ORIGINAL ARTICLE

Public Pedagogy of Healthy Living: A Thematic Analysis of Social Media Posts about Obesity, Physical Activity, and Diet

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ABSTRACT

Background. There has been growing interest among scholars to examine public discourses concerning obesity, physical activity (PA), and diets during the last couple of decades. Some of these studies appear to counter-discourse that identifies the take-ups of obesity as a 'health problem' to be socially and morally problematic. **Objectives.** The purpose of this study was to critically analyze social media posts on obesity as they intersected with PA and diets. **Methods.** The current study was social media research employing big data analytics followed by a qualitative method. The data collection process took several stages. First, we created a set of terms commonly used to describe obesity and overweight, including laymen's words in the big data analytical machine. The second stage of data collection involved qualitative data which we sampled from machine learning. Data analysis included strategies to describe demographic characteristics and the sentiments of the posts were performed by big data analytics through natural language processing (NLP) algorithms. We further analyzed the qualitative data through six steps of thematic analysis. **Results.** The analysis resulted in the development of three major themes. First, it clustered around the characteristics of social media users as the public of the public pedagogy under investigation along with the inactions of that pedagogy through social media. The second theme includes the meanings of healthy bodies as socially constructed through posts regarding body weight. The last theme revolved around discourses about the resolution of unhealthy bodies, especially through PA and diets. **Conclusion.** We conclude that social media is extensive in spreading out messages concerning living a healthy life. This becomes a discursive process of constructing what constitutes a healthy body and how to resolve undesirable bodies. The roles of authorities are also central in producing the discourse. Therefore, authorities should carefully examine all possible consequences of the health messages being circulated in the community while conclusive understanding has not been achieved yet. Because the impacts on our society could be profound, in ways through which social injustice could be reproduced through negative stigmatization that is based on body size.

KEYWORDS: *Public Discourse, Health Messages, Bodies, Exercise, Diet, Social Media Research, Big Data Analytics, Qualitative Analysis.*

INTRODUCTION

The term pedagogy is generally understood as the art and the science of teaching. But critical pedagogists have extended the concept beyond formal schooling that encompasses the acquisition of new knowledge and skills or the transformation of the existing ones as a result of someone's interaction with social institutions (1).

Taking place in public space, including virtual spaces such as social media, this public pedagogy is termed public pedagogy (2) and one of the operational processes is the re/production of public discourses.

There has been growing interest among scholars to examine public discourses concerning

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obesity, physical activity (PA), and diets during the last couple of decades (3-7). Some other studies specifically addressed how public discourse related to obesity, PA, and diets has been articulated by placing obesity as the solution to obesity (8), disempowering those with obesity and overweight (9), and intensifying the dehumanization of fatness (10). Within this focus of interest, Pringle and Pringle (2012) mapped out two competing streams of discourse: the dominant and the alternative obesity discourses (11). On the one hand, the dominant obesity discourse centralizes around the notion of obesity as a 'health problem' and therefore pathologizing excessive fat. By taking advantage of the scientific justification, this discourse delivers messages about controlling the amount of physical activity and food consumption to resolve 'the health problem.' While such discourse emerges in various representations ranging from public health promotions to digital media content, the dominant obesity discourse also predominates the scientific discourses-- notably in the field of sport and exercise science. Research within the area of dominant obesity discourse seems to be overwhelming. This is not to mention many more studies with the underlying assumption of obesity as a 'health problem' (5, 6).

On the other hand, there appears counter-discourse that identifies the take-ups of obesity as a 'health problem' to be socially and morally problematic (11, 12). This alternative discourse emanates mainly from a critical perspective on health and physical activity studies. For example, Alexander and Coveney (2013) critically examined public health promotions regarding the obesity epidemic and PA as they have been anchored in ideological and political interests—specifically neoliberalism (13). Other scholars focused on how television circulated discourses about healthism in which solving the obesity problems rested in the hands of the individual (6, 14). Instead of using knowledge to promote 'healthy living', the programs tended to use body shaming for obese individuals. Rich (2014) further moved to unfold the ways through which media served as surveillance of obese bodies (1). In many cases, the operation of the dominant discourse produced social stigma based on body size (15, 16). Rich, De Pian, and Francombe-Webb (2015) revealed that such stigmatization usually intermingles with lower social class resulting in social and cultural tensions (17).

While the alternative obesity discourse looks powerful in scrutinizing the dominant discourse, many areas in the literature remain unexplored. This is especially apparent concerning discourses reproduced in digital media. A few exceptions include Brun, et al., Cain, et al., Chou, et al. (15, 18, 19). We positioned our study within this alternative discourse as we attempt to not only fill the gap in the literature but also to socially critique the dominant discourse related to obesity being expressed in social media. More specifically, we utilized access to social media posts and platforms through big data analytics and then critically analyzed those with a qualitative approach. This represented the original contribution that our study was the potential to offer in the field of sports science. The purpose of this study was then to analyze social media posts on obesity as it intersected with a PA and diets from a critical perspective. Two research questions were developed to guide the analysis: what are the characteristics of the virtual public of public pedagogy for healthy living and how public pedagogy on the interrelation of obesity, physical activity, and diets are enacted in social media?

MATERIALS AND METHODS

The current study was social media research, an emerging area within research methodology (20). We took advantage of the information and analytics resulting from the machine learning algorithm. However, we then examined thoroughly the qualitative data extracted from social media posts. Our paradigmatic standpoint included interpretativism to accomplish this attempt.

Data Collection. The data collection process took two stages. At each stage, we developed protocols for collecting data which have been reviewed by two independent experts. First, we took advantage of a computer-based engine to access the social media big data from five major platforms (i.e., Facebook, Twitter, Instagram, YouTube, and TikTok). We created a set of terms commonly used to describe obesity and overweight, including laymen's words. Examples were fatty, big tummy, chubby, gym, physical activity, sports, body goals, and diets. Since those terms were in Bahasa Indonesia, it resulted in social media data in the same language and geolocation within the country. Second, we collected data from five social media platforms

dated from September 2020 to September 2021. Big data analytics for ebdesk.com were utilized to help with the magnitude of publicity of the public pedagogy being investigated. Figure 1 shows the exposure of posts by social media platforms with the ones from Twitter, Facebook, and Instagram dominating the related posts. Small amounts of the post were from YouTube and TikTok.
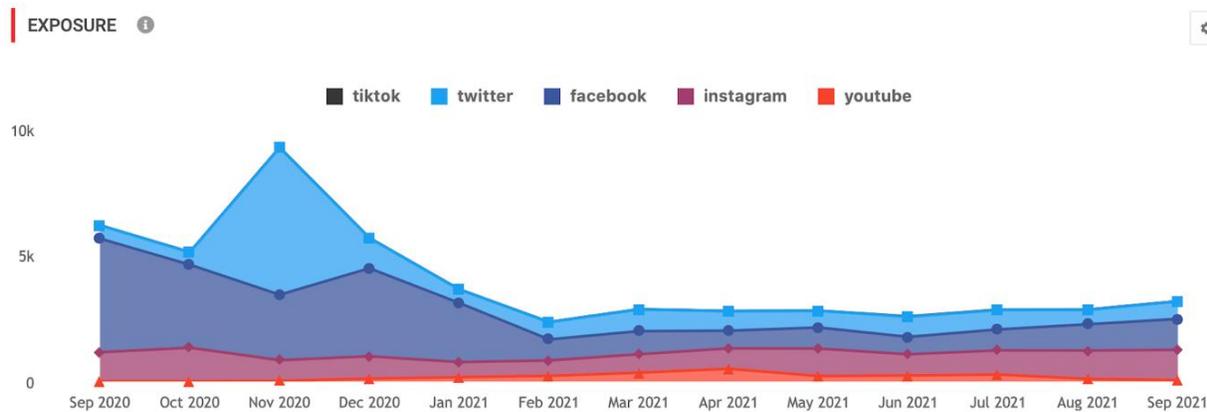

Figure 1. Post-exposure by social media platforms (retrieved from ebdesk.com with permission)

The big data analytics also algorithmically identified demographic information through text mining producing information in Table 1. As by the social media platforms, the characteristics of the public here--to a greater extent--were females, married individuals, and predominantly aged between 18 to 40 years old. These demographic characteristics might be interpreted that having concerns with body weight and health was aligned with femininity and productive age ranges. Therefore, it might be connected to wealth status and the decrease in PA. Additionally, these users were predicted by the algorithm as having a good formal education. Half of them were even well-educated possessing diplomas from higher education. These social media users might be exposed to academic socialization and culture.

The second stage of data collection involved qualitative data which we sampled from machine learning. In other words, we took all samples as they were provided by the machine from the most favorite posts. These data included posts containing various types of data such as textual micro-blogging, images, and videos. The links to posts were accessed and the web pages containing textual, visual, and audiovisual information were captured and saved in PDF formats and video files. A total of 105 files was prepared for further qualitative analysis.

Table 1. Demographic information of social media accounts generated by an algorithmic process.

	N	Percent
Gender		
Male	9.965	41,58
Female	14.001	58,42
Marital Status		
Married	13.947	56,2
Not currently married	10,866	43,8
Age range		
< 18	491	1,94
18 - 21	7.159	28,31
22 - 30	9.616	38,03
31 - 40	5.545	21,93
41 - 55	2.294	9,07
> 55	181	0,72
Last education		
High school	8.303	46,67
College	8.681	48,81
Graduate school	803	4,52

Data Analysis. Analysis to describe the demographic characteristics of the posts was performed by big data analytics through natural language processing (NLP) algorithms. We further analyzed the qualitative data through six steps of thematic analysis (21). These steps include familiarizing with the data, generating initial codes, identifying themes, reviewing themes, defining and naming themes, and writing up the report. We also took advantage of Computer Assisted Qualitative Data Analysis Software (CAQDAS), called ATLAS. Tip 9. More specifically, the software helped us in organizing the unstructured data of social media posts (microblogs, images, audiovisual forms). ATLAS. It also eased us in creating the coding system, categorizing codes into clusters of patterns, and finally doing more in-depth analysis to develop themes.

RESULTS

From the analysis process, we have developed three major themes clustered around the characteristics of social media users as the public of the public pedagogy under investigation along with the inactions of that pedagogy through social media. The second theme includes the meanings of healthy bodies as socially constructed through posts regarding body weight. The last theme revolved around discourses about the resolution of unhealthy bodies, especially through PA and diets. The following sub-headings describe the results of the analysis.

Delivering the messages to the public: enacting pedagogy through social media. We first explored the data to draw on the characteristics of 'the public' in this study before moving toward the description of the theme 'pedagogy through social media.' For this purpose, we took the analysis of a big data processing algorithm. Figure 2 presents several 36.513 sums of user IDs breaking down into engagement information details.

TOTAL POSTS	TOTAL LIKES/FAVORITES	TOTAL DISLIKES ON YOUTUBE	TOTAL CONTRIBUTORS
49.726 Count	3.406.229 Sum Of Likes Count	1.170 Sum Of Dislike Count	36.513 Sum Of User Id

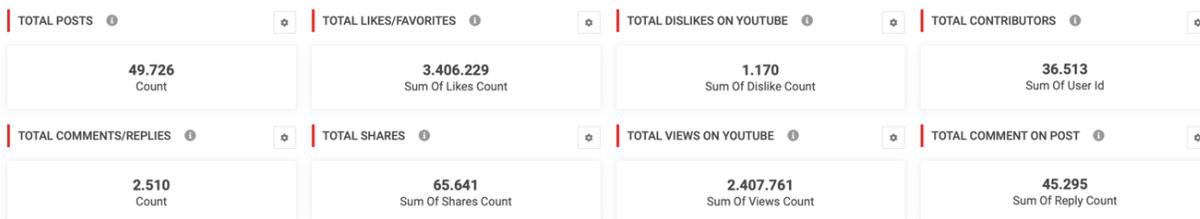| TOTAL COMMENTS/REPLIES	TOTAL SHARES	TOTAL VIEWS ON YOUTUBE	TOTAL COMMENT ON POST
2.510 Count	65.641 Sum Of Shares Count	2.407.761 Sum Of Views Count	45.295 Sum Of Reply Count

Figure 2. Users' engagement in posts related to obesity, PA, and diet (retrieved from ebdesk.com with permission)

How the information in Figure 2 was meaningful to this study? It was not our interest in statistically making sense of the numbers. But we would like to see the magnitude of the related posts (49.726 counts) in reaching the audiences, namely publicity of the public pedagogy. These posts engage social media users through views, likes/dislikes, shares, comments, and replies. Typically, the posts by regular users might not reach large audiences but their circle of social networks (e.g., friends, followers). Since they were the majority of the contributors, their posts might be interpreted as well-circulated. On the contrary, the social media influencers were small numbers but one post could be engaged much more extensive audiences. All at once, both regular users and the influences had delivered the pedagogy to a such widespread public.

Equally important to the nature of the publicity of the public pedagogy includes the delivery of educational messages. Data analysis showed how public pedagogy of healthy living had been delivered through diversified ways of public posts. Microblogging took up a major profile of the means of pedagogizing the public. The contents in the microblogs were broadcasted by regular social media users and influencers. Some other contents were packed in an advertisement of products (e.g., supplements, body goal programs, traditional medicines) which, one way or another, contained materials for making healthy living. All of these messages were mediated through short texts, images, and videos.

Additionally, our analysis also focused on the pedagogical strategies to deliver the messages. First, the most common strategy was to threaten the audiences about the risk of having obese bodies. The nature of some warnings was subtle, indirect, and implicit such as exposing bad bodies to visualize them as unwanted body shapes and

weights. Some others included direct, explicit messages. For example, a Twitter account stated that obesity killed a human being in a dishonorable way. It tweeted, "So surprise 'cause gaining too much body weight. It's time to seriously do sport. Don't wanna die in vain just because my organs pressed by fat." The pedagogical strategy of risking 'unhealthy bodies' was frequently accompanied by representing the advantages of doing PA and dieting. Some other social media users strategically compared before and after weight-loss programming, more often through juxtaposing fatty bodies before exercise or diet and slim body pictures. To convince the audiences to execute 'healthy body' goals, some posts provided success stories from public figures. Additionally, the teaching of healthy living through maintaining 'healthy' body weights, PA, and diet had been backed up by the authorities having the capability to justify the truth of the messages. Some of the posts seemed to be powerful as they were delivered by professionals in health (e.g., doctors, nurses, nutritionists) and PA (e.g., coaches, fitness instructors). For non-professionals, it was quite common to support their posts as legitimate truths by basing them on scientific information. A post on Facebook explained,

A study from the London School of Economics and Political Science has concluded that regular walks for weight loss have equal benefits to go to the gym. A 13-year research project that investigated the effects of various exercises on health among more than 50,000 adults found that walkers tend to be slimmer than those who regularly go to the gym for high-intensity training.

Constructing bodies: obesity and overweight as health problems. The second theme is clustered around the pedagogy being enacted through the construction of the body. It recapitulated bodies as they were interconnected with other dimensions in the data, including health, physical activity, and diets. The Sankey Diagram (Figure 1) being produced through ATLAS. The 9 shows the meaning of the constructed bodies. First and foremost, bodies were uniquely linked to health status as far as they were located in a certain range of weights. Despite the exact measurement not explicitly mentioned, social media users profoundly termed overweight, fat, beer belly, central obesity, and obesity to indicate health

problems. For example, a famous actor through his Instagram account announced a competition that included "a program for 3-month-transformation from obesity to becoming healthy" and provided prize money for those who had successfully done so. His statement connotated that obesity meant to be unhealthy. Another Instagram user posted that being overweight or obese was not a problem of ideal beauty or feminine ideals, but was more of a health problem. She stated,

I lose 10 kilograms of my weight in 20 days. I wanna be slim not only because I wanna get married, but also for health. When I was fat, I got irregular periods whereas I had been OK before being fat (Marleen, an Instagram user).

More specifically, the health problems linked to body weight include several non-communicable diseases. Despite naming several diseases, social media users tended to frequently mention the ones related to cardiovascular such as coronary artery disease, heart failure, stroke, hypertension, and high blood pressure. An example is a comment on a Facebook post by a local politician about his family's physical activity, "By reducing body fat, it also decreases the blood pressure among those with hypertension." A note on a YouTube video described that "Beer belly does not only make you less confident, but it can also trigger chronic diseases like diabetes, heart diseases, high blood pressure, even cancer."

At this point, bodies were valued concerning the norm (e.g., the standard of healthy weights) which eventually led to the justification of having either good or bad bodies. Further analysis revealed aspects of healthism emphasizing individual responsibility to achieve good (healthy) bodies. This was especially apparent through blaming individuals' lifestyles as unhealthy when they could not be able to maintain 'healthy body weights.' For example, a social media user twitted her/his experience of virtually doing medical consultation, "After I consulted with Hi Doc, I was suggested to do the diet and begin a healthy life." We noticed that the care for self by controlling what and how much to eat (diet) marked the beginning journey of healthy life. However, there was apparent self-judgment of her/his life as being unhealthy that also indicated a self-blaming action toward the body size falling outside the category of 'healthy weight.' While defining body weight status through BMI is considered to be a narrow

health assessment, social media posts in this study prevailed to justify the health status of these unhealthy bodies or bad bodies. In the end, it can be inferred that social media tended to unintentionally define what it meant to be healthy by body weight and size.
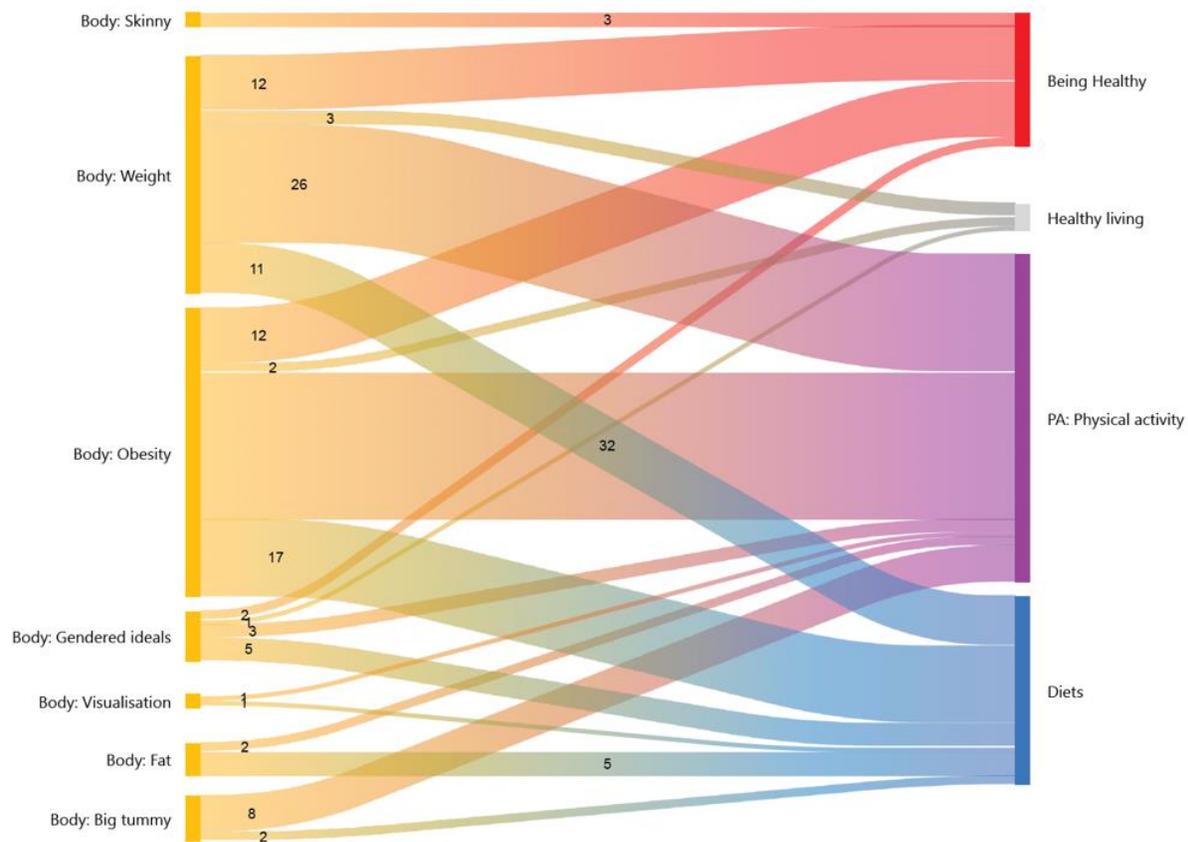

Figure 3. The interrelation between the construction of body and health, PA, and diets.

Resolving bad bodies: the promise of physical activity and diets. The social media pedagogy through the construction of unhealthy bodies continued to predominate the discourse regarding PA and diets. More specifically, they were tied up with obesity discourse as promising to resolve the 'health problems.' An example is from a Twitter account who self-attributed as a medical doctor.

For those who happened to read this post, is your body fat? Do the weight loss program immediately to achieve healthy body weights. Obesity is a chronic illness with consequences of having dangerous diseases. Manage your eating pattern, and do physical activity routinely! (Doctor Who Twitter user)

The above statement explicitly categorized obesity as an illness that required serious attention. The specific pedagogical nuance here was not merely providing messages, but it was also a call for action. It was even like an alarm call for emergency response. Dieting and PA were positioned as the answer to this 'health problem.' Figure 4 below depicts the solution for tackling obesity as a 'health problem' getting extracted from analysis utilizing ATLAS.ti 9.

More specifically, the types of physical activity being identified by the social media users were varied, but they seemed to fall under the forms of recreational physical activity and exercise. These PAs ranged from cardio exercises (i.e., walking, jogging, biking, swimming, skipping, aerobic dancing, weight training) to outdoor-adventure activities (i.e., rafting). Analysis informed that social media users tended to prescribe PA in generic ways, such as "do sport" or "be physically active." But some users educated the public in more detail suggesting not only the types of activities but also the amount of PA, notably in terms of the frequency and volume. For example,

a Facebook user stated, "Speed walking for at least 30 minutes a day correlates to having a lower body mass index and slimmer waist size in comparison to non-walkers."
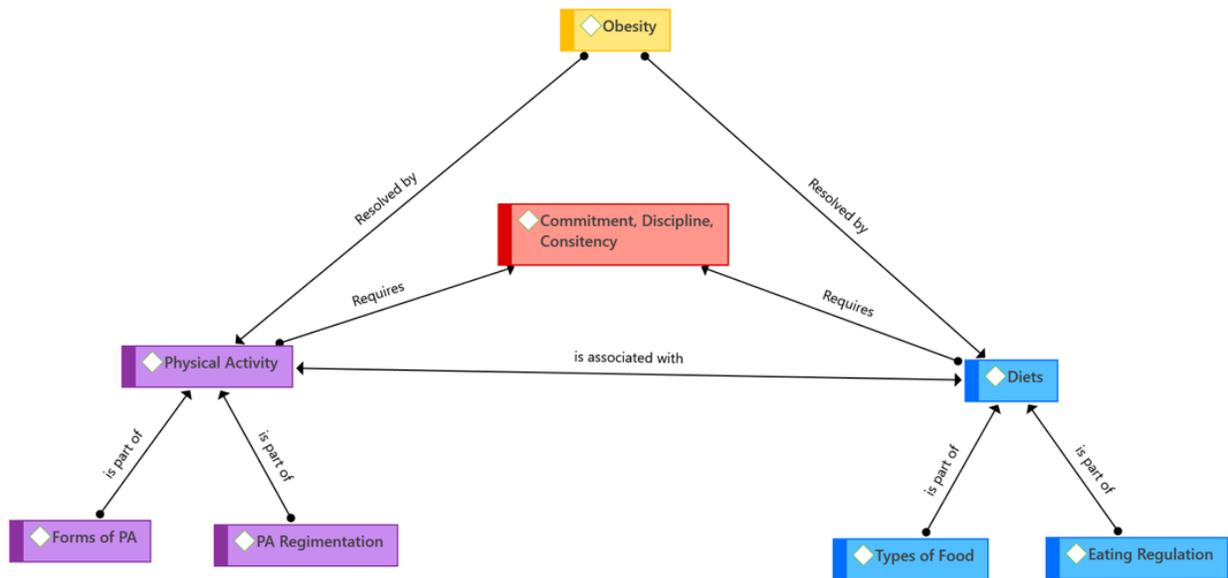

Figure 4. Thematic maps for resolving unhealthy bodies

Similarly, social media inadvertently taught what and how much food should be consumed if a desirable 'healthy body' was intended to be achieved. High variety of food types were presented for dieting such as beans, herbs, spices, and supplements. However, vegetables and fruits were commonplace in the data to be recommended for gaining and maintaining a 'healthy weight.' A video clip on TikTok represented several female artists who had been successfully losing their body weight. One slide on the clip was one artist with accompanying text saying "Adele Panasuset admits that she does not eat white rice. She maintains her body weight by consuming more fruits and vegetables."

Despite being widely promoted, both PA and diet were also exposed to be hard to achieve. Prerequisites were apparent in the data, that both efforts needed strong commitment, tough discipline, and durable consistency. An account on Instagram described, "Tight dieting is not always good and effective for everyone. The key to a successful diet that has been undermined is located in commitment and discipline." Several posts depicted PA as requiring regular physical exertion. The potential injury was also highlighted by some users cautioning the audiences about the correct procedures and the regime of the exercise. Concerning diet, successful programs required the suppression of

appetite for food the bodies get accustomed to (i.e., white rice, coconut milk, sweets, and flour-based culinary). In addition to what food could be eaten, social media users unintentionally educated the audiences about the restriction of nutrition amounts and the regulation of meal time. While it was told to need a lot of effort, the results of dieting were not guaranteed.

DISCUSSION

Our focus included social media as a virtual space in which we explored the public nature of public pedagogy about healthy living. While the concept of social media is context and technologically sensitive (20), the social media in this study appeared to enable the users to create, co-create, modify, share, and engage with pedagogical content regarding obesity, PA, and diet virtually mediated social contexts. Our exploration was aligned with existing literature (19) in which platforms such as Twitter and Facebook were commonly the sites to swell out the obesity discourse. The users of these platforms could be associated with modern adulthood life where a healthy body had increasingly been the concern. We could expect that these users tended to reject and stigmatize obesity as bad bodies. Despite ideas of digital literacy for such body dissatisfaction have begun to offer (22), social media posts seem to still be

powerful as "pedagogical strategies that target the body and the self" (23).

Our analysis also developed an understanding that social media posts generated the discourse of risk. This was relevant to what we have known from the literature about obesity discourse. For example, a study informs that mass media in the UK recently tended to escalate the dramatic nuance of risk discourse concerning obesity with more personalized language to emphasize self-responsibility (24). In other words, it is a neoliberal approach to public health. Alongside this discourse of risk was the discourse of panacea for resolving the 'unhealthy bodies.' This had been reproduced through reproducing the necessity to maximize a healthy body and minimize the risk (25), notably through PA and diet.

Important social media posts involving the intersection of obesity, PA, and diet included the authorities having the capability to speak the truth about the message contained in the discourse. Authorities with professional knowledge were central here as is in the pedagogical analysis (26, 27). These authorities and other users in this study appeared to rarely validate the conclusive status of the scientific information they handed over virtually from the literature. This was especially obvious among laypersons who did not bother with the accuracy of the studies to back up their arguments. The post from a Facebook account above demonstrated the implausibility and the accuracy of the sources. London School of Economics and Political Science might conduct such a study, but it was doubted to have much focus from a health perspective. This point is aligned with a study by Cain, et al., (2016) showing that the media could serve as a channel to advise individuals on what to do (18), often times backed up with the truth discourses coming from authority (26).

CONCLUSION

Our analysis helped us to develop themes in the data which included the characteristics of the 'public' within the public pedagogy concerning obesity, PA, and diet. The second theme focused on the description of how social media delivered messages about healthy living, more specifically the articulation of obesity discourse. The last theme was the social media posts as the means through which un/healthy bodies were constructed by social media users. We essentially critique the operation of this discourse. It is not our intention to debate the degrees of truth regarding the discourse being investigated, in particular the scientific information. However, we argue that authorities should carefully examine all possible consequences of the health messages being circulated in the community while conclusive understanding has not been achieved yet. Because the impacts on our society could be profound, in ways through which social injustice could be reproduced through negative stigmatization based on body size. Despite our accomplishment to reveal the public pedagogy of healthy living, we have been limited to a degree to which big data analytics involved technical aspects from the field of computer science. We tried to avoid working in the such area, but it was not possible to completely disregard the computational process through which data was extracted, analyzed, and presented to the researchers. Future studies may involve collaboration with computer or data scientists to enhance the more complete portrayals of phenomena under investigation.

APPLICABLE REMARKS

- We offer an alternative perspective about obesity discourse that we critically scrutinized upon its direction leading to social justice issues.
- Digital literacy becomes important to address this concern, especially the possible impact that people would have negative sentiments toward PA and food.
- PE and Sports pedagogists are important professions to counter the balance of the obesity discourse. Therefore, higher education institutions offering such professions should first reform their policy and practices of teaching their students.

AUTHORS' CONTRIBUTIONS

Study Concept and Design: Eka Novita Indra. *Acquisition of data:* Caly Setiawan. *Analysis and interpretation of data:* Eka Novita Indra. *Drafting of the manuscript:* Eka Novita Indra. *Critical revision of the manuscript for important information*: Sumaryanto Sumaryanto. *Statistical analysis:* Eka Novita Indra. *Administrative, technical, and material support:* Caly Setiawan. *Study supervision:* Sumaryanto Sumaryanto.

CONFLICT OF INTEREST

The authors declare that there is no potential conflict of interest.

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