

Low fertility awareness in U.S. reproductive-aged women and medical trainees: creation and validation of the Fertility & Infertility Treatment Knowledge Score (FIT-KS)

Rashmi Kudesia, M.D., M.Sc., Elizabeth Chernyak, M.D., and Beth McAvey, M.D., M.S.

Division of Reproductive Endocrinology and Infertility, Albert Einstein College of Medicine, Hartsdale, New York

Objective: To create, validate, and use a fertility awareness survey based on current U.S. data.

Design: Cross-sectional study.

Setting: Not applicable.

Patient(s): Phase 1 included U.S. women ages 18–45; phase 2 included female medical students and obstetrics and gynecology trainees at two urban academic programs.

Intervention(s): Survey including demographics, the Fertility & Infertility Treatment Knowledge Score (FIT-KS) instrument, and General Nutrition Knowledge Questionnaire.

Main Outcome Measure(s): Knowledge of natural fertility and infertility treatments.

Result(s): The FIT-KS was validated through detailed item and validity analyses. In phase 1, 127 women participated; their median age was 31 years, and 43.7% had children. Their mean FIT-KS score was 16.2 ± 3.5 (55.9% correct). In phase 2, 118 medical trainees participated; their median age was 25 years, and 12.4% had children. Their mean FIT-KS score was 18.8 ± 2.1 (64.9% correct), with year of training correlating to a higher score ($r=0.40$). Participant awareness regarding lifestyle factors varied, but it was particularly low regarding the effects of lubricants. The majority underestimated the spontaneous miscarriage rate and overestimated the fecundability of 40-year-old women. There was general overestimation of success rates for assisted reproductive technologies, particularly among medical trainees.

Conclusion(s): The FIT-KS is validated to current U.S. data for use in both general and medical populations as a quick assessment of fertility knowledge. The knowledge gaps demonstrated in this study correlate with national trends in delayed childbearing and time to initiate treatment. For medical trainees, these results raise concerns about the quality of fertility counseling they may be able to offer patients. Greater educational outreach must be undertaken to enhance fertility awareness. (Fertil Steril® 2017; ■:■–■. ©2017 by American Society for Reproductive Medicine.)

Key Words: Fertility, fertility awareness, gynecology, infertility, medical education

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E.C. present address: Department of Medicine, Presbyterian Hospital-Columbia University Medical Center, New York, New York.

Current address for R.K. and B.M.: Division of Reproductive Endocrinology & Infertility, Icahn School of Medicine at Mount Sinai, New York, New York.

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Reprint requests: Rashmi Kudesia, M.D., M.Sc., Division of Reproductive Endocrinology & Infertility, Icahn School of Medicine at Mount Sinai, 26 Court Street, Suite 2710, Brooklyn, New York 11242 (E-mail: rashmi.kudesia@gmail.com).

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Fertility-related knowledge among the general public is low (1–5). Studies across the Western world have consistently demonstrated gaps in understanding and misconceptions regarding both male and female fertility, especially natural age-related fertility decline and fertility-impacting lifestyle factors. For example, in a survey study of Swedish high school students, the majority of both female and male students were unaware that sexual infection with *Gonorrhea* could impact fertility; other factors affecting

fertility were also often misunderstood (2). Similar results were seen in a 2006 study by Lampic et al. (4), which studied Swedish university students and found analogous gaps in fertility knowledge.

The natural age-related decline in fertility is particularly underestimated in the general public. Peterson et al. (1) found that among a group of 246 U.S. undergraduates the participants “demonstrated a lack of fertility awareness by vastly overestimating the age at which women experience declines in fertility.” The literature also specifically demonstrates that individuals grossly overestimate the success rates of assisted reproductive technologies (ART), particularly with regards to in vitro fertilization (IVF) where the female partner is in her 40s (1,2, 6–9). Perhaps more disconcerting, even those individuals themselves seeking fertility care are misinformed. In studies by Daniluk et al. (6, 7), infertility patients rated themselves as “having some knowledge” or “being fairly knowledgeable” about fertility and ART, but ultimately they performed poorly on true/false questionnaires regarding fundamental fertility knowledge. One study of women giving birth after age 40 summarized the poor a priori understanding of the relationship between fertility and age as “age shock” (8).

The mass media has picked up on this phenomenon, with *The New York Times* featuring a dramatic spread entitled “Are You as Fertile as You Look?” and a *Wall Street Journal* cover entitled “My Fertility Crisis,” both describing a cohort of women clearly unaware of the impact of age on their reproductive potential (10, 11). These misconceptions are in stark contrast to the most recently available published U.S. data, which show a 2013 national live-birth rate per autologous-oocyte IVF cycle of only 11.1% in women aged 41–42, 5.2% in women aged 43–44, and only 1.6% in women older than 44 (12).

Though women delay childbearing for many reasons, the conflict between career and pregnancy in the prime reproductive years is among the top reasons—which is particularly poignant for medical students and physicians (13–15). Despite their access to general medical knowledge, female medical trainees remain an at-risk group for delayed childbearing. The small amount of time dedicated to infertility education in both the didactic and clinical years, misconceptions regarding risk factors for infertility and success rates of fertility treatments, and the normalization of postponing pregnancy within the field of medicine are all potential contributing factors. Indeed, studies have demonstrated the infertility prevalence among physicians to be well above the general average (15, 16).

Though attention to the rising prevalence of delayed childbearing has increased over recent years in both the medical and lay communities, a U.S.-based questionnaire specifically addressing fertility, based on current statistics, and validated for use across the spectrum of medical knowledge has never been created. Such an instrument would not only elucidate fertility understanding in the general population but could also be used in research, clinical practice, and medical education to assess fertility knowledge. Therefore, our objective was to construct and validate an instrument to assess fertility and infertility treatment knowledge for use with women in the United States.

MATERIALS AND METHODS

Study Design

The questionnaire, the Fertility & Infertility Treatment Knowledge Score (FIT-KS) was designed as a Web-based survey. Institutional review board approval was obtained through the Albert Einstein College of Medicine. The research team initially brainstormed relevant topics to be included based on prior literature, international surveys and research, and clinical experience. Questions relating to ART success rates used the most recent Society for Reproductive Technology (SART) data, allowing for periodic update of the survey should success rates change in the future (12). The first draft of the survey was then reviewed by an expert panel of 15 reproductive endocrinologists for evaluation of appropriate breadth and depth. The revised survey underwent face validation by 10 laypeople to ensure that the questions were clear in their intent, and that the online survey administration worked smoothly. Consultation regarding study design was also sought with individual experts in the field of test construction.

The finalized instrument consisted of a 29-item general scale, with questions assessing natural fertility (21 items) and infertility treatment (8 items). Demographic information pertaining to age, marital and parental status, geography, ethnicity, faith, education, income, and occupation was also collected. These questions served not only to characterize the population but to allow confirmation that knowledge did not specifically vary by such demographics, for example, as a reflection of regional or other trends in formal sexual education. The survey is included in the [Supplemental Appendix](#) (available online). Participants in the validation phase also completed section 1 of the previously validated General Nutrition Knowledge Questionnaire (GNKQ) to evaluate divergent validity (17). Based on norms in the field of test construction, we aimed to exceed 100 participants in each phase.

Survey Dissemination and Eligible Participants

The survey was uploaded into the RedCAP system, a secure Web-based application designed to support data capture for research studies (18). Recruitment for both phases of the study, as described here, occurred from June to November 2014, and all respondents received a \$20 gift card for their time.

Phase 1 consisted of surveying reproductive-aged women (18–45 years), with additional inclusion criteria of speaking English as a first language and holding primary residence in the United States. The survey was then disseminated via Amazon Mechanical Turk, a forum that can host and disseminate surveys to individuals in the general population who are interested in volunteering as a research participant.

Phase 2 turned to recruitment of female medical trainees, including medical students and house staff pursuing postgraduate training in obstetrics and gynecology. Participants were drawn from two large urban academic medical centers, with potential participants receiving an e-mail describing the study and a link to the RedCAP system for survey completion.

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