

Comparison of knowledge, attitude and practice on haze among first and final year medical students in Universiti Putra Malaysia

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Received:

November 09, 2017

Accepted:

February 28, 2018

Published:

May 30, 2018

Abstract

Haze is one of atmospheric pollution that has occurred in Malaysia. Most of the haze episodes occurred in conjunction with period of prolonged drought associated with El Nino phenomenon. Haze gives great negative impacts in terms of health, social and economy. The study aims to know the knowledge, attitude and practice on haze among first and final year of medical students in Universiti Putra Malaysia (UPM). In this cross-sectional study, a total of 244 students were involved as respondents. Questionnaires were administered to determine socio-demographic, information knowledge, altitude and practice on haze among them by using 'Statistical Package for Social Sciences (SPSS) Version 22.0. Result showed that the level of knowledge for first and final year of medical students was moderate which was 40(41.9%) and 59(39.1%) respectively. The level of attitude for both groups were also moderate, which was 54(57%) and 97(64.2%) respectively. For the practice level, both group showed bad practice during haze, which was 64(68.8%) and 107(70.9%). The findings also indicated that there were no significant difference of mean knowledge, attitude and practice on haze between these two groups ($Z=0.555$, $p>0.05$; $t=-1.573$, $p>0.05$; $Z=-0.720$, $p>0.05$). Malay and Chinese students were associated with knowledge level with odd ratio (OR) 5.22 and 2.98 respectively. In addition, there was an association between knowledge and practice ($p=0.003$, $p<0.005$). The attitude level was associated with practice level in which moderate attitude tend to have poor practice on haze ($p=0.024$, $p<0.05$). As overall, the medical students perceived moderate knowledge and attitude, but low in practice.

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Keywords: Knowledge; Attitude; Practice; Haze; Medical Students

Introduction

Haze phenomenon is not a new phenomenon and had occurred almost every year in Malaysia. Previously, haze had occurred in 1982-1983, 1987, 1994, 1997-1998, 2002, 2004, 2005, 2006, 2009, 2013 and 2015. As example, on 15 September 2015, 34 areas in the country recorded unhealthy air quality status the first time in Malaysia's history since 1997. Hence, all

schools in Putrajaya, Kuala Lumpur and Melaka were closed on 15 September 2015 following by schools in Kuching and Samarahan Divisions, Sarawak on 18 September 2015.

Haze can be defined as weather phenomenon that leads to an atmospheric visibility of less than 10km due to the amount of suspended solid or liquid particles, smoke and vapour in the (Xiao et al, 2011). Besides particulate matter, haze also contains inorganic gases such as Sulphur dioxide (SO_2) and



nitrogen dioxide (NO₂), hydrocarbons, aldehydes and polycyclic aromatic hydrocarbons. Haze also contains aerosol which is small particles and water vapour. There are several factors that contribute to haze. According to Haliza (2013), the factors can be domestic or transboundary. The main factor is the widespread of biomass from the large scale of forest fires in Sumatra and Kalimantan, Indonesia because to save the cost, the oil palm companies practice slash-and-burn method to clear the site before replanting the oil palm. For domestic factor, open burning, industrial activities and transportation enhance the hazy situations. Haze pollutants significantly affect the human health depending on individual health, attitude and practice during haze. The impacts can be short-term or long-term. Among short term effects of haze are coughing, wheezing, asthma, skin and eye irritation. Meanwhile, for long term effects, the person might get coronary obstructive pulmonary disease (COPS), heart disease and cancer.

The previous study had reported that high proportion of respiratory problems during haze appeared due to lack of knowledge, unsafe attitude and dangerous practice. The usefulness of knowledge, attitude and practice (KAP) questions was in highlighting the lack of KAP with respect to safe practice during haze. In addition, this study could contribute beneficial information about the level of KAP during haze among the respondents.

This study was conducted at Universiti Putra Malaysia (UPM) because it was one of the institutions that was affected by haze and were forced to close on 19th and 20th October 2015 due to worsening haze. Furthermore, there were increasing of health problems among UPM students during haze especially infection of upper respiratory tract by 69.0% in August, 79.4% in September and 76.6% in October 2015. Other diseases experienced by them are infection of lower respiratory, asthma, skin problem and infection of eyes irritation (UPM Health Centre 2015) (Table 1).

Medical students were chosen as respondents because they study about anatomy and impacts of pollutants to human body. In future, these medical doctors have to deal with the community especially patients and educate as well guiding them about the best practice that they should do during haze to avoid any adverse impacts on their health. In addition, this study was conducted among them to know whether they are aware with this breaking news since they are exposed

to health issues. Since the medical students are more sensitive with the health issues, it could facilitate their adoption of healthy lifestyle. This study also was conducted among first and final year of medical students because there was a gap of knowledge between them. The final year students had already enriched their knowledge and skill meanwhile the first year is still new in this field.

Materials and Method

This is a cross-sectional comparative which focused to determine the KAP on haze among first and final year of medical students in UPM. The study was conducted at Faculty of Medicine and Health Sciences, UPM, Serdang, Selangor, Malaysia. The total respondents involved in this study were 244 which 91 are first year student and another 151 were final year student.

The level of KAP on haze among respondents were evaluated by using self-administrated questionnaire. The questionnaire comprised of four sections. Section A was about the social demographic of the respondents such as age, gender and races. For Section B, the questions were about general information regarding haze phenomena. Meanwhile, Section C comprised of three subtopics which were knowledge about haze, attitude towards haze and practice during haze. Other than that, questions in Section D were about the suggestion to minimize the haze.

Then the data was analysed by using 'Statistical Package for Social Sciences (SPSS) Version 22.0. The level of KAP on haze was evaluated using scoring method as follow:

i) The scoring method for knowledge

Right answer: 1 point

Wrong answer: 0 point

The score calculated was converted in term of score level which was good, moderate and low level. A mean score and standard deviation of the group were used to identify the subject into three groups as follow (Ajit, 2011):

Good level : score > Mean + SD

Moderate level: score = Mean +/- SD

Poor level : score < Mean - SD

i) The scoring method for attitude

Strongly agree : 5 points

Agree : 4 points

Not certain answer : 3 points

Disagree : 2 points



Strongly agree : 1 point

The score calculated was converted in term of score level which was high, medium and low attitude. A mean score and standard deviation of the group were used to identify the subject into three groups as follow (Ajit, 2011):

Good attitude : score $>$ Mean + SD

Moderate attitude : score = Mean \pm SD

Poor attitude : score $<$ Mean - SD

ii) The scoring method for practice

Right answer : 1 point

Wrong answer : 0 point

The score calculated was converted in term of score level which was good and bad. A mean score and standard deviation of the group were used to identify the subject into three groups as follow (Ajit, 2011):

Good level : score $>$ Mean

Poor level : score $<$ Mean

Descriptive statistical was used to determine the mean and standard deviation. To determine the association between two different groups, Chi square was used. Meanwhile, Independent t-test and Mann U-Whitney were used to compare two groups of respondents. To determine the relationship between two variables, logistic regression was used.

Before conducting the study, the approval from the Ethical Committee for UPM (JKEUPM) was gained [EXP15-OSH(U048)].

Furthermore, to ensure the reliability of the questionnaire, a pilot study was conducted among 25 respondents from second year of medical students who had similar characteristics with the sample subject. The Cronbach alpha obtained from the pilot study was 0.796. Thus, the questions were considered reliable.

Results

Socio demographic

Regarding age, for the first year of medical students, the range of age was 19-21 years old. Majority of the first year were 20 years old, which were 68 (73.1). For the final year, their age ranged from 23 to 25 years old. There were 96 (63.6%) among them with aged 24 years. For gender, the study population comprised of 40 (43%) males and 53 (57%) females for the first year. For final year student, the numbers of male respondents were 48 (32%) and female were 103 (68%). The respondents were dominated by Malay students which 62(66.7%) for the first year and 102(67.5%) for the final year.

General Knowledge on Haze

Regarding the questions about hearing about the terms of haze, 241(98.8%) of students heard about that while 3(1.2%) had not heard about it. There were 242(99.2%) notice about haze phenomenon in Malaysia and 2 (0.8%) did not notice it. There were 137(56.1%) of students knew about components of haze, meanwhile 107(43.9%) did not know about it. On the components of haze question, 92(37.7%) of students chose particulate matter as components of haze, followed by SO₂ (81-33.2%) and CO₂ (79-32.4%). For NO₂, 59(24.2%) chose it as their answer and 25(10.2%) chose ozone as components of haze. It indicated that the students were unaware of the fact that ozone was one of the components of haze. Considering the students' background, it was quite worrisome because even they have higher education level, majority of them were still lacking in knowledge regarding haze.

Regarding sources of information about haze, majority of the students got information via television (212-99.2%), followed by internet (209-85.7%). Other information got from friend (127-52%), radio (119-48.8%) and lecturer (108-44.3%).

There were 193 (79.1%) agreed that El Nino phenomenon makes haze become worsening. Furthermore, there were 206(84.4%) of the respondents knew that N95 mask as adequate protection again haze. Most of the respondents chose forest fire as the regional sources of haze which was 211(86.5%), followed by open burning 194(79.5%), industries 162(66.4%) and transportation 124(50.8%). Moreover, on local sources of haze, 161(66%) knew that industries was the main sources, followed by open burning 156(63.9%), transportation 143(58.6%) and forest fire 124(50.8%).

KAP on Haze

i) Knowledge about haze

There were 15 questions being asked on respondents' knowledge on haze. The obtained score was converted in term of score level and categorized into three levels which were high, moderate and low knowledge. A mean score of 11.78 and standard deviation of 1.70 were used to classified respondents into three groups as follow:

Good level : score of 13 or more

Moderate level : score between 11-12

Poor level : score of 10 or below

To sum up the knowledge level, final year of medical students had good level of knowledge (59-39.1%)



compared to first year students (29-31.2%). For moderate level, final year had 59 (39.1%) while first year had 40 (41.9%). There were 33 (21.9%) of final year students and 24 (26.9%) of first year students had poor level of knowledge about haze.

Since haze was recurrent issues, the knowledge on haze was an important for the university students to have good practice during haze. Without appropriate knowledge, they might have tendency to adopt bad practice that could lead to increment of outpatient in the hospital due to haze-related disease such as asthma, cough, fever and others.

As the hazy situation occurred around the respondents, they might hear, know or read about this issue. However, due to limited information delivered to them especially from formal education, their knowledge on haze was slightly moderate. Many studies had shown that knowledge was a prerequisite for environmental behavior (Ahmad et al, 2010). By delivering knowledge to students, it was believed to enhance awareness and lead to positive attitudes towards environment (Arbaat et al, 2011).

ii) Attitude towards haze

To explore the attitude towards haze among respondents, there were 15 questions being asked about their opinion either agree or not with the statements for attitude towards haze. The scoring method was used to classify the attitude level. The score was given 5 for strongly agree answer, 4 for agree answer, 3 for not sure answer, 2 for disagree and 1 for strongly disagree answer.

The score obtained was sum up and classified into three levels which were high, moderate and low level attitude. A mean score of 60.81 and standard deviation of 6.91 were used to classify the subjects into three levels as follow:

Good level : score of 67 or more

Moderate level : score between 55-66

Poor level : score of 54 or below

Most of the respondents from first and final year of medical student had moderate attitude which were 54(57%) and 97(64.2%). Meanwhile, 21(22.6%) and 38(25.2%) from first and final year perceived good level of attitude. About 18(20.4%) of first year and 16(10.6%) of final year students had poor level of attitude.

The attitude towards haze influenced the practice of the students during haze whether good or bad. Having good knowledge and attitude must come along to encourage people to apply good practice. It was revealed by a previous study that showed attitude

towards the environment was influenced by their level of knowledge about the environment (Rosta et al, 2011).

Attitude is a complex mental construct (perception) which emerges out of an integration of an individual's belief and values system (Boershing & de Young, 1993). Hence, it was quite challenging to ensure application of good attitude among the youth generation as their attitude already accumulated and formed throughout the upbringing process and the attitude involved what they believed about and what positive value they got by practicing good attitude during haze (Awang et al, 2013).

iii) Practice during haze

For practice during haze, there were 15 questions being asked to the respondents to know their practice during haze. The respondents got 1 scores for correct answer and 0 mark for wrong answer. The obtained practice score was converted in term of score level and classified into two groups which were good and bad practice. A mean score of 11.53 and standard deviation of 2.74 were used to classify the subjects into two groups as follow:

Good practice : score of 12 or more

Bad practice : score below 11

Majority of the students for both groups had bad practice which were 64(68.8%) and 107(70.9%). Meanwhile, there were 29(31.2%) and 44(29.1%) of the first and final year who applied good practice during haze.

Practice was an indicator to know the successful or failure of any environmental programmes. If the person could apply good practice right after the end of the programmes, it showed that the programmes were effective and successful. But for the present study, majority of the students were categorized as bad practice. The result was similar to a study done by Wang et al (2015), and come out with two possible reasons that contribute to low practice, which were the respondents could not answer the questions properly as the "practice" part was created at the end of the questionnaire, resulting in some missing value and the other reason was the lack of air pollution good self-guidance. Hence, the medical students were unaware about the most appropriate protective measure that they should apply.

Comparison of the KAP of Haze among First and Final Year of Medical Students

The p-value of Kolmogorov-Smirnov (KS) for knowledge was 0.000. It was not normally



distributed, hence Mann-Whitney test was used. For the knowledge score, the mean rank of first year was 119.17, while the mean rank of final year was 124.55. Based on Mann-Whitney test, the Z statistics is -0.590 and p value is 0.555 which is >0.05. Therefore, there was no significance difference of median knowledge between first and final year groups.

The curriculum structure for medical students was full with medical subjects and lack of environmental subject. For first year, they were not exposed yet with the environmental subject in their lecture schedule, hence they did not know much or deeply about environmental terms and facts. Meanwhile, for the final year, they have learnt the environmental subject during second year and already left the subjects for almost two years, so the chance for them to forget the content of the specific environmental terms is high. In addition, they already have many subjects to do revision and limited time to access to environmental issues such as haze.

The skewness/standard error for knowledge score was -2.44. It was normally distributed. Independent T-test was used. The mean attitude among final year students was higher compared to first year students. The 95% confidence interval for mean difference was between -3.282 and 0.371. Based on Independent T-test, the T-statistics is -0.573 a p value is 0.118 which is >0.05. There was no significant difference of mean attitude between first and final year groups.

The p-value of Kolmogorov-Smirnov (KS) for practice score was 0.000. It was not normally distributed, hence Mann-Whitney test was used. For the practice score, the mean rank of first year was 126.61, while final year was 119.55. Based on Mann-Whitney test, the Z statistics is 0.720 and p value is 0.472 which is >0.05. Therefore there was no significance difference of median practice between first and final year groups.

Even the medical students might know about haze-related diseases, but they did not put the knowledge into practice that could prevent the negative impacts on their health during haze. The first year of medical students spent most of their times in air-conditioned lecture hall listening to sharing session in medical field while the final year spent most of their times doing practical in the hospital. A study indicated that Malaysian public was concerned about environment, but they did not turn them into practice (Haliza, 2011).

Association between Social Demographic with Student’s Knowledge, Attitude and Practice

The association between social demographic (age, gender and race) with student’s KAP were analysed by using Chi-square test (Table 2, 3, 4, 5, and 7).

There was no association between social demographic with the KAP among first and final year of medical students. The p-value for all selected variables was more than 0.05. There were no significant differences between sociodemographic with the KAP during haze among respondents.

Table - 1: Haze-related diseases in UHC, UPM from August to October 2015

Types of diseases	Month		
	August	September	October
Infection of upper respiratory tract	846	1618	1535
Infection of lower respiratory tract	87	67	69
Asthma	71	88	108
Skin problem	213	249	257
Infection of eye irritation	9	15	34

Sources: UPM Health Centre (2015)

Table 2: Association between socio-demographic with knowledge among first year medical students

	Knowledge level, n (%)			X ² (df)	p-value
	Good	Moderate	Low		
Age					
19	5 (35.7)	7 (50.0)	2 (14.3)	5.366 (4)	0.252
20	18 (26.5)	29 (42.6)	21 (30.9)		
21	6 (54.5)	4 (36.4)	1(9.1)		
Gender					
Male	13 (32.5)	19 (47.5)	8 (20.0)	1.285 (2)	0.526
Female	16 (30.2)	21 (39.6)	16 (30.2)		
Race					
Malay	17 (27.4)	29 (46.8)	16 (25.8)	5.422 (6)	0.491
Chinese	6 (35.3)	5 (29.4)	6 (35.3)		
Indian	5 (41.7)	6 (50.0)	1 (8.3)		
Others	1 (50.0)	0 (0.0)	1 (50.0)		

N=93, Chi-square test



Table 3: Association between socio-demographic with attitude among first year medical students

Age	Attitude level, n(%)			X ²	p-value
	Good	Moderate	Low		
19	6 (42.9)	4 (28.6)	4 (28.6)	8.99 0 (4)	0.061
20	15 (22.1)	41 (60.3)	12 (17.6)		
21	0(0.0)	9 (81.8)	2 (18.2)		
Gender					
Male	9 (22.5)	22 (55.0)	9 (22.5)	0.47 2 (2)	0.790
Female	12 (22.6)	32 (60.4)	9 (17.0)		
Race					
Malay	14 (22.6)	33 (53.2)	15 (24.2)	11.1 73 (6)	0.083
Chinese	2 (11.8)	13 (76.5)	2 (11.8)		
Indian	3 (25.0)	8 (66.7)	1 (8.3)		
Others	2 (100.0)	0 (0.0)	0 (0.0)		

N=93, Chi-square test

Table 4: Association between socio-demographic with practice among first year medical students

Age	Practice level, n(%)		X ²	p-value
	Good	Bad		
19	5(35.7)	9(64.3)	0.371	0.831
20	20(29.4)	48(70.6)		
21	4(36.4)	7(63.6)		
Gender				
Male	14 (35.0)	26(65.0)	0.477 (1)	0.490
Female	15 (28.3)	38(71.7)		
Race				
Malay	22 (35.5)	40(64.5)	2.530 (3)	0.470
Chinese	3(17.6)	14(82.4)		
Indian	3(25.0)	9(75.0)		
Others	1(50.0)	1(50.0)		

N=93, Chi-square test

Table 5: Association between socio-demographic with knowledge among final year medical students

Age	Knowledge level, n (%)			X ² (df)	P-value
	Good	Moderate	Low		
23	13 (37.1)	14 (40.0)	8 (22.9)	4.729 (4)	0.316
24	38 (39.6)	34 (35.4)	24 (25.0)		
25	8 (40.0)	11 (55.0)	1(5.0)		
Gender					
Male	20 (41.7)	18 (37.5)	10 (20.8)	0.199 (2)	0.905
Female	39 (37.9)	41 (39.8)	23 (22.3)		
Race					
Malay	41 (40.2)	41 (40.2)	20 (19.6)	3.813 (6)	0.702
Chinese	13 (33.3)	14 (35.9)	12 (30.8)		
Indian	2 (40.0)	2(40.0)	1 (20.0)		
Others	3(60.0)	2(40.0)	0(0.0)		

N=151, Chi-square test

Table 6: Association between socio-demographic with attitude among final year medical students

Age	Attitude level, n(%)			X ²	p-value
	Good	Moderate	Low		
23	9 (25.7)	21(60.0)	5 (14.3)	2.926 (4)	0.570
24	26 (27.1)	60(62.5)	10 (10.4)		
25	3 (15.0)	16(80.0)	1(5.0)		
Gender					
Male	10 (20.8)	34(70.8)	4(8.3)	.341(2)	0.511
Female	28 (27.2)	63(61.2)	12 (11.7)		
Race					
Malay	26 (25.5)	66 (64.7)	10 (9.8)	6.388(6)	0.381
Chinese	11 (28.2)	24 (61.5)	4 (10.3)		
Indian	0(0.0)	3 (60.0)	2 (40.0)		
Others	1 (20.0)	4 (80.0)	0(0.0)		

N=151, Chi-square test



Table 7: Association between socio-demographic with practice among final year medical students

Age	Practice level, n(%)		X ²	p-value
	Good	Bad		
23	11 (31.4)	24(68.6)	2.232 (2)	0.328
24	30 (31.3)	66(68.8)		
25	3 (15.0)	17(85.0)		
Gender				
Male	19 (39.6)	29(60.4)	3.718 (1)	0.054
Female	25 (24.3)	107 (70.9)		
Race				
Malay	35 (34.3)	67(65.7)	4.092 (3)	0.252
Chinese	7(17.9)	32(82.1)		
Indian	1(20.0)	4(80.0)		
Others	1(20.0)	4(80.0)		

N=151, Chi-square test

From the findings, there were no significant difference social demographic with the KAP among first and final year medical students. It was similar with the previous study that showed no association between social demographic with students' KAP, but there were two factors that affecting the level of knowledge which were respondents' educational level and average annual household income (Wang et al, 2015). Besides, a study by Afiff et al (2016) also found there were no significance difference between sociodemographic factors and attitude.

The association between demographic with students' KAP and practice were further analysed by using Simple Logistic Regression test. From the findings, there were no factors associated with the attitude and practice on haze among respondents. However, for knowledge, there was predictor associated with it for final year medical students, which is race. The p-value obtained was <0.001 for final year group. Malay and Chinese students were associated with knowledge level with odd ratio (OR) 5.22 and 2.98 respectively. It showed that Malay and Chinese students had better knowledge about haze compared to Indian and others.

Association between KAP during haze

To analyse the association between knowledge and attitude on practice during haze, Chi-square was used. About 45(78.9%) students had poor knowledge and poor practice during haze. Only 38(43.2%) students had good knowledge and good practice during haze. The Chi-square test obtained was 11.631 and the p-value was 0.003. Therefore, there was association between knowledge and practice during haze.

Association between Knowledge and Practice

About 11(76.2%) students had moderate attitude and poor practice during haze. Meanwhile, only 24(42.4%) of students who had good attitude and good practice. The Chi-square test obtained was 7.493 and the p-value was 0.024. Therefore, there was an association between attitude and practice during haze.

Even the knowledge of health behavior was useful, it did not automatically intent that this behavior would be followed (Wang et al, 2015). The finding of previous study in UKM students showed that there had high level of knowledge, awareness and attitude but low level of environmental practice (Arbaat et al, 2011). In the meantime, the attitude of the student must be strengthened to increase their environmental awareness especially during haze and to influence them in practicing good practice.

Suggestion

Question 1

What is the ways in which the government can help the public/private organization adapt to haze problem?

The respondents chose public education programme as one of the ways in which government can help public/private organization adapt to haze problem (209 respondents), followed by policies and legislation (138 respondents) and administrative support (74 respondents). The least choice was financial assistance (71 respondents). From the previous study, it was stated that formal education was the best method to deliver environmental information and promote the right environmental values in youth especially students (Rosta et al, 2011).



Question 2

What are the requirements for improving public/private sectors' ability to participate in haze adaptation/mitigation activities?

Majority of the students chose greater number of health programmes with 141 respondents, followed by policies and legislation with 139 respondents and financial assistance from the government with 116 respondents. The least preference answer was administrative support, in which 111 respondents chose it.

With greater number of health programmes, the knowledge of the individuals also will be increased. Then, high level of knowledge will create positive attitude towards environment (Rosta et al, 2011). The enforcement of policies and legislation also played important role in haze adaptation/mitigation activities. By enforcing strict laws and policies, it was one of methods that develop cost effectiveness of implementation (Suchindah, 2015). A previous study by Haliza (2010a) showed that imposed a strict punishment was a main suggestion to conserve the environment. In addition, environmental legislation is one of the strategies used to manage the environment long time ago (Haliza, 2010b).

Question 3

What is your suggestion to reduce the haze in Malaysia?

About 55 students suggested that reduce open burning as one of the ways to reduce haze. Law enforcement and health awareness also were suggested by them with frequency of 44 and 24 respondents respectively.

Question 4

Do you think the environmental health course should be taught to all university students regarding mitigation and strategy to tackle health issue?

About 150 of the respondents agreed that environmental health course should be taught to all university students and 21 respondents did not agree. According Haliza (2014), education is the least expensive and most effective way to deliver information regarding environmental issues as they could save and mitigate themselves safely.

Conclusion

This study showed that the medical students have moderate level of knowledge and attitude during

haze. However, the level of practice was poor. When comparing the level of KAP on haze among first and final year of students, there were no significant difference between them. This result revealed that it was important to provide formal environmental education and environmental protection campaign to improve awareness linked to air quality especially haze among medical students. In applying good practice, it must be supported by having good knowledge and attitude. The finding of this study showed that there were association between knowledge-practice and attitude-practice.

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