Evidence Based Dentistry Curriculum:

Teaching Evidence Based Dentistry to dental students is the key to increasing the uptake of evidence-based treatments and practices in dentistry. Hence a formal curriculum on Evidence Based Dentistry is designed for undergraduate dental students. This EBD curriculum is built upon adult learning principles which include peer teaching, hands on training, group discussion, integration of research, reasoning, independent learning etc. Problem-based and evidence based learning in a classroom environment with a predetermined teaching scenario is also an effective method for introducing the principles of evidence based health care. The course is designed to help students understand the fundamental knowledge of EBD, including research methodology, epidemiology, biostatistics, and acquire the skills of literature searching and critically appraising the scientific literature. The aim is to facilitate a learning experience that will provide the skills to develop implement and disseminate an evidence-based approach for effective dental practice.

The course fits integrally with EBD spread across Four years of BDS where the principles learned are applied in reading and evaluating the literature. The course is designed to take advantage of adult learning and includes independent, online small group and workshop learning environments.

The course supports the following objectives:

[1] The ability to critically evaluate new knowledge and to determine its relevance to the clinical problems and challenges presented by the individual patient.

[2] The ability to interpret, assess, integrate, and apply data and information in the process of clinical problem solving, reasoning, and decision making

[3] The ability to learn independently.

The EBD course is a step to achieve the following competencies:

A. Knowledge

1. Define basic statistics, epidemiologic concepts, and study designs

2. Locate high quality medical information resources and know how to use them

B. **Skills**

1. Use computers and PDAs effectively to find answers to clinical questions at the point-of care

2. Complete and effective MEDLINE search of intermediate complexity

3. Assess the quality of a study

4. Critically evaluates the medical literature and weighs competing evidence

5. Balance evidence, clinical expertise, and patient preferences in medical decision-making

C. Attitude

1. Believe in the value of life-long learning

2. Value evidence in making medical decisions over opinion

3. Inculcate a habit of search and research

4. Patient centric scientifically sound practice

Educational objectives of the course: At the completion of EBD teaching, students will be able to:

1. Define evidence-based dentistry, and describe the EBD process.

2. Value evidence in making medical decisions over opinion and the practice of life-long learning.

3. Distinguish between different scales of measurement; define mean, median, mode, variance, range, and probability.

4. Understand epidemiologic concepts of incidence, prevalence, rate etc.

5. Recognize differences in study design for both observational and experimental studies including randomized controlled trials, community intervention trials, cohort studies, case-control, cross-sectional, case series, community surveys, systematic reviews, and meta-analyses.

6. Discuss the strengths and weaknesses of each and the application of appropriate statistics for each study type.

7. Recognize the value of a literature search strategy and define MeSH. Translate strategy into a MEDLINE search of moderate complexity using MeSH and limits appropriately.

8. Understand and utilize principles of statistics used in cohort and case-control studies including odds ratio, relative risk, and absolute risk. Define and recognize types of bias found in these studies.

9. Appreciate the difference between statistical significance and clinical significance

10. Understand the use of and define markers to evaluate the strength of evidence, including absolute and relative risk reduction, number needed to treat, and confidence intervals. Differentiate between disease and patient oriented evidence.

11. Understand the application of statistical and study-design concepts in evaluating clinical trials.

12. Describe and define characteristics of randomized controlled trials such as randomization, blinding, concealed allocation, intention-to-treat analysis and explain how these characteristics reduce bias.

13. Recognize appropriate statistical methods for categorical and continuous data, including Chi-squared, survival analysis, linear regression, logistic regression, and ANOVA.

14. Describe how the EBD process is used and applied in a medical setting. Distinguish between narrative review articles, systematic reviews, and meta-analysis and understand issues in using them such as publication bias, forest plots, and heterogeneity.

15. Use the basic knowledge in understanding the evidence when integrated in text and practice.

16. Formulate clinical problems in PICO format and undertake adequate search to get best answer.

17. Develop ability to formulate hypothesis based, community oriented questions and undertake short research projects.

Conduct of the course:

The EBD course will be conducted through lectures, assignments, small groups and Practical classes. Lectures will help students to understand basic knowledge. Lectures will be taken by experts in epidemiology, biostatistics, human research and trained teachers for EBD.

Assignments:

Assignments are given to students to enhance critical thinking skills and promote independent learning.

Practical:

Practical is planned in the four years on a one to one interaction basis along with hands on training in small groups which will enhance student's skill and interest in EBD. Faculty will facilitate small groups. They will take attendance and evaluate student knowledge, participation, listening, and preparation.

Peer teaching:

Basic topics in EBD will be divided into micro topics. Students will be assigned a micro-topic and allowed to teach the other students about the assigned topic. Teacher will be observer during this exercise. This exercise will be conducted during theory classes.

Podcasts: Audio podcasts can be made and can be uploaded on university website.

<u>Role play:</u> During their clinical posting in dental subjects, case will be selected for role play and the facilitator will follow all the steps of evidence based decision making and will take shared decision (in fourth BDS).

Course Contents:

1.1   1st BDS

    Theory classes   8 hrs

    1.1.1 EBD:

       1.1.1.1   Definition

       1.1.1.2   History

       1.1.1.3   Advantages of EBD.

       1.1.1.4   EBD vs Opinion,

       1.1.1.5   Gap between research and practice

       1.1.1.6   Levels of evidence.

    1.1.2 Process of Evidence Based Decision Making (EBDM):

       1.1.2.1   Steps and process of EBDM

       1.1.2.2   Formation of PICO

       1.1.2.3   Search and acquire evidence

       1.1.2.4   Appraise available evidence

       1.1.2.5   Apply in decision making.

    1.1.3 Internet use protocol.

    1.1.4 Search Engines and search filters

    1.1.5 Medical databases

    1.1.6 Sources of Evidence

       1.1.6.1   Primary source of evidence

       1.1.6.2   Secondary source of evidence

1.2   **Practical class:**   **8 hrs**

(One to one interaction and hands on training in small group will be provided in a Computer lab with internet connectivity). The following topics will be demonstrated and worked upon:

   1.2.1 Role play for basic searching strategies and searching protocol.

   1.2.2 Use of PubMed

   1.2.3 Use of EBSCO

   1.2.4 Use of Google Scholar

   1.2.5 Use of secondary sources of evidence

  1.3   Home Assignments:-

   1.3.1 Chart on fundamentals of EBD

   1.3.2 Bibliography preparation

   1.3.3 PICO

2. 2nd BDS

4.1 **Theory** **16 Hrs**

4.1.1 Biostatistics

    i. Definition

    ii. Use for EBD

    iii. Measures of central tendency,

    iv. Hypothesis testing,

    v. Odds ratio,

    vi. Relative risk,

    vii. Confidence interval,

    viii. Various statistical methods and its appropriate use

    ix. Bias and error.

4.1.2 Research designs

    4.1.2.1 Importance of Research

    4.1.2.2 Types of Research,

    4.1.2.3 Choice of Research design

4.1.3 Observational studies (Definition, characteristics strength, weakness and related statistics in each of the following)

    4.1.3.1 Cross sectional study,

    4.1.3.2 Case control study

4.1.3.3   Cohort study;

4.1.4 Experimental study: (Definition, characteristics, strength, weakness and related statistics)

4.1.4.1   Randomized controlled trials

4.1.4.2   Quasi randomized controlled trials

4.1.4.3   Non-Randomized trials

4.1.4.4   Multicentre Clinical trials

4.1.5 Epidemiological concepts

4.1.5.1   Incidence

4.1.5.2   Prevalence

4.2   **Home Assignments**

2.2.1 Preparation of charts on research designs.

5. 3rd BDS

5.1 Theory   13 Hrs

5.1.1 Clinical significance

5.1.2 Amalgamate the correct study design with Statistical analysis.

5.1.3 Statistical needs for evidence based practice

5.1.4 Clinical significance vs. statistical significance

5.1.5 Estimation of risk of bias.

5.1.6 Systematic review: Definition, characteristics, strength, weakness and related statistics.

5.1.7 Critical appraisal

     5.1.7.1   Rationale

     5.1.7.2   Appraisal tool kits

     5.1.7.3   Appraisal of evidence using tool kits.

5.1.8 Application to patient

     5.1.8.1   Patient role in the Evidence based decision making process,

     5.1.8.2   Legal aspect

5.2 Practical: 08 Hours

5.2.1 Formulating a clinical question

5.2.2 Advanced searching

5.2.3 Acquire relevant evidence

      5.2.4 Estimation of risk of bias

5.3   **Home Assignments:**

      5.3.1 Chart on Statistical Methods.

      5.3.2 Design mock research

6. 4th BDS

6.1 **Theory**   **07 Hrs.**

6.1.1 GRADE (Grading of Recommendations Assessment, Development and Evaluation) system

6.1.2 Future trends in EBD

6.1.3 Clinical Trial Registry-India (CTRI)

6.1.4 Drug Controller General of India (DCGI)

6.1.5 Indian Council of Medical Research (ICMR)

6.1.6 Institutional Ethics Committee (IEC)

6.1.7 Food and Drug Administration(FDA)

6.2 **Practical:**   **12 Hrs.**

6.2.1 Critical appraisal of –

    6.2.1.1   Epidemiological study

    6.2.1.2   Randomized controlled trials

    6.2.1.3   Systematic review and Meta analysis

6.2.2 Preparation of evidence based protocol

6.2.3 Clinical case management on evidence based system

6.2.4 Writing an EBD Prescription

6.3 **Assignments:**

6.3.1 Identify clinical problems and prepare CATs (critically appraised topic)

7. **Evaluation:** Final exam conducted with university examination of each year as a theory examination only.

7.1　Theory: 30 marks (1 Hour)

7.2　Scheme of Theory examination:

　7.2.1　Three short essay questions of 05 mark each.

　7.2.2　Fifteen one liner questions of 01 mark each.

7.3　Assignments for 20 Marks is to be calculated from the assignment marks conducted over the four years of BDS.

7.4　Guidelines for evaluation of assignments:

　7.4.1　Marks will be given for each assignment. Each assignment will carry 10 marks.

　7.4.2　Marking will be done as per Check list which will be preserved for one year in the department.

　7.4.3　Marks achieved by the student for each assignment will then be totaled. Percentage will then be calculated and as per the percentage marks out of 20 will be awarded.

7.5　**Grading system:**

　7.5.1　The student is evaluated for a total of 50 marks (Theory 30 Marks + Assignment 20 marks) and graded on a ten point scale as A to D.

　　Grade A^{+}　41-50

Grade A 31-40

Grade B$^+$ 21-30

Grade B 11-20

Grade C ≤ 10

7.5.2 Marks may not be calculated for rank.

7.5.3 Student who excels with 'A$^+$' grade in all the four exams will be granted subject proficiency award.

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Post script:

- Some aspect of how later evidence will be integrated in teaching-learning process and what will be the use of this basic information.