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THE EFFECTS OF HEALTHY SLEEP CAMPAIGN TOWARDS THE INTENTION TO PRACTICE HEALTHY SLEEP BEHAVIOUR IN MANAGING OBESITY AMONG MALAY WOMEN

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Abstract: *In today's climate, obesity management should be extended beyond the conventional manner of the sole emphasis on diet and exercise. The newly-emerging issues of sleep in the current obesity prevalence would benefit from being highlighted as an important indicator in managing the medical condition via lifestyle changes. Therefore, this called for the positioning of sleep in a form of a campaign to create awareness regarding the gravity behind healthy sleep. With that mentioned, this study looked into the effect of Healthy Sleep Campaign towards the intention to practice healthy sleep behaviour in order to lose weight, using the Theory of Planned Behaviour. The one-time campaign was executed with the participation of 400 obese Malay women aged between 18 and 55 years old in the state of Melaka, where they were asked to complete a survey form. Such step appeared to be integral in measuring whether the knowledge gained from the campaign was indeed capable of influencing their respective intentions to perform healthy sleep behaviour in achieving weight loss. Subsequent statistical analysis was undertaken for both the measurement and structural models respectively using the Partial Least Square Structural Equation Model (PLS-SEM). Based on the analysis, the Healthy Sleep Campaign was found to pose a significantly direct influence on all predictors in the study. Furthermore, it was also capable of moderating the relationship between the predictors towards the intention to practice healthy sleep behaviour. However, the study was primarily limited by the measurement, as it*

was focused on the intention to perform healthy sleep behaviours instead of looking into the actual behavioural changes themselves. Nevertheless, the results indicated important implications regarding the possible planning and implementation of healthy sleep campaign in a structured manner alongside lifestyle practices in managing obesity beyond diet and exercising. Moreover, suggestions for future research were also made specifically in measuring behavioural changes towards healthy sleep as a new weight loss factor, as well as exploring the impacts of healthy sleep behaviour in managing obesity.

***Keywords**: Obesity, Sleep Health, Metabolism, Theory of Planned Behaviour, Health Behaviour*

Introduction

Obesity is a life-threatening medical condition capable of instigating higher mortality rates compared to being underweight, and it has grown rapidly in number, despite the multitude of current policies and strategies in place to prevent its increment. Out of 340 million children and adolescents aged between 5 and 19 years, a staggering 41 million of children aged less than 5 years across the global population has been found to be overweight or obese in 2016. In Africa alone, the number of overweight children aged under 5 years old has nearly increased by 50% since year 2000, whereas almost half of the recorded number of overweight or obese children of the aforementioned age is from Asia (World Health Organization, 2018).

Lifestyle and behavioural choices are widely acknowledged as important factors that influence weight status, with physical inactivity and unhealthy dietary choices being specifically linked as the major risk factors for overweight and obesity. They subsequently lead to various chronic health conditions, including cardiovascular diseases, diabetes mellitus, some types of cancer and high blood pressure. Furthermore, various epidemiological studies have underlined increased energy intake, reduced high-fibre food consumption, and a sedentary lifestyle as exemplary and major instigating factor for the obesity epidemic (Qi & Cho, 2008). Chaput (2011) has subsequently highlighted the concentrated efforts expended on interventions in addressing most health-related behaviors that cause critical health diseases, including obesity. However, efforts aimed at investigating associated sleep behaviors have been largely and notably absent. Nevertheless, evidences suggesting a short sleep duration as a determinant of obesity have steadily accumulated and linked the element with obesity and weight gain (Chaput & Tremblay, 2012).

Inadequate sleep has evidently accommodated caloric digestion due to the obesogenic environment that renders food availability constantly accessible. Moreover, increased food consumption, poor dietary quality, and overweight have been correlated with shortened sleep duration, insufficient sleep quality, and late bedtime. Besides, excessive meal consumption on a daily basis, snacking, and the impacts of energy-rich food have also been associated with the lack of sleep (Chaput, 2013). According to Brondel et al. (2010), one night of reduced sleep alone may trigger increased food consumption, which to a lesser extent compromises the estimation of physical activity related to energy expenditure in healthy men. The aforementioned study has thereby suggested sleep restriction as a reason behind obesity promotion, which may be ascertained via a long-term energy balanced measurement.

Furthermore, the elements of timing, duration, and quality of sleep have been revealed to affect endocrine, metabolic, and neuro-hormonal bodily functions (Kondracki, 2012). In fact, the important factors of early bedtime and dark environment are associated with combating obesity due to the stimulation of the melatonin hormone production integral in Brown Adipose Tissue (BAT) activation. BAT activity has paralleled a high likelihood in decreasing the risk of obesity development as the fat storage available is dedicated for thermogenesis, while a direct and improved adipocyte metabolism may also contribute towards weight loss (Stephens, Ludgate, & Rees, 2011). Similarly, another study has revealed potential melatonin suppression by a blue light that is strongly generated in a short-wavelength spectrum between 446 and 477 nm (West et al., 2011). Therefore, it has substantiated the recommendation for a dark environment or a complete shutdown of any artificial blue or white lights for improved sleep. Additionally, a sufficient duration of sleep is also a proven factor in combating obesity, as a comparison of participants who reporting sleep duration between 7 to 9 hours per night has displayed a higher likelihood for the short sleepers to be obese and have abdominal obesity (Ford et al., 2014). Hence, positioning healthy sleep campaign in this study has been driven by the emphasis of three important factors that lead to quality sleep, specifically early bedtime, adequate sleep duration, and sleeping in a dark environment.

The Problem

The lack of sleep has been found to parallel the obesity epidemic, with various evidences mushrooming from the laboratory and epidemiological studies alike to underline short sleep duration and poor sleep quality as the new risk factors for obesity development (Beccuti & Pannain, 2011).

The national total prevalence for obesity according to the Malaysian Adult Nutrition Survey (MANS, 2014) has reported a 6.3% increment since 2003, with women recording a higher value compared to the national prevalence at 8.2% in 2014. Furthermore, the national overweight prevalence among women is also higher at 31.4% compared to the prevalence of obesity at 22.9%. These numbers are worrying figures that indicated the need for improvements of the current strategic implementation. Such necessity is further supplemented by the potentially alarming increment of numbers from overweight to obesity prevalence in the future, should no further intervention is undertaken beyond dietary changes and physical activity.

Additionally, the accumulating prevalence of obesity is also indicative of the need for the current obesity management strategies to be revisited and refined to solve the associated issues underlined by many researchers. This is especially in light of the substantial evidence revealing the influence of sleep on obesity. Hence, the importance of revising the present implementation for obesity management, specifically by incorporating sleep as a multi-component strategy is undeniable. Such aim can be achieved by examining the behavioral response towards the influence of knowledge-based campaign on the benefits of sleep for weight loss.

Objectives

The objective of the study is to measure the effects of Healthy Sleep Campaign (HSC) towards the intention to practice healthy sleep behaviour using the Theory of Planned Behaviour (TPB). The measurements are undertaken in the context of its direct influence on the predictions, as well as its moderating effect between the predictors towards the intention to practice healthy sleep behaviour (IPHS) in order to lose weight.

Research Scope and Hypotheses

The study has been designed to answer two research questions: (1) whether there is a significant direct influence of Healthy Sleep Campaign (HSC) on obese Malay women's prediction towards their intention to practice healthy sleep behavior (IPHS); and (2) whether there is a positive moderating effect of Healthy Sleep Campaign (HSC) on these predictors towards their intention to practice healthy sleep behaviour (IPHS) for weight loss. Hence, the study has hypothesized that:

Hypothesis 1: There is a significant influence of Healthy Sleep Campaign (HSC) towards the attitude (ATT).

The study has operated on the assumption that a relationship is present between obese women's attitude (ATT) towards their intention to practice healthy sleep behaviour. It has been formulated based on the study by M.S. Kim and Hunter (1993), which has confirmed a stronger correlation between attitude and intention compared to that between intention and the actual behaviour.

Hypothesis 2: There is a significant influence of Healthy Sleep Campaign (HSC) towards the subjective norm (SNM).

Several studies have highlighted that the more favourable attitudes and subjective norms are combined with greater perceived behavioural control, the stronger the intention is for environmentally-oriented behaviour (Rezai, 2012), health awareness (First & Brozina, 2009), and reference knowledge (Amran & Nee, 2012), respectively.

Hypothesis 3: There is a significant direct influence of Healthy Sleep Campaign (HSC) towards the perceived behaviour control (PCB).

The essence of HSC has been rooted in the knowledge that is communicated and emphasised during the campaign execution. A study has underlined the significant association between attitude and knowledge among 448 women who attended primary care facilities in Kelantan regarding practising heart-healthy lifestyles (Mohamad, Yahya, & Yusoff, 2012).

Hypothesis 4: Healthy Sleep Campaign (HSC) has an effect on the impact of attitude (ATT) towards the intention to practice healthy sleep behaviour (IPHS)

In a sample consisting of urban Native American youths, findings have revealed the value of TPB in predicting factors that are directly related to healthy eating behaviour, but not for the indirect effect of intention. Therefore, this is suggestive of other potential factors besides intention that underscore healthy eating behaviour and may be utilised to develop interventional strategies promoting healthy eating practices in overweight or potentially risky for overweight youths accordingly. Moreover, barriers, attitude, subjective norms, and self-efficacy have also been found to be elements that influence such healthy eating behaviours, thus necessitating the incorporation of a program design (Fila & Smith, 2006). Hence, HSC has also been postulated as an external factor capable of affecting all TPB predictors (i.e. attitude, subjective norms, and perceived behaviour control) on the IPHS.

Hypothesis 5: Healthy Sleep Campaign (HSC) has an effect on the impact of subjective norms (SNM) towards the intention to practice healthy sleep behaviour (IPHS)

Hypothesis 6: Healthy Sleep Campaign (HSC) has an effect on the impact of perceived behaviour control (PCB) towards the intention to practice healthy sleep behaviour (IPHS)

Similarly, media campaigns on sugary drinks and obesity may also be effective in raising public awareness regarding added sugars typically found in beverages. Moreover, they may improve public knowledge regarding health problems associated with excessive sugar consumption and promote behavioural intentions to reduce sugary drink consumption (Boles, Adams, Gredler, & Manhas, 2014).

Significance

Results pertaining to the behaviours associated with an obese population may prove their significance in improving current interventions to combat obesity and Non-Communicable Diseases (NCD) alike. It will also contribute new and novel insights in positioning healthy sleep behaviour as a weight loss behaviour and an element of a multi-component strategy in managing obesity. Additionally, it may result in influential improvement towards the current obesity prevalence and overall community health with the HSC promoted as an element of the program.

Theoretical Framework

This study has utilized the Theory of Planned Behaviour (TPB) developed by Icek Ajzen in 1985 to measure the intention towards practicing healthy sleep behaviour. This is due to its status as the leading and prominently cited theory in the social psychology of intentional behaviour (Armitage & Conner, 2001). TPB has long since been recognized as a valuable framework in understanding adolescent health behaviours (Brug, de Vet, de Nooijer, & Verplanken, 2006). Upon its application to this particular study, the theory has allowed the assumption that the independent variables comprised of three TPB constructs (i.e. ATT, SNM, and PCB) may influence or explain the dependent variable (i.e. IPHS). This is due to the theory itself that conceptualized behaviour to be the most directly predicted by intention, and further predicted by the three determinants. However, very few applications have opted to implement it in developing and assessing interventional actions in order to facilitate behavioural changes. According to Fishbein and Ajzen (1975), "the ultimate test of the theory rests upon its ability to guide the development of effective behavioural change interventions" (p. 24). Hence, understanding the association between sleep and obesity is instrumental in instigating new behavioural changes, mainly among the obese population in Malaysia.

The selected behaviour was proven to contribute to weight loss result, substantiating implementation of TPB in achieving the study's objectives, alongside with extended construct adoption. Figure 1 below displays the Theoretical Framework of the study, depicting the relationship between each TPB constructs (i.e. attitude (ATT), subjective norms (SNM) and perceived behaviour control (PCB) towards the IPHS for weight loss. Furthermore, HSC is also displayed in the framework as another independent variable linked to the constructs, which is examined for the presence of its moderating impact on the relationship between TPB constructs and IPHS.

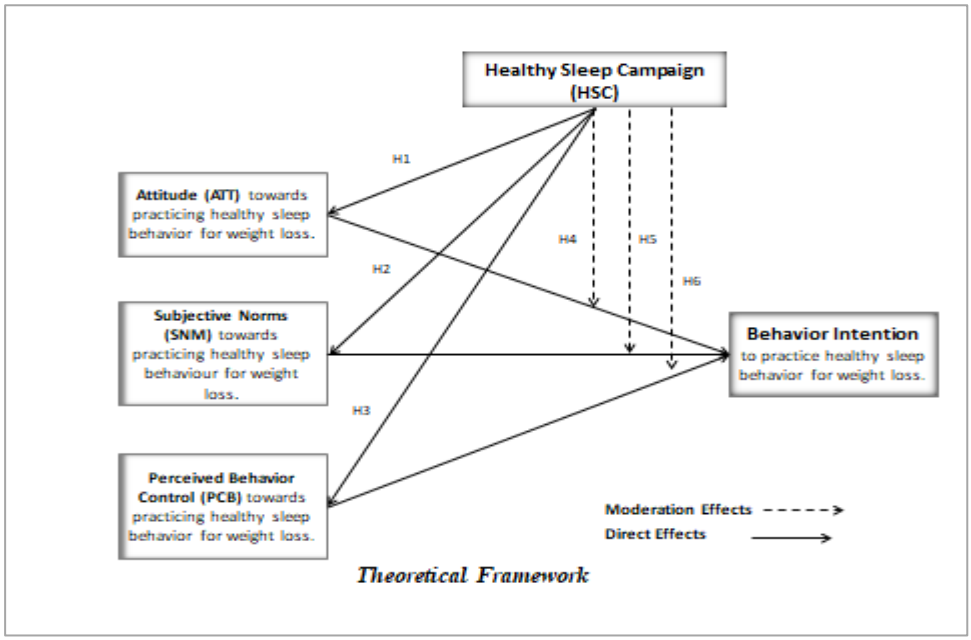

Figure 1: Theoretical Framework

Methodology

The study used survey questions to carry out data collection from the respondents. The development of the instruments was based on the framework connecting all variables so as to answer the research questions that shaped the work. HSC was tested for both its direct influence towards TPB predictors and its moderating effects towards the intention to practice healthy sleep behaviour (IPHS). All data was collected from a sample of 400 obese women in the state of Melaka that satisfied the following criteria: (1) women; (2) Malay; (3) adult aged ≥ 18 years old; and (4) BMI ≥30.00. Furthermore, all benefits of healthy sleep towards their weight loss efforts were extensively explained in combination with other weight loss factors during the campaign promotion. The data was collected using two approaches: 1) a cluster group range; and 2) one-to-one survey via snowballing method.

In the cluster group approach, respondents were gathered in groups consisting of 5 to 30 participants at one time, who were from governmental and private institutions alike. Meanwhile, the snowballing method was applied to reach the projected sample size of 400 respondents. This was undertaken according to Cohen, Manion and Morrison (2007), whereby the method was convenient in utilizing the original group serving as the informants to assist the researcher in identifying additional samples also meeting the criteria underlined. The secondary recruitment would in turn continually identify other samples afterwards. This solidified the snowballing method as a process of assistance obtained from the current respondents in recommending or identifying other potential respondents adhering to the criteria set for the survey participation (Barnett, 2002; Groenewald, 2004).

The method was evidently the most convenient in reaching the number of targeted sample size as most of the obese population displayed the tendency to socialize in various community-based weight loss activities, such as Zumba, aerobics and others. Therefore, the survey forms were distributed using online survey forms via Facebook, WhatsApp, Telegram and email applications. This allowed any sensitivity issues to be minimized especially in potential respondents who could not be conveniently approached directly and individually.

Regardless, all respondent referrals were subjected to several screening questions to ascertain that they met the criteria outlined.

Table 2: Summary of Path Coefficient for Significant Result

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
HSC -> ATT	0.325	0.33	0.042	7.653	0.00
HSC -> PCB	0.217	0.225	0.051	4.239	0.00
HSC -> SNM	0.276	0.28	0.044	6.26	0.00

Results

Table 2 displays the summarized details on the Path Coefficient findings obtained in answering the first research question. The findings indicated highly significant paths between HSC and TPB constructs, specifically attitude (HSC→ATT) ($t = 7.65$, $p = 0.000$), subjective norms (HSC→SNM) ($t = 4.239$, $p = 0.000$) and perceived behavior control (HSC→ PCB) ($t = 6.29$, $p = 0.000$). Therefore, ***Hypotheses 1, 2 and 3 of the study were accepted.***

Then, Figure 2(a) depicts the outcomes of the moderating effect of HSC between ATT→ IPHS to answer the second research question. Evidently, HSC displayed a positive effect on the relationship between attitude (ATT) and IPHS. The value of ATT→IPHS was at 0.060, thereby indicating that increments of HSC by 1 SD would result in increased relationship between ATT→IPHS. This was based on the interaction size term, with the value of 0.060 + 0.013 = 0.073. Hence, the increments of HSC were substantial in explaining IPHS, thus indicating that ***Hypothesis 4 of the study was accepted.***

Meanwhile, the simple slope plot in Figure 2(b) presents the interaction effect of HSC→ATT, whereby the three lines display the relationship between ATT (x-axis) and IPHS (y-axis). The middle line represents the relationship for an average level of the moderating variable HSC, whereas the remaining two lines represent the relationship between ATT and IPHS for the higher (i.e. mean value of HSC plus 1 SD unit) and lower (i.e. mean value of HSC minus 1 SD unit) levels of the moderating variable HSC. The findings subsequently displayed a positive relationship between ATT and IPHS, as the two lines were indicated by their positive slope, respectively. Hence, a higher level of IPHS went hand in hand with a higher level of attitude (ATT).

Furthermore, Figure 3(a) depicts the results of the moderating effect of HSC between SNM→ IPHS. A **positive effect** of HSC towards the relationship between SNM→IPHS was evidently displayed accordingly. In terms of the interaction size, the value of SNM→IPHS was 0.008, indicating that increments of HSC by 1 SD would result in an increase of the relationship between SNM→PHS.
This was based on the values of 0.008 + 0.199 = 0.207. Hence, the increase of HSC was also found to be integral in explaining IPHS, thus ***Hypothesis 5 was accepted.***

Meanwhile, the interaction effects of HSC→SNM are displayed in Figure 3(b). The findings showed a positive relationship between SNM and IPHS, with the higher line being indicated by the positive slope. Hence, a higher level of intention to practice healthy sleep behaviour (IPHS) went hand in hand with a higher level of subjective norm (SNM).

In Figure 4(a), the results of the moderating effect of HSC between PCB→IPHS are presented accordingly. A **positive effect** of HSC towards the relationship between PCB→IPHS was evidently observed, whereby the value of PCB→IPHS was 0.099 in the context of interaction size. This was indicative of increments of HSC by 1 SD that would result in an increase of the relationship between PCB→IPHS, based on the values of 0.099 + 0.4 = 0.499. Hence, the increase of HSC was suggestive of its importance in explaining IPHS, thereby ***Hypothesis 6 was accepted.***

Finally, the simple slope plot in Figure 4(b) represents the interaction effect of HSC→PCB. It was evident that the relationship between PCB and IPHS was positive for two lines, as indicated by their positive slopes respectively. Hence, a higher level of intention to practice healthy sleep behaviour (IPHS) went hand in hand with a higher level of perceived behaviour control (PCB).

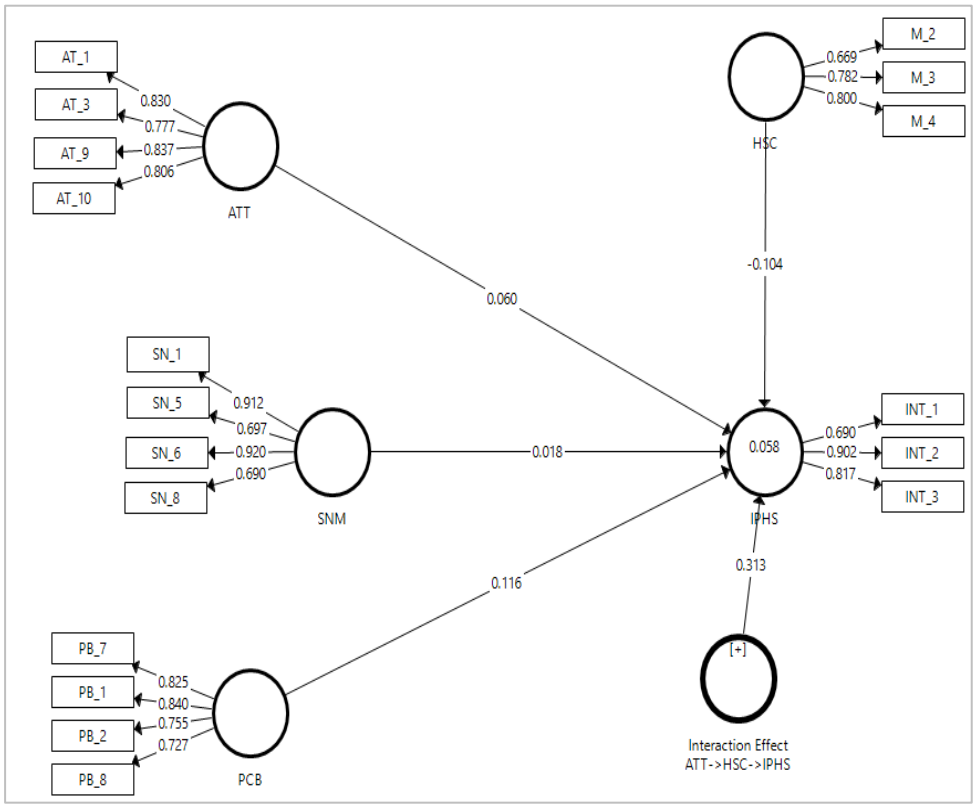

Figure 2(a): Moderator Analysis Results on ATT→HSC in Smart-PLS

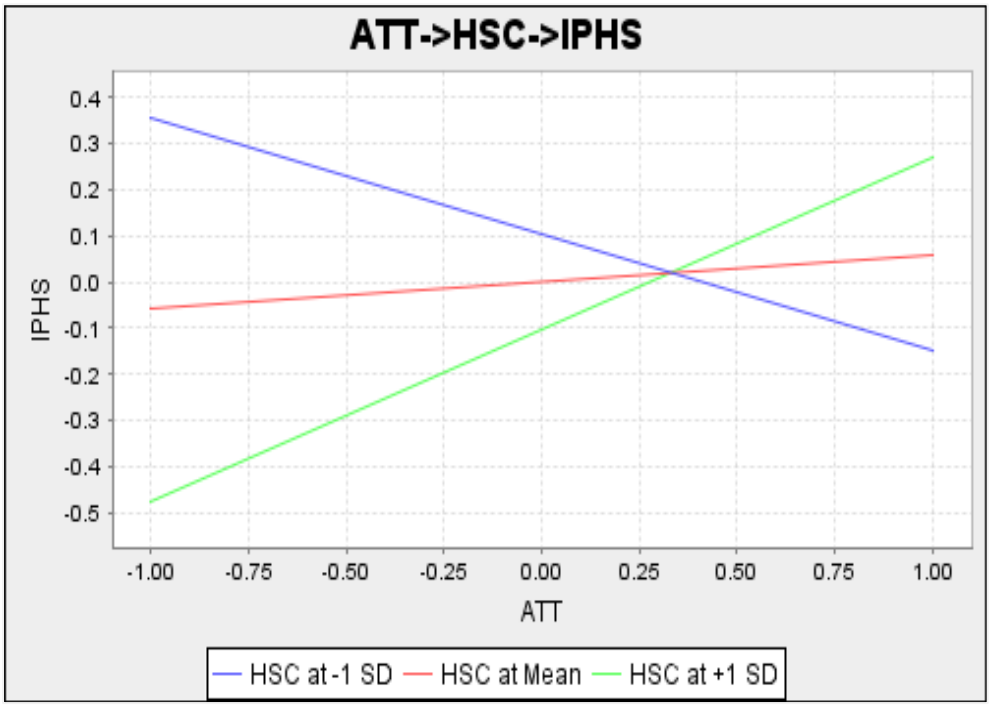

Figure 2(b): Simple Slope Plot on Interaction Effect ATT→HSC

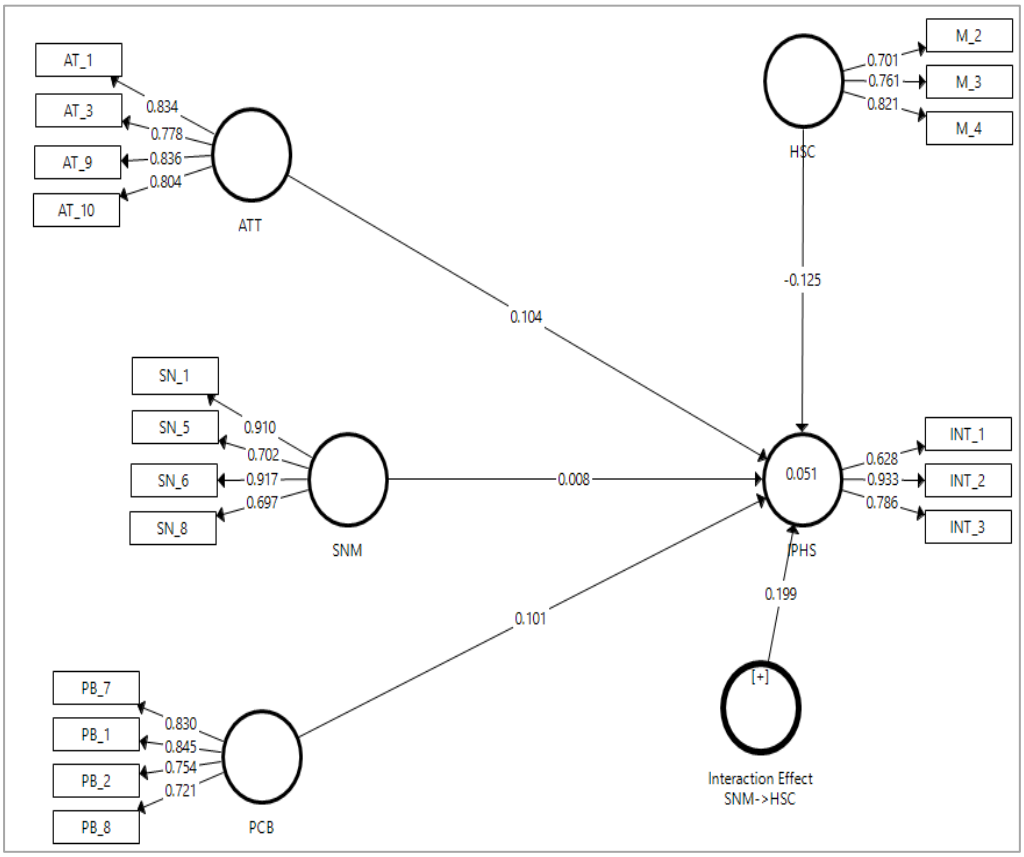

Figure 3(a): Moderator Analysis Results on SNM→HSC in Smart-PLS

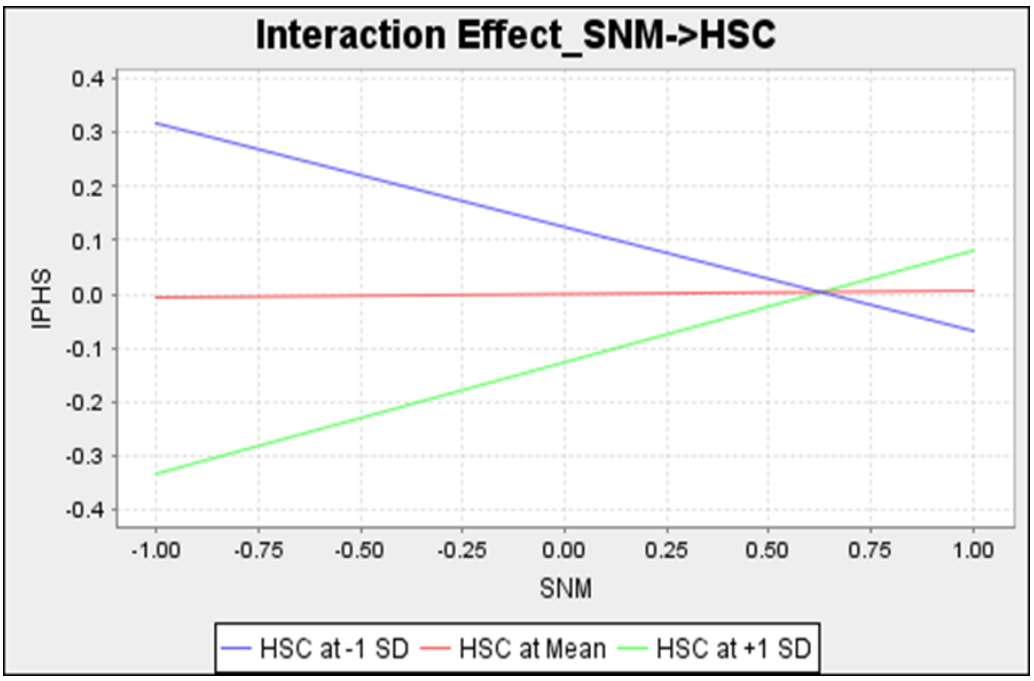

Figure 3(b): Simple Slope Plot on Interaction effect SNM →HSC

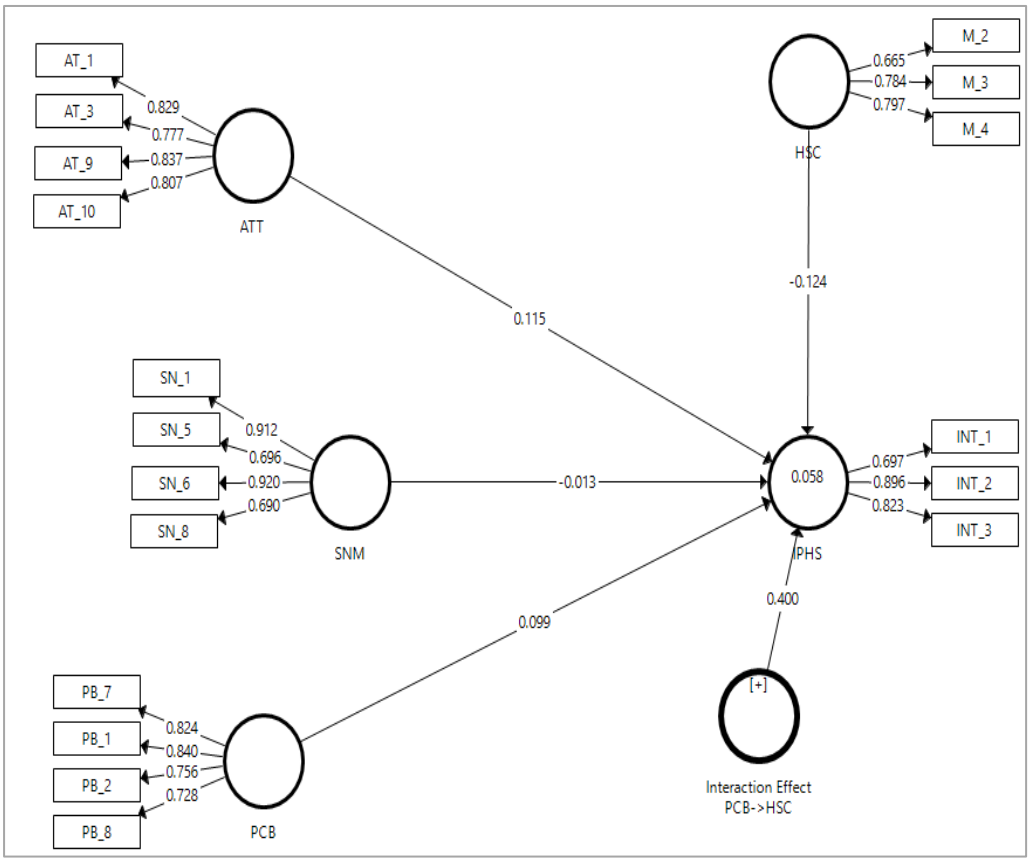

Figure 4(a): Moderator Analysis Results on PCB→HSC in Smart-PLS

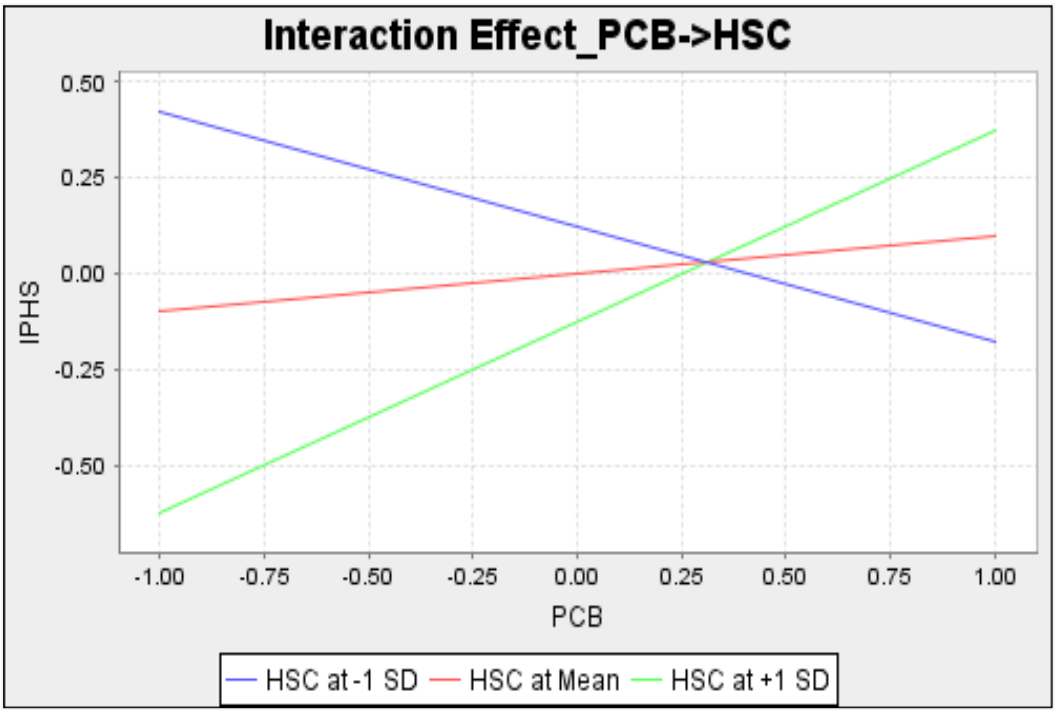

Figure 4(b): Simple Slope Plot on Interaction effect PCB→HSC

Discussion

This study was driven by the aim of measuring the effect of HSC towards the IPHS using the TPB. The measurements utilized using this theory underpinned the direct influence of HSC upon the predictors (i.e. attitude, subjective norms, and perceived behavior control) and its moderating effect between these predictors towards the IPHS to achieve weight loss.

The findings revealed that HSC posed a significant effect towards TPB predictors, indicating its important role in influencing the personal factors of the respondents. Despite the weight of its effects that were not capable of affecting a high effect size towards the IPHS, a campaign designed with a better and improved structure may inevitably pose a higher impact between the predictors towards IPHS. Such belief was rooted in the fact that this study communicated or promoted HSC as a one-time campaign rather than a long-term and structured design. Regardless, it successfully elicited and displayed the respondents' interest in the topic. A study also conclude that the strength of a media campaign to produce positive changes or prevent negative changes in health-related behaviours across large populations were contributed by the concurrent availability community-based programmes, required services and products, and policies that support behaviour change (Wakefield, Loken, & Hornik, 2010). Hence, a combination of promotions or campaigns with media entities or other relevant approaches would be immensely beneficial in communicating the advantages of healthy sleep behavior and enhance its impact in influencing the behavior.

Upon a cursory glance at the relative importance of the exogenous driving factors for the IPHS, HSC was notably influential in affecting the TPB determinants. PCB, in particular, was the most impacted element towards the intention to practice healthy sleep behavior (IPHS). The positive results obtained in this study showed that HSC played an integral role in influencing

the relationship between all TPB predictors towards the IPHS. Furthermore, its direct influence towards the predictors indicated highly significant results and revealed an effect that was not significant between the predictors and intention to practice healthy sleep behavior (IPHS) due to the small effect size. Therefore, a continuous HSC that was designed and executed in a highly structured manner would lead to significant impacts due to the presence of positive moderating effects.

A comprehensive evaluation on the theory and the implications linked with obesity prevention via a new weight loss factor like healthy sleep behavior necessitated the determination of the behavioural intention of obese women towards practicing healthy sleep behavior. Moreover, it was also necessary for the contributions of attitudes, subjective norms, or perceived behavioral control to be identified, with respect to specific behavioral intention and the influence of HSC. Even a small effect of significance or interaction size would serve as an instrumental indicator, as the campaign was conducted in this study as a one-time approach. Therefore, it only served as a preliminary study in measuring the intention towards new behavior.

The results obtained in this study indicated positive moderating effects of HSC on the relationship between all TPB determinants (i.e. ATT, SNM, and PCB) towards the intention to practice healthy sleep behavior (IPHS). Hence, increased frequency and intensity of HSC were integral in explaining the intention to practice healthy sleep behavior (IPHS).

Firstly, attitude (ATT) revealed a positive moderating effect by HSC per the evaluation on the expected outcome of the new behavior for weight loss. The TPB described the nature of relationships between beliefs and attitudes, explaining that an individual's evaluation of or attitudes (ATT) towards behavior were controlled by their persisting beliefs regarding the behavior itself. Belief could be defined as the subjective likelihood that a behavior would produce a certain outcome. Therefore, an evaluation of each outcome specifically contributed to the attitude in a direct ratio to the individual's subjective likelihood that the behavior would produce the outcome in (Fishbein & Ajzen, 1975). Attitudes may be implemented in many ways, evident by the manner in which mass media via advertising used to influence the attitude towards particular products, services or even issues. Social psychologists revealed that attitudes and the actual behavior were not in a constantly perfect alignment. Humans displayed a tendency and a higher likelihood to behave according to their attitudes under a certain condition inclusive of their expectations for a favorable outcome, or upon finding an opportunity to either benefit or lose something due to the issue (Chaiklin, 2011). Thus, the positive effect observed in this study may be translated to the benefits of the new weight loss behavior due to the current obesity issue. Hence, this could be perceived as a promising start towards the acceptance of beliefs among the respondents regarding the outcomes of the behavior, specifically due to the knowledge they obtained from the HSC despite the short duration.

Another previous study also highlighted the relationship between intention and behavior that was subject to the powerful influence of external factors (Ham, Jeger, & Ivković, 2015). Thus, this may also signal the respondents' acceptance of the effects of HSC that moderated their personal attitude, and subsequently to anticipate the gains behind the weight loss outcome should they opt for the new behavior.

Secondly, Subjective Norms (SNM) referred to the perceived social pressure to either participate or not in a particular behavior. It was typically determined by the overall access of normative beliefs regarding the expectations of important referents, whereby the strength of each normative belief (n) could be weighted by the motivation to comply (m) with the referent in question, and the products were then aggregated. The results of this work displayed a positive moderating effect of HSC on subjective norms (SNM), thereby indicating its role in influencing SNM despite the small effect. The positive but small effect was attributable to the lack of social pressure towards the intention to practice healthy sleep behavior (IPHS), as the association between the behaviour for weight loss was new to the population. Similarly, it could be interpreted as the weak and almost absent social pressure towards the new weight loss behavior surrounding the respondent, as the present climate for healthy sleep behavior was not obviously promoted in the population.

Finally, perceived behavior control (PBC) relationship was described by Ajzen (2005) to be moderated by past behavior due to the presence of a potential mechanism supporting the element to moderate actual control. However, this study only enabled the HSC in a short duration via a one-time campaign, which may be a new concept to most of the respondents. Hence, the positive moderating effect of PBC on HSC was revealed to be not affected by past behavior, but rather by the power the respondents perceived in their capability to endorse and practice the new behavior. Therefore, it would reveal higher accuracy and disclose actual control adequately to show a stronger relationship between PBC and behavior if the respondents were familiar with the new behavior, particularly those with years of past behavior.

Evidently, the outcomes of this study exhibited the need for improvements of the intervention strategy currently in place in combating obesity among Malaysian women as its rates consistently increased. Although intention and perceived behavioral control were statistically significant in predicting behavior, past behavior and response inhibition had accounted for more variance when they were added to the TPB model. Therefore, subjective norm was found to be the strongest predictor for the intention, indicating the significance of normative influences in sleep hygiene behaviors.

Furthermore, a careful evaluation of the theory and consequences associated with obesity prevention via a new weight loss factor (e.g. healthy sleep behavior) rendered it necessary to determine the behavioural intention of obese Malay women towards performing healthy sleep behavior. It was also imperative so as to recognize whether ATT, SNM, or PCB contributed to the intention to practice healthy sleep behavior with the influence of HSC. These objectives substantiated the usefulness of the TPB due to its status as the most influential theory in health-related human behavior, specifically psychology, in evaluating the acceptance of new behavior in a population.

The TPB stated that the best predictor of an individual's behavior was their intention to perform that specific behavior (Ajzen, 1991). Attitudes, subjective norms, and perceived behavioral control being the predictive factors for intention to engage in the behavior were subsequently investigated in the context of obese Malay women from the state of Melaka. It was conducted to determine the feasibility of the HSC in influencing the IPHS as new weight loss factor. Consequently, a measurement of the intention allowed this study to identify the specific determinants affected by the knowledge obtained from the campaign. Additionally, the elements that could be manipulated in a strategic and structured program would further

strengthen the intention, which would be utilizable as a platform for behavioral changes towards sustainability.

Conclusion

Behavioral changes towards any new behavior must be consistently promoted to ensure sustainable awareness, which would inevitably be converted afterwards into routine behavior. Sleep behavior in particular was a novel concept in the current climate and population, thus being the reason why most of the respondents were unaware of the correlation between sleep and obesity. Therefore, knowledge delivery with an emphasis on the benefits of healthy sleep behavior towards weight loss as the core of the campaign as per this study would serve as a pioneering step to initiate lifestyle changes among the public. Similarly, measuring the intention towards the particular behavior should be treated as a preliminary effort as one should not anticipate behavioural changes towards healthy sleep behavior within a short time frame, specifically due to its novelty to the public.

Hence, an integrated cooperation between health agencies and the population with supplementary governmental support may initiate a 360-degree impact to boost public awareness regarding the importance of healthy sleep behavior in combating obesity. Additionally, it would concurrently stimulate the improvements of overall and comprehensive health circumstances and enhance the current strategies implemented by health professionals in incorporating healthy sleep behavior as a multi-component strategy against obesity nationwide. The need to discover the most powerful obesity prevention strategy therefore remained to be one of the most profound challenges in public health today.

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