RESEARCH ARTICLE

Emotional readiness and weight consequences evaluation for behavioural modification of obese adolescence in Jakarta-Indonesia

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Abstract

Objective: With increasing incidence of obesity in Indonesia, behavioural modification plays an important role for its management. Applying the Trans-Theoretical Model (TTM) to assess behavioural modification readiness of obese adolescence, this study highlighted two main processes of change in TTM: emotional readiness to change (EmR) and weight consequence evaluation (WCE). Adolescence may develop difference EmR and WCE in handling obesity status especially in high school and college years, due to different phases of physic, autonomy and behavioural development.

Methods: A comparative cross-sectional study was conducted using validated Indonesian version of the TTM questionnaire to compare WCE and EmR scores (scale 0-100) between high school students and college freshmen group which included means comparison tests and linear regression.

Results: The study involved 116 obese adolescents and majority were at the action (32%) and contemplation (31%) TTM stage. After comparing 59 high school students and 57 college freshmen, EmR and WCE scores were not significantly different ($p > 0.05$). Both groups had good EmR score. Weight consequences awareness were only slightly higher among college freshmen compared to high school students, scoring at 78 (20-96) and 63 (30-100) respectively. Higher body mass index was associated with better EmR and WCE scores in both groups.

Conclusion: Majority of the obese adolescents were already at the action and contemplation phase and also had appropriate emotional readiness to change. However, compared to college students, high school adolescence needed more support to maintain their weight management, in the form of education to raise awareness of obesity consequences.

Keywords: Obesity management, Adolescent behaviors, Emotional adjustment. (JPMA 71: S-46 [Suppl. 2]; 2021)

Introduction

The Basic Health Survey (Riskesdas) of 2018 mentioned that the incidence of obesity in Indonesians above 18 years old, increased from 14.8% in 2013 to 21.8% in 2018. The central obesity in the population aged 15 years and older also increased from 26.6% in 2013 to 31% in 2018.[1] This rapid increase in obesity has gained attention because obesity is one of the most common disorders responsible for various health problems, such as cardiovascular disease, type 2 diabetes mellitus, obstructive sleep apnoea, and osteoarthritis.[2] As the report1 mentioned, the current prevalence begins approximately at late adolescence. Obesity in young adults should be addressed in order to prevent the onset of comorbidities that could affect their daily activity and health.

The transtheoretical Model (TTM) stage of change is able to investigate individuals' readiness to change their behaviour. It includes five stages of change: pre-contemplation, contemplation, preparation, action, and maintenance. The pre-contemplation stage includes people who lack any intention to act in the near future. Contemplation refers to that stage where people have the intention to change their behaviour within the next 6 months. The preparation stage is similar to contemplation; however, it occurs within the next 30 days. Action refers to the stage in which individuals have already made lifestyle modifications within the past 6 months, but not all modification is considered to be significant for changing their health condition; hence, the modification made should be specific, with proof that it can reduce risks of the disease. The next stage is maintenance and refers to individuals trying to prevent relapse but with fewer change processes compared to the action stage. It is possible for a person to regress to the previous stage(s): The term for this event is relapse.[3]

There are four processes, including emotional re-evaluation (EmR), weight consequence evaluation (WCE), weight management actions, and environmental restructuring. Emotional re-evaluation (EmR) refers to individuals' emotional readiness to change or to their

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reaction towards being obese and what could happen if they started taking actions to manage their weight. WCE is someone's awareness of the consequences upon his or her life that stems from obesity. Weight management actions is a process of change when someone takes specific actions in an attempt to manage their condition. The last stage is environmental restructuring, and it refers to the actions that individuals take to change their environment so that it promotes or supports their weight management.[4]

Knowing someone's stages and processes of change can be invaluable in determining a proper care plan. For example, if someone is in the precontemplation stage, then providing interventions to reduce his or her weight will fail to meet their needs because the individual might not undertake the weight management any time soon, and therefore, greater motivation or awareness of the importance of managing their weight should be promoted.[4]

Adolescence is a critical growth and development period during life, and it is related both to biological changes and social interactions. Neurocognitive development plays a role in adolescent decision making and behaviour; furthermore, a number of social determinants influence the perception of their health.[5] One study reported that adolescents who were classified as overweight or at risk of being overweight consider themselves as underweight. Only few individuals from this group perceived themselves as overweight.[6]

Treatment for obesity includes losing weight by healthy eating and lifestyle modification, which can be achieved by individuals gaining better control of their will to change their habits.[7] In order to manage adolescence obesity, it is important for physicians to be aware of adolescent perceptions and knowledge of obesity. This awareness helps in determining the proper intervention according to their current level of readiness and understanding. Due to the different phases of physique, cognitive, social interaction, and behavioural development between adolescence in high-school and college, assessing the EmR and WCE in each group is crucial for designing weight management programmes that match their current state of readiness.

Subjects and Methods

The study design was cross-sectional in order to analyze whether any difference in terms of EmR and WCE scores existed between high school students and college freshmen students. Inclusion criteria were those who had BMI 25kg/m^2 and either at high school or college freshmen students. We excluded those who were younger than 15 and older than 21 years age.

We used secondary data for EmR and WCE scores, age, gender, education level, and BMI values gathered from Senior High School and Universitas Indonesia students in Jakarta city. The main research was conducted by Aria Kekalih titled 'Development of Smartphone Application as Intervention for Adolescence Obesity based on Readiness Level of Behavioural Change' from May-December 2018. Study used a validated Indonesian version of the Stages and Processes of Change Questionnaire.[4,8-10] The questionnaire for EmR included 11 statements, and for WCE six statements. Each statement was marked with a scale rating from 1-5, where 1 meant "strongly disagree" and 5 meant "strongly agree". The marks were then converted into a 1-100 range for the score value. The sample size was calculated by using the mean comparison made for the analysis of the unpaired numerical data. Based on these calculations, the minimum number of samples was found to be 108; we included 116 respondents collected by consecutive sampling. Ethical clearance for this research was obtained from the research ethics committee board of the Faculty of Medicine at Universitas Indonesia in 2018 (0525/UN2.F1/ETIK/2018).

The EmR and WCE scores were compared and analyzed in terms of age group, gender, education level, and BMI. The dominant variables were analyzed using linear regression tests. Analysis was conducted using IBM SPSS Statistics Version 20. Univariate analysis was performed to discover normal or abnormal distribution for both numerical and categorical data. Bivariate analysis was used for normally distributed data and independent t-test and Mann-Whitney test was used for non-normally distributed data. Multivariate analysis used linear regression to analyze data with p value for bivariate analysis < 0.2.

Results

The data selected from the main research database consisted of 116 respondents that included 59 high school students and 57 college freshmen students. Of the total number of respondents, 83 (71.6%) categorized themselves in obesity grade 1, and the rest categorized themselves in obesity grade 2. In addition, 59(50.9%) of respondents were male, and 57 (49.1%) were female. The largest percentage of respondents fell within the action stage 37 (31.9%), followed by contemplation 36 (31%), preparation 20 (17.2%), maintenance 14 (12.2%), and pre-contemplation 9 (7.8%), as presented in Table-1.

Table-2 shows the score of each item for both the EmR

Table-1: Characteristics of obese adolescence based on gender, education level, body mass index, age and stage of behavioural change readiness (n = 116).

Characteristics	n	%
Gender		
Male	59	50,9
Female	57	49,1
Education level		
High school student	59	50,9
College freshmen student	57	49,1
Age		
15 – 17 (years)	60	51,7
18 – 21(years)	56	48,3
Age		16,3 (14,7 – 20,7)
BMI		
Obese stage I	83	71,6
Obese stage II	33	28,4
Stage of change		
Pre-contemplation	9	7,8
Contemplation	36	31
Preparation	20	17,2
Action	37	31,9
Maintenance	14	12,2

BMI: Body Mass Index.

and WCE processes. As part of the EmR process, the item "If I lost weight, I would be happier" had the highest median score, whereas the lowest score was for the item 'Losing weight would help me improve my relationships with others'. Important items, such as 'I think I should eat food with less fat' and 'Being overweight makes me feel bad' were among the five EmR items with the lowest score.

In the WCE process, the item with the highest median score was "I now realize I have a weight problem. In addition, important items such as "Most of my health problems are due to my being overweight", or "My current weight makes my daily life difficult" were amongst the three items with the lowest scores. The dispersion median score of WCE items were lower compared to EmR items (Table-2).

Table 3 reveals that high school students had higher EmR scores compared with college freshmen. Based on TTM readiness level, those in the preparation stage had the highest EmR score, whereas respondents in the pre-contemplation stage had the lowest score. Female respondents had a higher score than male respondents. However, none of those findings were statistically significant. The only significant differences were between obese level II and obese level I, with the former having a higher EmR score compared to the latter. This trend was also proven based on multivariate linear regression, after adjustment with other covariates (education level, stage of change, and gender).

Contrary to EmR, WCE scores was higher in college freshmen students, whereas female respondents possessed higher scores compared to male respondents, but with no statistical significance. Preparation score also had the highest score for WCE, and precontemplation also

Table-2: Profile of process of behavioural changes for obesity intervention in obese adolescence: Emotional Readiness to change evaluation (EmR) and Weight Consequences Evaluation (WCE) questionnaire items, ordered from the best to worse score (n = 116).

Process of behavioural modification items for obesity intervention	Median (Min - Max)	Mean	Std. Deviation
Emotional Readiness to change-evaluation (EmR)			
If I lost weight, I would be happier	5 (1 - 5)	4,34	0,84
If I lost weight, I would feel better about myself	5 (1 - 5)	4,33	0,84
When I lose weight, I feel proud of myself	4 (1 - 5)	4,17	0.90
I feel good when I am able to control my eating habits	4 (1 - 5)	4,03	0,91
I am committed to losing weight	4 (1 - 5)	3,96	0,95
I am worried about gaining more weight	4 (1 - 5)	3,97	1,05
I think I should eat food with less fat	4 (2 - 5)	3,83	0,81
I am not happy with my current weight	4 (1 - 5)	3,79	1,09
Being overweight makes me feel bad	4 (1 - 5)	3,59	1,03
I feel guilty when I overeat	4 (1 - 5)	3,41	1,37
Losing weight would help me improve my relationships with others	3 (1 - 5)	3,43	1,09
Weight Consequences Evaluation (WCE)			
I now realise I have a weight problem	4 (1 - 5)	4,03	0,98
My family and friends are worried about my weight	3 (1 - 5)	3,14	1,09
Society's view of obese people affects me emotionally	3 (1 - 5)	2,94	1,19
Most of my health problems are due to my being overweight	3 (1 - 5)	2,83	1,09
My current weight makes my daily life difficult	3 (1 - 5)	2,66	1,12
My weight restricts my relationships	2 (1 - 5)	2,1	1,09

Table-3: Association of Emotional Readiness with change evaluation (EMR) and Weight Consequences Evaluation (WCE) score to education, body mass index, gender, age and stage of behavioural change readiness in obese adolescence subject (n = 116).

	Bivariate				Multivariate[lr]	
	EmR score	p-value	WCE score	p-value	EmR	WCE
Education level						
High school student	81 (30-100)	0.455[mw]	63 (30-100)	0.299[mw]	0,736	0,219
College freshmen student	78 (25-100)		78 (20-96)			
Gender						
Male	76.1 ± 14.8	0.190[t-test]	56.6 (20 – 86.6)	0.736[mw]	0,054	N/A
Female	79.7 ± 13.9		60 (23.3 – 96.6)			
Age		0.536[sct]		0.541[sct]	N/A	
BMI						
Obese I	76.3 (25.4 – 100)	0.002[mw]	55.8 ± 15.1	0.001[t-test]	0,001	0,001
Obese II	87.2 (56.3 – 100)		66 ± 14.4			
Stage of change						
Pre-contemplation	67.2 (50.9 – 96.3)		46.6 ± 11.9			
Contemplation	78.1 (30.9 – 100)		57.6 ± 14.7			
Preparation	82.7 (61.8 – 100)	0.148[kwt]	63.5 ± 15.4	0.065[owat]	0,367	0,235
Action	80 (25.4 – 100)		61.6 ± 15.9			
Maintenance	81.8 (43.6 – 100)		56.9 ± 16.7			

mw: Mann Whitney test ; t-test: Unpaired t-test; sct: Spearman correlation test.
kwt: Kruskall-Wallis test; owat: One-way ANOVA test; lr: linear regression test.

had the lowest score. The similar significance was also only seen in BMI, in which individuals in the obese II group had a higher score compared to those in the obese I group, based on bivariate and multivariate linear regression analysis (Table-3).

Discussion

Understanding the nature of adolescent emotional response and apprehension towards their physical condition is quite complex since this is the age of adjustment from childhood into adulthood. Adolescence represents a stage when individuals start to gain independence in making decisions; however, they also remain vulnerable since individuals at this age can greatly be influenced by various social interactions, mainly from their parents and peers.[19] Therefore, this study is novel in examining the relationship between scores of emotional readiness and consequences of weight awareness in late adolescents in terms of education level, gender, stage of change, and BMI value. An improved understanding in this matter could result in treatments that correspond to the patient's needs and weight management programmes that patients have the ability to maintain and adhere to.[15,16]

In this study, EmR and WCE were assessed through the Stages and Processes of Change Questionnaire.[4,8,9] It was developed by Andres A. et al.[4], and it has the ability to explore someone's current stage and process of change. EmR represents someone's emotional reaction towards their obesity, whereas WCE determines a person's awareness of several consequences in his or her life caused by their excess weight problem.[4] A higher score indicates that individuals' emotions are greatly affected by their condition (EmR) and that they are aware of the consequences that can occur from their condition (WCE).

There was no difference in terms of EmR and WCE scores between high school students and college freshmen students. The only significant independent variable affecting late adolescents behaviour was their BMI value; individuals with greater BMI were more emotionally affected and more aware of their condition as well as the consequences that could arise from their conditions. This finding is in line with a previous study on weight stigmatization experienced by obese persons that turns out often to go beyond their behaviour but went as far as their character and selfhood, with obesity usually correlated with laziness, unattractiveness, self-indulgence, and several other negative judgements.[11] BMI had a positive association with appearance-based social anxiety mediated by body image dissatisfaction based on a study of female undergraduates in several Australian universities.[12]

Both EmR and WCE scores were not normally distributed for the remaining independent variables. Females had higher median values compared to males for both processes. However, the median for EmR was higher in

high school students, whereas WCE median score was higher in college students. Female high school students were reported as being more likely to consider themselves as overweight than males.[6] Moreover, a study about body image and eating patterns in adolescence found that overweight girls desired to have thinner bodies, whereas a number of overweight boys were satisfied with their body image because male body satisfaction was affected by both muscularity and the weight factor. Body dissatisfaction that is related to weight could disrupt the emotional well-being of teenagers. Furthermore, a recent study discovered that low body-esteem and self-esteem in college students aged 18-22 years old played a role in the occurrence of social anxiety.[13-16] In addition to these findings, a study in Australian adolescents reported interesting results: When asked about body image in terms of both appearance and functionality in a single questionnaire, both male and female adolescents were more satisfied with and valued the functional aspect of the body more than appearance.[17]

Since the preparation stage had the highest score for EmR, an intervention that can build motivation through adolescence emotional state could help them move into the next stage in which they take actions to improve their health conditions. There are few differences regarding the stage of change in Indonesian samples with UK samples from a previous study,[4] where most of the people in the action stage had the highest score for EmR, and this was followed by people in the preparation stage. This difference might be influenced by the wide range of population that was included in the UK-based research and the cultural difference between UK and Indonesia. Indonesia is one of several countries in the world with high cultural and family values. One study conducted with adolescents from different nations with different cultures discovered a positive correlation between parent admiration of adolescents with adolescent life satisfaction. In cultures where family values were more important, the connection between peer acceptance and a teenagers' life satisfaction was not as relevant.[18] Additionally, parental support has been proven to be beneficial in lowering BMI incrementally from late adolescence to young adulthood in an African-American female sample.[19]

Due to the low WCE score, we analyzed the score of each item for both WCE and EmR and found that one item from each process that had the lowest median. For EmR, the item 'Losing weight would help me improve my relationships with others' demonstrated low result, which indicates that losing weight did not affect most of the respondents' relationships emotionally. Furthermore, this suggests that they felt their relationship with other people was not affected by their current weight condition. This view is supported by a study[20] that found social skills and social support had greater impact on the subjective well-being of obese population than their BMI values.

The value of one particular WCE item; namely, 'My weight restricts my relationships' had the lowest score among other WCE items and also supported the idea that obesity did not necessarily impact adolescents' relationship with other persons. This result might also be explained by a study[21] of an obese sample in Germany that demonstrated that social distance to this population was associated with emotional responses from non-obese individuals, who often exhibited willingness to interact with obese individuals, whereas obese persons often hesitated to interact with non-obese persons when negative public stigma was present; this study in general depicted how social distance was influenced by both parties' emotional responses. Another interesting finding from the breakdown of the questionnaire result was related to the item 'I now realize I have a weight problem' which has the result of 4 (1-5); this result suggested that a number of respondents scored low on this item, which indicated that they did not notice their obese condition; therefore, increasing the obesity awareness of such individuals remains a concern.

Additionally, one study suggested that among European adolescents, those who had normal weight could evaluate their food quality regardless of their gender, pubertal status, and parental educational level. Unfortunately, obese adolescents could not evaluate and were unaware of the quality of their dietary habits. They consumed foods whether or not it was healthy for their condition.[22] However, male high school students in Korea were reported to be more likely to choose undesirable methods to lose weight, such as fasting and medications. Even when they possessed good nutritional knowledge, they often chose other undesirable methods to lose weight. However, female high school students were more likely to lose weight to attain slimmer bodies because of influence from adults, their peers, and media. Furthermore, male high school students chose to increase their muscularity rather than simply losing weight, a trend which was mainly influenced by their close friends.[23]

Six themes contributing to the unhealthy dietary habits of adolescents within a peer environment were identified: 1) having regular meals with peers as a common form of social interaction, 2) peer pressure to practice unhealthy dietary habits, 3) easy access and high availability of

unhealthy foods, 4) poor nutritional knowledge, 4) inattentive parenting style, and 5) passive interaction within friendships which makes them feel obligated to follow peers or unable to say no to them. Despite that, a confident, decisive, and self-determined adolescent tends to be less influenced by their peers regarding unhealthy dietary habits; this feature endows them with enhanced behavioural confidence.[24] This trend reveals the crucial role of parents and peers in adolescent life.

Conclusion

No significant differences between high school and college freshmen were detected for neither EmR and WCE scores. However, due to the convenient sampling method and sample size, generalisability of the finding to the greater adolescent population is limited. The main findings include the positive correlation between BMI and both EmR and WCE scores and higher score being associated with higher BMI, which means that the emotions of obese late adolescents tend to push them to act to manage their weight. WCE score was relatively low which indicates that adolescents lacked awareness of their conditions and consequences of obesity. These results can serve as valuable input for experts seeking to educate them and raise their awareness.

The current study encourages future researchers to delve deeper into this issue, considering research in this area that includes sufficient data to devise the most suitable interventions related to adolescents' readiness to change remains limited in Indonesia. If possible, experts should also include participation from both parents and peers within an intervention programme to provide mild motivation for obese adolescence, so that they receive the support needed to complete the plan, as it may take considerable amount of time to achieve the targeted behavioural modification, depending on the positive progression made by individual teenagers, which may differ according to individuals.

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