

Dietary Intake Patterns of Alcoholics; A Case Study of Selected Rehabilitation Centers in Kenya

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Abstract

Introduction

Sub-optimal dietary intake patterns have a major detrimental impact on the nutritional status of an alcoholic. These patterns exacerbate the status of alcoholism and the functioning of the alcoholic's body.

Objective

This study aimed to examine alcoholic's dietary intake patterns.

Methods

A cross-sectional study was conducted on 204 alcoholics undergoing alcohol rehabilitation in selected rehabilitation centers. A 24 hour food recall and food frequency questionnaire was used to assess dietary intake of the respondents. Factor analysis of food items and groups, cluster analysis of dietary intake patterns, and multivariate regressions were carried out.

Results

Three dietary intake patterns were identified among alcoholics namely a low calorie intake (described mainly by consumption of plant-based foods); a composite intake (distinguished by adequate consumption of both plant-based and animal-based foods) and a high calorie intake (characterized by high consumption of animal-based foods).

Conclusion

Optimal dietary intake promotion programs are needed to address the dietary intakes of recuperating alcoholics under rehabilitation to help prevent malnutrition and other associated comorbidities.

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Introduction

Alcoholism impacts negatively on health outcomes of abusers, heavy alcohol intakes may also adversely affect the diet and nutrient status of the individual, increasing the risk of malnutrition [1]. Heavy alcohol use may cause primary malnutrition whereby alcohol displaces other nutrients and secondary malnutrition resulting from alcohol interfering with the digestion, absorption, metabolism and utilization of some nutrients [2]. Alcohol intoxication also damages two major organs involved in metabolism and nutrition: the liver and the pancreas. The liver removes toxins from harmful substances. The pancreas regulates blood sugar and the absorption of fat [3]. Damage to these two organs results in an imbalance of fluids, calories, protein, and electrolytes. Many alcoholics present severe malnutrition, as alcohol's metabolic process prevents the body from proper absorption, digestion, and use of essential nutrients. Alcoholics' dietary intake patterns are adversely being influenced by the changing environmental-factors leading to alarming rates of underweight, obesity, higher metabolic risk factors causing diabetes, hypertension, other chronic diseases and hindering effective rehabilitation from alcoholism [4]. Dietary intake patterns of alcoholics undergoing rehabilitation in Kenya's rehabilitation centers have been reported to be inclusive of higher energy dense [5], poor nutrient dense [6], lack of dairy products [7], inadequate fruit and vegetable intake [8], snacking [10], spread of fast food chains [9] and other restaurants (eating out). In general, their diets are higher in fats, cholesterol and refined carbohydrates (increase of energy and fat intake), and low in dietary fibers and polyunsaturated fatty acids per capita [4]. The consumption of fruits, vegetables and complex carbohydrates has decreased due to the harsh economic conditions over the last few decades [10]. Sub-optimal dietary intake patterns amongst alcoholics have resulted in the deficiency of essential nutrients especially during their rehabilitation; with 32% of alcoholics being undernourished and 61% either overweight or obese [11]. This hinders effective rehabilitation from alcoholism and also becomes a threat to the health status of recuperating alcoholics. Both under-nutrition and over-nutrition are prevalent amongst alcoholics

which are related to practice of poor dietary intake patterns as a result of diverse and interrelated factors [10]. The objective of this study was, therefore, to assess dietary intake patterns of recuperating alcoholics by understanding their diet intake with regard to commonly consumed foods groups.

Methods

Study Design

A cross-sectional study was conducted from May-July, 2018 on 204 randomly sampled inpatient alcoholics during their first week of admission in the selected rehabilitation centers. Based on the data of alcoholics' population across various rehabilitation centers, a proportionate sample of 200 alcoholics was targeted to allow for adequate power for bivariate and multivariate analyses to be carried out. Informed consent was obtained for the study; sampled respondents received a preliminary medical examination, detoxification and further medical and psychological assessment before the rehabilitation programme was started. The study was conducted according to the research ethics guidelines laid down by NACADA.

Procedure

Trained research assistants approached the inpatients alcoholics two weeks after admission into the rehabilitation program and explained the study objectives. Those who expressed interest and provided their oral consent were handed a written consent to append their signature as a legal acceptance to participate in the study. A self-administered anonymous questionnaire structured with the following sections; a socio-demographic, anthropometric, dietary intake pattern was administered to the respondents who completed within approximately 30 min. The anonymity of the respondents was guaranteed during the data collection process. Out of 300 distributed questionnaires 204 (68%) were returned to the research assistants, thus the sample size needed for sufficient power to conduct the analyses was met. During their rehabilitation period of three months, respondents were offered cognitive-behavioral treatments, group discussions on sub-optimal dietary intake issues related to alcoholism and educational meetings on impact of optimal dietary intake on alcohol rehabilitation. Further methodological details were presented by authors

elsewhere.

Dietary Intake Assessment

Dietary intake was assessed using food frequency questionnaire where respondents were asked to relate the frequency of consumption and portion sizes of listed foods and beverages. The reference period for the food frequency was the usual dietary intake of the alcoholics before they were admitted in the rehabilitation center. Once returned to the research assistants, the forms were reviewed for completeness. The main section of the FFQ was the listed food and beverage items, with questions of the usual frequency of intakes. To determine scores for components 1-5 (cereals, vegetables, fruits, meat and milk groups), food items from the FFQ was placed in their appropriate food groups. The information collected on dietary consumption allowed to calculate a dietary diversity score over 24 hours. Finally the scores were counted from each food group and respondent dietary diversity scores were calculated based on the FAO guidelines for measuring individual dietary diversity [12].

Data Analysis

Factorial and cluster analyses are two of the most common methods used to analyze common eating patterns which allow for empirical derivation of dietary patterns. Factor analysis analyzes patterns based on inter-correlations between food items/groups, whereas cluster analysis depends on individual differences in mean intakes when reducing data into patterns. Both methods were utilized in this study, with factorial analysis identifying food group patterns based on inter- correlations between food components and cluster analysis allowed for grouping individuals within the sample into mutually exclusive groups based on their adherence to these food group patterns. Empirical methods allow for exploring correlations between derived dietary patterns and various health outcomes. This procedure is shown in the following sections; firstly, an exploratory factor analysis was conducted to identify patterns of habitual food categories consumed by alcoholics. Kaiser–Meyer–Olkin (KMO) index and Bartlett’s Chi- square test of sphericity was used to conduct sample adequacy with the factors of food categories consumption being extracted using the principal component analysis. Factors with Eigen values

higher than one were retained; confirmation of adequacy with a Scree plot was performed and interpretability of the results was taken into account. Items with factor loading ≥ 0.4 were considered as belonging to a factor. Reliability analysis was performed by Cronbach’s alpha values for factors and the total scale. Secondly, a cluster analysis was performed with the identified factor scores reflecting patterns of consumption of food categories using the K-mean method to identify dietary patterns consumed by respondents. This method allowed respondents to be grouped into non-overlapping mutually exclusive clusters reflecting their dietary patterns. Analysis allowed for 30 iterations centering results on zero and convergence was only reached using a three clusters structure, i.e., thus, three different dietary patterns.

Results

Food Categories Consumptions Patterns

The main factors were extracted using factor analysis of the 11 food categories. These factors reflected food categories consumed by the respondents. Kaiser–Meyer–Olken value was 0.751 ($p < 0.001$ for Bartlett’s test of sphericity), denoting the sample adequacy for the analysis. All communalities were higher than 0.3, except for juice, which was subsequently removed from the factor as it did not load adequately on any of the extracted factors. Three factors were then extracted, explaining together 57.31% of the total variance:

- Factor 1 showed high loadings on high calorie foods
- Factor 2 showed high positive loadings low calorie foods
- Factor 3 had high positive loadings on composited foods (Table 1). Moreover, the reliability analysis of the food items gave a moderate value of Cronbach’s alpha (0.537), showing the need for factors segregation. Thus, for the factors described above, reliability was 0.661 for high calorie foods; 0.497 for composite foods respectively.

Dietary Intake Patterns of Alcoholics

As shown in Table 2, the three clusters were labeled as: the “low-calorie” dietary pattern: as it had a strong inverse correlation with factors 1 and a weak but

Table 1. Factor Loadings of Food Categories

| Food categories | Factor 1-High Calorie Foods | Factor 2- Low foods | Factor 3- Composite calorie foods |
|-------------------|-----------------------------|---------------------|-----------------------------------|
| Carbonated drinks | 0.725 | | |
| Fast Foods | 0.711 | | |
| Beverages | 0.701 | | |
| Desserts | 0.689 | | |
| Fruits | | 0.492 | |
| Vegetables | | 0.453 | |
| Rice and pasta | | | 0.782 |
| Grains | | | 0.452 |
| Legumes | | | 0.434 |
| White Meat | | | 0.684 |
| Red Meat | | | 0.848 |

Table 2. Dietary Intake Patterns of Alcoholics

| Factor | Cluster 1- low calorie diet | Cluster 2- Mixed diet | Cluster 3- High calorie |
|-----------------------------|-----------------------------|-----------------------|-------------------------|
| Factor 1-High calorie foods | -0.72 | 0.14 | 0.79 |
| Factor 2- Low calorie foods | 0.25 | 0.77 | -0.66 |
| Factor 3-Composite foods | -0.36 | 0.56 | -0.38 |

positive correlation with factor 2. The “mixed” dietary pattern had the highest scores for factor 2, followed by factor 3 with a low correlation with factor 1. The high calorie dietary pattern had a strongest association with factors 1 and an inverse correlation with factors 2 and 3.

Discussion

In this study, we present findings on the main food categories and dietary patterns practiced by alcoholics’ in Kenya. Eleven main food categories consumed by the study respondents were derived from high calorie, composite and low calorie foods that formed the dietary patterns. The consumption of these food categories was further explored by dividing the respondents into three groups referring to three dietary patterns adopted based on the food categories. Identified dietary patterns in our study were relatively similar to those reported in other studies on alcoholics [3]. According to Mathew [10] three dietary patterns were identified; these were mainly the western, prudent, and traditional, as well as alcohol dietary patterns. Azadbakht [13] showed that alcoholics adopted four similar patterns: fast food and meat, refined grains and cereals, traditional, and alcohol [15]. Furthermore, similar patterns were found among alcoholics in other countries, where “vegetable,” “fruit,” “sweet/salty snack foods,” and “starchy foods” were reported [1], whereas “western,” “traditional,” and “mixed” diets were found [4]. These differences in identified patterns between different studies and settings may be due to numerous environmental-factors including the availability, affordability and access to certain types of foods in addition to the nutrition transition status which requires further research. The dietary patterns we found were adopted differently by alcoholics. Thus these significantly impacts on the alcoholism status and rehabilitation of the respective alcoholic. High and low calorie dietary patterns have been associated with persistent alcohol cravings, increased risk of relapsing after rehabilitation and likelihood of developing chronic diseases [1,3,14,16]. Because alcoholics frequently have poor nutritional status, which is further exacerbated by alcohol’s effects on the body’s metabolism, nutritional approaches are useful in the treatment of recuperating alcoholic [17]. However optimal dietary intake should include a diet

that is balanced, varied and sufficiently compensates for deficits in nutrients, as well as counteracts the alcohol-induced increase in oxidative stress [1]. Several limitations could, however, be stated for this study: reporting bias is possible given that food consumption frequencies were self-reported by respondents. Food consumption may be differentially reported since there is a well-established evidence of underreporting of dietary intakes among females and over-reporting of dietary intakes among males, which may lead to an additional reporting bias [18]. The relationship between dietary patterns and the nutritional status of alcoholics, in addition to other nutritional parameters, remains to be established by appropriate prospective studies [4].

Conclusion

Nutrition promotion programs and evidence-based educational interventions are needed to promote healthy eating amongst alcoholics in an effort to limit related co-morbidities and improve alcohol rehabilitation. Further-more, more importance should be given to exploring dietary patterns rather than the intake of individual nutrients and foods in relation to health of a particular alcoholic. Further research is needed to explore determinants of dietary patterns among alcoholics more importantly, the association between identified dietary patterns and health outcomes.

Competing Interests

The authors declare that no conflict of interests exists.

Authors’ Contributions

All authors were involved with the drafting of the research paper, critically reviewed the manuscript and approved the final version submitted for publication.

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