

Health Assessment of Academicians through Body Mass Index Evaluation and Relationship with Strain

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Abstract- In the Aviation Field, safety is important and numerous steps had been taken to alleviate safety or retain it. The graduates from aviation institutions were trained to be efficient, skillful, and knowledgeable so that mistakes during jobs could be minimized or maintained at zero. In order for these graduates to have those characteristics, their lecturers or academicians should be at their bests in order to train these graduates efficiently. Being at their bests require the lecturers to be fit and healthy. We had investigated the health and fitness of these academicians and the results varies.

Index Terms- Health Assessment, Fitness in Aviation, Body Mass Index, Strain

I. INTRODUCTION

It is no secret that aviation is highly regulated and procedures needed to be adhered in a strict manner. This is to retain safety at its highest standard and also to minimize loss in terms of resources and lives. According to Ausrotas, aviation is intricate and to maintain safety one has to manage numerous aspects or factors [1]. Ausrotas stated that safety was the primary reason for procedures to be in place and these procedures ensured incidents or accidents were kept low [1]. With this in mind, it is imperative for us to evaluate the fitness or health of academicians or lecturers of an aviation institute. Lecturers that are fit are able to effectively train graduates to be efficient in their jobs and graduates which are efficient are inherently skillful and knowledgeable and these characteristics would retain or increase the safety of the ecosystem. We had evaluated the health and fitness of academicians from a designated department at Universiti Kuala Lumpur Malaysian Institute of Aviation Technology (UniKL MIAT). UniKL MIAT is an institution located in Malaysia and had produced graduates in the field of Aviation.

Janic had spelled out several risks that were inherent in aviation and he indicated that it's important to retain safety in lieu with all these risks [2]. Janic had quantified several risks and we had followed suit where we deemed those with health or fitness predicaments to be parlaying risks toward the aviation ecosystem.

We had evaluated the fitness and health of our subjects via Body Mass Index (BMI). We then captured the subject's strain via interview. A question was asked whether they were strained when walking or strolling around campus. The strain data were

then mapped with their respective BMIs. Nuttall had stipulated that excessive BMIs are not healthy to individuals and these excessive values would decrease their fitness and hamper their abilities to perform at their workplaces [3]. Nuttall also said the values of BMI were also used to define the policies of health of certain ministries where the policies were there to promote healthy BMI among the masses [3]. Dohle agreed with the notion of unhealthy BMI and stated that BMIs which were high or unhealthy are dangerous in the sense that the individuals would be at more risk to gain various diseases [4]. Dohle also pointed out that unhealthy BMIs showed correlations with mortality where it's important for one to be vigilant of their BMI value in order to mitigate mortality [4].

Harridon had studied fitness predicaments among crews of Search and Rescue and he pointed out that crews that were equipped with appropriate experiences (due to numerous training and implementation) were able to maintain their fitness level and health [5]. This showed that educating the masses is a good way to equip them with the necessary tools to maintain their BMI at healthy levels.

The unhealthy BMI posed a threat where the excessive weight would lead to strain upon the legs of the individuals. Howitt had stated that those with excessive weights would induce strains upon their legs since the legs were carrying more loads and were constantly being barraged with these loads daily [6]. Howitt also explained that the overused of these legs contributed to pain and discomfort among individuals [6].

Harrington had studied excessive weights upon legs and concluded that these weights had affected the legs and strains were produced due to this [7]. Harrington had also indicated in some cases the excessive weights had contributed to pains in the knees of the individuals [7]. These overlaying facts had prompted us to dwell upon this research and our evaluation of the BMIs of the academicians were justified.

II. LITERATURE REVIEW

As mentioned before, safety is uttermost important in aviation and all parties should be physically fit to perform at their bests. Oster mentioned that safety had improved tremendously in recent years and this was due to comprehensive incident or accident analyses where these analyses had pinpointed the reasons behind incidents and accidents [8]. One of the reasons was human factor where personnel in aviation were not performing effectively due to unfit physical forms. This is where

our research came in where we assessed those involved in aviation in terms of health and physical fitness.

Bala had studied literature pertaining to Aviation Safety and he had classified several factors that contributed to Aviation Safety [9]. Interestingly human factors did played roles as contributors toward Aviation Safety where those with optimum fitness were prone to enhance the safety of the aviation environment [9].

Stenholm had studied subjects in 4 European countries and results had indicated that those with excess BMI were not healthy and were inclined to gain various health problems [10]. Stenholm had listed heart failure as one of the unhealthy components of excessive BMI and Stenholm had advocated for the introduction of programmes to reduce the values of BMIs among those that showed unhealthy BMIs [10].

Ezzati stipulated that most diseases were due to surpluses of fats that were etched upon individuals and these surpluses translated into high values of BMIs [11]. Ezzati mentioned that being overweight is not healthy and the propensity to be not fit is high [11]. This of course is detrimental to the aviation industry as the industry requires instructors or lecturers that are fit where instructors that are fit can mould the students efficiently.

Harridon had spelled out several appropriate methods that could be utilized in order to reduce the BMI values [12]. Harridon had actuated research upon aviation workers and Harridon had proposed High Intensity Interval Training (HIIT) to aviation personnel in order to reduce their excessive BMIs [12]. Furthermore, Harridon had also laid out 2 exercises, which were

Squats and Step-Ups, that could strengthen the legs of individuals and subsequently eradicate or minimize strain [12].

As mentioned before, those with excessive weights would be imparted with strains especially at their legs. Wollesen ascertained that loads and weights were the culprits that induced strains upon individuals [13]. Wollosen had scummage through selected literature and had elucidated strains and mapped these to individuals that were studied [13]. There were consequently different degrees of strains that derived from different sets of chores or types of jobs actuated by the individuals [13].

Dixon noted that overused of the legs or extreme utilization of the legs would create strains in the legs [14]. We paraphrased this to be the overloading of the legs through additional body weight and this extra weight has subsequently be a detriment to the movements of the individuals. We cautioned academicians to take note of this as they are in constant movements around campus, moving from classes to classes and also moving to attend lab sessions or meetings. We can observed that our study is important where we had identified academicians that were in need of direction in terms of actuating physical fitness regime in order to gain a healthy BMI.

III. METHODOLOGY

Figure 1 showed our approach for this research.

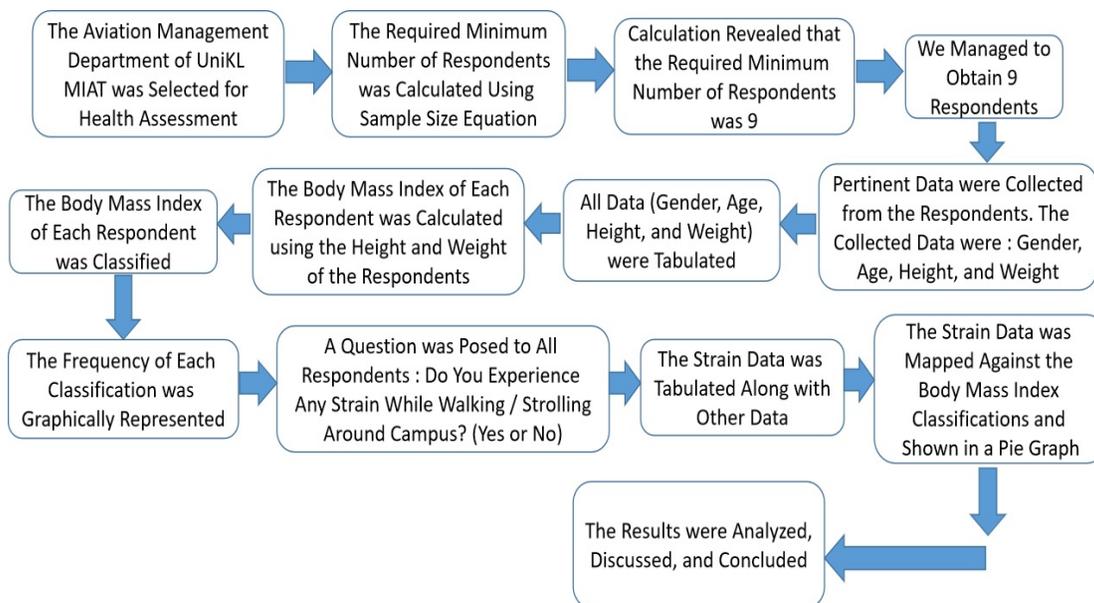


Figure 1. The Methodology that was Utilized

The Aviation Management Department of UniKL MIAT was chosen for our study. The academicians in this department were assessed pursuant to their health and fitness. The minimum required number of respondents or subjects from this department was calculated using Sample Size Equation. The following values were inserted into the equation : population size = 11, confidence level = 80%, and margin of error = 9.55%. We obtained the value 9 for the minimum required number of

subjects and we had successfully obtained data from 9 subjects or academicians.

Data of gender, age, height, and weight were collected from the respondents and these data were tabulated which gave us a proper display and gave us ease for analyses. The Body Mass Index of each academician in our study was calculated by using the BMI Equation where data of height and weight of each

respondent were inserted into this equation. The BMI of each respondents was then classified in accordance to Table 1. Each classification was then represented graphically in order to gain or display the number of academicians in each category or class.

The respondents were posed a question with regards to the strains they encountered while walking or strolling around campus. The “yes or no” answers (strain data) were tabulated along with other previous data. The strain data were also mapped against the BMI classes of each respondents and these mappings were represented in a pie graph. The results that we gained were analyzed, discussed, and concluded.

Table 1. Body Mass Index Classification for Males and Females [15]

Body Mass Index (Males & Females) (kg/m ²)	Classification
Below 18.5	Underweight
18.5 - 24.9	Normal or Healthy Weight
25.0 - 29.9	Overweight
30.0 and Above	Obese

Respondent6	Female	40	1.67	67	24.0	Normal or Healthy Weight
Respondent7	Female	44	1.57	95	38.5	Obese
Respondent8	Female	45	1.69	70	24.5	Normal or Healthy Weight
Respondent9	Female	46	1.58	78	31.2	Obese

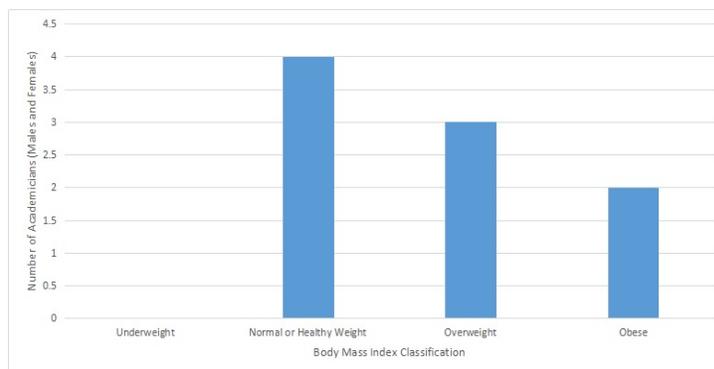


Figure 2. Overall View of Body Mass Index Classifications (Male & Female Respondents)

IV. RESULTS

Table 2, Table 3, Figure 2, Table 4, and Figure 3 showed the results of our research.

Table 2. Body Mass Index Classification of Male Respondents

Respondent	Gender	Age	Height (m)	Weight (kg)	Body Mass Index (kg/m ²)	Body Mass Index Classification
Respondent1	Male	43	1.75	84	27.4	Overweight
Respondent2	Male	69	1.70	72	24.9	Normal or Healthy Weight
Respondent3	Male	34	1.70	85	29.4	Overweight
Respondent4	Male	59	1.70	72	24.9	Normal or Healthy Weight
Respondent5	Male	66	1.85	90	26.3	Overweight

Table 3. Body Mass Index Classification of Female Respondents

Respondent	Gender	Age	Height (m)	Weight (kg)	Body Mass Index (kg/m ²)	Body Mass Index Classification
Respondent6	Female	40	1.67	67	24.0	Normal or Healthy Weight
Respondent7	Female	44	1.57	95	38.5	Obese
Respondent8	Female	45	1.69	70	24.5	Normal or Healthy Weight
Respondent9	Female	46	1.58	78	31.2	Obese

Table 4. Strain of Walking / Strolling Around Campus

Respondent	Gender	Body Mass Index (kg/m ²)	Body Mass Index Classification	Strained (Yes or No)
Respondent1	Male	27.4	Overweight	Yes
Respondent2	Male	24.9	Normal or Healthy Weight	No
Respondent3	Male	29.4	Overweight	No
Respondent4	Male	24.9	Normal or Healthy Weight	Yes
Respondent5	Male	26.3	Overweight	No
Respondent6	Female	24.0	Normal or Healthy Weight	Yes
Respondent7	Female	38.5	Obese	Yes
Respondent8	Female	24.5	Normal or Healthy Weight	Yes
Respondent9	Female	31.2	Obese	No

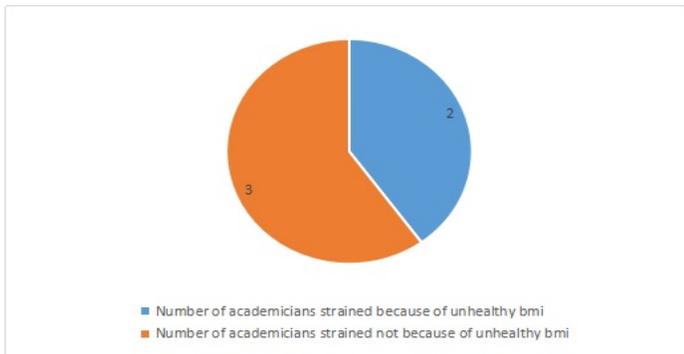


Figure 3. Representation of Strain (Walking/Strolling Around Campus)

V. DISCUSSION

Table 2 showed the tabulated data of gender, age, height, and weight for males. It also showed the calculated BMI for each male respondent and the BMI classification as well. Two of the male respondents were healthy while three male respondents were overweight. We were concerned about this figure as the three male respondents represented the majority of male respondents. In fact the two male respondents that were healthy in actuality were borderline healthy and their BMIs almost reached the threshold of overweight. Hence we opinionated that all 5 male respondents should be integrated into a physical fitness programme or training.

Harridon had indicated that some quarters of professionals in aviation, especially those involved in Aviation Search and Rescue, had gone through extensive training in order to perform well during work [16]. Harridon stipulated that these training were not only in the fields of their expertise but also in the physical fitness realms as those equipped with this type of training were familiar with the methods or ways to improve their physical being and subsequently their performance during work [16].

Table 3 showed the data for the female respondents. The gender, age, height, and weight represented these data. Table 3 also showed the BMI of each female respondents along with their classifications. 50% of the female respondents were normal while 50% of them were obese. This situation is grave and we proposed an immediate initialization of a physical fitness programme which would gradually decrease the BMIs of these respondents. As stated before, the chances of contracting diseases are high with the advent of unhealthy BMI and hence we were overly concerned.

Figure 2 parlayed the classifications of the Body Mass Index and the number of academicians (males and females) in each class. The greatest number of academicians was in the Normal or Healthy Weight Class. This is promising and showed a majority of the respondents were taking care of their health and fitness. But it was alarming to observe 2 respondents in the Obese Class and 3 respondents in the Overweight Class. Collectively they represented a big chunk of the academicians. This reinforced our prescription to initiate a physical fitness programme at the campus.

Table 4 gave us a view of the strain data. Four academicians had not felt any strain while walking or strolling

around campus while five academicians felt the strain. This is worrisome as a majority of the academicians felt strained while strolling the campus. Strolling the campus is part of their job as they need to be at numerous places in campus to deliver lectures, attend meetings, and others. Peering discreetly, 3 out of 4 female academicians felt strained while walking and 2 out of 5 male academicians felt strained while walking. 75% of female academicians felt the strain while walking and this is quite high and alarming.

We were interested to know the number or percentage of academicians that were strained because of their excessive or unhealthy BMIs. Figure 3 showed the mapping of the strain data against classes of BMI. 2 academicians were strained because of unhealthy BMIs while 3 academicians were strained not because of unhealthy BMIs. Investigating further, we found out that these 3 academicians were actually having BMIs that were almost unhealthy (24.0 till 24.9) and hence which explained why they felt strained while walking in campus. This strengthen our decision in prescribing physical exercises for the academicians and validated our gist of assessing personnel in the aviation field.

Harridon had assessed the physical fitness of Aviation Personnel at an aviation company in Malaysia and through this assessment several personnel were identified as being unfit and it was proposed to them to expedite their physical exercise regime [17]. Harridon mentioned that their physical forms should be constantly monitored as to maintain the integrity of aviation safety [17]. Our gist is similar to Harridon as there is always the need to assess individuals that worked in the aviation field since safety is paramount and important.

VI. CONCLUSIONS

Our assessment had unearthed vital information regarding the health and fitness of academicians in the aviation field. A majority of our respondents were ingrained with unhealthy BMIs and this increases their risks of gaining harmful diseases. Our results also indicated that a majority of the academicians had felt strained while walking or strolling around campus in order to attend meetings, delivering lectures, and performing other academic tasks. We had provided several measures to decrease the BMIs of the academicians and numerous literature were parlayed to mould the academicians to be fit and healthy. This is inline with the philosophy of aviation where a fit worker is not prone to mistake and thus safety is retain or increase.

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