ORIGINAL ARTICLE

Awareness, Knowledge & Attitude on Urinary Tract Infection among Government Secondary School Students in Shah Alam, Malaysia

Neni Widiasmoro Selamat[1], Kenneth Paul Martinez[1], Mohammad Sarimie Nurul Nizam[1], Gaiyathre Subrain[1], Eva Tan Lee Yin[1], Titinun Auamnoy[2]

[1] Department of Diagnostics and Allied Health Sciences, Faculty of Health and Life Sciences, Management & Science University, 40100 Shah Alam, Selangor, Malaysia.
[2] Faculty of Pharmaceutical Sciences, Burapha University, 2013, Chonburi, Thailand

ABSTRACT

Introduction: A cross-sectional study was conducted to provide preliminary insight of Awareness, Knowledge and Attitude (AKA) assessment on urinary tract infection (UTI) among adolescents which includes the general level of AKA and correlation between the domains as well as the relationship between Total AKA and the sociodemographic factors. **Methods:** A modified and adapted questionnaire was developed, consisting of socio-demographic questions and AKA domains employing descriptive statistics, linear regression and multiple regression analysis via SPSS Version 23.0. **Results:** In general, AKA level was reported as moderate (0.5 ± 0.11). Among the three domains, Knowledge (0.70 ± 0.12) risen with the most astounding mean, took after Awareness (0.36 ± 0.22) and Attitude (0.65 ± 0.11). A positive but weak correlation was found between the domains; Awareness and Knowledge is significant at $p = 0.034$, $r = 0.157$; $R^2 = 0.02$ and similarly, a weak correlation was also found between Knowledge and Attitude which is significant at $p = 0.000$, $r = 0.411$; $R^2 = 0.17$. After covariates adjustment, female gender was found to have the strongest relationship with Total AKA. **Conclusion:** The general level of Total AKA on UTI is moderate. The AKA domains in this study was found to be positively correlated and female was found to be the best predictor for a better Total AKA on UTI. Thus, these findings provide important information to formulate an effective education intervention to improve the AKA on UTI among adolescents.

Keywords: Urinary tract infection, Awareness, Knowledge, Attitude, Adolescents

Corresponding Author:
Neni Widiasmoro Selamat, PhD
Email: neni_widiasmoro@msu.edu.my
Tel: +603-5521 6480

INTRODUCTION

Micturition or also known as urination, involves expulsion of urine from the bladder, hence emptying the urinary bladder through the urethra to the exterior of the body (1). Urinary framework of healthy people is intended to keep urine from backing up to the ureters and kidneys from the urinary bladder and the stream of the urine from the bladder normally helps wash away any microorganisms (2). However, factors such as poor personal hygiene (3) or sexual intercourse would cause the organisms to travel up the urethra and may likewise contaminate the urinary bladder (4,5).

Urinary tract infection (UTI) is defined as microbial infiltration of the otherwise sterile urinary tract (6,7). Eventually, when infection in urinary system is not treated, infected individuals may only show rather vague symptoms (8) and may cause numerous of complications. The infection may encompass complications such as infection of the urethra (known as urethritis), bladder (known as cystitis), prostate (known as prostatitis) and kidney known as pyelonephritis (6,9).

Study by Akram, Shahid and Khan (10) and Harding and Ronald (11) estimated about 150 million people were diagnosed with this infection every year, and has been a significant factor causing global morbidity of untreated UTI cases from various age groups and genders (12–16). Nevertheless, despite occurring in all age group (2) the infections at a younger age are more dangerous due to asymptomatic infections.

In Malaysia, the study of UTI prevalence among adolescents have never been done before and previous studies that have been done on same population in other countries and regions were also limited. However, the findings of studies in other countries such as India and United States of America showed high prevalence of UTI (17,18). For instance, study done by Fouad and Boraie (19) found percentage of asymptomatic urinary abnormalities among adolescents in East of Egypt, Nile

Delta was higher in the first screening with a prevalence of 32.1%, which means that there is higher asymptomatic urinary infection that could be found in adolescents. In addition, previous study done in Malaysia involving population of men matured 40 and above found that the pervasiveness of lower urinary tract manifestations was found at 42.7% in which the severity of LUTS was analyzed in relation to their age group (20).

There were several AKA-based studies that was done previously in Malaysia (21,22). Population of rural in Peninsular Malaysia (East Coast region) was found to have contributed findings on the level of AKA on seizures in Malaysian population whereby the general level of AKA towards epilepsy was observed to be for the most part low simply like their awareness and knowledge (23). This finding of this study was actually supported by a previous study in northern Nigerian (24) which also found rather similar pattern of results. However, the outcome of a study that was done in Bandung, Indonesia were in contrast whereby the awareness level among the overall population was accounted for to be high (25).

This shows that the AKA level towards epilepsy was found to be varied between different communities and countries. Therefore, the difference of outcomes between these studies shows that different population and background possesses different outlook and level of AKA on a particular disease or condition. Moreover, to this date, there has been no literature on the data of adolescents' awareness, knowledge and attitude towards UTI.

Thus, this study aimed to be the first to describe the understanding of awareness, knowledge and attitude (AKA) level among government secondary school students in Shah Alam, Malaysia regarding urinary tract infection (UTI) and the correlation between the AKA domains. In addition, this paper also aimed to investigate the relationship between the Total AKA and sociodemographic factors.

MATERIALS AND METHODS

Study design and sample selection
This cross-sectional study was conducted over a three-month time span from August - October 2018. It was carried out in two government secondary schools in Shah Alam; Sekolah Menengah Kebangsaan Alam Megah 1 and Sekolah Menengah Kebangsaan Alam Megah 2 where both schools are located almost in between of both urban and rural area as it is about 11.9 km and 13.6 km respectively via Persiaran Tengku Ampuan. The respondents were chosen through multistage sampling which made up of two sampling stages. First, the government secondary schools in Shah Alam were chosen through purposive sampling because in Malaysia, majority of adolescent studied in this fully funded secondary school. Next, simple random

sampling was done on each classes of age 13, 14 and 16 years old registered in the two selected schools to prevent biasness. The sample size was calculated using a software method, known as Raosoft Sample Size Calculator (26,27). Given the population of the selected schools was around 250 students, the software suggested at least 125 respondents were required for this investigation with a response distribution of 80%.

Data collection procedure
After acquiring several approvals from; Management & Science University (MSU), Ministry of Education Malaysia and State Office of Education in Shah Alam, at the first meeting, the researcher asked for the school principal's approval to run the study in the selected schools. Then, potential respondents were defined as government secondary school students within the selected area of locality who met all the inclusion criteria: [1] student aged 13, 14 and 16 years old registered at secondary school in Shah Alam, [2] student with parent's consent and [3] student that understand either Bahasa Malaysia or English were set to be the inclusion criteria. In contrast, the exclusion criteria for the respondents were: [1] student aged 15 and 17 years old registered at secondary school in Shah Alam, (restriction of ethical approval given from Ministry of Education Malaysia, due to Public Examination), [2] student without parent's consent and [3] student that do not understand either Bahasa Malaysia or English. The information sheet regarding the study together with the parent's consent form was provided to the respondents to help upgrade their comprehension about the investigation as well as acquiring the approval from their parents. All subjects gave their parent's informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved on August 17 2018 by the University Ethics Committee of Research Management Center, MSU (MSU-RMC-02/FR01/08/L2/079).

Instrument
The instrument that was used in this research is a self-administered questionnaire that consists of closed ended questions which was used to collect relevant data to meet the research objectives. The questionnaire in this research consists of two sections which includes the screening and also the AKA section. Screening section composed of social demographic and also the screening questions. Second section consists of Awareness, Knowledge and Attitude (AKA) on urinary tract infection (UTI). Every section of the questionnaire was adapted and modified from previous studies. Part One (Awareness) consists of total 5 questions that measures the awareness level of the respondents. This part ask questions such as; "Have you ever heard or read on UTI?", "Have you ever attended a seminar or talk on UTI?" and "Have you ever discussed the problem of UTI in class?"(23). Part Two (Knowledge) recorded the respondents' knowledge on UTI based on 13 statements that includes the cause

of UTI, the risk factors as well as the treatment of UTI cases (23). Part Three (Attitude) documented 10 attitude statements for the respondents to answer which was adapted and modified by two previous studies (23,28). All sections in the questionnaire only requires simple responses (e.g. "Yes" or "No or "Not sure"/ "True" or "False") from the respondents (29). The scoring system of this questionnaire is uniform for every domain which was set within the range of 0 – 1. One score [1] were given to each correct answers given by the respondent, half mark [0.5] were given for uncertain answers and on the other hand, zero score [0] were given to false answers. For this study, the information in the research instrument was translated into Malay (29) language for local use. The translation process underwent two phases to maintain the content of the research items. Finally, there were also validation process which composed of six steps; establish face validity, pilot test, and clean data set, principle components analysis and Cronbach's Alpha. In the face validity process, there two steps were established; first, an individual who understands the topic well (microbiologist) validated the questionnaire. This step was done to validate the effectiveness of the questions in the questionnaire, that was distributed for the investigation. Second, for further validation process, psychometrician was needed to check any errors such as confusing, leading questions or double barreled that usually appear when creating a questionnaire. Next, pilot testing was done to survey on a subset of target population which is secondary school students around Shah Alam area. The process involves a small group of examinees that filled the questionnaire and feedback form on comments regarding any kind of errors or issues that was found in the questionnaire. The responses were acknowledged and then entered into a spreadsheet after performing pilot study and the data was cleaned. To continue the validation process, by using the principal components analysis (PCA), the components that are underlying was identified. The factors that were measured in the research was known as component or factor loadings. When it comes to the grouping factor loadings, the range was from -1.0 to 1.0, and the researcher focused on that values that are higher or equal to ±0.5. Furthermore, internal consistency of questions was found to be correlated between the questions loading onto the same factor. By this, the consistency of the responses received from the respondents was measured and identified. Cronbach's alpha was used for the standard test of internal consistency and the value given range from 0-1.0. The values of each AKA section and the Total AKA were greater than 0.70.

Statistical analysis

This study utilized Statistical Package for Social Sciences (Version 23.0) for data analysis. General AKA level was exhibited descriptively as mean and standard deviation. Subsequently, both Pearson Correlation and Multiple Regression Analysis was done to examine the correlation between AKA domains and investigate the relationship between Total AKA and sociodemographic factors, respectively.

RESULTS

Socio-demographic characteristics

Total respondents participated in this study were 136 (male students n=50 and female students n=86). The age involved in the study ranged from 13 to 16 years old. Majority of the respondents were Malay (92.6%), female (63.2%), and aged 16 years old (39.0%) that resided in urban area (95.6%). In contrast, the very least proportion of respondents consists of other races in Malaysia (1.5%) followed by male respondents (36.8%) and aged 14 years old (29.4%) that resided in rural area (2.9%). Further details are shown in Table I.

Table I: Distribution of respondents according to the socio-demographic data (n=136)

Variables	Categories	Frequency	Percentage (%)
Age	13 years old	43	31.6
	14 years old	40	29.4
	16 years old	53	39.0
Gender	Male	50	36.8
	Female	86	63.2
Residential Area**	Urban	130	95.6
	Rural	4	2.9
Race	Malay	126	92.6
	Chinese	2	1.5
	Indian	6	4.4
	Others	2	1.5

**Contains missing data (n≠136) thus total percentage ≠ 100%
**13 years old = Form 1; 14 years old = Form 2; 16 years old = Form 4

General AKA level

In general, the Total AKA level is found to be in moderate category (0.57 ± 0.11) with scores ranging from 0.0 – 1.0. Among the three domains, Knowledge (0.70 ± 0.12) risen with the most astounding mean, took after Awareness (0.36 ± 0.22) and Attitude (0.65 ± 0.11). According to the mean score of each domain, respondents are suggested to have high level of knowledge with moderate awareness and indifferent attitude towards urinary tract infections (UTIs). The three AKA levels were classified based on the maximum score of each domains, which are 1 (23). Then, the maximum score of 1 was divided to 3 (levels). Hence, mean value of < 0.33 indicated low/negative level of AKA, mean of 0.34 - 0.66 indicate a moderate/indifferent AKA and mean of > 0.67 indicate high/positive level of AKA. Further details were shown in Table II.

Positive Correlations between Awareness, Knowledge and Attitude domains

Pearson Correlation test was done between three domains with linear regression. Table III shows that the

Table II: Overall Awareness, Knowledge, Attitude and Total AKA level

Domain	Mean	Standard Deviation	Score Range	Interpretation
Awareness	0.36	0.22	0.0 – 1.0	Moderate
Knowledge	0.70	0.12	0.0 – 1.0	High
Attitude	0.65	0.11	0.0 – 1.0	Indifferent
Total AKA	0.57	0.11	0.0 – 1.0	Moderate

*Descriptive statistics
*Low / Negative : <0.33
*Moderate / Indifferent : 0.34-0.66
*High / Positive : >0.67

Table III: Pearson Correlation between Awareness, Knowledge and Attitude domains (n=136)

	Correlation (r)		
Pearson Correlation	Awareness	Knowledge	Attitude
Awareness	1		
Knowledge	*0.157	1	
Attitude	0.136	*0.411	1

*Significant level set at $p < 0.05$

correlation of Awareness and Knowledge is significant at $p = 0.034$. The state of positive linear correlation is weak between Awareness and Knowledge, $r = 0.157$; $R^2 = 0.02$. That being said, the total percent variance of Knowledge can be explained by 2% of variance of the Awareness score. Similarly, a weak correlation was also found between Knowledge and Attitude, $r = 0.411$; $R^2 = 0.17$ which is significant at $p = 0.000$. Hence, the total percent variance of Attitude can be predicted by 17% of variance of the Knowledge score.

Relationship between Total AKA and socio-demographic factors

From the univariate analysis, several sociodemographic factors; age ($r = 0.203$), female gender ($r = 0.263$) and Indian race ($r = -0.233$) were found to be statistically significant $p < 0.05$ [Table IV(A)], Then, multiple regression analysis (MRA) further shows that when compared to male gender, female gender significantly predicted higher Total AKA regarding UTI ($\beta = 0.216$, p < 0.05) while among the race, Indian was found to be significantly predicted lower Total AKA regarding UTI ($\beta = -0.177$, $p < 0.05$) when compared to Malay (reference group). Hence, after covariate adjustment using MRA, female gender was found to have the strongest relationship compared to other covariates [Table IV(B)]. All independent factors combined accounted for 14.8% of variability in Total AKA regarding urinary tract infection and no multicollinearity was found.

DISCUSSION

Most studies scrutinized on experimental studies elucidating the microbial aspect of UTI and over the years, there were only several studies of urinary

Table IV: Correlation matrix and Regression Analysis of Total Awareness, Knowledge and Attitude on Sociodemographic factors

A. *Correlation matrix of Total AKA and sociodemographic factors*

	Total AKA	Age	Female	Rural	Chinese	Indian	Other Races
Total AKA	1						
Age	*0.203	1					
Female	*0.263	0.120	1				
Rural	0.029	-0.063	-0.138	1			
Chinese	0.135	0.003	0.093	-0.021	1		
Indian	*-0.233	-0.133	-0.133	-0.037	-0.026	1	
Other Races	0.055	0.051	0.093	-0.021	-0.015	-0.026	1

B. *Regression of Total Awareness, Knowledge and Attitude (AKA) on Sociodemographic factors*

Variables	Unstandardized Coefficients	Standard Error	Standardized Coefficients	t	p-value
Age	1.260	0.670	0.156	1.882	0.062
Female	4.687	1.817	**0.216**	2.580	**0.011**
Rural	4.024	5.087	0.065	0.791	0.430
Chinese	9.676	7.084	0.112	1.366	0.174
Indian	-9.022	4.209	**-0.177**	-2.144	**0.034**
Other Races	2.191	7.089	0.025	0.309	0.758

*Significant level set at $p < 0.05$
a. Dependent Variable: Total Awareness, Knowledge and Attitude (AKA)

tract infections (UTIs) that have been done on the adolescent population. The aims of most of the studies often emphasizes on the prevalence of this infection. Therefore, these findings give idea on the epidemiology of UTIs among this adolescent alone. However, there have been no study done on this population in Malaysia. Similarly, study on the level of Awareness, Knowledge, Attitude or even Practice on UTI has also never been done before. Compared to other infections or conditions such as epilepsy, there have been study done on the AKA level on this condition of which was conducted among university students (30) and rural population in Malaysia. According to Neni et al. (23) public awareness, knowledge and attitude level towards epilepsy shifted between various groups in various nations. Besides that, their findings on AKA level also strongly suggested the need for further studies concerning on the local public awareness, knowledge and attitude regarding a specific infection or conditions.

Given that there has been no previous study of AKA level on UTI, this finding would be known to be the first insight of adolescents' awareness, knowledge, attitude and overall AKA level on this infection. The findings presented in the current study involving the adolescent population's general AKA level towards UTI was found to be generally moderate (mean ± 0.57). Similarly, both their Awareness (mean ± 0.36) and Attitude (mean ± 0.65) level were also moderate and indifferent, respectively. The moderate and indifferent category has a mean score ranging from to 0.33 to 0.66. The

similarity of awareness and attitude level can may be explained from previous study done among secondary school students in Malaysia on environment education. The study found out that there is a strong relationship observed between awareness and attitude among the respondents. Hence, same interpretation can be made of both awareness and attitude domains in this study (31). This finding could validate the importance and relevance of AKA study on any diseases and infections, especially UTI as it would show the relationship between the domain. On the other hand, the domain which possesses high score was the Knowledge of respondents. The contrast of knowledge from the other domains can also be explained and compared to the same study by which also found significant but weak relationship was found between knowledge and attitude.

Therefore, the same relationship trend between these domains can be observed. However, the high level of knowledge can be explained based on the fact that majority of the respondents are living in urban area (95.6%) compared to only (2.9%) from rural area (Table I). To further compare this finding, an AKA study done in Klang Valley, Malaysia on mental health which involved 15 urban areas and 15 rural areas found contrast results of low level of knowledge among the population (32). Thus, this would mean that the level of knowledge is influenced by the background of the respondents.

The weak correlation between Awareness and Knowledge domains in this study is supported by previous study regarding environmental education done on similar population of secondary school students in Malaysia (31). It might suggest that knowledge on UTI might not be dependent to the respondents' awareness regarding this infection. It is because despite lacking exposure to UTI or being unaware about it, these respondents might still be able to get knowledge on UTI from various other resources such as their educators, parents or even media (33). In addition, several other studies done on different populations from different countries and region also reported a similar correlation outcome between Knowledge and Attitude domains (34). These previous researches have shown that there is relationship between knowledge and attitude of an individual on a subject. That being said, a positive attitude about subjects can be predicted or increased when a high knowledge increased or possessed by an individual

After covariate adjustment, female gender (β = 0.216) shown to have the strongest relationship to Total AKA. Findings of sex-based differences were often reported on previous literature that involves the predictability of sociodemographic factors on various issues whereby female gender was often reported to performed better than male. According to Covassin et al. (35) both genders have been reported has performed differently memory-wise whereby female were significantly better

on verbal memory whilst male were significantly better on visual memory. Hence, in this study, female gender significantly predicted better Total AKA on UTI because they can benefit the written and spoken language more compared to male which would have performed much better with non-verbal memory (visual). Therefore, this finding would suggest the need for education animation video regarding UTI so that both genders would fully benefit from the intervention with the hope that their level of AKA would be improved.

In contrast, when compared to Malay race (reference group), Indian race (β = -0.177) was found to have a negative but significant relationship to Total AKA on UTI. Previous study done in Malaysia also had reported that Indian race are among the sociodemographic factors associated with cardiovascular disease risk factors (34) and globally there are several other papers that found significant race differences on; oral diseases (36). On the other hand, study done by Jansson, Nyamathi, Heidemann, Duan and Kaplan (34), found that race are not significantly related to patient advocacy engagement. Henceforth, the ability of race differences to predict a particular condition or illness are unclear and under studied in most cases. Therefore, in general, race differences may not be as clinically relevant in this study, but they should be considered when the results are interpreted.

There are several limitations of the study that needed to be acknowledged; first, the small sample size and second, exclusion of aged 15- and 17-years old students from the study would reduce the generalization of the adolescent population. Next, despite the use of simple random sampling on the sample size, the respondents' sociodemographic distribution such as the gender and residential background might have influenced the outcome of the results. Last but not least, there are some data that could have been collected which would helped figure out and explain the current AKA levels among the respondents, such as the parents' education background.

CONCLUSION

The level of Total AKA on UTI is moderate. Knowledge domain has risen with the most astounding mean, took after Awareness and Attitude, respectively. The correlation test between the domains showed positive but weak correlation between Awareness and Knowledge as well as Knowledge and Attitude. In addition, among the sociodemographic factors involved in this study, female gender significantly predicted Total AKA. The current level of adolescents' awareness, knowledge and attitude towards UTI would suggest the need for IT-based UTI education tool for the aim of improving the AKA level for adolescents not only in Malaysia but also for other countries and regions. This should represent the next focus of the future study which involve testing of health

educational methods that would aid the population on this matter.

REFERENCES

1. Marieb EN, Hoehn K. Human Anatomy & Physiology. 10th ed. Harlow, United Kingdom: Pearson; 2015. 1261 p.

2. VanMeter KC, Hubert RJ. Microbiology for the Healthcare Professional, 2nd Edition - 9780323320924 [Internet]. 2nd ed. Maryland Heights, Missouri: Elsevier Inc.; 2010. 296–302 p.

3. Gondim R, Azevedo R, Braga AANM, Veiga ML, Barroso Jr. U, Gondim R, et al. Risk factors for urinary tract infection in children with urinary urgency. Int braz j urol [Internet]. 2018 Apr [cited 2018 May 14];44(2):378–83.

4. Engelkirk Paul G., Duben-EngelkirkJanet L., Gwendolyn R., Burton Wilson. Burton's Microbiology for the Health Sciences [Internet]. 9th ed. Philadelphia, Pa.: Wolters Kluwer.; 2011. 297–299 p.

5. Winberg J, Andersen HJ, Bergstrum T, Jacobsson B, Larson H, Lincoln K. EPIDEMIOLOGY OF SYMPTOMATIC URINARY TRACT INFECTION IN CHILDHOOD. Acta Paediatr [Internet]. 1974 Nov 1 [cited 2018 May 14];63(s252):1–20.

6. Barber AE, Norton JP, Spivak AM, Mulvey MA. Urinary Tract Infections: Current and Emerging Management Strategies. Clin Infect Dis [Internet]. 2013 Sep 1 [cited 2018 May 12];57(5):719–24.

7. Fatima SS, Mussaed E Al. Urinary Tract Infection. In Springer, Singapore; 2018 [cited 2018 May 14]. p. 1–22.

8. Williams A, Jacobsen A. Pediatric and Adolescent Gynecology : Urinary Problems in Pediatric and Adolescent Gynecology Practice [Internet]. Cambridge University Press; 2018 [cited 2018 May 14]. 172 p.

9. Beyene G, Tsegaye W. Bacterial Uropathogens in Urinary Tract Infection and Antibiotic Susceptibility Pattern in Jimma University Specialized Hospital, Southwest Ethiopia. Ethiop J Health Sci [Internet]. 2011 Aug 26 [cited 2018 May 12];21(2):141–6.

10. Akram M, Shahid M, Khan AU. Etiology and antibiotic resistance patterns of community-acquired urinary tract infections in J N M C Hospital Aligarh, India. Ann Clin Microbiol Antimicrob [Internet]. 2007 [cited 2018 May 12];6(1):4.

11. Harding GKM, Ronald AR. The management of urinary infections; what have we learned in the past decade? Int J Antimicrob Agents [Internet]. 1994 Jun 1 [cited 2018 May 14];4(2):83–8.

12. Michaud JE, Gupta N, Baumgartner TS, Kim B, Bosemani T, Wang M-H. Cost and radiation exposure in the workup of febrile pediatric urinary tract infections. J Surg Res [Internet]. 2016 Jun 15 [cited 2018 May 12];203(2):313–8.

13. Flores-Mireles AL, Walker JN, Caparon M, Hultgren SJ. Urinary tract infections: epidemiology, mechanisms of infection and treatment options. Nat Rev Microbiol [Internet]. 2015 May 8 [cited 2018 May 21];13(5):269–84.

14. Becknell B, Schober M, Korbel L, Spencer JD. The diagnosis, evaluation and treatment of acute and recurrent pediatric urinary tract infections. Expert Rev Anti Infect Ther [Internet]. 2015 Jan 2 [cited 2018 May 12];13(1):81–90.

15. Spencer JD, Schwaderer A, McHugh K, Hains DS. Pediatric urinary tract infections: an analysis of hospitalizations, charges, and costs in the USA. Pediatr Nephrol [Internet]. 2010 Dec 14 [cited 2018 May 12];25(12):2469–75.

16. AL Freedman. Urologic diseases in North America Project: trends in resource utilization for urinary tract infections in children. J Urol [Internet]. 2005;(3):949-954.

17. Srivastava S. International journal of reproduction, contraception, obstetrics and gynecology. [Internet]. Vol. 7, International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2018 [cited 2018 May 14]. 1385–1388 p.

18. Selekman RE, Allen IE, Copp HL. Determinants of practice patterns in pediatric UTI management. J Pediatr Urol [Internet]. 2016 Oct 1 [cited 2018 May 14];12(5):308.e1-308.e6.

19. Fouad M, Boraie M. Prevalence of asymptomatic urinary abnormalities among adolescents. Saudi J Kidney Dis Transpl [Internet]. 2016 May [cited 2018 Apr 21];27(3):500–6.

20. Ho CCK, Ho C, Goh EH, Singam P, Tan GH, Bahadzor B, et al. Prevalence and awareness of lower urinary tract symptoms among males in the outpatient clinics of University Kebangsaan Malaysia Medical Centre. J Mens health [Internet]. 2011 Oct 1 [cited 2018 May 12];8(3):208–208.

21. Shaziman S bin, Rani M, Aripin K bin N. Assessing Nutritional Knowledge, Attitudes and Practices and Body Mass Index of Adolescent Residents of Orphanage Institutions in Selangor. Pakistan J Nutr [Internet]. 2017 [cited 2018 May 14];16(6):406–11.

22. Ghazali S, Islahudin F, Ismail G. Awareness of Human Papillomavirus (HPV) among School

Children in Johor, Malaysia. J Pharm Res Int Br J Pharm Res Turkey Ghazali al JPRI [Internet]. 2017 [cited 2018 May 14];1937068(192):1–7.

23. Neni SW, Latif AZA, Wong SY, Lua PL. Awareness, knowledge and attitudes towards epilepsy among rural populations in East Coast Peninsular Malaysia: a preliminary exploration. Seizure [Internet]. 2010 Jun 1 [cited 2018 May 12];19(5):280–90.

24. Kabir M, Iliyasu Z, Abubakar IS, Kabir ZS, Farinyaro AU. Knowledge, Attitude And Beliefs About Epilepsy Among Adults In A Northern Nigerian Urban Community. Ann Afr Med [Internet]. 2005 [cited 2018 May 13];4(3):107–12.

25. Gunadharma S. Public awareness, understanding and attitude towards epilepsy in Bandung, Indonesia. Neurol Asia [Internet]. 2004;9(1):133–4.

26. Azmin NS, Pardi KW. Knowledge of HPV and HPV Vaccination and The Associated Factor Among Primigravidas in A Tertiary Hospital. Int J Public Heal Clin Sci [Internet]. 2017;4(3):57–68.

27. Rajiah K, Maharajan M, Fang Num KS, How Koh RC. Knowledge about Human Papillomavirus and Cervical Cancer: Predictors of HPV Vaccination among Dental Students. West Asia Organ Cancer Prev [Internet]. 2017 Jun 1 [cited 2018 May 12];18(6):1573–9.

28. Neni SW, Latif AZA, Wong SY, Lua PL. Awareness, knowledge and attitudes towards epilepsy among rural populations in East Coast Peninsular Malaysia: a preliminary exploration. Seizure. 2010 Jun;19(5):280–90.

29. Thanavanh B, Harun-Or-Rashid M, Kasuya H, Sakamoto J. Knowledge, attitudes and practices regarding HIV/AIDS among male high school students in Lao People's Democratic Republic. J Int AIDS Soc [Internet]. 2013 Jan 1 [cited 2018 May 13];16(1):17387.

30. Sadiq MB, Syed-Hussain SS, Ramanoon SZ, Saharee AA, Ahmad NI, Noraziah MZ, et al. Knowledge, Attitude and Perception Regarding Antimicrobial Resistance and Usage Among Ruminant Farmers in Selangor, Malaysia. Prev Vet Med [Internet]. 2018 Apr [cited 2018 May 14];

31. Ab Rahman AF. Awareness and knowledge of epilepsy among students in a Malaysian university. Seizure [Internet]. 2005 Dec 1 [cited 2018 May 13];14(8):593–6.

32. Aminrad Z, Zarina S, Sayed Zakariya B, Hadi AS, Sakari M. Relationship Between Awareness, Knowledge and Attitudes Towards Environmental Education Among Secondary School Students in Malaysia. World Appl Sci J [Internet]. 2013

33. Malta DC, Oliveira MM de, Machado IE, Prado RR, Stopa SR, Crespo CD, et al. Características associadas a autoavaliazro ruim do estado de saьde em adolescentes brasileiros, Pesquisa Nacional de Saьde do Escolar, 2015. Rev Bras Epidemiol [Internet]. 2018

34. Jansson BS, Nyamathi A, Heidemann G, Duan L, Kaplan C. Predicting Patient Advocacy Engagement: A Multiple Regression Analysis Using Data From Health Professionals in Acute-Care Hospitals. Soc Work Health Care [Internet]. 2015

35. Covassin T, Swanik CB, Sachs M, Kendrick Z, Schatz P, Zillmer E, et al. Sex differences in baseline neuropsychological function and concussion symptoms of collegiate athletes * Commentary * Commentary. Br J Sports Med [Internet]. 2006 Sep 15 [cited 2019 Jan 27];40(11):923–7.

36. Bulgareli JV, Faria ET de, Cortellazzi KL, Guerra LM, Meneghim M de C, Ambrosano GMB, et al. Factors influencing the impact of oral health on the daily activities of adolescents, adults and older adults. Rev Saude Publica [Internet]. 2018 [cited 2019 Jan 27];52:44.