

A Didactic Intervention to Improve Fertility Knowledge Among Resident Physicians

Leah May Roberts (✉ leahmayroberts@gmail.com)

Temple University Health System Inc <https://orcid.org/0000-0002-8065-6098>

Rashmi Kudesia

Colorado Center for Reproductive Medicine

Shaliz Dolan

Temple University Hospital

Marisa Rose

Temple University Hospital

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Abstract

Background: Knowledge of family planning and reproductive health is recommended as part of the Core Competencies for Internal Medicine (IM) trainees ¹, yet is rarely assessed. **Objective:** This pilot study explored the need for and efficacy of a didactic session to impact fertility knowledge among IM residents

Methods: IM residents at a single institution were recruited via email to voluntarily attend a didactic session on fertility in March of 2018. Attendees of the session voluntarily completed a survey to assess demographics and fertility knowledge, measured by the validated Fertility & Infertility Treatment Knowledge Score (FIT-KS), both before (“pre-test”) and after (“post-test”) the intervention.

Results: Of 108 possible residents, thirty residents attended the session (27%). Of those who attended eighteen completed the pre-test survey (60%), and ten completed a portion of the post-test survey (33%). There was no significant association between fertility knowledge and demographics. The mean pre-test FIT-KS score was 65.1% (+/- 9.1%). The post-test mean FIT-KS score was 70.3% (+/-8.8%). Seven participants (response rate of 6.5%) completed both the pre and post-test with their average matched score improving from 64% (+/- 8.2) to 72.4% (+/- 4.9) ($p=0.047$). In the paired analysis, the rates of feeling comfortable answering patient questions about fertility increased from 14% to 57%.

Conclusions: Substantial gaps exist in fertility knowledge among IM residents, with understanding of male fertility being particularly limited. Despite a small sample size, the intervention significantly improved IM residents’ fertility knowledge and their comfort in discussing fertility with patients.

Introduction

The average age of childbearing in developed countries has showed substantial increases in the last century.^{2,3,4,5} Though the popular media often covers the topic of fertility, the general public remains misinformed about their own reproductive potential.⁶ In a variety of populations all over the globe, studies have demonstrated that patients generally overestimate pregnancy rates, especially with advancing maternal age, as well as the success rates of fertility treatments.^{7,8,9,10}

Fertility misinformation cuts across both socioeconomic and culture lines, with Danish, Swedish, American, Israeli, and Hong-Kong University students all showing gaps in awareness of female infertility risk factors and overestimations of age related fertility.^{8,11,12,13} There has been a difference shown between the intended and realized family size, also called the fertility gap, as more men and women delay the start of childbearing.⁹ Causes of this delay include completing education, financial limitations, and delay in finding a suitable partner.

Internal Medicine physicians are frequently the first line of counseling for men and women of reproductive age.^{1,14} These physicians often have access to their patients during both well and sick visits well before any fertility issues arise, and can preemptively provide family planning and fertility counseling. The American Board of Internal Medicine Core Competencies specifically include family

planning and reproductive health as part of appropriate care in the area of women's health.¹ These physicians should also recognize when it is appropriate to refer their patients to either a gynecologist or a reproductive endocrinologist for further testing.

As part of the medical school curriculum, all students are taught about the menstrual cycle, and all go through an obstetrics and gynecology clerkship. However the curriculum may not include age related fertility decline, and how to approach patients in a general medicine practice about their reproductive potential.¹⁵ Additionally, physicians themselves are even more likely than the general population to delay childbearing due to stressors of career, and may be at a high risk to be personally influenced by age related infertility.^{2,16,17}

Materials And Methods

Permission was received to use the Fertility and Infertility Treatment Knowledge Score (FIT-KS, see supplemental material). Institutional review board exempt status was obtained through Lewis Katz School of Medicine at Temple University (#25004). All participants gave written informed consent through the initial survey, and risk was deemed to be minimal.

The survey was given to a group of internal medicine residents through an online platform, Survey Monkey, in March of 2018. Participants were provided a survey link by email one week before the planned intervention of a formal didactic session. The Grand Rounds intervention was given in an interactive lecture format. The presentation provided a foundation of fertility and reproductive competencies based on guidelines of the American Society for Reproductive Medicine and the American College of Obstetricians & Gynecologists. The FIT-KS survey was repeated by those who had participated in the lecture. The final survey consisted of demographic questions, the FIT-KS instrument, and several additional questions regarding participants' attitudes towards the topics in question. The FIT-KS instrument assessed knowledge of natural fertility and risk factors for infertility, as well as infertility treatment.

The percentage of correct answers for each item between the pre- and post- tests was analyzed by Pearson's chi-squared test. Total scores between the seven who completed the pre- and post-tests were also performed in the same fashion.

Results

Demographics

The internal medicine program has one hundred and eight total residents. Thirty residents attended the session (27%). Of those who attended eighteen completed the pre-test survey (60%), and ten completed a portion of the post-test survey (33%). Of those, seven completed the post-intervention survey for a response rate of 23%. They represented a range of years of study, from interns to administrative chief

residents. In each analysis, gender was distributed approximately evenly, with no score differences found between men and women. The majority of participants [83%] were 26–30 in age. The portion of participants that were matched is representative of the larger sample in both gender and age, but not in year of study, as the PGY1 cohort was not represented in the matched analysis (See Table 1 for demographic information.) Analysis was also performed by year of training, but was not found to be significant.

Table 1
Demographics

| Demographics | Pre-Intervention Participants (n = 18) | Matched Participants (n = 7) |
|-------------------|--|------------------------------|
| PGY1 | 3 | 0 |
| PGY2 | 6 | 2 |
| PGY3 | 7 | 3 |
| PGY4 (Chief) | 2 | 2 |
| Male | 9 | 4 |
| Female | 9 | 3 |
| 26–30 | 15 | 6 |
| 31–35 | 2 | 1 |
| 36–40 | 1 | 0 |
| Internal Medicine | 18 | 7 |

Fit-ks Scores

There was no significant association between fertility knowledge and demographics. The mean pre-test FIT-KS score was 65.1% (+/- 9.1%) correct. The post-test mean FIT-KS score was 70.3% (+/- 8.8%) correct. When matching only those who completed both tests (7 participants), the average score improved from 64% (+/- 8.2) to 72.4% (+/- 4.9) ($p = 0.047$) The median score for questions related to natural fertility (11 items) was 48.2% and related to infertility treatment items (8 items) was 52.3%. In the post-survey, the median score for questions related to natural fertility was 76.9% and related to infertility treatment was 58.3%.

Natural Fertility And Treatments

For fertility items (see Table 2), overestimating fecundability and underestimating miscarriage rates was seen in the pre-intervention group. They also overestimated the success rates of assisted reproductive

technologies (ARTs). All participants (100%) were able to define intrauterine insemination, oocyte cryopreservation, and in vitro fertilization.

Table 2
Selected Fertility Items

| Fertility item | Underestimating | Correct | Overestimating |
|-----------------------------------|-----------------|----------|----------------|
| Fecundability at age 40 | | < 5% | |
| Pre-intervention (n = 18) | N/A | 9 (50%) | 9 (50%) |
| Pre-intervention matched (n = 7) | N/A | 4 (57%) | 3 (43%) |
| Post-intervention matched (n = 7) | N/A | 7 (100%) | 0 (0%) |
| Sperm survival time | | 3–5 days | |
| Pre-intervention (n = 18) | 15 (83%) | 3 (17%) | N/A |
| Pre-intervention matched (n = 7) | 6 (86%) | 1 (14%) | 0 (0%) |
| Post-intervention matched (n = 7) | 1 (14%) | 6 (86%) | 0 (0%) |

Infertility Risk Factors

In the pre-survey, the median score for risk factors (10 items) was 77%; among matched participants, participants scored 84% pre-intervention, and 94% post-intervention. The largest changes in knowledge after the intervention were seen in moderate alcohol consumption, and sexual lubricants usage (see Table 3).

Table 3
Risk Factors

| Risk factors affecting fertility | Pre-intervention | Pre-matched | Post - matched |
|---|-------------------------|--------------------|-----------------------|
| Smoking | 18/18 | 7/7 | 7/7 |
| Being underweight | 18/18 | 7/7 | 7/7 |
| Gonorrhea or Chlamydia infection | 10/18 | 6/7 | 6/7 |
| Obesity | 16/18 | 6/7 | 7/7 |
| Using certain types of sexual lubricants | 11/18 | 5/7 | 7/7 |
| Male partners age | 18/19 | 6/7 | 7/7 |
| Risk factors not affecting fertility | Pre-intervention | Pre-matched | Post-matched |
| Prior use of oral contraceptive pills | 17/18 | 6/7 | 7/7 |
| Occasional caffeine intake | 17/18 | 6/7 | 7/7 |
| Moderate alcohol consumption | 13/18 | 4/7 | 6/7 |
| Safely-conducted pregnancy termination | 15/18 | 6/7 | 7/7 |

Patient Counseling

Only 5.9% stated that they ever discussed fertility with their patients. 88.2% stated that they did not feel comfortable answering patient's questions about fertility. In the paired analysis, the rates of feeling comfortable answering patient questions about fertility increased from 14–57% ($p = 0.03$).

Discussion

The findings of this survey are consistent with prior research showing limited fertility knowledge even among highly educated individuals. This study supports the data showing that even those individuals training in the medical field retain these knowledge gaps.

This survey highlights the need for targeted education in regards to certain components of fertility and age related fertility decline. Specific gaps in knowledge of particular concern in this study include the male partner's effect on fertility, as well as the impact of female age on fecundability and ART treatment success rates.

Strengths of this study include use of a validated survey instrument and matched pairs from before and after the intervention. Limitations of this study include the small sample size and therefore the generalizability of the findings to other internal medicine residents. We do not know if non-participants

potentially differ from those who completed the survey, both in those who chose to attend the lecture and did not answer the survey and in those who did not attend the lecture. This study is also limited by the immediacy of the follow-up outcome measurement to the intervention. This significantly decreases the ability to measure if the intervention provided any long-term benefit.

The present study provides interesting insight into Internal Medicine residents' attitudes toward and their comfort in counseling patients on infertility. This needs assessment pilot study documented gaps in knowledge and a need for further education in fertility in residency education. A larger sample size and adding specialties, such as family medicine, which play a similar role in patient counseling, may be considered in future studies.

Conclusions

The American Board of Internal Medicine Core Competencies has recommended knowledge of family planning and reproductive health as part of appropriate care in women's health since 1997.¹ Two decades later, there exists little data to measure progress in the adoption of recommended women's health into IM residency curricula. The FIT-KS survey may be used to assess resident achievement of this competency. Although overall post-test scores improved, results of this pilot study are limited due to small sample size. A larger study group and expanded physician outreach of this intervention may improve physician knowledge of this topic and should be further studied.

Declarations

Conflict of Interest: The authors declare that there are no conflicts of interest regarding the publication of this paper. The authors report no external funding source for this study.

Ethics: This project was approved by the Temple University Institutional Review Board as except, Protocol #25004. All participants in the survey signed the following consent statement: You are invited to take part in a research survey about resident knowledge about fertility. Your participation will require approximately 10 minutes and is completed online at your computer. There are no known risks or discomforts associated with this survey. Taking part in this study is completely voluntary. If you choose to be in the study you can withdraw at any time without adversely affecting your relationship with anyone at Temple University Hospital or your institution. Your responses will be kept strictly confidential, and digital data will be stored in secure computer files. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified. If you have questions, concerns, complaints or want a copy or summary of this study's results, you can contact the researcher at the email address leah.roberts@tuhs.temple.edu or by calling 267-512-4348

This research has been reviewed and approved by the Temple University Institutional Review Board. Please contact them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following:

questions, concerns, or complaints about the research; questions about your rights; to obtain information; or to offer input.

Confidentiality: Efforts will be made to limit the disclosure of your personal information, including research study records, to people who have a need to review this information. However, the study team cannot promise complete secrecy. For example, although the study team has put in safeguards to protect your information, there is always a potential risk of loss of confidentiality. There are several organizations that may inspect and copy your information to make sure that the study team is following the rules and regulations regarding research and the protection of human subjects. These organizations include the IRB, Temple University, its affiliates and agents, Temple University Health System, Inc., its affiliates and agents, the study sponsor and its agents, and the Office for Human Research Protections.

Clicking the “Next” button below indicates that you are 18 years of age or older, and indicates your consent to participate in this survey. “

Consent for publication: N/A

Availability of data and materials: The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

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Authors Contributions:

LM: Conceived the project, designed the project, acquired the data, analyzed the data, interpreted the data, and drafted the work

RK: Assisted in conception and design of the project, substantial review of the work

SD: Provided substantial revision of the work

MR: Provided assistance in design of the project, assisted in substantial review of the work

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