IIHMR UNIVERSITY

SUMMER TRAINING REPORT

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1032
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PART- I Research Report

Identifying the Most Common Reason for the Cancellation of Scheduled Cases on the Day of Surgery in Operation Theatre of Tertiary and Government Hospitals in India- A Systematic Review

Introduction

- Operation theatre (OT) is one of the most important components of a hospital.
- It requires huge investment of resources.
- Primary area of revenue generation; therefore requires optimum utilization.
- Delay and cancellation of scheduled cases is a frequent problem faced by majority of hospitals in India.
- This causes considerable loss to patients and hospitals both in terms of financial and opportunity costs.
- It also causes emotional distress to the patients and family.

Objective

To systematically review the research papers to identify the most common reason for the cancellation of scheduled cases on the day of surgery in the operation theatres of tertiary care and government hospitals in India.

Methodology

- **Data Sources and Searches-**
  - MEDLINE/PubMED, Research Gate, Google Scholar.
  - References of relevant research papers were searched by manual searching and systematic snowballing.

Methodology-contd.

- **Inclusion Criteria-** Studies that were:

  1) observational,

  2) aimed to analyze operation theatre efficiency along with identifying reasons for on-the-day cancellation of scheduled surgeries in the operation theatres of tertiary care and government hospitals of India, and

  3) observed all or general elective surgeries rather than specialized elective surgeries, were included in our systematic review.

Methodology-contd.

- **Exclusion Criteria-** Studies that were:

1) interventional,

2) had an objective other than identifying or analysing reasons for on-the-day cancellation of scheduled surgeries in the operation theatres,

3) were conducted in a setting other than tertiary care and government hospitals,

4) were conducted in countries other than India, and,

5) observed only specialized elective cases rather than all or general elective cases, were excluded from our systematic review.

Methodology-contd.

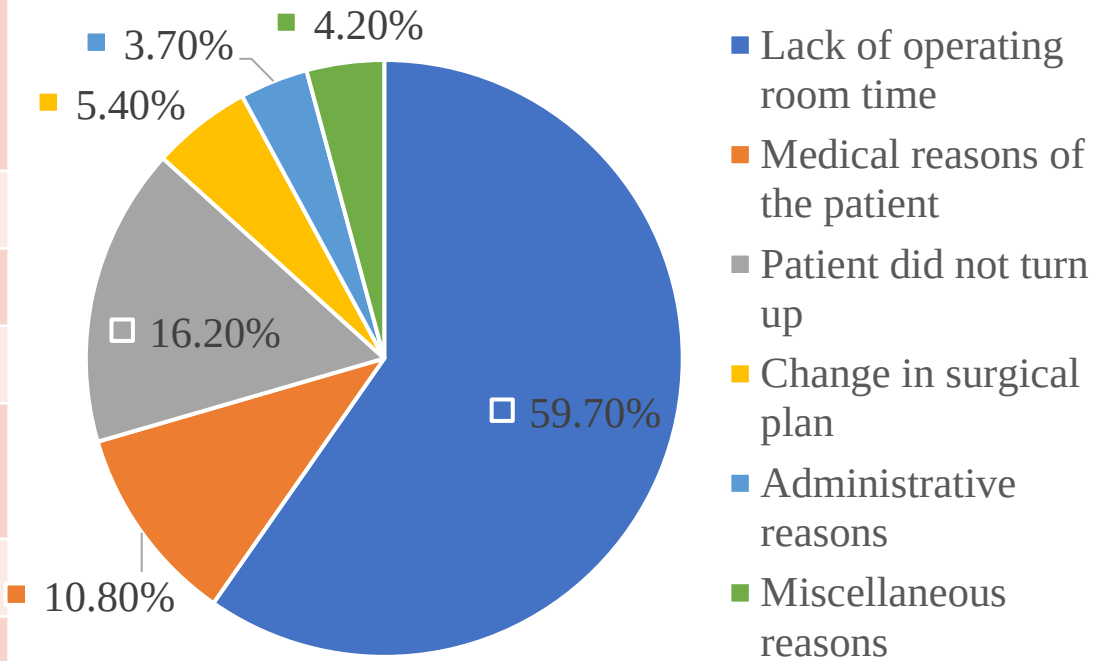
- **Data Extraction-**
  - ➢Double data extraction and verification was used for the process.
- **Data Synthesis and Analysis-**
  - ➢The evidence was qualitatively described and summarized.

Results

- We screened and reviewed 20 studies that included both the full-text articles as well as abstracts.
- Six studies were included for our systematic review based on the pre-specified inclusion criteria.

Study	Garg, R., Bhalotra, A. R., Bhadoria, P., Gupta, N., & Anand, R. (2009). Reasons for cancellation of cases on the day of surgery-a prospective study. *Indian Journal of Anaesthesia*, 53(1), 35-39.
Study Purpose	To find out the causes of cancellation of cases scheduled on the day of surgery and to suggest measures for optimum utilization of operating room (OR) time
Time Frame	6 months
Study Setting	Government Hospital, New Delhi, India
Study Design	Prospective Observational type
No. of Scheduled Cases	1590
No. of Cancellations	482
Cancellations (%)	30.3%
Most Common Reason for Cancellation	Lack of OT time (59.7%)

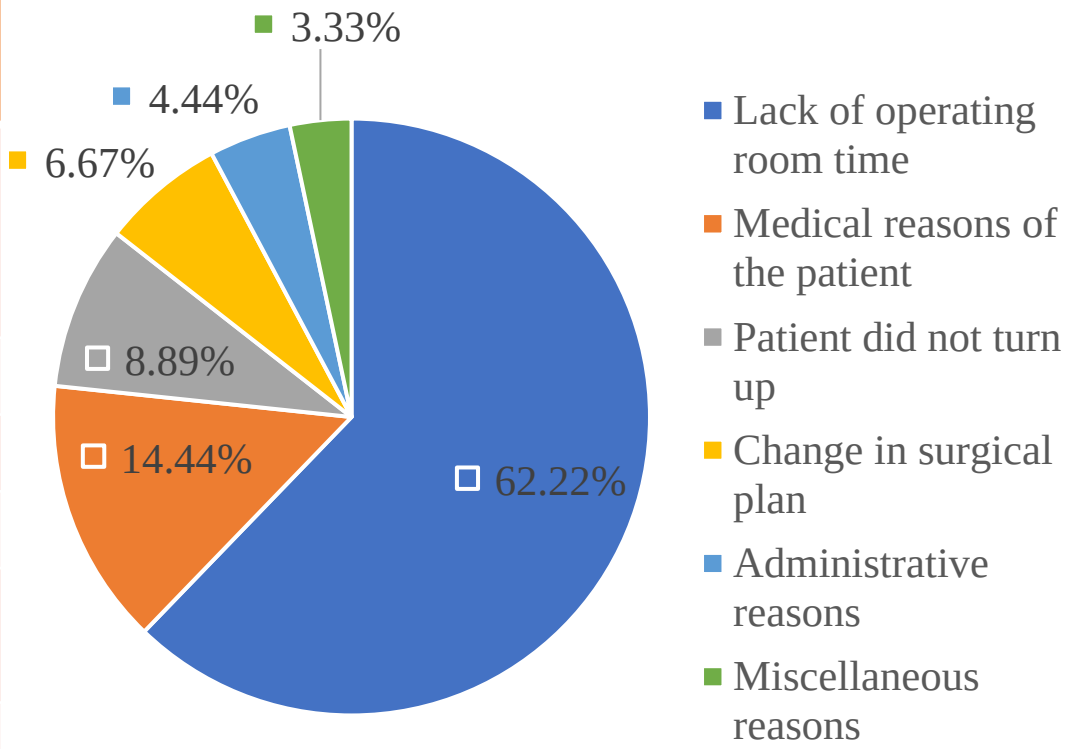
Graph 1: Distribution According to the Reasons of Cancellation (n=482)



Relevant Findings from Study by Garg et al.

Study	Naik, S.V., Dhulked, V. K., & Shinde, R. H. (2018). A prospective study on operation theatre utilization time and most common causes of delays and cancellations of scheduled surgeries in a 1000-bedded tertiary care rural hospital with a view to optimize the utilization of operation theater. *Anesthesia Essays and Researches*, 12(4), 797-802
Study Purpose	To study the OT utilization time and most common causes of cancellations and rescheduling of surgeries
Time Frame	2 months
Study Setting	Tertiary Hospital, Western Rural Maharashtra
Study Design	Prospective Observational type
No. of Scheduled Cases	N/A
No. of Cancellations	90
Cancellations (%)	N/a
Most Common Reason for Cancellation	Lack of OT time (62.22%)

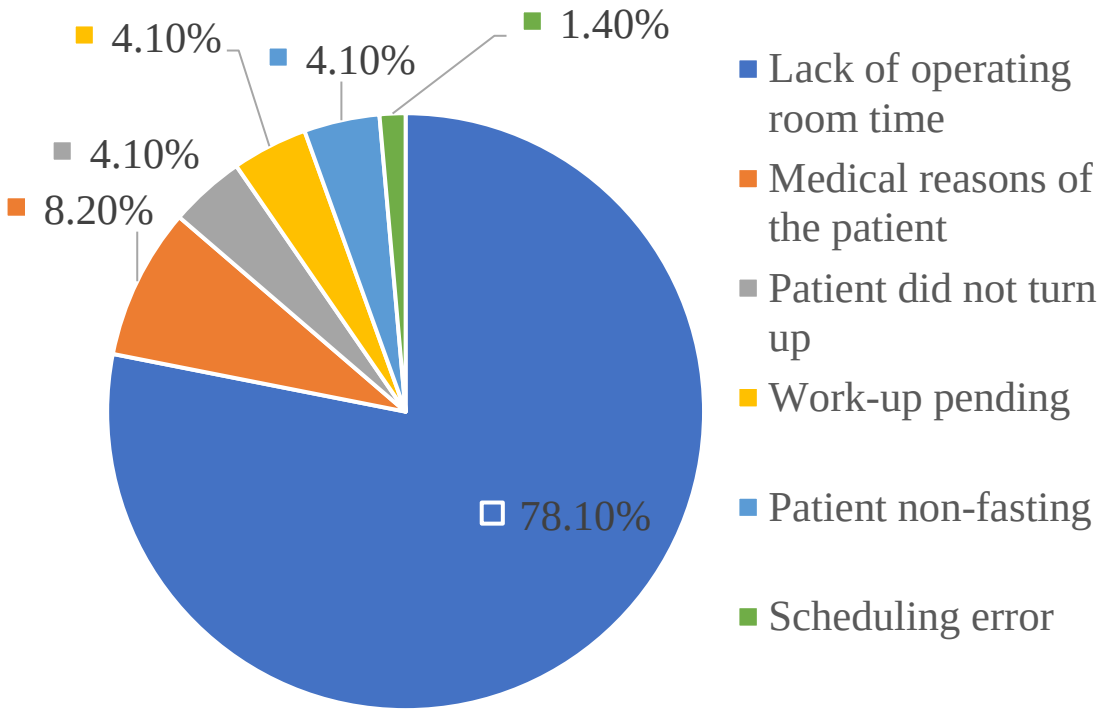
Graph 2: Distribution According to the Reasons of Cancellation (n=90)



Relevant Findings from Study by Naik et al.

Study	Talati, S., Gupta, A. K., Kumar, A., Malhotra, S. K., & Jain, A. (2015). An analysis of time utilization and cancellations of scheduled cases in the main operation theatre complex of a tertiary care teaching institute of North India. *Journal of Postgraduate Medicine*, 61(1), 3-8.
Study Purpose	To analyze the time utilization and to assess the stated causes of cancellations of scheduled cases in the OT complex of a tertiary care teaching institute.
Time Frame	3 months
Study Setting	Tertiary Hospital, North India
Study Design	Prospective Observational type
No. of Scheduled Cases	325
No. of Cancellations	73
Cancellations (%)	22.5%
Most Common Reason for Cancellation	Lack of OT time (78.1%)

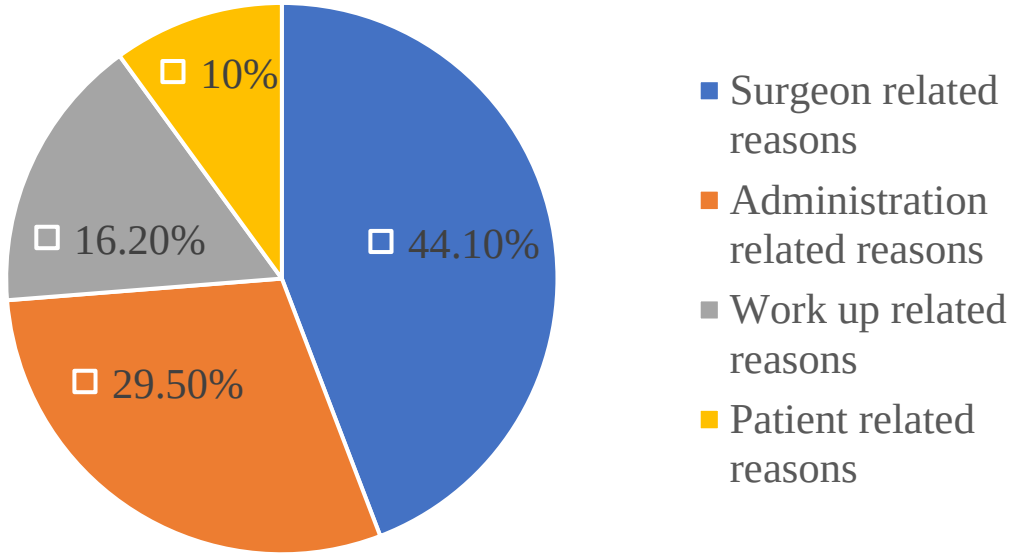
Graph 3: Distribution According to the Reasons of Cancellation (n=73)



Relevant Findings from Study by Talati et al.

Study	Huda, F. (2014). A retrospective analysis of reasons for cancellation of elective surgery in a teaching hospital. *International Journal of Scientific Study,* 2(2), 28-30.
Study Purpose	To analyze the reasons for cancellation of elective surgery in a teaching hospital
Time Frame	11 months
Study Setting	Tertiary Hospital, Uttar Pradesh, India
Study Design	Retrospective Observational type
No. of Scheduled Cases	3618
No. of Cancellations	246
Cancellations (%)	6.8%
Most Common Reason for Cancellation	Lack of OT time (30.8 %)

Graph 4: Distribution According to the Reasons of Cancellation (n=240)



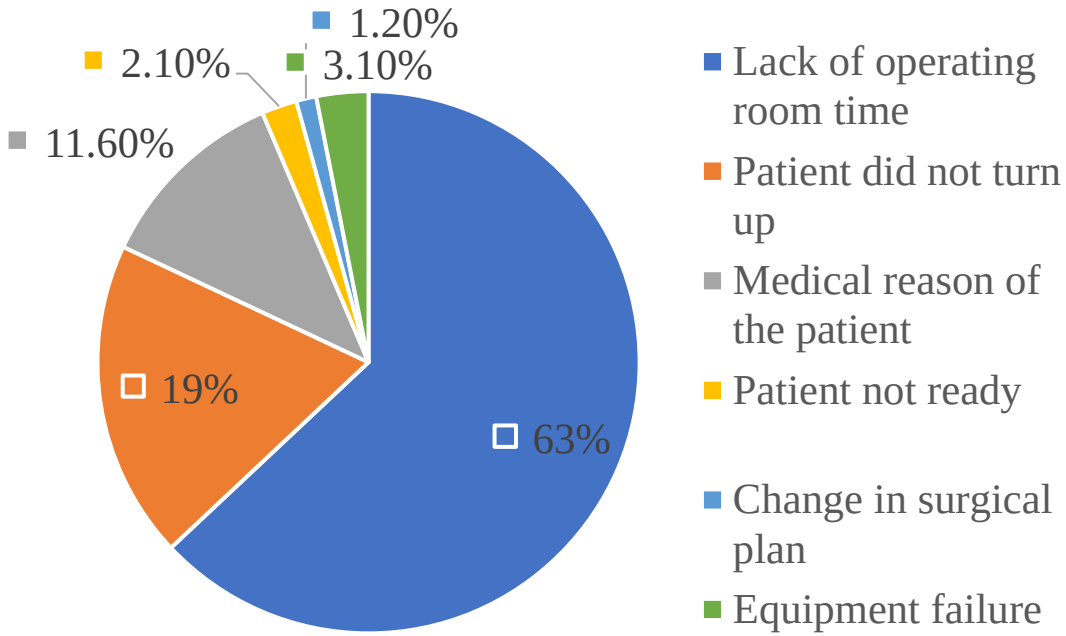
Relevant Findings from Study by Farhanul Huda

Categories	Cancellation Reasons	No. (n)
Surgeon	**Time constraints**	**74**
	No senior surgeon available	14
	Surgical team involved in a different emergency	07
	Change in surgical plan	06
	Wrong diagnosis/decision	05
	Subtotal	106 (44.1%)
Administrative	Shortage of autoclaved surgical equipments/linen	20
	Lack of OT staff	09
	Blood not arranged by attendants	19
	Surgical equipment failure	07
	Acute disruption of water/electric supply	08
	Subtotal	71 (29.5%)
Work up	Acute change in medical status	24
	Abnormal laboratory tests	10
	Medical work up incomplete	05
	Subtotal	39 (16.2%)
Patient Related	Patient refused consent	09
	Patient did not turn up	07
	Pre-operative instructions not followed	08
	Subtotal	24 (10%)

Table 1: Reasons of Cancellation of Surgical Cases (n=240) [Source: Study by Farhanul Huda]

Study	Kumar, R., & Gandhi, R. (2012). Reasons for cancellation of operation on the day of intended surgery in a multidisciplinary 500 bedded hospital. *Journal of Anaesthesiology Clinical Pharmacology,* 28(1), 66-69.
Study Purpose	To evaluate reasons for cancellation of elective surgical operation on the day of surgery.
Time Frame	12 months
Study Setting	Government Hospital, India
Study Design	Prospective Observational type
No. of Scheduled Cases	7272
No. of Cancellations	1286
Cancellations (%)	17.7%
Most Common Reason for Cancellation	Lack of OT time (63%)

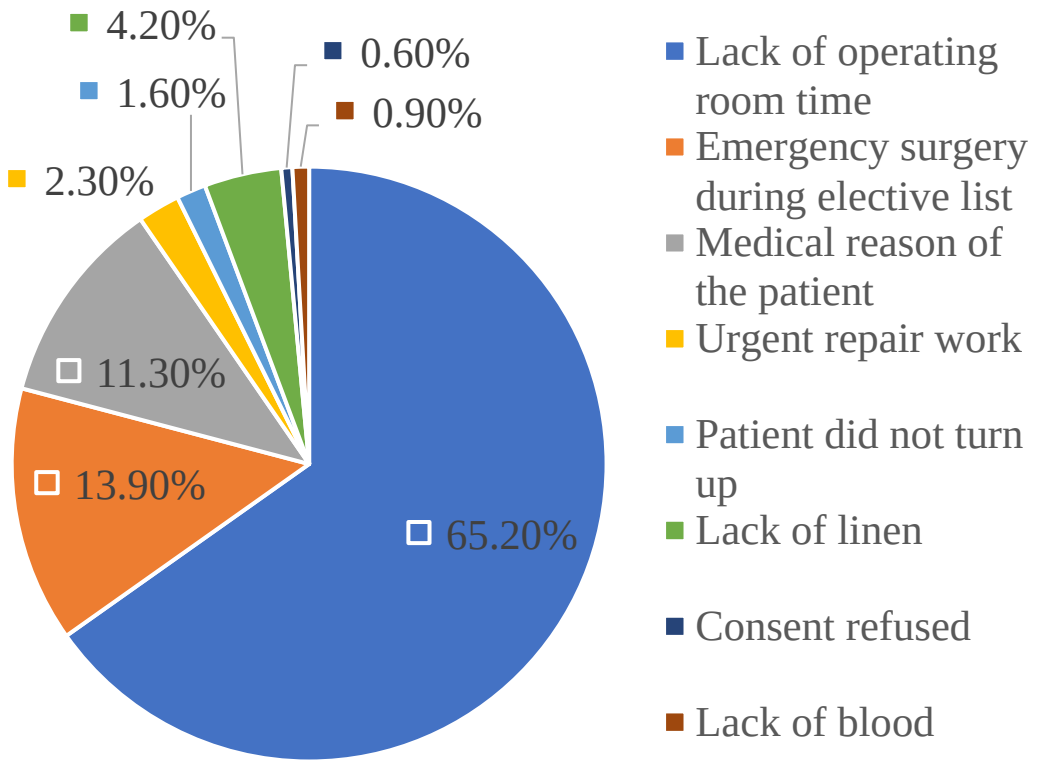
Graph 5: Distribution According to the Reasons of Cancellation (n=1286)



Relevant Findings from Study by Kumar et al.

Study	Vinukondaiah, K., Ananthakrishnan, N., & Ravishankar, M. (2000). Audit of operation theatre utilization in general surgery. *National Medical Journal of India*, 13(3), 118-121.
Study Purpose	To find out how efficiently operating time was utilized in a major teaching hospital and to identify areas, if any, where improvements are feasible.
Time Frame	12 months
Study Setting	Tertiary Hospital, Pondicherry, India
Study Design	Prospective Observational type
No. of Scheduled Cases	2083
No. of Cancellations	310
Cancellations (%)	14.3%
Most Common Reason for Cancellation	Lack of OT time (65.2%)

Graph 6: Distribution According to the Reasons of Cancellation (n=310)



Relevant Findings from Study by Vinukondaiah et al.

Discussion

- Cancellation of scheduled surgeries leads to underutilization of operating theatres.
- Inefficient utilization of resources leads to rise in cost of services which is passed on to the patients.
- Our systematic review included six studies (5 prospective observational and 1 retrospective observational).
- Consistent evidence showied that the most common reason for the cancellation of scheduled cases on the day of surgery is lack of availability of operating room time.
- Studies cited that the time constraint is a potentially avoidable reason.

Discussion (contd.)

- Lack of operating room time can be attributed to several reasons according to the studies:
  - Scheduling error,
  - Non-availability of senior surgeons,
  - Surgeries performed by junior or inexperienced surgeons,
  - Unplanned admissions,
  - Improper coordination and presence of conflicts among OT staff.

Discussion (contd.)

- Limitations of our systematic review:
  - Scarcity of researches on OT efficiency in India
  - Inaccessibility to the authors for missing data
- Strengths of our systematic review:
  - Comprehensive search to build the quality of the study
  - Included studies have been conducted across different parts of India through the past twenty years

Recommendations & Conclusion

- OT efficiency can be significantly improved with optimized time utilization.
- Time constraint is a controllable factor.
- Some recommended ways to reduce time constraint:
  - Proper team approach under the supervision of OT in charge,
  - Proper time estimation of operations and planned admissions,
  - Preparation of OT list by experienced surgeon,
  - Effective coordination and cooperation among OT staff.

Recommendations & Conclusion (contd.)

- Various models can also be applied to better manage the problem of on-the day cancellations of scheduled surgeries and to improve the OT efficiency.
- A study by Rohini et al. [11], applied the DMAIC Six Sigma approach to improve the process in the operation theatre of a corporate multi specialty hospital in Bangalore, India. The result of this interventional study was that the OT utilization was increased and 87% reduction in cost of error per year due to cancellations was achieved.
- Sufahani et al. [16] applied integer linear programming technique to find the optimal operating theatre schedule. Results of the study showed that the integer linear programming technique managed to obtain the optimal schedule that meets the objectives of the study and also the related constraints.

Recommendations & Conclusion (contd.)

- Several other techniques like heuristic algorithm and hybrid genetic algorithms can be used to reduce the constraints and solve the non-productive scheduling problems.
- A paucity of studies on OT efficiency in India serves a future scope for conducting more such studies and updating the systematic review regularly.
- This would guide the hospitals in a direction towards efficient and effective management of the OTs.
- The costs of the services delivered to the patients would be contained and the quality of health care delivered to them would be improved appreciably.

References

1. Garg, R., Bhalotra, A. R., Bhadoria, P., Gupta, N., & Anand, R. (2009). Reasons for cancellation of cases on the day of surgery-a prospective study. Indian Journal of Anaesthesia, 53(1), 35-39.

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4. Huda, F. (2014). A retrospective analysis of reasons for cancellation of elective surgery in a teaching hospital. International Journal of Scientific Study, 2(2), 28-30.

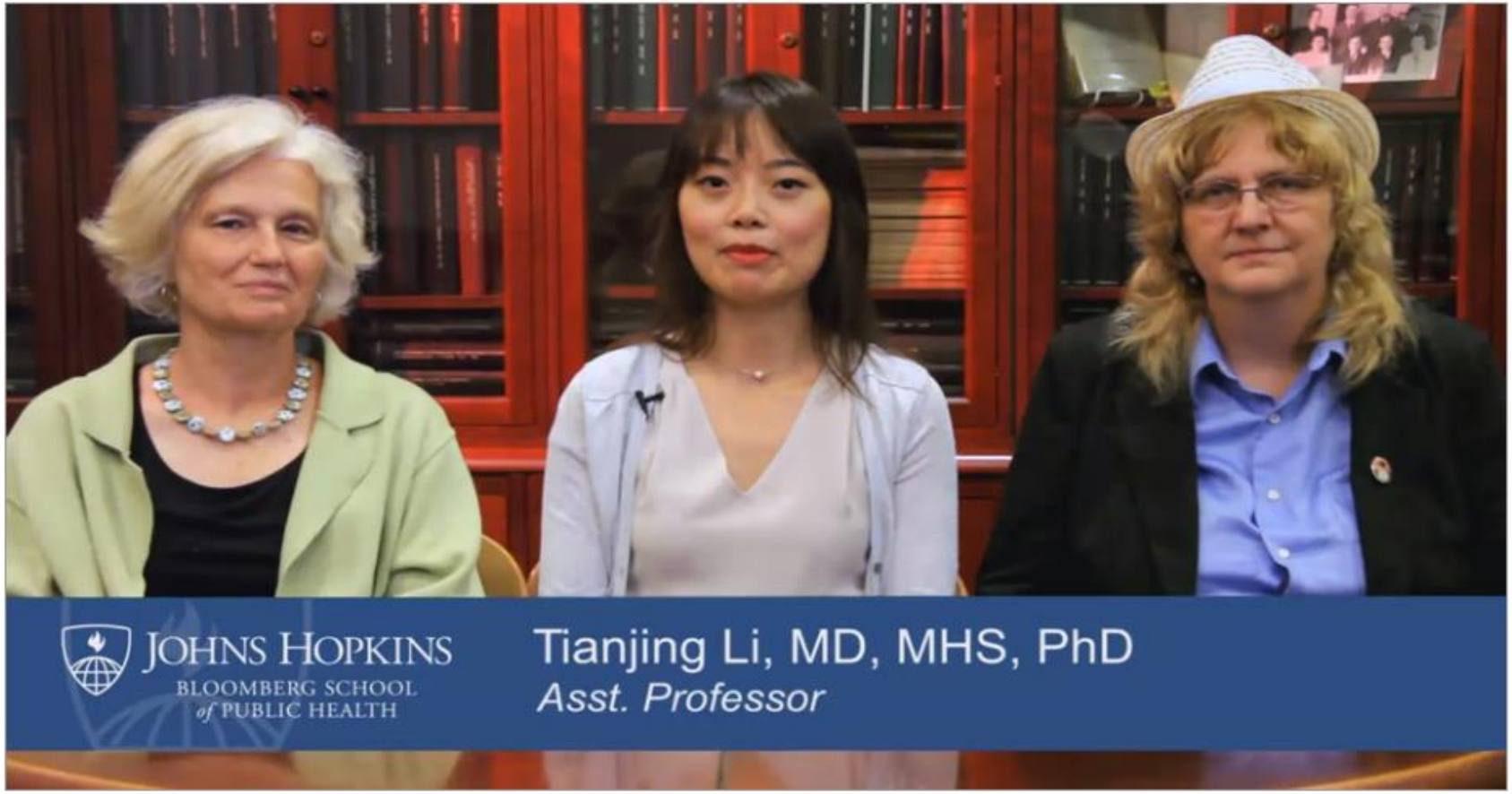
5. Kumar, R., & Gandhi, R. (2012). Reasons for cancellation of operation on the day of intended surgery in a multidisciplinary 500 bedded hospital. Journal of Anaesthesiology Clinical Pharmacology, 28(1), 66-69. doi: 10.4103/0970-9185.92442

6. Vinukondaiah, K., Ananthakrishnan, N., & Ravishankar, M. (2000). Audit of operation theatre utilization in general surgery. National Medical Journal of India, 13(3), 118-121.

PART- II Course Report

Introduction to Systematic Review and Meta-Analysis

Welcome to Systematic Reviews and Meta-Analysis



Save Note Discuss Download

Why this Course?

- This course from Coursera was taken to hone my secondary research skills.
- The purpose of selecting this course was to develop useful learning for conducting systematic reviews with the help of secondary data. Consequently, this would help me contribute in delivering evidence-based health care for the people concerned.

Course Description

- The course explains methods that are used to conduct systematic reviews and gives a deeper understanding about the process of meta-analysis of clinical trials.
- It describes-
  - formulation of an answerable research question
  - defining inclusion and exclusion criteria
  - searching the evidence and extraction of data
  - assessment of the risk of bias in clinical trials, and
  - process of meta-analysis

Objectives of the Course

1. To describe the steps followed while conducting a systematic review
2. To give a deeper insight into the process of meta-analysis
3. To formulate an answerable research question with the use of “Participants Interventions Comparisons Outcomes” (PICO) framework
4. To describe the process that is used for the collection and extraction of data from the reports of clinical trials
5. To explain the methods that are used for the critical assessment of the risk of bias of clinical trials
6. To describe and interpret the results of qualitative synthesis in a systematic review

Course Contents

1. Introduction
2. Framing the question
3. Finding the evidence- searching principles
4. Assessing the risk of bias in clinical trials
5. Minimizing meta-bias
6. Qualitative synthesis and interpreting results

Learning Methodology

- Lectures
- PPT
- Assignments
- Reading Material

Key Learnings

1. Systematic reviews are integrative synthesis where we systematically assemble, critically appraise, and synthesize the results of primary investigations addressing a specific topic or problem.
2. There are two components of systematic review- qualitative and quantitative.
3. Qualitative synthesis describes the nature of the evidence in the literature.
4. A quantitative synthesis, also called meta-analysis uses statistical methods to combine the results of several independent studies.

Understanding Systematic Review

- Systematic review uses explicit, pre-planned and scientific methods to identify, select, appraise and summarize similar but separate studies.
- It targets a specific question.

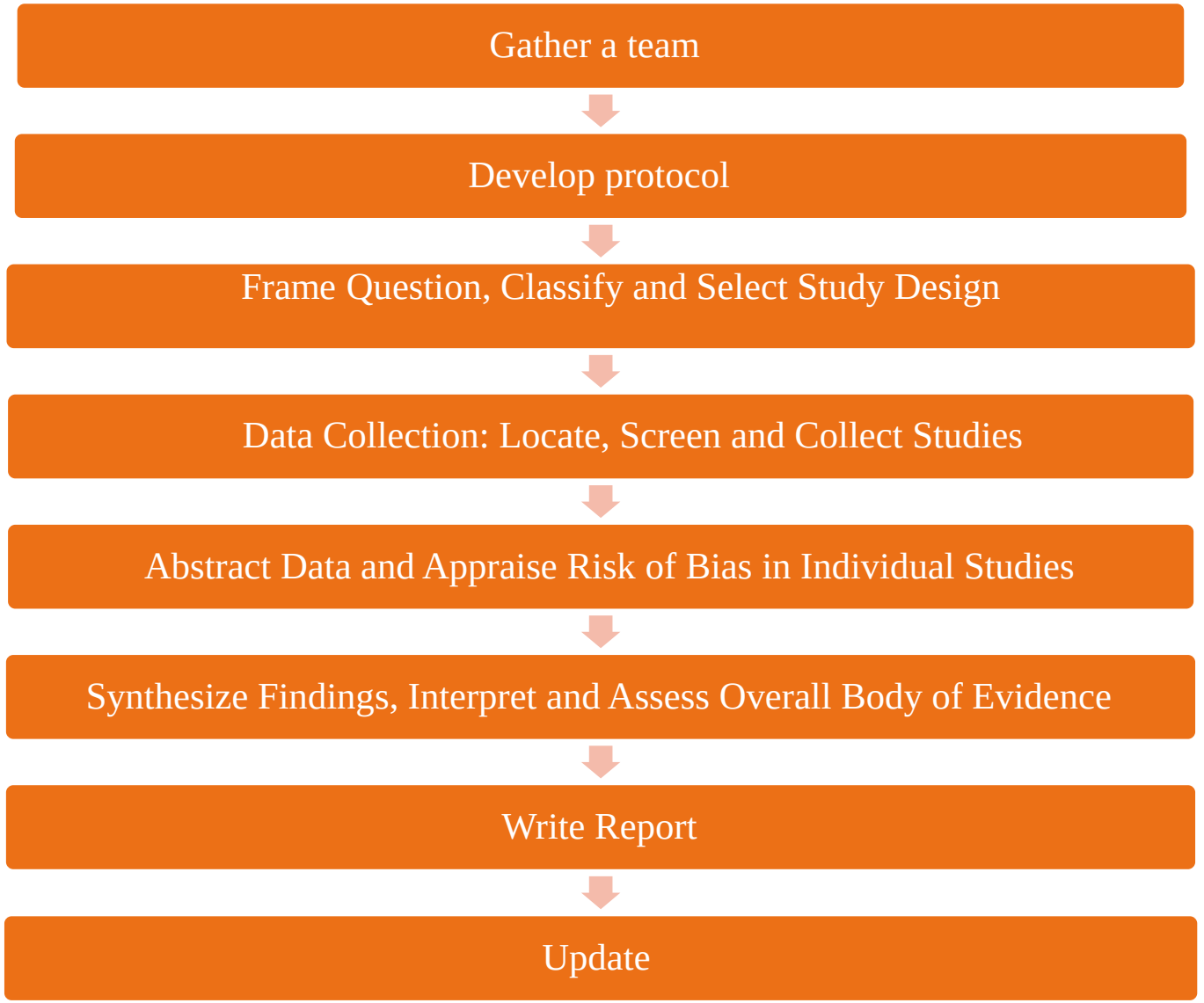


Figure:1 Flowchart depicting the protocol for conducting systematic review

Evidence Based Health Care

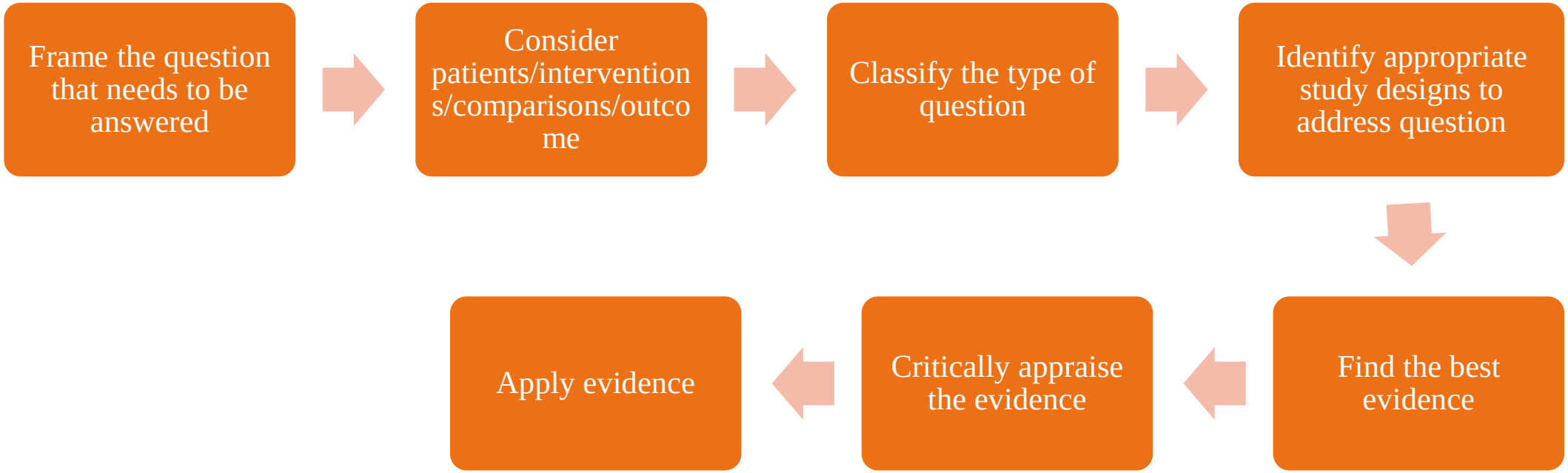


Figure 2: Steps in the practice of evidence-based health care

Comparative Effectiveness Research (CER)

- It compares effectiveness of various methods for managing a clinical condition or for the improvement of health care by searching and formulating best evidence.
- It also compares benefits and harms of using alternative interventions or health care delivery methods to the patients or concerned people.

Understanding Meta-Analysis

- Quantitative component of systematic review.
- It uses statistical methods to analyse results from individual studies for integrating the findings.
- It can be conducted when-
  - a treatment effect or association has been estimated by more than one study,
  - when the treatment effect is unlikely to be affected by the differences in the characteristics of the study, or,
  - when there exist similar ways that have measured and reported the treatment effect.

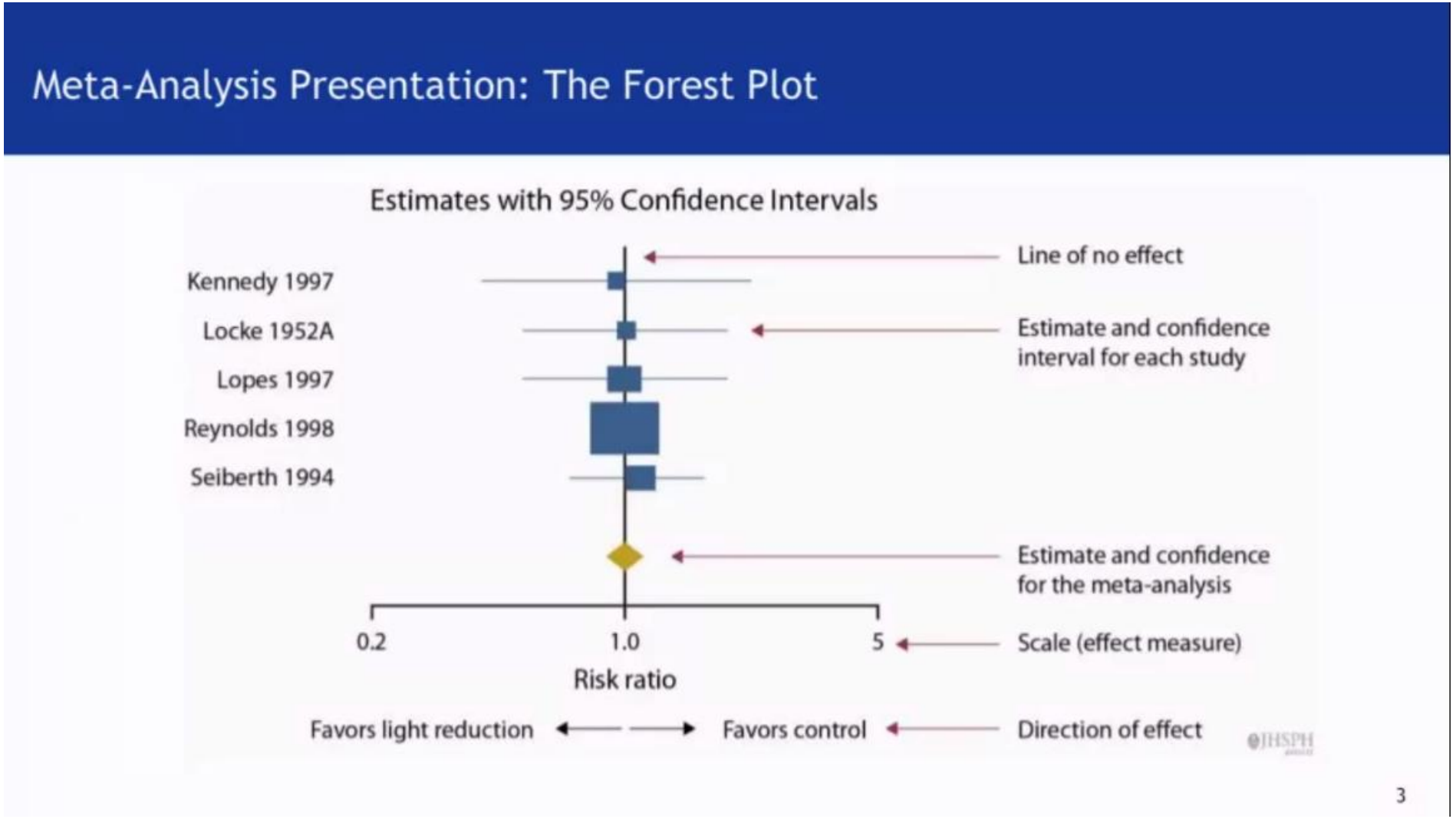


Figure 3: Meta-analysis Presentation: The Forest Plot

Source: Lecture 1B: Introduction to Meta-analysis; Introduction to Systematic Review and Meta-analysis; Coursera

Features of Systematic Review

- It efficiently integrates the information for rational decision making.
- It offers a clear and transparent process.
- It clearly demonstrates the areas in which the health care effects are consistent.
- It minimizes the chances of bias.
- Meta-analysis tend to show estimates with increased precision.
- It can be updated readily as needed.

Framing Question

- Systematic review begins with a well-framed question.
- The review question must follow a standard PICO format.
- Classification of questions is as shown in the figure on the right side.

Question	Classification/type
What proportion of the population is newly diagnosed with this problem each year?	Incidence
What proportion of the population is currently living with this problem?	Prevalence
What should be done to treat this problem?	Therapy
Will detecting this problem early, before symptoms, make a difference in my health?	Screening
How good is this test at detecting this problem?	Diagnostic accuracy
What is the likely outcome of this problem?	Prognosis
Will there be any negative effects (of an intervention)?	Harm
What causes this problem?	Etiology
How can this problem be prevented?	Prevention

Framing Question (contd.)

- Once the question is well formulated it will help determine the criteria used to select studies, development of the search strategy and data to be abstracted.
- Study designs for each type of review question are as shown in the figure on the right side.

Question	Look for evidence from:
Incidence, prevalence	Surveys, cohort studies
Therapy	Clinical trials
Screening	Clinical trials
Diagnostic accuracy	Clinical trials, cross sectional studies
Prognosis	Clinical trials, cohort studies
Harm	Clinical trials, cohort studies, case control studies
Etiology	Cohort studies, case control

Finding the Evidence: Searching Principles

- Few key sources for searching are key electronic databases, controlled vocabulary (indexing).
- Major Bibliographic Databases are MEDLINE/PubMED, EMBASE.
- Use of all of these databases may be necessary to identify all reports.
- Systematic snowballing is another feature for searching data.

Assessing Risk of Bias in the Included Studies

- Presence of bias in the methods that are used by the studies included in the systematic review of meta analysis is an undesirable phenomenon.
- Therefore, we attempt to lower the risk of bias.
- Three major sources of bias and methods to minimize them are shown in the figure below.

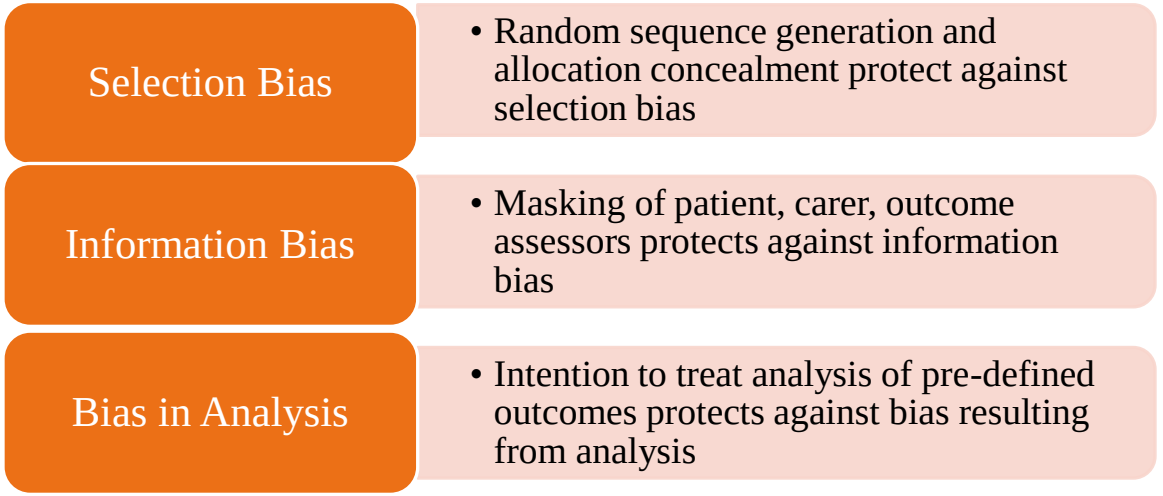


Figure 5: Sources of bias in studies and methods to minimize them

Minimizing Meta-bias

- Meta-bias refers to the bias in the methods used in the systematic review.
- There are three potential sources of meta-bias:
  - Selection bias
  - Information bias
  - Bias in Analysis
- Reporting bias and inclusion bias are some of the important types of selection bias. A comprehensive search is recommended to minimize these meta-bias.

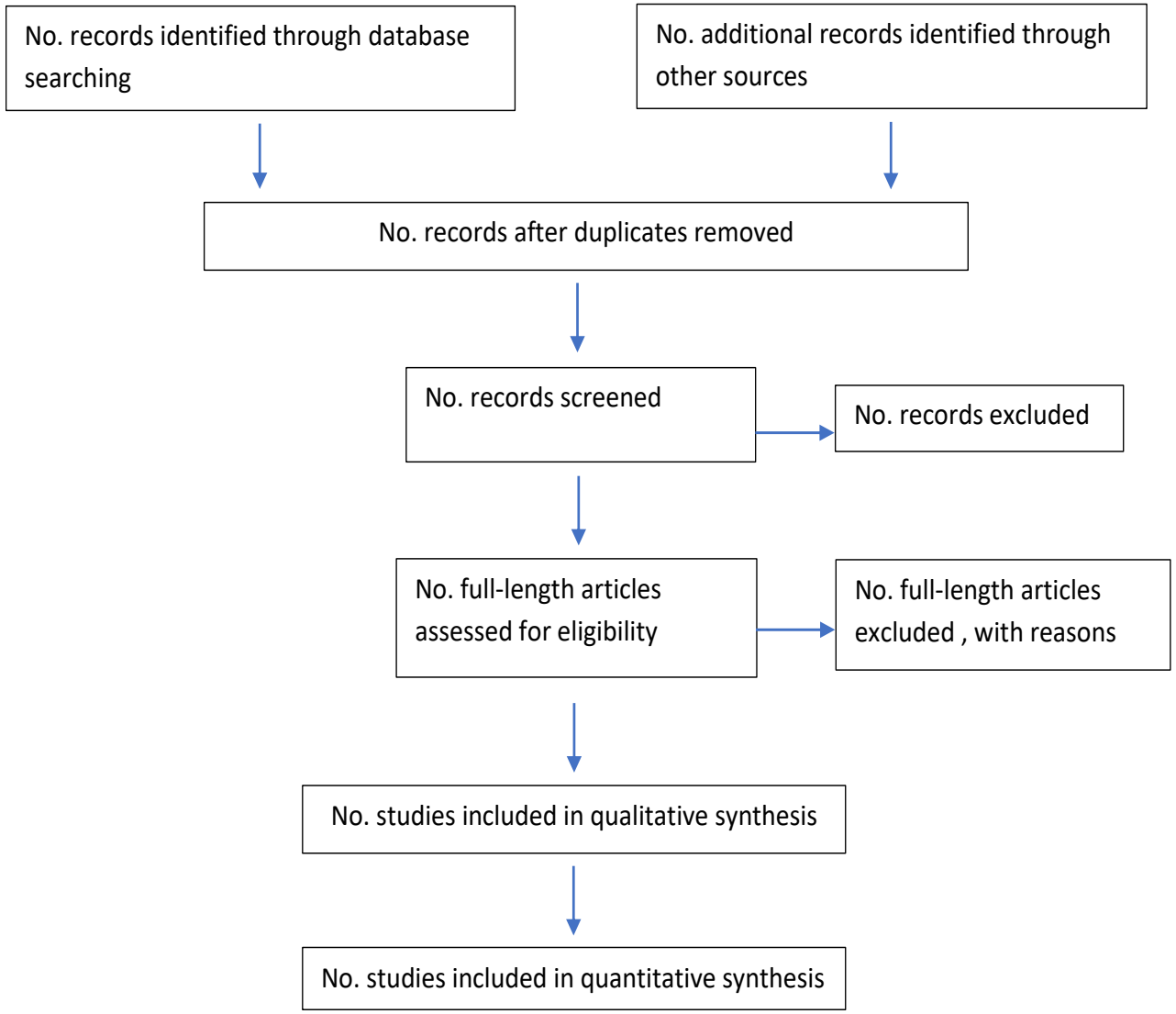
Minimizing Meta-bias (contd.)

- In terms of information bias, we are concerned about the accuracy of our quality assessment.
- Knowledge of study investigators or outcomes might affect selection of studies to be included in systematic review.
- Single data extraction plus verification and double data extraction are a few methods to minimise such meta-bias.

Reporting Transparently

- Standard guidelines like PRISMA and MOOSE are used for reporting systematic reviews of clinical trials and observational studies respectively.
- MOOSE being a little outdated, an updated form is being worked on.

Figure 4: PRISMA flow of information



Qualitative Synthesis and Interpreting Results

- When the results of all the studies are brought together without the numbers, it is known as qualitative synthesis.
- It details number of studies assessed, why the studies were excluded, the range of sizes of study and treatments comparison, or quality of each study as measured by a risk of bias tool.
- The objective of the qualitative synthesis is to synthesize and deliver a deeper understanding about the working of intervention.

Lessons Drawn

- There is no limit to the number of research studies that must be needed to conduct a systematic review.
- As the name suggests, systematic review must follow a systematic and scientific protocol using standard guidelines like PICO, PRISMA along with apprpriate and comprehensive search strategy.
- Risk of bias in the included studies must be carefully assessed and apprpriate methods should be used to minimize meta-bias in the systematic review.
- Meta-analysis is the quantitative and optional component of systematic review that uses statistical models to analyse and integrate results from individual studies.
- Systematic reviews must be regularly updated to provide the best evidence-based health care to the people concerned.

Figure 6: Chart depicting the lessons drawn

Scope of Application

This course serves as a useful learning tool that would guide me in conducting a systematic, scientific and well-planned evidence-based research in the form of systematic review for my upcoming academic research study.


THANK YOU