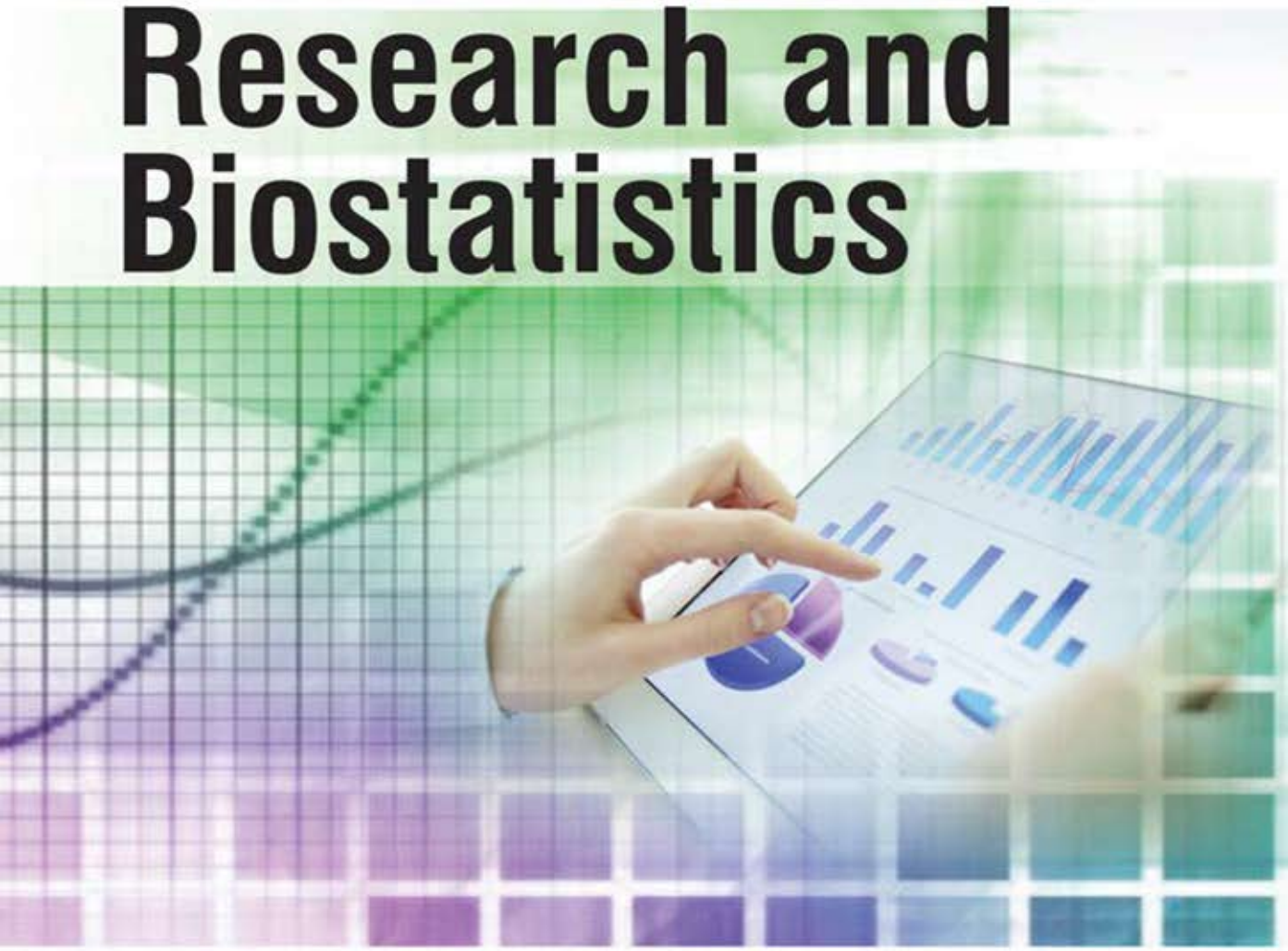
rothers.com, for detailed information on nursing books, visit our website www.jaypeebrothers.com, for detailed information on nursing book

A Guide to NURSING Research and Biostatistics



Mamita Dey

Foreword
Amal Kumar Basu

JAYPEE

Contents

SECTION I: NURSING RESEARCH **1—318**

Unit I: Basic Concepts of Nursing Research **2–62**

Chapter–1: Methods of Acquiring Knowledge 3–19

- Introduction 3
- Methods of acquiring knowledge 3
- Problem-solving 4
- Scientific method 7
- Research 9
- Historical evolution of research in nursing 16

Chapter–2: Basic Research Terms 20–37

- Terminology 20

Chapter–3: Scope of Nursing Research 38–40

- Classification of scope of nursing research 38
- Problems in nursing, health and social research 39

Chapter–4: Concept of Evidence-based Practice 41–46

- Overview of evidence-based practice 41
- Definition 42
- Evidence-based nursing 43
- Importance of evidence-based practice 43
- Steps in evidence-based practice 43
- Levels of evidence hierarchy (Stetler, et.al.) 45
- Limitations 46
- Legal and ethical issues of evidence-based research 46
- Barriers of implementing evidence-based practice 46
- Conclusion 46

Chapter–5: Ethics in Research 47–59

- Introduction 47
- Definition 47
- Planning for the protection of subject's rights 47
- Ethical implications for nursing research 48
- Historical background 50
- Code of ethics 51
- ICMR policy statement on ethical consideration 52

- Statement of general principles in biomedical research involving human subjects 53

Chapter–6: Overview of Research Process 60–62
- Definition 60
- Nurses responsibility in relation to research 61

Unit II: Review of Literature 63–70

Chapter–7: Background of Literature Review 64–70
- Introduction 64
- Definition 64
- Purposes 64
- Criteria of good resources 65
- When to conduct the literature review 66

Unit III: Research Approaches and Designs 71–113

Chapter–8: Quantitative and Qualitative Research Design 72–113
- Research design 72
- Quantitative research 75
- Experimental research design 75
- Nonexperimental research design 86
- Types of survey research 88
- Qualitative research design 95

Unit IV: Research Problem 114–145

Chapter–9: Specific Terms 115–128
- Research objectives 115
- Assumption 117
- Variables 118
- Hypothesis 120
- Types of hypotheses 123
- Operational definition 125
- Limitations 127

Chapter–10: Identification of Research Problem 129–132
- Introduction 129

Chapter–11: Research Proposal 133–145
- Planning of resources 137
- Proforma for writing research proposal 137

Unit V: Theoretical/conceptual Gramework 146–157

Chapter–12: Developing Theoretical/conceptual Framework 147–157
- Theory and conceptual framework 147

Unit VI: Population, Sample and Sampling **158–183**
Chapter–13: Sample and Sampling Technique 159–183
- Introduction 159
- Basic concepts of sampling 159
- Sample and sampling 160

Unit VII: Concept of Data Collection **184–258**
Chapter–14: Tools and Methods of Data Collection 185–254
- Methods of data collection 185
- Observation methods 197
- Questionnaire 200
- Schedule 206
- Interview method 207
- Some other methods of data collection 218
- Experimentation as a method of data collection 226
- Simulation 230
- Case study as a method of simulation 231
- Nonexperimental methods 234
- Sociometry used as data collection 235
- Content analysis 239
- Delphi technique of data collection 240
- Ethologic technique of data collection 241
- Secondary data collection 241
- Measurement and measurement scale 241
- Sources of error in measurement 243
- Scaling 244
- Checklist 253

Chapter–15: Validity and Reliability 255–258
- Validity 255
- Reliability 257
- Item analysis 257

Unit VIII: Pilot Study **259–263**
Chapter–16: Pretesting and Pilot Study 260–263
- Pretesting of the research study 260
- Pilot study 261

Unit IX: Analysis and Interpretation of Data **264–279**
Chapter–17: Methods of Analysis and Interpretation of Data 265–279

Unit X: Reporting and Utilization of Research Findings 280–315
Chapter–18: Communication and Utilization of Research Findings 281–315
- Introduction 281
- Criteria for communicating research findings 281
- Types of report 281
- Popular reports 282
- Guidelines for writing popular reports 282
- Characteristics of good research reports 283
- Guidelines for writing research report 283
- Steps in writing reports 284
- Format of the research report 286
- Contents of the format 287
- Chapter—I: Introduction 289
- Chapter—II: Review literature 290
- Chapter—III: Methodology 290
- Chapter—IV: Analysis and interpretation of data 290
- Chapter—V: Discussion 290
- Chapter—VI: Conclusions and recommendation 290
- American Psychological Association (APA) referencing style guide 291
- Vancouver citation style 307
- Barriers in utilization of nursing research 314
- Strategies to facilitate utilization of nursing research 314

Unit XI: Critical Analysis of Research Report 316–318
Chapter–19: Critiquing Research Report 317–318

SECTION II: INTRODUCTION TO BIOSTATISTICS 319–393
Unit XII: Introduction to Biostatistics 320–393
Chapter–20: Introduction to Statistics 321–325
- Introduction 321
- Definitions of statistics 321
- Characteristics of statistics 323
- Scope of statistics 324

Chapter–21: Tabulation of Data 326–331
- Significance of tabulation of data 326
- Essential parts of a table 327

- Classification of table 328
- General guidelines and rules of tubulation 329

Chapter–22: Charts and Diagrams 332–341
- Meaning of medical statistics 332
- Collection of medical data 332
- Presentation of statistical data in health 332
- Diagrams and graphs 333
- General rules for constructing diagrams 333
- Types of diagram 334
- Characteristics of bar diagrams/graphs 334
- Types of bar diagram 335
- Graphs 340

Chapter–23: Frequency Distribution of Data 342–350
- Meaning 342
- Useful terms associated with grouped frequency distribution 342
- Cumulative frequency distribution 344
- Diagrammatic representation of frequency distribution 345

Chapter–24: Measures of Central Tendency 351–362
- Meaning 351
- Median 354

Chapter–25: Measures of Dispersion 363–368
- Mean deviation 363
- Standard deviation 363

Chapter–26: Chi-square Test 369–372
- Introduction 369

Chapter–27: T-test 373–376
- Introduction 373

Chapter–28: Tests of Statistical Significance 377–383
- Standard error of the mean 377
- Correlation 380

Chapter–29: Demography 384–393
- Introduction 384
- Defferent types of indicators 384

Appendix I *395–407*

Model question papers *395*

Model question papers 1 *395*

Model question papers 2 *395*

Model question papers 3 396
Model question papers 4 397
Model question papers 5 398
Questions from other colleges 398–402
Worksheet for students 402
Key answers 407

Appendix II 408–411
Critical value 408
Critical value of t-table 408
Percentage points of the chi-square distribution 409
Critical values of the pearson product-moment correlation coefficient 410

Suggested Reading 413

Index 417

chapter

4 Concept of Evidence-based Practice

OBJECTIVES

- Discuss the overview of evidence-based practice
- Define evidence-based practice and evidence-based nursing
- Enumerate the objectives of evidence-based nursing
- Discuss the importance of evidence-based practice
- Describe the steps of evidence-based practice
- Discuss the levels of evidence-based practice
- Discuss the limitations of evidence-based practice
- Discuss the legal and ethical issues in evidence-based research
- Explain the barriers of evidence-based practice

OVERVIEW OF EVIDENCE-BASED PRACTICE

Introduction

Reading and using research is not necessarily the easiest possible approach to seeking answers for clinical questions. To look for answers in research the investigator must—

- Identify research in the area of interest.
- Access the research report.
- Need and understand the research report.
- Decide whether the research is relevant and useful in answering the questions.
- Decide whether to accept and use what you find in the research.

Using research in the clinical practice can broadly be called evidence-based practice (Fig. 4.1). That, is, a nursing practice that is based on evidence from research. Evidence-based practice is broadly defined as the conscious and intentful use of research and theory-based information to make decisions about patient care delivery. Research is not the only evidence that nurses use as a basis for their practice.

During the 1980's the term 'evidence-based medicine' emerged to describe the approach that used scientific evidence to determine the best practice. Later, the term shifted to become 'evidence-based practice' as clinicians other than physicians recognized the importance of scientific evidence in clinical decision-making. Evidence-based practice and evidence-based health care assume



FIGURE 4.1: Evidence-based practice

JAYPEE BROTHERS

that evidence is used in the context of a particular patient's preferences and desires, the clinical situation and the expertise of the clinician. Health care that is evidence based and conducted in a caring context leads to better clinical decisions and patient outcomes.

Evidence-based practice (EBP) is an approach to health care wherein health professionals use the best evidence possible, i.e. the most appropriate information available, to make clinical decisions for individual patients. It involves complex and conscientious decision making based not only on the available evidence but also on patient characteristics, situations and preferences. It recognized that health care is individualized and everchanging and involves uncertainties and probabilities.

DEFINITION

The term 'evidence' means 'knowledge derived from a variety of sources that has been found to be credible' (Higgs and Jones, 2000).

Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.

The term 'evidence-based practice' is derived from definitions of evidence-based medicine. The evidence-based medicine working group (1992), based in Canada, describes evidence-based medicine as the process of de-emphasizing.

- Intuition, unsystematic clinical experience and pathophysiologic rationale as sufficient grounds for clinical decision-making and stresses the examination of evidence from clinical research.

The McMaster University Evidence-based Medicine Group (1996) offered this more comprehensive and workable definition:

- The collection, interpretation and integration of valid, important, and applicable patient-reported, clinician-observed, and research-derived evidence. The best available evidence, moderated by patient circumstances and preferences, is applied to improve the quality of clinical judgments and facilitate cost-effective health care.

The most quoted definition of evidence-based medicine comes from Sackett, et al. (1996). It is described as:

The conscientious, explicit and judicious use of current based evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external medicine evidence from systematic research.

According to Sackett, et. al. (1996), the evidence based medicine involves the "thoughtful identification and compassionate use of individual patients' predicaments, rights, and preferences in making clinical decisions about their care".

Carnwell defines EBP as—"The systematic search for and appraisal of, best evidence in order to make clinical decisions that might require changes in current practice, while taking into account the individual needs of the patient".

"Best evidence might be defined as that which is valid and relevant to the patient". (Carnwell, 2001).

"Clinical decisions should be informed by up-to-date, relevant and robust evidence rather than outdated primary training or over interpretation of individual patient experiences (Donald and Greenhalgh, 2000; Sackett, et al. 2000).

JAYPEE BROTHERS

EVIDENCE-BASED NURSING

Evidence-based nursing started in the 1800's with Florence Nightingale. Evidence-based nursing is a problem solving approach to clinical decision making. "Evidence-based decision-making is a continuous interactive process involving the explicit, conscientious and judicious consideration of the best available evidence to provide care"—Position statement by Canadian Nurses' Association.

Evidence-based nursing is a practical guide to evidence-based nursing for students and practitioners. Proceeding step by step, it enables nurses to understand and evaluate the different types of evidence that are available, and to critically appraise the studies that lay behind them. It also considers the ways in which these findings can be implemented in clinical practice, and how research can be practically applied to clinical decision-making.

Evidence-based nursing is a type of evidence-based healthcare, drawing on some of the traditions of evidence-based medicine. It involves identifying solid research findings and implementing them in nursing practices, in order to increase the quality of patient care. Evidence-based nursing is a process founded on the collection, interpretation and integration of valid, important and applicable research. In order to practice evidence-based nursing, practitioners must understand the concept of research and know how to accurately evaluate the research.

Evidence-based nursing is an integration of the best evidence available, nursing expertise and the values and preferences of the individuals, families and communities who are served (Fig. 4.2).

Evidence-based nursing is "process by which nurses make clinical decisions using best available evidence, clinical expertise and patient preferences in the context of available resources" (Dicenso, 1998).

Objectives of Evidence-based Nursing

- Increase awareness of the effectiveness of decisions and actions of practitioners, educators, and policy makers.
- Improve decision-making and achieve clinical effectiveness by enabling clinicians to use the most effective interventions to reduce waste and eliminating unnecessary practices.
- Develop and use guidelines based on evidence which will improve patients' outcome.
- Reduce the reliance on expert knowledge and increase the transparency of decision-making.

IMPORTANCE OF EVIDENCE-BASED PRACTICE

The importances of evidence based practice are as follows:

- Ensures patient/clients receive the care that fits their needs.
- Facilitates should decision-making and makes it more explicit.
- Minimizes risk to the patient/client so that benefits outweigh harm.
- Provides the nurse with the skills and knowledge to evaluate health care literature and practice.
- Exposes gaps in knowledge and conflicts in evidence.

STEPS IN EVIDENCE-BASED PRACTICE

Step 1. Select a Topic

The first step is to select a topic. Ideas come from different sources but are categorized in two areas:

- Problem focused triggers.
- Knowledge focused triggers.

When selecting a topic, nurses should formulate questions that are likely to gain

JAYPEE BROTHERS

support people within the organization. An interdisciplinary medical team should work together to come up with an agreement about the topic selection. The priority of the topic should be considered as well as the severity of the problem. Nurses should consider whether the topic would apply to many or few clinical areas. Also the availability of solid evidence should be considered because providing proof of the research will increase staffs' willingness to implement into nursing practice.

- **Problem-focused triggers**—Problem-focused triggers are identified by health care staff through quality improvement, risk surveillance, benchmarking data, financial data or recurrent clinical problems. Problem-focused triggers could be clinical problems, or risk management issues.
- **Knowledge-focused triggers**—Knowledge focused triggers are created when health care staff read research, listen to scientific papers at research conferences or encounter EBP guidelines published by federal agencies or organizations. Knowledge-based triggers could be new research findings that further enhance nursing, or new practice guidelines.

Step 2. Form a Team

Forming a team increases the chance of EBP being adopted. A team becomes paramount in implementation and evaluation of the EBP. It is important to have representatives of the team from authority members of the organization and also grass roots members. The EBP team should have explanations that clearly define the types of patients, setting, outcomes, interventions and exposures. The role of the practitioners is remarkable in any meaningful gains, they are therefore inevitable and their role becomes pivotal. The approach they adopted and their ability to educate the coworkers, answer their questions and clarify any misconceptions greatly improves the outcomes.

Step 3. Evidence Retrieval

One of the most challenging issues in using EBP in the clinical setting is learning how to adequately frame a clinical question so that an appropriate literature review can be performed. When forming a clinical question the following should be included—The disorder or disease of the patient, the intervention or finding being reviewed, possibly a comparison intervention and the outcome according to PICO model:

- P—Who is the patient population?
- I—What is the potential intervention or area of interest?
- C—Is there a comparison intervention or control group?
- O—What is the desired outcome?

Once the topic is selected, the research relevant to the topic must be reviewed, in addition to other relevant literature. It is important that clinical studies, systematic reviews, and well known and reliable existing EBP guidelines are accessed in the literature retrieval process. When reviewing any article for evidence retrieval read it very closely. Articles can appear to be precise and factual on the surface but with further and much closer examination, flaws can be found. The article can be loaded with opinionated and/or biased statements that would clearly taint the findings, thus lowering the credibility and quality of the article. Use of rating systems to determine the quality of the research is crucial to the development of EBP. Time management is crucial to information retrieval. Nurses making their way through the vast amount of research available may find it helpful to read research articles or critical reviews instead of clinical journals. To maintain high standard for EBP implementation, education in research review is necessary to distinguish good research from poorly

JAYPEE BROTHERS

conducted research. Reviewed material should be current.

Links to article sources

- Cinahl Information Systems Home Page.
- British Medical Journal.
- Medline Industries, Inc.
- Pubmed.

Once the literature is located, it is helpful to classify the articles as either conceptual (theory and clinical articles) or data-based (systematic research reviews). Before reading and critiquing the research, it is useful to read theoretical and clinical articles to have a broad view of the nature of the topic and related concepts and to then review existing EBP guidelines.

Step 4. Apply the evidence

After determining the internal and external validity of the study, a decision is arrived at whether the information gathered does apply to your initial question. It's important to address questions related to diagnosis, therapy, harm and prognosis. The information gathered should be interpreted according to many criteria and should always be shared with other nurses and/or fellow researchers.

Step 5. Conclusion

The last step is conclusion, called recommendation. The recommendation should be derived from the results gathered earlier in the article. Based on the results, the researcher will be able to judge whether the data and hypothesis should be applied to nursing practice.

LEVELS OF EVIDENCE HIERARCHY (STETLER, et.al.)

1. Level-I: Meta-analysis of multiple RCTs.
2. Level-II: Individual RCTs.
3. Level-III: Quasi –Experimental.
4. Level-IV: Nonexperimental, quantitative.
5. Level-V: Program evaluation; QI;RU; Case reports.
6. Level-VI: Opinion of respected authorities.

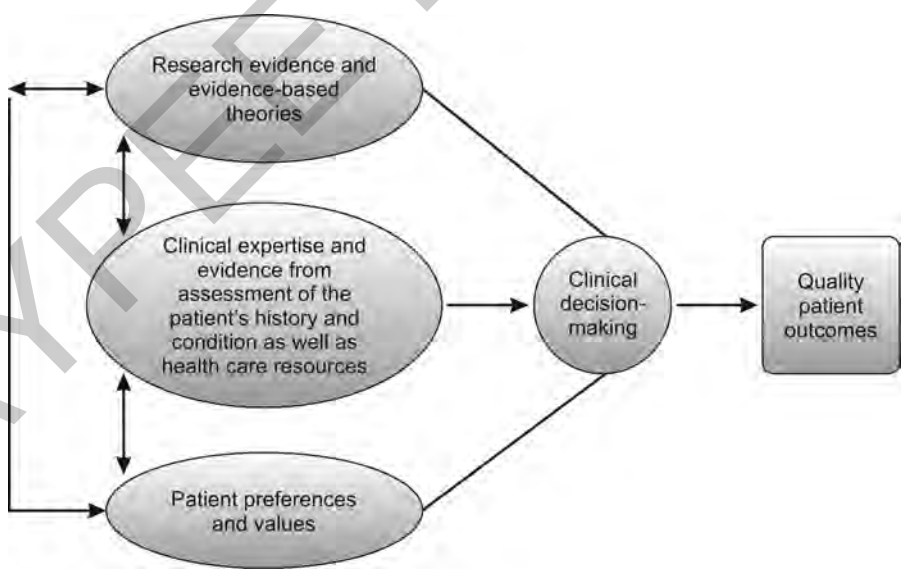


FIGURE 4.2: Evidence-based practice in nursing

JAYPEE BROTHERS

LIMITATIONS

- Resistant to changes in nursing practice.
- Ability to critically appraise research findings.
- Time, workload pressures and competing priorities.
- Lack of continuing education programs.
- Fear of 'stepping on one's toes'.
- Poor administrative support.

LEGAL AND ETHICAL ISSUES OF EVIDENCE-BASED RESEARCH

Both legal and ethical issues are important in considering patient-based research. The American Nurses Association (ANA) has set up five basic rights for patient protection:

- Right to self-determination.
- Right to privacy and dignity.
- Right to anonymity and confidentiality.
- Right to fair treatment.
- Right to protection from discomfort and harm.

BARRIERS OF IMPLEMENTING EVIDENCE-BASED PRACTICE

The barriers that prevent nurses from using research in everyday practice have been cited in numerous studies and some common findings have emerged. Findings are as follows:

- Lack of value for research in practice.
- Difficulty in changing practice.
- Lack of administrative support.
- Lack of knowledgeable mentors.
- Insufficient time to conduct research.
- Lack of education about the research process.
- Lack of awareness about research or evidence-based practice.
- Research reports/articles not readily available.
- Difficulty accessing research reports and articles.
- No time on the job to read research.
- Complexity of research reports.

Despite these barriers, nurses are engaging in EBP and making a difference in patient outcomes. Barriers can be overcome through organizational efforts focused on integrating research in practice and using strategies such as journal clubs, nursing grand rounds, etc.

CONCLUSION

Evidence-based practice takes resources; work, time and effort, but the outcomes make them worthwhile. Every patient deserves care that is based on the best scientific knowledge and that ensures high quality, cost-effective care.

JAYPEE BROTHERS

for detailed information on nursing books, visit our website www.jaypeebrothers.com, for detailed information on nursing books, visit our w

A Guide to NURSING Research and Biostatistics

Salient Features

- Gives clear and concise information about nursing research and biostatistics
- Based on the Indian Nursing Council syllabus for the BSc (Nursing) students
- MSc (Nursing) students can also refer this book
- Student friendly
- Syllabus oriented
- Comprehensive
- Systematic and logical in organization
- Includes multiple choice questions at the end of the chapters keeping in view the examination perspective.

Mamita Dey is currently Assistant Professor in Peerless College of Nursing, Kolkata, India. She did her MSc (Nursing) in Medical Surgical Specialty from BM Birla College of Nursing under West Bengal University of Health Sciences. She attended many national and international conferences and presented paper in international conference. She is a life member of Trained Nurses' Association of India and Asian Journal of Cardiovascular Nursing.



Available at all medical bookstores or buy online at www.jaypeebrothers.com

JAYPEE BROTHERS
Medical Publishers (P) Ltd.
www.jaypeebrothers.com

Join us on facebook.com/JaypeeMedicalPublishers

ISBN 978-93-86056-13-9