

Influencing factors of Drug Resistance Prevention Behavior of Nanyang Textile employees

Chadapat Sawandpornpen

*Assumption convent school
E-mail: chadapatbell@gmail.com*

Abstract

To assess drug resistance knowledge, attitude toward antibiotic usage and preventive behavior toward drug resistance. An online cross-sectional survey was conducted among 99 Thai adults who could access the internet. Drug resistance related knowledge, attitude and behavior toward drug resistance prevention were assessed. The differences between outcomes and socio demographic were analyzed through independent t-test and ANOVA. A generalized linear model was calculated to determine the predictive variables of preventive behaviors. Participants revealed moderate knowledge about drug resistance, correctly answering 5.8 (SD=1.46) questions in a total of 9 and favorable attitude (M=18.02, SD=2.47) and an average score of 51.89 (SD=5.09) of 12 behaviors in terms of always engaging in prevention, which was considered to be good. Knowledge about drug resistance had a positive correlation with preventive behaviors toward drug resistance ($r=-.199^{**}$, $p<0.01$). Having a positive attitude toward preventive behaviors of drug resistance predict the adoption of those preventive behaviors (Exp. $(\beta) = 0.212$, $p<0.05$). From the study, it was recommended to improve the level of drug resistance preventive behaviors, drug resistance related knowledge should be educated more for this group about behaviors toward antibiotic usage specifically.

Keywords: Drug resistance, Antibiotic resistance, Drug resistance preventive behavior

Methods

Participants and procedure

This was a cross-sectional observational study. An online questionnaire was purposely developed and available through Google Form between 1-May-20 and 6-May-20. All Nanyang textile employees who were eligible (for this study) were invited to participate in the study. The invitation was sent to employee's company emails. All participants can access to their company emails so they all receive an invitation. In this invitation inform about the objectives of the study as well as the ethical guarantee of confidentiality and anonymity in the data collected as stated in the informed consent were explained. Participation was completely free and voluntary and no personal data were collected from any participants.

Instrument

The questionnaire was developed based on a literature review including (1) Drug resistance, AMR, Antibiotics, mode of transmission, how to prevent from WHO, CDC] (2) studies performed on the same topic where several common items are used to assess each of the dimensions analyzed in this study.

A preliminary version of the instrument was reviewed by three experts to validate its content. A pre-test was then performed with a small sample of adults to test for comprehension and difficulty. All the questions remained without modifications. The psychometric characteristics of the questionnaire were tested, as described in the statistical analysis subsection.

The final version of the questionnaire contained 31 questions; 5 about socio demographic data (gender, age, education, position and income) and 26 items divided into 4 sections.

Knowledge about drug resistance: these sections consisted of 9 questions related to drug resistance, cause of antimicrobial resistance, antibiotic, misunderstanding about antibiotic and antibiotic guideline. The participants are asked to choose the correct answer from multiple choices of 4. One point was assigned to each correct answer, while providing an incorrect answer will be got zero points. The sum of all items was made by higher scores corresponded to a higher level of knowledge.

Attitude toward antibiotic use: this scale was composed of 5 items, and response categories consisted of a five-point liker scale (from 1-strongly disagree, to 5 agree) with the highest score corresponding to more positive attitudes toward following antibiotic guideline. Some items on the scale were inverted for the analysis. A sum of all the items was made to obtain a score. The "Attitude toward following antibiotic guideline" factor consisted of xx items and varied from 5 to 23 and the higher values corresponded to a more positive attitude toward following antibiotic guideline.

Preventive behaviors toward drug resistance: this scales referred to the number of preventive behaviors adopted and included 12 items consisting of drug preventive behaviors, hygiene, washing hands and antibiotic usage. The analyzed data reports to xx items. Each item was answered using a five-point scale (From 1-Never to 5-Always), with one point assigned to each behavior that was always practiced. The number of behaviors practiced was added up. A high score on this scale indicated good preventive behaviors, ranging from 12 to 60.

Statistical analysis

The analysis was performed using SPSS for windows, version 26 to analyze psychometric characteristics of the scales, an exploratory factor, using principal component analysis with varimax rotation, was carried out. Reliability is analyzed through the calculation of total item correlation coefficients and Cronbach's alpha (α) for the scales of the questionnaire. The descriptive variables (Knowledge, attitudes and behaviors) and the socio demographic characteristics, considering the sample size, independent t-test and the ANOVA are used as appropriate. The correlations between the outcomes of the study are calculated by Pearson's correlation. Lastly, a generalized linear model was calculated to determine the predictive variables of the preventive behaviors. Exp. (β) and the respective 95% confidence intervals (95% IC) are presented. Statistical significance was defined as $p < 0.05$.

Ethical Considerations

This research applies an anonymous data collection method to collect data by using Google form. The invitation was sent by email to the Nanyang textile employees. These invitations inform about the study's objectives and the ethical guarantee of confidentiality and anonymity in the data collected as stated in the informed consent was explained. Participation was completely free and voluntary, and no personal data were collected from any participants.

Result

99 samples from questionnaire are female 64 persons (64.6%), male 35 persons (35.4%). Age group 36-45 years ($n=36$, 36.4%), age group over 50 years ($n=32$, 32.3%) and age group 46-50 years, with 13 (13.1%) age 26-35 years old, there are 10 persons (10.1%), and the group under 25 years old is 8 persons (8.1%). Most of samples have a bachelor's degree ($n=71$, 71.1%), 14 persons with a master's degree (14.1%). There are 12 persons who graduated from vocational school (12.1%) and 2 PhD graduates (2.1%). The positions are mostly general employees ($n=63$, 63.6%), 15 persons working as sections managers (15.2%), 11 persons working as department managers (11.1%), and directors are 10 persons (10.1%). Samples in wage 20,001- 40,000 baht per month ($n=43$, 43.4%), wage more than 40,000 baht per month are 42 persons (42.4%), and less than 20,000 baht per month are 14 persons (14.1%).

The respondents have a moderate level of knowledge about drug resistance with the mean score average of 5.8 ($SD=1.46$) Females have a higher mean score than males ($M=5.89$, $SD=1.30$). Males have a knowledge of drug resistance at 5.71 ($SD=1.62$). Age group 46-50 years have a knowledge of drug resistance. The highest mean ($M=6.54$, $SD=0.88$), followed by the age group under 25 years with a mean knowledge score on drug resistance of 6.00 ($SD=2.33$). The age group of 36-45 years have a knowledge of drug resistance score on the mean of 5.89 ($SD=1.28$). The age group over 50 years have a mean knowledge score on drug resistance 5.63 ($SD=1.41$). The age group 26-35 years old have a mean knowledge score on drug resistance 5.20 ($SD=1.40$). A group of respondents who graduated with a Ph.D. have the highest average knowledge about drug resistance ($M=8.00$, $SD=1.41$), followed by those with a master's degree which have a mean knowledge score on drug resistance 6.14 ($SD=1.66$) among those with a bachelor's degree. The respondents had a mean knowledge score on drug resistance at 5.77 ($SD=1.39$). The group of people who graduated with vocational certificate/high vocational certificate have a mean knowledge about drug resistance of 5.42 ($SD=1.00$) working as a director of the company is the group which have the highest average knowledge about drug resistance ($M=6.20$, $SD=1.55$), followed by those who worked in the company's general staff position with 5.90 ($SD=1.46$) with an average of 5.82 ($SD=0.87$), those working as department managers had a mean knowledge score of 5.72 ($SD=1.44$). The highest mean drug resistance ($M=5.98$, $SD=1.33$) 20,001-40,000 baht per month, with a mean knowledge score on drug resistance 5.72 ($SD=1.58$), and those with income less than 20,000 baht per month had a knowledge about drug resistance average 5.71 ($SD=1.14$).

We found that attitudes for antibiotic usage had a good score ($M=18.02$, $SD=2.47$), with males having higher attitude scores on antibiotics usage than females ($M=18.23$, $SD=2.49$) the females have a mean antibiotic usage attitude score of 17.81 ($SD=2.46$). Ages group 26-35 have the highest mean antibiotic attitude scores ($M=18.30$, $SD=2.63$), followed by those age group over 50 ($M=18.25$, $SD=1.83$). Those aged group 36- 45-year-

olds have a mean antibiotic attitude score of 18.06 (SD=2.44), age group 46-50 have a mean antibiotic attitude score of 17.23 (SD=3.98), under 25 years old have a mean antibiotic attitude score of 17.13 (SD=2.57). Master's and doctoral studies have the highest average antibiotic attitude scores (M=18.50, SD=2.03) (M=18.50, SD=0.71). High Vocational Certificates have a mean antibiotic usage attitude score of 18.00 (SD=2.56) and those with a bachelor's degree have antibiotic usage attitude score of 17.82 (SD=2.57). Department managers had the highest average antibiotic usage attitude scores (M=18.93, SD=1.83), directors have the average antibiotic usage attitude scores. 18.60 (SD=1.58), section managers have a mean antibiotic usage attitude score of 17.91 (SD=1.64), and employed in general staff positions have a mean antibiotic usage attitude score of 17.63 (SD=2.76). Wages greater than 40,000 baht per month have the highest average antibiotic usage attitude scores (M=18.40, SD=1.67), followed by those with higher incomes, less than 20,000 baht per month have an average antibiotic usage attitude score of 18.36 (SD=1.55). 20,001-40,000 baht per month, with an antibiotic attitude usage score of 17.40 (SD=3.18).

Behavioral aspect of preventing drug-resistant infections is found that a good level of anti-infection behavior score (M=51.89, SD=5.09). Males have a higher mean score on anti-infection prevention behavior than females (M =52.20, SD=5.31). The females have a mean score of 51.58 in the prevention of drug-resistant infection (SD=4.88). Age group over 50 years have the highest mean scores on anti-infection prevention behavior (M=52.50, SD=4.46), age group 46-50 years who have an average drug-resistant infection prevention behavior scores 52.38 (SD=5.27), age group 36-45 years have a mean score on prevention of drug-resistant infection of 52.25 (SD=4.19), age group under 25 years have a mean score on prevention of drug-resistant infection 49.38 (SD=7.07) and age group 26-35 years have a mean score of 49.10 (SD=6.72) in the prevention of drug-resistant infection behaviors. Samples who graduated with doctorate degrees have the highest average scores on drug-resistant infection prevention behaviors (M=55.50, SD=2.12), graduated with vocational certificate/high vocational certificated in prevention of drug-resistant infections was 54.00 (SD=3.38), with a master's degree have a mean score 52.36 (SD=4.85) for anti-infection prevention behaviors and with a bachelor's degree have a mean score on prevention of drug-resistant infections of 51.21 (SD = 5.23) who work as department managers, have the highest average scores on drug-resistant infection prevention behaviors (M=53.27, SD=3.72), followed by those who work in general staff positions with a mean score on drug prevention behavior of 51.75 (SD=5.25), working as department managers have average score on prevention drug-resistant infections of 51.73 (SD=5.26) and who work in the director position have a mean score for prevention of drug-resistant infections of 50.60 (SD=4.67). Wages of more than 40,000 baht per month have the highest average drug-resistant infection prevention behavior score (M=52.55, SD=4.88), followed by those whose income was less than 20,000 baht per month have the prevention behavior score of 51.79 (SD=4.17) and those with income 20,001-40,000 baht per month, with a mean score on preventing drug-resistant infections of 51.07 (SD=5.39).

Table 1.

Differences in outcomes according to the socio demographic characteristics of participants (N=99)

Socio demographic characteristic		Knowledge about Drug Resistance n (Range 0-9)		Attitude toward Antibiotic Usage N (Range1-21)		Drug Resistance Preventive Behavior n (Range1-60)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Gender	N (%)	5.8	1.46	18.02	2.47	51.89	5.09
male	35 (35.4)	5.71	1.62	18.23	2.49	52.20	5.31
female	64 (64.6)	5.89	1.30	17.81	2.46	51.58	4.88
Age							
< 25	8 (8.1)	6.00	2.33	17.13	2.53	49.38	7.07
26-35	10 (10.1)	5.20	1.40	18.30	2.63	49.10	6.72
36-45	36 (36.4)	5.89	1.28	18.06	2.24	52.25	4.19
46-50	13 (13.1)	6.54	0.88	17.23	3.98	52.38	5.27
> 50	32 (32.3)	5.63	1.41	18.25	1.83	52.50	4.46

Educational level							
Vocational college	12 (12.1)	5.42	1.00	18.00	2.56	54.00	3.38
Bachelor's degree	71 (71.1)	5.77	1.39	17.83	2.57	51.21	5.23
Above bachelor's degree	14 (14.1)	6.14	1.66	18.50	2.03	52.36	4.85
Position							
Staff	63 (63.6)	5.90	1.46	17.63	2.76	51.75	5.25
Section Manager	15 (15.2)	5.27	1.44	18.93	1.83	51.73	5.26
Department Manager	11 (11.1)	5.82	0.87	17.91	1.64	53.27	3.72
Director	10 (10.1)	6.20	1.55	18.60	1.58	50.60	4.67
Income(Baht)							
<20,000	14 (14.1)	5.71	1.14	18.36	1.55	51.79	4.17
20,001-40,000	43 (43.4)	5.72	1.58	17.40	3.18	51.07	5.39
>40,000	42 (42.4)	5.98	1.33	18.40	1.67	52.55	4.88
Total	99(100)	5.8	1.46	18.02	2.47	51.89	5.09

From the Pearson Correlation analysis, it was found that knowledge of drug-resistance was positively correlated between knowledge of drug-resistance and antimicrobial behavior statistic significantly. ($r=.199^*$, $p<0.01$) (Table 2).

Table 2. Pearson's correlation coefficient between the study outcomes

Variables	Knowledge about Drug resistance	Attitude toward Antibiotic usage	Drug resistance Preventive Behavior
Knowledge about drug resistance	1		
Attitude toward antibiotic use	-.078	1	
Drug resistance preventive behavior	.199*	.002	1
**Correlation is Significant at the 0.01 *Correlation is Significant at the 0.05			

From the analysis of the Generalized linear model, it was found that the variables that had the power to predict behavior in the prevention of drug-resistant pathogens. The best respondents of this group of respondents were Knowledge and understanding of drug-resistant bacteria {(Beta = .212, $p\text{-value}<0.01$,)} age ($r= .203$, $p\text{-value}<0.01$)

Table 3. Generalized linear model predicting preventive behaviors of drug resistance.

	B	SE	EXP (β)	Sig (p)
Intercept	45.995	5.408		.000
Gender	-.831	1.140	-.080	.468
Age	.804	.441	.203	.072
Educational level	-.455	.943	-.053	.631
Position	-.830	.659	-.170	.211
Income	.723	.937	.101	.443
Knowledge about drug resistance	.753	.368	.212	.043
Attitude toward antibiotic use	.035	.206	.017	.864
R = .312, R Squared = .097				

Discussion

From the study; knowledge level, attitude and antimicrobial behavior of employees of Nanyang Textile Company found that most of them had an intermediate level of knowledge about drug-resistant bacteria. Due to hard question in questionnaire, respondents can't understand because it is out of the company product field, which Nanyang Textile Company Limited is a company dealing with the production and distribution of yarn. Nanyang Textile Company does not sell and manufacture products related to antibiotics. As a result, employees are knowledgeable in the field of intermediate antibiotics. The level of attitude towards the use of antibiotics was found to be at a high level, possibly because Nanyang Textile Company is a large and reliable company, resulting in a large number of customers to buy products. As a result, employees must be committed and responsible for their work. Stress also affects the body such as headaches, body aches and rapid heartbeats, forcing employees to take medication to get back to work as quickly and efficiently as possible. However; in order not to have the body to be worse than before, most employees choose to take antibiotics prescribed by a doctor or pharmacist and avoid buying antibiotics for themselves and stay clean. Most of the respondents have a high level of antimicrobial protection behaviors. Employees at Nanyang Textile Company are upset and may take antibiotics frequently. They have an experience in taking antibiotics, therefore their behaviors in preventing antibiotics-resistant infections are at a high level.

An analysis of the relationship between Pearson's correlation variables revealed that knowledge of drug-resistant bacteria was positively correlated between knowledge of drug-resistant and antimicrobial behavior in statistically significant.

The study of affecting factors in antibiotic use behavior from 120 patients in Khlung Hospital, Chanthaburi Province by Suwat Porisutiwutiporn and Monthana Hemchayat [8] found that age, education, medication advice and antibiotics knowledge are factors that affects the behavior of drug usage. Knowledge was the most powerful predictor of behavior with statistical significance. A positive result which is consistent with the employees of Nanyang Textile Company with moderate knowledge of antibiotics and age, education level and receiving advisee on antibiotic use is a statistically insignificant factor. The respondents have a good antibiotic usage behavior score and have a moderate antibiotic knowledge score. The respondents lacked of knowledge of antibiotic storage. There is a misconception that antibiotics are anti-inflammatory and lack of knowledge on how to store them.

Jidapha Ratanathaworn[9] studied on factors affecting antimicrobial behavior of students in grades 4-6 in Bangkok. It was found that the respondents had a high level of knowledge, attitude and antimicrobial behavior. Because the content of drug resistance is taught at the 4th grade level. The students have a high level of attitude towards antibiotic usage, possibly because they were still in their student years. When did you learn? or have been taught to believe and follow more than any other ages. The behavior of prevention of drug-resistant infections was at a high level because the students had learned about drug resistance in the health education course. Therefore, students have knowledge about drug resistance. This knowledge effects on students to have good behavior in preventing drug-resistant infections. Furthermore, Triam Udom Suksa School is a highly competitive school that requires students to have knowledge and diligence, thus giving students a lot of knowledge around them.

Nannapas Tonginta and Sujimon Mungkalarungsi[10] studied factors that influenced on drug resistance preventative behavior of high school teachers in Bangkok and found that respondents had middle level of Antibiotics Resistance level because the knowledge of drug-resistance is quite specific. Without a degree in biology or health sciences, it may be difficult to answer questions. Only 60.4% of teachers at Satri Witthaya School who teach science-mathematics lesson plans. Teachers with a science degree in physics may be less knowledgeable about drug-resistance than teachers with science degrees in biology and chemistry. Attitudes towards the prevention of drug-resistant infections are at a high level. A teacher is a career that must be a good role model. Moreover, according to the teachings of Buddhism mentions, the characteristics of a good teachers being regarded as a person of great conduct who deserves respect.

Limitation

Collecting data with an online form, respondents may use the Internet to find answers. During the COVID-19 outbreak, the lockdown protocol and working or studying from home make respondents may not contract the disease. Data were collected from the study group of companies; the difficulty level of the questionnaire was the level of general knowledge for the people.

Conclusion

From 99 persons there had knowledge of germs is at an intermediate level. Attitudes about antibiotics are at a good level and behaviors related to the incidence of drug-resistant infections were at a good level. From Pearson's correlation analysis, it was found that knowledge of drug-resistant bacteria was positively correlated with antimicrobial behavior ($r=199^*$, $p<0.05$) with statistical significance. From the analysis of the generalized linear model to find the factors predicting the behavior of drug-resistant bacteria, it was found that knowledge of drug-resistant bacteria was the predictive factor for the prevention of drug-resistant bacteria ($EXP(\beta) = .212$, $p=0.05$)

Reference

- [illegible]