ABSTRACT. Objective. «Ozu» is the name for the alcoholic liquor locally brewed from palm juice. It is the beverage commonly consumed in Ika land, Delta State Nigeria. No documented information is yet available on the health disturbances associated with ozu consumption in Ika Province. This baseline study therefore attempts to report the effect of ozu consumption on blood pressure parameters and body mass index.

Material and Methods. Seven hundred and eighty apparently healthy-looking and most suitable men, who gave their consent were selected after interview.

Results. The results showed that heavy consumption of ozu induced significant increase in blood pressure parameters (systolic blood pressure, diastolic blood pressure, mean arterial blood pressure and pulse rate) in older men (41-60 years) when compared with the age-matched control (non-drinkers) values. Such heavy drinking also reduced body mass index. About 6% of heavy drinkers of ozu between the ages of 41-60 years were underweight, an indication of nutritional disorders. Within the same age bracket (41-60 yrs) about 28%, 35%, 30% and 7% of the heavy drinkers were normotensive, prehypertensive, stage I hypertensive and stage II hypertensive subjects, respectively.

Conclusions. By extension, it can be speculated that heavy consumption of ‘ozu’ may likely elicit cardiovascular and nutritional complications. However, further epidemiological, biochemical and post-mortem investigations are required to convincingly document the effects of ozu consumption. This is imperative in order to advise, and possibly, alert the communities and the lay public of the health implications of consuming ozu.

KEY WORDS: «ozu», blood pressure, body mass index, alcohol consumption.

ÁREA CLÍNICA

Effect of «ozu» consumption on blood pressure parameters

I. ONYESOM a, A.O. NAIHO b AND I.R. ANINYEI b

a Department of Medical Biochemistry. Faculty of Basic Medical Sciences. Delta State University. Abraka. Nigeria.

b Department of Physiology. Faculty of Basic Medical Sciences. Delta State University. Abraka. Nigeria.

Correspondencia: I. ONYESOM.
P. O. Box 144.
Correo electrónico: onyesominno@yahoo.co.uk

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Efecto del consumo de «ozu» sobre la presión arterial

RESUMEN. Objetivo. «Ozu» es el nombre del licor producido a partir del extracto de la palma, una bebida frecuentemente consumida en el territorio de Ika, en el delta de Nigeria. No existe información acerca de las consecuencias para la salud del consumo de ozu en el territorio de Ika. Este estudio pretende analizar el efecto del consumo de ozu sobre la presión arterial y el índice de masa corporal.

Material y métodos. Se han incluido en el estudio 780 voluntarios sanos, varones. Todos los participantes en el estudio firmaron el consentimiento informado.

Resultados. Los resultados del estudio muestran que el consumo excesivo de ozu induce a un incremento significativo de la presión arterial (presión diastólica, presión sistólica y presión arterial media) y de la frecuencia cardíaca en personas adultas (41-60 años) en comparación con personas del mismo rango de edad que no han consumido bebidas alco-
hólicas. El consumo elevado o excesivo de ozu redu-
ce el índice de masa-corporal. Cerca del 6% de los con-
sumidores de ozu entre los 41 y 60 años de edad
presentaban un peso menor al ideal, indicativo de
un trastorno nutricional. Dentro de este rango de
edad (41-60 años), el 28, 35, 30 y 7% de los bebedo-
res excesivos de ozu fueron catalogados, respectiva-
mente, como normotensivos, pre-hipertensivos, hi-
pertensivos estadio I e hipertensivos estadio II.

Conclusions. Se podría especular que el consu-
mo excesivo de ozu pudiera acarrear complicacio-
nes cardiovasculares y nutricionales. Sin embargo,
son precisos posteriores estudios epidemiológicos,
bioquímicos y post-mortem con el fin de documen-
tar con precisión los efectos del consumo de ozu.
Ello es necesario con el fin de aconsejar, y posiblemente
alertar, a la población acerca de las conse-
cuencias para la salud del que consume este licor.

PALABRAS CLAVE: ozu, presión arterial, índice de
masa corporal, consumo de alcohol.

Introduction

In Ika, a small province in the northern part of Del-
ta state, Nigeria, ‘ozu’ refers to the alcoholic liquor
obtained from palm sap. The Ikas like ‘ozu’ for
friendship and so, their socio-cultural activities centre
on its consumption. Individuals engage themselves in
the local production of the wine for private consump-
tion, and those who do not, patronize drinking outlets.
Though, there are no documented data on daily con-
sumption, speculated information obtained from com-
commercial tappers suggest staggering quantity.

Ozu alters the mood of the drinker and gives him
the courage to commit crime, hence deviance beha-
vours are common and increasing in Ika communi-
ties. In these communities the Elders in Council have
constituted local vigilante anti-crime squad to help re-
duce crime wave. Heavy consumption of ozu also ap-
pears to threaten the health of addicts.

Ozu, a highly intoxicating product of fermentation,
obviously contains ethanol, though the amount in the
liquor is yet to be documented. The ingestion of etha-
nol in fairly high amount has been reported to increase
blood pressure\textsuperscript{1,2} and induce hypertension\textsuperscript{3,4}.

In this investigation, we measured blood pressure
parameters and body mass index of light, moderate
and heavy drinkers of ozu in apparent good health,
with the intention of classifying them into the diffe-
rent categories of blood pressure according to current
guidelines\textsuperscript{5}. It is hoped that the baseline data derived
from this research would spark-off intervention stu-
dies, if need be.

Materials and methods

Subjects and Sample Areas

The town crier announced the scheduled meeting
round the community and the congregation that gathe-
red in the community’s hall on the arranged date was
briefed on the aims and objectives of the research. The-
reerer, those who volunteered were interviewed in order
to select the most suitable subjects. Individuals with fac-
tors that could possibly interfere with blood pressure pa-
rameters and alter cardiovascular function were elimina-
ted using information on obesity (body mass index),
occupation, stress, history-limited to first degree relati-
ves, drug use (caffeine, nicotine), diet, physical activi-
ties, life style and habits, obtained from the respondents
during the interview section. The elimination exercise
was important in order to ensure that the changes in blo-
od pressure parameters of the subjects selected were to a
large extent induced by ozu (alcohol) consumption.

Seven hundred and eighty (780) apparently healthy
— looking men were selected from twenty-six (26)
communities in Ika Province of Delta State. Informed
consent was obtained from the enlisted subjects and
their participation was approved by a committee of the
ruling Elders in Council and our Faculty’s Research
and Ethics Committee. The volunteers were then sepa-
rated into two major age categories (21-40 and 41–60
years). Each age bracket was further divided into four
(light: 10.075 ± 0.015 l/day moderate: 0.20 ± 0.10
l/day, heavy > 0.30 l/day and non-drinkers) groups ba-
based on their average daily consumption of ozu.

Measurement of blood pressure parameters

Systolic and diastolic blood pressure, and pulse rate
were measured oscilometrically using an automatic
digital sphygmomanometer (SE – 7000; Seinex Elec-
tronics Ltd., Belfast, UK) in a well – seated position
after about 10 min of rest as previously documented\textsuperscript{6}.
The mean arterial (blood) pressure (MAP) was in turn
estimated mathematically. MAP = \(\frac{1}{3}\) systolic pressu-
re + \(\frac{2}{3}\) systolic pressure. Subjects were then classified
into: normal, prehypertension, hypertension stage I or
II depending on the obtained values for the blood
pressure parameters. The classification was done ac-
cording to current guidelines\textsuperscript{5}.
Measurement of body mass index

Height and weight were measured to the nearest 0.1 cm and 0.1 kg, respectively, by a standard meter rule and weighing balance (Bathroom scale: BR 119; Hana Ltd., Nigeria). These values were used to derive the body mass index, BMI. \[ \text{BMI} = \frac{\text{weight}}{\text{Height}^2} \]. Subjects were then separated into four BMI groups according to National Institute of Health (NIH) Classification criteria.

Statistical analysis

Statistical significance of the differences between the population in the various classes of blood pressure categories was assessed by repeat measure analysis of variance (ANOVA) followed by Dunnett’s test for multiple comparisons and statistical difference was established at the 5% probability level. The EPI computer software package was used.

Table 1 shows the information obtained from the subjects and the various measured values. Older subjects (41-60 years) drinking ozu heavily have higher risk of cardiovascular dysfunction, significantly different \((P < 0.05)\) from the risk of non-drinkers in the same age-range. Thus, heavy consumption of ozu may be a risk factor of essential hypertension and other cardiovascular complications especially among older consumers.

Judging from the classification of BMI data (table 1), heavy consumption of ozu reduces body weight, especially among the 41-60 age (yr) range. This indicates that chronic excessive consumption of ozu may complicate nutrient (energy) metabolism. Light or moderate consumption appears not to have considerable risk in this regard.

Table 1. Some demographic information and classification of 'ozu' drinkers into blood pressure groups based on values obtained

<table>
<thead>
<tr>
<th>21-40 yrs</th>
<th>41-60 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social and demographic information obtained from subjects</td>
<td></td>
</tr>
<tr>
<td>Drinking duration (years)</td>
<td>Non-drinkers (n = 61)</td>
</tr>
<tr>
<td>0-5</td>
<td>51.7</td>
</tr>
<tr>
<td>6-10</td>
<td>32.2</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>22.1</td>
</tr>
<tr>
<td>Smoking status</td>
<td>89.3</td>
</tr>
<tr>
<td>Never</td>
<td>100</td>
</tr>
<tr>
<td>Former</td>
<td>7.1</td>
</tr>
<tr>
<td>1-2 cigarettes/day</td>
<td>3.6</td>
</tr>
<tr>
<td>3-4 cigarettes/day</td>
<td>3.6</td>
</tr>
<tr>
<td>Household income (₦)/month</td>
<td>0-10,000</td>
</tr>
<tr>
<td>10,001-29,999</td>
<td>32.8</td>
</tr>
<tr>
<td>30,000-49,999</td>
<td>54.1</td>
</tr>
<tr>
<td>≥ 50,000</td>
<td>13.1</td>
</tr>
<tr>
<td>Body mass index</td>
<td>Classification of measured data based on recent recommendations</td>
</tr>
<tr>
<td>Underweight</td>
<td>98.4</td>
</tr>
<tr>
<td>Normal weight</td>
<td>1.6</td>
</tr>
<tr>
<td>Overweight</td>
<td>–</td>
</tr>
<tr>
<td>Obese class I</td>
<td>–</td>
</tr>
<tr>
<td>Obese class II</td>
<td>–</td>
</tr>
<tr>
<td>Blood pressure groups</td>
<td>96.7</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>3.3</td>
</tr>
<tr>
<td>Stage I hypertension</td>
<td>–</td>
</tr>
<tr>
<td>Stage II hypertension</td>
<td>–</td>
</tr>
</tbody>
</table>

Values are reported in percentages; *P < 0.05; ₦ is the naira symbol—the Nigerian currency; light drinkers: 0.075 ± 0.015 l ozu/day; moderate drinkers: 0.200 ± 0.100 l ozu/day; heavy drinkers > 0.300 l ozu/day

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Discussion

From this investigation, it appears that heavy consumption of ozu significantly increased blood pressure (cardiovascular) parameters in older drinkers (41-60 years, table 1).

The relationship between chronic ethanol consumption and hypertension has been reported to be solid. This relationship has been observed in white, black and Asian men and women suggesting that it is not unique to a specific group. The demonstrated effect of ozu, an alcoholic beverage, on blood pressure parameters and the associated risk of hypertension appears to further strengthen the reported relationship between alcohol and hypertension among black men. Ethanol and its metabolite, acetaldehyde have been observed to activate the sympathetic nervous system which constricts blood vessels and increase the contractile force of the heart. Numerous epidemiological studies have demonstrated that chronic ethanol consumption is associated with hypertension.

One plausible mechanism recently postulated for this relationship centres around the oxidation of acetaldehyde, the first metabolite of ethanol oxidation. Acetaldehyde oxidation by acetaldehyde dehydrogenase increases mitochondrial NADH/NAD⁺ ratio and this stimulates the respiratory chain in order to re-oxidize NADH and maintain the NAD⁺ redox state. The resulting increase in electron flow along the respiratory chain has been reported to generate reactive oxygen species, which directly react with endothelial nitrogen (II) oxide, NO. The product of the above “destructive” reaction activates xanthine oxidase known to produce uric acid and reactive oxygen species that could further destroy endothelial NO, a potent regulator of blood pressure. The uric acid produced by the stimulation of xanthine oxidase activity, exhibits an increase in juxtaglomerular renin and a decrease in macula densa neuronal NO synthase enzyme activity, and these limit the synthesis and release of NO, further complicating endothelial NO availability. Reactive oxygen species generated during the metabolism of ethanol have also been implicated in the pathogenesis of ethanol-associated cell injury, microvascular changes and even hypertension. Thus, cardiovascular and nutritional (evidence by the proportion of overweight heavy drinkers) disorders may contribute to the ill-health and death of heavy drinkers of ozu. Further research is therefore needed to completely establish facts that would help to alert the public on the inherent dangers of the communities’ permissive behaviour to ozu consumption.

Acknowledgement

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Bibliography