PATTERN OF BREAKFAST CONSUMPTION AND ITS PERCEIVED HEALTH BENEFITS AMONG MASTER OF PUBLIC HEALTH STUDENTS IN UNIVERSITY OF IBADAN, OYO STATE, NIGERIA

BY

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DEDICATION

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ABSTRACT

Breakfast is the most important meal of the day as it is known to provide energy and nutrient intake. Several studies have shown that breakfast skipping is common among young adults in Colleges and Universities who often pay little attention to breakfast, with some missing breakfast because it takes too much time to prepare. Few studies have documented pattern of breakfast consumption and its perceived health benefits especially in Nigeria. This study, therefore, investigated the pattern of breakfast consumption and its perceived health benefits among Master of Public Health students in the University of Ibadan.

The study was a descriptive cross-sectional survey that used a two-stage sampling technique to select 212 Master of Public Health students across seven departments in the Faculty of Public Health, University of Ibadan. A pretested semi-structured self-administered questionnaire which contained 8-point knowledge scale, 12-point perception scale, questions relating to factors influencing the pattern of breakfast consumption among students was used for data collection. Knowledge scores 0-4 and >4 were classified as poor and good respectively. Perception scores 0-6 and >6 were also classified as poor and good respectively. The data were analysed using descriptive statistics and inferential statistics such as Chi square and Fisher's Exact Test at $p<0.05$.

Respondents' mean age was 30.5±14.8 years with majority (74.5%) within the ages of 20-29 years, 60.8% of the respondents were females, majority (87.3%) were Christians and 75.9% were single. Few (25.5%) of the respondents had breakfast everyday of the week, while about 74.5% of the respondents skipped breakfast or had infrequent breakfast consumption. A greater proportion (77.4%) of respondents had good knowledge of the perceived health benefits of breakfast consumption. More than half (70.3%) of the respondents had good perception of the health benefits of breakfast consumption. Majority (73.1%) reported that their busy schedules (lack of time) prevented them from consuming breakfast. Less than half (43.4%) did not like to eat early. A few (18.9%) skipped breakfast to lose weight. However, 49.5% consumed breakfast to keep them alert, while 31.1% attributed skipping breakfast to waking up late.

The respondents' knowledge and perception of the health benefits of breakfast consumption was high, yet many skipped breakfast or had infrequent breakfast consumption. Lack of time to prepare breakfast due to early morning lectures was a major hindering factor. Programs to promote breakfast consumption should be encouraged and organised by the faculty administration and the suggestion that lectures should start not earlier than 9.00 am is also valid since this will provide adequate time for having a good breakfast in a relaxed environment.

Keywords: Breakfast consumption, Perceived health benefits, Master of Public Health students, University of Ibadan.

Word count: 437

CERTIFICATION

I certify that this work was carried out by OSITA, Nonso Chinjika in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Oyo State, Nigeria.

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LIST OF ABBREVIATIONS

BDA:	British Dietetic Association
BMI:	Body Mass Index
EAT:	Eating Among Teens
FFA:	Free Fatty Acid
GUTS:	Growing Up Today Study
HBM:	The Health Belief Model
IEC:	Information, Education and Communication
LDL:	Low Density Lipoprotein
LUTH:	Lagos State University Teaching Hospital
MPH:	Master of Public Health
NCI:	National Cancer Institute
NHANES:	National Health and Nutrition Examination Survey
RTEC:	Ready-to-eat Cereal
WHO:	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Breakfast: This is the first meal of the day, eaten before or at the start of daily activities, typically no later than 12noon.

Perceived Health Benefits: This is a person's opinion of the value or usefulness of a new behaviour in decreasing the risk of developing a disease.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Breakfast is the most important meal of the day as it is known to provide energy and nutrient intake (Affenito, Thompson, Barton, Franko, Daniels, Obarzanek, Schreiber and Striegel-Moore, 2005; Matthys, De Henauw, Bellemans, De Maeyer and De Backer, 2007). Breakfast is widely recommended as part of a healthy diet, providing approximately 20% of daily energy requirements (British Dietetic Association, 2010) and has consistently been associated with positive health benefits. The breakfast meal is known to provide key macronutrients and micronutrients in the diet, including B-vitamins, iron and calcium (Ruxton and Kirk, 1997; Chitra and Reddy, 2007; Williams, 2007).

This is reflected in the observation that breakfast skippers tend to have lower nutrient intakes compared to habitual breakfast consumers (Rampersaud, Pereira, Girard, Adams and Metzl, 2005; Matthys et al., 2007; Williams, 2007). Indeed, evidence indicates that breakfast skippers fail to compensate for micronutrients missed at breakfast at mealtimes later in the day (Gibson, 2003). The provision of energy and nutrients throughout the day is extremely important and breakfast has been considered an important dietary factor for energy regulation (Behrens, 2009). For university students, breakfast consumption is associated with a range of positive outcomes, including academic performance, nutrient intake, fitness, and appropriate body weight (Moore, Moore, Tapper, Lynch, Desousa, Hale, Roberts and Murphy, 2007; Hoyland, Dye and Lawton, 2009; Sandercock, Voss and Dye, 2010).

Breakfast omission tends to increase with age after childhood and appears to be most frequent in adolescents and young adults (Barton, Eldridge, Thompson, Affenito, Striegel-Moore, Franko, Albertson and Crockett, 2005). A wealth of data indicate that regular breakfast consumption has also been associated with a healthier body mass index and reduced likelihood of obesity development in adults and children alike (de la Hunty and Ashwell, 2007; Szajewska and Ruszczynski, 2010). It may also be protective of weight gain over time (Ask, Hernes, Aarek, Johannessen, and Haugen,

2006; Albertson, Franko, Thompson, Eldridge, Holschuh, Affenito, Bauserman and Striegel-Moore, 2007). Breakfast skipping has also been associated with other unhealthy behaviours including smoking, infrequent exercise, and frequent alcohol intake in adolescents and their parents (Keski-Rahkonen, Kaprio, Rissanen, Virkkunen, and Rose, 2003), as well as low physical activity levels (Sandercock, Voss and Dye, 2010). Irregular breakfast eating is associated with irregular intake of other meals and a higher percentage of daily energy intake from snack foods eaten between meals (Sjoberg, Hallberg, Hoglund and Hulthen, 2003).

Evidence also suggests that breakfast consumption can enhance cognitive function and academic performance, as well as improve mood (Wesnes, Pincock, Richardson, Helm and Hails, 2003; Widenhorn-Muller, Hille, Klenk and Weiland, 2008; Hoyland, Dye and Lawton, 2009). Breakfast skipping has also been found to be associated with dysmenorrhea among the females (Fujiwara, 2003). On the other hand, intake of breakfast has also been found to be a contributing factor in maintaining weight loss (Wyatt, Grunwald, Mosca, Klem, Wing and Hill, 2002). During these transitional years of adulthood, establishment of healthy lifestyle can have a long lasting impact on their health and the health of their future family. It is important that these adults are educated and reinforced in healthy eating especially breakfast consumption and are able to select healthy choices of food in the future.

Hopefully these healthy eating food habits can be sustained into the future so that problems of chronic diseases such as diabetes mellitus, hypertension and coronary heart disease could be delayed or prevented. All these diseases are lifestyle related where diet plays an important role (Hu, Manson, Stampfer, Colditz, Liu, Solomon and Willett, 2001; Sobngwi, Mbanya, Unwin, Kengne, Fezeu, Minkoulou, Aspray and Alberti, 2004; Lakka and Bouchard 2005; Lindstrom, Peltonen and Tuomilehto, 2005).

1.2 Statement of Problem

Skipping breakfast has been associated with adverse effects on cognitive function (including memory), academic performance, school attendance, psychosocial function, and mood in children and young people (Rampersaud, Pereira, Girard, Adams and Metzl, 2005). Reduced breakfast energy intake is associated with higher

total daily energy intake (Schusdziarra, Hausmann, Wittke, Mittermeier, Kellner, Naumann, Wagenpfeil and Erdmann, 2011) and when breakfast is skipped it can be difficult to properly compensate for it later in the day. For example, those people who skipped breakfast are reported to have higher daily intakes of fat, cholesterol, and energy, and lower intakes of fiber, vitamins, and minerals in comparison to breakfast eaters, thereby increasing the likelihood of gastrointestinal disease later in life (Timlin and Pereira, 2007).

Increased snacking, sedentary lifestyle and obesity have been found to be common among those who skip breakfast than the breakfast eaters (Keski-Rahkonen et al., 2003; Moy, Johari, Ismail, Mahad, Tie and Wan Ismail, 2009). Research has linked the consumption of breakfast with adolescents' mental and physical health (O'Sullivan, Robinson, Kendall, Miller, Jacoby, Silburn and Oddy, 2008; Pearson, Biddle and Gorely, 2009). Factors such as emergence of fast food outlets, shopping malls, convenience stores and high cost of healthy meal has contributed to the unhealthy eating habits among university students (King, Mainous and Geesey, 2007), and lack of knowledge of healthy food choices may negatively affect nutritional status and eating habits (Gan, Mohd, Zalilah and Hazizi, 2011).

University students often pay little attention to breakfast, with some missing breakfast because it takes too much time to prepare (Zeng, Li, Xiong, Su and Wan, 2011). In Nigerian universities, it has been observed that most students lack funds or divert their pocket or feeding money to something of little value or significance and so skip meals including breakfast and there are no central feeding facilities for students in the university campuses, so the students are forced to take responsibility for their feeding (Achinihu, 2009).

1.3 Justification

Previous research on breakfast consumption has focused on comparing breakfast consumption with no breakfast consumption (Lawman, Polonsky, Vander Veur, Abel, Sherman, Beauer and Foster, 2014) rather than the pattern of breakfast consumption and its perceived health benefits. Despite the large volume of literature linking the consumption of breakfast with a generally healthy lifestyle (Ruxton and Kirk, 1997; de la Hunty and Ashwell, 2007), limited information exists that directly relates

breakfast consumption to measures of health and wellbeing. To this end, this study assessed the pattern of breakfast consumption and its perceived health benefits among Master of Public Health (MPH) students in the University of Ibadan, Nigeria. This is because health personnel are important promoters and role models for maintaining a healthy lifestyle for the general population (Boo, Chia, Wong, Chew, Chong, Loo, 2010).

Early in 1999, the World Health Organization (WHO) endorsed the position that physicians, as role models of healthy living, should not overlook their own lifestyle habits. University and college arenas represent the final opportunity for health and nutritional education of a large number of students with the object of ensuring the development of a healthy lifestyle that can be subsequently promoted after they graduate and enter the health care profession (World Health Organization, 1999; Sakamaki, Toyama, Amamoto, Liu, Shinfuku, 2005).

1.4 Research Questions

1. What is the level of knowledge of MPH students on breakfast consumption and its perceived health benefits in the University of Ibadan?
2. What is the perception of MPH students on breakfast consumption and its health benefits in the University of Ibadan?
3. What is the frequency of breakfast consumption among MPH students in the University of Ibadan?
4. What are the factors influencing the pattern of breakfast consumption of MPH students in the University of Ibadan?

1.5 Broad Objective

- To investigate the pattern of breakfast consumption and its perceived health benefits among MPH students in the University of Ibadan.

1.6 Specific Objectives

1. To assess the level of knowledge of MPH students on breakfast consumption and its perceived health benefits in the University of Ibadan.

2. To determine the perception of MPH students on breakfast consumption and its health benefits in the University of Ibadan.
3. To determine the frequency of breakfast consumption among MPH students in the University of Ibadan.
4. To identify the factors influencing the pattern of breakfast consumption of MPH students in the University of Ibadan.

1.7 Research Hypotheses

1. There is no significant relationship between the level of knowledge of the perceived health benefits of breakfast consumption and the frequency of breakfast intake among MPH students in the University of Ibadan.
2. There is no significant relationship between the perception of the health benefits of breakfast consumption and the frequency of breakfast intake among MPH students in the University of Ibadan.
3. There is no significant relationship between the level of knowledge of the perceived health benefits of breakfast consumption and the perception of the health benefits of breakfast consumption among MPH students in the University of Ibadan.
4. There is no significant relationship between the socio-demographic characteristics and the frequency of breakfast intake of MPH students in the University of Ibadan.

CHAPTER TWO

LITERATURE REVIEW

2.1 Defining "Breakfast" and Potential Benefits

Although definitions of breakfast often vary in time of day, types of food or composition of the meal eaten, breakfast is a unique meal because it is the time when prolonged fasting cease, hence its name "breaking the fast." (Rabinovitz, Boaz, Ganz, Jakubowicz, Matas, Madar, and Wainstein, 2014). Some working definitions have been proposed such as breakfast being the first meal of the day, eaten before or at the start of daily activities (e.g., errands, travel, work), within 2 hours of waking, typically no later than 10 am (Giovannini, Verduci, Scaglioni, Salvatici, Bonza, Riva and Agostoni, 2008) and of a calorie level between 20% and 35% of total daily energy needs (Timlin and Pereira, 2007) which includes dairy products, cereals, fruit and healthy fats (Monteagudo, Palacin-Arce, Bibiloni Mde, Pons, Tur, Olea-Serrano and Mariscal-Arcas, 2013), but there is no single, universally agreed-upon or evidence-based definition. Most observational studies rely upon individual participants' perception of breakfast rather than using a standardized definition across individuals. Based on current information, it may be that eating anytime in the morning is key (Rabinovitz et al., 2014).

Breakfast consumption has been related to improvement in mood, such as contentment (Wesnes et al., 2003), motivation to learn/concentrate (Hoyland et al., 2009), and overall cognitive functioning (Mahoney, Taylor, Kanarek and Samuel, 2005). Breakfast facilitates optimal growth and development through contributing to nutritional adequacy and enhanced dietary profiles, (Ruxton and Kirk, 1997; Dubois, Girard, Potvin Kent, Farmer, and Tatone-Tokuda, 2009; Szajewska and Ruszczynski, 2010). Compared with children who skip breakfast, eaters are more likely to consume nutrient-dense "breakfast foods" such as milk, cereal and fruits. In addition, breakfast skippers are more likely to use nutrient supplements (Keski-Rahkonen et al., 2003).

Eating breakfast has generally been associated with a total improvement in food choices (such as increased consumption of milk and vegetable and decreased consumption of soft drinks and French fries) amongst children and adolescents in the

US, such that breakfast skippers have been found to be more likely to have diets defined as poor or inadequate. Breakfast skipping has also been linked with increased snacking, and particularly an increase in the intake of high fat snacks (Rampersaud et al., 2005).

Rampersaud et al., (2005) also stated that breakfast eaters appeared to have a higher total energy daily intake of energy compared with breakfast skippers, suggesting that the breakfast skippers did not consume more calories at the other mealtime in an attempt to compensate for the breakfast deficit. This was particularly true amongst female adolescents. Berkey, Rockett, Gillman, Field and Colditz, (2003) had similar findings in that children who reported that they never ate breakfast, maintained lower energy intakes than those who ate breakfast on a daily basis. Breakfast eaters were more likely to have higher daily intakes of total carbohydrate, protein, fat, and saturated fat, while daily fat intake (expressed as the percentage of the total daily energy consumed) were lower amongst breakfast consumer in some, but not all studies reviewed.

Breakfast eaters have higher daily intakes of micronutrients and are inclined to meet their nutrient intake recommendations when compared to those who skip breakfast. Nutrients that seem predominantly affected across a variety of population groups include vitamins A and C, riboflavin, zinc, iron and calcium while iron, B vitamins and zinc intakes are improved with the inclusion of ready-to-eat cereal (RTEC) in the diet (Albertson et al., 2003). Mean daily intakes of calcium were found to be higher in breakfast eaters when compared to breakfast skippers, and this subsequently forms part of a key nutritional issue amongst children and adolescents since peak bone calcium accretion occurs during adolescents (Rampersaud et al., 2005).

2.2 Knowledge of Breakfast Consumption and its Perceived Health Benefits

Breakfast is the most important meal of the day as it is known to provide energy and nutrient intake (Affenito et al., 2005; Matthys et al., 2007). Breakfast consumption has been associated with a multitude of health-related benefits, including improved nutrient intake (Gibson and Gunn, 2010), increased moderate-to-vigorous physical activity (Corder, van Sluijs, Ridgway, Steele, Prynne, Stephen, Bamber, Dunn, Goodyer and Ekelund, 2014), and improved mood (Defeyter and Russo, 2013).

Consumption of breakfast is a dietary pattern which contributes positive benefits in nutrition and cognitive function (Albertson, Douglas, Debra and Norton, 2011). It is correlated with better food choice and consequently better intake of essential nutrients (Sugiyama, Okuda, Sasaki, Kunitsugu and Hobara, 2012). The consumption of a healthy breakfast is important to health (Timlin and Pereira, 2007). Specifically, eating breakfast is associated with improved nutrient intake and lower body mass index (Sjoberg, Hallberg, Hoglund and Hulthen, 2003; Affenito et al., 2005; Barton et al., 2005; Croezen, Visscher, Ter Bogt, Veling and Haveman-Nies, 2007; Deshmukh-Taskar et al., 2010). Regular breakfast consumption takes advantage of physiologic mechanisms that are hypothesised to increase the satiety and reduce the risk of childhood obesity (Timlin, Pereira, Story and Neumark-Sztainer, 2008).

Breakfast is widely recommended as part of a healthy diet, providing approximately 20% of daily energy requirements (British Dietetic Association, 2010) and has been consistently associated with positive health benefits. The breakfast meal is known to provide key macronutrients and micronutrients in the diet, including B-vitamins, iron and calcium (Ruxton and Kirk, 1997; Chitra and Reddy, 2007; Williams, 2007). This is reflected in the observation that breakfast skippers tend to have lower nutrient intakes compared to habitual breakfast consumers (Rampersaud et al., 2005; Matthys et al., 2007; Williams, 2007). Indeed, evidence indicates that breakfast skippers fail to compensate for micronutrients missed at breakfast during meal times later in the day (Gibson, 2003).

A wealth of data indicate that regular breakfast consumption has also been associated with a healthier body mass index and reduced likelihood of obesity development in adults and children alike (de la Hunty and Ashwell, 2007; Szajewska and Ruszczynski, 2010); it may also be protective of weight gain over time (Ask et al., 2006; Albertson et al., 2007). By eating breakfast, students get more of important nutrients, vitamins and minerals such as calcium, dietary fiber, folate and protein (Affenito et al., 2005; Wilson, Parnell, Wohlers and Shirley, 2006). Breakfast consumption is an important component of nutrition, and as part of a healthy diet and lifestyle, is thought to impact positively on children's health and well-being (Rampersaud et al., 2005). Studies have shown that children who eat breakfast on a regular basis are less likely to be overweight (Timlin, Pereira, Story, and Neumark-

Sztainer, 2008; Dubois et al., 2009). Evidence also suggests that breakfast consumption can enhance cognitive function and academic performance, as well as improve mood (Wesnes et al., 2003; Widenhorn-Muller et al., 2008; Hoyland, Dye and Lawton, 2009). Regular breakfast consumption is also associated with reduced stress, depression, and emotional distress (Smith, 2002). Amongst young people, eating breakfast correlates with improved school attendance, whilst skipping breakfast interferes with memory and attention (Hoyland, Dye and Lawton, 2009). Conversely, those who eat breakfast on a daily basis may benefit further in terms of obesity and disease prevention through e.g., nutrient and fiber-rich meals such as whole grain cereals (Siega-Riz, Popkin and Carson, 2000; Pereira, Jacobs, Pins, Marquart and Keenan, 2001; Pereira, Ebbeling, Pawlak, Leidig and Ludwig, 2002; Pereira, Jacobs, Pins, Raatz, Gross, Slavin and Seaquist, 2002; Rampersaud et al. 2005; Timlin and Pereira, 2007). In addition, for university students, breakfast consumption is associated with a range of positive outcomes, including academic performance, nutrient intake, fitness, and appropriate body weight (Sandercock, Voss and Dye, 2010; Hoyland, Dye and Lawton, 2009; Moore et al., 2007).

2.3 Perceptions of Breakfast Consumption and its Perceived Health Benefits

Perceptions of breakfast may also influence a person's likelihood of consuming breakfast and subsequent psychological reactions to this meal (Chapman, Melton, and Hammond, 1998; Reeves, Halsey, McMeel, and Huber, 2013). For example the calorie content of foods eaten at breakfast has been linked to body image satisfaction (Geshwind, Roefs, Lattimore, Fett, and Jansen, 2008) and other indicators of health and wellbeing. When it comes to breakfast consumption many individuals have their own habits, definitions and perceptions. Furthermore it has been shown that conscientiousness, possibly more so than the other factors of the five factor personality theory (Costa and McCrae, 1992) may influence health status directly via changes in health behaviours such as increased fruit and vegetable consumption and lower consumption of high fat snacks (O'Connor, O'Conner, Jones, McMillan, and Ferguson, 2009).

There is also this perception that fatigue is a common problem in medical students. It is believed to be highly related to dietary habits, especially skipping breakfast, and

may be a cause of poor academic performance (Bruce, 1989). Chapman et al. (1998) in a study of Canadian university students reported that the majority of respondents perceived breakfast to be important in providing energy and increasing productivity in the morning. In contrast, Unusan, Sanlier, and Danisik, (2006) compared attitudes to breakfast in Turkish children living in Turkey and Germany and found that those living in Turkey reported significantly more positive effects associated with breakfast, whereas significantly more children in Germany perceived that breakfast made them feel tired.

Specifically, Lattimore, Walton, Bartlett, Hackett, and Stevenson, (2010) reported that women were significantly less hungry, fuller, happier and more relaxed and satisfied with their body image and weight after consuming a cereal-based breakfast compared to a muffin, despite similar calories being provided by both breakfasts. It is also perceived that children who do not regularly eat breakfast are less likely to regularly eat lunch and/or dinner and are significantly more likely to consume snack foods, mostly between meals (Sjoberg et al., 2003; Utter, Scragg, Mhurchu and Schaaf, 2007). Consuming a complete and well-balanced breakfast avoids hunger feelings in the morning (Pearson, Biddle and Gorely, 2009), which can lead to nibbling snack foods, particularly those high in sugar and fat (Billon, Lluch, Gueguen, Berthier, Siest and Herbeth, 2002).

2.4 Frequency of Breakfast Consumption

Breakfast omission tends to increase with age after childhood and appears to be most frequent in adolescents and young adults (Barton et al., 2005). For example, food diary data from a sample of Dutch 4–15 year olds revealed that 5% of primary school children and 13% of secondary school children skipped breakfast before school (Brugman, Meulmeester, Spee-van der Wekke, and Verloove-Vanhorick, 1998). A higher incidence of breakfast skipping was observed in the recent pan-European Healthy Lifestyle in Europe by Nutrition in Adolescence study (Hallstrom, See Vereecken, Ruiz, Patterson, Gilbert, Catasta, Diaz, Gomez-Martinez, Gonzalez Gross, Gottrand, Hegyi, Lehoux, Mouratidou, Widham, Astrom, Moreno and Sjostrom, 2011), which reported that 46% of the sample of 3528 adolescents from ten countries

agreed either slightly, moderately or strongly with the statement 'I often skip breakfast'.

Differences between sexes in their eating patterns have also been documented (Kiefer, Rathmanner and Kunze, 2005; Sakamaki, Toyama, Amamoto, Liu, and Shinfuku, 2005; Alizadeh and Ghabili, 2008). Female students were always found to have better dietary habits as compared to their male counterparts (Kiefer, Rathmanner and Kunze, 2005; Kremmyda, Papadaki, Hondros, Kapsokefalou, and Scott, 2008; Mikolajczyk, El Ansari, and Maxwell, 2009), particularly daily breakfast intake and meal frequency (Yahia, Achkar, Abdallah and Rizk, 2008). Additionally, female students were found to be more commonly consuming fruits, vegetables, milk and milk products, cereals, sweets and cakes while males were found to be more commonly consuming soft drinks, meat, fish (Mikolajczyk et al., 2009) and fast food (Huang, Harris, Lee, Nazir, Born and Kaur, 2003).

A high incidence of breakfast skipping was also reported in the US National Health and Nutrition Examination Survey (NHANES 1999– 2006), where 20% of children and 32% of adolescents reported skipping breakfast (Deshmukh-Taskar, Nicklas, O'Neil, Keast, Radcliffe and Cho, 2010). Previous studies have found that breakfast consumption has declined in all age groups over the past 25 years, particularly amongst older females and female adolescents aged from 15-18 years (Australian Bureau of Statistics, 1995; Keski-Rahkonen, Kaprio, Rissanen, Virkkunen, and Rose, 2003). A more recent survey of Welsh primary schoolchildren indicated that 15% of the sample of 1672 9–11 year olds agreed or strongly agreed with the statement 'Most days, I don't eat breakfast' (Moore et al., 2009). In a further study, 7.2% of a large sample of 10–16 year old schoolchildren in the UK reported never eating breakfast (Sandercock, Voss and Dye, 2010).

2.5 Factors Influencing Pattern of Breakfast Consumption

Several factors influencing pattern of breakfast consumption have been suggested including financial constraints, habitual, unavailability of time to prepare breakfast among others (Moy, Johari, Ismail, Mahad, Tie, Wan Ismail, 2009). Recognizing factors influencing breakfast consumption is potentially important for identification of methods to promote breakfast consumption. Common factors include not liking the

food served at breakfast, not wanting to eat in the morning, and a preference for sleeping over eating. Lack of time available to eat breakfast before school may be a factor in breakfast omission, since it was discovered that children were more likely to eat a substantial breakfast during holidays than on school days (Ortega, Requejo, Lopez-Sobaler, Andres, Quintas, Navia and Rivas, 1998).

In one Australian study, the factors influencing pattern of breakfast consumption were almost exclusively lack of time and not being hungry in the morning. Moreover, breakfast consumption was related to gender, not income, with males consuming more than three times as often as females (Shaw, 1998). Furthermore, individuals who regard themselves as too heavy may skip breakfast to lose weight. Consistent with the literature, Cheng, Tse, Yu, and Griffiths, (2008) reported that the most common factor influencing Hong Kong primary 6 (P6) schoolchildren pattern of breakfast consumption was not having sufficient time to eat. In addition, the lack of perceived parental emphasis on breakfast was an important factor influencing pattern of breakfast consumption. This reflects the importance of parental influence on breakfast habit among young children. For example, it has been found that parental breakfast eating is the most significant factor associated with adolescent breakfast eating (Keski-Rahkonen et al., 2003; Pearson, Biddle and Gorely, 2009), suggesting that parents may play a pivotal role in influencing breakfast choices, likely via establishing norms around breakfast eating as well as controlling the availability and preparation of food.

In China, university students often do not pay sufficient attention to breakfast, with some individuals skipping breakfast because it takes too much time (Zeng, Li, Xiong, Su and Wan, 2011). Other factors influencing pattern of breakfast consumption include lack of monetary resources (Miech, Kumanyika, Stettler, Link, Phelan and Chang, 2006), or lack of time needed for caretakers to prepare and provide breakfast for their children, poor health and nutrition knowledge among older children (Davy, Harrell, Stewart and King, 2004), lack of time or hunger to eat and prepare breakfast (Sweeney and Horishita, 2005). While North American school nutrition programs have considered poverty to be a key issue in breakfast skipping, Shaw's findings suggest that, for Australian adolescents, skipping breakfast is a matter of individual choice (Shaw, 1998). Bidgood and Cameron, (1992) found that in Canada those

below the poverty line were skipping breakfast twice as often as others, but less than one percent said that they skipped due to lack of money or food. The most common factors given were, not liking to eat particular meals and lack of time. Similarly, Singleton and Rhoads, (1982) found that the most common factors influencing pattern of breakfast consumption given were no time (43%) and not being hungry (42%), less common factors included being on a diet to lose weight, not feeling good, no one to prepare food, not liking the food served, and food not being available. Thus, stated factors have generally involved personal choice rather than availability of food.

In Canada, this is not only a poverty issue. Children attend school without breakfast because families are challenged by busy, rushed schedules. In addition, children must take school bus rides very early in the morning, even if they ate breakfast they may be hungry by the time they reach school. Shaw, (1998) states that "too many young girls believe that if they can eliminate this meal, they can maintain some illusion of a perfect body shape and weight". Common factors influencing pattern of breakfast consumption given by adolescents are lack of time, lack of hunger, and dieting to lose weight (Shaw, 1998). Skipping breakfast is neither a sensible weight reduction measure, nor a "boon to the sleep deprived". Siega, Popkin, and Carson, (1998) found that with an increased number of women in the work force and increase in hours worked has altered eating patterns for families and this means that children from all types of socioeconomic backgrounds are now at risk for breakfast skipping.

2.6 The Role of Breakfast in Meeting Nutrition Recommendations

A large body of research supports breakfast's key role in helping adults and children meet nutrition recommendations. Regular breakfast consumption is associated with higher intake of several vitamins and minerals, which boosts the likelihood of meeting recommendations for these nutrients (Ruxton and Kirk, 1997; Nicklas, Myers, Reger, Beech and Berenson, 1998; Williams, 2005; Rampersaud et al., 2005; Kerver, Yang, Obayashi, Bianchi and Song, 2006). Conversely, breakfast skippers may not make up for missed nutrients at other meals during the day, whether they are children, adolescents (Rampersaud et al., 2005), or adults (Morgan, Zabik and Stampley, 1986; Nicklas et al., 1998). Irregular breakfast eating is associated with irregular intake of other meals and a higher percentage of daily energy intake from snack foods eaten

between meals (Sjoberg et al. 2003). Furthermore, children who skip breakfast are less likely to meet recommendations for fruit and vegetable intake (Utter et al., 2007). Previous studies have shown that university students often failed to meet the recommended intake for fruits and vegetables (Huang et al., 2003; Moy et al., 2009), had frequent snacking habits of high fat and calorie dense food (Kremmyda et al., 2008; Yahia et al., 2008), tended to skip meals, especially breakfast, and had higher frequency of fast food consumption (Alizadeh and Ghabili, 2008). There is also evidence to suggest that eating a nutritious breakfast develops good eating habits that will last a life time (Kennedy and Davis, 1998).

Breakfast's important role in helping adults meet nutrition recommendations is supported by findings from a recent research review (Timlin and Pereira, 2007). According to the review, many observational studies show that regular breakfast eaters consume better quality diets that include more fiber and nutrients and fewer calories compared to breakfast skippers. Numerous consumption surveys also show several positive associations between eating breakfast and diet adequacy. In general, regular breakfast eaters consume more fiber, calcium, vitamin A, vitamin C, riboflavin, zinc, and iron as well as fewer calories, and less dietary fat and cholesterol (Timlin and Pereira, 2007). A research review of 47 studies examined the association between breakfast consumption and several health related factors such as nutritional adequacy in children and adolescents (Rampersaud et al., 2005). The review found that breakfast eaters have higher daily intake of fiber, calcium, vitamin A, vitamin C, riboflavin, zinc, and iron and are more likely to meet nutrient intake recommendations compared to breakfast skippers.

Moreover, a high proportion of university students, for example, Japanese (Shimbo, Zhang, Matsuda-Inoguchi, Higashikawa, Nakatsuka, Watanabe, and Ikeda, 2004), Turkish (Sanlier and Unusan, 2007), and Croatians (Satalic, Baric, and Keser, 2007) failed to meet the recommended intake for most of the macro and micronutrients. Nutrient intake significantly differed between sexes with better macronutrient but not micronutrient intake among female students (Satalic, Baric, and Keser, 2007).

2.7 Breakfast and Body Weight

Eating behaviours, such as breakfast consumption has been associated with intake of nutrients as well as body weight (Obbagy, Patricia and Eve, 2011). There is increasing evidence that skipping breakfast is associated with excess weight gain and other adverse health outcomes (Timlin and Pereira, 2007). A wealth of data indicate that regular breakfast consumption has also been associated with a healthier body mass index and reduced likelihood of obesity development in adults and children alike (de la Hunty and Ashwell, 2007; Szajewska and Ruszczynski, 2010), it may also be protective of weight gain over time (Ask et al., 2006; Albertson et al., 2007). Children and adolescents who eat breakfast (including school breakfast) are significantly less likely to be overweight, while skipping breakfast is associated with a higher risk of obesity (Jones, Jahns, Laraia and Haughton, 2003; Millimet, Tchernis and Husain, 2009).

Breakfast is also important for anyone trying to lose weight or stay in shape. Ironically, many people think that skipping breakfast will help them lose weight but studies consistently show that those who eat breakfast are less likely to be overweight or obese (Siega-Riz, Popkin and Carson, 1998; Bertrais, Luque, Preziosi, Fieux, De Flot, Galan and Hercberg, 2000; Sjoberg et al., 2003; de la Hunty and Ashwell, 2007), whereas those who eat breakfast tend to be leaner and more likely to maintain weight over time (Gibson and O'Sullivan, 1995). Eating breakfast may help prevent weight gain, according to findings from the Health Professionals Follow-up Study (van der Heijden, Hu, Rimm and van Dam, 2007). This prospective study of 20,064 men ages 46 to 81 years found that breakfast consumption was inversely associated with the risk of a 5kilogram (11-pound) weight gain. The association was more pronounced in men with a baseline BMI of 25 or lower. Increased snacking, sedentary lifestyle and obesity have been found to be common among those who skip breakfast than the breakfast eaters (Keski-Rahkonen et al., 2003; Moy et al., 2009).

Data from America show that children and adults who eat breakfast have healthier weights than those who skip breakfast (Wolfe, Campbell, Frongillo, Haas, and Melnik, 1994; Haines, Guilkey and Popkin 1996). Those who skip breakfast on a regular basis are nearly five times more likely to be obese (Ma, Bertone, Stanek,

Reed, Hebert, Cohen, Merriam and Ockene, 2003). A recent summary of nine studies involving both adults and children found that people who eat breakfast cereals regularly tend to have a lower body mass index (BMI) and are less likely to be overweight than those who do not eat breakfast cereals frequently (de la Hunty and Ashwell, 2007). Eating breakfast each day may be a smart strategy for maintaining weight loss. Findings from the National Weight Control Registry show that 78 percent of people who have successfully maintained a weight loss of 30 pounds or more for at least one year eat breakfast daily and almost 90 percent eat breakfast on four or more days each week. Only 4 percent report never eating breakfast (Wyatt, Grunwald, Mosca, Klem, Wing and Hill, 2002). A recent review of studies on U.S. adults found that eating breakfast may aid in weight control and related disease risks, but cautioned that more research is still needed in larger, randomized trials (Timlin and Pereira, 2007).

In a nationally representative sample of adolescents from the NHANES III, 1988-1994 database, eating breakfast every day or some days was significantly associated with a risk of overweight in those with obese parent(s) and was the strongest protective factor in this group (Fiore, Travis, Whalen, Auinger and Ryan, 2006). The three-year Growing Up Today Study (GUTS) examined skipping breakfast and weight change in more than 14,000 adolescents. At baseline, children who never ate breakfast were heavier and more likely to be overweight than children who ate breakfast more consistently. However, over the first year, overweight children who skipped breakfast had smaller BMI increases than overweight children who ate breakfast daily. Normal weight children who skipped breakfast tended to have greater BMI increases compared to breakfast eaters, although this finding was not statistically significant (Berkey et al., 2003). Numerous studies have reported a link between breakfast skipping and obesity in children and adolescents.

The National Weight Control Registry follows adults who have lost significant amounts of weight, 78% of successful dieters in the Registry reported eating breakfast everyday (Wyatt et al., 2002). Findings from New Zealand's 2002 National Children's Nutrition Survey showed that, among a nationally representative sample of 3,275 children ages five to 14 years, skipping breakfast was associated with a higher BMI (Utter et al., 2007). The five-year prospective Project EAT (Eating Among

Teens) study examined the association between breakfast frequency and five-year body weight change in 2,216 adolescents. Cross-sectional analyses from an initial survey and follow-up survey five years later revealed inverse associations between breakfast frequency and BMI that were largely independent of confounding and dietary factors. A prospective analysis showed that frequency of breakfast was inversely associated with BMI in a dose-response manner. Adjustment for weight-related variables (concerns, behaviours, and pressures) seemed to partly explain this finding (Timlin and Pereira, 2008). Emerging research also suggests that whole oat and whole oat-based product consumption is consistent with dietary patterns that may favorably alter risk for elevated blood pressure, type 2 diabetes, and weight gain (Andon and Anderson, 2008).

2.8 Breakfast and Satiety

Appetite, which plays an important role in the regulation of food intake, includes at least two components: satiation and satiety (Geraedts, Troost and Saris, 2010). Satiation results from a series of neural and humoral signals, mostly produced in the gastrointestinal tract in response to food stimulation. It is defined as the process that evokes meal termination. Satiety refers to the postprandial state that influences the interval between meals. Satiety or the state of being satisfactorily full may play a role in weight management. Certain breakfast foods may be more satiating than others. A study of satiety ratings among 41 healthy female Australian university students showed that oatmeal had the highest satiety value compared to other breakfast foods tested such as bread, eggs, yogurt, and croissants (Holt, Miller, Petocz and Farmakalidis, 1995).

Carbohydrates are a major source of energy in our daily diets. A hierarchy of macronutrient satiating effects has been observed for protein, carbohydrate, and fat, with protein being the most satiating and fat the least (Paddon-Jones, Westman, Mattes, Wolfe, Astrup and Westerterp-Plantenga, 2007; Potier, Darcel and Tome, 2009). However, before a recent long-term clinical trial in 811 overweight adults that compared weight loss diets with different compositions of fat, protein, and carbohydrate did not find any significant differences in satiety at 6 months and 2 years (Sacks, Bray, Carey, Smith, Ryan, Anton, McManus, Champagne, Bishop, Laranjo,

Leboff, Rood, de Jonge, Greenway, Loria, Obarzanek and Williamson, 2009). Lack of adherence to the assigned intervention may partially explain the results. But more importantly, factors other than the macronutrient content may also influence the satiety process.

In a randomized crossover study of 30 overweight or obese American women, subjects who had eggs for breakfast reported greater feelings of satiety and consumed less energy, carbohydrate, protein, and fat for lunch compared to subjects who had bagel for breakfast. Energy intake following the egg breakfast remained lower for the entire day and the next 36 hours (Vander Wal, Marth, Khosla, Jen and Dhurandhar, 2005). Fiber is a major component of carbohydrate that is generally considered beneficial for health. Epidemiological studies show that intake of dietary fiber and whole grains is associated with a lower risk of overweight or obesity (Liu, Willett, Manson, Hu, Rosner and Colditz, 2003; Williams, Grafenauer and O'Shea, 2008). One possible mechanism for this association is prolonged satiety from lower-energy foods that are rich in dietary fiber compared with highly processed foods (Slavin, 2007; Kristensen, Jensen, Riboldi, Petronio, Bugel, Toubro, Tetens and Astrup, 2010).

A randomized crossover study conducted with 15 men and women found that women who ate higher fiber, higher fat breakfast meals had greater feelings of satiety and significantly higher cholecystokinin responses than did those eating a low fat, low fiber breakfast meal (Burton-Freeman, Davis and Schneeman, 2002). Cholecystokinin is a hormone associated with satiety. An analysis of self-reported food intake among 867 men and women suggests that eating foods with low energy density (i.e., less energy per gram than other foods) in the morning is satiating and can reduce the amount eaten over the rest of the day. Findings also suggest that low energy density intake at any time of the day could reduce overall intake, and that eating late at night may add to earlier food intake to the extent that overall daily intake is greater (de Castro, 2004).

2.9 Breakfast and Cognitive/Academic Performance

For more than a quarter century, researchers have examined the relationship between breakfast and various aspects of cognitive and academic performance in children. Despite the abundance of research, it is not yet possible to draw definite conclusions

because of numerous differences in study design, size, methodology, outcomes measured, populations studied, and breakfast definitions and composition (Pollitt and Mathews, 1998; Bellisle, 2004; Rampersaud et al., 2005; Taras, 2005; Grantham-McGrego, 2005). Evidence also suggests that breakfast consumption can enhance cognitive function and academic performance, as well as improve mood (Wesnes et al., 2003; Widenhorn-Muller et al. 2008; Hoyland et al., 2009).

2.9.1 Breakfast and Cognition

It has been suggested that skipping breakfast may have deleterious effects upon various aspects of cognitive functioning (Meyers, 1989). Breakfast skipping can interfere with cognition and learning among children (Rampersaud et al., 2005; Pearson, Biddle and Gorely, 2009). In some experimental studies, eating breakfast is positively associated with several aspects of short-term memory function for various age groups and types of tests. Specifically, benefits have been reported for recall (Vaisman, Voet, Akivis and Vakil, 1996), episodic memory (Wesnes et al., 2003), and short-term memory (Pollitt, Leibel and Greenfield, 1981; Simeon and Grantham-McGregor, 1989; Michaud, Musse, Nicolas and Mejean, 1991).

However, several studies report no effect from breakfast on short-term memory (Dickie and Bender, 1982; Simeon and Grantham-McGregor, 1989; Cromer, Tarnowski, Stein, Harton and Thornton, 1990; Lopez, de Andraca, Perales, Heresi, Castillo and Colombo, 1993; Chandler,Walker, Connolly and Grantham-McGregor, 1995; Jacoby, Cueto and Pollitt, 1996). Overall, data are less supportive for the effects of eating breakfast on other cognitive variables such as attention, problem solving, and reading or listening comprehension (Rampersaud et al., 2005). Differences in nutritional status may influence breakfast's effect on cognition in the short term. For example, short-term intervention trials conducted in rural populations outside the U.S. indicate that children at nutritional risk seem to benefit most from eating breakfast (Simeon and Grantham-McGregor, 1989; Chandler et al., 1995; Cueto, Jacoby and Pollitt, 1998), but in longer-term studies, do not gain additional benefits on achievement test scores compared to adequately nourished children (Powell, Grantham-McGregor and Elston, 1983; Powell, Walker, Chang and Grantham-McGregor SM, 1998).

A study of U.S. elementary school children compared the effects of instant oatmeal versus ready-to-eat-cereal breakfasts. Among 9 to 11 year olds, boys and girls showed enhanced spatial memory and girls showed improved short-term memory after consuming oatmeal. Among 6 to 8 year olds, boys and girls showed better spatial memory and better auditory attention and girls exhibited better short-term memory after consuming oatmeal (Mahoney et al., 2005). After 6 to 11 year old English school children consumed a low glycemic index breakfast cereal, they showed significantly less decline in performance on attention and memory tests throughout the morning compared to a high glycemic index cereal (Ingwersen, Defeyter, Kennedy, Wesnes and Scholey, 2007).

2.9.2 Breakfast and Academic Performance

Numerous observational studies show that eating breakfast has a beneficial effect on academic and achievement test scores, grades, school attendance and tardiness rates (Meyers, Sampson,Weitzman, Rogers and Kayne, 1989; Murphy, Pagano, Nachmani, Sperling, Kane and Kleinman, 1998; Kleinman, Hall, Green, Korzec- Ramirez, Patton, Pagano and Murphy, 2002; Boey, Omar and Arul Phillips, 2003; Kim, Frongillo, Han, Oh, Kim, Jang, Won, Lee and Kim, 2003). Several improvements were observed in students who participated in a school breakfast program. For example, Minnesota elementary school students participating in a Universal School Breakfast Pilot improved attendance, increased math and reading scores, and reported better concentration and increased alertness and energy (Wahlstrom and Begalle, 1999). Hunger in the morning can affect performance at school mainly due to lack of concentration (Nicklas, 2007).

Public school students in Philadelphia and Baltimore who increased their participation in the school breakfast program had significantly greater increases in math grades, significantly greater decreases in rates of school absence and tardiness, and significantly lower ratings of psychosocial problems than children whose participation remained the same or decreased (Murphy et al., 1998). Six months after the start of free school breakfast programs, inner-city students who improved their nutritional status also showed significantly greater improvements in attendance and school breakfast participation, decreases in hunger, and improvements in math grades and

behaviour (Kleinman et al., 2002). Two experimental studies on breakfast skipping (fasting) in well-nourished U.S. school children show mixed results. In one study, skipping breakfast adversely affected students' ability to accurately solve problems, but helped with immediate recall in short-term memory (Pollitt, Leibel and Greenfield, 1981). In the second study, skipping breakfast adversely affected the students' late morning problem-solving performance (Pollitt, Lewis, Garza, Shulman, 1982-1983). An European study of 195 10-year old school children suggested that the amount of calories consumed at breakfast may affect school performance (Wyon, Abrahamsson, Jartelius and Fletcher, 1997).When children consumed more than 20 percent of their recommended daily calorie intake at breakfast, voluntary physical endurance and performance on a creativity test were significantly better than when they consumed less than 10 percent of recommended calories at breakfast.

In addition, two randomized controlled trials show that school breakfast has a positive effect on achievement test scores and school attendance rates in undernourished rural Jamaican children (Powell, Grantham-McGregor and Elston, 1983; Powell et al., 1998). School attendance rates were improved in a trial of Peruvian children randomized to receive a school breakfast or no school breakfast for a period of three months (Jacoby, Cueto and Pollitt, 1996).

2.10 Breakfast and Health

2.10.1 Breakfast and Cardiovascular Health

Adequate nutrition is important for a variety of reasons including optimal cardiovascular function (Martin, 2006). Breakfast consumption may help promote cardiovascular health. Studies have shown that breakfast skipping adults and children had higher blood cholesterol levels than breakfast eaters, especially among those who ate cereal for breakfast (Stanton and Keast, 1989; Resnicow, 1991). Eating breakfast is also associated with heart protective eating patterns such as lower fat intake in adults and higher fiber intake in adults, children, and adolescents (Ruxton and Kirk, 1997). Breakfast skipping may be linked to the up-regulation of appetite later in the day which can result in not only weight gain but deleterious changes in the risk factors for cardiovascular diseases and diabetes (Giovannini, Agnosti, and Dhamir, 2010).

Overweight in childhood and adolescence is associated with conditions such as elevated blood pressure levels (Labarthe, Mueller and Eissa, 1991), type 2 diabetes mellitus (Vivian, 2006), and reduced insulin sensitivity (Ripamonti, De Medici, Guzzaloni, Moreni, Ardizzi and Morabito, 1991), that are associated with a high risk for the development of atherosclerosis and cardiovascular complications in adulthood (Schiel, Beltschikow, Kramer and Stein, 2006).

Recent research showed that high fiber oatmeal/oat cereal consumption favorably altered LDL cholesterol subclass in middle-aged and older men (Davy BM, Davy KP, Ho, Beske, Davrath and Melby, 2002). In addition, oat antioxidants (avenathramides) may reduce early atherogenic events (Chen, Milbury, Collins and Blumberg, 2007; Liu, Zubik, Collins, Marko and Meydani 2004; Nie, Wise, Peterson and Meydani 2006). A study evaluating the association between breakfast cereal intake and heart failure among 21,376 participants of the Physicians' Health Study I, found that higher intake of whole grain breakfast cereals, but not refined cereals, is associated with a lower risk of heart failure (Djousse and Gaziano, 2007).

2.10.2 Breakfast and Healthy Digestion

Several studies indicate that adults, adolescents, and children who regularly eat breakfast have a higher daily intake of fiber (Rampersaud et al., 2005; Timlin and Pereira, 2007). It is well known that dietary fiber found in many breakfast cereals and other grain products, fruits, and vegetables helps maintain a healthy digestive system by promoting regularity and helping to decrease the incidence of constipation. Although inconclusive, some research suggests that fiber helps reduce the risk of colon cancer (Peters, Sinha, Chatterjee, Subar, Ziegler, Kulldorff, Bresalier, Weissfeld, Flood, Schatzkin and Hayes, 2003; Bingham, Day, Luben, Ferrari, Slimani, Norat, Clavel-Chapelon, Kesse, Nieters, Boeing, Tjonneland, Overvad, Martinez, Dorronsoro, Gonzalez, Key, Trichopoulou, Naska, Vineis, Tumino, Krogh, Bueno de Mesquita, Peeters, Berglund, Hallmans, Lund, Skeie, Kaaks and Riboli, 2003). Furthermore, slow absorption and digestion of starch at one meal (i.e. breakfast) may improve carbohydrate tolerance at the following meal (Nestler, Barlascini, Clore and Blackard, 1988; Wolever, Jenkins, Ocana, Rao and Collier, 1988; Jenkins, Jenkins, Wolever, Vuksan, Rao, Thompson and Josse, 1994; Liljeberg,

Akerberg and Bjorck, 1999; Pereira et al., 2002; Clark, Gardiner, McBurney, Anderson, Weatherspoon, Henry and Hord, 2006).

2.10.3 Breakfast and Bone Health

Eating breakfast can contribute nutrients important to bone health. Several studies indicate that adults, adolescents, and children who regularly eat breakfast have higher daily intake of calcium and other important nutrients (Rampersaudet al., 2005; Affenito et al., 2005; Timlin and Pereira, 2007). A large body of research supports the role of high calcium intake in promoting bone health in adults and children (Heaney, 2000; Wosje and Specker, 2000; Lau, Lynn, Chan, Lau and Woo, 2004; Du, Zhu, Trube, Zhang, Ma, Hu, Fraser and Greenfield, 2004; Cheng, Lyytikainen, Kroger, Lamberg-Allardt, Alen, Koistinen, Wang, Suuriniemi, Suominen, Mahonen, Nicholson, Ivaska, Korpela, Ohlsson, Vaananen and Tylavsky, 2005). Some studies have linked high soft drink consumption rate to poor intake of calcium, vitamin C and increased risk of bone fractures (Harnack, Stang and Story, 1999). Breakfast eaters who ate ready-to-eat cereal with milk consumed seven times more calcium at breakfast compared to those who ate ready-to-eat cereal without milk (Song, Chun, Kerver, Cho, Chung and Chung, 2006). In one review that included 52 investigator controlled calcium intervention studies, all but two of these studies showed that high calcium intakes were associated with positive outcomes such as better bone balance, greater bone gain during growth, reduced bone loss in the elderly, or reduced fracture risk (Heaney, 2000).

2.11 Breakfast, Insulin Levels, and Metabolic Syndrome

Overweight and obesity in childhood is associated with elevated blood pressure (Labarthe, Mueller and Eissa, 1991), dyslipidemia (Weiss and Caprio, 2005), metabolic syndrome (Dhuper, Cohen and Daniel et al., 2007), type 2 diabetes mellitus, and reduced insulin sensitivity.

2.11.1 Breakfast and Insulin Levels

Breakfast is the most important among meals because it is the time when prolonged fasting ceases. Longer fasting times are associated with higher ghrelin concentrations and lower insulin concentrations, which could induce hunger and eating (Boyle, Shah

and Cryer, 1989; Cummings, Purnell, Frayo, Schmidova, Wisse and Weigle, 2001). Emerging evidence suggests that eating breakfast may positively impact circulating insulin levels. A small randomized crossover trial in 10 healthy women found that those who skipped breakfast had higher fasting insulin levels, as well as higher total and LDL cholesterol, after a test meal compared to those who ate a breakfast that included a whole grain ready-to-eat cereal and lower fat milk (Farshchi, Taylor and Macdonald, 2005). In a large sample of 13–16 year old Dutch adolescents, breakfast skipping was more strongly associated with being overweight than physical inactivity (Croezen, Visscher, Ter Bogt, Veling, Haveman-Nies, 2007). Further, after controlling for age, gender, life- style factors, and socio-demographics, individuals who skipped breakfast throughout childhood and adulthood were found to have higher fasting insulin levels, higher cholesterol, and greater waist circumferences than those who ate breakfast (Smith, Gall, McNaughton, Blizzard, Dwyer and Venn, 2010).

Another randomized crossover trial conducted with 45 adults with type 2 diabetes found that a low glycemic load breakfast meal containing psyllium soluble fiber improved the breakfast postprandial glycemic, insulinemic, and free fatty acid (FFA) responses after breakfast, but not after lunch (Clark, Gardiner, McBurney, Anderson, Weatherspoon, Henry and Hord, 2006). Similarly, a recent longitudinal study of children aged 9 to 15 years at the start of the study, when followed over 24 years also found that breakfast skipping in both childhood and current adulthood life were significantly associated with higher levels of BMI, waist circumference and blood markers of insulin and low density lipoprotein cholesterol compared to those who were taking breakfast at both time points, suggesting that infrequent breakfast consumption over a long period may have detrimental effects on body weight and cardio-metabolic health (Smith et al., 2010).

Some observational and clinical studies (Pereira et al., 2002; Liese, Roach, Sparks, Marquart, D'Agostino and Mayer-Davis, 2003; Steffen, Jacobs, Murtaugh, Moran, Steinberger, Hong and Sinaiko, 2003; McKeown, 2004; McKeown, Meigs, Liu, Saltzman, Wilson and Jacques, 2004), but not all (Juntunen, Laaksonen, Poutanen, Niskanen and Mykkanen, 2003; Anderson, Tengblad, Karlstrom, Kamal-Eldin, Landberg, Basu, Aman and Vessby, 2007), show that increased whole grain and fiber intake increase insulin sensitivity.

2.11.2 Breakfast and Metabolic Syndrome

The consumption of breakfast contributes to the prevention of weight gain and the metabolic syndrome (van der Heijden, Hu, Rimm, and van Dam, 2007; Thompson-McCormick, Thomas, Bainivualiku, Khan and Becker, 2010; Astbury, Taylor, Macdonald, 2011). In addition, the fiber from whole grain foods may have a greater effect than fiber from other sources. A cross-sectional examination of the prevalence of metabolic syndrome in participants in the Framingham Offspring Study showed that fiber from cereals, but not fruit and vegetables, was inversely related to the prevalence of the metabolic syndrome (McKeown et al., 2004). Diets rich in whole grains may be associated with decreased risk of metabolic syndrome (Esmaillzadeh, Mirmiran and Azizi, 2005; Baxter, Coyne and McClintock, 2006; Esmaillzadeh, Kimiagar, Mehrabi, Azadbakht, Hu and Willet, 2007).

Childhood obesity has been associated with increased prevalence of early onset of type 2 diabetes mellitus and metabolic syndrome (Bokor, Frelut, Vania, Hadjiathanasiou, Anastasakou, Malecka-Tendera, Matusik and Molnar, 2008; Ehtisham, Barrett, and Shaw, 2000). Some studies (Sonnenberg, Pencina, Kimokoti, Quatromoni, Nam, D'Agostino, Meigs, Ordovas, Cobain and Millen, 2005; Esmaillzadeh et al., 2007) but not all (Baxter, Coyne and McClintock, 2006), have shown dietary patterns that include high fruit consumption may play a role in reducing the prevalence of metabolic syndrome.

2.12 Breakfast and Healthful Lifestyle Habits

Breakfast skipping in adolescents has been associated with various health-compromising behaviours and unhealthy lifestyles, such as tobacco, alcohol, and substance use, and risk-taking in general (Revicki, Sobal and DeForge, 1991; Isralowitz and Trostler, 1996; Hoglund et al., 1998). Adolescents who skip breakfast may exhibit less healthful dietary behaviours, such as irregular eating patterns and an increased intake of less nutritious foods (Sjoberg et al., 2003; Keski-Rahkonen et al., 2003). Breakfast skipping has also been associated with other unhealthy behaviours, including smoking, infrequent exercise, and frequent alcohol intake in adolescents and their parents (Keski-Rahkonen et al., 2003), as well as low physical activity levels (Sandercock et al., 2010). Conversely, regular breakfast eating has been associated

with a health-conscious lifestyle (Baumert Jr, Henderson and Thompson, 1998; Cavadini, Decarli, Grin, Narring and Michaud, 2000). Habitual breakfast skipping is also associated with various lifestyles and physical conditions, including fatigue, insomnia, lack of time for eating, smoking, infrequent exercise, alcohol drinking, full-time working, and even coronary heart disease (Tanaka, Mizuno, Fukuda, Shigihara, and Watanabe, 2008; Huang, Hu, Fan, Liao, and Tsai, 2010; Cahill, Chiuve, Mekary, Jensen, Flint, Hu and Rimm, 2013). Research shows that daily breakfast consumption has important positive associations with healthy lifestyle behaviours, while breakfast skipping has negative associations with unhealthy lifestyle behaviours (See Vereecken, 2009). Parents, as some would suggest (Matthys et al., 2007; Ruglis and Freudenberg, 2010), may play one of the most important roles of all, as they set an example for their children in healthy eating and lifestyle habits.

2.13 Conceptual Framework

The Health Belief Model

The Health Belief Model (HBM) is by far the most commonly used theory in health education and health promotion (Glanz, Rimer, and Lewis, 2002; National Cancer Institute [NCI], 2003). It was developed in the 1950s as a way to explain why medical screening programs offered by the U.S. Public Health Service, particularly for tuberculosis, were not very successful (Hochbaum, 1958). The underlying concept of the original HBM is that health behaviour is determined by personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence (Hochbaum, 1958).

Theoretical Constructs

The following four perceptions serve as the main constructs of the model: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers. Each of these perceptions, individually or in combination, can be used to explain health behavior. More recently, other constructs have been added to the HBM; thus, the model has been expanded to include cues to action, motivating factors, and self-efficacy.

Perceived Seriousness

The construct of perceived seriousness speaks to an individual's belief about the seriousness or severity of a disease. While the perception of seriousness is often based on medical information or knowledge, it may also come from beliefs a person has about the difficulties a disease would create or the effects it would have on his or her life in general. For example, skipping breakfast could lead to chronic diseases such as diabetes mellitus, hypertension and coronary heart disease. All these diseases are lifestyle related where diet plays an important role (Hu et al., 2001; Sobngwi et al., 2002; Key et al., 2004; Lakka and Bouchard, 2005; Lindstrom, Peltonen and Tuomilehto, 2005).

Perceived Susceptibility

Personal risk or susceptibility is one of the more powerful perceptions in prompting people to adopt healthier behaviours. The greater the perceived risk, the greater the likelihood of engaging in behaviours to decrease the risk. It is only logical that when people believe they are at risk for a disease, they will be more likely to do something to prevent it from happening. Unfortunately, the opposite also occurs. When people believe they are not at risk or have a low risk of susceptibility, unhealthy behaviours tend to result. When the perception of susceptibility is combined with seriousness, it results in perceived threat (Stretcher and Rosen-stock, 1997). If the perception of threat is to a serious disease for which there is a real risk, behaviour often changes.

Perceived Benefits

The construct of perceived benefits is a person's opinion of the value or usefulness of a new behaviour in decreasing the risk of developing a disease. People tend to adopt healthier behaviours when they believe the new behaviour will decrease their chances of developing a disease. Would people consume breakfast regularly if they did not believe it was beneficial? Would people quit skipping breakfast if they did not believe it was better for their health? Probably not. Breakfast consumption has been associated with a multitude of health-related benefits, including improved nutrient intake (Gibson and Gunn, 2010), increased moderate-to-vigorous physical activity (Corder, van Sluijs, Ridgway, Steele, Prynne, Stephen, Bamber, Dunn, Goodyer and Ekelund, 2014), and improved mood (Defeyter and Russo, 2013). Consumption of breakfast is a dietary pattern which contributes positive benefits in nutrition and cognitive function (Albertson, Douglas, Debra and Norton, 2011). It is correlated with better food choice and consequently better intake of essential nutrients (Sugiyama, Okuda, Sasaki, Kunitsugu and Hobara, 2012).

Perceived Barriers

Since change is not something that comes easily to most people, the last construct of the HBM addresses the issue of perceived barriers to change. This is an individual's own evaluation of the obstacles in the way of him or her adopting a new behaviour. Of all the constructs, perceived barriers are the most significant in determining

behaviour change (Janz and Becker, 1984). In order for a new behavior to be adopted, a person needs to believe the benefits of the new behavior outweigh the consequences of continuing the old behavior (Centers for Disease Control and Prevention, 2004). This enables barriers to be overcome and the new behavior to be adopted. Several reasons for skipping breakfast have been suggested including financial constraints, habitual, unavailability of time to prepare breakfast among others (Moy, Johari, Ismail, Mahad, Tie, Wan Ismail, 2009). Recognizing reasons for skipping breakfast is potentially important for identification of methods to promote breakfast consumption. Common reasons for skipping breakfast include not liking the food served at breakfast, not wanting to eat in the morning, and a preference for sleeping over eating.

Modifying Variables

The four major constructs of perception are modified by other variables, such as age, sex, ethnicity, level of education, socioeconomic status, past experiences, skill, and motivation. These are individual characteristics that influence personal perceptions. For example, breakfast skipping has significantly increased among young people over the past thirty years, and children and adolescents are more likely to skip breakfast than any other meal (Siega-Riz, Popkin, and Carson, 1998). Breakfast skipping is more prevalent in girls than boys (Shaw, 1998; Keski-Rahkonen, Kaprio, Rissanen, Virkkunen, and Rose, 2003; Videon and Manning, 2003) and its occurrence increases from childhood through adolescence, with older children and adolescents being more likely to skip breakfast (Shaw, 1998; Pearson, Biddle, and Gorely, 2009).

Cues to Action

In addition to the four beliefs or perceptions and modifying variables, the HBM suggests that behavior is also influenced by cues to action. Cues to action are events, people, or things that move people to change their behavior. Examples include illness of a family member as a result of skipping breakfast. Those people who skipped breakfast are reported to have higher daily intakes of fat, cholesterol, and energy, and lower intakes of fiber, vitamins, and minerals in comparison to breakfast eaters, thereby increasing the likelihood of gastrointestinal disease later in life (Timlin and Pereira 2007).

Self-Efficacy

In 1988, self-efficacy was added to the original four beliefs of the HBM (Rosenstock, Strecher, and Becker, 1988). Self-efficacy is the belief in one's own ability to do something (Bandura, 1977). People generally do not try to do something new unless they think they can do it. If someone believes a new behaviour is useful (perceived benefit), but does not think he or she is capable of doing it (perceived barrier), chances are that it will not be tried.

In summary, according to the Health Belief Model, modifying variables, cues to action, and self-efficacy affect one's perception of susceptibility, seriousness, benefits, and barriers and, therefore, one's behaviour.

The diagram below shows the Health Belief Model including all the elements necessary for behaviour change (Figure 2.1).

Health Belief Model

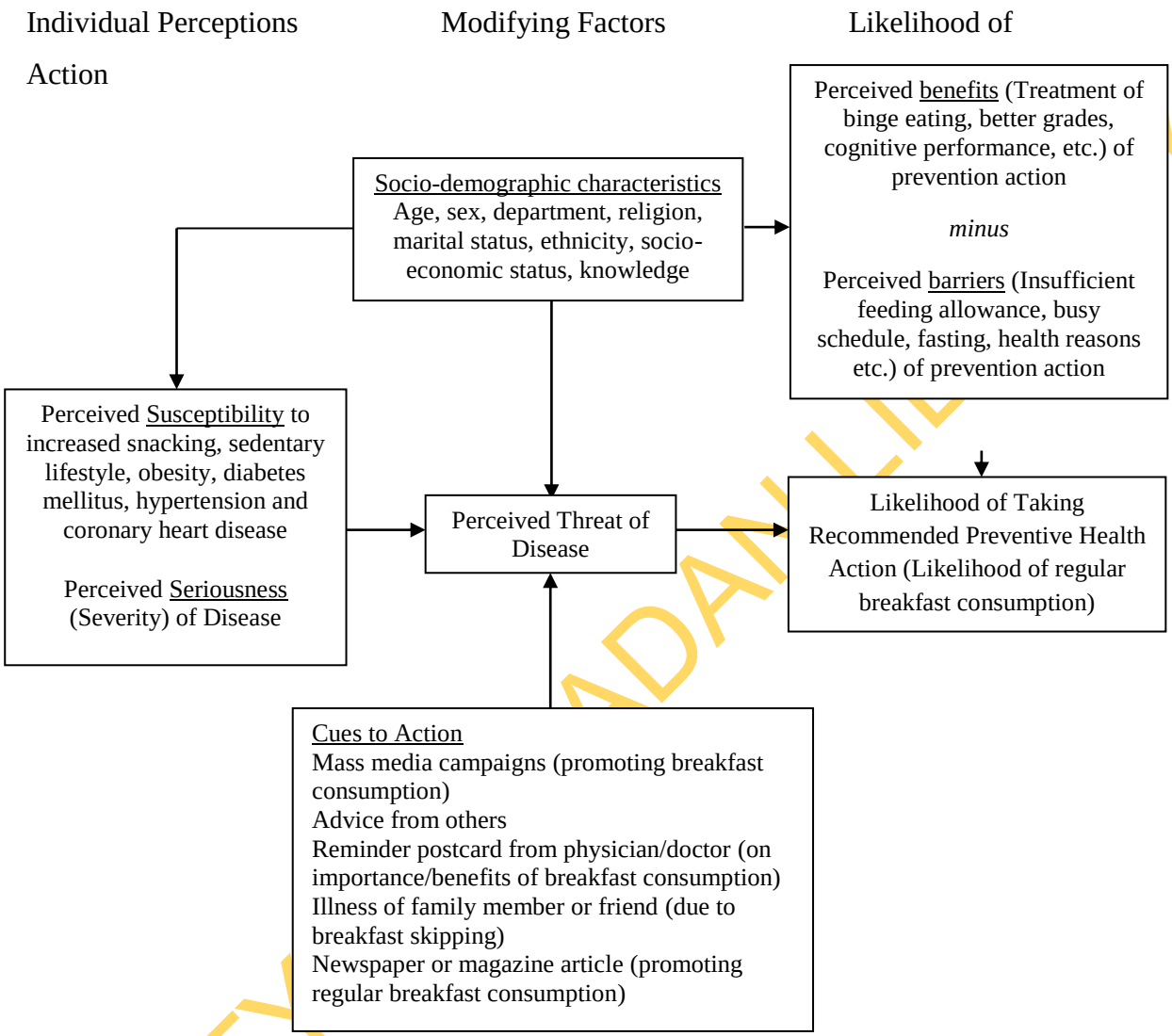

Figure 2.1 Health Belief Model illustrating the factors influencing the pattern of breakfast consumption.

Source: Stretcher and Rosenstock, (1997).

CHAPTER THREE

METHODOLOGY

3.1 Study Design

A cross-sectional study design was used to assess the pattern of breakfast consumption and its perceived health benefits among Master of Public Health students in the University of Ibadan, Oyo state, Nigeria.

3.2 Study Location

The study was carried out in the Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, the state capital of Oyo State in Southwestern Nigeria. Master of Public Health students as health personnel are important promoters and role models for maintaining a healthy lifestyle for the general population. The University of Ibadan was founded in 1948 as a college of the University of London with 104 students spread among three Faculties: Arts, Science and Medicine. It became an autonomous, degree-granting institution in 1962. Today, the University has a total enrolment of over 20,000 students shared among 13 different faculties: Arts, Sciences, Basic Medical Science, Clinical Sciences, Dentistry, Public Health, Pharmacy, Agriculture and Forestry, the Social Sciences, Education, Veterinary Medicine, Technology, Law, as well as Institute of African Studies, Institute of Education, Information Science, Centre for Literacy Training and Development in Africa, Institute for Advanced Medical Research and Training and the Centre for Peace and Conflict Studies. About 35% of its enrolments are postgraduate students.

3.3 Study Population

The study population was made up of 212 (83 males and 129 females) Master of Public Health students in the University of Ibadan. Presently, there are 6 departments and an Institute in the Faculty specializing in Health Promotion and Education, Environmental Health Science, Health Policy and Management, Epidemiology and Medical Statistics, Preventive Medicine and Primary Care, Human Nutrition, and Institute of Child Health.

3.3.1 Inclusion Criteria

Participants for the study were both first and second year MPH students inclusive in the Faculty of Public Health, College of Medicine, University of Ibadan.

3.3.2 Exclusion Criteria

All Faculty of Public Health students who did not fall within first and second year MPH students were excluded from the study.

3.4 Sample Size

The sample size for this research was calculated using Leslie Kish (1965) formula of

$$N = \frac{Z^2pq}{d^2}$$

Where N = minimum sample size required.

Z = standard normal deviation at 95% confidence level (1.96).

P = 85.3% prevalence of breakfast consumers (Anigo, Owolabi, Sule and Oluloto 2013).

d = level of precision at 5% (0.05).

q = 1-p.

$$N = \frac{(1.96)^2 \times 0.853 \times 0.147}{(0.05)^2}$$

$$= 192.68$$

A minimum sample size of 212 was used after adjusting for non-response, assuming a non-response of 10% = 19.268).

3.5 Sampling Technique

A Two-stage sampling technique was used for the study.

Stage 1: A list of the total number of MPH students from each department in the Faculty of Public Health, College of Medicine was collected and a proportionate sampling method was used to know the number of students selected from each department due to the variation in population.

Stage 2: A simple random sampling (balloting) method was then used to select the study participants from each department based on the total number of MPH students in the Faculty.

3.6 Data Collection Instrument

A semi-structured self-administered questionnaire was used to obtain information on socio-demographic, the frequency of breakfast consumption, the level of knowledge of breakfast consumption and its perceived health benefits using an 8 point scale (Score between 0-4 was categorised as Poor, while score >4 was categorised as Good), perception on breakfast consumption and its health benefits using a 12 point scale (Score between 0-6 was categorised as Poor, while score >6 was categorised as Good) and factors influencing the pattern of breakfast consumption among MPH students in the University of Ibadan.

3.6.1 Validity of the Instrument

Validity was ensured through extensive literature review to identify necessary variables that would be included in the instrument for measurement. The draft instrument was given to the research supervisor for review. An expert from the Department of Health Policy and Management, Faculty of Public Health, University of Ibadan, was also consulted to help in reviewing the instrument.

3.6.2 Reliability of the Instrument

Ten percent (10%) of the sample size was pre-tested among Master of Public Health students in the University of Logos. The data were then subjected to Cronbach Alpha statistical test. In this test, a result showing a correlation coefficient greater than 0.50 is said to be reliable and the closer the value of the reliability test to 1, the more reliable is the instrument. The Cronbach alpha score obtained in this study was 0.71. This confirmed its high degree of reliability. The result of the pretest was then used to modify the questions that were ambiguous to the respondents.

3.7 Data Management and Analysis

Data was entered directly from the pre-coded questionnaires. Computer print-outs of the data were reviewed for any information that might be out of range. The statistical

analysis was performed using SPSS for Windows version 20. Descriptive statistics such as frequencies, means, ratios, standard deviations and percentages, descriptive statistics and inferential statistics such as Chi square and Fisher's Exact Test was used to describe the variables. Significance level was set at $p<0.05$.

3.8 Ethical Consideration

Ethical approval to conduct this study was obtained from the University of Ibadan/University College Hospital Ethical Review Committee.

Informed Consent

Informed consent was sought from the participants who were willing to participate prior to the collection of the data.

Confidentiality

Data collected were only used for the purpose of this research and was kept confidential on a password protected computer. Students were assured of confidentiality as no form of identifier was included in the questionnaire.

Voluntariness

Study participation was without coercion. The participants were also informed of their right to decline or withdraw from the research without any undesirable effects.

Beneficence

The outcome of the research was useful in increasing the critical consciousness of MPH students on the perceived health implications of skipping breakfast.

Non-Maleficence

The participants were not subjected to any form of harm.

3.9 Limitations of the Study

Firstly, the data were collected through a self-reported measures, it is possible that the findings were affected by a social desirability response set. Secondly, the study did not explore the content or quality of breakfast. To this end, breakfast consumption

was captured using seven-day (weeklong) measurements rather than a day (current day breakfast consumption) to make the study more reliable and generalizable.

Despite these limitations, the study gave insight into pattern of breakfast consumption and its perceived health benefits among MPH students in the University of Ibadan. The strength of the study lies in the large study population, which allows meaningful conclusions. It is therefore suggested that the scope of future studies on the subject should be broadened to include other departments from different faculties in the University of Ibadan.

CHAPTER FOUR

RESULTS

4.1 Socio-Demographic Characteristics of the Respondents

A total of 212 Masters of Public Health students in the University of Ibadan were interviewed and the socio-demographic characteristics of the respondents were presented in Table 4.1a and 4.1b below. Eighty three (39.2%) of the respondents were males, while 129 (60.8%) were females. The mean age of the respondents was 30.5±14.8 years. Majority 158 (74.5%) of the respondents were within the ages of 20-29 years, while less than half 40 (18.9%) were within the ages of 30-39 years. Only a few 1 (0.5%) and 4 (1.9%) of the respondents were within the ages of 10-19 and 40-49 years respectively.

Majority 65 (30.7%) of the respondents were from Health Promotion and Education Department, while 48 (22.6%), 33 (15.6%), 23 (10.8%), 18 (8.5%), 15 (7.1%) and 10 (4.7%) were from Environmental Health Science, Health Policy and Management, Epidemiology and Medical Statistics, Preventive Medicine and Primary Care, Institute of Child Health and Human Nutrition Department respectively. A greater proportion 185 (87.3%) of the respondents were Christians, only a few 24 (11.3%) and 3 (1.4%) were from Islam and Traditional religion respectively. More than half 152 (71.7%) of the respondents were from the Yoruba ethnic group, while only 6 (2.8%) and 23 (10.8%) were from the Hausa and the Igbo ethnic group respectively. However, 30 (14.2%) of the respondents were from other ethnic groups namely: Ibibio, Igala, Ijaw, Efik, Edo, Idoma, Bini, Ekoi, Urhobo, Anaang, Ebira, Ika, Tiv, Ogoja, Isoko and Maryhi.

Majority 161 (75.9%) of the respondents were Single (Never Married), while less than half 50 (23.6%) and 1 (0.5%) were married and divorced respectively. Few 22 (10.4%) of the respondents have an estimated monthly allowance of ≤ ten thousand naira (≤ ₦10,000), while 51 (24.1%), 19 (9.0%), 14 (6.6%), 10 (4.7%) had (>10,000-40,000), (>40,000-70,000), (>70,000-100,000) and (>100,000) respectively. However, slightly below half 96 (45.3%) did not respond to the question on the estimated monthly income.

Table 4.1a: Socio-demographic characteristics of the respondents N=212

Variables	Frequency (n)	Percentage (%)
Gender		
Male	83	39.2
Female	129	60.8
Age (years)		
10-19	1	0.5
20-29	158	74.5
30-39	40	18.9
40-49	4	1.9
No response	9	4.2
Department		
Health promotion and education	65	30.7
Environmental health science	48	22.6
Health policy and management	33	15.6
Epidemiology and medical statistics	23	10.8
Preventive medicine and primary care	18	8.5
Institute of child health	15	7.1
Human nutrition	10	4.7
Religion		
Christianity	185	87.3
Islam	24	11.3
Traditional	3	1.4
Ethnic Group		
Yoruba	152	71.7
Hausa	6	2.8
Igbo	23	10.8
Others	30	14.2
No response	1	0.5

Table 4.1b: Socio-demographic characteristics of the respondents N=212

Variables	Frequency (n)	Percentage (%)
Marital Status		
Single (Never Married)	161	75.9
Married	50	23.6
Divorced	1	0.5
Monthly Allowance (₦)		
≤ 10, 000	22	10.4
> 10,000-40,000	51	24.1
> 40,000-70,000	19	9.0
> 70.000-100,000	14	6.6
> 100,000	10	4.7
No response	96	45.3

4.2 Knowledge of Breakfast Consumption and its Perceived Health Benefits

The knowledge of breakfast consumption and it perceived health benefits of the respondents are presented in Table 4.3 below. Greater proportion 162 (76.4%) of the respondents gave an incomplete definition of breakfast as "the first meal of the day", while only a few 36 (17.0%) were able to provide the complete (standard) definition of breakfast as "the **first meal of the day**, eaten before or at the start of daily activities, **typically no later than 12noon**". Majority 158 (74.5%) of the respondents were able to list correctly two types of foods best suitable for breakfast, 46 (21.7%) were able to list correctly only one type of food best suitable for breakfast, while only a few 4 (1.9%) provided wrong answers to the question.

Majority 124 (58.5%) of the respondents provided 2 correct health benefits of breakfast consumption, 67 (31.6%) were able to provide only one correct health benefit of breakfast consumption, while only a few 10 (4.7%) gave the wrong answers to the question. Many 109 (51.4%) provided correctly 2 health implications of skipping breakfast, 62 (29.2%) provided only one correct answer, while only a few 26 (12.3%) gave the wrong answers to the question. In general, greater proportion 164 (77.4%) of respondents had good knowledge of the perceived health benefits of breakfast consumption.

Table 4.2: Knowledge of breakfast consumption and its perceived health benefits

N=212

Variables	Frequency (n)	Percentage (%)
Breakfast definition		
Wrong	8	3.8
Incomplete	162	76.4
Complete	36	17.0
No response	6	2.8
Two types of foods that are best suitable for breakfast listed		
Wrong answers	4	1.9
One correct answer	46	21.7
Two correct answers	158	74.5
No response	4	1.9
Two health benefits of breakfast consumption mentioned		
Wrong answers	10	4.7
One correct answer	67	31.6
Two correct answers	124	58.5
No response	11	5.2
Two health implications of skipping breakfast mentioned		
Wrong answers	26	12.3
One correct answer	62	29.2
Two correct answers	109	51.4
No response	15	7.1
Knowledge Score (Classified)		
Poor (0-4)	48	22.6
Good (>4)	164	77.4

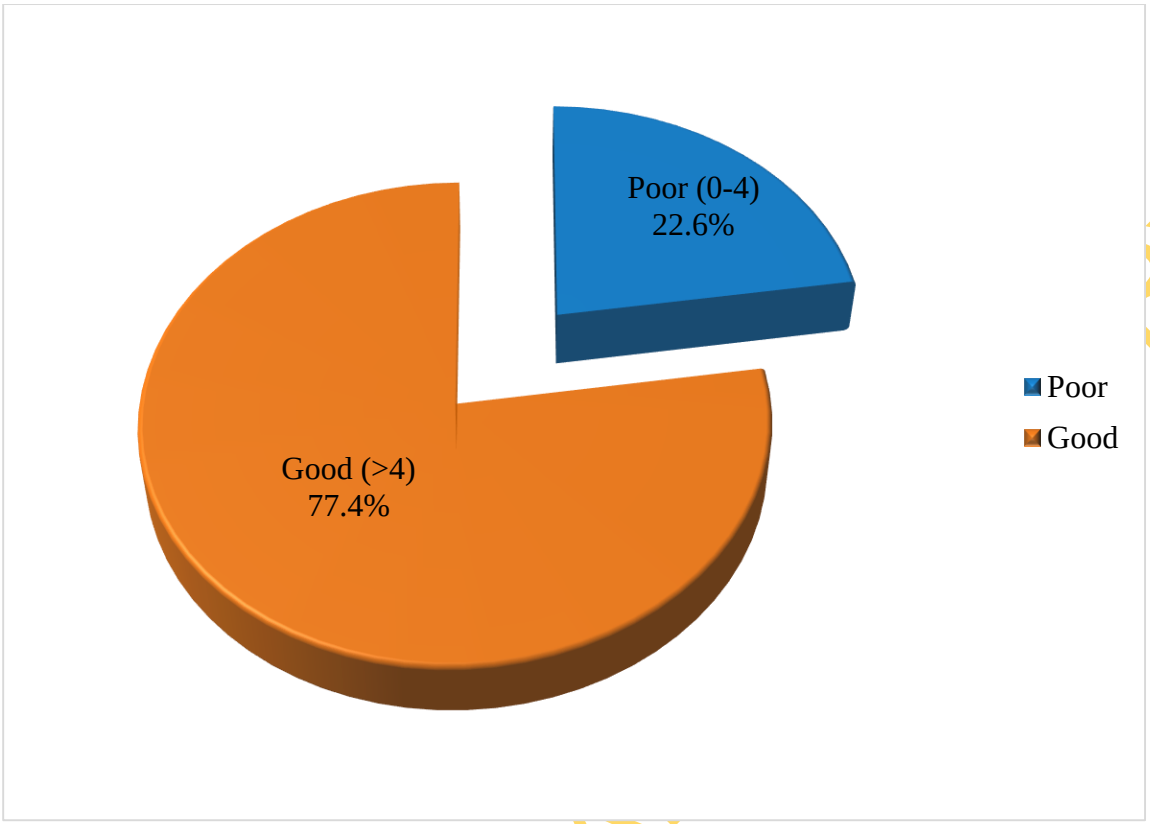

Figure 4.1: Knowledge Score of the respondents (Classified)

4.3 Perception of Breakfast Consumption and its Health Benefits

The perception of breakfast consumption and its health benefits of the respondents are presented in Table 4.4 below. Majority 171 (80.7%) of the respondents perceived to be more active when they consume breakfast, while 41 (19.3%) did not perceive that. However, majority 148 (69.8%) were of the perception that their daily activities were affected by breakfast consumption, while only 64 (30.2%) perceived that their daily activities were not affected by breakfast consumption. A greater proportion 156 (73.6%) of the respondents perceived that breakfast consumption enhanced their performance in school. About 95 (44.8%) perceived that they did not consider themselves fully alert until they have had breakfast. Many 109 (51.4%) were of the perception that students who take breakfast make better food choices during the day. More than half 153 (72.2%) perceived that having breakfast sets them up for the day, while 117 (55.2%) did not perceive that skipping breakfast makes them consume more during lunch. Greater proportion 170 (80.2%) of the respondents were of the perception that breakfast consumption is important for cognitive function and academic performance.

However, majority 147 (69.3%) of the respondents were not of the perception that breakfast consumption makes them feel sluggish. More than half 138 (65.1%) of the respondents perceived that breakfast consumption improves their mood, while majority 120 (56.6%) did not consider themselves at risk of any chronic diseases later in life as a result of skipping breakfast. A greater proportion 178 (84.0%) did not perceive that breakfast consumption makes them add weight. In general, majority 149 (70.3%) of the respondents had good perception of the health benefits of breakfast consumption.

Table 4.3a: Perception of breakfast consumption and its health benefits

N=212

Variables	Frequency (n)	Percentage (%)
Tend to be more active on eating breakfast		
Agree**	171	80.7
Disagree*	41	19.3
Daily activities not affected by breakfast		
Agree*	64	30.2
Disagree**	148	69.8
Eating breakfast helps in doing better in school		
Agree**	156	73.6
Disagree*	56	26.4
Not fully alert until breakfast is taken		
Agree**	95	44.8
Disagree*	117	55.2
Students who take breakfast makes better food choices during the day		
Agree**	109	51.4
Disagree*	103	48.6
Think having breakfast sets one up for the day		
Agree**	153	72.2
Disagree*	59	27.8
Skipping of breakfast results to consuming more during lunch		
Agree**	95	44.8
Disagree*	117	55.2

Table 4.3b: Perception of breakfast consumption and its health benefits

N=212

Variables	Frequency (n)	Percentage (%)
Do not think breakfast is important for cognitive function and academic performance		
Agree*	42	19.8
Disagree**	170	80.2
Feels sluggish after taking breakfast		
Agree*	65	30.7
Disagree**	147	69.3
Breakfast improves mood		
Agree**	138	65.1
Disagree*	74	34.9
Do not consider to be at any risk of chronic diseases later in life whenever breakfast is skipped		
Agree*	120	56.6
Disagree**	92	43.4
Think taking breakfast results to weight gain		
Agree*	34	16.0
Disagree**	178	84.0
Perception Score (Classified)		
Poor (0-6)	63	29.7
Good (>6)	149	70.3

**Correct

*Incorrect

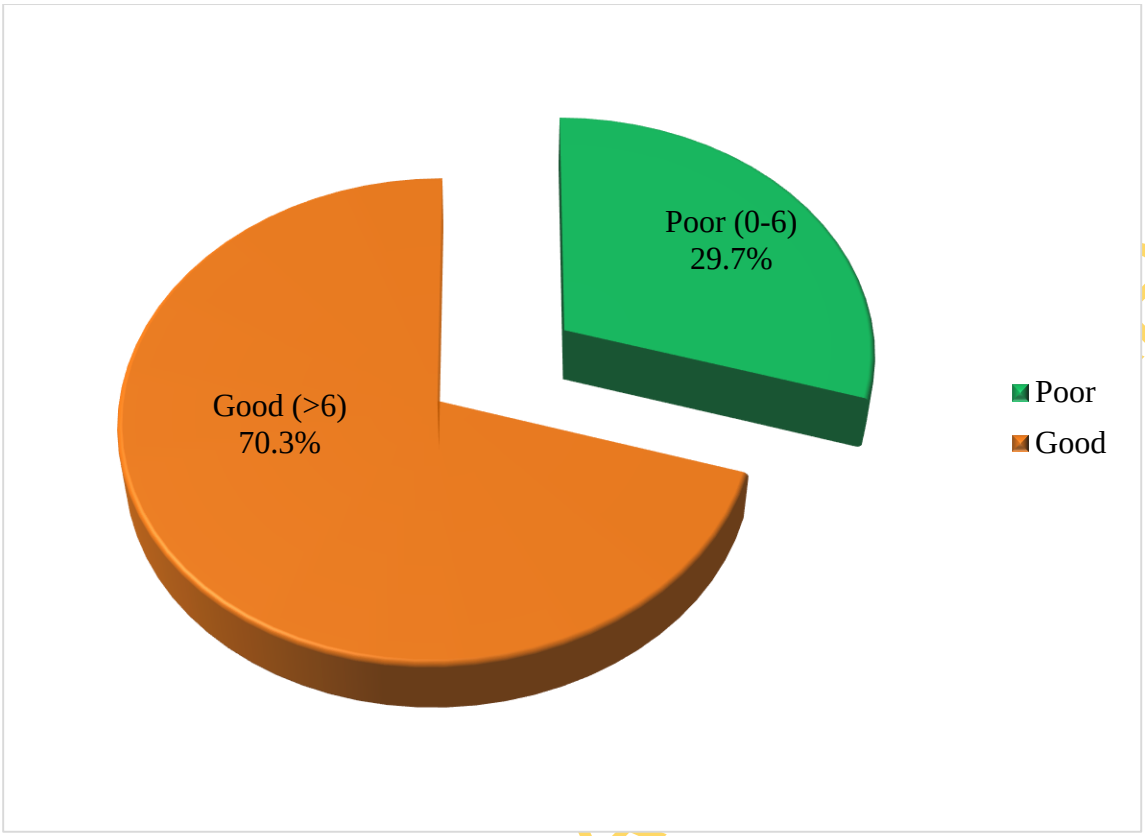

Figure 4.2: Perception Score of the respondents (Classified)

4.4 Frequency of Breakfast Consumption

As shown in Table 4.2a and 4.2b below: All 212 (100.0%) of the respondents affirmed that they consume breakfast. About 54 (25.5%) of the respondents (Breakfast Consumers) had breakfast everyday of the week, while 90 (42.5%) , 8 (3.8%), 51 (24.1%), 9 (4.2%) of the respondents (Breakfast Skippers) had irregular breakfast in a week, ≤ 2 days a week, 3-5 days a week and ≤ 6 days a week respectively. Greater proportion 128 (60.4%) of the respondents reported they took breakfast on the day of the interview, while 80 (37.7%) of the respondents did not take breakfast on that day.

A greater percentage 95 (44.8%) of the respondents had ready-to-eat cereal (cornflakes, rice crispy, etc) for breakfast ≤ 2 days in a week, while 6 (2.8%) and 52 (24.5%) had ready-to-eat cereal for breakfast everyday of the week and 3-5 times a week respectively. About 58 (27.4%) of the respondents reported that they never consumed ready-to-eat cereal for breakfast. Greater proportion 117 (55.2%) had bread /flour based (toast, cake, etc) for breakfast ≤ 2 days in a week, 64 (30.2%) of the respondents had bread/floor based for breakfast only 3-5 times a week, while only a few 8 (3.8%) had bread/flour based for breakfast everyday of the week. Majority 111 (52.4%) of the respondents never consumed fruit juice for breakfast, but only a few 3 (1.4%) reported that they consumed fruit juice/yoghurt for breakfast everyday of the week. Majority 87 (41.0%) of the respondents consumed cooked breakfast ≤ 2 times a week, 84 (39.6%) had cooked breakfast 3-5 times in a week.

However, only a few 14 (6.6%) had cooked breakfast everyday of the week. Majority 109 (51.4%) of the respondents reported that they never consumed bars and biscuits for breakfast. About half 104 (49.1%) of the respondents reported that they never had porridge for breakfast, while 92 (43.4%) had porridge for breakfast ≤ 2 days in a week. More than half 118 (55.7%) of the respondents never consumed fast-food for breakfast, but only a few 6 (2.8%) had fast-food for breakfast everyday of the week. Greater proportion 84 (39.6%) of the respondents had hot drinks in the form of tea or coffee for breakfast ≤ 2 days in a week, while half 106 (50.0%) of the respondents reported that they had never consumed carbonated drinks for breakfast, however, only about 68 (32.1%) consumed carbonated drinks for breakfast ≤ 2 days in a week.

About 67 (31.6%) reported taking water only for breakfast everyday of the week, while only a few 17 (8.0%) of the respondents consume fruits and vegetables everyday of the week.

Table 4.4a: Frequency of breakfast consumption **N=212**

Variables	Frequency (n)	Percentage (%)
Takes breakfast		
Yes	212	100.0
No	0	0.0
Frequency of breakfast intake in a week		
≤ 2 days a week	8	3.8
3-5 days a week	51	24.1
≤ 6 days a week	9	4.2
Everyday	54	25.5
Irregular	90	42.5
Took breakfast that morning		
Yes	128	60.4
No	80	37.7
No response	4	1.9

Table 4.4b: Frequency of breakfast consumption **N=212**

Variables	Frequency (n)	Percentage (%)
Frequency of foods/drinks taking at breakfast		
Ready-to-eat Cereals	6	2.8
Everyday of the week	52	24.5
3-5 times a week	95	44.8
≤ 2 days a week	58	27.4
Never		
Bread/Flour Based	8	3.8
Everyday of the week	64	30.2
3-5 times a week	117	55.2
≤ 2 days a week	20	9.4
Never	3	1.4
No response		
Cooked Breakfast	14	6.6
Everyday of the week	84	39.6
3-5 times a week	87	41.0
≤ 2 days a week	22	10.4
Never	5	2.4
No response		
Hot Drinks (tea, coffee, etc.)	20	9.4
Everyday of the week	68	32.1
3-5 times a week	84	39.6
≤ 2 days a week	38	17.9
Never	2	0.9
No response		
Fruits and Vegetables	17	8.0
Everyday of the week	50	23.6
3-5 times a week	88	41.5
≤ 2 days a week	54	25.5
Never	3	1.4
No response		

4.5 Factors Influencing Pattern of Breakfast Consumption of the Respondents

As shown in table 4.5 below: Majority 155 (73.1%) of the respondents reported that their busy schedules (no time to eat) prevented them from taking breakfast, while only 90 (45.2%) reported that they skipped breakfast only during religious fasting. Greater proportion 161 (75.9%) of the respondents reported that their skipping breakfast was never due to insufficient fund/feeding allowance. However, slightly below average 92 (43.4%) did not like to eat early. A few 40 (18.9%) reported that they skipped breakfast just to lose weight, while 52 (24.5%) skipped breakfast due to the absence of food at home. About half 105 (49.5%) of the respondents reported taking breakfast to keep them alert, while 66 (31.1%) attributed skipping of breakfast to waking up late. A quarter 53 (25.0%) of the respondents reported that they skipped breakfast because it takes too much time to prepare.

Table 4.5a: Factors influencing pattern of breakfast consumption of the respondents

N=212

Variables	Frequency (n)	Percentage (%)
Busy Schedule (No time to eat)		
Yes	155	73.1
No	51	24.1
Don't know	6	2.8
Skip breakfast only when fasting		
Yes	90	45.2
No	117	55.2
Don't know	5	2.4
Insufficient feeding allowance		
Yes	45	21.2
No	161	75.9
Don't know	6	2.8
Do not like to eat early		
Yes	92	43.4
No	114	53.8
Don't know	6	2.8
To lose weight		
Yes	40	18.9
No	168	79.2
Don't know	4	1.9
No food in the house		
Yes	52	24.5
No	153	72.2
Don't know	7	3.3

Table 4.5b: Factors influencing pattern of breakfast consumption of the respondents

N=212

Variables	Frequency (n)	Percentage (%)
To be alert		
Yes	105	49.5
No	101	47.6
Don't know	6	2.8
Wake up late		
Yes	66	31.1
No	141	66.5
Don't know	5	2.4
It takes too much time to prepare		
Yes	53	25.0
No	153	72.2
Don't know	6	2.8
Other factors (*Please specify*)		
Don't feel comfortable taking breakfast	1	0.5
Skip breakfast when ill	1	0.5
Too lazy to cook	1	0.5
Fear of having running stomach in school	1	0.5
Lack of appetite	1	0.5
No response	206	97.2

4.6 Test of Hypotheses

The results of the hypothesis tested are shown below:

Hypothesis 1: There is no significant relationship between the level of knowledge of the respondents on the perceived health benefits of breakfast consumption and the frequency of breakfast intake. The result of the finding is shown in Table 4.6 below: Fisher's Exact Test was used to test for a relationship between the level of knowledge of the respondents on the perceived health benefits of breakfast consumption and the frequency of breakfast intake, and it was found that there was a significant relationship statistically with P = 0.031. This meant that the level of knowledge of the respondents on the perceived health benefits of breakfast consumption had a significant influence on the frequency of breakfast intake. Therefore, the null hypothesis was rejected.

Hypothesis 2: There is no significant relationship between the perception of the respondents on the health benefits of breakfast consumption and the frequency of breakfast intake. The result of the finding is shown in Tables 4.7 below: The table showed a statistical relationship between the perception of the respondents on the health benefits of breakfast consumption and the frequency of breakfast intake with P = 0.000. This meant that the perception of the respondents on the health benefits of breakfast consumption had a significant influence on the frequency of breakfast intake. Therefore, the null hypothesis was rejected.

Hypothesis 3: There is no significant relationship between the level of knowledge of the respondents on the perceived health benefits of breakfast consumption and their perception on the health benefits of breakfast consumption. Table 4.8 showed the result of the finding. Chi square was used to test for a relationship between the level of knowledge of the respondents on the perceived health benefits of breakfast consumption and their perception on the health benefits of breakfast consumption, and it was found that there was a significant relationship statistically with P = 0.000. This meant that the level of knowledge of the respondents on the perceived health benefits of breakfast consumption had a significant influence on their perception of the health benefits of breakfast consumption. Therefore, the null hypothesis was rejected.

Hypothesis 4: There is no significant relationship between the respondents' socio-demographic characteristics and the frequency of breakfast intake. The results of the findings are shown in Tables 4.9a, 4.9b and 4.9c below: The tables showed no statistical relationship between the socio-demographic characteristics (sex = 0.962; departments = 0.709; religion = 0.105; ethnic group = 0.614; marital status = 0.171; monthly allowance = 0.73 and age = 0.983) of the respondents and the frequency of breakfast intake. Therefore, the null hypothesis was not rejected.

Table 4.6: Relationship between knowledge score and frequency of breakfast intake **N=212**

Variable	≤ 2 days/wk N (%)	3-5 days/wk N (%)	≤ 6 days/wk N (%)	Everyday N (%)	Irregular N (%)	Total N (%)	*X^2	P-Value	Ho
Knowledge Score of respondents									
Poor (0-4)	5 (62.5)	12 (23.5)	1 (11.1)	7 (13.0)	23 (25.6)	48 (22.6)	9.992	0.031	Rejected
Good (> 4)	3 (37.5)	39 (76.5)	8 (88.9)	47 (87.0)	67 (74.4)	164 (77.4)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	21200.0)			

*** Fisher's Exact Test was used**

Table 4.7: Relationship between perception score and frequency of breakfast intake **N=212**

Variable	≤ 2 days/wk N (%)	3-5 days/wk N (%)	≤ 6 days/wk N (%)	Daily N (%)	Irregular N (%)	Total N (%)	*X^2	P-Value	Ho
Perception Score of respondents									
Poor (0-6)	3 (37.5)	14 (27.5)	1 (11.1)	4 (7.4)	41 (45.6)	63 (29.7)	27.268	0.000	Rejected
Good (>6)	5 (62.5)	37 (72.5)	8 (88.9)	50 (92.6)	49 (54.4)	149 (70.3)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			

***Fisher's Exact Test was used**

Table 4.8: Relationship between perception score and knowledge score **N=212**

Variable	Poor (0-4) N (%)	Good (> 4) N (%)	Total N (%)	X^2	P-Value	Ho
Perception Score						
Poor (0-6)	25 (52.1)	38 (23.2)	63 (29.7)	14.862	0.000	Rejected
Good (> 6)	23 (47.9)	126 (76.8)	149 (70.3)			
Total	48 (100.0)	164 (100.0)	212 (100.0)			

Table 4.9a: Relationship between socio-demographic characteristics and frequency of breakfast intake N=212

Variables	≤ 2 days/wk N (%)	3-5 days/wk N (%)	≤ 6 days/wk N (%)	Everyday N (%)	Irregular N (%)	Total N (%)	X^2	P-Value	Ho
Sex									
Male	4 (50.0)	20 (39.2)	4 (44.4)	20 (37.0)	35 (38.9)	83 (39.2)	0.605	0.962	Accepted
Female	4 (50.0)	31 (60.8)	5 (55.6)	34 (63.0)	55 (61.1)	129 (60.8)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			
Departments									
Health Promotion and Education	2 (25.0)	14 (27.5)	3 (33.3)	18 (33.3)	28 (31.1)	65 (30.7)	19.775	0.709	Accepted
Environmental Health Science	2 (25.0)	11 (21.6)	1 (11.1)	15 (27.8)	19 (21.1)	48 (22.6)			
Health Policy and Management	2 (25.0)	9 (17.6)	1 (11.1)	5 (9.3)	16 (17.8)	33 (15.6)			
Epidemiology and Medical Statistics	0 (0.0)	6 (11.8)	2 (22.2)	8 (14.8)	7 (7.8)	23 (10.8)			
Preventive Medicine and Primary care	2 (25.0)	3 (5.9)	0 (0.0)	4 (7.4)	9 (10.0)	18 (8.5)			
Institute of Child Health	0 (0.0)	3 (5.9)	1 (11.1)	2 (3.7)	9 (10.0)	15 (7.1)			
Human Nutrition	0 (0.0)	5 (9.8)	1 (11.1)	2 (3.7)	2 (2.2)	10 (4.7)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			

Table 4.9b: Relationship between socio-demographic characteristics and frequency of breakfast intake N=212

Variables	≤ 2 days/wk N (%)	3-5 days/wk N (%)	≤ 6 days/wk N (%)	Everyday N (%)	Irregular N (%)	Total N (%)	X^2	P-Value	Ho
Religion									
Christianity	7 (87.5)	48 (94.1)	8 (88.9)	40 (74.1)	82 (91.1)	185 (87.3)	13.219	0.105	Accepted
Islam	1 (12.5)	2 (3.9)	1 (11.1)	13 (24.1)	7 (7.8)	24 (11.3)			
Traditional	0 (0.0)	1 (2.0)	0 (0.0)	1 (1.9)	1 (1.1)	3 (1.4)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			
Ethnic group									
Yoruba	6 (75.0)	39 (76.5)	9 (100.0)	37 (68.5)	61 (67.8)	152 (71.7)	13.798	0.614	Accepted
Hausa	0 (0.0)	1 (2.0)	0 (0.0)	3 (5.6)	2 (2.2)	6 (2.8)			
Ibo	2 (25.0)	7 (13.7)	0 (0.0)	4 (7.4)	10 (11.1)	23 (10.8)			
Others	0 (0.0)	4 (7.8)	0 (0.0)	10 (18.5)	16 (17.8)	30 (14.2)			
No response	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.1)	1 (0.5)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			
Marital status									
Single (Never married)	7 (87.5)	42 (82.4)	4 (44.4)	38 (70.4)	70 (77.8)	161 (75.9)	11.584	0.171	Accepted
Married	1 (12.5)	8 (15.7)	5 (55.6)	16 (29.6)	20 (22.2)	50 (23.6)			
Divorced	0 (0.0)	1 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.5)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			
Monthly allowance (₦)									
≤ 10,000	2 (25.0)	4 (7.8)	1 (11.1)	6 (11.1)	9 (10.0)	22 (10.4)	15.661	0.737	Accepted
>10,000-40,000	3 (37.5)	15 (29.4)	2 (22.2)	10 (18.5)	21 (23.3)	51 (24.1)			
>40,000-70,000	0 (0.0)	8 (15.7)	1 (11.1)	2 (3.7)	8 (8.9)	19 (9.0)			
>70,000-100,000	0 (0.0)	5 (9.8)	1 (11.1)	4 (7.4)	4 (4.4)	14 (6.6)			
>100,000	0 (0.0)	3 (5.9)	0 (0.0)	3 (5.6)	4 (4.4)	10 (4.7)			
No response	3 (37.5)	16 (31.4)	4 (44.4)	29 (53.7)	44 (48.9)	96 (45.3)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			

Table 4.9c: Relationship between socio-demographic characteristics and frequency of breakfast intake N=212

Variable	< 2 days/wk N (%)	3-5 days/wk N (%)	< 6 days/wk N (%)	Everyday N (%)	Irregular N (%)	Total N (%)	X^2	P-Value	Ho
Age (years)									
10- 19	0 (0.0)	1 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.5)	6.408	0.983	Accepted
20-29	7 (87.5)	37 (72.5)	6 (66.7)	42 (77.8)	66 (73.3)	158 (74.5)			
30-39	1 (12.5)	9 (17.6)	3 (33.3)	9 (16.7)	18 (20.0)	40 (18.9)			
40-49	0 (0.0)	1 (2.0)	0 (0.0)	1 (1.9)	2 (2.2)	4 (1.9)			
No response	0 (0.0)	3 (5.9)	0 (0.0)	2 (3.7)	4 (4.4)	9 (4.2)			
Total	8 (100.0)	51 (100.0)	9 (100.0)	54 (100.0)	90 (100.0)	212 (100.0)			

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Respondents' Socio-demographic characteristics

The age range of the respondents was between 19 to 49 years of age with a mean age of 30.5±14.8. Majority (74.5%) of the respondents fell between the ranges of 20-29 years of age which showed that most of the respondents were young adults and 75.9% were single (never married). Studies showed that the prevalence of breakfast skipping is common among young adults in colleges and universities (Samuelson, 2000; Keski- Rahkonen et al., 2003; Osako et al., 2005; Song et al., 2005) which are consistent with the findings of this study. Young adults have the habits of skipping meals especially breakfast (Keski-Rahkonen et al., 2003) which is similar to indications in some countries that breakfast consumption among adults is declining (Akinyele et al., 1997) especially among young adults. Older adults are more likely to consume breakfast than younger adults. For example, among young adults age 20 to 29 years, 71 percent of females and 62 percent of males eat breakfast, but about nine out of 10 men and women age 60 and above eat breakfast (National Health and Nutrition Examination Survey, 2001-2002).

5.2 Respondents' knowledge of the perceived health benefits of breakfast consumption

The findings from this study showed that majority (77.4%) of the respondents had a good knowledge of the perceived health benefits of breakfast consumption and a contributing factor could be that the study population was made up of MPH students of the faculty of public health and considering their level of exposure. In accessing their knowledge of breakfast consumption and its perceived health benefits, the question 'What is breakfast?' was asked. A few (17%) of the respondents were able to provide the complete definition of breakfast in terms of it being the first intake of food taking place at a certain time of the day rather than what people eat which is consistent with Giovannini et al. (2008) who defined breakfast "as the first meal of the day, eaten before or at the start of daily activities, within the 2 hours of waking, typically no later than 10am". This contrasts with

perhaps more methodical definitions that have been previously published which describe breakfast as being a certain number of calories consumed (Cho et al., 2003).

However, the National Health and Nutrition Examination Survey (NHANES III) in the U.S. described breakfast as 'any food or beverage consumed in a meal occasion named by the respondent as breakfast' (Cho et al., 2003), not dissimilar to the 76.4% of respondents in this study who described breakfast as being simply 'the first meal of the day', that is, those who gave an incomplete definition of breakfast. Respondents were also asked to list 2 types of foods best suitable for breakfast, 2 health benefits of breakfast consumption and 2 health implications of skipping breakfast. The respondents possessed a high level of knowledge of the perceived health benefits of breakfast consumption. This can be deduced from their responses about some of the health benefits of breakfast consumption.

Most (90.1%) of the respondents gave at least one correct health benefit of breakfast consumption which includes improved nutrient intake, better food choice, improved mood, alertness, lower BMI, improved cognitive functions and academic performance. This is supported by Gibson and Gunn, (2010) which confirmed that breakfast consumption has been associated with a multitude of health-related benefits, including improved nutrient intake, increased moderate-to-vigorous physical activity (Corder et al., 2014), and improved mood (Defeyter and Russo, 2013). Consumption of breakfast is a dietary pattern which contributes positive benefits in nutrition and cognitive function (Albertson et al., 2011). It is correlated with better food choice and consequently better intake of essential nutrients (Sugiyama et al., 2012). The consumption of a healthy breakfast is important to health (Timlin and Pereira, 2007). Specifically, eating breakfast is associated with improved nutrient intake and lower body mass index (Sjoberg, et al. 2003; Affenito et al., 2005; Barton et al., 2005; Croezen et al., 2007; Deshmukh-Taskar et al., 2010).

5.3 Respondents' perception of the health benefits of breakfast consumption

The findings from this study showed that majority (70.3%) of the respondents had good perception of the health benefits of breakfast consumption. This can be related to the high level of knowledge of the perceived health benefits of breakfast consumption possessed by the respondents which was found to be statistically significant with P=0.000. This could also be tagged to the fact that the respondents were within the academic settings. Perception of breakfast may also influence a person's likelihood of consuming breakfast and subsequent psychological reactions to this meal (Chapman et al., 1998; Reeves et al., 2013). This is consistent with the findings from this study which found the relationship between the perception of the respondents on the health benefits of breakfast consumption and the frequency of breakfast intake statistically significant with P=0.000.

Majority (84%) of the respondents was of the perception that breakfast consumption helps them control or lose weight. These findings are in contrast with Wardle et al., (2000) who found no difference in self-reported breakfast eating habits of UK adults who were watching their weight or wanting to lose weight and adults who were happy with their weight, but consistent with a wealth of data which indicated that regular breakfast consumption has also been associated with a healthier body mass index and reduced likelihood of obesity development in adults and children alike (de la Hunty and Ashwell 2007; Szajewska and Ruszczynski 2010); it may also be protective of weight gain over time (Ask et al., 2006; Albertson et al., 2007).

Evidence also suggests that breakfast consumption can enhance cognitive function and academic performance, as well as improve mood (Wesnes et al., 2003; Widenhorn-Muller et al., 2008; Hoyland et al., 2009) which is consistent with the findings of this study. Majority (80.2%) perceived breakfast to be important for cognitive function and academic performance, while 65.1% perceived that breakfast consumption improved their mood. Chapman et al., (1998) in a study of Canadian University students reported that the majority of respondents perceived breakfast to be important in providing energy and increasing productivity in the morning. In contrast, Unusan, Sanlier, and Danisik, (2006) compared attitudes to breakfast in Turkish children living in Turkey and Germany

and found that those living in Turkey reported significantly more positive effects associated with breakfast, whereas significantly more children in Germany perceived that breakfast made them feel tired. This is inconsistent with the findings of this study where only few (30.7%) perceived that breakfast consumption makes them feel sluggish.

However, many (69.8%) were of the perception that their daily activities were not affected by breakfast consumption, while 44.8% perceived themselves not fully alert until they have had breakfast. About half (51.4%) perceived that breakfast consumption helps them make better food choices during the day and this correlates with better food choice and consequently better intake of essential nutrients as a result of breakfast consumption reported by Sugiyama et al., (2012).

5.4 Respondents' frequency of breakfast consumption

The main finding of this study indicates that 74.5% of the respondents skipped breakfast or had infrequent breakfast consumption. This finding was higher in comparison with previous studies. The study conducted among undergraduates in university in Kuala, Malaysia showed that 29.2% skipped breakfast (Moy et al., 2009), similar study conducted by Tanaka et al., (2008) showed that 35.4% skipped breakfast meal, 31.5% of adolescents skipped breakfast in a study conducted by Priya, Theresa, Carol, Debra, John and Susan, (2010), the prevalence of breakfast skipping among students studying traditional Chinese medicine and Mongolian medicine was 22.7% (Sun, Liu, Wu, Bian, Wu, Eshita, Li, Zhang and Yang., 2013), 14.7% prevalence of breakfast skippers among Ahamdu Bello University students (Anigo et al., 2013), while it was 44.9% among undergraduates of Federal University of Agriculture Abeokuta, Nigeria (Adesina, 2013).

Quite a high number of female participants skipped breakfast more than male counterpart, perhaps the females are more concerned with their body image, that is, fear of being overweight and obese. This is similar with the previous studies that linked meals skipping to concern about body image among adolescent girls (Sjoberg et al., 2003; Calderon, Yu and Jambazian, 2004; Chin and Mohd Nasir, 2009; Onyiriuka, Umoru, Ibeawuchi, 2013). People who did not take breakfast were much more likely to have

inadequate nutrient intakes. Regular breakfast consumption is associated with better diets for adults overall (Williams, 2005). A study by Ma et al., (2003) found that adults and adolescents who skipped breakfast tend to eat more for the rest of the day.

Ready-to-eat cereal was the most commonly consumed breakfast food, followed by bread, with fewer students eating foods from dairy and fruit groups. This is comparable to results from a systematic review where it was found that ready-to-eat cereals and dairy foods were the most commonly consumed breakfast items, followed by fruit and fruit juice, and bread products (Mullan and Singh, 2010). It has been suggested that consuming a breakfast that includes cereal is beneficial to overall nutrient intake, as some cereals are indeed low in fat, good sources of complex carbohydrates, fortified with essential nutrients, and high in dietary fibre (Barton et al., 2005). In contrast, there are concerns about the nutritional quality of other ready-to-eat cereals based on their high sugar content and lack of nutrients (Nicklas et al. 2002). Studies show that consumption of vegetables and fruits are unsatisfactory among college or university students (Debate, Topping and Sargent, 2001; Osako *et al.*, 2005), which is comparable with the findings of this study.

Glanz and Holscher, (2004) found that a changing environment, policy and pricing did manage to result in moderate improvement on the consumption of fruits and vegetables. However, about half of the respondents (49%) had snacks (carbonated drinks like coke with pastry) at least once a week, which are unhealthy.

5.5 Factors influencing pattern of breakfast consumption of the respondents

The factors influencing pattern of breakfast consumption of the respondents were not different from what other studies reported. Factors influencing pattern of breakfast consumption were more of personal choice such as no time to eat, did not like to eat early, no appetite or overslept. Similar findings have been reported elsewhere (Chitra and Reddy, 2007). Other factors stated were personal as reported in the Kuala study (Abaidoo and Unit, 2014). These include availability of food to purchase, lack of appetite or not hungry, normal habit, oversleeping, spiritual (fasting). The major factor influencing

pattern of breakfast consumption of the respondents was that of availability of time to eat/busy schedule (73.1%). Similarly, Singleton and Rhoads, (1982) found that the most common factors influencing pattern of breakfast consumption was no time (43%) and not being hungry (42%); less common factors included being on a diet to lose weight, not feeling good, no one to prepare food, not liking the food served, and food not being available. Also, Australian study by Shaw, (1998) found that the factors influencing pattern of breakfast consumption were almost exclusively lack of time and not being hungry in the morning. Moreover, breakfast skipping was related to gender, not income, with females skipping more than three times as often as males, which is similar with the finding of this study where only few (21%) of the respondents reported financial reasons for skipping breakfast. This is comparable with the reasons for skipping breakfast reported by Moy et al., (2009) which included financial constraints, habitual, unavailability of time to prepare breakfast among others. For most of these respondents, breakfast was not a priority in the management of their finances.

5.6 Implication of the study findings for health promotion and education

The findings of this study have implications for health promotion and education. This study has identified factors influencing pattern of breakfast consumption among Master of Public Health students in the University of Ibadan. Majority of the students who skipped breakfast or had infrequent breakfast consumption reported that the major factor influencing their pattern of breakfast consumption was that of availability of time to eat/busy schedules. The respondents had good knowledge and perception of the health benefits of breakfast consumption, yet many skipped breakfast or had infrequent breakfast consumption. Health promotion and education strategies such as advocacy, effective communication or public enlightenment and training can be used to tackle some of these challenges identified in this study.

Advocacy

This is a health education intervention/strategy which involves championing the course of something or an action. It is often aimed at defending a group of people or improvement

of their status (Obar, Zube and Lampe, 2012). Advocacy could be done through methods such as media advocacy and lobbying by interest groups. The objective is to guide policy-makers at national and sub-national levels in the development and implementation of policies that will promote healthy eating especially frequent breakfast consumption in the school/college setting, as well as to recommend changes in the school food environment by providing a suitable and convenient cafeteria for breakfast. For example, the guide will recommend the inclusion of nutrition education in school/college policies and programmes, as a means of providing knowledge and skills about the relationship between breakfast and health; allowing students to identify barriers to breakfast consumption and solutions to overcome the identified barriers; addressing the suggestion that lectures should start not earlier than 9.00am so as to provide adequate time for having a good breakfast in a relaxed environment; addressing the safe preparation of breakfast and its consumption as an essential positive and enjoyable aspect of life; and involving the Heads of each department and the lecturers in the Faculty in imparting health messages promoting breakfast consumption to students.

Public enlightenment/Effective communication

Public enlightenment is an organised communication activity with the aim of creating awareness and changing behaviour among the general population. They are often characterised as mass media campaigns. The World Health Organisation (2011) recommends mass media campaigns as one of their "Best Buys" for NCDs prevention and control, they also involve the provision of information to the general public through a variety of other channels, including: Health and education-related settings; Public relations events, such as talks, demonstrations and tours; Social media and Mass media.

The impact of information and communication is very essential in health promotion on behaviour change. Information, Education and Communication (IEC) materials can be used to address the high breakfast skipping or infrequent breakfast consumption among students and to get the students familiar with the perceived health implications of skipping breakfast. This can be achieved by the Faculty in collaboration with the representatives of Master of Public Health students in the University of Ibadan. The IEC

materials will contain messages promoting frequent breakfast consumption, health benefits of breakfast consumption and the health implication of skipping breakfast. For example, development of messages such as "Eating breakfast sets you up for the day"; "Students who eat breakfast make better food choices during the day" can be done with supervision from a health promotion expert vast in behavioral communication. These tailored messages will go a long way in improving the breakfast consumption pattern of students.

Training

Training is an educational process design to equip people with functional knowledge and skills, with the objective of enabling people to do things well. From the findings of this study, the respondents had good knowledge and perception of the health benefits of breakfast consumption; hence, training could be in form of continuing education, conference, seminar or workshop for both lecturers and students in the Faculty to tackle the problem of breakfast skipping among Master of Public Health Students in University of Ibadan. For example, seminars on the theme "The health benefits of breakfast consumption" could be organised by the faculty involving the whole departments within the faculty. This will require the invitation of lecturers/specialists in Public Health Nutrition to facilitate such program. The content of the seminar could be "the perceived benefits of breakfast consumption", the materials involved will be materials such as projector, charts, flyers and so on. The evaluation methods that will ensure that the objectives of the proposed seminars are met are pre and post tests as well as question and answer.

5.7 Conclusion

This study has helped revealed that though there was a high level of knowledge of the perceived health benefits of breakfast consumption and a high perception of the health benefits of breakfast consumption, and a contributing factor could be that the study population was made up of MPH students of the faculty of public health presently within an academic settings and considering their level of exposure, yet majority of the respondents skipped breakfast or had infrequent breakfast consumption.

The major factor influencing pattern of breakfast consumption of the respondents was that of availability of time to eat/busy schedule, less common factors included being on a diet to lose weight, religious fasting, do not like to eat early, no food in the house, to be alert, not feeling good, lack of appetite, and too lazy to cook.

5.8 Recommendations

In view of the findings of this study, the following recommendations were made:

1. The lack of consistency in the result shows the need for further research to be conducted to find a degree of consistency in how breakfast should be defined, however, until more research is done to better define parameters of what aspects of breakfast are most beneficial (e.g., amount of calories, macronutrient composition, timing) and how sleep quality and duration are intertwined with breakfast habits, we will continue to have a less than complete understanding of what specific advice to give regarding "eating breakfast."
2. Future exploratory studies may also consider measuring breakfast consumption over a longer period to ensure the data is representative and generalisable, as well as measuring energy intake at breakfast. Breakfast interventions could explore ways to change eating at individual level (e.g. encouraging healthy individual food choices). For example, encouraging students to substitute high sugar cereals with those that are not only lower in sugar but also have additional health benefits (e.g. fibre and nutrients), an approach adopted in the current Australian "swap it don't stop it" campaign.
3. There is also need to encourage consumption of breakfast by students, along with selection of more healthful breakfast food choices that are culturally appropriate which may be an important strategy for improving the nutritional quality of their dietary intake.
4. Health awareness campaigns or the introduction of healthy eating guidelines should be implemented to MPH students as well as to the caterers in campus. The policy and pricing of catered food in campus should also be reviewed.

5. In summary, the perceived health implications of eating breakfast remain an active area of research that is needed to support specific recommendations on breakfast timing, frequency and composition.

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APPENDIX 1

QUESTIONNAIRE

PATTERN OF BREAKFAST CONSUMPTION AND ITS PERCEIVED HEALTH BENEFITS AMONG MASTER OF PUBLIC HEALTH STUDENTS IN UNIVERSITY OF IBADAN, OYO STATE, NIGERIA

INTRODUCTION: Greetings, I am a student of the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan. I am conducting a study on the Pattern of Breakfast Consumption and its Perceived Health Benefits among Master of Public Health Students in University of Ibadan and would very much appreciate your participation. I will be grateful if you spend some time answering these questions, promise not to take much of your time. All the information provided will be kept confidential. You are not obliged to answer any question you do not wish to answer. Thanks.

Questionnaire Identification Number: _____

Date of Interview: _____

Would you like to participate? Yes [ ] No [ ]

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

***Instruction:* Please tick ☑ in the boxes provided (as appropriate)**

1. Sex 1. Male ☐ 2. Female ☐
2. How old were you at your last birthday? _____ (in years)
3. Department _____
4. What religion do you practice?
   1. Christianity ☐ 2. Islam ☐ 3. Traditional religion ☐
   4. None ☐ 5. Others (specify) _____
5. Ethnic group
   1. Yoruba ☐ 2. Hausa ☐
   3. Igbo ☐ 4. Others (specify) _____

6. What is your Marital Status?
   1. Single ☐ 2. Married ☐ 3. Cohabit ☐ 4. Divorced ☐
   5. Separated ☐ 6. Widowed ☐ 5. Others (specify) _____

7. Monthly allowance/Salary _____ (in naira)

SECTION B: FREQUENCY OF BREAKFAST CONSUMPTION

***Instruction*: Please tick ☑ in the boxes provided (as appropriate)**

8. Do you eat breakfast? YES ☐ NO ☐

9. How often do you eat breakfast in a week?
   1. Never ☐
   2. ≤ Two days a week ☐
   3. Three to five days a week ☐
   4. ≤ Six days a week ☐
   5. Everyday ☐
   6. Irregular ☐

10. Did you take your breakfast this morning? YES ☐ NO ☐

Please kindly tick ☑ appropriately

	How often do you eat the following during breakfast?	**Everyday of the week**	**3-5 times a week**	**≤ 2 days a week**	**Never**
11	Ready-to-eat Cereals (cornflakes, puffed rice, etc.)				
12	Bread/Flour Based (toast, cake, etc.)				
13	Fruit Juice/Yogurt				
14	Cooked Breakfast (noodles, egg, etc.)				
15	Bars and Biscuits				
16	Porridge				
17	Fast-food (burger, doughnut, etc.)				

18	Hot Drinks (tea, coffee, etc.)				
19	Carbonated Drinks (coke, energy drink, etc.)				
20	Water only				
21	Fruits/Vegetables				

SECTION C: KNOWLEDGE OF BREAKFAST CONSUMPTION AND ITS PERCEIVED HEALTH BENEFITS

S/N	QUESTIONS	OPTIONS AND ALLOTTED POINTS	Official Use
22	What is Breakfast?	_____ _____ _____	
23	List 2 types of food that are best suitable for breakfast	_____ _____ _____	
24	Mention 2 health benefits of breakfast consumption	_____ _____ _____	
25	Mention 2 health implications of skipping breakfast	_____ _____ _____	

26. Score Obtained: _____
27. Code: _____

SECTION D: PERCEPTION ON BREAKFAST CONSUMPTION AND ITS HEALTH BENEFITS

***Instruction*: Please read the statements below and tick ☑ appropriately**

	Perception Statement	Answers	Official Use
28	I tend to be more active when I eat breakfast	Agree ☐ Disagree ☐	
29	I think my daily activities are not affected by breakfast	Agree ☐ Disagree ☐	
30	Eating breakfast helps me do better in school	Agree ☐ Disagree ☐	
31	I consider myself not fully alert until I have had breakfast	Agree ☐ Disagree ☐	
32	Students who eat breakfast make better food choices during the day	Agree ☐ Disagree ☐	
33	I think having breakfast sets me up for the day	Agree ☐ Disagree ☐	
34	Skipping of breakfast makes me consume more during lunch	Agree ☐ Disagree ☐	
35	I do not think breakfast is important for cognitive function and academic performance	Agree ☐ Disagree ☐	
36	I think after eating breakfast I feel sluggish	Agree ☐ Disagree ☐	
37	Breakfast improves my mood	Agree ☐ Disagree ☐	
38	I do not consider myself at any risk of chronic diseases later in life whenever I skip breakfast	Agree ☐ Disagree ☐	
39	I think eating breakfast makes me add weight	Agree ☐ Disagree ☐	

40. Score Obtained: _____

41. Code: _____

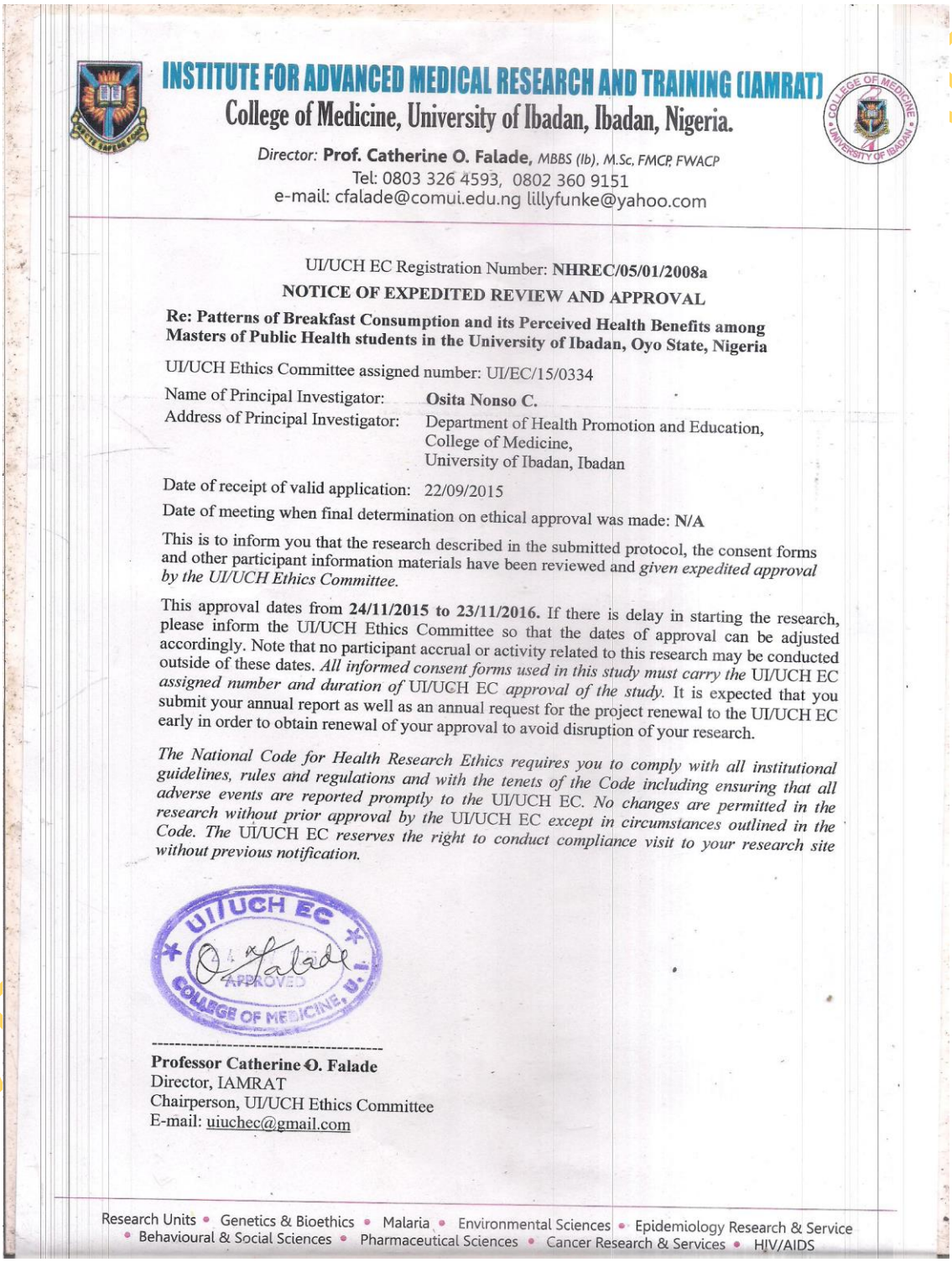
SECTION E: FACTORS INFLUENCING PATTERN OF BREAKFAST CONSUMPTION

	Factors influencing pattern of breakfast consumption	**Yes**	**No**	**Don't Know**
42	Busy Schedule (No time to eat)			
43	Skip breakfast only when fasting			
44	Insufficient feeding allowance			
45	Do not like to eat early			
46	To lose weight			
47	No food in the house			
48	To be alert			
49	I wake up late			
50	It takes too much time to prepare			
51	Other factors (*Please specify*)			

Thank you for your participation

APPENDIX 2

ETHICAL APPROVAL



INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IAMRAT)
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UI/UCH EC Registration Number: **NHREC/05/01/2008a**

NOTICE OF EXPEDITED REVIEW AND APPROVAL

Re: Patterns of Breakfast Consumption and its Perceived Health Benefits among Masters of Public Health students in the University of Ibadan, Oyo State, Nigeria

UI/UCH Ethics Committee assigned number: UI/EC/15/0334

Name of Principal Investigator: **Osita Nonso C.**
Address of Principal Investigator: Department of Health Promotion and Education, College of Medicine, University of Ibadan, Ibadan

Date of receipt of valid application: 22/09/2015

Date of meeting when final determination on ethical approval was made: **N/A**

This is to inform you that the research described in the submitted protocol, the consent forms and other participant information materials have been reviewed and *given expedited approval by the UI/UCH Ethics Committee.*

This approval dates from **24/11/2015 to 23/11/2016.** If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the* UI/UCH EC *assigned number and duration of* UI/UCH EC *approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC early in order to obtain renewal of your approval to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the UI/UCH EC. *No changes are permitted in the research without prior approval by the* UI/UCH EC *except in circumstances outlined in the Code. The* UI/UCH EC *reserves the right to conduct compliance visit to your research site without previous notification.*

UI/UCH EC APPROVED COLLEGE OF MEDICINE, U.I.

Professor Catherine O. Falade
Director, IAMRAT
Chairperson, UI/UCH Ethics Committee
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Research Units • Genetics & Bioethics • Malaria • Environmental Sciences • Epidemiology Research & Service • Behavioural & Social Sciences • Pharmaceutical Sciences • Cancer Research & Services • HIV/AIDS