

# Risk of Female Breast Cancer in Lifetime Alcohol Consumption in a Community of Trans Nzoia County, Kenya

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## Abstract

Consumption of alcohol increases the risk of Breast cancer as revealed in many studies. In 2008, cancer killed 7.6 million people worldwide. In Kenya, one in every eight women had the disease with 2, 2000 deaths in 2011. A matched hospital case control study was carried out to estimate the risk of breast cancer among drinkers and nondrinkers in TransNzoia County. One hundred and fifty participants, 50 cases and 100 controls were included and matched for age ( $\pm 2$ ) years and residence (1 case to 2 controls). A questionnaire was administered to participants identified from breast cancer registers. Data was collected and analyzed using SPSS version 20 for descriptive statistics. Chi square was used to test association of alcohol and breast cancer. Alcohol measured as ever versus never with OR of 1.558 ( $p=0.044$ , 95% CI). Odds ratios  $> 0.5$  and 5 grams of use per day among drinkers and nondrinkers being 1.8 ( $p=0.02$ , 95% CI) and 1.0 ( $p=0.06$ , 95% CI) respectively. The OR for the time when an individual began drinking was 1.2 ( $p=0.06$  95% CI) but the risk increased with the period consumed 3.2 ( $P=0.01$ , 95% CI). This study demonstrated an association between alcohol consumption and breast cancer among women alcohol drinkers and non drinker.

**Keywords:** Alcohol, Breast cancer, Case control study

## 1. Introduction

Breast cancer like other cancers is class of disease in which a group of cells display uncontrolled growth with intrusion and destruction of adjacent tissues and sometimes spread to other locations in the body Mophs and Moms, (2011). Breast cancer is one of the leading causes of morbidity and mortality for women worldwide Jemal A, Ward E, Thun MJ,(2007). While communicable diseases still remain the leading killers in many developing countries, the incidence and mortality from non-communicable diseases is rising rapidly which has resulted in a double burden of disease Partin DM et al, (2006). In recent decades, breast cancer incidence has steadily increased in many developing countries while it reached a plateau in developed nations Porter P,(2008). One of the factors responsible for this decrease is the early detection and management of non-invasive and precancerous Breast lesions through screening Petra *et al.*, (2008). In 2005, breast cancer struck an estimated 211,000 women in United States American cancer society, (2005). Also many African countries are also experiencing a rise in morbidity and mortality due to breast cancer. Although Uganda women have a lower incidence of breast cancer than in Canada and Western Europe, the disease rate is rising steadily. It has nearly tripled within a short period of time from 11 per 100,000 in 1962 to 31 per 100,000 in 2006 and it is predicated to become a commonest malignant cancer among Ugandan women within less than a decade Gondos A, Brenner et al, (2005). In Kenya, breast cancer is the most common cancer in women and is second common cancer to cervical cancer Mophs and Moms, (2011). Breast cancer affects young women between 30 years and above 49 years compared to the west where the peak prevalence is between 50 years and 59 years. Kenya among African countries has the highest risk of cancer including female breast cancer Parkin DM, Bray F, Ferlay J, Jemal A. (2012).

Kenya in the year 2000 had an age standardized world rates (ASWR) attributed to breast cancer morbidity of 25.2 per 100,000 women. This was second only to Mauritius (ASWR 33.1 per 100,000 women) among the 16 eastern Africa countries (Regional average 19.5 per 100,000 women). The breast cancer age Standardized mortality rate for Kenya in the same year was 18.1 per 100,000 Women and was the highest for the region [www.dep.iarc.fr](http://www.dep.iarc.fr), (2008).

Although there are several risk factors for developing Breast cancer such as age, female, genetic predisposition and smoking, extensive epidemiological studies have linked alcohol consumption to risk of breast cancer Key JJ, Verkasalo PK, Banks E,(2007). Consumption of alcoholic beverages has also been linked to a large number of health impairments, chronic diseases and death worldwide WHO,(2009). There are two major potential mechanisms that have been postulated by which estrogen increases the risk of breast cancer. The first mechanism is the stimulation of estrogen receptor mediated transcription that results in cell proliferation and the second mechanism is direct carcinogenesis through alcohol consumption metabolic activation and direct binding of DNA Yager JD et al,(2000), Colditz GA, (1998). There is substantial evidence that alcohol consumption increases breast cancer risk. For example, In one pooled analysis of 6 largest cohort studies conducted in Canada, the Netherlands, Sweden and United States of America the risk of breast cancer was found to increase with alcohol intake and cumulative lifetime consumption Gareth and Wowed, (2007). In Kenya, the Government has

developed some interventions aimed at reducing the burden of all cancers that include among others; acquisition of modern facilities, improving access to cancer treatment, promotion of cancer education and awareness and passing of cancer bill which provides policies and guidelines for the management of cancers in the country Kenya National Assembly,(2011). In Transzoia County, crude data from the review of Health information system registry in 2015 showed breast cancer to be the second common female cancer after cervical cancer (16.4%) and (6%) respectively. This was based on a three year unpublished report covering July 2013 and June 2015(Cancer registers, Kitale referral Hospital). These findings also concur with Kenya medical research institute report on newly diagnosed cases of breast cancer in health facilities Mutuma GZ, et al (2006). However, discussions with clinicians indicate that this is underestimated due to lack of efficient population based cancer registries. Therefore this study was carried out to determine the overall risk of breast cancer in alcohol consumption in a community of Trans Nzoia County in Kenya.

## **2. Material and methods**

This was a hospital based case control study involving female alcohol drinkers and nondrinker's residing in Trans Nzoia west, East, Endebess and Sabot Sub-Counties where one case was matched to two controls for age ( $\pm 2$ ) years and by Sub County of residence. Cases were defined as all females with incident of breast cancer confirmed by histology, mammography and radiological methods. Women between 30 years and above were eligible if they attended breast cancer clinics in the study area and controls selected among patients without confirmed breast cancer attending the same health facilities. Alcohol consumption was measured as ever versus never, grams of alcohol per day, age started drinking and total years of drinking. There were 100 potential cases and 250 controls identified, of the potential cases 80 were contacted but only 50 accepted to participate compared to 100 controls that agreed to participate which were then matched with cases identified. Physicians at study sites reviewed inpatient and outpatient medical records for past and current medical history to identify potential study participants. The study was explained to potential participants and those willing to participate were asked to contact investigators who requested them to sign consent form before interviewing them.

### **2.1 Data collection**

Data was collected using a standard questionnaire and key informant interviews. Variables included were demographic information and lifetime residence, and breast cancer risk factors especially alcohol consumption. Questions on alcohol exposure included whether the respondent had ever used alcohol, age started, type of alcohol consumed and number of drinks consumed at a time. The risk of breast cancer was explored by comparing ever versus never drank alcohol.

### **2.2. Statistical analysis**

Logistic regression model for matched case control studies was used in SPSS version 20 program for both univariate and multivariate analyses. Univariate analysis was done by including one independent variable of interest in the model. Multivariate analysis was used to study the association between various measures of alcohol and breast cancer risks and never drinkers were the reference group for risk calculations.

Variables studied as potential confounder included amongst others are marital status, age at first start drinking, type of alcohol consumed, average grams drank per day and total years of alcohol consumption.

## **3. Results**

Forty percent (40%) of the participants came from Trans-Nzoia West sub-county, 30% from Trans-Nzoia East, Endebbes 20% and 10% were from Saboti sub-county. Majority of the participants were aged between 35 – 39 years adding to 34.2%, followed by those aged between 40-44% adding to 26.8%.

**Table 1: Socio-demographic variables**

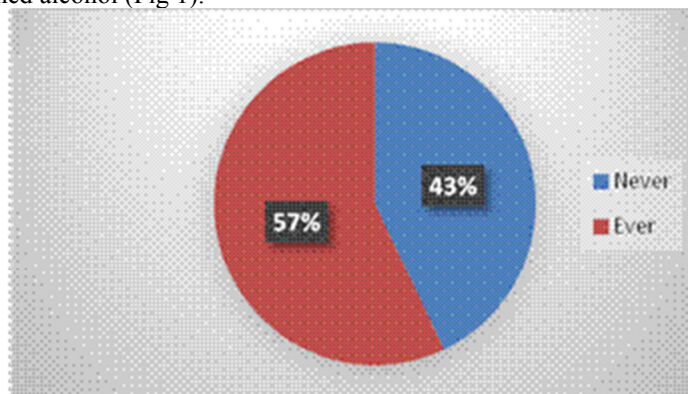
Variables	Frequency	Percent
<b>Study group</b>		
Control	100	66.7
Case	50	33.3
Total	150	100.0
<b>Residence of study participants</b>		
Trans-Nzoia West	60	40.0
Trans-Nzoia East	45	30.0
Endebbes	30	20.0
Saboti	14	10.0
Total	149	100.0
<b>Age of the respondents</b>		
Between 30-34 years	28	18.8
Between 35-39 years	51	34.2
Between 40-44 years	40	26.8
Above 45 years	30	20.2
Total	149	100.0
<b>Religion of the respondents</b>		
Christians	79	53.0
Muslim	44	29.5
Other	26	17.5
Total	149	100.0
<b>Marital status</b>		
Married	72	48.0
Single	48	32.0
Widowed	29	19.3
Total	149	99.3

After adjustment for breast cancer risk factors, the odds ratio for ever versus never drinking was 1.558 (p=0.044, 95% confidence interval at post menopause status. The odds ratios for women who consumed 0-5 grams and >5 grams of alcohol per day was 1.8 (p=0.02, 95% C.I). The OR increases from 1.2 to 3.2 for women who began drinking at the age of 18-24 years and over 25 years respectively (p=0.01, 95% C.I). The risk of breast cancer was significant with the period of alcohol consumption (p=0.022, 95% C.I).The chances of developing breast cancer increases with the increase of average drink in grams. Drinking 1-5 grams of alcohol a day has a risk 1.8 (Table 2).

**Table 2: Drinking and risk of developing breast cancer during pre and post-menopausal status**

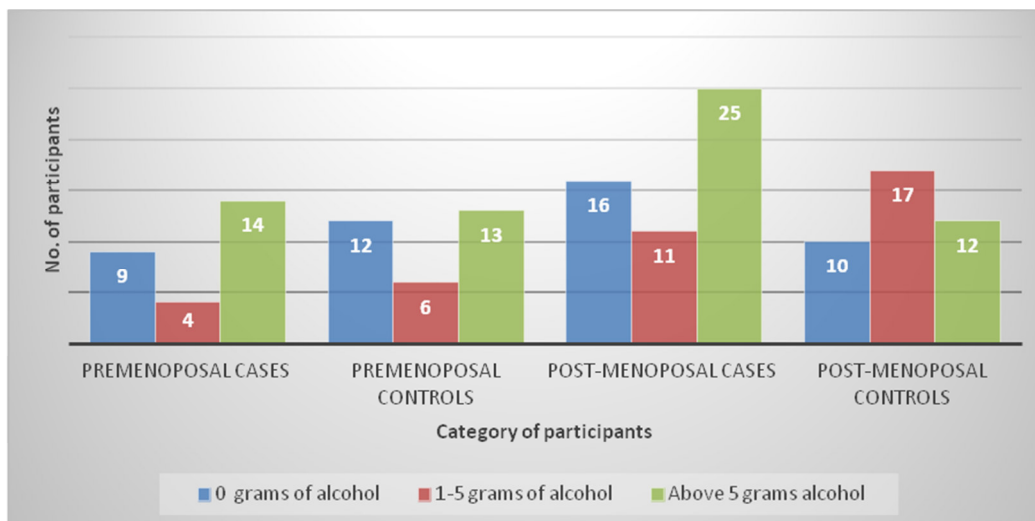
		What is your menopausal status?				Total	OR	P-value
		Pre- menopausal		Post- menopausal				
		Cases	Controls	Cases	Controls			
Have you ever consumed alcohol?	Never	9	14	29	12	64	1.558	0.044
	Ever	18	17	23	27	85		
Total		27	31	52	39	149		
Type of alcohol consumed	Beer	9	6	11	10	36	Ref	0.036
	Spirit	4	5	8	7	27	-	
	Wine	2	3	7	6	18	-	
	Local brew	9	12	19	12	42	1.6	
	Combination	3	5	7	4	26	1.06	
Total		27	31	52	39	149		
If ever above, what is the average drink in grams used per day?		9	12	16	10	47	Ref	.002
	1-5 grams	4	6	11	17	38	1.8	
	Above 5 grams	14	13	25	12	64	4	
Total		27	31	52	39	149		
At what age did you start drinking in years?	Less than 17 years	3	1	5	9	18	Ref	.01
	18-24 years	22	18	20	16	76	1.2	
	Above 25 years	2	12	27	14	55	3.2	
Total		27	31	52	39	149		
How many years have you used alcohol?	Less than a year	8	10	16	19	53	Ref	.022
	1-20 years	19	21	32	12	84	3.33	
	21-40 years	0	0	2	5	7	1.33	
	More than 40 years	0	0	2	3	5	1.5	
Total		27	31	52	39	149		

Majority of the participants (57%) have ever consumed alcohol while 43% of the participants stated that they have never consumed alcohol (Fig 1).



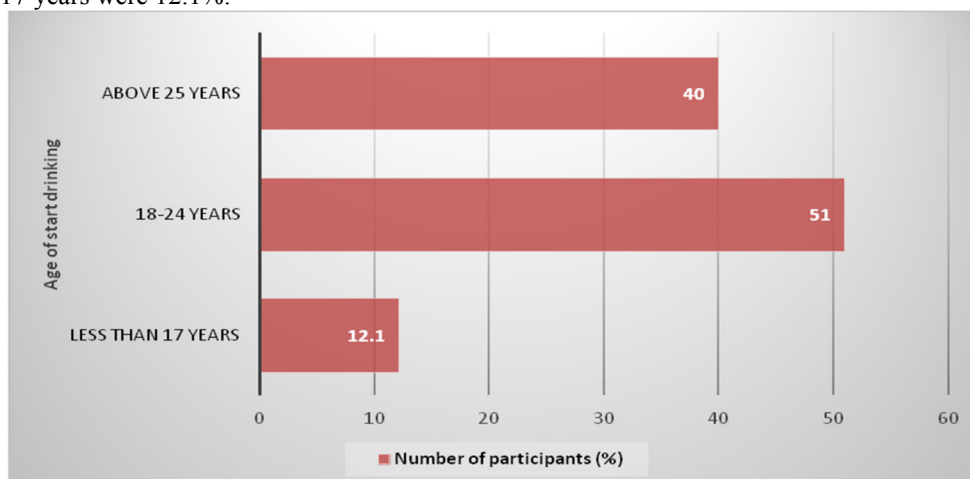
**Figure 1: Consumption of alcohol among participants**

The average drink in grams used per day by drinkers was 1-5 grams with 48.28%, followed by those with 0 grams with 34.48% and those who drank above 5 grams per day with 17.24%.



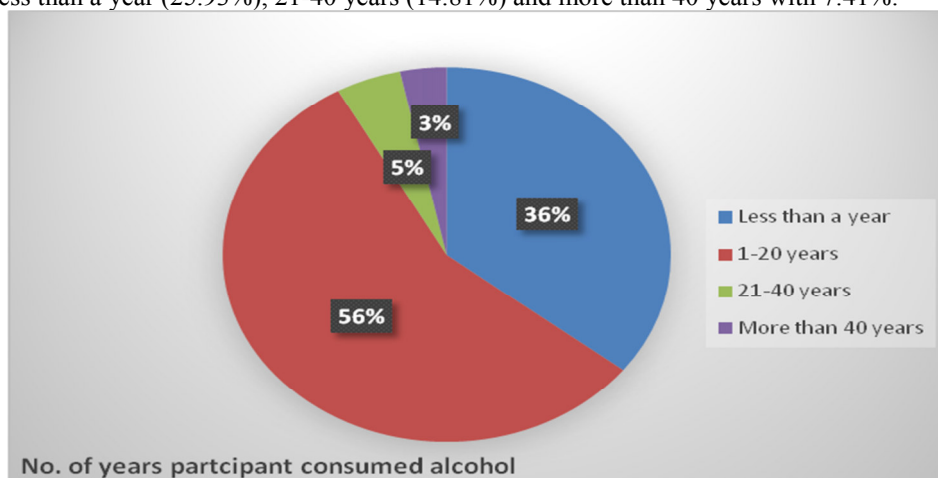
**Figure 2:** Average drink in gram used per day

Majority of the participants (51%) who consumed alcohol started drinking while at the age of 18-24 years, followed by those who started drinking while at the age above 25 years (40%). Those who started drinking at the age 17 years were 12.1%.



**Figure 3:** Age at which participant started consuming alcohol

Majority of the participants (51.85%) stated that they have used alcohol for 1-20 years, followed by those who less than a year (25.93%), 21-40 years (14.81%) and more than 40 years with 7.41%.



#### 4. Discussion

In the current study, 34.2% of the participants were aged between 35-39 years while those aged between 40-44 years were 26.8%. Majority of cases (51.85%) had consumed alcohol for 1-20 years while a few (7.41%) had

taken alcohol for more than 40 years. Several studies have shown that the risk of developing breast cancer increases with age. The older a woman is, the higher the likelihood of getting breast cancer. American Cancer Society, (2015). This also concurs with a study conducted in the U.S targeting Nurses between the age 25 and 42 years showed that alcohol consumption during adolescence and early adulthood is dose-dependently associated with marked increase in the risk of proliferative benign breast disease, which may lead to invasive breast cancer later in life Morch LS, et al, (2007). Our study also showed a dose response relationship between duration of alcohol drinking and the breast cancer risk. This agrees with several studies which found that women who drank for over 20 years had about twice the Odds ratio of being breast cancer cases compared with non-consumers Bowline SJ, et al (1997). Other studies have also observed an inverse relationship between breast cancer risk and drinking greater than 15 grams of alcohol per day compared to nondrinkers (OR=0.66, 95% CI(0.41-1.06 Chen, et al, (2006). Although among the studies which examined the age a woman first started to drink, two found no association between alcohol intake and breast cancer. This could be due to mode of data collection in terms of interviewer administration versus self-reporting Smith, SJ et al, (1994). A study where 80% of information on alcohol and tobacco consumption was analyzed indicated relative risk of breast cancer to be 1.32(1.19-1.42  $p < 0.00001$  for an intake of 33.4 grams per day and 1.46(1.33-1.61,  $p < 0.0001$ ) for >45 grams per day of alcohol. The relative risk increased by 7.1% (95% CI: 5-8.7%,  $p < 0.00001$  for each additional 10 grams per day Bessaoud F, Daures JP, (2008). In the present study, the risk of breast cancer increased by 15% for women who ever drunk alcohol. Women drinking >5.8 g/ day had 24% increased risk but most reports on breast cancer and alcoholic consumption lacked data on duration of drinking and on age when alcohol drinking was first started and it is therefore a potential area for future research.

Several studies found higher risks among those who started drinking at younger ages Liu Y, Tamimi RM, Berkey CS, et al (2012). We cannot rule out; however that heavy drinking at an early age is associated with breast cancer, because we did not measure the amount of drinking at various ages.

In the present study, the risk of breast cancer increased as total years of drinking increased but after 40 years no further increase was seen.

From our result on duration of drinking, it suggested that risk increased as years of alcohol consumed during a women's life increased. This may have occurred because intensity of drinking. (i.e./day) was important contributor to risk not duration. Further studies are therefore needed specifically to separate the effect of intensity and duration of drinking on breast cancer risk per Sub County of residence.

The strength of this study is based on the measures of alcohol consumed by the respondents and a higher participation rate among cases (63%) than controls (40%). Alcohol use in the cases may have been greater compared to controls because of selection bias resulting in a higher OR. While the selection bias for these variables appears to be small, the possibility of biases concerning other characteristics cannot exclude especially among controls.

Cases may have recalled alcohol consumption more accurately than controls. Studies show that retrospective data collection and any associated recall bias for alcohol consumption had minor effects on alcohol reporting and risk estimates as compared to prospectively collected data Baugartners KB, Annegers JF, Samet JM (2002). Interviews were not masked to case control status and may have differentially assessed alcohol exposure between the two groups. At the time data was collected, the association between alcohol and breast cancer was not well recognized and both subjects and interviews were not aware of the hypothesis of this study thus lessened the likelihood of recall bias.

## 5. Conclusion

This study has demonstrated that there is an association between alcohol consumption and the development of female breast cancer in Trans Nzoia County and the risk appeared to increase even at moderate levels of moderate alcohol consumption.

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