CORRECTION

Knowledge, Attitude and Vaccination Status of Varicella Among Students of Universiti Kebangsaan Malaysia (UKM)

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SUMMARY

Varicella is a highly infectious disease that can lead to severe complications such as pneumonia, encephalitis and death. Vaccination is the best method to prevent the disease. The objective of this study was to assess the level of knowledge, attitude and vaccination status of varicella among UKM students. A cross sectional study involving pre-tested questionnaires was undertaken between February and April, 2005. Questionnaires were distributed and filled by the first and second year students from four faculties in UKM (n=879). The faculties included were divided into two categories: medical fields and non-medical fields. The results showed that the overall level of knowledge on varicella among respondents was intermediate. The score of knowledge was significantly higher among medical students ($t=10.9$, $p<0.05$) compared to non-medical students. The varicella vaccination coverage was low among UKM students (19.3%). The vaccination status was significantly higher among medical students compared to non-medical students ($\chi^2=8.6$, $p<0.05$). Vaccination status of varicella among respondents had no association with the level of knowledge ($\chi^2=2.42$, $p>0.05$). In conclusion: the awareness and vaccination status of varicella among UKM students were low. More varicella awareness programs should be held on universities' campuses to educate students on methods of prevention of this serious disease.

KEY WORDS:
Varicella, Universiti Kebangsaan Malaysia, Knowledge, Vaccination

INTRODUCTION

Varicella, also known as chicken pox, is a highly infectious disease caused by varicella zoster virus (VZV). Although it has been considered as a benign childhood disease[1], it can be fatal especially in neonates, elderly and immunocompromised persons due to its rare but severe complications[2]. The risk of complications and mortality is 10-20 folds higher among adults compared to children[3]. The severe complications of chickenpox include bacterial infections of the skin and soft tissues, pneumonia, hemorrhagic complications and encephalitis[3]. Perinatal varicella and congenital varicella syndrome which involve newborns whose mothers were infected with varicella during pregnancy cause fatality rate of 30% if untreated[3].

During the pre-vaccine era (1988-1995), the incidence of varicella was high with 4 million cases, 11,000 hospitalizations and 100 deaths in the United States every year[4]. The tropical countries experience different age-related VZV seroprevalence patterns compared to temperate countries[5]. Seroconversion mostly occurs in late adolescence and adulthood where the disease is more severe[6]. In Malaysia, the seroconversion was low among children and more than 90% of seroconversion only happened in those over 30 years of age[5]. The varicella incidence rate per 100,000 populations in Kuala Lumpur was 1.89[7]. There were four reported deaths caused by varicella in Malaysia in 1995, which was 0.01% of the total deaths[8].

A live attenuated varicella vaccine derived from Oka strain of VZV was licensed in the United States in 1995, and the Advisory Committee on Immunization Practices (ACIP) issued recommendations for prevention of varicella in 1996 for use in susceptible healthy persons greater than or equal to 12 months of age[9].

This study was carried out to determine the level of knowledge, attitude and vaccination status of varicella among UKM undergraduate students in both medical and non-medical fields. The association between varicella vaccination status and the level of knowledge of respondents was also assessed.

MATERIALS AND METHODS

Study design

This cross-sectional study was conducted from February to April 2005 at UKM main campus, Bangi and UKM/Kuala Lumpur campus. The relevant data was collected from the respondents through distributed questionnaires.

Study population

The study population was made up from UKM students of first and second year which were divided into two groups: 1) medical fields: Faculty of Medicine and Faculty of Allied Health Sciences; 2) non medical fields: Faculty of Economy and Business and Faculty of Engineering.

Questionnaires

Questionnaires were written in English and Malay. The survey was carried out in 3-4 weeks. Participants were given a questionnaire and explanation was provided to help them complete the questionnaire. The information obtained included: A) demographic data B) knowledge of varicella C) medical history D) vaccination status E) attitude towards varicella. The students were given multiple choices to choose from in the questionnaire.

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After completing the questionnaire, participants were given brochures about varicella to improve their knowledge on the disease. All the brochures were provided by GlaxoSmithKline Sdn. Bhd.

Statistical analysis
Data was analysed using Statistical Package for Social Sciences (SPSS) version 11.0. Descriptive statistics, including frequencies and percentages, were calculated for each item in the questionnaire. Level of knowledge of the respondents was classified based on the score in Table I according to the total mark for their answers in questionnaires. Two marks were given to each correct answer and the total mark was 74. The classification was as follows:

Hypothesis
There were several hypotheses in this study: 1) The mean score of varicella knowledge was higher among students of medical fields than students of non-medical fields. 2) Varicella vaccination status was higher among students of medical fields than students of non-medical fields. 3) Vaccination status was higher among respondents with high level of varicella knowledge.

RESULTS

A total of 879 respondents were enrolled in the survey from students of first and second year of UKM which were divided into two groups: 1) medical fields: Faculty of Medicine (n=206) and Faculty of Allied Health Sciences (n=254); 2) non medical fields: Faculty of Economy and Business (n=231) and Faculty of Engineering (n=188). The average age of the respondents was 20.7. 61.1% of the respondents were females. Most of the respondents were Malay (48.8%), followed by Chinese (48.1%) and Indian (1.7%). Most of the respondents (41.8%) were in RM1001-RM2500 of the family monthly income. Details of the demographic data were shown in Table II.

Knowledge of varicella
A higher percentage (85%) of the respondents in medical fields knew that varicella was caused by virus compared to only 50% of the respondents in non-medical fields. Most of the respondents knew that varicella can spread through direct contact with patients or indirectly through clothes or objects contaminated by discharge from lesions. Fever and itchiness were well known among respondents as symptoms of varicella, while less than 50% of the respondents knew that rashes, vesicles, muscle pain, headache and joint pain are symptoms of varicella. Less than 50% of the respondents had correct knowledge about varicella vaccination. Students of the Faculty of Medicine were superior to the other groups in knowing that immunity following vaccination lasts 10-20 years. 70.4% of total respondents knew that the vaccine is contraindicated in pregnancy.

Only 40.8% of the total respondents were aware that varicella can be fatal. The highest percentage was achieved among students of Faculty of Medicine (60.6%). Most of the respondents knew about scars on the skin, skin bacterial infection as complications of varicella. Only 29.1% of respondents knew that congenital varicella syndrome is a complication of varicella. Generally, the level of knowledge on varicella among the respondents was satisfactory with most of them (79%) falling in the intermediate category. The mean score of knowledge was significantly higher among medical fields students compared to non-medical fields ones ($t=10.9$, $p<0.05$). Hypothesis was accepted where the mean score of the varicella knowledge was significantly higher among medical fields students compared to non-medical fields students. Details of the knowledge about varicella among the respondents were shown in Table III.

Table I: Level of knowledge

Level of knowledge	Score of correct answers
High	52-74
Intermediate	22-51
Low	<22

Chi-squared test and independence T-test were performed to establish the significant differences or independence between the tested parameters. The significant level (p value) was set at 0.05.

Table II: Demographic data of respondents

Groups	Medicine n (%)	FSKB n (%)	Economy n (%)	Engineering n (%)	Total n (%)
No. of subjects (N)	206 (23.4)	254 (28.9)	231 (26.3)	188 (21.4)	879 (100)
Average age (years)	20.5	20.7	20.8	21.0	20.7
Gender					
Female	107 (51.9)	98 (38.7)	49 (21.2)	86 (47.0)	340 (38.9)
Male	99 (48.1)	155 (61.3)	182 (78.8)	97 (53.0)	533 (61.1)
					873 (100)
Race					
Malay	107 (52.2)	133 (53.0)	127 (57.2)	52 (28.7)	419 (48.8)
Chinese	91 (44.4)	112 (44.6)	84 (37.8)	126 (69.6)	413 (48.1)
Indian	5 (2.4)	1 (0.4)	8 (3.6)	1 (0.6)	15 (1.7)
Others	2 (1.0)	5 (2.0)	3 (1.4)	2 (1.1)	12 (1.4)
					859 (100)
Family monthly income					
<RM1000	52 (25.7)	74 (29.2)	75 (33.3)	75 (42.4)	276 (32.2)
RM1001-2500	83 (41.1)	118 (46.6)	99 (44.0)	58 (32.8)	358 (41.8)
RM2501-4000	37 (18.3)	33 (13.0)	36 (16.0)	33 (18.6)	139 (16.2)
RM4001-6500	18 (8.9)	22 (8.7)	8 (3.6)	6 (3.4)	54 (6.3)
>RM6500	12 (5.9)	6 (2.4)	7 (3.1)	5 (2.8)	857 (100)

Table III: Knowledge about varicella among respondents

	Faculty				Total, n (%)
	Medicine n (%)	Allied Health Sciences n (%)	Economy and Business n (%)	Engineering n (%)	
1) Know about varicella					
Yes	200 (97.1)	252 (99.2)	228 (98.7)	179 (95.2)	859 (97.7)
Mass media	73 (36.5)	68 (27.0)	80 (35.1)	36 (20.1)	257 (29.9)
Vaccination program	59 (29.5)	60 (23.8)	24 (10.5)	21 (11.7)	164 (19.1)
Healthcare worker	15 (7.5)	18 (7.1)	15 (6.6)	8 (4.5)	56 (6.5)
Education	137 (68.5)	129 (51.2)	85 (37.3)	53 (29.6)	404 (47.0)
Own experience, family and friends.	141 (70.5)	192 (76.2)	194 (85.1)	157 (87.7)	684 (79.6)
No	6 (2.9)	2 (0.8)	3 (1.3)	9 (4.8)	20 (2.3)
					879 (100)
2) Knowledge of spreading					
Virus	178 (88.1)	205 (82.3)	109 (48.9)	91 (50.3)	583 (68.2)
Bacteria	22 (10.9)	40 (16.1)	97 (43.5)	69 (38.1)	228 (26.7)
Fungus	3 (1.5)	3 (1.2)	28 (12.6)	14 (7.7)	48 (5.6)
Helminth	1 (0.5)	3 (1.2)	6 (2.7)	16 (8.8)	26 (3.0)
Protozoa	2 (1.0)	3 (1.2)	8 (3.6)	10 (5.5)	23 (2.7)
					855 (100)
3) Transmission of varicella through					
Vector	7 (3.4)	6 (2.4)	6 (2.7)	12 (6.5)	31 (3.6)
Direct contact with patient	160 (77.7)	197 (78.2)	152 (67.3)	136 (73.5)	645 (74.2)
Indirect contact with patient	135 (65.5)	170 (67.5)	122 (54.0)	123 (66.5)	550 (63.3)
Cough	77 (37.4)	64 (25.4)	68 (30.0)	43 (23.2)	252 (29.0)
Sneezing	76 (36.9)	59 (23.4)	64 (28.3)	43 (23.2)	242 (27.8)
					869 (100)
4) Knowledge of susceptibility					
Not infected before	196 (95.6)	240 (94.5)	205 (89.9)	165 (88.2)	806 (92.2)
Infected before	23 (11.2)	29 (11.4)	35 (15.4)	31 (16.6)	118 (13.5)
Unvaccinated	160 (78.0)	166 (65.4)	103 (45.2)	98 (52.4)	527 (60.3)
Vaccinated	26 (12.7)	22 (8.7)	11 (4.8)	18 (9.6)	77 (8.8)
Healthy	79 (38.5)	66 (26.0)	22 (9.6)	34 (18.2)	201 (23.0)
Immunocompromised	139 (67.8)	143 (56.3)	77 (33.8)	64 (34.2)	423 (48.4)
					874 (100)
5) Knowledge of symptom					
Fever	196 (96.1)	237 (93.7)	211 (92.5)	168 (89.8)	812 (93.1)
Fatigue	153 (75.0)	185 (73.1)	134 (58.8)	118 (63.1)	590 (67.7)
Anorexia	149 (73.0)	156 (61.7)	147 (64.5)	105 (56.1)	557 (63.9)
Muscle pain	71 (34.8)	94 (37.2)	90 (39.5)	74 (39.6)	329 (37.7)
Joint pain	47 (23.0)	67 (26.5)	65 (28.5)	50 (26.7)	229 (26.3)
Itchiness	183 (89.7)	216 (85.4)	187 (82.0)	146 (78.1)	732 (83.9)
Rash/ vesicles	160 (78.4)	136 (53.8)	34 (14.9)	52 (27.8)	382 (43.8)
High blood pressure	3 (1.5)	14 (5.5)	2 (0.9)	7 (3.7)	26 (3.0)
Headche	73 (35.8)	85 (33.6)	58 (25.4)	46 (24.6)	262 (30.0)
					872 (100)
6) Knowledge of transmission of varicella to others before appearance of vesicles					
Yes	76 (37.6)	61 (24.0)	88 (39.1)	74 (32.9)	299 (34.5)
No	52 (25.7)	65 (25.6)	14 (6.2)	31 (13.8)	162 (18.7)
Not sure	74 (36.6)	128 (50.4)	123 (54.7)	80 (35.6)	405 (46.8)
					866 (100)
7) Knowledge of infection giving long term but not Lifelong immunity					
Yes	79 (38.7)	76 (29.9)	98 (43.0)	79 (42.0)	332 (38.0)
No	83 (40.7)	87 (34.3)	39 (17.1)	56 (29.8)	265 (30.3)
Not sure	42 (20.6)	91 (35.8)	91 (39.9)	53 (28.2)	277 (31.7)
					874 (100)
8) Knowledge of reactivation of VZV causing zoster later in life after primary infection					
Yes	106 (52.0)	25 (9.9)	13 (5.7)	34 (18.2)	178 (20.4)
No	20 (9.8)	51 (20.2)	62 (27.2)	45 (24.1)	178 (20.4)
Not sure	78 (38.2)	177 (69.9)	153 (67.1)	108 (57.7)	516 (59.2)
					872 (100)

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Table III: Knowledge about varicella among respondents

9) Knowledge of vaccine can only be taken by those above aged 12 month and above					
Yes	43 (21.3)	50 (19.7)	44 (19.4)	48 (25.9)	185 (21.3)
No	50 (24.8)	50 (19.7)	63 (27.7)	44 (23.8)	207 (23.8)
Not sure	109 (53.9)	154 (60.6)	120 (52.9)	93 (50.3)	476 (54.8)
					868 (100)
10) Knowledge of number of shots in a full course of varicella vaccination					
1 dose	29 (14.2)	27 (10.6)	17 (7.5)	28 (15.1)	101 (11.6)
2 doses	64 (31.4)	40 (15.7)	43 (18.9)	38 (20.5)	185 (21.3)
Not sure	111 (54.4)	187 (73.6)	167 (73.6)	119 (64.3)	584 (67.1)
					870 (100)
11) Knowledge of immunity following vaccination					
10-20 years	49 (24.6)	46 (18.2)	26 (11.7)	38 (20.7)	159 (18.5)
Whole life	68 (34.2)	72 (28.5)	61 (27.5)	59 (32.1)	260 (30.3)
Not sure	82 (41.2)	135 (53.4)	135 (60.8)	87 (47.3)	439 (51.2)
					858 (100)
12) Knowledge of contraindication of the varicella vaccine					
Allergy	161 (83.9)	176 (71.3)	95 (43.8)	110 (94.0)	542 (64.9)
Pregnancy	127 (66.1)	162 (65.6)	168 (77.4)	131 (73.2)	588 (70.4)
Severe illnesses	101 (52.6)	104 (42.1)	54 (24.9)	59 (33.0)	318 (38.1)
Having immunity illnesses	120 (62.5)	102 (41.3)	56 (25.8)	52 (29.1)	330 (39.5)
Taking long term steroid	77 (40.1)	57 (23.1)	45 (20.7)	31 (17.3)	210 (25.1)
					835 (100)
13) Knowledge of varicella can be fatal					
Yes	120 (60.6)	95 (37.5)	55 (24.2)	82 (44.3)	352 (40.8)
No	35 (17.7)	51 (20.2)	52 (22.9)	41 (22.2)	179 (20.7)
Not sure	43 (21.7)	107 (42.3)	120 (52.9)	62 (33.5)	332 (38.5)
					863 (100)
14) Knowledge of varicella complications					
Skin bacteria infection	137 (67.8)	157 (62.1)	149 (66.2)	114 (62.6)	557 (64.6)
Pneumonia	42 (20.8)	42 (16.6)	14 (6.2)	23 (12.6)	121 (14.0)
Scars on skin	159 (78.7)	212 (83.8)	139 (61.8)	112 (61.5)	622 (72.2)
Encephalitis	59 (29.2)	32 (12.6)	5 (2.2)	13 (7.1)	109 (12.6)
Liver diseases	14 (6.9)	20 (7.9)	8 (3.6)	7 (3.8)	49 (5.7)
Syndrome congenital varicella	71 (35.1)	74 (29.2)	46 (20.4)	60 (33.0)	251 (29.1)
					862(100)
15) Knowledge of symptomatic treatment of varicella					
Yes	94 (47.5)	81 (32.1)	39 (17.3)	48 (25.8)	262 (30.4)
No	41 (20.7)	45 (17.9)	36 (15.9)	38 (20.4)	160 (18.6)
Not sure	63 (31.8)	126 (50.0)	151 (66.8)	100 (53.8)	440 (51.0)
					862 (100)

Table IV: Vaccination status among respondents who were not infected before with varicella

	Faculty				Total, n (%)
	Medicine, n (%)	Allied Health Sciences, n(%)	Economy and Business, n (%)	Engineering, n (%)	
Ever received varicella vaccine?					
Yes	19 (40.4)	13 (18.6)	6 (10.3)	6 (11.3)	44 (19.3)
Before primary school	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
During primary school	5 (26.3)	9 (69.2)	3 (50.0)	3 (50.0)	20 (45.5)
During secondary school	1 (5.3)	3 (23.1)	3 (50.0)	3 (50.0)	10 (22.7)
During university	13 (68.4)	1 (7.7)	0 (0.0)	0 (0.0)	14 (31.8)
No	28 (59.6)	57 (81.4)	52 (89.7)	47 (88.7)	184 (80.7)
					228 (100)

Attitude towards varicella
45.0% of the respondents agreed that varicella is a serious disease. Most of them (80.0%) suggested that varicella vaccination should be made compulsory in Malaysia and added to the vaccination schedule. Majority of the respondents (87.3%) said that it is important for a person who was not infected by varicella before to take the vaccine to avoid the complications and economic loss caused by the disease. Most respondents (83%) would recommend family members and friends to take the vaccine if they were not immune.

Varicella vaccination status
Among the respondents who were not infected with varicella before, only 19.3% were vaccinated with the highest percentage (40.4%) from the Faculty of Medicine and the lowest percentage (10.3%) from the Faculty of Economy and Business. The vaccination status was significantly higher among medical students compared to non-medical students (χ^2=8.6, $p<0.05$). Details of the vaccination status of the respondents were shown in Table IV.

Vaccination status and level of varicella knowledge
There was no significant association between the vaccination status and the level of knowledge (χ^2=2.42, $p>0.05$). We categorized the level of knowledge according to Table I, described in the materials and methods section.

DISCUSSION
The level of knowledge and vaccination status was significantly higher among medical students compared to non-medical students. Vaccination status of varicella among the respondents had no association with the level of knowledge.

Knowledge of varicella
The majority of the respondents (92.2%) knew that those who were never infected before were susceptible to the disease. Only 13.5% of the respondents said that varicella reinfection could occur. It is possible to get chickenpox more than once but it is uncommon. For most people one infection appears to confer lifelong immunity[4].

Less than half of the respondents knew about the risk of fatality following varicella infection, especially among neonates, elderly and immunocompromised patients, as well as other serious complications such as pneumonia, encephalitis and congenital varicella syndrome. In United States, CDC had received 8 reports of varicella fatality cases between June 2003 and June 2004, where the victims aged between 1-40 years old[10]. It was shown that fatality still occurs among infected healthy persons despite of the availability of the varicella vaccine. Informing health care workers and the public about the possible serious complications and fatality caused by varicella could raise the awareness of the public towards varicella.

Score of knowledge
The mean score of knowledge was significantly higher among students of medical fields. This is due to their education and their interest in prevention of infectious diseases during their clinical attachments. Knowledge of varicella is important for health care workers as they face higher risks of infection through occupational and community exposures[11].

Vaccination status
A low vaccination rate (19.3%) among the uninfected respondents was probably because many of them did not know about the availability of the vaccine. Some respondents might worry about waning of immunity following vaccination, this was true in a study conducted by Wallington *et al*[12].

Own initiative (40.0%) and doctor's suggestion (31.1%) were the reasons of vaccination given by the respondents. The role of physicians in encouraging vaccination was important[13]. Providing information about the safety of the vaccine by healthcare providers was one of the important factors to influence vaccine uptake[14]. The vaccination status was significantly higher among students of medical fields compared to other students, which was in contrast with the results of a study done in a Nigerian teaching hospital that showed low rate of vaccination compliance among clinical workers[15]. This may be due to the fact that the respondents in our study were students who usually followed more closely recommendations for vaccination and were not concerned about possible side effects from vaccination.

Attitude towards varicella
Only 45.0% of the respondents said that varicella was a serious disease. This might be due to the common mild symptoms such as fever, rashes and itchiness that will disappear in 7-10 days for most patients[2] and lack of knowledge about the serious complications of chickenpox.

Most of the respondents (80%) agreed that varicella vaccination should be compulsory in national immunization schedule. This was similar to results of an earlier study where 72% of the subjects agreed that varicella vaccination should be included in the immunization schedule[16].

Vaccination status and level of varicella knowledge
There was no significant association between the vaccination status and the level of knowledge. Those who had a high level of varicella knowledge did not necessarily take the vaccine. An earlier study showed that healthcare workers who were more qualified were less compliant to the vaccination[17].

Limitations
Some limitations to the findings in this study were as follows: firstly, only first and second year students were included in this survey, so the results might not represent all UKM students. Secondly, data of medical history and vaccination status was based on questionnaires and therefore was dependent on recollection of respondents. Lastly, the bilingual questionnaires were quite long and this may have caused the participants to be impatient in answering questions which could introduce inaccurate data.

CONCLUSION

The level of knowledge about varicella among the respondents was intermediate with better knowledge among medical students compared to others. However most students did not know the serious complications of the disease and only 19.3% of uninfected students were vaccinated against chickenpox. More awareness and vaccination programs should be held on Universities' campuses to educate students on the serious complications of chickenpox and benefits of taking effective preventive measures. This can reduce the risk of infection on campuses and also during clinical attachments by students from medical fields.

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