Consanguinity and the prospect of inheriting breast cancer in Sudanese women

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الخلاص:

المقدمة:

زواج الأقارب هو أحد أشكال الزواج التقليدي في معظم المجتمعات في شمال أفريقيا والشرق الأوسط وغرب آسيا، حيث يشكل زواج الأقارب نسبة تصل إلى 20-50% من جميع الزيجات. و قد يستمر لأجيال عديدة و عليه، تظهر الامراض الوراثية في الأفراد الذين هم نتاج زواج الأقارب و خاصة في الأقارب من الدرجة الأولى و يقال في الأقارب من الدرجة الثانية و الثالثة و رغم ذلك، ليست هناك معلومات عما إذا كان التعرض للأمراض الوراثية في أقارب الدرجة الثانية و الدرجة الثالثة قد يسبىي في أقارب الدرجة الأولى في الأسر التي لديها الزيجات داخل الأسرة تمتد لاجيال طويلة. لذلك، في هذه الدراسة اخننا سرطان الثدي كمثال لفحص قابلية الإصابة بسرطان الثدي عند الأسر التي يمتد فيها زواج الأقارب لأجيال متعدد و لديهم تاريخ عائلي للمرض امتد لأجيال.

الطرق و الوسائل:

أجريت في هذه الدراسة 30 امرأة سودانية مصابية بسرطان الثدي و لها تاريخ عائلي و أقاربها المصابين كانوا من الدرجة الأولى و الثانية و الثالثة كما ان جميع المشتركات في الدراسة أستمر زواج الأقارب لديهن لعدة أجيال.

النتائج:

كان عمر المرشدي 30-75 عام (متوسط العمر 46.8 عام متوسط العمر 46.5 عام). عدد الإناث اللاتي من اقارب الدرجة الأولى و مصابين بسرطان الثدي كانوا 26 (36.4%) مصابين و من أقارب الدرجة الثانية 21 (35%) و أقارب من الدرجة الثالثة 13 (17.2%) ممثلين أجمال عدد أقارب المشتركات في الدراسة.

المناقشة:

بغض النظر عن مدى الزواج ضمن أفراد العائلة المتمدة لاجيال، فإن التعرض لسرطان الثدي في عائلة واحدة يزيد بين الأقارب من الدرجة الأولى و يخفض كما يبعد درجة القرابة. و عليه، هناك حاجة إلى مزيد من الدراسات العائلية، و خاصة في المجتمعات التي يستمر فيها زواج الأقارب لاجيال عديدة. و ذلك لمعرفة النطاق التوريثي للأمراض المورثة بين أقارب قابلية أفراد العائلة الواحد للترحيل في المرض و خاصة سرطان الثدي الذي هو أكثر شيوعا بين الإناث في السودان.
ABSTRACT

Introduction:

Consanguineous marriage is traditional in most communities of North Africa, Middle East and Western Asia, where intra-familial unions collectively account for 20–50+% of all marriages. Most populations that have practiced consanguineous marriage have done so for many generations. Therefore, genetic disease will show in individuals who are products of consanguineous marriage. However, there isn’t information whether susceptibility to a specific genetic disease increases in second degree and third degree relatives equally as first degree relatives in families with prolonged intermarriages that continues through several generation. Therefore, in this study we took breast cancer as an example to examine the susceptibility to breast cancer on highly consanguineous families who has a family history of the disease throughout many generations. Materials and Methods: Patients included were 30 Sudanese women with family history of breast cancer- either first, second or third degree relative- and parental consanguinity described as continuous and prolonged intermarriages for several generations. Age of the patients was 30-75 years old (mean age 46.8 years old median age 46.5 years old). Results: The number of affected women with breast cancer is higher among first-degree relatives’ than with second and third degree relatives [26 (43.3%), 21 (35%)and 13 (21.7%)], respectively. Conclusion: Regardless of the extent of marriage within the same family; susceptibility to breast cancer in one family increases among first-degree relatives and decreases among further extended family members. Further genetic family studies are needed to detect the susceptibility genes to breast cancer among Sudanese.

Keywords: "Breast cancer", "consanguinity", "age of onset", "Sudan"
Introduction:

In many countries, the occurrence of cancer, congenital abnormalities and intellectual disability is significantly higher in offspring of consanguineous than non-consanguineous marriages [1, 2, and 3]. Consanguinity increases the homozygous probability of the disease. Individuals whose parents are related are expected to have an increased proportion of their autosomal genome that is homozygous [4, 5, 6]. Most populations that have practiced consanguineous marriage have done so for many generations [7]. Thus the more closely the parents are related, the greater this effect is expected to be [8]. In general offspring of second degree cousins are expected to have children with 1/64 of their genome homozygous; offspring of first degree cousins, 1/16; offspring of double–first cousins, 1/8; and offspring of incestuous union, 1/4 [9]. Furthermore, in the case of first-cousin offspring, it has been calculated that the average homozygous segment will be 20 cM [10]. This degree of homozygosity is far greater than that seen in apparently outbred populations [11].

Breast cancer is by far the most common cancer in Sudanese women [12]. The reasons for the relatively high rates of cancers of the breast in Sudan are not known. Lifestyle and reproductive factors may have influence [12]. However, the role of genetic factors is also possible due to young age of disease onset, which is less than 50 years old [13, 14].

In this study, taking breast cancer as an example of genetic disease, we aimed to study the effect of inheritance of breast cancer in families with extended intermarriages and
analyze if extended family members with breast are equally as closer family members.

Materials and Methods:

This study consisted of 30 Sudanese women diagnosed with breast cancer and referred for treatment in Radiation and Isotopes Center of Khartoum (RICK) during one-year time (from 2008-2009). All patients have a family history of either first, second or third degree relatives with breast cancer. Patients’ age was between 30-75 years old.

Results:

Total number of family members who has breast cancer was 60 patients. Mean age 46.8 years old median age 46.5 years old. For each family we recorded the degree of relation between the affected members with breast cancer. We found that, the degree of relations between patients and affected family members with first degree relative was higher than with second or third degree relatives with breast cancer [26 (43,3%), 21 (35%) and 13 (21,7%)], respectively (Table; 1).

Table 1: show number of relative affected with different types of cancers.

<table>
<thead>
<tr>
<th>Type of cancer</th>
<th>First degree</th>
<th>Second degree</th>
<th>Third degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer</td>
<td>26 (43,3%)</td>
<td>21 (35%)</td>
<td>13 (21,7%)</td>
</tr>
</tbody>
</table>
Discussion:

Worldwide, about 1,000 million people live in countries where 20% to more than 50% of marriages are consanguineous [6]. In Sudan there isn’t any data on percentage of consanguineous marriage among Sudanese, but it is expected to be high, this is because marriage within the same extended family is favorable and for many years ago, marriage outside the family was stigmatized. This type of marriage usually extends and further generation also inbreeds within the same family mostly among cousins. One of the main indicators of inherited disease is young age at onset. In this study, all patients were of young age (mean age of 46.8 years old). One of the most important factors contributing to the preponderance of tendency of cancer to aggregate in one family is the deep-rooted norm of consanguineous marriages [15, 16]. The impact of consanguinity increases the inbreeding coefficient [17], and increases among first degree relatives, as already observed in this study. Here breast cancer among first degree cousins was higher than second and third degree cousins. This is most probably because genetic materials are more shared among siblings than first degree cousins and less shared with second degree cousins, even though the inbreeding was high among the patients’ families.

Conclusion:

We conclude that, this study had shown strong evidence for the genetic role in breast cancer causation especially in societies with high rate of consanguineous marriages like Sudanese. First degree relative are more susceptible to inherit breast cancer than second and third degree relatives in families with extended intermarriages.
6. References:


