

Influence of Psychosocial Factors on Optimal Dietary Intake of University Students of Kenya

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Abstract

Background: University students' encounter environmental changes which exerts mixed perceptions on sufficiency of their diets.

Objective: This cross-sectional study determined the influence of psychosocial factors influencing optimal dietary intake of university students.

Methods: This was conducted from August to November, 2017 within 5 Kenyan universities purposively sampled. Stratified sampling was utilized to obtain 230 respondents. Quantitative data was collected where exploratory factor analysis tested dimensionality of questions, while skewness and kurtosis assessed normality of data. Structural equation modeling determined predictive power of latent variables.

Results: The model fitted data acceptably well; $P < 0.001$, Tucker Lewis index = 0.93, comparative fit index = 0.95, root mean square error of approximation = 0.090, Hoelter critical N (0.01=230), with optimal dietary intake. Regression weights showed predictive power for student's attitude ($\beta = 0.68$, $P < 0.01$), subjective norm ($\beta = 0.36$, $P < 0.05$), perceived behavioral control ($\beta = 0.34$, $P < 0.05$) towards intention ($\beta = 0.95$ $P < 0.001$).

Conclusion: Student's attitude was a significant factor in improving and upholding optimal dietary intake.

Keywords: optimal dietary intake, psychosocial factors, university students, theory of planned behavior

Introduction

Sub-optimal dietary habits are among the major risk factors for obesity, undernourishment, micro-nutrient deficiencies and associated metabolic conditions, particularly if adopted during early adulthood (1, 2). This is becoming more prevalent across all age groups where traditional healthy diets are being progressively replaced by more westernized dietary patterns (3). University students seem to be the most affected by this nutrition transition (4); studies have shown that young adults living away from home to attend university, experience numerous health-related behavioral changes, including the adoption of unhealthy dietary habits (5, 6, 7). These behaviors are mostly attributed to drastic changes in the environment and resources available, frequent exposure to unhealthy foods and habits. This leads to higher consumption of energy-dense foods and low

intake of nutrient-dense foods in addition to frequent skipping of meals. Nutritionists and dieticians' support has been reported to be an essential motivational factor in promotion of optimal dietary habit across populations of all age groups (1); however, evidence suggests this is not basically the case for university students (3). For university students to be inspired to practice healthy dietary habits, the optimal balance between factors that manipulate their cognitive and experiential aspects must be achieved (2). These cognitive and experiential aspects are the psychosocial factors that determine student's attitude, subjective norm and perceived behavioral control towards intention to practice healthy behavior in this case optimal dietary intake. Intention is a significant predictor of dietary intake, which can be optimal or suboptimal. Studies have described many factors associated with the intention to practice optimal dietary intake amongst university students. These factors include environmental, socio-demographic and behavioral that determines students' decision to optimal dietary intake (8, 9, 10). However, there

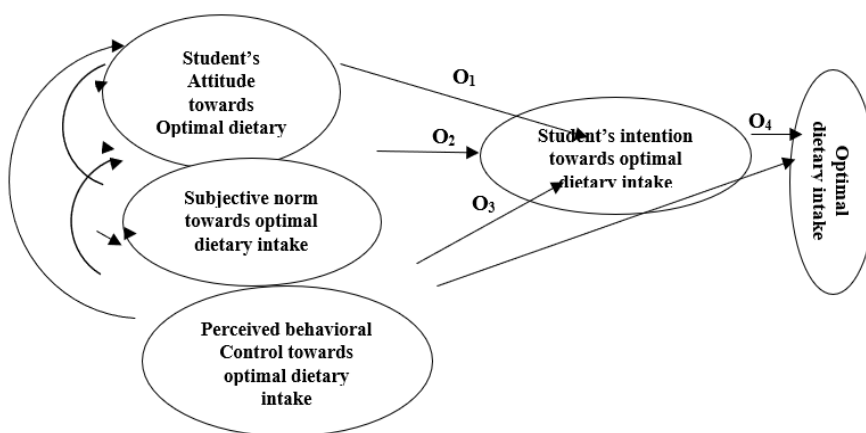
is limited information on psychosocial factors which include attitude, subjective norm and perceived behavioral control in association to practice of optimal dietary intake (11). Thus, this current study aimed at revealing the influence of student's attitude, subjective norm, perceived behavioral control on their intention to practice optimal dietary intake.

Methods and Data

Study Framework

The study adapted Ajzen's Theory of Planned Behavior (TPB) model (12) (Figure 1) to fit psychosocial factors that influence optimal dietary intake of university students. The TPB model works on the basis that the approach to target behavior is to assess behavioral intention, which in turn is seen to be an operation of 4 exogenous variables: attitudes, subjective norm, perceived control and intention. In this context, students' attitude was the certainty about likely outcomes of optimal dietary intake multiplied by evaluation of these outcomes (behavioral beliefs). Subjective norm was the belief of the students over important people in his/her life that may or may not have influenced them to optimally feed multiplied by the level of compliance to such influences (normative beliefs). Perceived behavioral control was viewed as control factors to promote or inhibit the students to optimally feed multiplied by the power they had over those factors (control beliefs). Perceived behavioral control was measured both directly and indirectly since optimal dietary intake was not under completely volitional control. Therefore, students' attitude and subjective norm were posited to have influenced optimal dietary intake indirectly through intention. While perceived behavioral control both indirectly and directly manipulated optimal dietary intake.

Intention was described as a behavioral tendency that captured the motivational factors that had an impact on behavior (optimal dietary intake). The latent variables were endogenous since they depend on observed variables to be measured, whereas observed variables were exogenous since they are independent variables. When a variable is believed to "cause" another variable, the relationship between the variables is shown as a directed arrow, from cause to effect. Whether one variable "causes" another is an assumption that the researcher makes and only data can reveal. Co variation between 2 variables is shown as a 2-headed arrow connecting the variables. As a theory of competency and mastery, psychosocial factors influencing students' optimal dietary intake describes that initiation and persistence towards it are determined primarily by students' optimal dietary intake cognitive judgments and expectations. To comprehend optimal dietary intake using the TPB model (Ajzen, 1991), an elicitation study was initially conducted prior to the current study to elicit salient beliefs on which exogenous variables are based. This was then employed to construct a questionnaire, which was pretested and used to assess the influence of these psychosocial factors on optimal dietary of university students. Therefore, the Theory of Planned Behavior model was the theory of focus since it has the ability to distinguish between those who perform and do not perform the behaviour under investigation (13). Therefore, by utilizing the TPB, one can gain an understanding of the behaviour (optimal dietary intake) by tracing its determinants back to the underlying beliefs and possibly further influence the behaviour by changing a sufficient number of these beliefs (14). A structural model was specified as per the objectives and tested as a good fit for data obtained on optimal dietary intake.



O₁-Objective 1, O₂-Objective 2, O₃-Objective 3, O₄-Objective 4

Figure 1: Theory of Planned Behavior Model.

Study Area and Design

The study was conducted within 5 Public Kenyan Universities purposively selected with the aim that they had operational human nutrition programme that emphasized the health benefits of optimal dietary intakes.

This cross-sectional study was conducted from August to November, 2017 amongst 230 randomly selected and stratified students receiving education in a human nutrition related Bachelor's Degree from the 5 universities. Permission was obtained from the School of Graduate Studies. Ethical approval was given by National Council for

Science and Technology. Research authorization was granted by the respective administration of the 5 universities. We sought informed consent from the respondents who were informed on the research procedures, details and assured of confidentiality.

Sample Criteria and Sampling Techniques

Sampling procedures involved selection of universities and respondents. Purposive sampling was used to identify 5 Public Universities for the study with the target that they offered Human Nutrition Related Bachelor’s Degree programme and were accredited by their regulator-Kenya Nutritionists and Dietetics Institute. Proportionate stratified sampling was used to get the sample size of respondents from each stratum of University A (46), University B (44), University C (50), University D (48) and University E (42). Random sampling was then employed on each stratum depending on its size to get the final study sample size of N=230. Sample criteria included both males and females students pursuing a Bachelors Degree in Human Nutrition. Participation in the study was voluntary although 4 %(9) of respondents dropped out of the study due to inevitable circumstances but were immediately replaced through a random sampling procedure performed on eligible participants. The respondents were not compensated for taking part in the study but were highly appreciated and given a debriefing letter after completion of the interview sessions.

Data Collection Instrument

Data collection was conducted from August to November, 2017 by the main researcher and 5 trained research assistants. A 7-point Likert-type scale optimal dietary intake questionnaire was used to collect the quantitative data. Both convergent and divergent validity were determined by comparing answers to each question measuring the same concept, then by measuring this answer to the respondent’s response to a question that asks for the exact opposite answer. Back-translation was also done to check for reliability of the translation. The pretested questionnaire was acceptable based on factor analysis criteria used and concepts of measurements loading with communalities for each item being greater than .5. This questionnaire was acceptable having confirmed adequacy of sample size (N=230) using test of sphericity. The internal consistency estimates of the various concepts, using Cronbach’s alpha, ranged from .64 to .89. The closer the Cronbach’s alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. George and Mallery’s rule of thumb was used to classify the Cronbach’s alpha coefficients generated.

Statistical Methods

Data was entered into SPSS version 15 to calculate for reliability tests where Cronbach’s alpha was used to assess the consistency of the questions. The response for each question was distinctive, and rotated component factors loading for each variable was subjected to principal component analysis. George and Mallery’s (15) rule of thumb was employed to categorize the average of

communalities of student’s attitude, subjective norm, perceived behavioral control and intention. To establish whether the model nested based on TPB variables applied to optimal dietary intake fitted the data acceptably well, structural equation modeling using AMOS version 7 was conducted. Structural equation modeling was used to determine the influence of student’s attitude, subjective norm, perceived behavioral control and intention on optimal dietary intake. Intention was assessed by the extent to which respondents were willing to practice optimal dietary intake (eating a balanced diet, diet diversity & variety, and sufficient diets). Measurements of this was done using a Likert-type scale ranging from 1 to 7, where 1 represented not at all and 7 represented very much. The overall model fit was evaluated using χ^2 (CMIN) and relative χ^2 divided by degrees of freedom (CMIN/df), comparative fit index (CFI), the standardized root mean square error of approximation (RMSEA), Hoelter’s critical N, and Bollestone bootstrap. CFI and Tucker– Lewis index (TLI) values greater than .90 were considered satisfactory. RMSEA values less than .08 were considered satisfactory. CMIN/df was regarded as fit when it ranged 3:1 and considered better when closer but not less than 1. Hoelter’s critical N for significance levels of .05 and .01 were used where bootstrap samples were set at 200.

Results

Influence of Student Attitude, Subjective Norm, and Perceived Behavioral Control on Intention to practice Optimal Dietary Intake

It was found that the items characterizing attitude, subjective norm and perceived behavioral control had high regression weights approaching to 1.00. The relationships between observed variables in the model (Figure 2) were significant. The goodness of fit was statistically non-significant at the .01 level, but the model would be rejected at the .05 level ($\chi^2 = 620.1$, $df = 250$, $P = .12$, $\chi^2/df = 2.30$). Although the χ^2 was under the recommended 3:1 range indicating acceptable fit, after significant modification indices were unassociated. Other fit indices (TLI = .93, CFI = .95, RMSEA =.090) also showed a good model fit (Table 1). Hoelter’s critical N values recommend that the model would have been accepted for lower limit at the .05 significance level with 200 cases, and the upper limit of N for the .01 significance level is 230 cases. The Bollen–Stine $P = .12$ provided further reassurance about the model fit among other global fit indices.

Fit Indices Recommended	Fit Measures Default
RMSEA 0.09 or less is better	0.09
CFI above 0.9 is good fit	0.95
CMIN/DF between 2-3	2.21
TLI >0.8 is good fit	0.93
Hoelter’s Critical N >200 adequate	230
p > 0.10 good fit	0.12
<i>Note: RMSEA=Root mean square residual; CFI=Comparative fit index; CMIN/DF=Chi-square/degree of freedom; TLI= Tucker-Lewis Index; χ^2= Chi-square.</i>	

Table 1: Fit Indices of Default Model.

The regression weights (Figure, 2) indicates that students' attitude had a statistically significant influence on optimal dietary intake through intention ($\beta = .68, P < .01, N = 230$). Indirect perceived behavioral control had a statistically significant influence on optimal dietary intake through intention ($\beta = .64, P < .01, N = 230$). This was followed by subjective norm, which had a statistically significant

influence on optimal dietary intake through intention ($\beta = .52, P < .05, N = 230$). Intention was found to have the strongest prediction for optimal dietary intake ($\beta = .95, P < .001, N = 230$). Direct perceived behavioral control had the least influence on optimal dietary intake ($\beta = .12, P > .05, N = 230$).

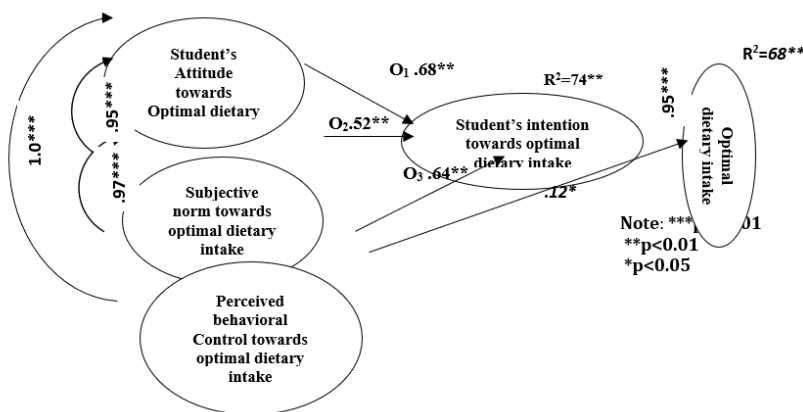


Figure 2: Default Model of optimal dietary intake.

Discussion

This study focused on examining motivational beliefs (attitude, subjective norm and perceived behavioral control) associated with students practice of optimal dietary intake of based on the Theory of Planned Behavior.

Influence of student's attitude on optimal dietary Intake

The default model had significant influence and was valued, since the forecasts supported the validity of the TPB model. The concept of influence involved dietary intake that was retrospectively explained by TPB, which allowed a prospective test of theoretical understanding. The influence of students' attitude, subjective norm, perceived behavioral control and intention in extrapolating optimal dietary intake was tested. Standardized regression weights in (Figure 2) indicated that more students placed a high value on the health benefits of practicing optimal dietary intake ($\beta = .68, P < .01, N = 230$). Positive attitudes are associated with supportive significant others who motivated practice of optimal dietary intake (16). Previously, (11) revealed that associated health benefits were linked to practicing optimal dietary intake which had an impact on the attitudes of young adults in colleges. A recent study found that young adults, compared to middle-aged adults, had lower perception regarding optimal diets and health, suggesting a relatively low level of interest in health among young adults (9). Similarly, previous studies found that reasons for sub optimal dietary intake amongst the young adults were 'poor attitudes' and 'wrong influence' (6). Thus, nutrition education, accurate information and right influence should positively impact on attitudes of students to practice optimal dietary intake

based on one's health concerns. In this study, students' attitude was perceived to be associated with optimal dietary intake knowledge, influence of significant others and self-efficacy of the student. This illustrates that attitude correlates with other factors for it to be optimal. The current study established a statistically significant correlation between student's attitude and subjective norm ($r = .95, P = .001$). The correlation between attitude and perceived behavioral control was stronger, positive and statistically significant ($r = .97, P = .001$). Contrary students may have positive attitudes towards optimal dietary intake although the obstacles they encounter surpass their ability to optimally practice the behavior.

Influence of student's subjective norm on optimal dietary Intake

Subjective are the behavioral standards that exist in a social group for what is considered correct and appropriate behavior (17), and they emerge from the shared practices and expectations of the group members. Previous research has shown that, through changing individual' perceptions of existing social norms, various kinds of health behaviors can be influenced, such as optimal dietary intake (18). A student's decision to optimally feed is influenced by what is socially acceptable, open to social and cultural influences. We examined normative influences in relation to referents differing in social distance, including family members, friends, colleagues and mass media. However, of particular interest in this study was the detailed analysis of student's perception of social pressure from significant sources of reference and change in perception of these views in relation to balanced diets, diet diversity & variety and diet sufficiency. This finding suggests that informal groups such as family members, friends, colleagues and mass media are

important sources to influence the practice of optimal dietary intake in students. Previous studies using the TPB have suggested somewhat inconsistent results regarding the influence of significant others, partly supporting the results of the current study (19, 20). Previously, (21, 22) argued that a potential way to improve individual's dietary intake was to intervene in the social norms that govern eating behavior. Improving the social norms surrounding optimal dietary intake may stimulate healthy instead of unhealthy dietary intake of an individual. Fostering strong combined relationships amongst significant other is fundamental to support any individual practicing optimal dietary intake. When social and environmental support systems are in place, making healthful choices becomes possible and has an opportunity to improve dietary habits (23).

Influence of student's perceived behavioral control on optimal dietary Intake

A statistically significant influence of indirect perceived behavioral control ($\beta = .64, P < .01, N = 230$) and a statistically least significant direct perceived behavioral control ($\beta = .12, P < .05, N = 230$) were reported. Ajzen's contended that the direct link may only be apparent when perceived control closely parallels actual control. We conjecture that perceived control did not parallel actual control in this group of respondents, for whom the sense of dietary intake control only exerted its effect more indirectly through intentions. The indirect measure was promising because it showed that though students have other obstacles to optimal dietary intake, they have confidence in their ability to practice it. Previous research reported positive relationship between indirect perceived behavioral control and intention (23, 24). It was hypothesized that perceived dietary intake control would influence optimal dietary intake as it would be similar to self-efficacy, since both are concerned with perceived ability to perform a behavior. When a student has higher sense of self-efficacy regarding optimal dietary intake, they will react more positively when problems arise and persist when confronted with problems. Therefore, a higher perceived behavioral control score in the indirect measure should be associated with lower problem severity perceptions in practice of optimal dietary intake. Increasingly, younger Kenyans inclusive of university students have access to more education opportunities, consequentially higher possibilities for nutrition knowledge and their dietary intake habits (16). Based on the study analysis, student's attitude, subjective norm, and indirect perceived behavioral control had a statistically significant influence on their intention of practicing optimal dietary intake. However, the direct influence of perceived behavioral control on optimal dietary intake illustrated a very minimal prediction ($\beta = .12, P > .05, N = 230$). As the analytical results of (24) showed that although direct perceived behavioral control is reasonably explained by belief control, it does not in turn provide better prediction of intention over and above that provided by indirect subjective norm, attitude, and perceived behavioral control. Furthermore, (25) also claimed that the direct perceived behavioral control is less likely to be related to

intention. Given that the influence of student's attitude, subjective norm and perceived behavioral control statistically influenced intention ($\beta = .95, P < .001, N = 230$), this study established these psychosocial factors practically influences optimal dietary intake of students. This indicates that a unit change in student's attitude, subjective norm and perceived behavioral control was associated with a change of 0.68, 0.52, 0.64 units respectively, in intention. A variance of 74% was obtained for intention predictors, whereas direct perceived behavioral control and intention accounted for 68% of variance on optimal dietary intake. Thus, the aspect of predictability of psychosocial factors is not just a mere postulation but a logically proven detail.

Implications for Practice and Research

Our data reveal that psychosocial factors remain statistically significant in influencing optimal dietary intake of university students. Since students desire to practice optimal dietary intake but they encounter barriers that originate from their attitude, social pressures from significant referents and their self-efficacy (confidence). These attitudinal, normative, and control beliefs, which the study has determined to be predictive, are optimal dietary intake barriers/facilitators that limit students' capability of practicing optimal dietary intake. Hence, efforts should include further promotion and research into students' perception of the value of optimal dietary intake that affects their attitude. Significant others should address the issue of social support and influence optimal dietary intake intention. Discussing the students' worries, providing education on the anxiety response and offering help with structured problem solving and sustainable techniques may help alleviate the students' self-efficacy towards optimal dietary intake, thus boosting their emotional support. To enhance students' self-efficacy, they need to be informed of the challenges that may arise during practice of optimal dietary intake and how to overcome them. Therefore, this research confirms that psychosocial factors, namely, students' attitude, subjective norm, perceived behavioral control are important predictors of optimal dietary intake and may also hinder the practice of optimal dietary intake among young adults inclusive of university students.

Conclusion

Optimal dietary intake promoters, practitioners and researchers should capitalize on understanding and motivating young people including university students about these psychosocial factors that determine intention of optimal dietary intake by using the generated modified framework from Ajzen's TPB. Since our findings support the use of the TPB to predict the influence of students' attitude, subjective norm/social pressures and perceived behavioral control on optimal dietary intake intention, it is significant for programs to incorporate strategies that target individuals' beliefs which in turn reveal what beliefs and factors need to be addressed for optimal dietary intake to be practiced. Although dietary intake of respondents in the 5 universities varied they were only reported and controlled during analysis but not established. The analysis

of dietary intake in each of the 5 universities could have been conducted by comparing model fitness indices; however, sample size did not allow for smaller clustering of respondents. This study recommends that educating university students about the benefits of optimal dietary intake, identifying barriers to optimal dietary intake, developing strategies to address the barriers and identifying the significant referents may be important areas to target for future dietary intake promotion programs.

Competing Interests

The authors declare that no conflict of interests exists.

Authors' Contributions

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

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