Implementing Telepresence Robots in Glaucoma Patient Education

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NEW JERSEY MEDICAL SCHOOL

I. Purpose

Interactive patient education sessions → Increase patient knowledge of pathology → Improve patient compliance
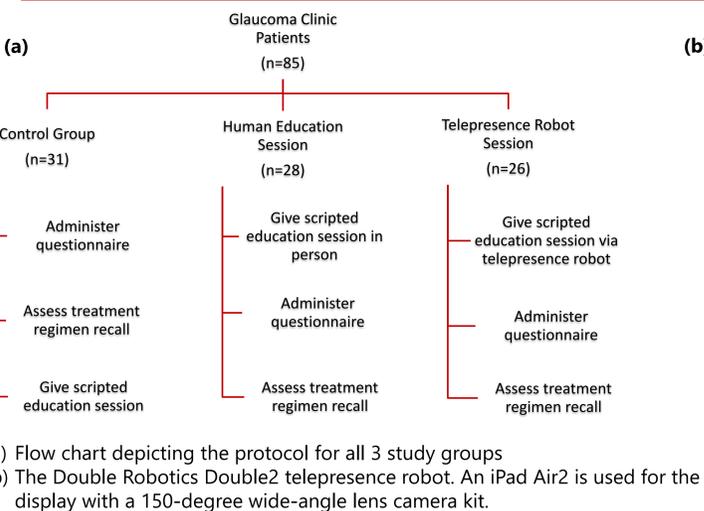
- Innovative patient education modalities that follow social distancing guidelines are needed during the COVID-19 pandemic
- In communities that lack resources or personnel for in-person education sessions, telepresence robots (TR) can safely deliver direct, real-time contact with remote educators

GOAL
Education sessions given via a telepresence robot are as efficacious as an education session given by an in-person educator

II. Methods

(a) Flow chart depicting the protocol for all 3 study groups
(b) The Double Robotics Double2 telepresence robot. An iPad Air2 is used for the display with a 150-degree wide-angle lens camera kit.

- Mean age 58.3 +/- 2.8 years, 51% male
- Communication via the TR (Double Robotics, Burlingame, CA) met the WebRTC standard with a 256-bit AES cipher for end-to-end encryption
- Glaucoma Knowledge Scores (KS) measured with the National Eye Institute's Eye-Q Test with a maximum score of 10
- Treatment regimen recall (RR) assessed by subject describing medications, dosage, and eye laterality, with greater than 90% accuracy considered a success

III. Results

Outcome	N	Raw Score	Mean % Difference Compared to Control	P-value
Control participants				
Knowledge Score	31	5.8 [5.1 – 6.5]		
Regimen Recall	31	74% [58% - 90%]		
Human session participants				
Knowledge Score	28	8.4 [7.9 – 8.9]	+44.8%	<.001
Regimen Recall	28	93% [83% - 100%]	+25.7%	.053
TR session participants				
Knowledge Score	26	7.9 [7.4 – 8.4]	+36.2%	<.001
Regimen Recall	26	92% [82% - 100%]	+24.3%	.065

Table 1: Between group comparison of mean glaucoma knowledge scores and mean treatment regimen recall outcomes.

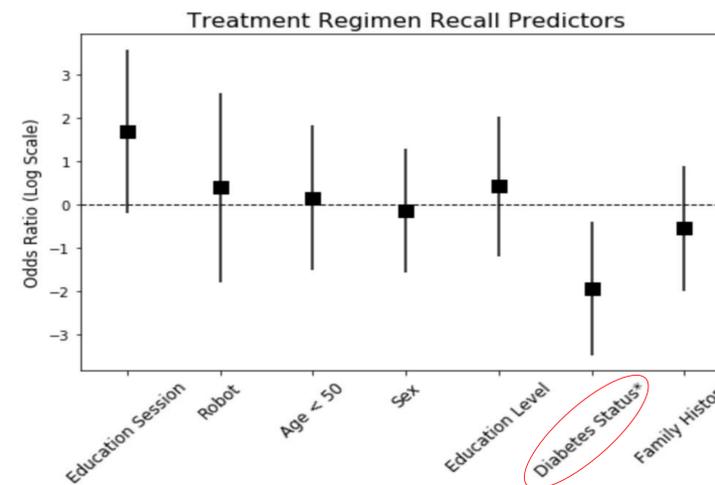**Figure 2:** Binary logistic regression was used to determine predictors of RR. Significant (p<.05) odds ratios are highlighted in red.

Figure 1: Linear regression was used to determine predictors of KS. Significant predictors (p<.05) are highlighted in red.

Figure 3: Results of the Eye-Q Questionnaire results across all 85 participants shown to reflect percentage of correct responses to each question.

IV. Discussion and Conclusion

- To our knowledge, this was the first study to implement telepresence robotics to conduct education sessions for glaucoma patients
- TRs provide a novel modality to safely and effectively continue patient education during the COVID-19 pandemic
- Key points in glaucoma education should emphasize the irreversible nature of this disease and the "silent course" most cases of glaucoma take
- Characteristics like having diabetes may be associated with a lower KS and RR, indicating these patients may require further educational interventions
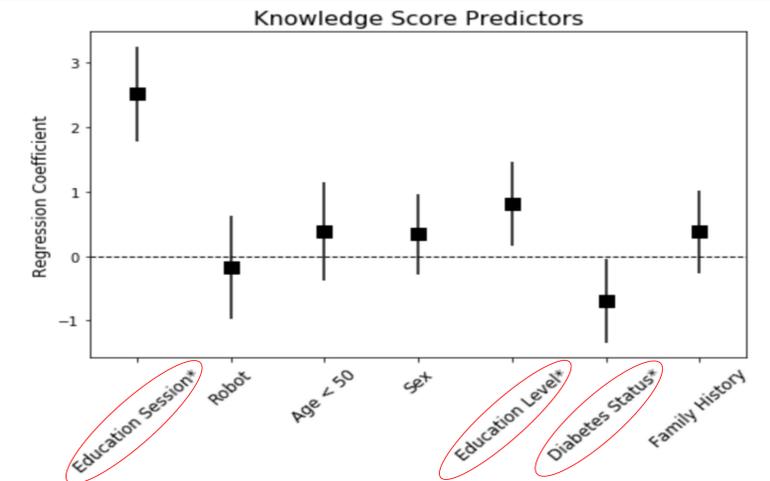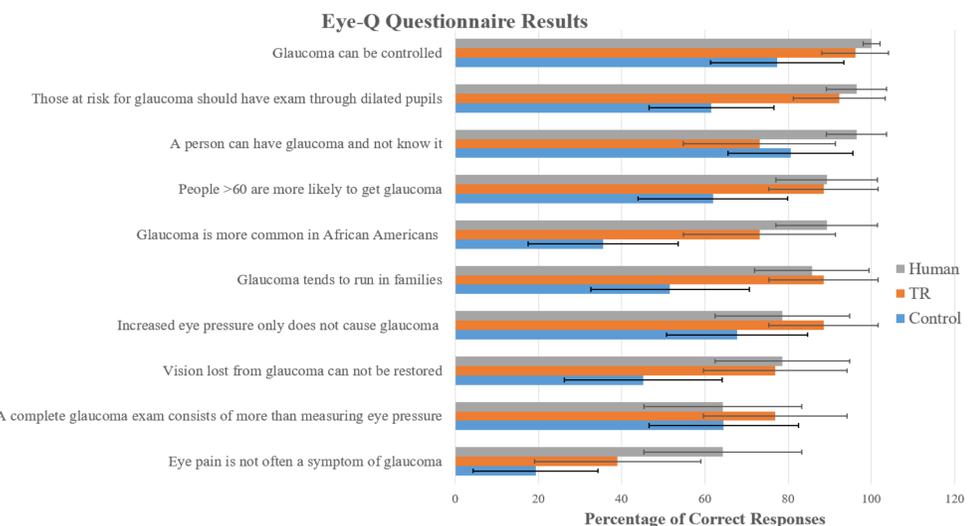
FUTURE DIRECTIONS
- Analyze long-term knowledge retention and treatment regimen adherence
- Evaluate cost effectiveness of TRs in the clinical setting
- Expand scope of TRs to aid ophthalmologists in triaging eye patients in the emergency room

V. Acknowledge and Support