

Research Article

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*Corresponding Author

OGUNMUYIWA Yusuf Adeleke RDN, Department of Nutrition and Dietetics, Yaba College of Technology, Yaba, Nigeria, P.M.B. 2011, Yaba, Lagos, Nigeria, Tel: +2348054192510, 7030614800, E-mail: yusuf.ogunmuyiwa@yabatech.edu.ng; dietitian.ogunmuyiwa@yahoo.com

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Dietary Management Assessment of Burn Patients Admitted at University College Hospital, Ibadan, Nigeria

OGUNMUYIWA Yusuf Adeleke RD^{1*}, ABDULSALAMI Ahmad Olayinka RD², ADEOSO Abiodun Olaitan RD¹, OGUNMUYIWA Oladoyin Basirat³, OMOJOLA Mosunmola Tolulope RD⁴, OGUNMUYIWA Sumayyah Adebusey⁵, ARIY-IBI Felicia Fogoolorunhan¹, AYEBUSI Temitope Bodunde¹, BRAI Justin¹ and EZENWAKA Chioma⁶

¹Department of Nutrition and Dietetics, Yaba College of Technology, Yaba, Nigeria

²Department of Dietetics, University College Hospital, Ibadan, Nigeria

³Guidance and Counselling Unit, Littletikky School, Ipaja, Lagos State, Nigeria

⁴Phidel College, Lagos State, Nigeria

⁵Star Space School, Ipaja, Lagos State, Nigeria

⁶Department of Nursing Sciences, Tansian University, Anambra State, Nigeria

Abstract

This study assessed the dietary management of burn patients admitted at the University College Hospital, Ibadan. Twelve burn patients admitted at Burn unit of the University College Hospital, Ibadan were purposely selected for the study. Foods such as beans, rice, yam-pottage, bread, yam, beans pudding, amala, vegetables, egg, egg-custard, fish, fortified soy and milk were prepared and served from Dietetics kitchen. Nutritional care record was used to document the quantity of food consumed and converted into daily macronutrients and calorie intake using food composition table. Result revealed that all the twelve patients had the following mean protein and calorie respectively; 149g and 4028kcal; 80g and 2527kcal; 78g and 2948kcal; 171g and 2784kcal; 150g and 2519kcal; 141g and 4193kcal; 101g and 3002kcal; 74g and 2789kcal; 124g and 4432kcal; 104g and 2292kcal; 162g and 3013kcal; 112g and 2919kcal. All the patients with burn injury below 20% Total Burn Surface Area (TBSA) representing 58.3% met their daily protein and calorie intake requirement, while those patients with burn injury above 20% TBSA were not able to meet their protein and calorie requirement over a long period of time.

Keywords: Burns management; Protein & Calorie Adequacy and Pattern of Burns

Introduction

Most burns are due to heat from hot liquids, solids, or fire. Among women in many areas of the world, the risk is related to the use of open cooking fires or unsafe cooking stoves. Alcoholism and smoking are other risk factors. Burns can also occur as a result of self-harm or violence between people [1]. Burns that affect only the superficial skin layers are known as superficial or first-degree burns. They appear red without blisters and pain typically lasts around three days [2,3]. When the injury extends into some of the underlying skin layer, it is a partial thickness or second degree burn. Blisters are frequently present and they are often very painful. Healing can require up to eight weeks and scarring may occur. In a full thickness or third degree burn, the injury extends to all layers of the skin. Often there is no pain and the burn area is stiff. Healing typically does not occur on its own. A fourth degree burn additionally involves injury to deeper tissues, such as muscle, tendons, or bones. The burn is often black and frequently leads to loss of the burned part [4]. Prolonged and persistent hypercatabolism provokes a dreadful cascade of events, including weight loss, constitutive muscle and bone catabolism, growth retardation, immunosuppression, infection, physiologic exhaustion, and possible death. A 10% loss of total body mass leads to immune dysfunction; 20% to decreased wound healing; 30% to severe infections; and 40% to death [5]. In the past, severely burned, catabolic patients would routinely lose up to 25% of their total body mass. Even today, although rare, patients may still develop caloric deficits in the tens of thousands that translate into massive weight losses.

Burn injuries continue to be a major source of mortality and morbidity from trauma in many parts of the world, particularly in the low and middle-income countries. Nigeria, the largest country in Africa, with a population of about 216 million as at 2022, belongs to this category [6]. The available statistical data on burn epidemiology are predominantly hospital based. Burn injuries account for 4.8% of trauma deaths in Nigeria [7] and 6.7% of surgically related deaths [8]. In children, burns and scalds are the fourth commonest cause of trauma after road traffic accidents, accidental falls and bites [9,10].

In South-Western Nigeria, flame accounted for 65 - 71% of burn injuries in Ile-Ife [11]. Flame burn disasters in the recent past have contributed to an increase in the incidence of flame burns. Many such reports were from Southern Nigeria. Disasters have also occurred owing to deliberate damage, the pilfering of gasoline from underground pipelines, and the contamination of kerosene, a common household fuel, gasoline during storage or transportation. Accidents usually occurred while filling up lighted kerosene lamps and cooking stoves, resulting in explosions [12]. Intentional burns are also common cause and occur at high rates in young women, secondary to domestic violence and self-harm [13].

Globally, fire related burns were responsible for 238,000 deaths in the year 2000 and burns were the eighth commonest cause of mortality. Over 95% of fatal fire related burns occurred in low and middle-income countries. Although preventable, burn injuries commonly occur [14]. In developed countries, an estimated 500,000 burn injuries receive medical treatment yearly in the United States [15]. 70% of burns deaths mostly occur in males. The highest incidence of fire burns occurs in those 18–35 years old, while the highest incidence of scalds occurs in children less than five years old and adults over 65 years [2]. Electrical burns result in about 1,000 deaths per year (Edich *et al.*, 2005). Lightning results in the death of about 60 people in a year [15]. In Europe, intentional burns occur most commonly in middle aged men [13].

Overfeeding can augment hyperglycemia, which can be difficult to treat, as both endogenous and exogenous insulin effects are often countered by the surge of catabolic hormones [16]. Attempting to overcompensate by providing excess calories and/or protein is ineffective and likely to increase complications such as hyperglycemia, carbon (iv) oxide retention and azotemia [17]. These complications are not specific to parenteral or enteral feedings but are instead due to overcompensating for the remarkably increased substrate demand experienced by burned patients. A major determinant of outcome for severe burn patients is time to treatment. Any delays in resuscitation lead to poorer outcomes [18]. Acutely, there is significant gut mucosal damage and increased bacterial translocation that collectively lead to decreased nutrient absorption [19,20]. As such, optimal nutrition support for the

severely burned patient is best accomplished by early (within 24 hours after injury) initiation of enteral nutrition [20]. The hypermetabolic and hypercatabolic response after severe burn injury requires an aggressive nutrition replacement [21].

Glucose is important because the burn wound and cellular components of the immune and inflammatory systems are obligate glucose consumers. The administration of carbohydrate is also known to decrease proteolysis [22]. Protein requirements are increased due to increased muscle catabolism, wound losses and tissue repair. Optimal protein administration is essential, since improved survival has been found with high-protein diets [23]. The adverse effects of lipid administration appear to be dose dependent [24] and, as such, over-supplementation should be avoided. It was found that fat supplied at 15% of total energy reduced infectious morbidity and shortened hospitalisation time compared to 35% of energy requirements being derived from fat [25]. The recommended nutrient distribution of macronutrients should be 50 to 60% carbohydrates, 20 to 25% protein, and 20% or less fat [26]. It was found that a high-carbohydrate diet, with 3% fat, 82% carbohydrates and 15% protein, stimulated protein synthesis, increased endogenous insulin production and improved lean body mass accretion compared to an isocaloric-isonitrogenous high-fat diet [27].

This research study hereby assessed the dietary management of burn patients admitted at the University College Hospital, Ibadan and determined the extent to which burn patients meet their daily protein and calorie requirement.

Methodology

Study location

This study was conducted in Burns unit, Accident and Emergency Department, University College Hospital, Ibadan, within Ibadan North Local Government Area of Oyo State, South-Western region of Nigeria.

Study design

This research study was purposive in design

Study population & sample size

All the patients with burns injuries admitted in burns unit of the department of Accident and Emergency, University College Hospital, Ibadan, Oyo State, Nigeria were screened for the study. The numbers of patients involved in this study were determined based on total number of patients seen with a well-documented nutritional care record, Total Burn surface Area, causes of burns, gender and age. Twelve (12) burn patients participated in this study.

Sampling techniques

Purposive sampling procedure was used for the total burn surface area, causes of burn, ages and gender.

Ethical Consideration

Written informed consent was obtained from the study care givers before obtaining any information from their records. Utmost care was taken to maintain privacy and confidentiality.

Data Collection

Data was collected within the period of 8 weeks with the use of nutritional care record to document the daily macronutrients intake and total calorie intake. The exact quantity of foods consumed was documented and converted into nutrients and calorie intake using food consumption table by Akinyele & Oguntona, 1995.

Data analysis

Data was analysed using Statistical Package for Social Sciences (SPSS) version 23. The results were presented using descriptive statistics such as frequency and percentage.

Results
Table 1: Expected and Mean Calorie and Macronutrient intake

CLIENTS	SEX	AGE (YRS)	TBSA (%)	WT AT ADM (Kg)	DAYS FED	ECI (Kcal)	MCI (Kcal)	EPI (g)	MPI (g)	MCI (g)	MFI (g)
1	F	25	51	45	41	4470	4028	198	149	639	99
2	M	8	45	--	31	3255	2527	129	80	377	56
3	M	7.5	17	27	22	1730	2948	78	78	547	58
4	M	59	25	110	21	3950	2784	185	171	288	105
5	F	58	18	87	21	3000	2519	141	150	262	95
6	F	27	15	68	19	2410	4193	113	141	731	78
7	F	29	28	75	18	3460	3002	159	101	493	70
8	M	3	12	14	17	1120	2789	50	74	186	61
9	M	32	2	72	15	2880	4432	78	124	824	71
10	F	13	11	53	12	1830	2292	86	104	314	79
11	M	38	11	65	10	2070	3013	98	162	387	83
12	M	13	5	27	8	890	2919	42	112	477	64

Key note: TBSA: Total Burn Surface Area; WT AT ADM: Weight at admission; ECI: Expected Calorie Intake; MCI (kcal): Mean Calorie Intake; EPI: Expected Protein Intake; MPI: Mean Protein Intake; MCI (g): Mean Carbohydrate Intake; MFI: Mean Fat Intake

Table 2: Pattern of Burn Injury

Mode of burn	Frequency	Percentage
Flame	9	75
Scald	2	16.7
Electrical	1	8.3
Nature of Burn	Frequency	Percentage
Accidental	12	100
Suicidal	0	0
Homicidal	0	0
%TBSA	Frequency	Percentage

<25	8	66.7
25 – 50	3	25
>50	1	8.3
Severity	Frequency	Percentage
Minor (<15%)	5	41.7
Moderate (15-25%)	3	25
Major (>25%)	4	33.3
Age	Frequency	Percentage
0 – 20	5	41.7
21 – 40	5	41.7
41 – 60	2	16.6
Sex	Frequency	Percentage
Male	7	58.3
Female	5	41.7
Comparison	Frequency	Percentage
Clients who met required calorie	7	58.3
Clients who didn't meet required calorie	5	41.7
Clients who met required protein	7	58.3
Clients who didn't meet required protein	5	41.7

Discussion

More than half of the studied patients were male (58.3%) and majority of the burn injuries were caused by flame (75%), which was through accident (100%). The severity of the burn injuries were minor (41.7%). The ages of the burn victims were majorly between 0 – 20 years and 21 – 40 years respectively (41.7%). Within these age groups, under-5 years represent 8.3%, which is lower compared to the previous study stating that under-5 were the commonest age group of burn patients from Port Harcourt (South-Eastern Nigeria) and Zaria (Northern Nigeria), where the under-5 age group was with equal gender distribution [28]. A higher incidence of childhood burn injury was noted in females from Ibadan (South-Western Nigeria), with a female to male ratio of 2:1 and flame

burns accounting for 56.5% of the cases. Flame burns found in this clinical study cut across all ages within this study, Scald was found within the children, while electrical burn was found within the youth. The pattern of injuries is similar to that reported from various other parts of the world [29]. Almost all the burns cases seen in this research study was home-made accident, which represent 91.7%. This correspond with an earlier study on burn which reported that traditionally, most burn injuries occurred in the home was up to 80% [8,30-32] with scald and flame sharing a similar incidence of 49% and 48%, respectively [33]. These domestic accidents commonly occur in toddlers' accidental falling onto hot fluids or naked flame. Domestic burn disasters have however also been reported to occur owing to the adulteration of kerosene, a common domestic fuel with gasoline, which increases its flammability [34,35].

It was seen in this research that more than half of the studied

clients (58.3%) meet up with their protein requirement over an average period of time. This was linked with the level of Total Body Surface Area (TBSA), and majority of the patients (66.7%) had TBSA < 25%. This research shows that all clients with a TBSA below 20% were able to meet up with their protein requirements, which brought about faster recuperation period, rapid wound healing and limit length or period of hospital stay. This is in accordance with a research conducted in Enugu, Nigeria, which results shows that no patient with 20% TBSA or less died in its study but patients with 80% TBSA and above all died [36].

It was observed that less than half (41.7%) of the patients with TBSA above 20% were those who could not meet up with their protein requirement over an average period of time. This could be affiliated to different factors such as financial constraint, taboo, culture and stress response on organs of metabolism. The implication of not meeting up to the required protein could result to a low albumin level, longer period of hospital stay, prolong hyper-metabolism and hyper-catabolism and delay in wound healing etc [36].

About 58.3% of the patients were able to meet up with their calorie requirement over an average period of time. This has been correlated with Total Body Surface Area (TBSA), which

shows that patients with TBSA below 20% were able to meet up with their calorie requirement, while patients with TBSA above 20% in this research were not able to meet up with their required calorie (Jiburum, 2005).

Conclusion and Recommendation

All the patients with burn injury below 20% TBSA, representing 58.3% met their protein and calorie requirement over a long period of time, while those patients with burn injury above 20% TBSA were not able to meet their protein and calorie requirement over a long period of time. All those who met their protein requirement also met their calorie requirement, which shows a direct linear progression between those who met their requirement and those who did not meet their requirement.

It is therefore recommended to all stakeholders involve in public health issue and fire disaster team saddled with the responsibility of disseminating timely and frequent information to disseminate the preventive measure to abate the pandemic disaster of fire burns and other related burns through all possible ways, such as the media, community campaign, the use of postal, handbills and fliers.

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