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Abstract:

Purpose: To assess learning outcomes of allied dental students following a disaster victim identification (DVI) multimedia learning experience. **Methodology:** Senior dental hygiene and dental assistant students (n=41) from two institutions completed a descriptive pretest/posttest intervention study to assess cognitive and affective changes resulting from exposure to a multimedia DVI learning experience consisting of a PowerPoint presentation with audio/video recordings. Participants were presented with 10 sets of mismatched antemortem (AM) and postmortem (PM) digital bitewing radiographs and asked to visually compare the images to identify matches. **Results:** Dental hygiene (n=27) and dental assistant (n=14) students accurately matched at least four out of five radiographic DVI sets for an accuracy rate of 80%. Results revealed a statistically significant ($p<0.05$) increase of DVI match performance for dental hygiene compared to dental assistant students. A statistically significant ($p<0.05$) increase in perceived cognitive knowledge of DVI skills for mass fatality incidents (MFIs) was revealed among all participants, and a statistically significant increase ($p<0.05$) in perceived affective attitudes regarding perceived importance of their respective professions as DVI volunteers was shown. **Conclusion:** A multimedia learning experience may significantly increase allied dental students' cognitive and affective abilities to aid DVI efforts.

Problem:

- Current literature lacks research on the effects of DVI learning interventions on cognitive and affective learning outcomes for allied dental professionals.

Methods and Materials:

- IRB exempt descriptive researcher designed pretest/posttest intervention study
- Convenience sample (n=41): senior dental hygiene and dental assistant students from two institutions completed a multimedia learning experience consisting of a PowerPoint with educational text, audio/video recordings, and examples of victim cases presented in a virtual synchronous format by one of the researchers.

- Participants' cognitive ability to visually interpret mismatched sets of AM and PM dental radiographs to indicate 5 identification match sets was assessed using Qualtrics.
- Pre- and posttest surveys consisted of seven, 3-point Likert scale questions.

Results:

- **Participant Demographics:**
  - Senior dental hygiene students (n=27, 65.8%)
  - Senior dental assistant students (n=14, 34.1%)
  - All were female (n=41, 100%)
  - Majority were white (n=24, 58.5%)
  - Majority were 18-22 years old (n=21, 51.2%)
- **Match Accuracy of all Participants** (Figure 1):
  - Accurately matched 5 out of 5 sets: (n=35, 85%)
  - Accurately matched 3 out of 5 sets: (n=6, 15%)
  - One-sample binomial proportion test: Statistically significant ability to accurately match 4 out of 5 sets ($p<0.05$)
- **Match Performance by Discipline** (Figure 2):
  - <u>Dental hygiene</u>: 5 accurate matches (n=26, 99.96%)
  - <u>Dental assistant</u>: 5 accurate matches (n=9, 55%)
  - Fisher's exact test: statistically significant ($p<0.05$) association between match performance and student academic discipline.

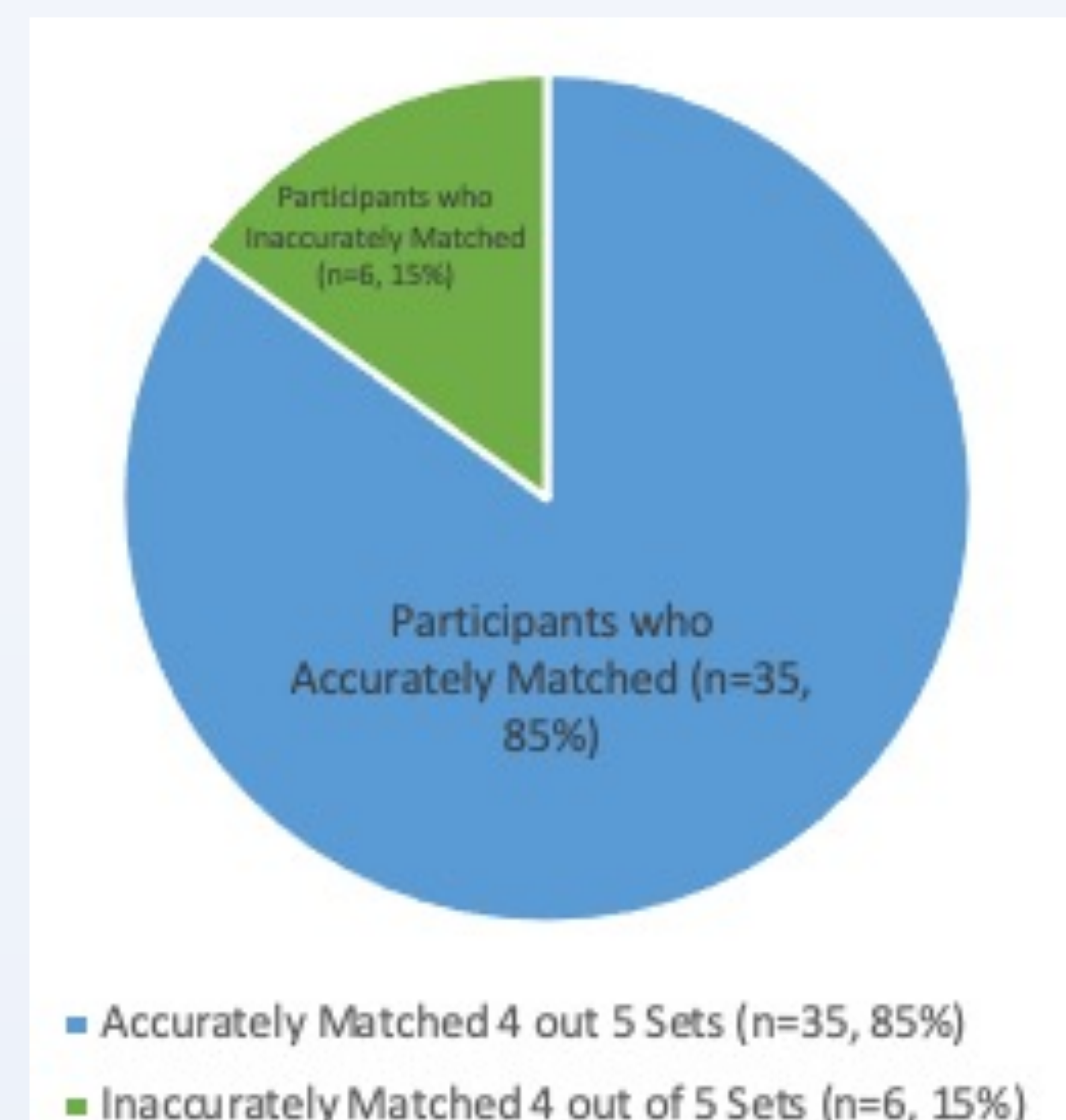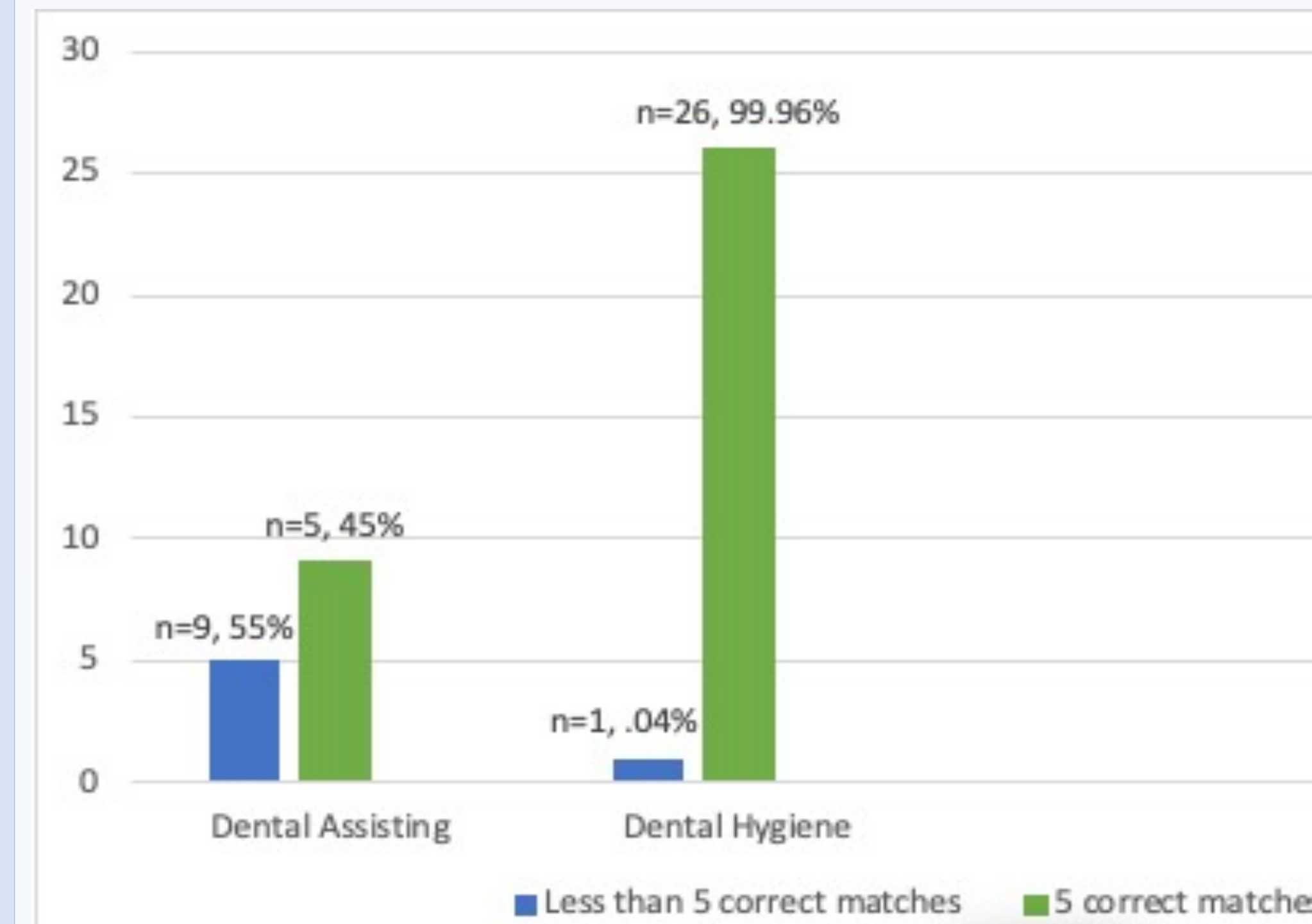### Figure 1. Participants' Accuracy Matching AM and PM Dental Radiographic Sets

- Accurately Matched 4 out 5 Sets (n=35, 85%)
- Inaccurately Matched 4 out 5 Sets (n=6, 15%)

Figure 2: Match Performance of All Participants


Less than 5 correct matches — 5 correct matches

- **Statistically significant pre- posttest increase of perceived knowledge ($p<0.05$)** (Table 1):
  - Who forensic odontologists are and their role in DVI
  - Knowledge of DVI in MFIs
  - Knowledge of Dental Morphology
  - Knowledge of Dental Radiology in DVI

Table 1: Levels of Perceived Knowledge Related to DVI Topics

Type	Levels of Perceived Understanding:		
	What is a forensic odontologist and what is their role?		
	Slightly	Moderately	Extremely
Pre survey	21(51.2%)	15 (36.6%)	5 (12.2%)
Post survey	1 (2.4%)	17 (41.5%)	23 (56.1%)
	Knowledge of DVI in MFIs		
	Slightly	Moderately	Extremely
Pre survey	28 (68.3%)	10 (24.4%)	3 (7.3%)
Post survey	2 (4.9%)	17 (41.5%)	22 (53.6%)
	Knowledge of Dental Morphology		
	Slightly	Moderately	Extremely
Pre survey	25 (61%)	9 (22%)	7 (17%)
Post survey	2 (4.9%)	13 (31.7%)	26 (63.4%)
	Knowledge of Dental Radiology in DVI		
	Slightly	Moderately	Extremely
Pre survey	15 (36.6%)	20 (48.4%)	6 (14.6%)
Post survey	1 (2.4%)	12 (29.3%)	28 (68.3%)

- **Participants' perception of professional importance for DVI Volunteerism** (Figure 3):
  - Statistically significant pre- posttest increase of perceived importance (<0.05)
  - <u>Dental hygiene</u>: pretest (18.5%); posttest (77.8%)
  - <u>Dental assistant</u>: pretest (35.7%); posttest (50%)

Figure 3. Perception of Importance for DVI Volunteerism

Pre-Survey — Post-Survey
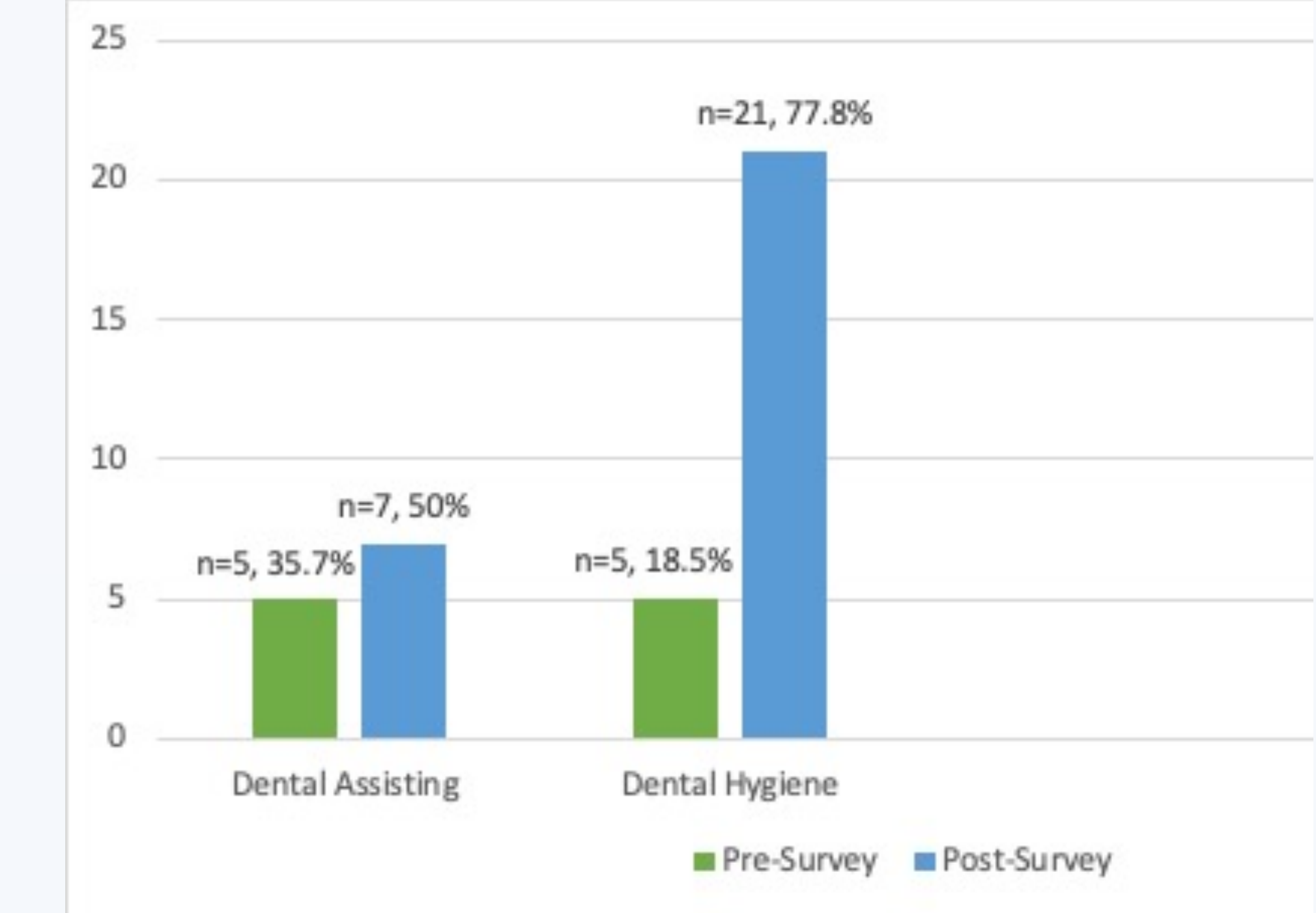
Discussion:

- High match accuracy rates demonstrated by these allied dental student participants revealed that their respective educational programs did provide them with foundational skills to perform DVI tasks such as radiographic comparison of AM and PM data.
- It is unclear why the dental hygiene students had a higher match accuracy rate compared to the dental assistant students but future research on this is needed.
- Pretest/posttest results from the learning experience intervention revealed that positive learning outcomes can be achieved by educational experiences that are not overly sophisticated or costly in design.
- During MFIs when additional DVI personnel is needed, the likelihood of enlisting competent volunteers may be increased by learning experiences which educate responders on the importance of their professional expertise as a needed source as was observed in the posttest results for these participants.

Conclusions:

- Allied dental students' educational programs prepare them with skills that are transferrable and useful for DVI tasks.
- A multimedia DVI learning experience increased allied dental students' perceived knowledge regarding DVI.
- After a multimedia learning experience, dental assistant and dental hygiene students indicated increased positive perceptions of DVI volunteerism.