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Editorial: Cancer screening and “virtuous” health behaviors: the contribution of behavioral economics

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Editorial on the Research Topic

Cancer screening and “virtuous” health behaviors: the contribution of behavioral economics

Cancer screening is a vital component of public health, enabling early detection and improved outcomes for diseases such as colorectal, breast, and cervical cancer (Wender et al., 2018). Despite substantial investments in organized, population-based screening programs, achieving broad participation among eligible individuals remains a significant challenge (Mosquera et al., 2020; Kregting et al., 2022). Understanding the psychological and contextual barriers that prevent people from engaging in screening is essential for improving uptake (von Wagner et al., 2011; Camilloni et al., 2013; von Wagner et al., 2019). Behavioral economics (BE) provides a valuable framework for this purpose, as it recognizes that decisions are influenced by cognitive biases, heuristics, emotions, and social factors, rather than being purely rational (Purnell et al., 2015).

BE has contributed to cancer screening by identifying and addressing predictable patterns of behavior that lead to suboptimal health decisions, such as procrastination, inertia, or avoidance due to fear or misunderstanding (Purnell et al., 2015; Taylor et al., 2022). Interventions informed by BE, often called “nudges,” include strategies like default scheduling (opt-out systems), emotionally resonant or gain/loss-framed messages, timely reminders, and social norm cues (Taylor et al., 2022). These approaches guide behavior without restricting individual freedom and have been shown to increase participation in cancer screening, particularly for colorectal cancer (Taylor et al., 2022; Ahadinezhad et al., 2024).

Default-based interventions were among the most effective, while incentives showed mixed results (Taylor et al., 2022). Social norm messages and reminders have also been effective, especially among previous non-responders (Gorini et al., 2023). However, not all interventions are universally effective, and some studies have reported limited or no impact, highlighting the importance of context and thoughtful design (Taylor et al., 2022).

Most research to date has focused on high-income countries, particularly the United States, indicating a need for more studies in diverse settings (Ahadinezhad et al., 2024). As screening guidelines become more personalized, BE strategies must evolve to address new complexities in decision-making. Health economics also emphasizes the importance of evaluating not only the effectiveness but also the cost-efficiency

and scalability of these interventions (Shih et al., 2022). Advancing this field will require collaboration among behavioral scientists, clinicians, economists, and policymakers to translate insights into practical solutions that improve public health outcomes (Purnell et al., 2015; Shih et al., 2022).

In this Research Topic, six studies adopt an interdisciplinary approach to examine the determinants of participation in cancer screening programs and to evaluate the effectiveness of institutional interventions aimed at promoting these programs.

The first study (Lin et al.) develops and validates a Chinese version of a questionnaire to assess knowledge, attitudes, and practices regarding breast cancer screening among female financial industry workers in Taiwan. An item pool was first created and reviewed by 16 experts to ensure content relevance and coverage. A cross-sectional survey was then conducted with 1,511 participants. Construct validity was examined through correlations with related scales, while internal consistency was measured using Cronbach's α . Factor analysis identified three main components: positive attitudes toward mammography (68.3% of variance), negative attitudes (10.3%), and reasons for not receiving mammography (20.9%). Cronbach's α coefficients indicated acceptable reliability for attitudes (0.91) but lower consistency for knowledge (0.37). Higher scores on positive attitudes and on reasons for not undergoing mammography were significantly associated with past mammography practice, showing clear exposure-response relationships. Overall, the Chinese questionnaire demonstrated strong validity and reliability, offering a useful tool for evaluating breast cancer screening attitudes in this population.

The second study (Stoffel et al.) demonstrates how dynamic social norms messaging, a core insight from BE, can be leveraged to increase screening intentions among individuals with low baseline intentions. The study investigated whether highlighting a positive trend in peer participation in the English bowel cancer screening program could increase screening intentions. Participants ($n = 1,194$) were randomized to receive no normative message, a static social norm (current uptake), a dynamic social norm (increasing participation), or an extended dynamic message (combining both). The analyses found that the extended dynamic message significantly increased screening intentions compared to control. However, none of the interventions affected participants' interest in learning more or their perception of informativeness. While this study provides evidence that dynamic social norms when combined with static uptake information can enhance screening intentions among individuals with initially low intentions, the lack of an effect on behavioral outcomes highlights the limitations of such nudges (Taylor et al., 2022).

The third study (Fu et al.) assesses the cost-effectiveness of colorectal cancer (CRC) screening strategies, with a focus on how colonoscopy acceptance rates shape outcomes. Using a decision-tree Markov model from a societal perspective, the authors compared no screening, a sequential two-step approach (fecal immunochemical test and risk assessment followed by colonoscopy), and direct colonoscopy screening. Results indicate that sequential screening is more cost-effective than direct colonoscopy (USD 19,335 vs. 27,379 per quality-adjusted life year). At current acceptance levels (20.3%), sequential screening could prevent 32.2% of CRC deaths, compared with 17.6% for colonoscopy. However, once colonoscopy acceptance surpasses

37.2%, direct colonoscopy delivers greater health benefits. The findings suggest that sequential screening is well suited for regions with limited resources or for early program phases, while direct colonoscopy becomes preferable as screening uptake grows. Reducing colonoscopy costs emerges as a critical driver of individual willingness to participate.

The fourth study (Otieno et al.) presents a systematic review that explores evidence on the accuracy, acceptability, cost, equity, and uptake of HPV self-sampling compared with provider-sampling in low- and middle-income countries (LMICs). A comprehensive search of six databases identified 124 eligible studies, involving 164,165 women across 23 years. Most were cross-sectional, with fewer randomized, modeling, and cost studies. Findings show that HPV self-sampling is generally well accepted: nearly two-thirds of studies reported high participant preference, while only a small minority favored provider-sampling. Sensitivity and specificity varied widely (37.5–96.8% and 41.6–100.0%, respectively), with limited evidence directly comparing transport methods for self-collected vs. provider-collected samples. Cost analyses suggested that, despite similar laboratory expenses, overall costs were lower for self-sampling. Uptake was higher in most studies assessing it. While equity dimensions such as age, education, and residence were frequently mentioned, their impact remained underexplored. Further research is needed to assess accuracy, logistics, and equity implications to inform scalable HPV screening strategies in LMICs.

The fifth study (Antinyan et al.) examines the impact of introducing a digital portal in an Italian Local Health Unit's cervical cancer screening program. The portal allowed women to manage their appointments online, complementing the traditional phone system. Using administrative data and a difference-in-differences design, the authors compared women with portal access ($n = 870$) to a control group relying solely on phone rescheduling ($n = 768$). Results show that the portal significantly reduced phone-based rescheduling and improved the collection of information on screenings conducted outside the program, as well as on reasons for appointment cancellations. However, it also led to a decline in overall screening participation, largely driven by an increase in unjustified no-shows. These findings highlight the dual role of digital tools: while enhancing program efficiency and data collection, they may inadvertently reduce engagement by fostering behavioral biases such as inattention and procrastination. Complementary strategies, like reminder systems, are needed to sustain participation.

The sixth study (Monroy-Iglesias et al.) investigates the prevalence and predictors of severe anxiety and depression among patients presenting with non-site specific symptoms at the Rapid Diagnostic Clinic (RDC) of Guy's and St Thomas' NHS Foundation Trust in London. Between June 2019 and January 2023, 1,734 patients completed standardized questionnaires (GAD-7 and PHQ-8). Severe anxiety was observed in 13.8% of patients and severe depression in 9.3%. Logistic regression identified consistent risk factors for both conditions: prior mental health conditions, fatigue, weight loss, progressive pain, and symptom duration exceeding 6 months. Machine learning algorithms (random forest and Support Vector Machine-SVM) were compared with logistic regression for predictive performance, with logistic regression and SVM showing the highest accuracy

(86–89%). These findings highlight the psychological burden in patients attending RDCs and underline the value of integrating mental health assessment into diagnostic pathways, both to improve patient care and to support earlier intervention for psychological distress.

Author contributions

MB: Writing – original draft, Writing – review & editing. LC: Writing – original draft, Writing – review & editing. SS: Writing – original draft, Writing – review & editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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