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Breast cancer incidence rates among Orthodox Jewish women

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Abstract

BRCA 1/BRCA2 founder mutations have been documented among Ashkenazi Jews. Little is known about cancer rates and cancer-related health behaviors among an insular subset of this population, Orthodox Jews. The goal of this study was estimate the risk of breast and ovarian among the Orthodox Jewish population. We used geo-coding with SEER data to identify this subgroup and estimate breast and ovarian cancer rates. Relative to neighborhoods with lower estimated Jewish populations, higher breast cancer rates were found in neighborhoods with higher estimated Orthodox Jewish population, there were no comparable differences in ovarian cancer rates. Implications include more research on health behaviors that may contribute to breast cancer in this insular community.

Keywords

health disparities; insular communities; health behaviors; cancer incidence rates

Introduction

The risk of breast and ovarian cancer among Ashkenazi Jews (AJ) is well documented among carriers of founder mutations *BRCA1/BRCA2* genes, which are present in approximately 2.5% of the AJ population [1]. Members of this group are not defined by a shared value or cultural belief system; rather they are a population with shared genetic origins [2, 3]. As intermarriage increases among AJ [4, 5], the rates of hereditary susceptibility to cancer and other conditions may decrease. However, the population of Orthodox Jews, and specifically those considered to be ultra-Orthodox, has steadily grown due to high birth and low intermarriage rates [5]. Ultra-Orthodox Jews in the U.S. are predominately Ashkenazi and have strong shared values and cultural beliefs which lead to the expectation that their high prevalence of *BRCA1/2* mutations will persist. Low cancer screening rates and poor health practices among Ultra-Orthodox Jews have been

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documented [6, 7]. This may be a result of their religious value system, which may include limited interactions with secular society and poor health education [8].

Our goal of this study was to estimate breast and ovarian cancer incidence rates among Orthodox Jews compared to the non-Orthodox population. We used geo-coding to estimate rates in neighborhoods believed to have substantial numbers of Orthodox Jews and compared incidence in those areas to non-Jewish areas. We expected higher breast and ovarian cancer rates in areas with higher concentrations of Orthodox Jews, partly due to the expected higher prevalence of BRCA1/2 mutations.

Methods

Participants and Procedures

We used data on cancer rates derived from the Metropolitan Detroit Cancer Surveillance System (MDCSS), a founding member of the NCI Surveillance, Epidemiology, and End Results (SEER) program. We included all SEER-reportable invasive breast and ovarian cancers diagnosed between 1996 and 2005 among non-Hispanic White women. There are several neighborhoods with predominantly Orthodox Jewish populations in metropolitan Detroit. Orthodox families generally live within very close geographic proximity of one another due to religious practices that prohibit driving on the Sabbath. These areas were defined as the top quartile of census tracts reporting Hebrew and/or Yiddish language spoken in the household in the 2000 census. Age adjusted incidence rates of breast and ovarian cancers for Orthodox census tracts were compared to rates from other census tracts with a lower Jewish population.

We also compared breast and ovarian cancer rates among 11 zip codes with the highest proportions of Jewish households in metropolitan Detroit (based on sampling 1,274 households from the 2005 Detroit Jewish Population Study) to 13 zip codes with low proportions of Jewish households [4]. Crude incidence rates were age-adjusted to the U.S. standard million population using SEER age groupings and 95% confidence intervals were calculated [9]. Figure 1 illustrates the 11 zip codes with the highest proportions of Jewish households.

Results

Table 1 shows age-adjusted invasive breast and ovarian cancer incidence rates for Jewish and non-Jewish dense census tracts and zip codes in metropolitan Detroit from 1996 to 2005. For the census tract method, the calculated age-adjusted breast cancer rate for Jewish areas was 188.9/100,000 (95% CI: 148.6, 241.4), and for the zip code method, 184.8 (CI: 158.2, 216.6). In contrast, the breast cancer incidence rates for non-Jewish areas were 161.7(95% CI: 154.9, 168.7) for the census tract method and 162.5 (95% CI: 139.0, 189.5) for the zip-code method. For ovarian cancer, the age-adjusted incidence rate among Jewish dense census tracts was 20.7 (CI: 8.9, 47.8) and 18.7(CI: 10.833.2) among Jewish dense zip codes. Among non-Jewish areas, the ovarian cancers rates were 19.7 (95% CI: 17.4, 22.2) using the census tract method and 22.3 (95% CI: 14.1, 34.1) using the zip code method.

Discussion

Our goal was to estimate breast and ovarian cancer incidence rates among the Orthodox Jewish population in metropolitan Detroit and to compare rates with non-Jewish areas. There was a higher incidence of breast cancer in neighborhoods that were defined as Jewish and assumed to be mostly Orthodox, based on the relatively high self-reported use of Hebrew and Yiddish in households. However, there were no differences found in rates of ovarian cancer for those neighborhoods. If higher rates of breast cancer were mostly due to a higher prevalence of *BRCA1/2* mutations, then we would expect that comparably higher ovarian cancer rates would also be found. The incongruent results of our analysis suggest the possibility that other factors, relevant to the Orthodox community could affect breast cancer risk. These factors could include poor health habits due to lack of health education, low screening rates, poor dietary habits and higher rates of obesity [6-8].

The time frame of the data used in this study was from 1996-2005. Although the general Jewish population in metropolitan Detroit has declined slightly since that time period [4], the Orthodox Jewish population has steadily increased [10, 11]. Therefore, the results of this study, implicating high risk of breast cancer among Orthodox Jewish women, may be even more important in the future.

A qualification to our conclusion of higher breast cancer incidence rates among the Jewish population is the overlap of the confidence intervals in the reported incidence rates, which may indicate that there is no statistical difference in the rates for Jewish and non-Jewish women. However, given the similarity in the point estimates for both methods, Jewish women may have higher rates of breast cancer than non-Jewish women in metropolitan Detroit.

Another limitation of our analysis is that because we were unable to definitively determine religious affiliations through the SEER registry, we based our estimates of cancer rates for areas with large concentrations of Orthodox Jews on the language reported to be spoken at home (i.e., Hebrew or Yiddish). Given the heterogeneity in the Jewish population and the difficulty in studying insular communities such as Orthodox Jews, these results at best suggest higher breast cancer rates among Jewish communities and indicate that breast cancer is a health problem that needs to be addressed in the Orthodox community. Further population surveys among self-identified Orthodox Jewish women are needed to address cancer rates in this population as well as underlying barriers to good health behaviors.

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Fig. 1.
Zip codes with highest proportion of Jewish households

Table 1

Age-adjusted invasive breast and ovarian cancer incidence rates for Jewish and non-Jewish dense census tracts and zip codes in metropolitan Detroit, 1996-2005

Cancer Site and Method	Number of Cancer Cases	Age-adjusted incidence rate per 100,000	95% confidence interval
Census Tract			
Breast – Jewish	804	188.9	148.6, 241.4
Breast – Non Jewish	21,959	161.7	154.9, 168.7
Ovary – Jewish	88	20.7	8.9, 47.8
Ovary – Non Jewish	2,688	19.7	17.4, 22.2
Zip Code			
Breast – Jewish	1796	184.8	158.2, 216.6
Breast – Non Jewish	1724	162.5	139.0, 189.5
Ovary – Jewish	176	18.7	10.8, 33.2
Ovary – Non Jewish	232	22.3	14.1, 34.1