

Insights into Preparation of Dissertation by Postgraduate Students in Emergency Medicine

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Abstract

According to the rules of Medical Council of India and the National Board of Examinations, a student before being permitted to appear in the examination for the degree of MD/DNB in emergency medicine, is required to submit a dissertation as a proof of having undertaken a research of high order under the guidance of a recognized postgraduate teacher during the period of training at the institute. The board of examiners appointed by the institute evaluate the research work which is submitted as thesis or dissertation. Thesis writing has evolved from simple research to a more comprehensive scientific writing with major emphasis on clinical and statistical content. We attempt to present the intricacies in writing scientific literature and expect that this information is useful to the postgraduate students. This review does not talk about how to conduct a study. However, we have hinted on them at few places to clear the common doubts.

Keywords: Thesis writing; Dissertation.

Introduction

Thesis writing is a major component of the postgraduate curriculum apart from theoretical knowledge, clinical skills, attitude including communication skills and training in research methodology. Thesis or dissertation is a document submitted in support of candidature for an academic degree or professional qualification presenting the authors research and findings. Work for writing the thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the candidate to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature [1].

Dissertation

We will be dealing the review under two major headings – Study Protocol and Thesis (Box Figure 1)

Study Protocol

A study protocol is a document that describes

the objective(s), design, methodology, statistical considerations and organization of a study. The protocol usually also gives the background and reason the trial is being conducted, but these could be provided in other documents referenced in the protocol.

The research idea either follows an established scientific literature or is “out of box” thinking. The protocol is submitted to institutional ethics committee, institute scientific committee and institute budget committee for approval. Every institute has preformed forms for submission including the details of project, primary investigator, supervisor/s and the finances involved. The important points to consider are:

1. The Title of thesis - It should be able to orient the reader to the kind of work you will perform. The title can also be used to express the type of study - whether prospective, randomized, blinded or otherwise.
2. A brief description of the background of study is added. The flow of description should introduce the drug and/or the technique. The reader should understand the gaps in existing literature.

3. The Aims can be divided into primary and secondary objectives. It clarifies that the investigator intends to primarily look for a particular effect but additionally he would note all related events occurring simultaneously.
4. A description of methodology is required in future tense. A pilot experiment, also called a pilot study, is a small scale preliminary study conducted before the main research, in order to check the feasibility or to improve the design of the research (Box figure 2). Pilot

Title- Should be brief, clear and focus on the relevance of the topic.

Introduction- Should state the purpose of study, mention lacunae in current knowledge and enunciate the Hypothesis, if any.

Review of Literature- Should be relevant, complete and current to date.

Material and Methods- Should include the type of study (prospective, retrospective, controlled double blind) details of material & experimental design procedure used for data collection & statistical methods employed; statement of limitations ethical issues involved.

Observations- Should be Organized in readily identifiable sections having correct analysis of data be presented in appropriate charts, tables, graphs & diagram etc. These should be statistically interpreted.

Discussion- Observations of the study should be discussed and compared with other research studies. The discussion should highlight original findings and should also include suggestion for future.

Summary and Conclusion

Bibliography- Should be correctly arranged in Vancouver pattern.

Appendix- All tools used for data collection such as questionnaire, interview schedules, observation check lists etc should be put in the annexure.

Fig. 1: Guidelines for writing of Thesis / Dissertation.

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**Sample size of 12 per group
rule of thumb for a pilot study**

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Abstract

When designing a clinical trial an appropriate justification for the sample size should be provided in the protocol. However, there are a number o settings when undertaking a pilot trial when there is no prior information to base a sample size on. For such pilot studies the recommendation is a sample size of 12 per group. the justifications or this sample size are based on rationale about feasibility: precision ablut the mean and variance; and regulatory considerations. the context of the justifications are that future studies will use the information from the pilot in their design.

Keywords: sample size, pilot study.

Fig. 2: Pilot Study

studies, therefore, may not be appropriate for case studies. They are frequently carried out before large-scale quantitative research, in an attempt to avoid time and money being wasted on an inadequately designed project. A pilot study is usually carried out on members of the relevant population, but not on those who will form part of the final sample. This is because it may influence the later behavior of research subjects if they have already been involved in the research. However, we can utilize them for calculating the sample size.

5. The most important document attached here is the informed written consent in Regional language, English and Hindi. The document has two parts- the information sheet which discusses the Introduction, purpose, type of research intervention, participant selection, voluntary Participation, procedures and protocol, duration, side effects, risks, discomforts, benefits, incentives, confidentiality, sharing of results, right to refuse or withdraw, alternatives to participating and whom to contact for administrative purposes. The second part is the certificate of consent for signatures with names and relation to patient.

Thesis

It is divided into 3 parts -

- A. Preliminaries including title page up to table of contents and abstract
- B. The text of thesis, from introduction to conclusion and,
- C. Reference material including bibliography and appendix.

A. Preliminaries -

The subheadings to be included in preliminaries are the Title page, Declaration by principal investigator/student, Certificates by Guide, co-guides and the Head of the Department, Acknowledgement or preface, Abbreviations, Table of contents, List of tables, List of figures and Abstract, if kept [2].

A typical title page is depicted in Figure 3. If title is more than one line then the title should be double spaced between the lines. It should be aligned in the centre, is never underlined or put in capital letters or put in quotation marks. Name of the author should be in centre and set half way down the page. Submission statement should be single

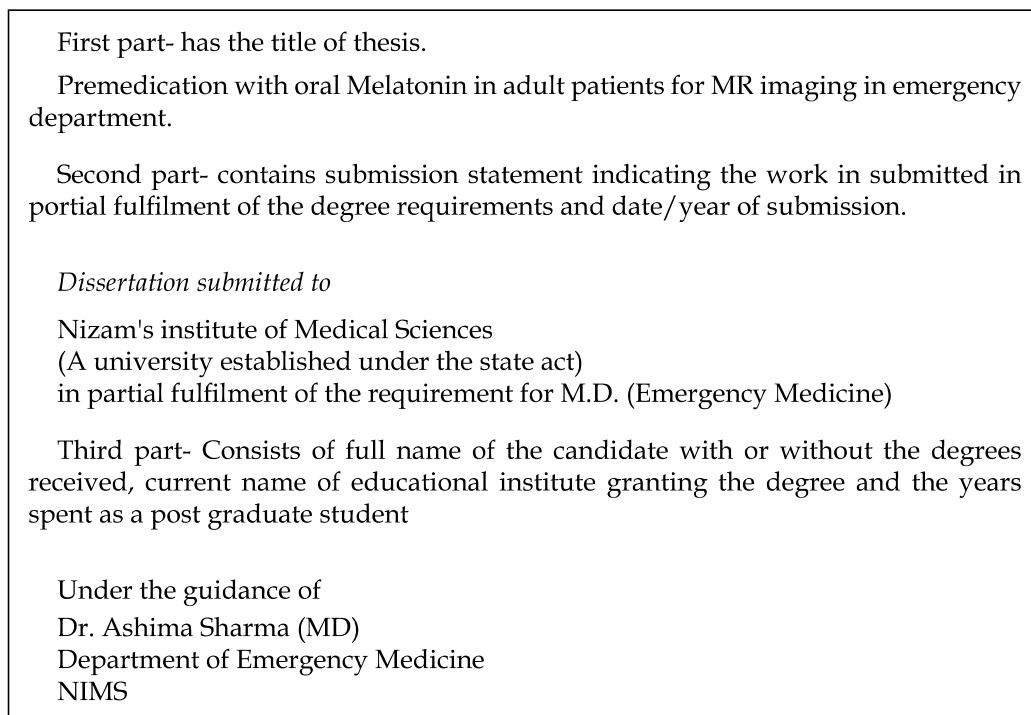


Fig. 3: The Title page.

spaced. Only those words are capitalized which are capitalized in normal sentence. There should be no terminal punctuation in any section or part of title page. The margins are two inches from the top, right and bottom of the page and two and a half inch on left side. An approximate space of one and a half inch should be placed between each part of title page.

The certificate of approval from guides, co-guides and HOD should contain their names, designation and office address. The signatures of the advisors are mandatory with their official seals.

On the Acknowledgement page, the author expresses gratitude to the teachers and fellow colleagues who have extended their help during the study. The language has to be extremely polite and professional.

Table of contents should have lists of chapter titles with subdivisions in each. All titles listed should correspond exactly to the titles in the text and page referenced should be correctly given.

Abstract is a summary of the whole thesis. It includes introduction, methods, results and discussion. Introduction includes brief description of the background of the topic and includes aim of the study. The basic design of the study and key techniques used are mentioned in methods. Results should inform the key quantitative results and trends. A brief summary of interpretations is mentioned in conclusions.

It is not necessary to include abstract as part of the thesis. However, it may be submitted as a separate sheet along with thesis. Abstract is not paginated. It can be kept before acknowledgement page or after the page.

B. The Text of thesis-

a. Introduction- should be interesting enough to motivate your reader to read the rest of the Thesis. One of the common patterns for writing introduction is CARS model. CARS' i.e., Creating a Research Space was described by John Swales in 1990. This model describes three elements-

1. Establishing the territory (explaining the importance of topic and reviewing the previous work)
2. Identifying a niche (indicating a gap in knowledge)
3. Occupying the niche (listing purpose of research, provide an overview of the structure of writing).

Introduction helps in establishing the importance of the topic to the discipline and patient care, writing synopsis of literature, highlighting a problem, controversy in the field of study, inadequacies of previous studies and paucity of research, stating the hypothesis (the purpose of research) and brief description of it.

b. Review of literature- This should be a critical synthesis of the state of the knowledge. Especially important are the areas needing further investigation: what has not been done, as well as what has been done, but for which there is a conflict in the literature. The literature review is vital to justify your hypothesis. The examiner finds out how the candidate thinks from reading this section. Apart from literature review, attention should be paid to referencing style and verb tense. The referencing style can be based on either to previous research *to date* (*various studies have shown that..../ tested the efficacy of melatonin as a premedication*), or to reference to single investigation in the past-researcher or investigation as the main focus or to research topic as the main focus. The present perfect tense (have/has verb participle) is to be used for the general referencing. For reference to specific studies carried out in the past, simple past tense is used. When referring to the words or ideas of writers, present tense is often used.

c. Aims and objectives- are the foundation of your thesis. Hypotheses are the larval forms of theories, some anticipation of a principle is to be established or rejected. The hypothesis must fit the known facts and be testable. Primary and secondary objectives should be clearly defined.

d. Methodology- contains the information to allow the reader to assess the believability of your results and information needed by another researcher to replicate your experiment. Where the methods chosen are new, unfamiliar or perhaps even controversial, methods section will tend to be more extensive. The verbs should be written in the simple past tense. The method and materials should present the description of your materials (Subjects), inclusion and exclusion criteria, theory, details of procedure, calculations, technique, equipment and calibration plots. The end point of study should be clearly mentioned.

e. Statistical methods- should include sample size determination, power analysis, Hypothesis testing and specific tests stating the level of significance. Power analyses can be performed before collecting data (a priori) or after collecting data (a posteriori). For a priori analysis that seeks to estimate sample size based on acceptable levels

of effect size, α , and power (β), Several authors have suggested a 4:1 ratio of β to α (1). That is, if the level of α is established a priori α at .05, then the corresponding power ($1-\beta$) is $1 - 4 (.05) = .80$.

f. Results- The results are actual statements of observations, including statistics, tables and graphs. The text should guide the reader stressing key results which provide answers to questions investigated with information on the observed range of variation. Subheadings are allowed in results to break the information into logical segments. Important negative results should also be presented. The text has to be written in

past tense and S.I units are used. Tables and figures should be arranged in a logical sequence. Numbers to be assigned in a sequence referred to them in the text. Format which depicts the result best should be decided. Same data should not be presented in both table and figure. A table can be used either to report precise numbers or to illustrate a trend. A trend is better illustrated with a figure (Fig. 4). The advantage of using box plots when exploring data is that several of the characteristics of the data such as outliers, symmetry features, the range, and dispersion of the data can be easily compared between

| Title → Comparison of Anxiety scores between patients premedicated with Melatonin or Alprazolam | | | | |
|---|----------------|-----------|-----------|---------|
| Headings → | | | | |
| | Time intervals | Group I | Group II | P value |
| | Baseline | 6.05±0.90 | 5.70±0.97 | 0.098 |
| | 15 min | 4.25±1.53 | 4.45±1.22 | 0.520 |
| | 30 min | 1.60±1.58 | 2.03±1.46 | 0.215 |
| | 90 min | 0.80±1.09 | 1.30±1.24 | 0.050 * |

Body →

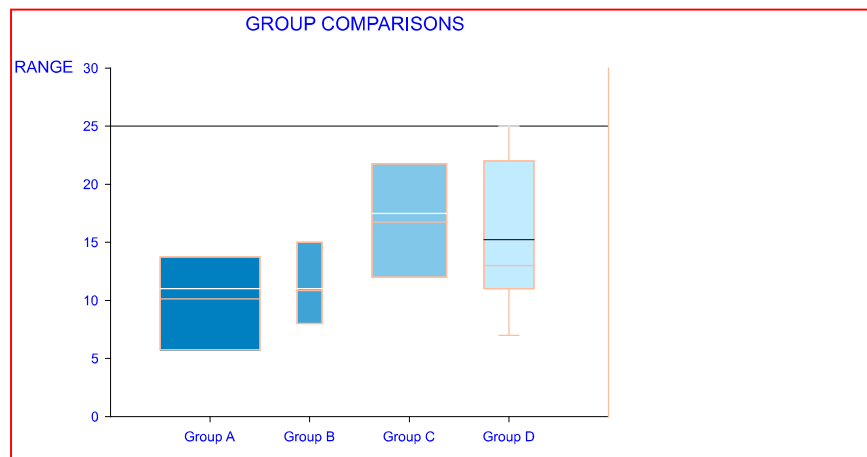


Fig. 5: A Box plot

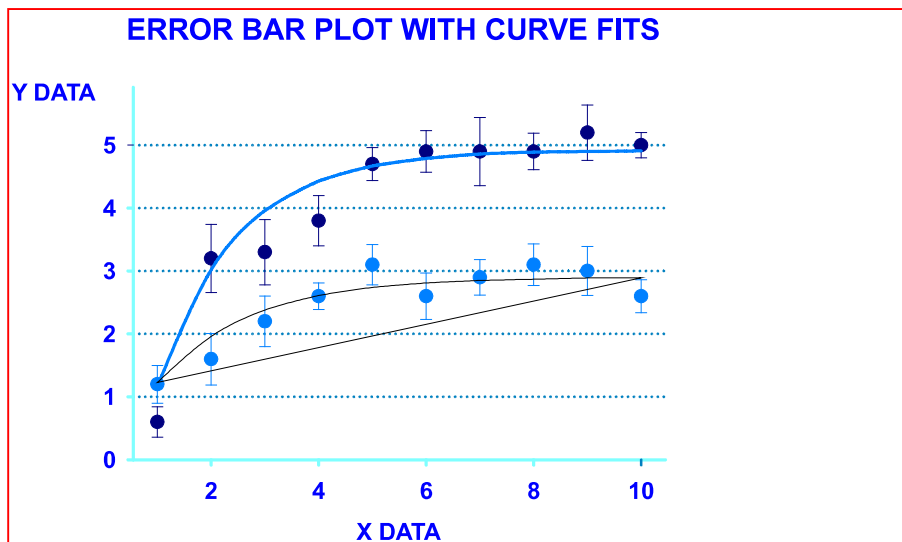


Fig. 6: Line graph.

different groups. (Figure 5). Line graph can be used to show the value of a variable over time. The values of the variable are given on the vertical axis, and the horizontal axis is the time variable. (Figure 6). Bar chart provides a picture of data that could also be reasonably displayed in tabular format. Bar charts can be created for nominal, ordinal, or continuous data. It can show the number or proportion of people by levels of a nominal or ordinal variable. The scatter plot pictorially represents the relation between two continuous variables.

g. Discussion- The discussion part should focus on the following:

1. Main message which answers the question posed in the introduction section and includes the main supporting evidence.
2. Critical assessment which includes opinions on any shortcomings in study design, limitations in methods, flaws in analysis, or validity of assumptions.
3. Comparison with other studies, where inconsistencies are discussed.
4. Contemplations or comments on possible biological or clinical implications [3].

h. Conclusion- should start with introductory restatement of aims and research questions. The consolidation of present research (e.g. findings, limitations) is summarized next with practical applications/implications. The limitations & recommendations for further research can be mentioned at the end.

C- Reference material including Bibliography and appendix

'The primary function of citing references is to avoid plagiarism by giving credit where credit is due'. [4]

Currently there are four main styles of referencing for academic articles, as follows:

- 1 **The APA style.** This system is also known as the **Harvard** or the 'name (date)' system.
2. **The Modern Languages Association (MLA) style.** In this version the authors' surnames (with or without the dates) appear in the text and the first author's surname comes first in the reference list.
3. **The Institute of Electronic and Electrical Engineers (IEEE) style.** Here, the authors in the text are numbered in order of their appearance in the text, sometimes without their names, and the numbers are enclosed in square brackets.

4. **The Vancouver style,** popular in medical journals, is named after its

Inception following agreements made during a meeting in Vancouver in 1987 by the International Steering Committee of Medical Editors.

The Vancouver style of writing references is used in medical thesis. This is based on NLM (National library of Medicine) style guide of authors, editors and publishers. Referencing is a standardized way of acknowledging the sources of information and ideas that have been used in assignments and which allows sources to be identified and to avoid plagiarism. This allows readers to more completely understand cited authors work. A citation is an acknowledgement in the text of references that support the study. It is a form of a number that correlates with a source in the reference list. It is identified by Arabic numbers in round brackets () or square brackets [] or in superscript with no brackets. As a general rule, these numbers are placed outside full stops and commas, and inside colons and semicolons. This applies to references in text, tables or figures.

The Vancouver system assigns a number to each reference as it is cited. The original number assigned to the reference is reused each time the reference is cited in the text regardless of its previous position in the text. Multiple references should have hyphen to join the first and last numbers, commas (without spaces) to separate non inclusive numbers e.g. (2, 3, 4, 5, 7, 10) is abbreviated to (2-5, 7, 10). A hyphen is not supposed to be used if there are no citation numbers in between e.g. (1-2). Instead use (1, 2).

Elements of citation can be a book, chapter in a book, article in a journal, thesis, newspaper, magazine or a web page. These are demonstrated in Box figure 7.

A reference list should have reference in the same order as cited in the text. The referencing softwares available are Endnote, Refworks and Mendeley. They allow us to enter and import online references, manage and edit them and easily create a bibliography in any citation style. However, it is important to check the entries before finalizing thesis.

Appendix

Appendices contain information that is not essential for understanding of paper, but may present information that clarifies the point without burdening body of presentation. Headings should be identified by roman numerals in sequence e.g.

Fig. 7: Referencing styles.

| Reference Type | In-text example | Reference list example |
|---------------------------------------|---|--|
| Edited book | In all cases, it is important to note the outer diameter of the tube [1]. | 1. Brooks A, Mahoney P, Rowlands B, editors. ABC of tubes, drains, lines and frames. West Sussex: Blackwell Publishing Ltd; 2008. |
| Two to six authors | Cheers, Darracott and Lonne have highlighted the fact that '.....'[2] | 2. Cheers B, Darracott R, Lonne B. Social care practice in rural communities. Sydney: The Federation Press; 2007. |
| Six or more authors | Professionals in collaboration [3] | 3. Hofmeyr GJ, Neilson JP, Alfirevic Z, Crowther CA, Gulmezoglu AM, Hodnett ED et al. A Cochrane pocketbook: Pregnancy and childbirth. Chichester, West Sussex, England: John Wiley & Sons Ltd; 2008. |
| Electronic book – entire book | Bartlett concludes that [4] | 4. Bartlett A. Breastwork: Rethinking breastfeeding [monograph online]. Sydney, NSW: University of New South Wales Press; 2005 [cited 2009 Nov 10]. Available from: NetLibrary |
| Chapter in an edited book | As discussed by Rowlands and Haine [5] | 5. Rowlands TE, Haine LS. Acute limb ischaemia. In: Donnelly R, London NJM, editors. ABC of arterial and venous disease. 2nd ed. West Sussex. Blackwell Publishing; 2009. |
| Chapter from an electronic book | Darwin believes that the natural selection [6] | 6. Darwin C. On the Origin of Species by means of natural selection or the preservation of favoured races in the struggle for life [internet]. London: John Murray; 1859. Chapter 5, Laws of Variation. [cited 2010 Apr 22]. Available from: http://www.talkorigins.org/faqs/origin/chapter5.html |
| Standard journal article – one author | As highlighted by Snowdon, [7] | 7. Snowdon J. Severe depression in old age. <i>Medicine Today</i> . 2002 Dec;3(12):40-47. |
| Published conference paper | This is well documented in the literature. [8] | 8. Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Reinhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6-10; Geneva, Switzerland. Amsterdam: North Holland; 1992. P. 1561-5 |
| Newspaper article with author | “many parents did not feed their babies enough” [9] | 9. Purdon F. Colder babies at risk of SIDS. <i>The Courier Mail</i> 2010 Mar 8:9 |
| Magazine article | The findings of the research [10] | 10. Marano HE. Making of a perfectionist. <i>Psychol Today</i> . 2008 Mar-Apr;41:80-86 |
| Thesis | The research is support by Kay [11]. | 11. Kay JG. Intracellular cytokine trafficking and phagocytosis in macrophages [PhD thesis]. St Lucia, Qld: University of Queensland; 2007. |
| Web page - with author | Behaviour medication [12] | 12. Atherton, J. Behaviour modification [Internet]. 2010 [updated 2010 Feb 10; cited 2010 Apr 10]. Available from: http://www.learningandteaching.info/learning/behaviour_mod.htm |

Appendix I, Appendix II. When tables and figures are included in appendix, format should be same as in result section but numbering should be in a separate sequence from the body of thesis.(start from table 1/fig 1) Some examples which might be included in appendix is proforma, consent form, ethical clearance, data sheet, extra photographs, explanation of formulas (mathematical/statistical) e.g., sensitivity, specificity, specialized computer programs for a particular procedure, full generic names of chemicals or compounds that may be mentioned by common name in body of paper and diagrams of specialized apparatus.

The rules on language used in the thesis

Scientific writing should be in simple english, unambiguous, precise (phrases like “quite small”, “a considerable length” etc. to be avoided), in passive voice and brief as a courtesy to your reader. When writing in the first person, use the singular or plural as appropriate.

The rules of numbering the pages

The title page, declaration, certificate, acknowledgement, abbreviations and abstract are to be numbered in lower case roman numerals (i, ii, iii, iv, v). Page number is to be centered at the bottom of the page. Numbering starts from the declaration page which should be numbered as page ii. Page i is title page which is not numbered. Rest of the thesis starting from introduction page is numbered in Arabic numerals 1, 2, 3...either in bottom or top of the page.

The rules of Layout of the thesis

Thesis is not restricted to one volume. It is typed on A4 paper with a left hand margin of 4 cm. There should be a 2 cm margin on all other edges. Typing on both sides is encouraged, and margins should be mirrored accordingly. The thesis should be computer printed in Times New Roman, or Arial font of 12 pt size for main Text, Titles and

Subtitles 16 & 14 pt with bold fonts. Double-spacing should be used in the text of the thesis. Single spacing should be used in long tables, block quotations separated from the text, footnotes, and bibliographical entries. All figure captions should be in the same font as the main text, preferably at one size smaller. Chapters should start on a new page, but sections and subsections should not. A proper binding of your work is an absolute ingredient to good presentation.

The thesis projects the candidate's awareness, interest, basic knowledge and uniformity in thought process. Therefore, one should be extremely careful about their work before submitting it for evaluation.

Key Messages

A well written Dissertation is a pleasure to read.

References

1. Writing Tips: Thesis statements. Center for Writing Studies.[Internet].2016[updated 2016 Apr 17; cited 2016 Apr 22]. Available from: [http:// www. cws. illinois.edu/workshop/writers.htm](http://www.cws.illinois.edu/workshop/writers.htm).
2. National Board of Examinations. NBE Guidelines for Preparation and Submission of Thesis Protocol. 2013. Available from: [http:// www.natboard.edu/ thesis.htm](http://www.natboard.edu/thesis.htm).
3. India. Medical Council of India. PG. Medical Education Regulations. 2000. Available from: [http:// www.mciindia.org/Rulesand Regulations. htm](http://www.mciindia.org/RulesandRegulations.htm).
4. Kate L. Turabian. A Manual for Writers of Research Papers, Theses and Dissertations. 7th ed. University of Chicago Press; 2007.