



Original Investigation | Neurology

Association Between Hormone-Modulating Breast Cancer Therapies and Incidence of Neurodegenerative Outcomes for Women With Breast Cancer

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Abstract

IMPORTANCE The association between exposure to hormone-modulating therapy (HMT) as breast cancer treatment and neurodegenerative disease (NDD) is unclear.

OBJECTIVE To determine whether HMT exposure is associated with the risk of NDD in women with breast cancer.

DESIGN, SETTING, AND PARTICIPANTS This retrospective cohort study used the Humana claims data set from January 1, 2007, to March 31, 2017. The Humana data set contains claims from private-payer and Medicare insurance data sets from across the United States with a population primarily residing in the Southeast. Patient claims records were surveyed for a diagnosis of NDD starting 1 year after breast cancer diagnosis for the duration of enrollment in the claims database. Participants were 57 843 women aged 45 years or older with a diagnosis of breast cancer. Patients were required to be actively enrolled in Humana claims records for 6 months prior to and at least 3 years after the diagnosis of breast cancer. The analyses were conducted between January 1 and 15, 2020.

EXPOSURE Hormone-modulating therapy (selective estrogen receptor modulators, estrogen receptor antagonists, and aromatase inhibitors).

MAIN OUTCOMES AND MEASURES Patients receiving HMT for breast cancer treatment were identified. Survival analysis was used to determine the association between HMT exposure and diagnosis of NDD. A propensity score approach was used to minimize measured and unmeasured selection bias.

RESULTS Of the 326 485 women with breast cancer in the Humana data set between 2007 and 2017, 57 843 met the study criteria. Of these, 18 126 (31.3%; mean [SD] age, 76.2 [7.0] years) received HMT, whereas 39 717 (68.7%; mean [SD] age, 76.8 [7.0] years) did not receive HMT. Mean (SD) follow-up was 5.5 (1.8) years. In the propensity score–matched population, exposure to HMT was associated with a decrease in the number of women who received a diagnosis of NDD (2229 of 17 878 [12.5%] vs 2559 of 17 878 [14.3%]; relative risk, 0.89; 95% CI, 0.84–0.93; $P < .001$), Alzheimer disease (877 of 17 878 [4.9%] vs 1068 of 17 878 [6.0%]; relative risk, 0.82; 95% CI, 0.75–0.90; $P < .001$), and dementia (1862 of 17 878 [10.4%] vs 2116 of 17 878 [11.8%]; relative risk, 0.88; 95% CI, 0.83–0.93; $P < .001$). The number needed to treat was 62.51 for all NDDs, 93.61 for Alzheimer disease, and 69.56 for dementia.

CONCLUSIONS AND RELEVANCE Among patients with breast cancer, tamoxifen and steroidal aromatase inhibitors were associated with a decrease in the number who received a diagnosis of NDD, specifically Alzheimer disease and dementia.

JAMA Network Open. 2020;3(3):e201541. doi:10.1001/jamanetworkopen.2020.1541

Key Points

Question Is hormone-modulating therapy associated with neurodegenerative disease in women with breast cancer?

Findings In this cohort study of 57 843 perimenopausal- to postmenopausal-aged women with breast cancer, exposure to hormone-modulating therapy (tamoxifen and aromatase inhibitors, especially exemestane) was associated with a significant decrease in the number of women who received a diagnosis of neurodegenerative disease, most specifically Alzheimer disease.

Meaning With the increased life expectancy seen after treatment, therapy selection for breast cancer should include a careful discussion of the risks and benefits of each treatment option that may be associated with a reduced risk of neurodegenerative disease.

+ Supplemental content

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Do Big 4 Auditors Provide Higher Audit Quality after Controlling for the Endogenous Choice of Auditor?

John Daniel Eshleman and Peng Guo

SUMMARY: Recent research suggests that Big 4 auditors do not provide higher audit quality than other auditors, after controlling for the endogenous choice of auditor. We re-examine this issue using the incidence of accounting restatements as a measure of audit quality. Using a propensity-score matching procedure similar to that used by recent research to control for clients' endogenous choice of auditor, we find that clients of Big 4 audit firms are less likely to subsequently issue an accounting restatement than are clients of other auditors. In additional tests, we find weak evidence that clients of Big 4 auditors are less likely to issue accounting restatements than are clients of Mid-tier auditors (Grant Thornton and BDO Seidman). Taken together, the evidence suggests that Big 4 auditors do perform higher quality audits.

Keywords: Big 4 auditor; audit quality; propensity-score matching; audit quality proxies.

JEL Classifications: M41; M42.

Data Availability: All data are publicly available from sources identified in the text.

INTRODUCTION

One of the earliest theories in the audit literature is that Big 4¹ auditors, due to their larger size and better training programs, provide higher audit quality than other auditors. The argument is that larger audit firms have more reputation to lose by sacrificing their independence on any given audit engagement (DeAngelo 1981). In addition, larger audit firms have

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We thank Donald J. Stokes, two anonymous reviewers, Qiang Cheng, Neil Bhattacharya, Jae Bum Kim, Chee Yeow Lim, Jeff Ng, Tharindra Ranasinghe, Ken Reichelt, Jared Soileau, Yoonseok Zang, and all workshop participants at Singapore Management University. All errors that remain are our own.

Editor's note: Accepted by Donald J. Stokes.

*Submitted: February 2013
Accepted: April 2014
Published Online: April 2014*

¹ We use the term Big 4 to refer to the Big 5 or Big 4 accounting firms.



Occupational status benefits of studying abroad and the role of occupational specificity – A propensity score matching approach

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ARTICLE INFO

Keywords:

Study abroad
International student mobility
Labor market returns
Occupational status
Occupational specificity
Propensity score matching

ABSTRACT

Occupational status benefits of student mobility remain uncertain, despite increasing interest in the implications of international student mobility for the reproduction of societal inequality. Since mobile young people are a selective group in terms of socio-economic and achievement-oriented factors, we apply propensity score techniques to test whether German higher education graduates who did or did not study abroad differ in occupational status (based on the Socio-Economic Index of Occupational Status) three years after graduation. Analyses are based on multi-cohort representative data of the German population (Working and Learning in a Changing World). Results confirm a positively biased effect of mobility on early career occupational status driven by compositional differences. Subgroup analyses show that even when accounting for this bias, occupational status returns to mobility are positive for those graduating in occupationally unspecific fields of study. There are no returns for those graduating in occupationally specific fields of study. Findings also suggest that the effect of studying abroad is not homogeneous across the study population. Individuals less likely to study abroad are at the same time more likely to reap the occupational benefits from this experience.

1. Introduction and research question

As international exchange schemes and fellowships have gained popularity and as the international education market rapidly grew into a ‘multi-billion dollar industry’ (Waters, 2006, 180) different disciplines developed a sustained interest into the characteristics, determinants, and consequences of studying abroad during higher education. Up to now, most research has been driven by the question *who* studies abroad (or who doesn't) closely related to discussions about growing horizontal education-based stratification (Lörz et al., 2016; Triventi, 2013). The group of students studying abroad is highly socially selective in terms of the economic, cultural, and social capital of the students' families (Brooks and Waters, 2010; Netz and Finger, 2016; Gerhards and Hans, 2013).

Given that the share of the population reaching secondary and postsecondary levels of education has increased substantially across the educationally expanding Western world, competitions for privileged positions in society have intensified. It is likely that horizontal characteristics of education such as international mobility become more important erecting new dimensions of social stratification and new types of social inequality (Gerber and Cheung, 2008; Reimer and Pollak, 2010, 427). In fact, the benefits of international mobility are often taken for granted. Being mobile possibly strengthens graduates' skills, resources, and competitive advantage on the job market and for this reason may be valued by individuals as well as potential employers (e.g., Oppen, 1991).

Based on these observations and assumptions, it is essential to figure out whether studying abroad actually yields returns in terms

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