Does collaboration lead to fewer diagnostic errors?

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Overview

Missed and delayed diagnoses occur with relative frequency and pose a substantial threat to patient safety. Suggested strategies to improve diagnostic accuracy include active reflection through collaboration with other providers and use of a diagnostic reminder system (DRS). However, these strategies are not well studied in either Physician Assistant (PA) or medical education.

The purpose of this study was to compare the impact of two different forms of reflection on PA student diagnostic accuracy during a series of standardized patient (SP) cases; use of Isabel PRO (a web-based DRS) and discussion with a resident physician (interprofessional collaboration).

Methods

Subjects and Setting: Sixty-five (n=65) first year PA students (PAS-1) completed a series of four SP cases as a final summative evaluation just prior to beginning their clinical training. SP case presentations were designed to include common presentations with frequently missed diagnoses in actual settings (Fig 1).

Case 1: Chest pain and fever; 30 year old male
Case 2: Back pain in a 50 year old male
Case 3: Fatigue in a 50 year old female
Case 4: Headache in a 60 year old female

Fig. 1 SP case presentations

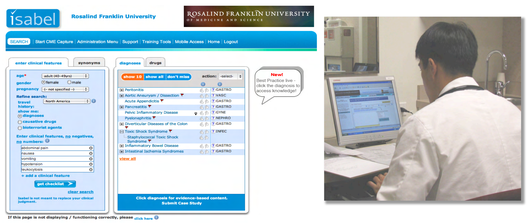

Fig 2. Isabel PRO query interface. Students enter a query based on clinical findings, reflect on their initial diagnostic hypotheses, and refine a list of final diagnostic hypotheses.

Study Design (Randomized Controlled Trial):

After each case, PAS-1 subjects submitted their diagnostic decisions and suggestions for further testing. PAS-1 subjects were then divided into two treatment groups; a) Isabel-PRO treatment group (n=38) where PAS-1 subjects were allowed to use a web-based DRS to augment their diagnostic decisions and b) Resident-discussion treatment group (n=27) where PAS-1 subjects engaged in interprofessional discussion with a resident to augment their diagnostic decisions. Figure 2 summarizes highlights the Isabel Pro interface for a sample case study.

PAS-1 diagnostic decisions were graded and reported as a diagnostic accuracy score (DAS). DAS scores were reported pre-intervention (Pre-Isabel DAS or Pre-Resident DAS) or after intervention (Post-Isabel DAS or Post-Resident DAS). Pre and Post measures were compared within treatment groups (Paired T-test) and final DAS was compared between treatment groups (Independent T-test). Figure 3 summarizes the study design.

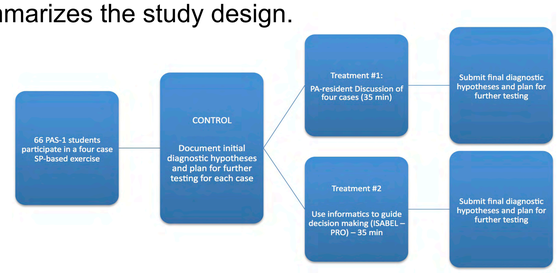

Fig 3: General Study Design

Results

Table 1 Decision Accuracy Score (DAS) mean and standard deviation Pre vs. Post Isabel (n=38 PAS-1 subjects). Means compared using a paired t-test, *significance noted at the p <0.05 level).

	Pre-Isabel DAS	Post-Isabel DAS	% change	t value	p value
Back Pain	.35 (+/- .16)	.47 (+/- .16)	+.12	-4.41	< .01*
Fatigue	.45 (+/- .22)	.46 (+/- .18)	+.01	-0.26	.80
Chest Pain	.47 (+/- .17)	.57 (+/- .20)	+.09	-2.97	<.01*
Headache	.34 (+/- .24)	.52 (+/- .23)	+.18	-4.73	< .01*
Overall	.40 (+/- .12)	.49 (+/- .14)	+.09	-3.49	<.01*

Table 2 Decision Accuracy Score (DAS) mean and standard deviation Pre vs. Post Resident measures (n=27 PAS-1 subjects). Means compared using a paired t-test, *significance noted at the p <0.05 level).

	Pre-Resident DAS	Post-Resident DAS	% change	t value	p value
Back Pain	.32 (+/-.16)	.32(+/-.14)	.00	-.03	.97
Fatigue	.51 (+/-.20)	.43 (+/-.12)	-.08	2.32	.03*
Chest Pain	.47 (+/-.12)	.40 (+/-.15)	-.07	3.36	.03*
Headache	.33 (+/-.25)	.29 (+/-.22)	-.03	.01	.37
Overall	.40 (+/-.08)	.35 (+/-.11)	-.05	2.47	.02*

Table 3 PAS-1 Decision Accuracy Score (DAS) mean and standard deviation between treatment groups. Means compared using an independent t-test, *significance noted at the p <0.05 level).

	Post-Resident DAS (% mean and SD)	Post-Isabel DAS (% mean and SD)	% difference	t value	p value
Back Pain	.32 (+/-.19)	.47 (+/- .16)	.15	3.55	< .01*
Fatigue	.43 (+/-.12)	.46 (+/-.18)	.03	.93	.36
Chest Pain	.40 (+/-.15)	.57 (+/-.20)	.17	3.55	<.01*
Headache	.29 (+/-.22)	.52 (+/-.23)	.23	4.11	<0.1*
Overall	.35 (+/-.11)	.49 (+/-.13)	.14	4.27	<0.1*

Statistically significant improvements were noted in PAS-1 diagnostic decisions after using Isabel PRO (Table 1). PAS-1 diagnostic decisions did not significantly improve after resident discussion (Table 2). Diagnostic accuracy was significantly greater Post-Isabel (Table 3, Fig 4). Resident subjects made more accurate final diagnostic decisions if the PAS-1 subject they discussed the case with had more accurate initial diagnostic decisions.

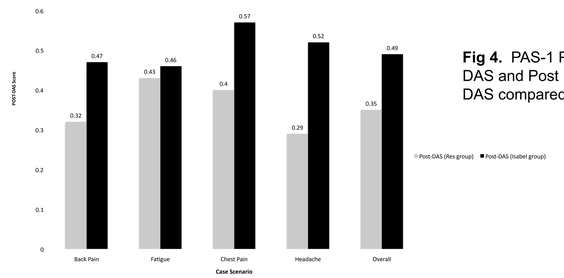

Fig 4. PAS-1 Post Isabel DAS and Post Resident DAS compared.

Both groups were significantly more confident post-reflection. However, post-resident PAS-1 subjects were significantly more *overconfident* due to the lack of corresponding increase in diagnostic accuracy.

Conclusions

In this study, the use of a diagnostic reminder system was more effective at improving diagnostic accuracy in PAS-1 students than case discussion with another provider. Interprofessional discussion while making diagnostic decisions may be helpful at improving diagnostic accuracy, but it should not be assumed that collaboration will correct for cognitive biases that are known to lead to diagnostic errors in individual providers (*e.g. premature closure, anchoring bias, confirmation bias, overconfidence bias*).

The results of this study suggest that it may be advisable for both individuals and collaborative groups charged with making diagnostic decisions to use an evidence based diagnostic reminder system when engaging in clinical reasoning activities.

References:

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