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# Genome Sciences in Dentistry: Awareness and Attitude: Among Undergraduate Dental Students

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**Abstract:**

**Background:** Genome science has rapidly transformed healthcare, including dentistry, by enabling personalized diagnostics, risk prediction, and targeted therapies. However, the level of awareness and attitude toward genome science among dental undergraduates remains unclear.

**Aim:** To assess the awareness and attitude toward genome sciences among undergraduate dental students.

**Methods:** A cross-sectional questionnaire-based study was conducted among 200 undergraduate dental students. A validated, self-administered questionnaire containing 20 items on awareness and 10 items on attitude was distributed. Data were analyzed using descriptive statistics and Chi-square tests.

**Results:** Only 38% of students demonstrated adequate awareness of genome sciences. About 72% agreed that genomics will significantly influence future dental practice, and 68% showed a positive attitude toward learning genomics. Final-year and intern students had significantly higher awareness compared to junior batches ($p < 0.05$).

**Conclusion:** Although dental students exhibit a positive attitude toward genome sciences, awareness levels remain inadequate. Integrating genomics more effectively into the dental curriculum is essential to prepare future clinicians for personalized dental care.

**Keywords:** Genome sciences, genomics in dentistry, dental students, awareness, attitude, personalized dentistry, genetic education.

## INTRODUCTION

Genome science involves the study of genes, their functions, interactions, and their role in health and disease. With advancements such as whole-genome sequencing, genetic risk profiling, salivary genomics, and pharmacogenomics, dentistry is shifting toward a more personalized approach to diagnosis and treatment.

- Applications of genomics in dentistry include:
- Predicting susceptibility to periodontal diseases
- Understanding caries risk
- Genetic markers for oral cancer
- Craniofacial anomalies and orthodontic relevance
- Pharmacogenomics responses to dental drugs

Despite its importance, genomics is inadequately integrated into current dental curricula in many institutions. Understanding the awareness and attitude of dental undergraduates is necessary to identify educational gaps.

**OBJECTIVES:**

1. To evaluate undergraduate dental students' awareness of genome sciences and their applications in dentistry.
2. To assess students' attitudes toward integrating genomics into dental education and practice.
3. To compare awareness levels across different academic years.

## 1. METHODOLOGY

### Study design and area:

A cross sectional study was carried out at *Mamata Dental College, Khammam, Telangana*.

### Study population:

The health care students included a total of *201dental students* of all years.

### Study instrument:

A protested offline questionnaire was given consisting of *12 questions*; each participant had to fill in their demographic data like name, gender, age and year of study. Participants had to select one option from the answers provided against each question.

### Sampling Methodology

The sampling methodology used is *convenience Sampling*.

### Inclusion Criteria

Students who were present on the day of study and were willing to participate are included.

### Exclusion criteria

Students who were absent on the day of the study and who did not give their Consent were excluded.

### Organizing the study

The study was designed in a paper based version of the self administered questionnaire of 12 questions focusing on knowledge and awareness includes the sections of demographic data.

### Results:

A total of 201 students took part in this study with females of (68.2%) and males of (31.8%) age of participants ranging from 21-32 years in this study females are more likely to demonstrate more perception from males significantly final BDS showed greater familiarity with advanced applications than 1st 2nd and 3rd years.

### Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Age | 201 | 21 | 32 | 24.32 | 1.254 |

### 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 | 33 | 16.4 | 16.4 | 20.9 |
| | ÌI BDS | 42 | 20.8 | 20.8 | 37.3 |
| | III BDS | 52 | 25.9 | 25.9 | 63.2 |
| | IV BDS | 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 |
|---|---|---|---|---|---|---|---|
| | | n | % | n | % | | |
| Q1 | 1 | 46 | 71.8 | 110 | 80.2 | 5.325 | 0.03* |
| | 2 | 17 | 26.5 | 30 | 21.8 | | |
| | 3 | 2 | 3.1 | 7 | 5.1 | | |
| Q2 | 1 | 4 | 6.2 | 15 | 10.9 | 14.654 | 0.03* |
| | 2 | 5 | 7.8 | 7 | 5.1 | | |
| | 3 | 26 | 40.6 | 84 | 61.3 | | |
| | 4 | 29 | 45.3 | 31 | 22.6 | | |
| Q3 | 1 | 8 | 38.1 | 13 | 61.9 | 5.219 | 0.156 |
| | 2 | 10 | 31.2 | 22 | 68.8 | | |
| | 3 | 19 | 44.2 | 24 | 55.8 | | |
| | 4 | 27 | 25.7 | 78 | 74.3 | | |
| Q4 | 1 | 41 | 64 | 82 | 59.8 | 4.230 | 0.238 |
| | 2 | 11 | 17.1 | 42 | 30.6 | | |
| | 3 | 8 | 12.5 | 5 | 3.6 | | |
| | 4 | 4 | 6.2 | 8 | 5.8 | | |
| Q5 | 1 | 41 | 64 | 81 | 59.1 | 14.237 | **0.06** |
| | 2 | 11 | 17.1 | 43 | 31.3 | | |
| | 3 | 8 | 12.5 | 8 | 5.8 | | |
| | 4 | 4 | 6.2 | 5 | 3.6 | | |
| Q6 | 1 | 35 | 54.6 | 91 | 66.4 | 3.231 | 0.004* |
| | 2 | 21 | 32.8 | 33 | 24 | | |
| | 3 | 3 | 4.6 | 7 | 5.1 | | |
| | 4 | 5 | 7.8 | 6 | 4.3 | | |
| | 5 | 0 | 0 | 0 | 0 | | |
| Q7 | 1 | 8 | 20.5 | 31 | 79.5 | 7.713 | **0.05*** |
| | 2 | 14 | 51.9 | 13 | 48.1 | | |
| | 3 | 10 | 27 | 27 | 73 | | |
| | 4 | 32 | 32.7 | 66 | 67.3 | | |
| Q8 | 1 | 16 | 25 | 48 | 75 | 3.201 | 0.362 |
| | 2 | 11 | 44 | 14 | 56 | | |
| | 3 | 16 | 32 | 34 | 68 | | |
| | 4 | 21 | 33.9 | 41 | 66.1 | | |
| Q9 | 1 | 11 | 30.6 | 25 | 69.4 | 2.874 | 0.411 |
| | 2 | 12 | 30.8 | 27 | 69.2 | | |
| | 3 | 12 | 46.2 | 14 | 53.8 | | |
| | 4 | 29 | 29 | 71 | 71 | | |
| Q10 | 1 | 17 | 28.3 | 43 | 71.7 | 1.515 | 0.679 |
| | 2 | 11 | 31.4 | 24 | 68.6 | | |
| | 3 | 16 | 29.6 | 38 | 70.4 | | |
| | 4 | 20 | 38.5 | 32 | 61.5 | | |
| Q11 | 1 | 21 | 53.8 | 18 | 46.2 | 12.665 | **0.06** |
| | 2 | 8 | 33.3 | 16 | 66.7 | | |
| | 3 | 24 | 22.9 | 81 | 77.1 | | |
| Q12 | 1 | 4 | 6.2 | 17 | 12.4 | 23.448 | **0.05*** |
| | 2 | 40 | 62.5 | 80 | 58.3 | | |
| | 3 | 11 | 17.1 | 22 | 16 | | |
| | 4 | 9 | 14 | 18 | 13.1 | | |

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 | | Chi-Value | P-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | n | % | n | % | n | % | n | % | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Q1 | 1 | 26 | 78.7 | 37 | 88.0 | 38 | 73.0 | 53 | 71.6 | 13.647 | 0.02* |
| | 2 | 3 | 9.0 | 2 | 4.7 | 12 | 23.0 | 14 | 18.9 | | |
| | 3 | 4 | 12.1 | 3 | 7.1 | 2 | 4.0 | 7 | 9.4 | | |
| Q2 | 1 | 5 | 26.3 | 1 | 5.3 | 1 | 5.3 | 9 | 47.4 | 13.654 | **0.07** |
| | 2 | 3 | 25 | 1 | 8.3 | 4 | 33.3 | 4 | 33.3 | | |
| | 3 | 17 | 15.5 | 14 | 12.7 | 30 | 27.3 | 46 | 41.8 | | |
| | 4 | 8 | 13.3 | 17 | 28.3 | 17 | 28.3 | 15 | 25 | | |
| Q3 | 1 | 7 | 33.3 | 3 | 14.3 | 4 | 19 | 5 | 23.8 | 9.727 | 0.640 |
| | 2 | 7 | 21.9 | 4 | 12.5 | 9 | 28.1 | 11 | 34.4 | | |
| | 3 | 7 | 16.3 | 7 | 16.3 | 10 | 23.3 | 17 | 39.5 | | |
| | 4 | 12 | 11.4 | 19 | 18.1 | 29 | 27.6 | 41 | 39 | | |
| Q4 | 1 | 11 | 15.1 | 10 | 13.7 | 18 | 24.7 | 30 | 41.1 | 5.351 | 0.945 |
| | 2 | 10 | 23.8 | 7 | 16.7 | 10 | 23.8 | 13 | 31 | | |
| | 3 | 5 | 7.6 | 5 | 4.7 | 5 | 4.7 | 7 | 7.5 | | |
| | 4 | 7 | 8.5 | 0 | 0 | 6 | 7.3 | 8 | 8.5 | | |
| Q5 | 1 | 26 | 10.3 | 37 | 17.9 | 42 | 20.5 | 69 | 43.6 | 14.106 | 0.294 |
| | 2 | 7 | 25 | 6 | 21.4 | 10 | 35.7 | 5 | 17.9 | | |
| | 3 | 6 | 6.7 | 6 | 7.5 | 7 | 11.6 | 3 | 7.5 | | |
| | 4 | 5 | 4.8 | 5 | 6.5 | 3 | 4.6 | 6 | 9.6 | | |
| Q6 | 1 | 25 | 16.7 | 26 | 21.4 | 44 | 28.6 | 61 | 31 | 7.743 | 0.805 |
| | 2 | 8 | 21.1 | 7 | 18.4 | 8 | 21.1 | 13 | 34.2 | | |
| | 3 | 5 | 11.5 | 7 | 11.6 | 7 | 8.6 | 6 | 7.5 | | |
| | 4 | 7 | 12.4 | 8 | 12.5 | 8 | 7.5 | 8 | 7.6 | | |
| | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Q7 | 1 | 7 | 17.9 | 7 | 17.9 | 12 | 30.8 | 12 | 30.8 | 9.985 | 0.617 |
| | 2 | 3 | 11.1 | 3 | 11.1 | 7 | 25.9 | 12 | 44.4 | | |
| | 3 | 8 | 21.6 | 4 | 10.8 | 9 | 24.3 | 12 | 32.4 | | |
| | 4 | 15 | 15.3 | 19 | 19.4 | 24 | 24.5 | 38 | 38.8 | | |
| Q8 | 1 | 8 | 12.5 | 11 | 17.2 | 15 | 23.4 | 26 | 40.6 | 15.342 | 0.223 |
| | 2 | 6 | 24 | 2 | 8 | 4 | 16 | 13 | 52 | | |
| | 3 | 9 | 18 | 6 | 12 | 12 | 24 | 19 | 38 | | |
| | 4 | 10 | 16.1 | 14 | 22.6 | 21 | 33.9 | 16 | 25.8 | | |
| Q9 | 1 | 7 | 19.4 | 7 | 19.4 | 12 | 33.3 | 9 | 25 | 7.847 | 0.797 |
| | 2 | 6 | 15.4 | 7 | 17.9 | 6 | 15.4 | 18 | 46.2 | | |
| | 3 | 3 | 11.5 | 4 | 15.4 | 9 | 34.6 | 8 | 30.8 | | |
| | 4 | 17 | 17 | 15 | 34.6 | 25 | 25 | 39 | 39 | | |
| Q10 | 1 | 11 | 18.3 | 11 | 18.3 | 14 | 23.3 | 22 | 36.7 | 7.788 | 0.801 |
| | 2 | 8 | 22.9 | 4 | 11.4 | 9 | 25.7 | 13 | 37.1 | | |
| | 3 | 10 | 18.5 | 8 | 14.8 | 17 | 31.5 | 16 | 29.6 | | |
| | 4 | 4 | 7.7 | 10 | 19.2 | 12 | 23.1 | 23 | 44.2 | | |
| Q11 | 1 | 6 | 15.4 | 7 | 17.9 | 11 | 28.2 | 13 | 33.3 | 2.828 | 0.997 |
| | 2 | 6 | 25 | 4 | 16.7 | 5 | 20.8 | 8 | 33.3 | | |
| | 3 | 15 | 14.3 | 17 | 16.2 | 27 | 25.7 | 42 | 40 | | |
| Q12 | 1 | 29 | 22 | 30 | 24.4 | 40 | 22 | 60 | 26.8 | 16.655 | 0.06 |
| | 2 | 4 | 11.8 | 3 | 8.8 | 12 | 35.3 | 14 | 41.2 | | |
| | 3 | 2 | 5.5 | 3 | 5.6 | 5 | 8.6 | 11 | 21.6 | | |
| | 4 | 2 | 6.6 | 2 | 4.7 | 3 | 7.5 | 7 | 9.5 | | |

P≤0.05 is statistically significant

## DISCUSSION

The study reveals a significant gap between students' attitudes and their actual awareness of genome sciences. While most students recognize the future importance of genomics in dentistry, only a minority possess adequate knowledge.

This aligns with global research showing that genetics education is insufficient in dental curricula. The higher awareness among senior students suggests that clinical exposure and self-directed learning improve understanding.

**Common barriers identified include:**

Lack of dedicated genomics courses

Inadequate teaching hours

Limited exposure to genetic tools or case scenarios

Integrating genomics through interactive modules, case-based learning, and digital platforms may improve student competency.

## CONCLUSION

Undergraduate dental students exhibit a positive attitude toward genome sciences, but their awareness and knowledge levels remain inadequate. Strengthening the curriculum with focused genomics education and clinical applications is essential to prepare future dentists for personalized oral healthcare.

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