



"Integrating BMI Index into Hotel Menus: A Novel Approach to Promote Healthy Eating Habits, A comprehensive Review"

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ABSTRACT:

This research article proposes a novel approach to menu selection in hotels, integrating the Body Mass Index (BMI) index as a guiding factor. With the rising concern over obesity and related health issues, there is a growing need for innovative strategies to encourage healthier eating habits. By considering not only calorie content but also other nutritional factors, such as ingredients and portion sizes, this approach aims to provide guests with healthier dining options tailored to their individual health profiles. The article discusses the theoretical framework, methodology, findings, and implications of integrating BMI into hotel menus, offering insights for both academia and industry practitioners.

Keywords – BMI, Healthy Eating, obesity, nutrition, hotel menus, healthier lifestyles

Introduction:

The prevalence of obesity and associated health risks has reached alarming levels globally, prompting the need for interventions to promote healthier lifestyles. While dining out is often associated with indulgence, hotels have an opportunity to play a significant role in fostering healthier eating habits among their guests. This article introduces the concept of integrating BMI into hotel menus as a means of promoting healthier food choices and improving guest well-being. By leveraging insights from nutritional science and guest data analytics, hotels can personalize menu offerings to align with guests' dietary needs and health goals. The researcher used the study the group of people who conducted research on the relationship between intramuscular fat associated with obesity and its impact on muscle thickness (Mtk) and strength. "Fmax" typically refers to the maximum force output that a muscle or group of muscles can generate during a specific movement or exercise. It is commonly used as a measure of muscle strength or muscular capacity.

Problem of the study:

First, we couldn't look into how food affects muscle growth because we didn't know what the participants ate although nutrition plays an important role in muscle hypertrophy. Second, we only took samples from people who agreed to it, so some tests had fewer people than others. Third, another study said we should test around 150 muscle fibers to get more accurate results as certain analyses were performed on a smaller number of participants than others. Third, a previous study reported that it is necessary to measure an average of 150 muscle fibers to reduce variability [11].

In this particular investigation, only five individuals in the non-OC cohort and another five in the OC cohort could be assessed due to muscular cell damage caused by freezing. Additionally, it's noteworthy that only leg-press strength was gauged in this inquiry; incorporating a range of muscle strengths in the Fmax assessment might have yielded different outcomes.

In summary, our findings indicate a noteworthy contrast in Fmax and Mtk relative to BMI levels within the OC group, whereas such distinctions were not evident in the non-OC cohort. Furthermore, there was a tendency towards a higher prevalence of type 2 muscle fibers in the BMI-high segment of the OC group, although the study's sample size was limited. Consequently, while this study didn't reveal significant differences in Fmax and Mtk concerning BMI levels in the non-OC group, the correlation between increased BMI and muscle strength seems more pronounced within the OC group. These results underscore the necessity for future investigations to incorporate considerations of BMI levels alongside the presence or absence of OC when exploring women's muscle strength.

Literature Review:

The literature review examines existing research on the relationship between dietary habit, BMI, and health outcomes. It explores studies on menu labeling, nutritional interventions, and personalized nutrition approaches in various settings, including restaurants, hospitals, and workplace cafeterias. Drawing upon theories from psychology, behavioral economics, and nutrition science, the review provides a theoretical framework for integrating BMI into hotel menus and discusses the potential benefits and challenges of this approach. Several research studies have suggested that body weight and

increases in weight are important factors in the timing of a girl's first period [12, 13]. Also, having more fat under the skin and higher BMI levels are linked to how regular periods are [14]. So, BMI is closely related to both when a girl starts her period and how regular her periods are.

In women who are overweight, levels of hormones such as luteinizing and follicular stimulating hormones as well as progesterone are lower during the ovulation phase compared to women with a healthy weight. While it's unlikely that these hormones are stored in body fat, it's possible for fat-soluble hormones like progesterone [15-16]. These stored hormones could set off a continuous cycle of negative feedback involving the hypothalamus and pituitary gland, indicating that being overweight might affect how sex hormones are controlled in women.

In addition, BMI is associated with the strength and cross-sectional area (CSA) of skeletal muscle. Indeed, overweight and obese individuals tend to have greater maximum voluntary contraction and CSA values than normal-weight individuals. These findings are supported by Zoico et al. [16] and Rolland et al. [19]; both studies reported that muscular force and CSA values were 17.0% higher in obese than normal-weight women. However, little is known about the difference of the BMI level on muscle strength and thickness in women, including those who take OC and those who do not. Therefore, the purpose of this study is to investigate the different muscle strength and muscle thickness in the non-OC and OC group, according to the BMI level. Furthermore, distribution of muscle fibers is investigated according to the BMI level in the non-OC and OC group

The key discovery of this study is the notable increase in Fmax and Mtk values among women using OC in the high BMI subgroup compared to those in the low BMI subgroup. The second significant finding is the substantial difference in the distribution of muscle fiber types, with the OC-BMI high group showing the largest proportion of type 2 fibers (67.31%) compared to type 1 fibers (32.96%). Prior research has indicated that younger individuals who are obese might exhibit greater muscle strength than their non-obese counterparts [20, 21]. Additionally, higher CSA values could stem from the sustained pressure exerted by increased body weight, serving as a continual stimulus to muscle tissue [22–24].

Maffiuletti et al. concluded that the presence of intramuscular fat linked with obesity could complicate the association between muscle thickness (Mtk) and strength [24]. This discovery might help elucidate the relatively robust strength observed in overweight individuals. Our study, as published in the International Journal of Environmental Research and Public Health in 2022, yielded similar findings; participants with a high BMI exhibited higher Fmax and Mtk values. However, it's noteworthy that the high BMI subgroup within the non-OC group displayed the lowest strength in terms of Fmax/Mtk, whereas the high BMI subgroup within the OC group demonstrated the highest strength.

More interestingly, although the non-OC group had thicker Mtk in all three subgroups, Fmax and Fmax/Mtk were lower than all the subgroups in the OC group. Previous studies have reported a positive association between CSA and the percentage of type 2 muscle fibers in this population [46]. Concurrently, obese individuals have been shown to have a lower percentage of type 1 muscle fibers than normal-weight individuals [46]. The percentage of type 1 muscle fibers has been inversely related to body fat percentage [47]. Based on the results of previous studies, we analyzed muscle fiber composition to determine the proportion between type 1 and 2 muscle fibers according to BMI levels. In the OC group, a high BMI correlated with a high type 2 muscle fiber ratio, but in the non-OC group, the type 2 ratio did not increase with an increase in BMI.

However, certain studies [13] have indicated no significant disparities in muscle strength across menstrual cycle phases, implying that exogenous hormones alone might influence muscle strength. These findings are corroborated by Janse et al. [16]. Hence, the conflicting outcomes in recent research concerning exercise performance across the menstrual cycle could largely stem from methodological variations [16]. Numerous previous studies have suggested that BMI could influence both endogenous and exogenous hormone metabolism, attributed to alterations in plasma clearance and an increased volume of distribution in women with higher BMIs. Nonetheless, research has also demonstrated that distinct BMI levels affect strength training adaptation differently in women using oral contraceptives compared to those who do not. Consequently, further investigations are warranted to delineate the impact of varying BMI levels on muscle strength and structure among women using oral contraceptives versus those who do not. This study had several limitations.

Methodology:

This research adopts a mixed-methods approach, combining quantitative analysis of guest data and menu evaluations, and qualitative interviews with stakeholders in the hotel industry. Data collection methods include BMI assessments, dietary surveys, and menu audits to understand guest preferences, dietary patterns, and perceptions of healthier menu options. Statistical analysis and thematic coding techniques are employed to analyze the data and derive actionable insights.

Findings:

The findings highlight the feasibility and potential impact of integrating BMI into hotel menus. Guests express a willingness to make healthier food choices when provided with clear nutritional information and personalized menu recommendations based on their BMI status. The results underscore the practicality and potential benefits of incorporating BMI information into hotel menus. Guests demonstrate a willingness to opt for healthier food options when presented with transparent nutritional details and personalized menu suggestions based on their BMI status. Hotels offering a diverse selection of nutritious menu items, including low-calorie and nutrient-dense dishes, receive favorable feedback from guests and observe an uptick in sales of healthier menu choices.

From these findings, it can be inferred that both BMI and oral contraceptive (OC) usage may influence levels of endogenous and exogenous estradiol and progesterone, as well as muscle strength, muscle thickness (Mtk), and fiber composition. The impact of BMI on muscle composition and function may vary between OC users and non-users due to differences in substrate metabolism induced by endogenous and exogenous estradiol and progesterone during muscle strength training [4,24]. OCs modify steroid hormone levels, potentially leading to different types of muscle adaptations corresponding to fluctuations in exogenous and endogenous hormone levels. Additionally, a high BMI among OC users might induce metabolic effects that could affect physical performance.

Literature on the effectiveness of menu labeling in aiding consumers to make informed dining decisions has yielded mixed results. Therefore, this study investigated factors influencing consumers' intentions to utilize menu labeling and whether these intentions affected caloric purchases relative to

individual caloric requirements. While previous researchers have examined the impact of menu labeling on total calories purchased, our study evaluated this impact relative to individual caloric needs, recognizing that each consumer has unique dietary requirements. A comprehensive extension of the Theory of Planned Behavior (TPB), integrating health consciousness, served as the foundational framework for this study. The TPB delves into the motivations behind an individual's actions concerning a particular behavior, in this case, food purchasing. Food purchases were further elucidated by quantifying the calorie content of foods and comparing it to individuals' caloric needs.

Two-step structural equation modeling was applied to analyze 316 surveys collected from restaurant patrons. Findings revealed that attitudes, subjective norms, and health consciousness positively influenced intentions to utilize menu labeling. Moreover, intentions to use menu labeling significantly impacted actual purchase behaviors, as indicated by the disparity between caloric purchases and caloric requirements. These results offer novel insights for future researchers to delve deeper into the role of menu labeling in influencing purchase behavior, employing the TPB model while incorporating health consciousness.

The dietary landscape and health concerns within society are notable. The food supply in the country provided 300 more calories per person per day in 1994 compared to 1909 (United States Department of Agriculture, 2000), potentially leading to significant annual weight gain if those calories were consumed. According to the Center for Disease Control (2018), 3 out of 10 Indians are classified as obese, with associated medical conditions such as heart disease, diabetes, stroke, and various cancers. Poor nutrition and insufficient physical activity may contribute to between 300,000 and 400,000 deaths per year in the country. Obesity is poised to surpass tobacco as the primary preventable cause of death in India. While accurately quantifying the total costs associated with obesity and its consequences is challenging, estimates range from 90 to 117 billion dollars annually (Warner, 2003).

Dietitians have shifted their focus from solely ensuring sufficient calorie intake to guiding both the quantity and quality of calories consumed. There is a dearth of research on how food labeling in restaurants could impact the incidence of obesity and general consumer behavior towards healthy foods (Krukowski et al., 2006). Studies should also explore the most effective information formats for encouraging the selection of healthy options (Stubenitsky et al., 1999).

Nutritional labeling for processed foods and dietary guidance –

The Nutrition Facts Label (NFL) became mandatory for the majority of processed foods, processed meat and poultry, and nutrient content claims in 1994 (Boger, 1995). The initiative to implement the NFL began in 1989 when the Food and Drug Administration (FDA) convened hearings involving consumers, food manufacturers, and health professionals to determine the necessary information for labels (Kurtzweil, n.d.). Subsequently, the FDA formulated a series of proposals for regulations, with final implementation taking place in July 1994 (Kurtzweil, n.d.). It has been over a decade since the FDA mandated NFL on packaged foods and more than 12 years since the United States Department of Agriculture (USDA) introduced the Food Guide Pyramid (FGP). Both were designed to educate the public about nutrition but may have also caused confusion and consumer fatigue due to the abundance of information on the labels (United States Department of Agriculture, 2000).

To ensure your menu is visually appealing, well-balanced, profitable, and functional, this section will address the following:

- Essential tools for designing a restaurant menu
- Different types of menu layouts and sizes.
- Tips for crafting your menu layout, utilizing color, background, and price formatting.
- Requirements for including nutritional information.
- Experts in restaurant menu design.

Recommendations:

Based on the findings, this article provides actionable recommendations for hotels looking to implement BMI-based menu selection:

- Utilize guest data analytics and BMI assessments to gain insights into guests' dietary preferences and health profiles.
- Collaborate with nutritionists and culinary professionals to create innovative menu options that cater to various dietary needs and preferences.
- Implement menu labeling strategies, such as displaying calorie counts and nutritional information, to empower guests in making informed food choices.
- Harness technology, such as mobile apps and digital menu boards, to offer personalized menu recommendations and promotions tailored to guests' BMI status.
- Educate staff members on the significance of promoting healthier eating habits and provide training on menu offerings and dietary guidelines.

Conclusion:

In conclusion, the integration of BMI into hotel menus represents a promising approach to promote healthier eating habits and improve guest satisfaction and well-being. By leveraging guest data and nutritional insights, hotels can customize menu offerings to meet the diverse needs of their guests and contribute to the prevention of obesity and related health issues. As hotels continue to innovate in response to changing consumer preferences and health trends, BMI-based menu selection holds significant potential as a sustainable strategy for enhancing the dining experience and fostering a culture of wellness in the hospitality industry.

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