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Assessing Knowledge of Biostatistics Among Residents and Medical Students

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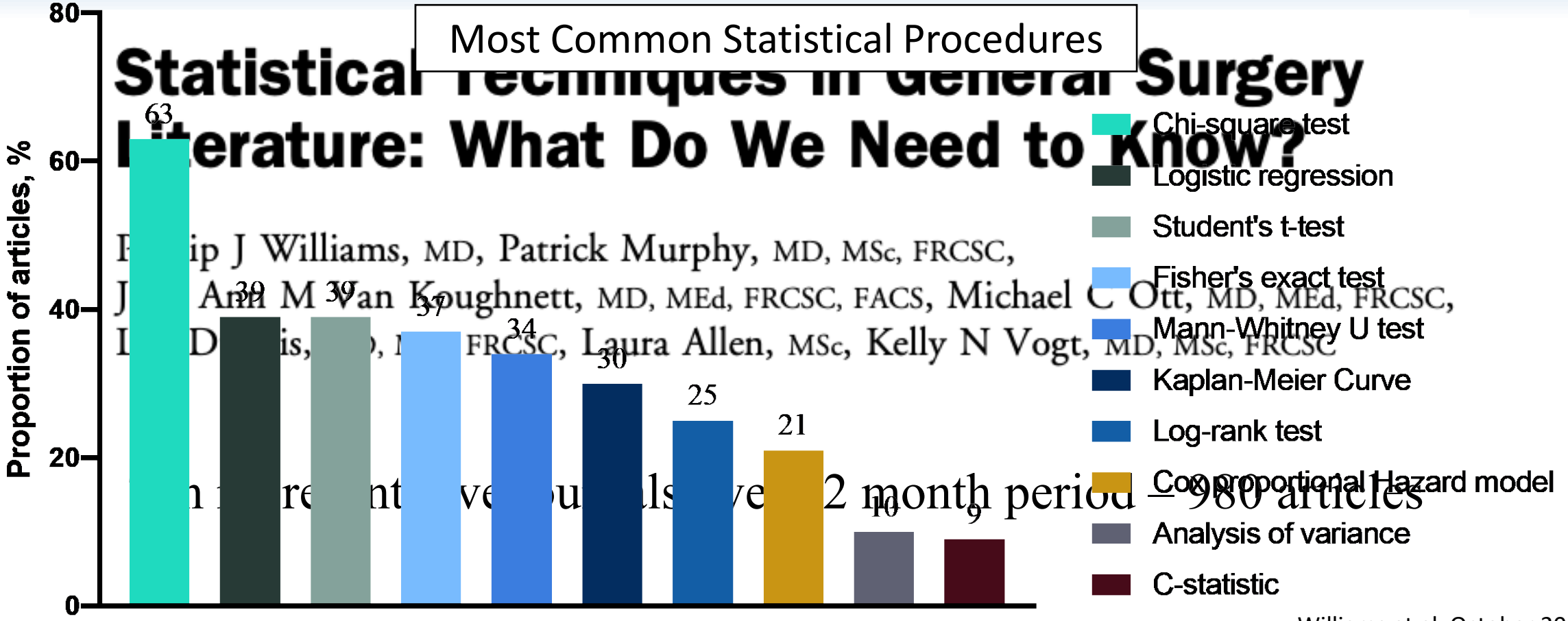
Henry Ford Health System/Wayne State University

Disclosures

I do not have any relevant financial relationship(s) with any commercial interest that pertains to the content of my presentation.

Background

Most Common Statistical Procedures



Williams et al. October 2018. JACS

Background

- Questions:
  - What is the current status of biostatistics knowledge among trainees?
  - Does this knowledge vary depending on the department?

Methods

- Surveyed residents and rotating medical students at our institute
  - During didactics to maximize participation
- Survey based on Windish et al.[1]
  - 17 knowledge questions
  - Demographics, department, previous biostatistics training, journal reading habits, participation in research, didactics in biostats, and journal clubs
- Primary outcome: percent correct

4. A prospective study looked at obesity, diet, and exercise habits of individuals. Match the appropriate analytic method for each of the following hypotheses.
(Fill in each blank below with your answer. Use each letter as many times as appropriate.)

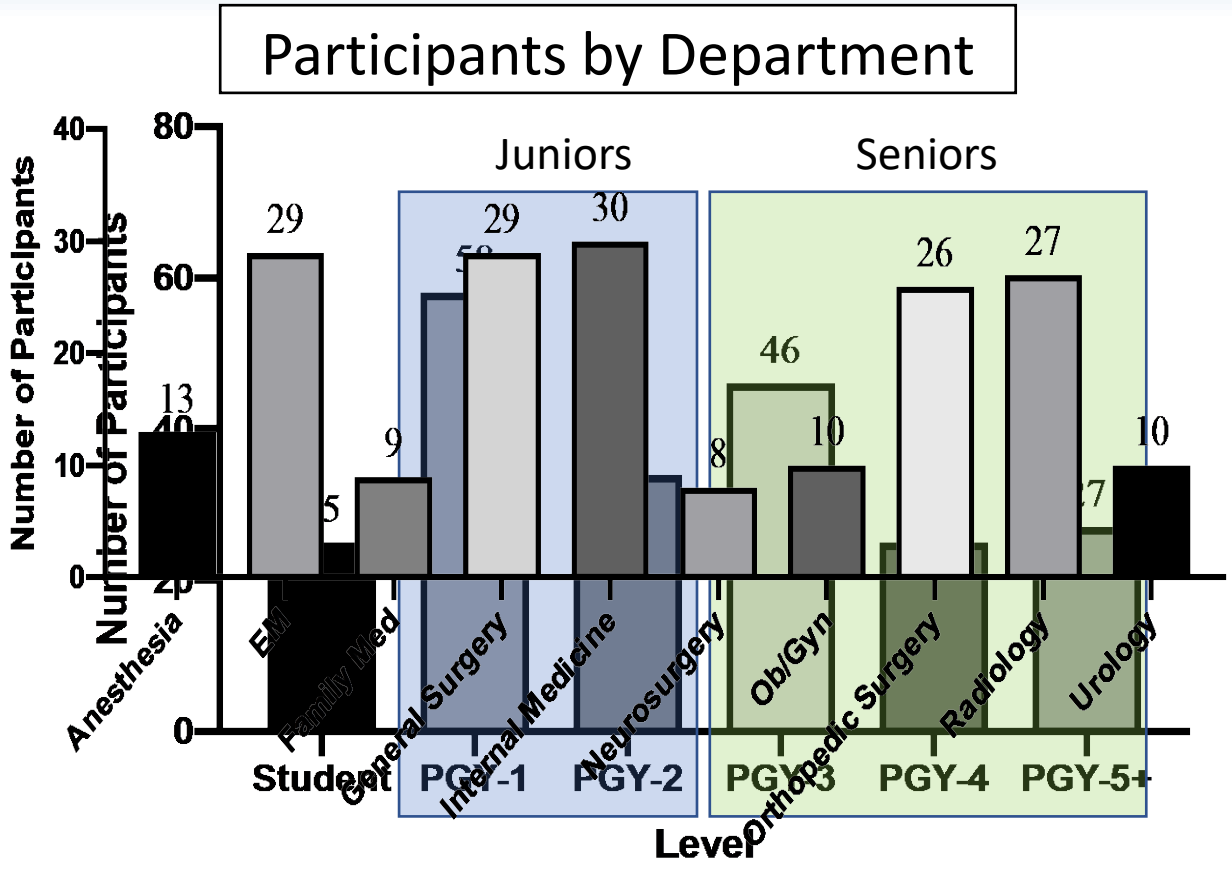
   A. T-test for comparing 2 population means
   B. Analysis of Variance (ANOVA)
   C. Correlation analysis
   D. Chi-square test of homogeneity
   E. Logistic regression

a. _____ Mean age does not vary across 4 groups of fat consumption
b. _____ Multivitamin use does not vary across the 4 groups of fat consumption
c. _____ Mean BMI is the same for the low fat and high fat consumption group

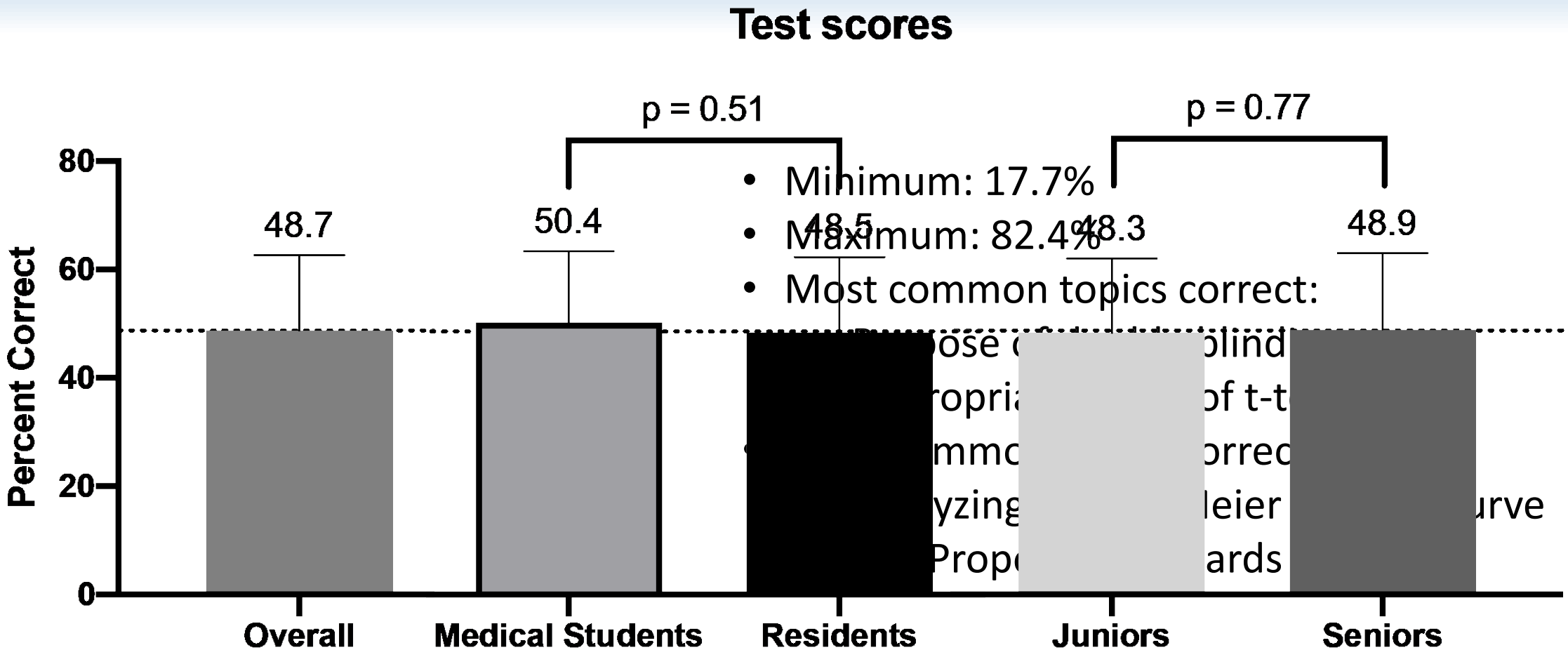
1. Windish et al. JAMA. September 2007

Results

- Total of 218 participants
  - 2 Responses removed - incomplete survey
  - 191 residents
  - 25 medical students
- Average age: 29 [SD: 3.7]
- 114 Male, 92 Female, 10 unanswered
- 175 (81.0%) have had prior training
- 80 (41.7%) report not having any didactics

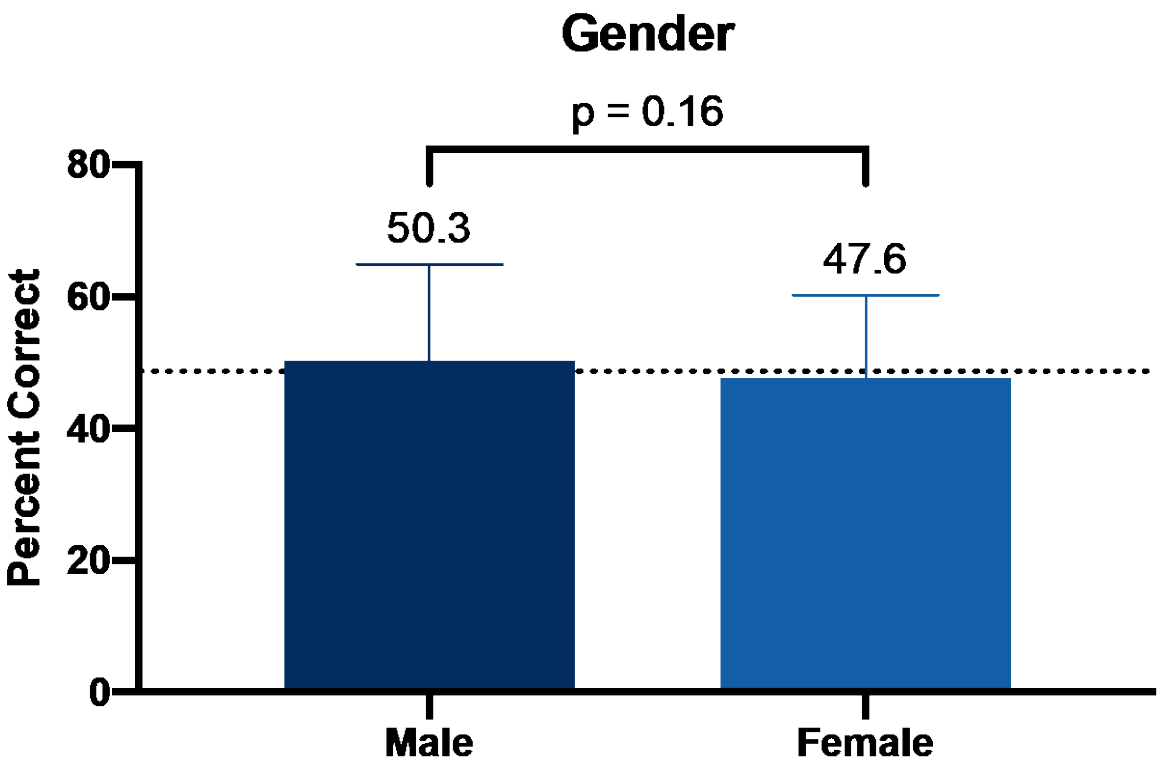


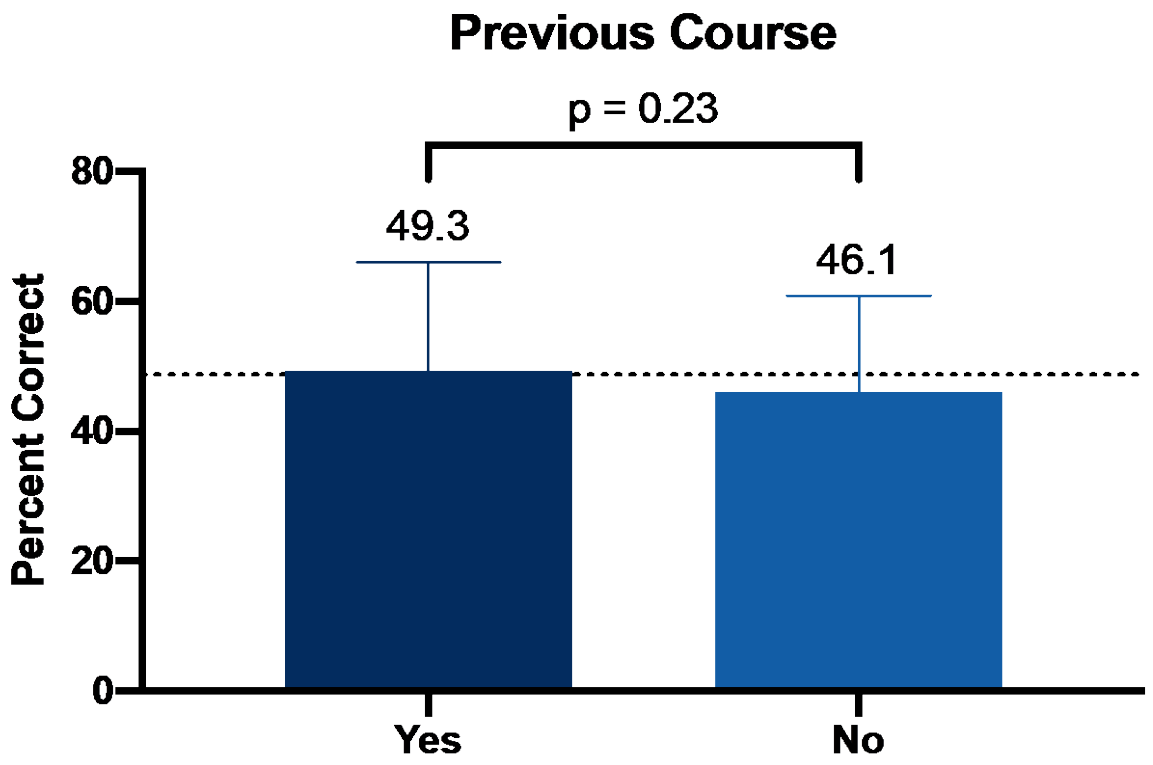
Results – Knowledge Assessment



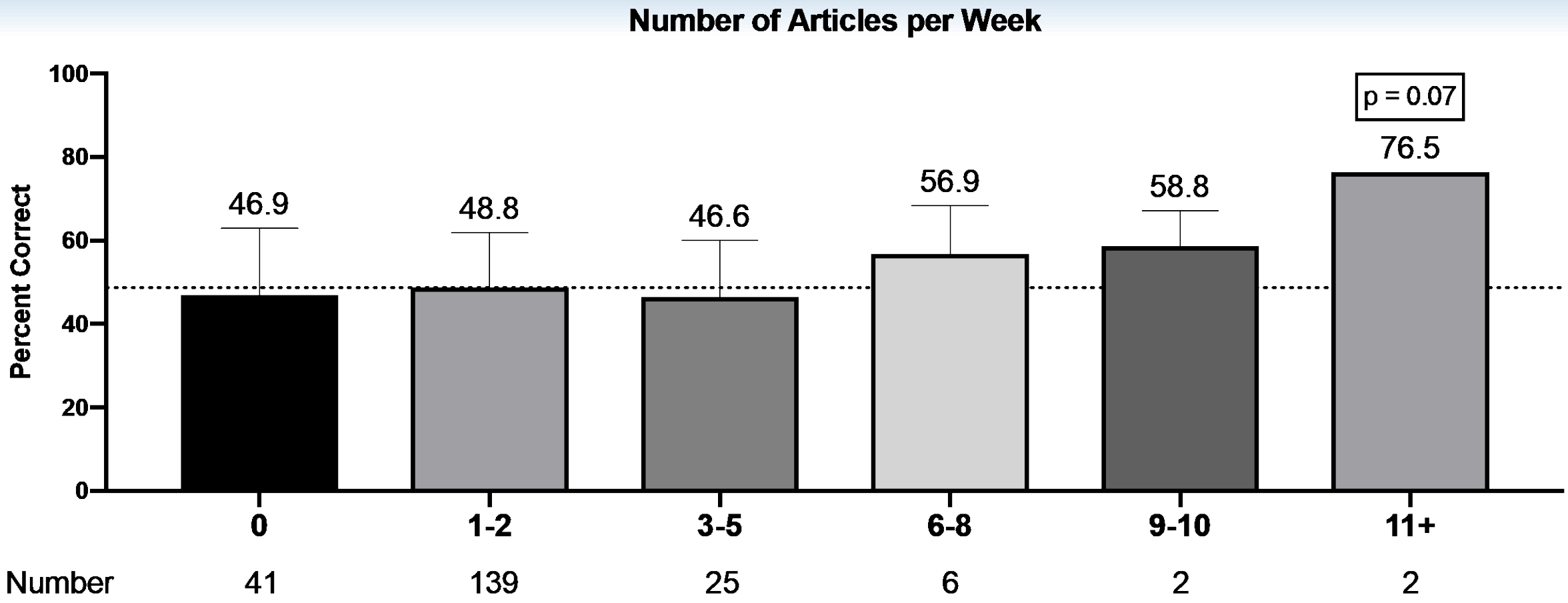
- Minimum: 17.7%
- Maximum: 82.4%
- Most common topics correct:

Results

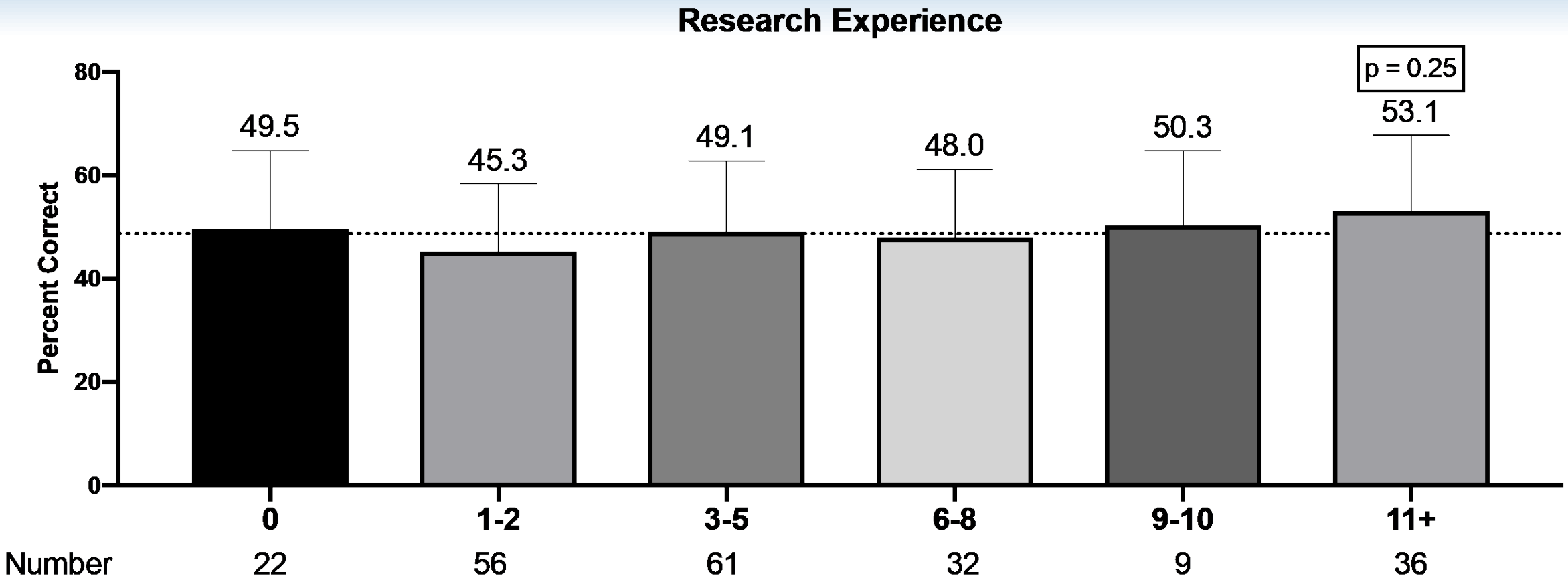

Gender
p = 0.16
Percent Correct
80
60
40
20
0
50.3
47.6
Male
Female


Previous Course
p = 0.23
Percent Correct
80
60
40
20
0
49.3
46.1
Yes
No

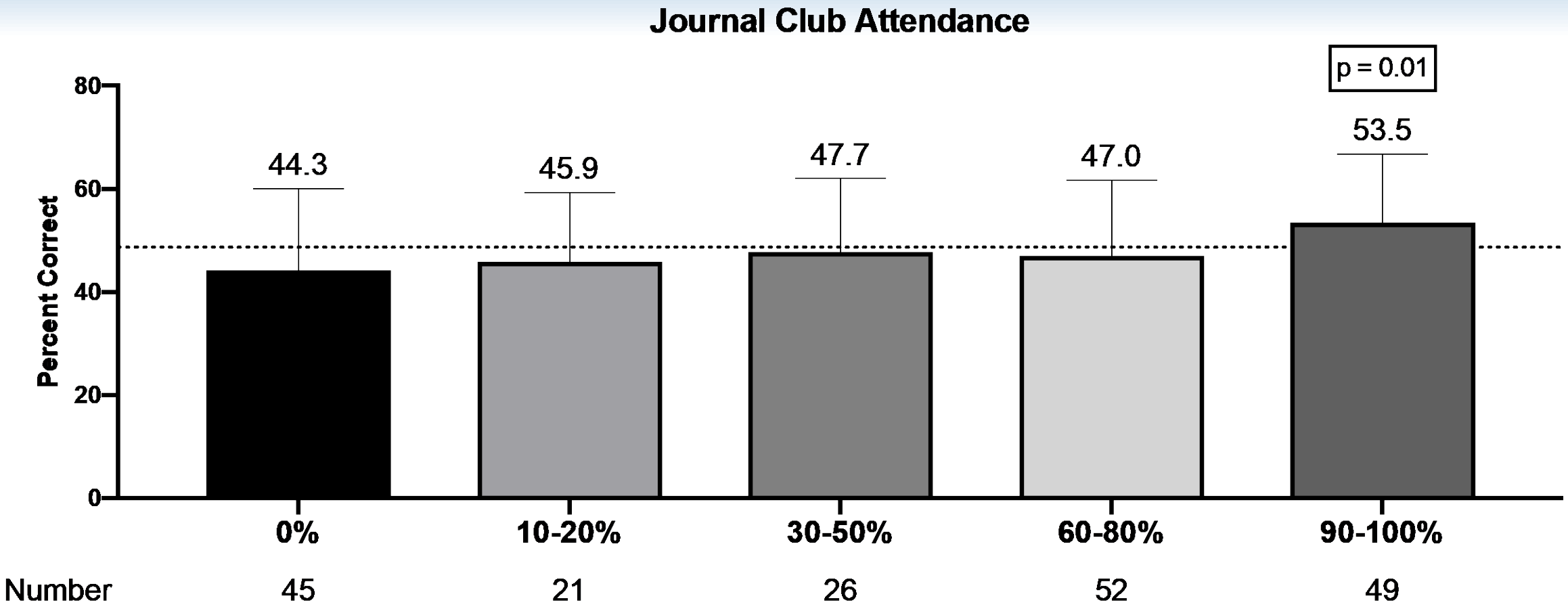
RESULTS


Number of Articles per Week
Percent Correct
100
80
60
40
20
0
46.9
48.8
46.6
56.9
58.8
76.5
p = 0.07
0
1-2
3-5
6-8
9-10
11+
Number
41
139
25
6
2
2

RESULTS

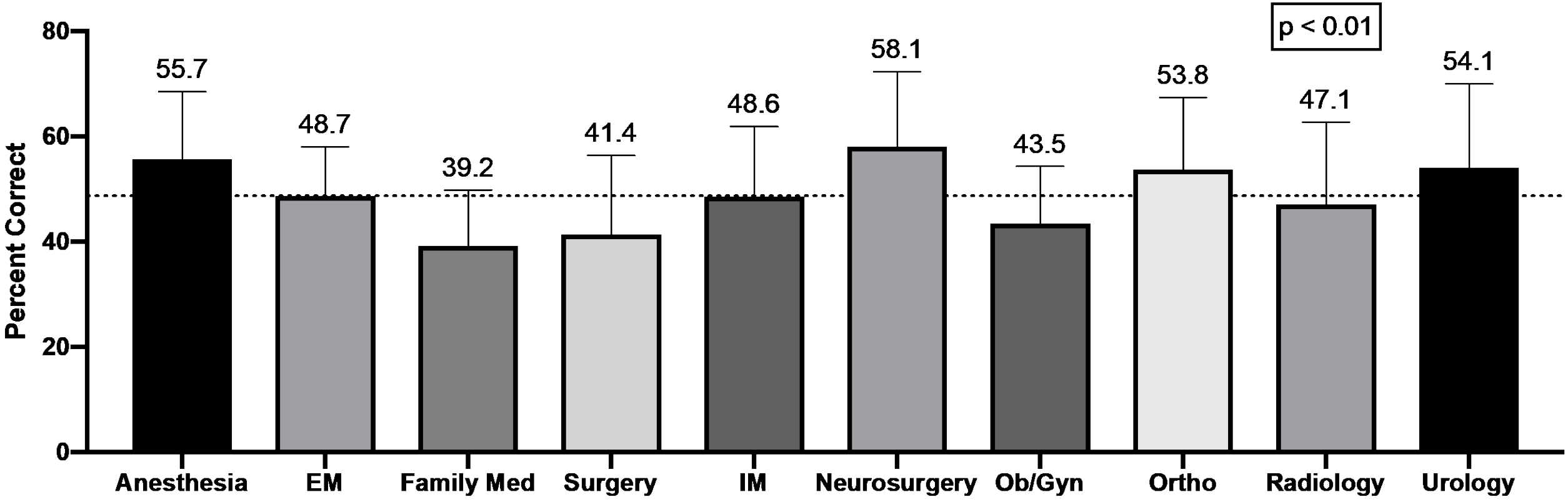

Research Experience
Percent Correct
80
60
40
20
0
49.5
45.3
49.1
48.0
50.3
53.1
p = 0.25
0
1-2
3-5
6-8
9-10
11+
Number
22
56
61
32
9
36

RESULTS


Journal Club Attendance
p = 0.01
Percent Correct
80
60
40
20
0
44.3
45.9
47.7
47.0
53.5
0%
10-20%
30-50%
60-80%
90-100%
Number
45
21
26
52
49

Results

Percent Correct by Department



Multivariate Analysis

	Score Change	95% CI	P Value
Department			
Anesthesiology	9.7	0.15 to 19.2	**0.048**
Emergency Medicine	-2.3	-9.6 to 5.0	0.54
Family Medicine	-11.8	-22.2 to -1.4	**0.03**
General Surgery	-3.3	-10.4 to 3.8	0.37
Internal Medicine	Ref		
Neurosurgery	13.0	0.23 to 25.8	**0.048**
Ob/Gyn	-4.6	-14.5 to 5.4	0.37
Orthopedic Surgery	7.2	-1.4 to 16.0	0.11
Radiology	-0.27	-7.7 to 7.2	0.94
Urology	6.5	-4.1 to 17.2	0.23

Conclusions

- Knowledge of biostats generally low
  - Increased knowledge with previous training, journal club, and more articles per week
- Considerable variation of performance across departments
- Limitations:
  - Single institution, recall bias, sample size varied by department
- Future Directions:
  - Implement uniform educational interventions to target gaps in knowledge

Questions?

Thank you!