Prevalence of Obesity in Malaysia: Perspectives in Terengganu towards Development of Malaysian Obesity DNA Bank

Muhammad IN¹,², Saifullah K², Hassan B¹, Yasarul I¹, Norizan AG³, Sonia S⁴, Khawar SJ⁴, Zubaidi ALA¹, Nordin S¹, *Atif AB¹

¹Faculty of Medicine, Universiti Sultan Zainal Abidin, Kuala Terengganu, Malaysia
²Faculty of Applied Social Sciences, Universiti Sultan Zainal Abidin, Kuala Terengganu, Malaysia
³Department of Health Professional, Faculty of Health and Life Sciences, Management and Science University, Malaysia
⁴DOW Medical College, DUHS, Karachi, Pakistan.

Abstract

A normal health status is highly depends on body weight. Many health problems may occur or impose risk for extremely obese individuals. Etiopathology of obesity includes interaction of several factors inclusive of genetic and non-genetic factors such as lifestyle changes. This study aimed to launch Malaysian Obesity DNA Bank and determine the prevalence of obesity along with anthropometric measurements of the subjects. The cross-sectional study was conducted on total of 340 subjects (obese = 95, overweight = 122 and normal = 123), aged 19-60 years, in Terengganu. The BMI and well appropriate anthropometric measurements (waist circumference, hip circumference, waist to hip ratio, fat percentage and ASindex) were determined through standard protocols and formulae. The mean difference of anthropometrics was determined by independent t-test. Data was analysed using SPSS ver.16.0.0. The BMI was determined for all subjects and it was found that out of 340 subjects, a total of 95 (27.9%) subjects were obese, followed by a total of 122 (35.8%) subjects were overweight and normal individuals were 123 (36.1%). The mean of the BMI, WHR, Fat% and ASindex, in Malay obese were 32.83, 0.88, 33.5 and 13.21 respectively, while in normal healthy individuals were 22.1, 0.78, 24.2 and 20.1 respectively. The difference of mean of BMI, WHR, Fat% and ASindex was calculated to be 10.73, 0.1, 9.3 and 6.89 respectively. To the best of our knowledge, this is the first report in Malaysia, reporting that this is very first Obesity DNA Bank in South East Asia region and prevalence of obesity in Terengganu, Malaysia to be 27.9%. In addition, it indicates a significant mean difference for anthropometric measurements among obese and normal individuals. For Asindex calculations suggest that the prevalence of genotype obesity is greater 89.9% of android obesity in Malay obese attributes

Keywords: Obesity, Terengganu, prevalence, Malaysia, body shape, ASindex, anthropometric measurements

*Author for Correspondence
Published on: July 30th, 2018
Introduction
Overweight and obesity are serious health concerns for both worldwide and in Malaysia. Etiopathology of obesity includes interaction of several factors inclusive of genetics and non-genetic factors such as lifestyle changes (low physical activity (PA), increased sedentary behaviour and unhealthy eating habits) [1]. Globesity as per defined by WHO, obesity is major health problem in many parts of the world, specifically in Malaysia [2]. Till date, Malaysian association for the study of obesity has been determining the nutritional based associations of obesity based on NHMS surveys as shown in table 1. Obesity has risen to be doubled in last two decades in Malaysia [3]. The current prevalence 17.7% of obesity in Malaysia is higher than world overall prevalence of obesity that is 13% in 2014. Prevalence of abdominal obesity have increased from 14% (2006) to 15.1% (2011) and from 39.5% (2006) to 45.4% (2011), respectively [4].

![Image](https://via.placeholder.com/150)

Table 1.
Prevalence of Obesity in Malaysia

<table>
<thead>
<tr>
<th>Status</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of overweight 30.0% is plateauing but obesity 17.7% is still rising</td>
<td>NHMS, 2015</td>
</tr>
<tr>
<td>29.45% Overweight and 15.1% Obese</td>
<td>NHMS, 2011</td>
</tr>
<tr>
<td>29.1% Overweight and 14.0% Obese</td>
<td>NHMS III, 2006</td>
</tr>
<tr>
<td>16.6% (overweight) and 4.4% (Obese) adult population</td>
<td>NHMS II, 1996</td>
</tr>
</tbody>
</table>

NHMS: National Health and Morbidity Survey

The pathophysiology of obesity being multifaceted disorder, involves interaction of environmental, behavioural, non-genetic and genetic factors. Genetic factors may influence metabolism or diet intake thus leading to increased adiposity [5].

Methods
This cross-sectional study was aimed to determine the prevalence of obesity in Terengganu along with anthropometric measurements of the subjects. This study was conducted with ethical approval and consent on a total of 340 subjects, aged 19-60 years. The BMI was determined for all subjects and it was found that out of 340 subjects inclusive of obese = 95, overweight = 122 and normal = 123. The subjects were recruited to develop record for Malaysian Obesity DNA Bank at UniSZA, Terengganu. The recruitment of subjects (n = 340) prior to genetic screening was done after ethical approvals. The recruitment was done in three stages; pre-screening via official letters and phone communications based on health promotions, followed by screening phase via BMI calculations based on WHO criterion [6] and last stage of enrolment of subjects to be involved in this study. The BMI and well appropriate anthropometric measurements (waist circumference, hip circumference, waist to hip ratio, fat percentage and ASindex) were determined through standard protocols and formulae. The data was analysed using SPSS.ver.16.0.0. The difference of means was determined by independent t-test, while means and frequencies were calculated through basic mathematical calculations.

Results & discussion
In order to understand the interaction and role of different genes reported to be involved in obesity pathophysiology are being studied by group of researcher in Faculty of Medicine, Universiti Sultan Zainal Abidin (UniSZA), Terengganu [7]. It was launched as Malaysian Obesity DNA Bank at UniSZA. The recruitment of subjects (n = 340) prior to genetic screening was done after ethical approvals. The recruitment was done in three stages; pre-screening, followed by screening phase via BMI calculations based on WHO criterion [6] (WHO, 2000) and last stage enrolment of subjects to be involved in study [2,3].

However, based on database from Malaysian Obesity DNA Bank, the several studies have been conducted to elucidate multifactorial pathophysiology interaction of obesity. A systemic review was conducted to determine non-genetic or social factors associated with obesity among Malays obese community [8]. Among findings the low self-esteem, body image & weight dissatisfaction, diet & eating habits, health knowledge, low physical activity, media influence, religious practices were associated with obesity in Malaysia. In conclusion, these factors have profoundly strong connection with obese individual’s people in the Malaysia. Researchers were focused on genetic and nutrient problem of obesity [9,10]. Out of 340 subjects it was found that a total of 95 subjects (27.9%) were found to be obese as per WHO criterion (World Health Organization, 2000) for BMI, a total of 122 subjects were overweight (35.8%) and normal BMI individuals were 123 (36.1%) [3]. Results are demonstrated in table 2.

![Table 2](https://via.placeholder.com/150)

Table 2.
Prevalence of obesity in Terengganu

<table>
<thead>
<tr>
<th>Status</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obese</td>
<td>95 (27.9%)</td>
</tr>
<tr>
<td>Overweight</td>
<td>122 (35.8%)</td>
</tr>
<tr>
<td>Normal</td>
<td>123 (36.1%)</td>
</tr>
</tbody>
</table>
Besides that, the comparative anthropometric measurements between obese and normal healthy individuals are of great importance for the underlying pathology associated with obesity. Classical anthropometric measurements (waist circumference, hip circumference, body mass index, waist to hip ratio and body fat percentage) were determined beside determination of a novel ASindex \[\text{hip} – \text{waist (cm)}\] \[11\]. The means of the BMI, WHR and Fat\%, in Malay obese were 32.83, 0.88 and 33.5 respectively; while in normal healthy individuals were 22.1, 0.78 and 24.2 respectively. The difference of mean of BMI, WHR and Fat\% was calculated to be 10.73, 0.1 and 9.3 respectively that indicate a significant difference of mean among obese and normal individuals.

Conclusion
To the best of our knowledge this is a data for the record of very first Obesity DNA Bank in South East Asia region and in future undertakings, the data will be not only helpful for developing anti-obesity strategies in Malaysia but genetic data will also complement HapMap and Malaysian node of Human Variome Project (HVP) in future. It is the first report in Malaysia, reporting the prevalence of obesity in Terengganu in 2018 considering it to be 27.9% with prevalence of overweight to be 35.8%. In addition, it is indicating a significant mean difference for anthropometric measurements among obese and normal individuals.

Acknowledgement
We would like to thank all the subjects, staff and postgraduate students involved in this study. The current study was supported by two grants directly or indirectly.
1. UniSZA/2017/DPU/33

Reference
5. Ilyas M, Atif A, Al-Hatamleh M, Al-Shajrawi O, Ariff T,

AJMB, Official Journal of Faculty of Medicine, Universiti Sultan Zainal Abidin, Malaysia. Muhammad et al.
Your next submission with AJMB will reach you the below assets
• Quality Editorial service
• Swift Peer Review
• Reprints availability
• E-prints Service
• Manuscript Podcast for convenient understanding
• Global attainment for your research
• Manuscript accessibility in different formats (Pdf, E-pub, Full Text, Audio)
• Unceasing customer service Track the below URL for one-step submission: