significant variations across gender and level of training. These results provide meaningful insight into how learner-centered pedagogies are perceived within dental education.

Theoretical Framework Underpinning PBL

Problem-based learning is grounded in constructivist learning theory, which posits that learners actively construct knowledge through interaction with problems and real-world contexts. Howard S. Barrows conceptualized PBL as a student-centered pedagogy in which learning is initiated by complex problems rather than content transmission. The educational shift from passive reception (lecture-based learning) to active inquiry aligns with adult learning theory

(andragogy), which emphasizes autonomy, relevance, and experiential engagement.

The current findings support this theoretical model. A substantial proportion of participants agreed that PBL enhances self-directed learning, critical thinking, and decision-making confidence. These competencies reflect higher-order cognitive domains as described in Bloom's taxonomy, particularly analysis, synthesis, and evaluation.

Knowledge of PBL Among Dental Graduates

The majority of respondents demonstrated adequate knowledge of PBL principles. This suggests that students are not merely passive recipients of curricular reform but are aware of the pedagogical intentions underlying PBL implementation.

Senior students and interns exhibited comparatively stronger knowledge and more favorable perceptions. This trend may be explained by progressive exposure to clinical scenarios, where integration of theoretical and practical knowledge becomes essential. The clinical phase of dental education inherently mirrors the structure of PBL—problem identification, hypothesis formulation, diagnostic reasoning, and management planning.

Thus, experiential maturity appears to enhance appreciation of PBL methodology.

Gender-Based Differences

The study identified statistically significant differences in responses between male and female participants across several variables. Female students demonstrated more positive perceptions toward communication enhancement, collaborative learning, and confidence development.

Possible explanations include:

Greater engagement in collaborative and dialogic learning environments.

Higher receptivity to reflective and self-directed learning processes.

Enhanced interpersonal communication orientation.

These findings align with educational psychology literature suggesting that collaborative learning strategies may be differentially perceived across gender due to variations in communication style and group participation dynamics. However, it is essential to

interpret such findings cautiously and avoid overgeneralization.

Academic Year-Based Variations

Significant differences across academic levels were noted for selected items. Interns and final-year students expressed more favorable attitudes compared to junior cohorts. This may be attributed to:

Increased clinical exposure.

Direct experience with real patient management.

Greater recognition of the need for integrative reasoning.

Junior students, particularly those in early preclinical years, may experience difficulty appreciating PBL's relevance due to limited clinical context. This suggests that early-stage orientation programs explaining the objectives and long-term benefits of PBL may enhance engagement.

Educational Impact of PBL

Participants reported that PBL:

Improves retention of knowledge.

Enhances communication and teamwork skills.

Promotes exploration of diverse learning resources.

Boosts confidence in clinical decision-making.

These findings are consistent with the systematic review by Saeed A. Azer, which emphasized the role of structured facilitation and group interaction in effective PBL outcomes. Furthermore, studies comparing PBL and lecture-based learning indicate improved integration of basic sciences with clinical reasoning in PBL-driven curricula.

In dental education specifically, where patient-centered problem-solving is fundamental, PBL closely simulates real clinical processes. Diagnosis, treatment planning, and interdisciplinary coordination require precisely the competencies fostered through PBL methodology.

Strengths and Challenges Identified

Strengths highlighted by participants include:

Interactive learning environment.

Development of teamwork.

Improved communication.

Increased confidence.

However, common challenges associated with PBL, both in this study and prior literature, include:

Time-consuming nature.

Unequal participation within groups.

Dependence on facilitator expertise.

Requirement of well-designed clinical triggers.

The success of PBL is highly contingent upon faculty training and scenario construction. Poorly structured cases or inadequate facilitation can reduce effectiveness and lead to student dissatisfaction.

Comparison with Global Literature

International studies in medical and dental education demonstrate comparable findings. Research comparing PBL with traditional didactic approaches shows improvements in:

Clinical reasoning ability.

Knowledge application.

Long-term retention.

Student motivation.

However, meta-analyses also indicate that while PBL enhances skill-based competencies, differences in factual knowledge acquisition may be modest. Thus, hybrid models integrating lectures with PBL sessions may offer optimal outcomes.

Implications for Curriculum Development

The findings suggest several curriculum implications:

1. Structured faculty development programs to enhance facilitation skills.
2. Integration of clinically relevant triggers from early academic years.
3. Balanced hybrid teaching models combining lectures and PBL.
4. Regular feedback mechanisms to improve scenario design.
5. Longitudinal assessment of clinical competence outcomes.

Adopting these measures may maximize the educational impact of PBL within dental institutions.

CONCLUSION

This investigation demonstrates that dental graduates possess adequate knowledge and predominantly positive perceptions toward problem-based learning. Gender and academic year significantly influence attitudes, with female students and interns demonstrating greater acceptance and appreciation of PBL methodology.

PBL contributes substantially to the development of critical thinking, communication skills, collaborative competence, and integration of theoretical and clinical knowledge—core attributes required for contemporary dental practice.

Strengthening faculty facilitation, improving case design, and implementing structured hybrid models can further enhance the effectiveness of PBL in dental education. Longitudinal and competency-based evaluations are recommended to determine its sustained impact on clinical performance and professional development.

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