

Assessment of the Influence of Kitchen Space Quality on the Cooking and Dietary Habits of University Students

¹Adelabu, J.K., ²Amole, D. and ³Suleiman, A. R.

¹Department of Architecture, University of Ilorin, Nigeria. ²Department of Architecture, Obafemi Awolowo University, Ile-Ife, Osun State. ³Department of Urban and Regional Planning, University of Ilorin, Nigeria.

Abstract

The design of students' residential environments facilitates healthy living practices, such as improved nutrition, which plays a key role in health outcomes. This study, conducted through a cross-sectional survey of students residing on campus residence halls in the University of Ilorin, Nigeria, assessed the influence of kitchen space quality on students' cooking and dietary habits to inform the built environment and health research. Four hundred and thirty (430) questionnaire were administered on students residing in twelve (12) residence halls purposively sampled among the twenty (20) residence halls on campus at the time this study was carried out. Primary data was collected through the use of questionnaire and observation schedule. The questionnaire were administered to elicit information on the demographic characteristics of the respondents and their cooking habits in the residence halls while the observation schedule, prepared and filled objectively by the researcher was used to collect information on the residence hall design with

respect to room-kitchen arrangements. Descriptive statistics, chi square and logistic regression analysis was used to analyse the data. The results revealed that gender and level of study influenced the cooking habit of students. It also showed that the quality of the kitchen significantly influenced the cooking habit of respondents. Therefore, the study recommends that architects and property developers concerned with the design and construction of students' residence halls pay more attention to providing and furnishing the cooking spaces in the female residence halls than in the male residence halls. This is because cooking habit was found to be gender sensitive. The study further recommends that the quality of cooking spaces in students' residence halls should be continuously improved so that students will find it convenient to cook thereby, maintaining proper dietary habits.

Key words: Kitchen space, Quality, Cooking habits, Residence hall, University students

1.0. INTRODUCTION

The relationship identified by current research between cooking habits and improved dietary intake makes cooking behavior studies important in recent times. Healthy nutrition promotes wellness and enables students to learn better and earn higher grades due to better memory, alertness, and faster information processing while also preventing diseases (Dodsworth, 2010). The importance of proper nutrition as one of the important aspects of lifestyle has been emphasized and the trend toward healthier diets has increased (Stampfer, Huf, Mansen, Rimm & Willett, 2000).

Previous studies have shown that university students often exhibit poor dietary habits which are strongly influenced by the consumption of poor quality foodstuffs. This is because the university period matches with more freedom and independent responsibility to choose and prepare food, which could have a negative impact on the students' eating behaviours. Many students eat high-calorie food with little nutritional value, which

increases their risk of health problems. Poor dietary habits put students in vulnerable conditions of nutritional risk, possibly accompanied by the onset of chronic diseases and changes in body perception . Unhealthy dietary habits is one of the six top health risk behaviours identified in university students . According to Jones, Conklin, Suhrcke and Monsivais (2014), poor dietary habits are often influenced by non-availability and lack of access to nutritious food, lack of resources necessary to prepare food, lack of time, lack of motivation to live healthy and poor cooking skills.

Self-cooking is the ability to cook or prepare one's food and is known to control food consumption while also providing other health benefits. Ability to cook one's food is important for achieving a healthy balanced diet as well as reduce reliance on takeaway foods and external food providers (MC Lomaire & Lydon, 2011; Thorpe, Kestin, Riddell, Russell & McNaughton, 2012). A higher frequency of self-cooking has also been associated with better dietary quality (Van der Horst, Brunner & Siegrist, 2011). In a study conducted by Larson, Perry, Story and Neumark-Sztainer (2006), young adults who prepared their food regularly were observed to consume fast food less frequently and were more likely to meet dietary recommendations. In a similar study, self-cooking was also found to be associated with increased fruit and vegetable consumption (Crawford, Ball, Mishra, Salmon & Timperio, 2007). Despite the numerous benefits associated with self-cooking, university students, particularly those living on campus residential environment often cook less (Larson, Perry, Story, & Neumark-Sztainer , 2006).

A kitchen is a furnished space for cooking or preparing meals to be taken into the body for growth and development (Hagan, Kwofie & Baissie, 2017). The main activities in the kitchen include food preparation, cooking and storage. Since cooking is one of the major activities that go on in the kitchen, kitchen spaces are also referred to as cooking spaces and for this study, both words shall be used interchangeably. Kitchen space quality describes the physical condition of kitchen spaces that significantly impact users. Quality of kitchen spaces has been studied in terms of indoor air quality (Marc, Śmiełowska, Namieśnik & Zabiegała, 2018), spatial quality (Acre & Wyckman, 2014), design of kitchen work surfaces and storage spaces (Charu, 2014). For instance, Kishtwana, Mathur and Rana(2007) analysed the kitchen work surfaces with set standards among thirty urban homemakers in Palampur. The study revealed the most suitable kitchen counter designs with the least ergonomic cost of work among the sampled respondents. In a similar study, Charu (2014), assessed the level of stress experienced in the use of ergonomically designed kitchen aid among 200 respondents in Ludhiana city. The level of stress recorded was found to be minimal compared to the level of discomfort experienced by the users in a poorly designed kitchen while carrying out most of their kitchen activities. Marc et al, (2018) revealed that the air quality of kitchen spaces is mainly influenced by the method of meal preparation and cultural styles of cooking among other factors.

Studies on the assessment of kitchen spaces in publicly owned university hostels especially in developing countries like Nigeria reveal that students' kitchens are ill equipped

with fittings in poor condition or non-functioning, and many students share kitchen spaces while some others do not even have spaces to cook. This has made it difficult for many of them to feed well in school and as such rely much on junk foods (Oladiran, 2013; Ajayi, Nwosu & Ajani, 2015). For example, Odaudu and Yahaya (2019), assessed the facilities in the male hostels of Kano University of Science and Technology, Wudil. The result of the study revealed that the basic kitchen facilities available were in deplorable condition. In addition, the kitchen spaces were inadequate, making the students resort to cooking in their bedrooms. However, students in privately owned university hostels showed a level of satisfaction with their kitchen facilities (Olukolajo & Mbazor, 2021). Also, Agyekum, Ayarkwa and Amoah(2016) carried out a study on post occupancy evaluation of postgraduate students' hostel facilities and services. The result of the study revealed that students were satisfied with their kitchen facilities.

The above studies show that kitchen facilities are important determinants of satisfaction especially in students' hostels. A gap however, remains in literature as to whether the quality of kitchen spaces affects the cooking habits of students as no study has assessed the quality of kitchen spaces in students' hostels and how it affects their cooking and dietary habits even though much attention should be focused on the dietary habits of young people. This study therefore, aims at assessing the influence of kitchen space quality on the cooking and dietary habits of university of Ilorin students. The University of Ilorin was chosen for this study because there has been an upsurge in the University's physical development in terms of academic, administrative and students' residential facilities due to the increasing number of students' enrolment in recent time. According to the Joint Admission and Matriculation Board (JAMB), the University owned by the federal government is one of the most sought after universities in Nigeria.

2.0. MATERIALS AND METHODS

Study Area

University of Ilorin is situated in the ancient city of Ilorin on latitude 8° 30'N and longitude 4° 32'E and has one of the largest landmass covering approximately 15,000 hectares of land. Ilorin, the capital of Kwara State, is geographically located within the North Central geopolitical zone of Nigeria, where there is a cultural confluence of the North and South. Ilorin has a tropical savanna climate.

University of Ilorin was founded in 1975, and began operation as a University College, affiliated to University of Ibadan. However, it was not until 1976 that the University enrolled her first set of 200 students admitted into three academic faculties: Arts, Science, and Education. The University started off as a mini-campus on a temporary site of the Kwara State Polytechnic campus which later grew to accommodate three more faculties. The University later moved to her permanent site and present location in 1982 with more faculties and facilities. Today, the University has a total of two institutes, fifteen faculties and over sixty departments. The University has witnessed a steady surge in students' enrollment over the years, which has led to a rapid increase in physical development in

academic, administrative, and students' residential facilities. At the time of this study, there were a total of twenty (20) residence halls on the university main campus which comprise of six (6) public (institution owned) hostels and fourteen (14) private residence halls. The University manages the private hostels in public-private partnership with private developers. With a staff population of about 3,500 and student population of over 40,000, a shortage of hostel facilities is still been experienced by students. As a result, the University has only been able to accommodate about 15% of the student population on campus leaving the other 75% to seek for accommodation outside the University (University of Ilorin, n.d).

Study Design, Sampling and Data Collection

The study focused on the on-campus residence halls of undergraduate students in the University of Ilorin. The study adopted a survey research design. Primary data was used and the instrument of data collection were the questionnaire and structured observation schedule. The study population comprised all the students residing in the university campus's private and public residence halls. The sampling method used was multi-stage sampling technique. The first stage involved a purposive sampling of twelve (12) residence halls based on ownership status, gender and residence hall design. The second stage involved a systematic selection of 12% of the population of students in each of the twelve (12) residence halls, with a random selection of the first student in each of the residence halls. A total of Four hundred and thirty (430) copies of questionnaire were administered on the students. Information obtained through the use of the questionnaire included respondents' demographic characteristics (gender, age, level and length of stay in the residence halls) and their cooking habits in the residence halls. The researchers prepared and filled the observation schedule objectively to collect information on the residence hall design with respect to room-kitchen arrangements. Out of the 430 questionnaires administered, 416 copies were retrieved representing a response rate of 97%. Data collected were analysed using descriptive statistics (such as frequency and percentages) and inferential statistics (chi square) tools. Binary logistic regression analysis was employed in testing the relationship between cooking space quality and cooking habits.

3.0. RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

The data collected on demographic characteristics included gender, age, level of study, and respondent's length of stay in residence hall as shown in Table 1. These characteristics were important for the study, because they gave insight into the kinds of students that occupied the residence halls. The results showed that majority of the respondents (72.4%) were females, most of them (79%) were between the ages of 18 and 24 years and were fairly distributed among 100 to 300 levels. In addition, most (62.5%) had lived in their residence halls for at least one session, which implied that they were familiar enough with the residential environment to enable them to supply sufficient information about it.

Table 1: Demographic Characteristics of Respondents (N = 416)

Variable	Frequency	Percentage
Gender		
Male	115	27.6
Female	301	72.4
Age (in years):		
<18	73	17.5
18 - 20	226	54.3
21 - 24	103	24.8
> 25	9	2.2
Level:		
100	111	26.7
200	116	27.9
300	106	25.5
400	72	17.3
>400	10	2.4
Length of stay (in the residence hall):		
< One semester	12	2.9
One semester	22	5.3
<One session	120	28.8
One session	260	62.5

Residence Hall Design

The study examined the design of the residence halls with respect to room-kitchen arrangements. As presented in Table 2, most (67%) of the residence halls selected were the suite type (a room with kitchen en suite); while the others were either shared kitchen (8%); had kitchen per floor design (8%) or had no kitchen space provided in the residence hall (17%). The suite type design was however, the commonest among the residence halls.

Table 2: Residence Hall Design

Variable	Values	Frequency	Percentage
Residence hall design	Suite type	8 hostels	67
	Shared kitchen	1 hostel	8
	Kitchen per floor	1 hostel	8
	No kitchen	2 hostels	17

Assessment of the Quality of Cooking Space

The overall quality of the cooking spaces were rated by the respondents in terms of ventilation, lighting, size of space, availability of storage facilities, availability of washing facilities, safety of food items, hygiene, maintenance, availability of sink, worktops and other kitchen facilities. As indicated in Table 3, the result reveals that 10.6% of the students rated their cooking space as excellent; 20.3% rated it as good; 35.4% rated their cooking space as fair; 22.3% rated their cooking space as poor; while 11.4% rated their cooking space as very poor. It can be deduced from the results that, majority of the students rated the quality of their cooking space as fair. This result suggests that the quality of the cooking space was just average.

The relationship between residence hall design and cooking space quality was examined and found to be significant ($\chi^2 = 98.786$; $df=8$; $p < 0.05$). The result revealed that a larger percentage (35.4% and 21.5%) of the students who lived in the suite type residence halls rated their cooking spaces as good and excellent respectively compared with the students who lived in the kitchen per floor (13.6% and 4.5%) and no kitchen residence halls (8.2% and 2.5%). It can be deduced that the suite type residence halls were rated better than the kitchen per floor and no kitchen residence halls. This may be due to the quality and maintenance of suite-type residence halls' facilities compared with the kitchen per floor residence halls.

Table 3: Respondents Assessment of the Quality of Cooking Space

Quality of cooking space	Frequency	Percentage
Excellent	37	10.6
Good	71	20.3
Fair	124	35.4
Poor	78	22.3
Very poor	40	11.4

Cooking Habit of Respondents

The cooking habit of respondents is presented in Table 4. The data collected on cooking habit included cooking preference, average time spent on cooking daily, meals often cooked, daily cooking frequency, cooking location and perception of cooking convenience in the residence hall.

On cooking preference, the result revealed that majority (61.8%) of the respondents preferred cooking their own meals while the others did not, though they admitted they liked to cook foods. Some of the respondents, however, preferred frozen, quick, microwavable foods (2.4%); some liked cooked food but do not like cooking (12%), while some cooked only when they felt like (23.6%). The results are similar to the findings of

Mitwe and Lihong, (2009). In their study, more than half of the respondents indicated that they cooked their own food compared to those who ate in a restaurant or ordered out their food.

Table 4: Cooking Habit of Respondents

Variable	Values	Frequency	Percentage
Cooking preference	Cooking my own meals	257	61.8
	Frozen, quick, microwavable foods	10	2.4
	I like cooked food but don't like cooking	50	12.0
	Depends on my mood that day	98	23.6
Average time spent on cooking daily	< 10 minutes	23	5.5
	10-20 minutes	99	23.8
	30-45 minutes	188	45.2
	45-60 minutes	74	17.8
	> 1 hour	26	6.2
Meals often cooked	Noodles	89	21.4
	Legumes and cereals	137	32.9
	Solid foods	12	2.9
	All of the above	170	40.9
	Others	3	0.7
Daily cooking frequency	Once	115	27.6
	Twice	247	59.4
	Thrice	17	4.1
	As many times as possible	29	7.0
	Others	5	1.2
Cooking location	In the room	148	35.5
	Kitchen	199	47.8
	On the balcony	48	11.5
	On the corridor	17	4.1
	Others	2	0.5
Perception of cooking convenience in the residence hall	Very convenient	102	24.5
	Convenient	215	51.7
	Difficult	73	17.5
	Very difficult	23	5.5

The relationship between gender and cooking preference was significant ($\chi^2 = 28.168$; $df=3$; $p \leq 0.05$). The result revealed that more females than males (65.4% & 52.6% respectively) preferred cooking their own meals. This suggests that the females cooked their own meals more than the males. This result also agrees with those of Mitwe and Lihong (2009), Da Rocha, De Oliveira and Pereira(2011) and Smith and Popkin (2013) where analysis of cooking habit by gender showed that female students often cooked their own foods than their male counterparts.

As revealed in Table 4, a high proportion of respondents (45.2%) spent an average of 30-45 minutes cooking daily while the others spent an average of less than 10 minutes (5.5%); 10-20 minutes (23.8%); 45-60 minutes (17.8%) or more than 1 hour (6.2%). Many of the respondents cooked noodles, grains and solid foods often (40.9%) while the others cooked mainly noodles (21.4%); grains (32.9%); solid foods (2.9%) or other kinds of food (0.7%). The result also revealed that a high proportion of respondents cooked twice daily (59.4%), while the others cooked once in a day (27.6%); thrice daily (4.1%); as many times as possible daily (7.0%) or at some other frequency (1.2%). The cooking spaces of the respondents was also examined. A high proportion of respondents cooked in the kitchen (47.8%) while others cooked in their rooms (35.5%); on the balcony (11.5%); on the corridor (4.1%); or in other places (0.5%). A chi square test showed a significant relationship between cooking location and residence hall design ($\chi^2 = 4.238E2$; $df=12$; $p < 0.05$). The result revealed that most of the respondents who lived in the suite type residence halls (94.1%) and all the respondents who live in the shared kitchen residence halls (100%) cooked in the kitchen compared to those in the kitchen per floor residence halls (12.1%) and the no kitchen residence halls (0%) who cooked in their rooms, on the balcony or corridor because of the non-availability of well equipped kitchen facility. This finding is in line with that of Odaudu and Yahaya(2019), which revealed that inadequate and poorly equipped kitchen spaces made students resort to cooking in their bedrooms.

On the perception of cooking convenience in the residence halls, a high proportion of respondents (51.7%) reported that cooking in the residence hall was convenient while others perceived cooking in the residence halls as very convenient (24.5%); difficult (17.5%); or very difficult (5.5%). The relationship between the perception of cooking convenience in the residence hall and residence hall design was significant ($\chi^2 = 57.66$; $df=9$; $p \leq 0.05$). The result revealed that most of the respondents who lived in the suite and shared kitchen residence hall types reported that cooking in the residence hall was convenient (92.8 % and 100% respectively) while those in the no kitchen and kitchen per floor residence hall type reported that cooking in the residence hall was difficult (37.9% and 17.2% respectively). This suggests that the facilities provided for cooking in the suite and shared kitchen residence hall type made cooking more convenient for the respondents, compared to the kitchen per floor and the no kitchen residence hall type where these facilities are inadequate and even completely absent respectively.

Influence of Cooking Space Quality on Cooking Habit of Respondents

In order to identify how the quality of cooking spaces in the residence halls influenced and predicted the cooking habits of respondents in the study area, three categorical regression models were designed using binary logistic regression. Logistic regression technique was used **because it could** describe the data and explain the relationship between one dependent **categorical** variable and one or more nominal or ordinal independent variables, which is the case with this study, hence its application. In each of the models, cooking space quality of the residence halls was the independent variable (X_1) or predictor, adjustments were made with the demographic characteristics of the respondents as mediating variables while cooking habit was the dependent variable (Y). Adjustment with demographic characteristics was necessary so as to determine their influence on the relationship between quality of cooking spaces and the cooking habits of the respondents. This included gender, age, and level of study. The dependent variable (cooking habit) was conceptualized as daily cooking frequency, cooking location and perception of cooking convenience in the residence hall. The dependent variable was dichotomized to make them binary variables. This was necessary so as to reveal the degree to which the independent variable would predict the dependent variable. The dichotomized outcome variables were recoded as 1 for the interest (reference category) and 0 for otherwise.

The first model comprised an adjusted model assessing the relationship between quality of cooking spaces (independent variable) and daily cooking frequency (dependent variable). The adjustment variables (demographic characteristics) used included: gender, age and level of study of respondents. The logistic regression model showed that the amount of variance explained by the independent variable was 4% ($R^2 = 0.04$) without adjustment and 10% ($R^2 = 0.10$) with adjustment by demographic characteristics.

Table 5 shows that the respondents' assessment of cooking space quality, gender, and level of study were significant predictors of daily cooking frequency. Cooking once daily was made the reference category. The table reveals that the respondents who gave a good assessment of cooking space were 56.0% (odds ratio =0.44, $p < 0.05$) less likely to cook once daily relative to those who gave a poor assessment of their cooking space. This result suggested that the better the kitchen space quality, the higher the frequency of cooking daily. The table also reveals that the female respondents were 68.0% (OR=0.32, $p < 0.05$) less likely to cook once daily when compared to their male counterparts. This suggested that the female respondents cooked more often daily than the males. This finding is in line with previous studies by Mitwe and Lihong (2009), Leah *et al*, (2011) and Smith *et al*, (2013), where a greater proportion of female compared to male respondents reported that they cooked frequently. The table also shows that respondents in their third year were about three times (OR=2.83, $p < 0.05$) more likely to cook once daily relative to those in their first year. This suggests that respondents in higher levels cooked less often than freshmen. This is expected because of the level of academic work load done by higher level students compared to the freshmen hence the availability of more time to cook often. The first

model revealed that age of the respondents was not a significant predictor of cooking frequency.

The second model comprised an adjusted model assessing the relationship between the quality of cooking space (independent variables) and cooking location (dependent variable). The adjustment variables (demographic characteristics) used included: gender, age, and respondents' level. The logistic regression model showed that the amount of variance explained by the independent variable was 45% ($R^2 = 0.45$) without adjustment and 51% ($R^2 = 0.51$) with adjustment by demographic characteristics. The model as presented in table 5 shows that gender and level of the respondents were significant predictors of cooking location. Cooking in the kitchen was made the reference category. The table reveals that the female respondents were about six times ($OR=5.70$, $p<0.05$) more likely to cook in the kitchen when compared to the male respondents. This could be linked to the previous result that revealed that the female respondents cooked more often than the males. The table also shows that respondents who are above 400 level were 93.0% ($OR=0.07$, $p<0.05$) less likely to cook in the kitchen. This could also be linked to the previous result that revealed that higher-level students generally cooked less than those in the lower levels probably due to their higher academic work load than those in the lower levels. The second model revealed that assessment of cooking space quality and age of the respondents were not significant predictors of cooking location.

The third model comprised an adjusted model assessing the relationship between the quality of cooking space (independent variables) and the respondent's perception of cooking convenience in the residence halls (dependent variable). The adjustment variables (demographic characteristics) used included: gender, age and level of respondents. The logistic regression model showed that the amount of variance explained by the independent variable was 18% ($R^2 = 0.18$) without adjustment and 24% ($R^2 = 0.24$) with adjustment by demographic characteristics. The model as presented in table 5 shows that assessment of cooking space quality and gender of respondents were significantly associated with the respondent's perception of cooking convenience in the residence hall. The table shows that the respondents who gave a good assessment of their cooking space quality were six times ($OR=5.54$, $p<0.05$) more likely to rate cooking in the residence hall as convenient compared to those who gave a poor assessment of cooking space quality. This suggests that a good assessment of cooking space quality was necessary to make cooking convenient. Finally, the table revealed that the female respondents were about three times ($OR=2.52$, $p<0.05$) more likely to rate cooking in the hostel as convenient compared to the male respondents. The third model revealed that the respondents' age was not a significant predictor of respondent's perception of cooking convenience in the residence hall.

Table 5: Adjusted Model on Cooking Habit

Independent Variables	Dependent Variables (Cooking habit)					
	Daily Cooking frequency <i>Reference = cook once</i>		Cooking space <i>Reference = kitchen</i>		Cooking convenience <i>Reference = convenient</i>	
	Odds ratio (OR)	95% CI	Odds ratio (OR)	95% CI	Odds ratio (OR)	95% CI
Quality of cooking space						
Poor	RC		RC		RC	
Good	0.4439*	0.23-0.85	2.1386	0.92-4.98	4.9509**	2.77-11.09
Sex						
Male	RC		RC		RC	
Female	0.3238**	0.17-0.63	5.6984**	2.50-12.97	2.5168*	1.22-5.20
Age						
< 18 years	RC		RC		RC	
18-20 years	0.8379	0.36-1.93	0.6509	0.22-1.90	1.3512	0.48-3.76
21-24 years	0.5159	0.18-1.44	0.7270	0.20-2.68	1.7231	0.53-5.63
25 years & above	0.1838	0.01-2.35	0.7220	0.05-9.73	2.8434	0.20-39.89
Level of study						
100L	RC		RC		RC	
200L	1.2736	0.55-2.97	1.1554	0.42-3.20	0.8684	0.32-2.35
300L	2.8295*	1.20-6.68	0.6478	0.21-2.01	1.0900	0.37-3.18
400L	2.5017	0.93-6.70	0.6397	0.18-2.24	0.5886	0.18-1.89
400+L	1.6085	0.25-10.5	0.0734*	0.01-0.84	0.1695	0.03-1.04
<i>Statistics</i>	<i>Pseudo R²=0.10</i>		<i>Pseudo R²=0.51</i>		<i>Pseudo R²=0.24</i>	

Note: RC=reference category, **= statistically significant at 0.01%, *=statistically significant at 0.05% CI=confidence interval

4.0. CONCLUSION AND RECOMMENDATIONS

As one of the first studies that explored the influence of the quality of cooking spaces in residence halls and the cooking habits of students in a Nigerian University, the study showed that gender and level of study influenced the cooking habit of students. It implies that gender and level of study needs to be importantly considered in studies on students' cooking behaviour. The result of the study also showed that the quality of the cooking spaces (in terms of lighting, ventilation, size, safety, maintenance and availability of sinks, worktops and other kitchen facilities) significantly influenced the cooking habit of students. Therefore, the study recommends that architects and property developers concerned with the design and construction of residence halls pay more attention to providing and furnishing the cooking spaces in the female residence halls than in the male

residence halls. This is because cooking habit was found to be gender sensitive. The study further recommends that the quality of cooking spaces in students' residence halls be continuously improved so that students will find it convenient to cook, thereby maintaining proper dietary habits.

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