

## Factors associated with return for routine annual screening in an ovarian cancer screening program

Michael A. Andrykowski<sup>a,\*</sup>, Mei Zhang<sup>b</sup>, Edward J. Pavlik<sup>c</sup>, Richard J. Kryscio<sup>d</sup>

<sup>a</sup> Department of Behavioral Science, University of Kentucky College of Medicine, Lexington, KY 40536-0086, USA

<sup>b</sup> College of Nursing, University of Kentucky, Lexington, KY, USA

<sup>c</sup> Department of Obstetrics and Gynecology, University of Kentucky, Lexington, KY, USA

<sup>d</sup> Department of Statistics and Department of Biostatistics, University of Kentucky, Lexington, KY, USA

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### Abstract

**Objective.** To identify clinical, demographic, dispositional, and attitudinal variables associated with return for routine, annual transvaginal sonography (TVS) screening for ovarian cancer.

**Methods.** Asymptomatic, average to high risk, women ( $n=585$ ) participating in a free university-based ovarian cancer screening program completed a baseline interview prior to undergoing an initial TVS screening test. During the baseline interview, demographic (age, education, partner status, race), clinical (family history of ovarian cancer), dispositional (optimism, health values), and attitudinal (perceptions of personal risk for ovarian cancer and effectiveness of screening, intentions to return for repeat routine screening, discomfort during screening, satisfaction with the screening process, ovarian cancer-specific distress) information was obtained. Return for repeat screening was documented from screening program records.

**Results.** Results from both multivariate proportional hazards and logistic regression analyses indicated that stated intentions to return for a repeat screening test within the next year was the strongest predictor of return for repeat screening. Possessing  $\geq 12$  years of education was also associated with a greater likelihood of repeat screening in both the proportional hazards and logistic regression analyses.

**Conclusions.** Results provide further support for low education as a risk factor for suboptimal participation in cancer screening. Results also highlight the critical link between intentions to perform a health-protective behavior and subsequent performance of that behavior and suggest that repeat screening could be enhanced by eliciting both an intention to return for annual ovarian cancer screening as well as a specific plan for implementing this intention.

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Ovarian cancer is the fourth leading cause of death due to malignancy in women with an estimated 16,210 deaths in the United States due to ovarian cancer anticipated in 2005 [1]. Early diagnosis is critical to prognosis. While the 5-year survival rate for ovarian cancer diagnosed at a local stage is 94%, 5-year survival declines to 69% for regional disease and 19% for distant disease [1]. However, as ovarian cancer is associated with few reliable signs and symptoms, only a small minority of ovarian cancers (19%) are diagnosed in the localized stage when prognosis is excellent [1].

Given early detection is critical to prognosis in ovarian cancer, development of a screening test for ovarian cancer has been an important research goal. CA-125 bioassay and transvaginal ultrasound (TVS) have been tested, alone and in combination, and have shown value in the early detection of ovarian cancer [2–4]. However, while these data are promising, data from prospective, randomized, controlled trials linking ovarian cancer screening to reduced mortality are lacking at this time. While the ongoing prostatic, lung, colorectal, and ovarian cancer screening trial [5] may clarify the value of ovarian cancer screening, mass screening of asymptomatic women for ovarian cancer is not recommended currently by any professional organization [6]. Nevertheless, preliminary data is promising

\* Corresponding author. Fax: +1 859 323 5350.

E-mail address: [mandry@uky.edu](mailto:mandry@uky.edu) (M.A. Andrykowski).

and suggests that participation in ovarian cancer screening trials is appropriate and critical to identification of the risks and benefits associated with ovarian cancer screening [7].

The effectiveness of any approach to cancer screening is predicated upon appropriate uptake of that screening modality. It is important that screening eligible individuals participate in an initial cancer screening test as well as return for routine, repeat screening at recommended intervals. Unfortunately, it is well known that initial uptake of screening as well as appropriate participation in repeat screening is often far less than 100% across all cancer screening modalities [8]. Consequently, understanding of factors that are associated with uptake of cancer screening is important and can inform efforts to improve participation in cancer screening.

In prior research, initial participation in a program offering free annual TVS screening to asymptomatic, average to high risk women was associated with a family history of ovarian cancer, lower dispositional optimism, and greater ovarian cancer-specific distress, with repeat, routine screening associated with greater education [9–11]. Participation in a TVS screening program for women at high risk for ovarian cancer was associated with worry about ovarian cancer in women with an affected relative [12]. Finally, adherence of intermediate and average risk women to a semiannual screening protocol using CA-125 and TVS was unrelated to age, education, personal or family history of cancer, or perceived ovarian cancer risk [13].

The present study extends our prior research examining factors linked to participation in a free, TVS screening program for asymptomatic, average to high risk women [9–11]. This earlier work focused on factors linked to participation in an initial TVS screening test [9] or examined a limited range of factors associated with repeat screening [10,11]. The aim of the present study was to identify demographic, clinical, and psychosocial variables associated with return for repeat TVS screening after an initial “normal” baseline TVS screening test. Selection of specific variables for examination as potential predictors of repeat TVS screening was based upon both empirical and theoretical considerations. From an empirical standpoint, a review of the general cancer screening literature [8,14,15] identified age, education, health consciousness, and perceived ovarian cancer risk as potentially associated with screening uptake. Review of the ovarian cancer screening literature (see above) suggested additional candidate variables including ovarian cancer-specific distress, family history of ovarian cancer, dispositional optimism, and knowledge of ovarian cancer risk factors [9–11]. From the standpoint of health behavior theory, the Theory of Planned Behavior [16] would posit that stated intentions to return for screening would be a strong proximal indicator of subsequent screening uptake. The Health Belief Model [17] would posit uptake of cancer screening would be positively associated with perceived susceptibility to cancer (i.e., perceived cancer risk) and perception of a favorable cost/benefit ratio associated with cancer screening.

Based upon both the empirical evidence and theoretical analysis described above, we hypothesized a greater likelihood of return for a routine, repeat annual TVS screening test would be associated with sociodemographic (older age, greater

education), clinical (family history of ovarian cancer), dispositional (lower optimism, greater value placed on health, greater monitoring informational coping style), and cognitive/attitudinal variables (greater perceived risk of ovarian cancer, greater intentions to undergo screening in the future, greater perceptions of the efficacy of ovarian cancer screening, reports of less discomfort associated with screening, greater satisfaction with baseline screening experience, greater ovarian cancer-specific distress).

## Method

### Sample

The study sample consisted of new participants in a university-based ovarian cancer screening program [4]. This program provides free, annual TVS screening to all asymptomatic women  $\geq 50$  years of age. Asymptomatic women 25 to 49 years of age can participate in the program if they possess a personal history of breast cancer or a history of ovarian cancer in  $\geq 1$  primary or secondary relative. Eligibility criteria for the current study included the following: (a)  $\geq 25$  years old; (b) no prior TVS screening; and (c) able to read and understand English. Using these criteria, 707 women in a consecutive series were invited to participate between April 2000 and April 2002. Of these, 622 (88%) provided informed consent for participation and underwent an initial TVS screening test. Thirty-seven women subsequently received an abnormal TVS test result and were excluded from study analyses. The remaining 585 women received a normal TVS test result. Standard clinic procedure for these women included a recommendation to return in 1 year for a routine, repeat TVS screening test. Before leaving the screening clinic, all women were given a reminder bookmark card on which the date they were due for their annual, routine screening test was written. Women were asked to schedule a follow-up screening test as soon as 6 months prior to the due date of their follow-up test. Women who had not made an appointment for a follow-up screening test by 5–6 weeks prior to their due date were mailed a reminder card. Both the bookmark and reminder card included a toll-free telephone number that was available for women to schedule their annual follow-up screening test. All women who had scheduled a follow-up screening test received a reminder telephone call 1–2 days prior to their follow-up test.

### Procedure

Upon arrival at the screening clinic, screening clinic staff provided each woman with information regarding the TVS screening test, including information regarding the importance of annual follow-up, and informed consent for the screening test was obtained. No individualized assessment of ovarian cancer risk was routinely provided. Following this, research staff provided each woman with information about current study procedures and informed consent for study participation was obtained. Women completed a baseline assessment consisting of a set of questionnaires, underwent an initial TVS screening test, and completed the TVS Experience Questionnaire (see below) immediately after their TVS screening test. The study protocol was approved by the University of Kentucky Institutional Review Board.

### Study measures

#### Demographic and clinical information

Information regarding age, race, marital status, education, and whether a woman had a first-degree relative previously diagnosed with ovarian cancer was obtained at the baseline assessment.

#### Psychological Distress

The Impact of Events Scale (IES) [18] was used as a measure of ovarian cancer-specific distress. The IES assesses avoidant and intrusive cognition regarding a specific stressor—in this case “the possibility you will develop ovarian cancer in your lifetime.” Coefficient alpha  $> 0.85$  for baseline scores for the IES Intrusion and Avoidance subscales.

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