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Effect of Heavy Alcohol Consumption on Risk of Prostate Cancer among Middle Aged Men in Port Harcourt, Nigeria

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ABSTRACT

Alcohol consumption is a modifiable lifestyle factor that may affect prostate cancer risk. Alcohol alters the hormonal milieu and contains chemical substances such as flavonoids (red wine), which may alter tumour cell growth. The aim of this study was to investigate the effect of alcohol on prostate-specific antigen (PSA) levels of middle-aged men and prostate cancer risk. A total of 45 male volunteers of 40 to 75 years of age participated in the study. All participants completed a questionnaire on life time alcohol consumption. Analysis was done on 20 samples of moderate alcohol consumers, 20 samples of heavy alcohol consumers and 5 samples of non-alcohol consumers which served as the control. The results were analyzed separately for alcohol consumers and non-alcohol consumers and it was significant. A significant increase in the serum level of prostate specific antigen was observed when heavy drinkers were compared with non-drinkers (P = 0.02) and also, when moderate drinkers were compared with non-drinkers (P = 0.01). There was a significant increase in the serum level of prostate specific antigen when moderate drinkers of 60yrs and above were compared with non-drinkers (P=0.02). No significant increase in the serum level of prostate specific antigen was observed when heavy drinkers were compared with moderate drinkers (p = 0.24). These results suggest that both moderate and heavy consumption of alcohol is a contributor to prostate cancer risk and that the risk increases with increase in age.

Keyword: *Alcohol, Prostate, Cancers, PSA, Risk*

1. INTRODUCTION

Measurement of serum PSA concentration can be an important tool in monitoring patients with prostatic cancer and in determining the potential and actual effectiveness of surgery or other therapies. Recent studies also indicated that PSA measurements can enhance early prostate cancer detection when combined with digital rectal examination (DRE).

Prostate cancer is one of the most common cancers affecting older men in developed and developing countries and a significant cause of death for them [1]. The disease is even more prevalent among blacks, who have the highest rate among 24 countries having reasonably accurate mortality data [2].

As of 2011, prostate cancer is the second most frequently diagnosed cancer and the sixth leading cause of cancer death in males worldwide [3]. Efforts made to get the statistics of new cases and deaths in Nigeria were abortive.

The presence of prostate cancer which is one of the leading causes of death in older men. Prostate specific antigen (PSA), testing increases cancer detection but does not decrease mortality [4]. Obesity, dietary intake, medication, alcohol, elevated blood levels of testosterone, and some other factors may increase the risk of prostate cancer [5]. If diagnosed early, prostate cancer is curable by radical surgery, with very good survival and cure rates. It is against this background that this study seeks to ascertain the effect of heavy alcohol consumption on the PSA levels of middle aged men and to provide a platform for knowledge on the need for screening to reduce the incidence of this disease

2. MATERIALS AND METHODS

2.1 Description of Study Area

The study area was in Port Harcourt Metropolis, the capital of Rivers State. It is located within $4^{o}45N'$ 7^{o} $00'E$ and $4.75^{o}N$ $75^{o}N$ $7^{o}E$. It is bounded on the South by the Atlantic Ocean, to the North by Abia and Imo States; the East by Akwa Ibom State and the West by Bayelsa and Delta States. Rivers State is located in the Niger Delta region. The State is the home of the country's hydrocarbons industry with many other natural resources including timbers, beaches and clay ceramics etc.

2.2 Sample Collection

A total of forty-five (45) samples were collected for this study. Forty (40) samples were collected from middle aged men who consumed alcohol while five (5) samples were collected from middle aged men who do not consume alcohol.

Questionnaires were accepted and completed by the subjects following an explanation of the purpose of the research. Their consent was thus obtained before sample collection. The samples were collected into a 5ml vacutaner from the antecubital veins for PSA analysis

2.3 Determination of Serum PSA

Quantitative determination of prostate specific antigen (PSA) in human serum was done using enzyme linked immunoassay method on a microtiter plate reader with a bandwidth of 10nm and an optical density range of 0 – 2 OD at 450nm wavelength, Stat Fax 2100 by Awareness Technology, USA.

Table 3.1: The mean PSA (ng/ml) values, and p-values of drinkers, heavy drinkers, moderate drinkers and non-drinkers

S/no	*Subject*	*Psa (ng/ml)*	*P-value*	*Remark*
1.	*Drinkers*	*2.09 ± 0.36*		
	Control	*0.84 ± 0.35*	*0.01*	*S*
2.	*Moderate drinkers*	*2.35 ± 0.36*		
	Control	*0.84 ± 0.35*	*0.01*	*S*
3.	*Heavy drinkers*	*1.83 ± 0.44*		
	Control	*0.84 ± 0.35*	*0.02*	*S*
4.	*Heavy drinkers*	*1.83 ± 0.44*	*0.24*	*NS*
	Moderate	*2.35 ± 0.36*		

The comparisons between various categories of alcohol consumption are shown in table 3.1. The PSA value of Drinkers was significantly higher than the control (p=0.01). Similar level significance was observed for Moderate and Heavy drinkers when compared with the control. However there was no significant difference between the PSA level of the Heavy and moderate drinkers (p=0.24)

Table 3.2: The Age ranges mean PSA (ng/ml) values, and p-values of moderate drinkers and non-drinkers.

S/no	*Subject*	*Psa (ng/ml)*	*P-value*	*Remark*
1.	*40 - 49yrs*	*1.13 ± 0.26*	*0.26*	*NS*
	Control	*0.84 ± 0.35*		
2.	*50 – 59yrs*	*1.60 ± 0.46*	*0.11*	*NS*
	Control	*0.84 ± 0.35*		
3.	*≥60yrs*	*4.60 ± 1.55*	*0.02*	*S*
	Control	*0.84 ± 0.35*		

The effect of age was considered in table 3.2. there was no significant difference in the mean PSA values of 40-49yrs and 50-59yrs compared to the control(p=0.26, p=0.11). There PSA value of subjects in age rang ≥60yrs was significantly higher than the control (p=0.02)

DISCUSSION

This work studied the prostate specific antigen (PSA) level of middle-aged men who consume alcohol and the values obtained were compared with the values obtained from apparently healthy individuals used as control subjects. From the

results obtained, there was a significant increase in the serum level of prostate specific antigen of alcohol drinkers when compared with non-drinkers (P=0.01), moderate drinkers when compared with non-drinkers (P = 0.01) and heavy drinkers when compared with non-drinkers (P = 0.02) at 95% confidence level.

These findings are in consonance with the studies conducted in North America and Australia, indicating that men, who drink just two drinks a day, increase their risk for developing prostate cancer by 20%. The scientists also said that the risk increases the more the patients consume alcohol [6]. There is a positive association between total alcohol consumption, moderate alcohol consumption and the risk of prostate cancer and men who maintained or increased their total alcohol consumption during an 11-year period had an approximately two fold increased risk of prostate cancer compared to men with no consumption during the same period [7].

In a related study published in 2001 there is also a small but significant increased risk for men drinking more than 50g/day of alcohol, with a slightly higher risk for men consuming more than 100g/day [8]. However, one study concludes that moderate alcohol consumption increases the risk of prostate cancer [9].

Heavy alcohol consumption and regular heavy drinking were also associated with increased risks of high-grade prostate cancer and makes finasteride ineffective for reducing prostate cancer risk [10].

A meta-analysis of studies published in 2009 found that consumption of only two standard drinks per day increased the cancer risk by 20% [11].

There was no significant increase in the PSA level of heavy drinkers when compared with moderate drinkers (P = 0.24) at 95% confidence level. This could be because, alcohol is the main subject under consideration and both heavy drinkers and moderate drinkers are alcohol consumers.

From the result also, there was no significant increase in PSA level of moderate drinkers whose ages range from 40 – 49 (P = 0.26), 50 – 59 (P = 0.11) when compared with control at 95% Confidence Level but there was a significant increase in the PSA level of moderate drinkers whose ages range from 60 and above when compared with control (P = 0.02) at 95% confidence level.

This could be because, prostate cancer has been known as a disease of elderly men and the risk greatly increases with older age.

There was no significant increase in PSA level of heavy drinkers whose ages ranges from 40 – 49 (P = 0.45), 50 – 59 (P = 0.06), 60 and above (P = 0.11) when compared with control at 95% confidence level.

There are several mechanisms whereby alcohol consumption could influence prostate carcinogenesis. Alcohol itself may be carcinogenic [12], it affects metabolism of carcinogens and suppresses DNA repair [13], it may increase DNA damage due to oxidative stress [14] and at high levels, it impairs immune response and increases the risk of micronutrient deficiencies [15].

Potential limitation of this study include recall bias and under reporting or over reporting of alcohol consumption levels due to social desirability, especially in the higher drinking categories leading

to misclassification of alcohol consumption. However, previous validation studies suggest that self-reported alcohol consumption is reasonably reliable and valid [16].

CONCLUSION

From the biochemical analysis and investigation carried out on the serum level of prostate specific antigen of middle-aged men who consume alcohol, the evidence summarized in this review indicate that there are significant changes on the PSA level of the test group compared to the control. It is important to know that synergistic effect of nutritional factors, oxidative metabolic changes and other factors may play prominent roles in the progression of benign to malignant prostate cancer.

REFERENCE

1. Boring CC, Squires TS, and Tong, T. (2003). Cancer statistics. *Cancer Clinic Journal*,43:7
2. Masko, E.M., Allott, E.H. and Freedland, S.J. (2012). "The Relationship Between Nutrition and Prostate Cancer: Is More Always Better?". *European Urology*, 63 (5), 810–20.
3. Djulbegovic M, Beyth RJ, Neuberger MM, Stoffs TL, Vieweg J and Djulbegovic B (2010). Screening for prostate cancer: systemic review and meta-analysis of randomized controlled trials. *British Medical Journal* 341:4543.
4. Gann PH, Ma J, Hennekens CH, Hollis BW, Haddad JG and Stampfer MJ (1996). Circulating vitamin D metabolites in relation to subsequent development of prostate cancer. *Cancer Epidemiology and Biomarkers Previews.* 5:121–126.
5. Jemal, F. Bray, M.M. Center, J. Ferlay, E. Ward, D and Forman G (2011). Global cancer statistics. *Cancer Journal Clinic*, 61:69-90
6. Howard G. Anderson RT, Russell G, Howard VJ and Burke GL (2000) Race, socioeconomic status, and cause-specific mortality. *Annals of Epidemiology* 10(4):214-223
7. Bagnardi V, Blangiardo M, La Vecchia C and Corrao G (2001). A meta-analysis of alcohol drinking and cancer risk. *British Journal of Cancer*.85:1700–1705.
8. Sesso H, Paffenbarger R and Lee I. (2001). Alcohol consumption and risk of prostate cancer: The Harvard Alumni Health Study. *International Journal of Epidemiology* 30:749-755
9. Zhihong G, Alan RK, Tangen CA, Goodman PJ,Thomson IM (2009). Alcohol consumption finasteride and prostate cancer risk: result from prostate cancer for prevention trials. *Cancer*.
10. Middleton Fk, Chikritzhs T, Stockwell T, Bostrom A, Pascal R (2009). Prevention. *Molecular Nutrition and Food Research*. 53(2);240-55
11. Anderson LM, Carter JP, Driver CL, Logsdon DL, Kovatch RM, Giner-Sorolla A (1993). Enhancement of tumorigenesis by N-nitrosodiethylamine, N-nitrosopyrrolidine and N6-(methylnitroso)- adenosine by ethanol. *Cancer Literature*.68:61–66.

12. Poschl G, Stickel F, Wang XD, Seitz HK (2004). Alcohol and cancer: genetic and nutritional aspects. Proc Nutr Soc.;63:65–71.
13. Dupont I, Bodenez P, Berthou F, Simon B, Bardou LG, Lucas D (2000). Cytochrome P-450 2E1 activity and oxidative stress in alcoholic patients. *Alcohol and Alcohol*. 35:98–103.
14. Lieber CS(1993). Herman Award Lecture, 1993: a personal perspective on alcohol, nutrition, and the liver. *American Journal of Clinical Nutrition*. 58:430–442.
15. Giovannucci E, Colditz G,and Stampfer MJ,(1991). The assessment of alcohol consumption by a simple self-administered questionnaire. *American Journal Epidemiology*. 133(8):810–81