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**KARNATAKA RADIOLOGY EDUCATION PROGRAM**

# CLINICAL RESEARCH – BRIDGING IMAGING & INNOVATION

## SESSION – 9 – MANUSCRIPT WRITING - III



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# DRAFTING THE MANUSCRIPT COMPONENTS

## 5. Results

5.1 Descriptive statistics

5.2 Procedural results

5.3 Measures of data validity and reliability

## 6. Discussion

6.1 Synopsis of main findings

6.2 Interpretation of your results

6.3 Interpretation of your data in the context of the literature

6.4 Clinical or pathophysiological implications

6.5 Limitations

6.6 Summary and future directions

## 7. References

# SCIENTIFIC MANUSCRIPT - RESULTS

- ✓ **PURPOSE:** PRESENT EXPERIMENTAL DATA THAT PROVE OR DISPROVE THE HYPOTHESIS OF YOUR STUDY, SUPPORTING THE OVERALL AIM.
- ✓ **ORGANIZATION:** THE RESULTS SECTION SHOULD PARALLEL THE ORDER OF THE METHODS SECTION. REPORT DATA OBJECTIVELY WITHOUT INTERPRETATION.

## USE FIGURES AND TABLES

- ✓ **DEMOGRAPHIC DATA:** PROVIDE DEMOGRAPHIC DATA OF PATIENTS IF THE STUDY IS PROSPECTIVE. USE A TABLE TO PRESENT COMPREHENSIVE DEMOGRAPHIC DATA AND COMPARE GROUPS.
- ✓ **IMAGING EXAMPLES:** INCLUDE A FIGURE WITH REPRESENTATIVE IMAGING EXAMPLES FROM SUBJECTS WITH VARYING DEGREES OF PATHOLOGY OR RELEVANT FINDINGS.
- ✓ **SUMMARIZE RESULTS:** SUMMARIZE RESULTS FROM ALL SUBJECTS USING FIGURES AND TABLES. INCLUDE RESULTS FROM STATISTICAL ANALYSES.
- ✓ **RELIABILITY ASSESSMENT:** PRESENT AN ASSESSMENT OF RELIABILITY (E.G., INTER- AND INTRA-OBSERVER VARIABILITY).



# SCIENTIFIC MANUSCRIPT – RESULTS

## PRESENTATION OF RESULTS

- ✓ **STAND-ALONE TABLES AND FIGURES:** EACH TABLE AND FIGURE, WITH A CAPTION, MUST BE ABLE TO STAND ON ITS OWN.
- ✓ **PRESENTATION MODES:** RESULTS MAY BE PRESENTED AS STATEMENTS, IMAGING EXAMPLES, GRAPHS, LINE DIAGRAMS, OR TABLES.
  - ✓ **TEXT:** PROVIDES PRECISE AND DETAILED INFORMATION WITH LOW IMMEDIATE IMPACT.
  - ✓ **IMAGING EXAMPLES:** SIGNIFICANT IMPACT BUT MAY NOT CONVEY A CLEAR MESSAGE UNLESS COMPELLING.
  - ✓ **GRAPHS:** CLARITY AND IMPACT, SHOWING RELATIONSHIPS BETWEEN PARAMETERS. KEEP GRAPHS SIMPLE.
  - ✓ **TABLES:** ORGANIZE EXTENSIVE DATA INTO AN ACCESSIBLE FORM, PROVIDING GREATER IMPACT THAN TEXT WHILE MAINTAINING PRECISION.

# SCIENTIFIC MANUSCRIPT – RESULTS

## IMAGE QUALITY AND FORMAT

- ✓ **QUALITY:** ENSURE EXCELLENT IMAGE QUALITY, MEETING JOURNAL REQUIREMENTS FOR DIGITAL RESOLUTION AND FILE FORMAT.
- ✓ **IMAGE CROPPING:** CROP IMAGES TO EMPHASIZE KEY COMPONENTS. USE WINDOW/LEVEL ADJUSTMENTS TO BEST DEPICT KEY FINDINGS. ARROWS CAN HIGHLIGHT SUBTLE FINDINGS.
- ✓ **PATIENT INFORMATION:** REMOVE IDENTIFYING INFORMATION FROM RADIOLOGICAL IMAGES WHILE STATING AGE, SEX, AND MEDICAL CONDITION IN THE FIGURE LEGEND.

# SCIENTIFIC MANUSCRIPT – RESULTS

## NUMERICAL ORDER AND CALL-OUTS

- ✓ **CALL-OUTS:** ALL TABLES AND FIGURES MUST BE "CALLED OUT" IN NUMERICAL ORDER FROM THE MANUSCRIPT TEXT.
- ✓ **EXPLANATION AND SIGNIFICANCE:** PROVIDE A BRIEF EXPLANATION AND SIGNIFICANCE OF EACH TABLE OR FIGURE WHEN CALLED OUT.
- ✓ **AUGMENT INFORMATION:** AUGMENT FIGURE INFORMATION AND GIVE SUFFICIENT DETAIL IN THE TEXT TO PRESENT EACH RESULT IN THE STUDY CONTEXT.

## AVOID DISCREPANCIES

- ✓ **PRECISION:** PROVIDE ALL DATA PRECISELY AND SUCCINCTLY. AVOID VAGUE TERMS LIKE "MOST," "SOME," AND "FEW."
- ✓ **CONSISTENCY:** AVOID DISCREPANCIES AND AMBIGUITIES TO PREVENT OVERCRITICAL REVIEW.

# SCIENTIFIC MANUSCRIPT - DISCUSSION

## PURPOSE

- ✓ PROVIDE YOUR INTERPRETATION OF THE DATA, FOCUSING ON THE SIGNIFICANCE AND IMPLICATIONS OF YOUR OWN RESULTS. AVOID LENGTHY INTERPRETATIONS OF PREVIOUS STUDIES OR EXPLANATIONS THAT BELONG IN THE INTRODUCTION.

## SYNOPSIS OF THE MOST RELEVANT RESULTS

- ✓ **REITERATE PURPOSE:** RESTATE THE OVERALL PURPOSE OF THE STUDY.
- ✓ **EVIDENCE SUMMARY:** PROVIDE A CONCISE AND BROAD VERSION OF THE EVIDENCE SUPPORTING THE CONCLUSION.
- ✓ **ANSWER HYPOTHESIS:** CONCLUDE WITH THE ANSWER TO THE INITIAL RESEARCH PURPOSE OR HYPOTHESIS.



# SCIENTIFIC MANUSCRIPT - DISCUSSION

## INTERPRETATION OF OWN RESULTS

- ✓ **SYNTHESIZE MEANING:** EMPHASIZE THE PARTICULAR SIGNIFICANCE OR ORIGINALITY OF EACH FINDING.
- ✓ **SCIENTIFIC ADVANCEMENT:** STATE AND STRESS ANY SCIENTIFIC ADVANCEMENT PROVIDED BY THE RESULTS.
- ✓ **AVOID OVERSTATEMENT:** DO NOT OVERSTATE THE SIGNIFICANCE OF RESULTS. AVOID SELF-PROMOTING TERMS LIKE “UNIQUE,” “HIGHLY-INNOVATIVE,” “WE ARE THE FIRST,” AND “EXTREMELY VALUABLE.”

## INTERPRETATION IN CONTEXT OF PREVIOUS STUDIES

- ✓ **RELATE TO PREVIOUS STUDIES:** DESCRIBE HOW YOUR RESULTS RELATE TO PREVIOUS STUDIES.
- ✓ **BUILD UPON PAST RESULTS:** DISCUSS HOW YOUR RESULTS INTEGRATE WITH OR BUILD UPON PAST FINDINGS.
- ✓ **STUDY COMPARISONS:** STATE IF YOUR STUDY WAS LARGER, BETTER POWERED, MORE GENERALIZABLE, OR USED UP-TO-DATE TECHNOLOGY.
- ✓ **NEGATIVE RESULTS:** PRESENT NEGATIVE RESULTS AND ANY DISCREPANCIES WITH PREVIOUS STUDIES, ARGUING POLITELY AND EXPLAINING THE UNDERLYING REASONS.

# SCIENTIFIC MANUSCRIPT - DISCUSSION

## CLINICAL OR PATHOPHYSIOLOGICAL SIGNIFICANCE

- ✓ **CLINICAL IMPLICATIONS:** DISCUSS THE CLINICAL OR SCIENTIFIC IMPLICATIONS OF THE STUDY.
- ✓ **IMPACT ON PATIENT CARE:** EXPLAIN HOW THE STUDY RESULTS WILL IMPACT PATIENT CARE.
- ✓ **ADOPTION AS STANDARD OF CARE:** MENTION IF YOUR INSTITUTION HAS ADOPTED THE METHOD AS STANDARD OF CARE.
- ✓ **FUTURE DEVELOPMENTS:** DISCUSS THE IMPACT ON FUTURE TECHNICAL DEVELOPMENTS OR UNDERSTANDING OF BIOLOGICAL PROCESSES.

## LIMITATIONS

- ✓ **STATE LIMITATIONS:** CLEARLY STATE THE LIMITATIONS OF YOUR STUDY.
- ✓ **PROACTIVE DESCRIPTION:** PROVIDE AN OPEN AND CLEAR DESCRIPTION OF ALL REASONABLE LIMITATIONS, DEMONSTRATING OBJECTIVITY AND UNBIASEDNESS.
- ✓ **FUTURE STUDIES:** INCLUDE A DESCRIPTION OF FUTURE STUDIES THAT BUILD ON THE CURRENT STUDY RESULTS

# SUMMARY, CONCLUSION, FUTURE DIRECTIONS & REFERENCES

- ✓ **SUMMARIZE FINDINGS:** SUMMARIZE THE MOST RELEVANT FINDING IN 2–3 SENTENCES.
- ✓ **STATE MAIN CONCLUSION:** PROVIDE THE MAIN CONCLUSION, ALIGNING WITH THE ABSTRACT CONCLUSION.
- ✓ **FUTURE STUDIES:** MENTION ANY INTRIGUING NEW SCIENTIFIC QUESTIONS AND PROVIDE AN OUTLOOK FOR FUTURE STUDIES.
- ✓ **REFERENCES**
  - ✓ **CRITICAL EVALUATION:** EVALUATE EVERY SCIENTIFIC PAPER CRITICALLY FOR CITATION, SELECTING ONLY THE MOST RELEVANT REFERENCES.
  - ✓ **RECENT REFERENCES:** CITING RECENT REFERENCES HIGHLIGHTS THE RELEVANCE OF YOUR STUDY.
  - ✓ **FORMATTING:** FORMAT THE CITATIONS AND BIBLIOGRAPHY ACCORDING TO THE JOURNAL'S INSTRUCTIONS.
  - ✓ **CITATION LIMIT:** DO NOT EXCEED THE MAXIMUM ALLOWED NUMBER OF CITATIONS

# SCIENTIFIC MANUSCRIPT – KEY POINTS

- ✓ **MISTAKES LEAD TO REJECTION:** MISTAKES IN THE PREPARATION OF SCIENTIFIC MANUSCRIPTS LEAD TO REJECTION.
- ✓ **LEARNABLE SKILL:** SCIENTIFIC WRITING, LIKE ANY IMPORTANT SKILL, CAN BE LEARNED.
- ✓ **WELL-DEVELOPED APPROACH:** A WELL-DEVELOPED APPROACH IMPROVES THE QUALITY OF SCIENTIFIC WRITING.
- ✓ **ESSENTIAL FOR COMMUNICATION:** HIGH-QUALITY SCIENTIFIC WRITING IS ESSENTIAL TO COMMUNICATE RESEARCH RESULTS.
- ✓ **EFFECTIVE COMMUNICATION:** A WELL-ORGANIZED MANUSCRIPT EFFECTIVELY COMMUNICATES A HYPOTHESIS-DRIVEN SCIENTIFIC STUDY.

# QUIZ

WHAT ARE THE RECOMMENDED COMPONENTS TO INCLUDE IN THE DISCUSSION SECTION OF A SCIENTIFIC MANUSCRIPT, AND WHY IS IT IMPORTANT TO PROVIDE A CLEAR STATEMENT OF THE LIMITATIONS OF YOUR STUDY?

- A) INTRODUCTION, METHODS, RESULTS, DISCUSSION, CONCLUSION
- B) SYNOPSIS OF RESULTS, INTERPRETATION OF OWN RESULTS, COMPARISON WITH PREVIOUS STUDIES, CLINICAL SIGNIFICANCE, LIMITATIONS, SUMMARY AND CONCLUSION
- C) BACKGROUND, HYPOTHESES, DATA ANALYSIS, FINDINGS, FUTURE DIRECTIONS
- D) PURPOSE, METHODS, DATA, SUMMARY, REFERENCES



# ANSWER

B) SYNOPSIS OF RESULTS, INTERPRETATION OF OWN RESULTS, COMPARISON WITH PREVIOUS STUDIES, CLINICAL SIGNIFICANCE, LIMITATIONS, SUMMARY AND CONCLUSION

**EXPLANATION:** THE DISCUSSION SECTION SHOULD INCLUDE A SYNOPSIS OF THE MOST RELEVANT RESULTS, INTERPRETATION OF OWN RESULTS, COMPARISON WITH PREVIOUS STUDIES, CLINICAL OR PATHOPHYSIOLOGICAL SIGNIFICANCE, LIMITATIONS, AND A SUMMARY, CONCLUSION, AND FUTURE DIRECTIONS. CLEARLY STATING THE LIMITATIONS IS IMPORTANT BECAUSE IT DEMONSTRATES THE AUTHOR'S OBJECTIVITY AND UNDERSTANDING OF THE STUDY'S DRAWBACKS, THEREBY STRENGTHENING THE MANUSCRIPT.

# THANK YOU

