Innovations

Knowledge about guidelines for critical appraisal of scientific literature amongst dental students

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Received: 22 May 2022 **Accepted:**28 June 2022 **Published:** 30 June 2022

Abstract :
Introduction*: -critical appraisal is the scieic assessment in a systematic manner to evaluate the quality of a scientific publication and analysis of the results. Critical appraisal is the task of assessing the quality and relevance of research in a particular context. It is an important skill for dental clinicians and dental students who have a responsibility to improve clinical care in their practice. One of the core skills of competent dentists is the ability to search and analyse high-quality evidence. An original research article should consist of the following headings: structured abstract, introduction, methods, results, and discussion. Problems in understanding the basic aspects of knowledge-based information may impede its implementation into clinical practice. It is an essential outcome for undergraduates and postgraduate students in application of their clinical practice. The inference gained from critical appraisal of a scientific literature helps the clinician to make decisions regarding patient care.* ***Objective:*** *- this study was aimed to evaluate the current knowledge about the critical appraisal of scientific literature amongst dental students.* ***Methods:*** *-a twenty one set questionnaire in google forms was circulated amongst undergraduate and postgraduate dental students. The questionnaire was analysed and evaluation about student's knowledge and perception of critically appraising a scientific literature was done.* ***Results:*** *- about one hundred and eighty two dental students , both undergraduate and post graduates(52.20%) followed the checklist and found them useful to appraise scientific literature.* ***Conclusion:*** *-the awareness of appraising a scientific literature is observed more in post graduates compared to undergraduate dental students.*

Keywords *: 1.Critical appraisal, 2.undergraduates, 3.postgraduates, 4.dental students, 5.scientific literature.*

Introduction

Critical appraisal is that the task of assessing the quality of research and relevance of research to get a clarity way of particular context. It is an important skill for clinicians who have a responsibility to improve and enhance clinical care in their practice. It is an essential and vital outcome for undergraduates and postgraduate students in application of their clinical practice(1). Critical appraisal of scientific literature may help students to differentiate between useful and flawed studies. Although some resources of peer-reviewed literature are available, flawed studies may show in unreliable sources. Flawed studies if used in the way to guide clinical decisions may find ourselves with no benefit or at worse end in significant harm.it also has become essential for the clinicians, researchers, and students to read articles from scientific journals(2). This is often not only to keep progress in their speciality concerned but also to be bear in mind of current trends in providing optimum healthcare to the patients(3). Reading scientific literature could be a must for college students who are interested in research, for choosing their topics and carrying out their experiments(4). Scientific literature willhelp to understand what has already been discovered and what questions remain unanswered and thus help in designing research projects as well(5).

An original research article should consist of the following headings: structured abstract, introduction, methods, results, and discussion (imrad)(6). There are few different types of articles which are systematic review or systematic review with meta-analysis, randomized control trials (rct), controlled clinical trials (cct), diagnostic studies, survey, and case-control or cohort study, case report or case series, cross sectional studies. For each study design , there's different checklist to critically appraise it(7).reviews is of two types -- non-systematic (narrative) or systematic. A narrative review is a review where broad overview of a topic without any specific question more or less an update and qualitative summary(8) whereas systematic review typically addresses a selectec and specific question about a topic, details of the methods by which papers were identified within the literature, uses predetermined criteria for selection of papers to be included within the review, and qualitatively evaluates them(9). A meta-analysis is the type
Of systematic review within which numeric results of several separate studies are statistically combined to determine the result of a specific research question(10). Some are invited reviews requested by the editor, from an expert in a particular field of study. Randomized control trials or controlled clinical trials is a study design that randomly assigns participants into an experimental group or a control group. As the study is conducted, the only expected difference between the control and experimental groups in a randomized controlled trial (rct) is the outcome variable being studied. Case controlled study is a study that compares two groups of people: those with the disease or condition under study (cases) and a very similar group of people who do not have the disease or condition (controls).case report is a study report of a single clinical case, whereas a case series is a description of a number of two or more than two cases.cross-sectional study design is a type of observational study design where the investigator measures the outcome and the exposures in the study participants at the same time(11). Diagnostic studies are studies that evaluate whether a particular test distinguishes between presence and absence of a particular disease as determined by a reference standard and they should have sensitivity, specificity of theresults(12).
Previously our team has a rich experience in working on various research projects across multiple disciplines (govindaraju and gurunathan 2017; a. Christabel et al. 2016; soh and narayanan 2013; mehta et al. 2019; ezhilarasan, apoorva, and ashokvardhan 2019; campeau et al. 2014; kumar and s 2016; s. L. Christabel 2015; kumar and rahman 2017; sridharan, ramani, and patankar 2017; ramesh et al. 2016; thamaraiselvan et al. 2015; thangaraj et al. 2016; ponnulakshmi et al. 2019; "fluoride, fluoridated toothpaste efficacy and its safety in children - review" 2018) now the

growing trend in this area motivated us to pursue this project. Critical appraisal is the scientific assessment in a systematic manner to evaluate the quality of a scientific publication and analysis of the results. The inference gained from critical appraisal of a scientific literature helps the clinician to make decisions regarding patient care. This study was aimed to evaluate the current knowledge about the critical appraisal of scientific literature amongst dental students.

Materials and methods

A cross sectional study was conducted amongst dental students(both under graduates and post graduates) with a 21 set questionnaire in google forms which was circulated amongst them. This study was aimed to evaluate the current knowledge about the critical appraisal of scientific literature amongst dental students. So the questionnaire was analysed and evaluation about student's knowledge and perception of critically appraising a scientific literature was done.

Questionnaire circulated to undergraduate and postgraduate dental students:-

1) Name: -
2) Age: -
3) Gender: -
4) Undergraduate / post graduate: -
5)If undergraduate – i year / ii year / iii year / iv year / intern
6)If post graduate – i year / ii year / iii year
7)Are you aware of different checklists available for different study designs?
yes/no
8)Which is the appropriate checklist for randomized control trials?
- care / consort / prisma / stard / strobe
9) Which is the appropriate checklist for systematic review with meta analysis?
- care / consort / prisma / stard / strobe
10) Which is the appropriate checklist for diagnostic studies?
- care / consort / prisma / stard / strobe
11) Which is the appropriate checklist for case-controlled studies?
- care / consort / prisma / stard / strobe
12) Which is the appropriate checklist for cross-sectional studies?
- care / consort / prisma / stard / strobe
13) Which is the appropriate checklist for cohort studies?
- care / consort / prisma / stard / strobe
14) Which is the appropriate checklist for case reports?
- care / consort / prisma / stard / strobe
15)Number of items present in consort checklist?
13 / 25 / 27 / 30 / 22
16) Number of items present in care checklist?
13 / 25 / 27 / 30 / 22
17) Number of items present in prisma checklist?
13 / 25 / 27 / 30 / 22
18) Number of items present in stard checklist?
13 / 25 / 27 / 30 / 22
19) Number of items present in strobe checklist?
13 / 25 / 27 / 30 / 22
20)Do you follow the checklist while critical appraising an article? Have you?
yes / no

21)Have you found the checklist to be useful in critically appraising an article?
- yes/no

A cross-sectional study design was conducted from january 2021 to march 2021 among dental students, involving both undergraduates and post graduates. Statistical analysis used were descriptive frequencies and percentages.

Table 1 represents different checklists for each type of study designs. The checklist for case reports is care guidelines which has 13 items, for randomized control trials is consort guidelines with 25 items, systematic review with meta-analysis is prisma guidelines with 27 items, for diagnostic studies is stard guidelines with 30 items, for case- controlled studies ;cross-sectional studies and cohort studies is strobe guidelines with 22 checklist items.

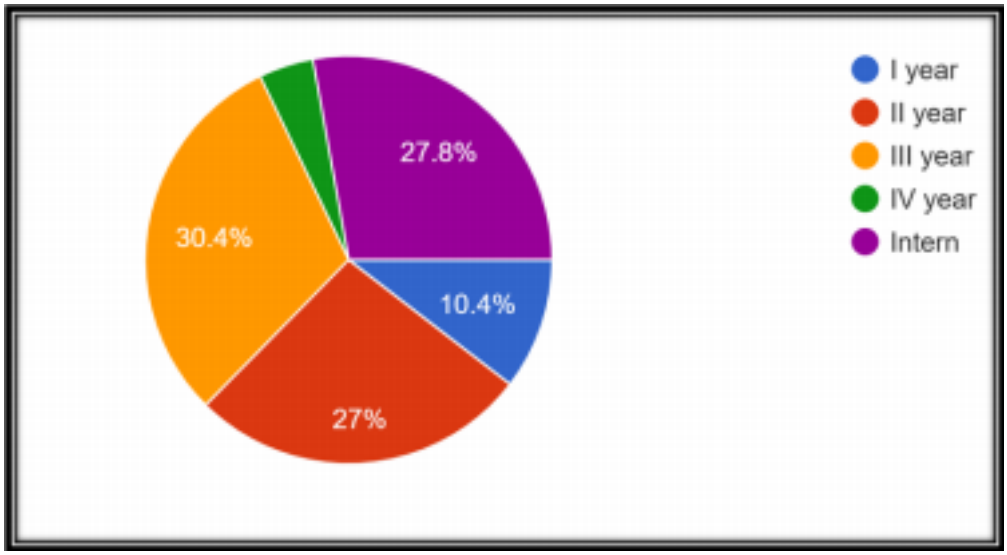
Study design	**Checklist**	**Number of items**
Case reports	Care	13
Randomized control trials	Consort	25
Systematic review with meta analysis	Prisma	27
Diagnostic studies	Stard	30
Case-controlled studies	Strobe	22
Cross-sectional studies	Strobe	22
Cohort studies	Strobe	22

Table 1 represents different checklists for different study design and total number of checklist items in it.

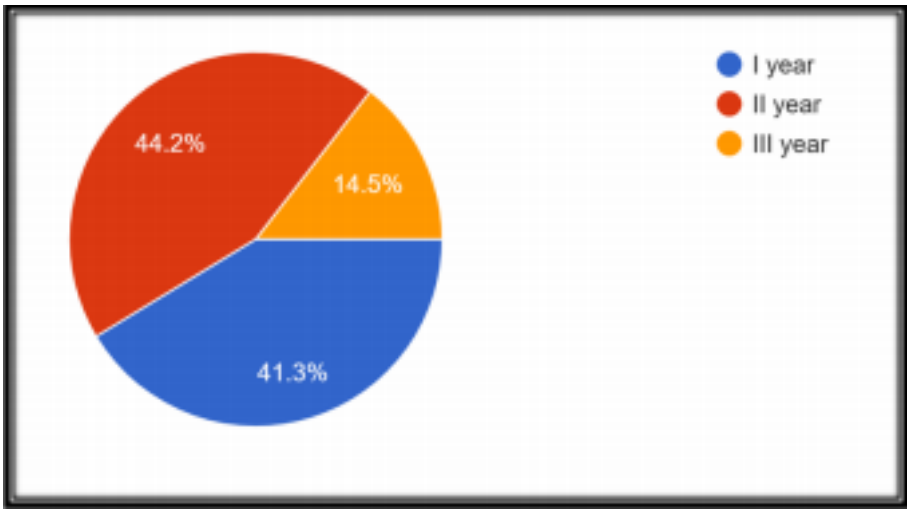
Results

Three hundred and seventy-two responses were obtained from this cross-sectional survey conducted amongst dental students. In undergraduates, about (24)10.4% of students of i year responded to the survey, (62)27% students of ii year,(70) 30.4% students of iii year, (9)4.4% students of iv year,(64)27.8 % students of interns (pie chart 1). In post graduates, about (57)41.3% of i year students responded to the survey, (61)44.2% of ii year students and (20)14.5% of iii year students (pie chart 2). Among undergraduates, only 28% are aware of checklists for critical appraisal and 72% are not aware of checklists (bar chart 2). Among postgraduates about 86.6 % are aware of checklists and only 13.4% students are not aware (bar chart 2). Bar chart 1 represents 52.20 % percentageof undergraduates and postgraduates who follow checklist and found to be useful and 47.80% of undergraduates and postgraduates who did not follow checklist for critical appraisal of scientific

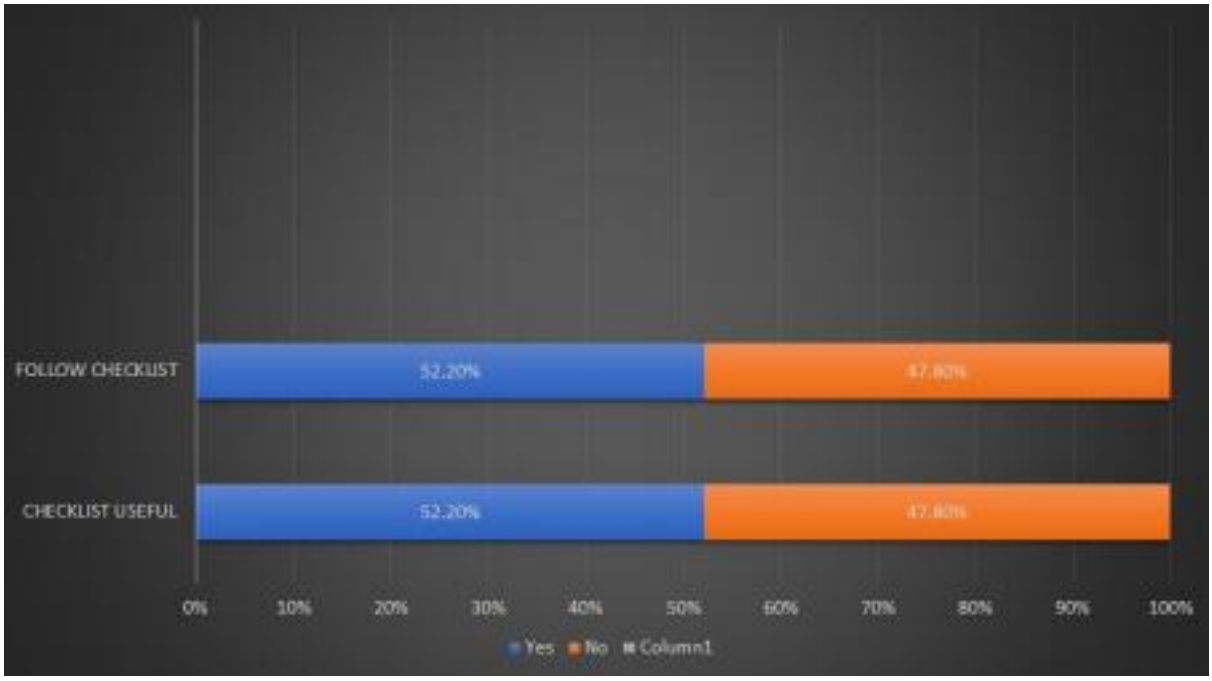
Literature. Data collection was done and tabulated in excel sheets and was analysed using spss software and statistical tests such as descriptive frequencies and percentages was done.



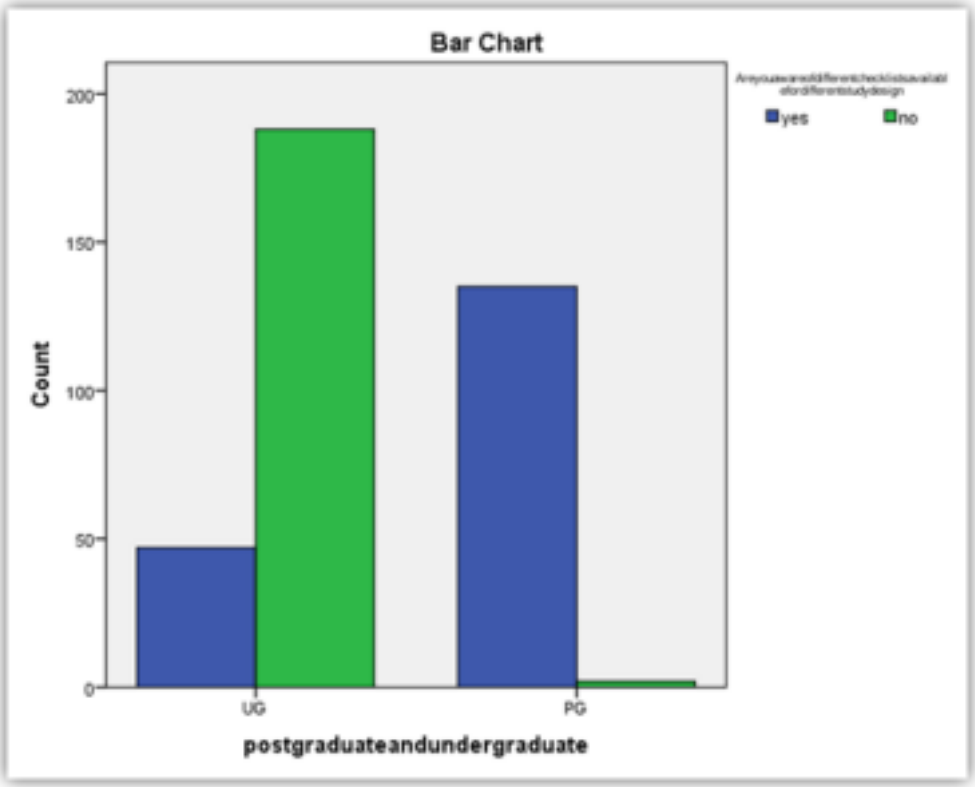
Pie chart 1 represents percentages of undergraduates who responded to the survey.10.4% represents percentages of i year undergraduates, 27% represents ii year undergraduates, 30.4% represents iii year undergraduates, 4.4% represents iv year undergraduates and 27.8% of undergraduates doing internship.



Pie chart 2 represents percentages of postgraduates who responded to the survey.41.3% represents i year postgraduates, 44.2% represents ii year post graduates and 14.5% represents iii year post graduates.



Barchart 1 represents percentages of undergraduates and postgraduates who follow and found guidelines for appraising scientific literature to be useful.52.20% of undergraduates and post graduates follow checklist and find the checklist to be useful and 47.80% of undergraduates and postgraduates do not follow checklist and find checklist not to be useful.



Bar chart 2 represents frequency of under graduates and post graduates who are aware of the guidelines for critical appraisal of scientific literature.

Discussion:

Critical appraisal is the task of assessing the quality and relevance of research in a particular context.Checklists are used in many fields to help ensure that the proper procedures are used. In the fields of engineering, aeronautics, medicine and dentistry, failures to follow checklists of evidence-based guidelines can be used in court cases to assign blame for bad outcomes too. Checklists are based on the method of decomposition, whereby a complex problem is analyzed in parts that can be solved more easily than the whole.it is an important skill for clinicians who have a responsibility to improve clinical care in their practice. It is an essential outcome for undergraduates andpostgraduate students in application of their clinical practice(1). Critical appraisal of scientific literature may help students to distinguish between useful and flawed studies. Although some resources of peer-reviewed literature are available, flawed studies may abound in unreliable sources. Flawed studies if used to guide clinical decisions may end up with no benefit or at worse result in significant harm.it also has become essential for the clinicians, researchers, and students to read articles from scientific journals(2). This is not only to keep progress in their speciality concerned but also to be aware of current trends in providing optimum healthcare to the patients(3). Reading scientific literature is a must for students interested in research, for choosing their topics and carrying out their experiments(4).despite the increasing number of scientific publications, many physicians and students find it difficult to read all the published literature. Selection, reading, and critical appraisal of publications is necessary to stay up to date in one's field(13).scientific research not only promotes health and combats diseases of an individual, but also it can strengthen the effectiveness of health systems. Hence, understanding of scientific methods becomes a crucial component in the dental profession. This requires that the students develop an effective search strategy for clinical questions. Information retrieval is the field concerned with acquiring, organising and searching for knowledge-based information(14).the critical appraisal of systematic reviews involves assessing the risk of bias, results, and applicability of such studies (15).the credibility of systematic reviews depends on whether or not the authors addressed a sensible clinical question, included an exhaustive literature research section, demonstrated reproducibility of the selection and assessment of the studies, and presented the results in an useful manner. Many dental clinicians and educators are undertrained in critical appraisal making.in this study, a questionnaire was circulated to undergraduate and postgraduate dental students ,372 responses were obtained. In i year students - about (24)10.4% responded to the survey, in ii year about (62)27% students ,in iii year about (70) 30.4% students , in iv year about (9) 4.4% ,interns of about (64) 27.8% students. Among them only 28% undergraduate students are aware of the checklist and 72% are not aware of the checklist for critical appraisal. In post graduates, in i year about (57)41.3% of students responded to the survey,(61) 44.2% students in ii year and (20) 14.5% students in iii year. Among them 86.6% students are aware of checklists and 13.4% are not aware of checklists.totally 182 dental students(52.2%) follow the checklist and find it useful in this study. Falessi et al. Debated the awareness of using the checklist to critically or scientifically appraise a literature. Molléri et al study employed an experimental design where 76 students (in pairs) used two checklists to evaluate two papers (reporting a case study and an experimental study) each and then compared the student's assessments against ratings from more senior researchers and also collected data on student's perception of using the checklists but not on awareness of checklists for different study designs. Only limited research was seen on awareness of guidelines for critical appraisal of scientific literature amongst dental students.

Our institution is passionate about high quality evidence based research and has excelled in various fields ((jayaseelanvijayashreepriyadharsini 2019; pc, marimuthu, and devadoss 2018; ramesh et al. 2018; ramadurai et al. 2019; sridharan et al. 2019; ezhilarasan, apoorva, and ashokvardhan 2019; mathew et al. 2020; samuel 2021; r et al. 2020; chandrasekar et al. 2020; j. Vijayashreepriyadharsini, smilinegirija, and paramasivam 2018).Critical appraisal of scientific

literature is an important skill to be mastered not just by academic professionals but also by those involved in clinical practice.

Conclusion

The awareness of appraising scientific literature is observed more in post graduates compared to undergraduate dental students. Before incorporating changes in the management of their patients, a thorough evaluation of the current or published literature is a necessary step in practicing evidence-based clinical management or treatment

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