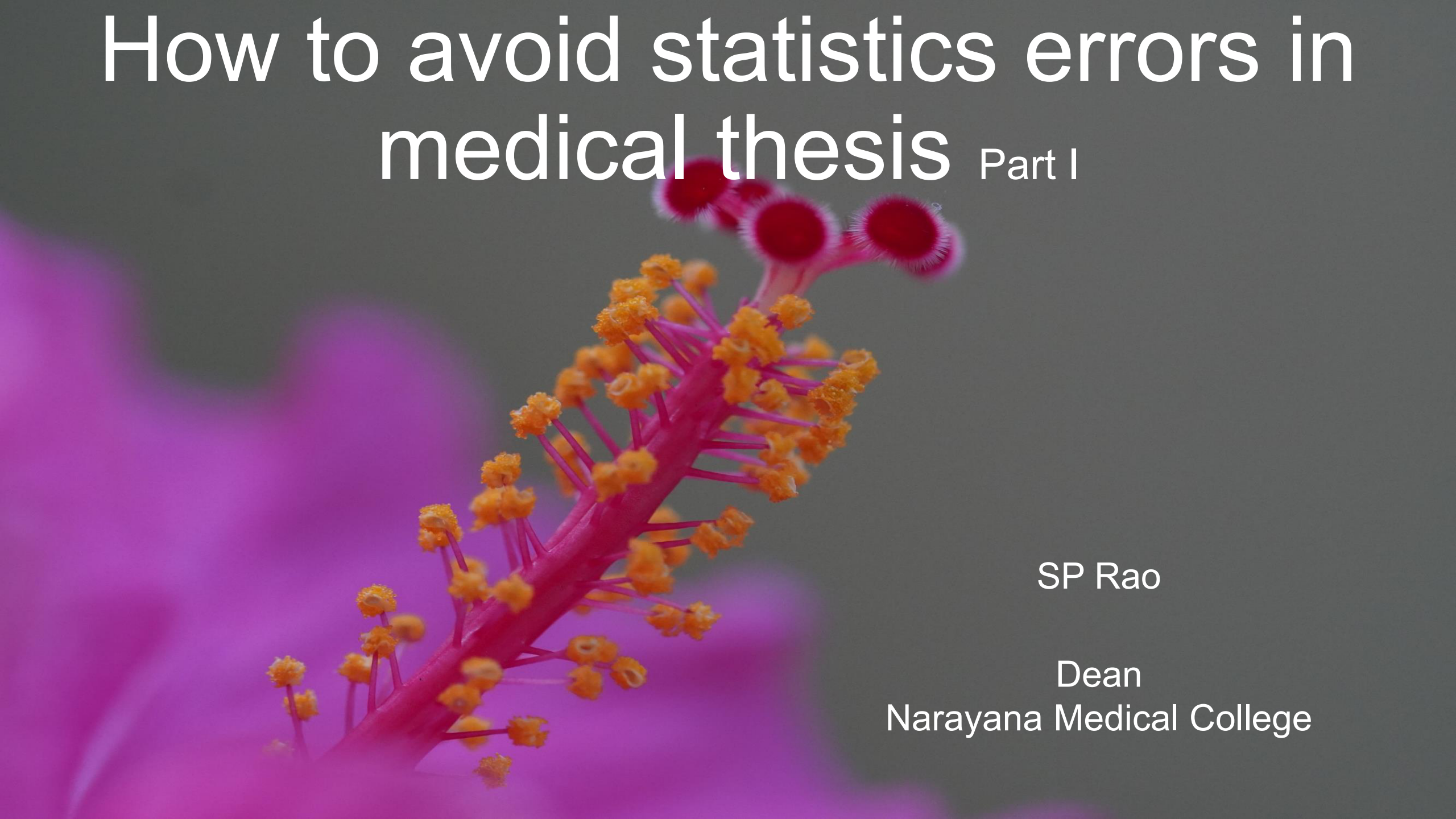
How to avoid statistics errors in medical thesis Part I



SP Rao

Dean
Narayana Medical College

NMC envisages to all postgraduates:

- Medical Audit
- Management
- Health Economics
- Health Information System
- Basics of statistics
- Human behaviour studies
- Pharmaco – economics
- Nonlinear mathematics

NMC : Thesis purpose

- Development of a spirit of enquiry
- Exposing to the techniques of research
- Critical analysis
- Acquaintance with medical science advances
- Manner of identifying & consulting available literature

Development of Spirit of enquiry

Raising Questions

Asking the right questions in the right way, finding the best available evidence, and assessing what practice change may be needed. PICOT

Challenging Practices

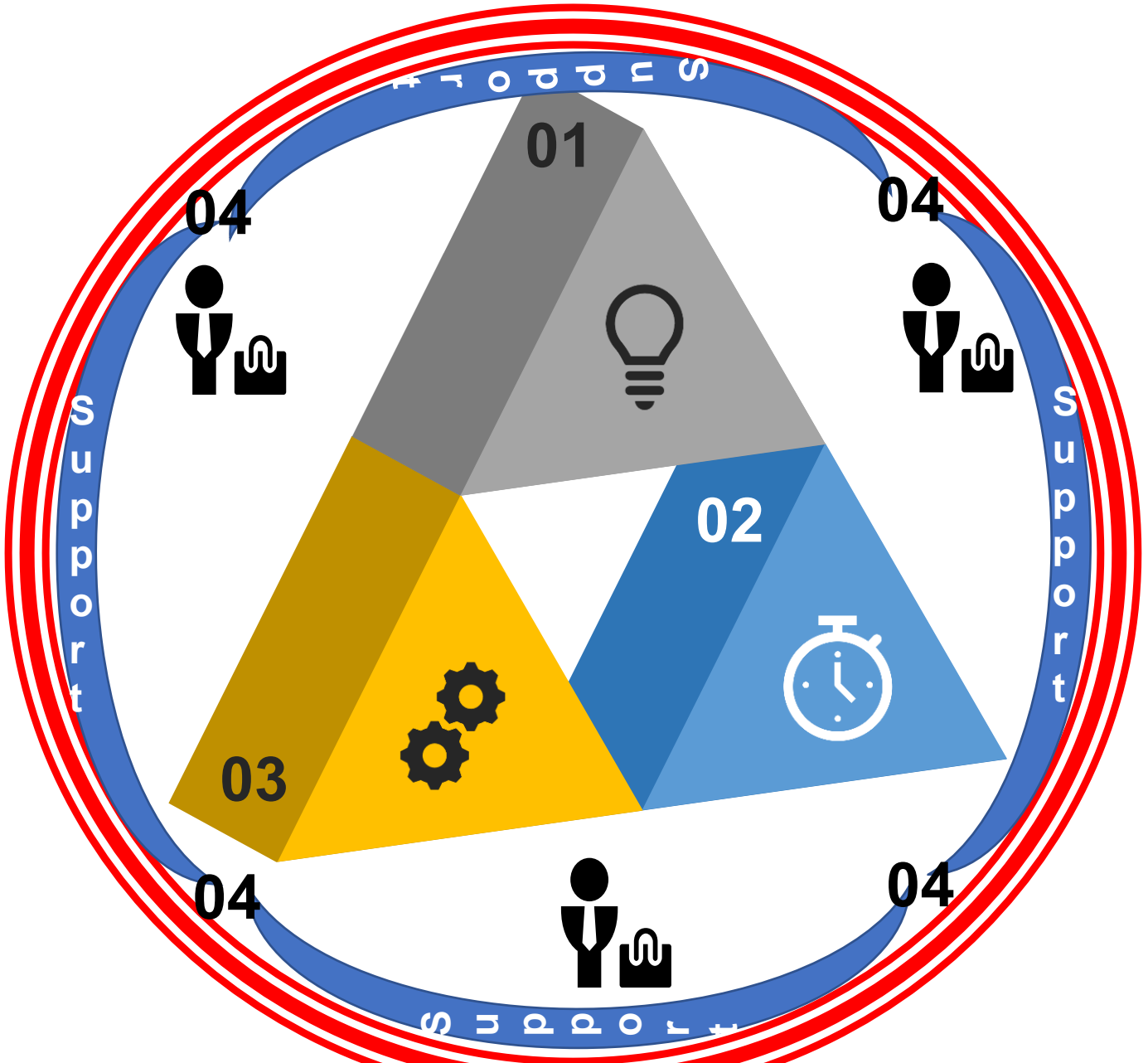
Challenge the way clinicians make decisions. Examine the specific advantages and limitations of each kind of medical knowledge.

Creative approaches

It includes originality/novelty and functionality / utility. The components are : the person, the process, the product, and the place

Support

Encouraging to push the boundaries of knowledge and use talents in new and different ways. Creating a comprehensive network of academic support in workplace



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Exposing to the Techniques of Research

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Detailed examination & evaluation of other person's ideas or work

1. Concise
2. Logic
3. Write in third person
4. Strengths and weaknesses
5. Methodological characteristics
6. Adequacy of statistical methods
7. Potential conflicts of interest
8. Relevance of research for clinical practice

Teaching critical appraisal skills to health professionals improved their knowledge of these skills. However there was a lack of good quality evidence as to whether teaching critical appraisal skills led to changes in the process of care or to changes in patient outcomes

Cochrane Library, 2001

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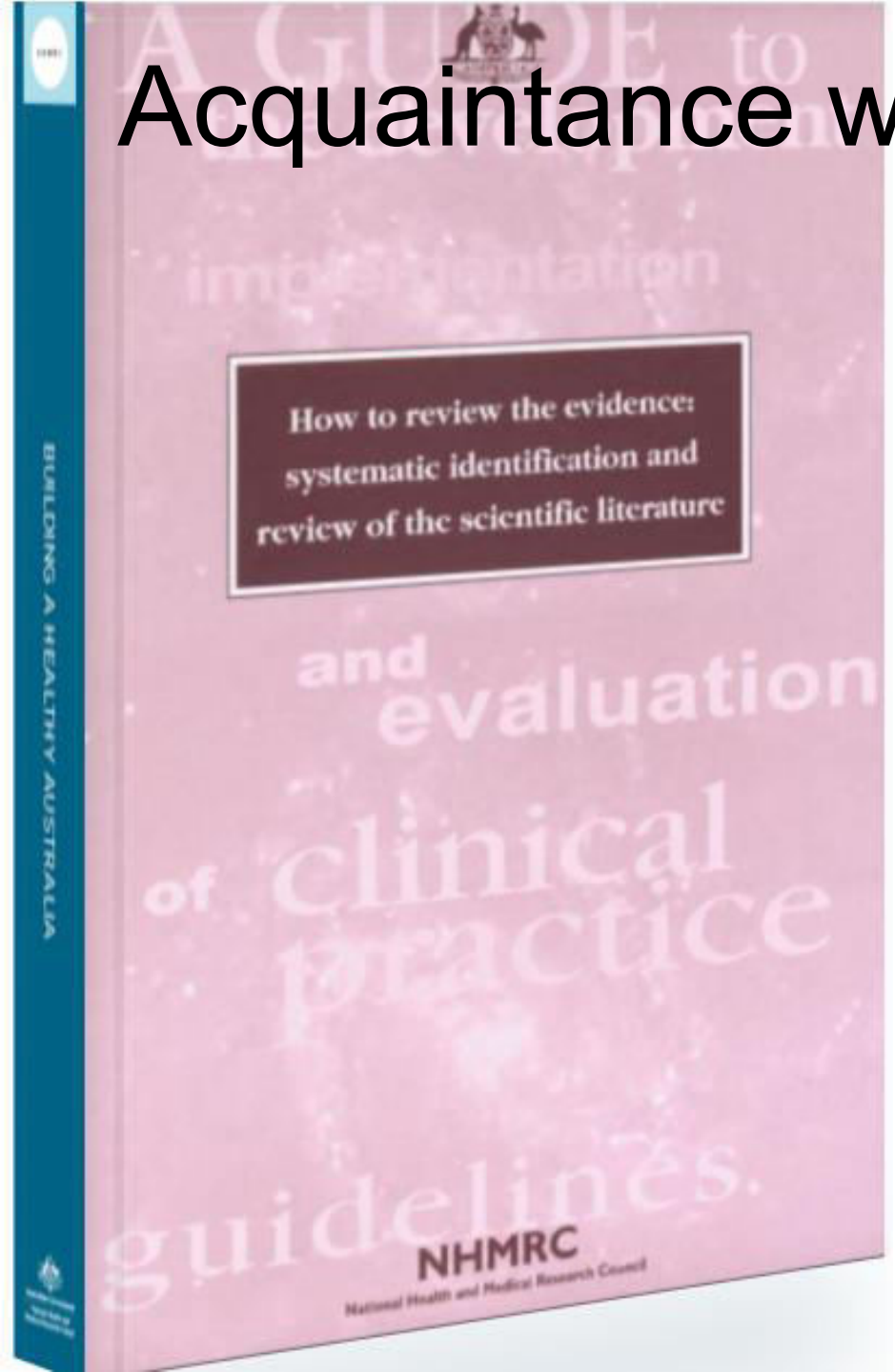
Acquaintance with medical science advances



1. Immunologics for Migraine Prophylaxis
2. PARP Inhibitors for Prostate Cancer
3. Vacuum-Induced Uterine Tamponade Device for Postpartum Hemorrhage
4. Increased Access to Telemedicine through Novel Practice and Policy Changes
5. Bubble CPAP for Increased Lung Function in Premature Babies
6. Universal Hepatitis C Treatment
7. New Medication for Cystic Fibrosis
8. Smartphone-Connected Pacemaker Devices
9. Novel Drug for Primary-Progressive Multiple Sclerosis
10. Gene Therapy for Hemoglobinopathies

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Hypnotise en masse by numbers

Most widely spoken language in the world

- Chinese
- English
- Spanish
- French
- Numbers

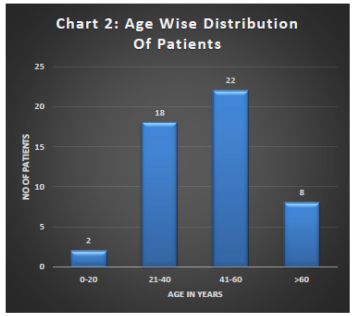
Interpretation of Data: Requirement

- High degree of Skill
- Care
- Judgment
- Objectivity

Misuse, Abuse and non-use of Statistics

Table 9 – Age wise distribution of study subjects in our study

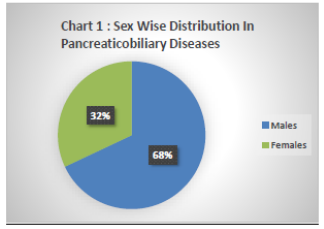
Age (Years)	Number Of Patients	Percentage (%)
0-20	02	04
21-40	18	36
41-60	22	44
>60	08	16
TOTAL	50	100



Graph 2 – Bar chart showing age wise distribution of study subjects in our study

Table 8 – Sex wise distribution of study subjects in our study

Sex	Number Of Cases	Percentage (%)
MALES	34	68
FEMALES	16	32
TOTAL	50	100



Graph 1 – Pie chart showing sex wise distribution of study subjects in our study

Fishing Expedition

Torture

To Study The Efficacy of Placental Extract Gel In Chronic Non Healing Foot Ulcer

Microsoft Excel was used to construct a master chart using SPSS 22.0. Mean, and percentages for descriptive analysis. _p‘ values are used to determine the significance in the difference noted between the two groups.

ROLE OF MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY IN PATIENTS WITH PANCREATICO BILIARY DISEASE

Objectives:

1. To evaluate the spectrum of findings in pancreatic and biliary disorders on MRCP.
2. To prove MRCP is the best imaging modality in the evaluation of pancreaticobiliary diseases and to assess its role in the management of the patients

Statistical Techniques:

Data analysis will be done using Rates, ratios, and Percentages of different diagnosis and outcome made by MRCP will be computed and compiled.

To prove MRCP is the best imaging modality in the evaluation of pancreaticobiliary diseases and to assess its role in the management of the patients

- Diagnostic ability = Sensitivity; Specificity; PPV; NPV;
  Likelihood Ratio; Diagnostic Odds Ratio;
  ROC; Youden's index; Accuracy

Common Errors

Bias

Biased statistics are bad statistics.

Definition incosistency

Lack of Uniform standardized definitions.

Faulty Generalisation

Inconsistent Hospital based generalization to population. Studies conducted with limitations are not fit for generalisation

Faulty Deductions

Faulty interpretation

.

Inappropriate comparisons

Misuse of tools

.

Technical Errors

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Abuse of Tools

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Failure to comprehend

Lorem Ipsum

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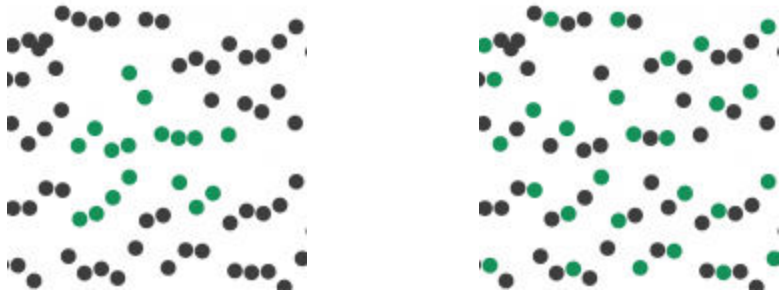
Bias

- Selection bias
- Recall bias
- Observer bias
- Omitted variable bias
- Cause-effect bias
- Funding bias
- Cognitive bias

(A) Randomization (B)



What's people's overall opinion about Mr Jagan Reddy's Chief Ministership?

All patients admitted to the Surgical wards of the Narayana Medical college with the confirmed diagnosis of the fistula in ano and are willing for the surgical management of the same

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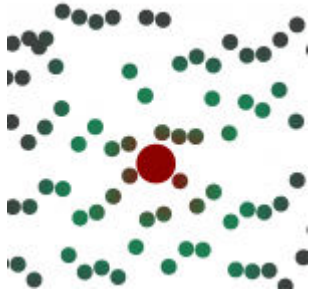

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ROLE OF COMPUTED TOMOGRAPHY IN EVALUATION OF MEDIASTINAL MASSES

Objectives:

1. To study the characteristics and determine the differential diagnosis of mediastinal masses by Computed Tomography.

2. To study the distribution of mediastinal masses.

3. To determine the accurate delineation and extensions of the tumors.

4. To correlate the histopathological diagnosis to the findings of CT scan where possible.

No Statistical Analysis mention

How to Avoid Biased Study

#1: Do not underestimate the amount of stupidity around you!

#2: Always ask about the research method!

#3: Do your own analyses and research!

#4: Ask smarter people!

#5: Think!

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Definition Inconsistency

Wound Measurement Ideal

- % Surface Area Reduction first 3-4 weeks
- Leg Ulcer Measurement Tool
- Pressure Ulcer Scale for Healing (PUSH)
- Sessing Scale (SS)
- Sussman Wound Healing Tool (SWHT)

Wound Measurement practiced

- Ulcer area
- Granulation
- Hospital stay

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Faulty Generalizations

A Comparative Study of VAAFT Versus Conventional Fistulectomy in Management of Fistula in Ano

Exclusion:

1. Age < 20 years
2. Patients unfit for surgery & anaesthesia
3. Patients not given consent for surgery

Conclusion:

we conclude that VAAFT video-assisted anal fistula treatment, show less wound, decreases pain, morbidity and hence can be safely used without any worry

Sonographic Evaluation of Thyroid Lesions with FNAC Correlation

Conclusion:

Hence ultrasound-guided FNAC should be the preferred choice for an accurate diagnosis.

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Correlation Vs Causation

High Resolution Computed Tomography (HRCT) Chest Findings in Immunocompromised Host

1. Fungal, bacterial, viral infections can be differentiated with high accuracy

- Our study did not include microbiological correlation if included it may give further confirmation in identification the pathogen
- HRCT chest is the gold standard investigation of choice for pulmonary infections in immunocompromised patients

Clinical Significance Vs Statistical Significance

Statistical significance means that it's likely that *something* is happening

Clinical significance verifies to what *extent* that thing is happening

Part II

Common Errors

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Abuse of Tools

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Failure to comprehend

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Repetition of study

.