



Universiti Malaysia
KELANTAN

**STUDY ON AWARENESS OF MICROBEADS
POLLUTION FROM PERSONAL CARE
PRODUCTS**

by

AIN NAJWA BINTI ABD LATIF

A report submitted in fulfilment of the requirements for the degree of
Bachelor of Applied Science (Sustainable Science) with Honours

**FACULTY OF EARTH SCIENCE
UNIVERSITI MALAYSIA KELANTAN**

2020

DECLARATION

I declare that this thesis entitled Study On Awareness Of Microbeads Pollution From Personal Care Products is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : _____

Name : Ain Najwa Binti Abd Latif

Date : 9th January 2020

UNIVERSITI
MALAYSIA
KELANTAN

ACKNOWLEDGEMENT

First I pay my gratitude to the almighty Allah for giving me the ability to work hard successfully.

Words actually will never be enough to express of my gratefulness. I will try my best to express my gratefulness towards some people. I would like to express my gratitude and respect to my supervisors Dr. Nor Shahirul Umirah bt Idris and Ms. Nur Hanisah binti Abdul Malek. Their constant guidance and advice in helping me finishing my final year project on Study On Awareness Of Microbeads Pollution From Personal Care Products really helped me a lot. They always advise me and shared their knowledge that were crucial in making this research paper flawless as possible.

I am indebted to Dr. Muhamad Azahar bin Abas and Mr. Nor Hizami bin Hassin that help me in recognizing my mistake and sharing additional information. Advice from Dr. Azahar and Mr. Hizami help me a lot in improving my understanding towards my research. I am also indebted to my fellow classmates especially Nurul Farah Hanim binti Hawari, Siti Nur Faiqah binti Mohamad Ghazali and Nur Liyana binti Zubairy for being a supportive friends that always encouraging me to keep doing my best.

Finally, my deep and sincere gratitude to my parents, Mr. Abd Latif bin Kaliman and Mrs. Wan Nor Azan binti Wan Othman, my siblings and also my family members for their continuous support, help, encouragement and for always being there for me. I dedicate this milestone to them.

Study On Awareness Of Microbeads Pollution From Personal Care Products

ABSTRACT

Microbeads are synthetic organic polymers that usually found in personal care products such as exfoliating body washes, facial scrub and sunscreen. Due to size of microbeads are smaller than 5 millimetre, they are unable to be filtered by wastewater treatment plant. This can be resulted in microbeads pollution which is harmful to environment and also human health. Thus, by studying the awareness of students in UMK Jeli Campus on microbeads pollution can help in improving awareness among students and also reduce the usage of personal care products which contain microbeads. Therefore, this study aims to analyze the knowledge on microbeads pollution towards their attitudes in choosing personal care products and evaluate students' perceptions on personal care products containing microbeads. The method used in this study is survey by using questionnaire. The stratified random sampling method is used where the students are divided based on their faculty. The percentage of students that have knowledge on microbeads pollution are 65.43 %. The percentage of students that practicing good attitudes in choosing personal care products are 65.51 %. Meanwhile the percentage of students that concerned on microbeads pollution are 75.68 % and the percentage of students that aware on microbeads pollution are 72.96 %. The results showed that students have good knowledge on microbeads pollution and concerned on microbeads pollution. However, their attitudes in reducing the used on microbeads are lower than their awareness on microbeads pollution issues.

UNIVERSITI
MALAYSIA
KELANTAN

Kajian Kesedaran Mengenai Pencemaran Manik Mikro Daripada Produk Penjagaan Diri

ABSTRAK

Manik mikro adalah polimer organik sintetik yang kebanyakannya digunakan dalam produk penjagaan diri seperti pembersih badan, scrub muka dan pelindung matahari. Saiz manik mikro ialah lebih kecil daripada 5 milimeter dan tidak dapat ditapis oleh loji rawatan air kumbahan. Hal ini mengakibatkan terjadinya pencemaran manik mikro yang berbahaya kepada alam sekitar dan juga kesihatan manusia. Oleh itu, dengan mengkaji kesedaran mengenai pencemaran manik mikro pelajar UMK Kampus Jeli dapat membantu meningkatkan tahap kesedaran di kalangan pelajar dan juga mengurangkan penggunaan produk penjagaan diri yang mengandungi manik mikro. Kajian ini bertujuan untuk menganalisis pengetahuan pelajar terhadap pencemaran manik mikro, sikap pelajar dalam memilih produk penjagaan diri dan juga persepsi pelajar terhadap produk penjagaan diri yang mengandungi manik mikro. Kaedah yang digunakan dalam kajian ini ialah kaedah kaji selidik dengan menggunakan soal selidik. Kaedah pensampelan rawak berstrata digunakan di mana pelajar dibahagikan berdasarkan fakulti. Peratusan pelajar yang mempunyai pengetahuan mengenai pencemaran manik mikro adalah 65.43 %. Peratusan pelajar yang mengamalkan sikap yang baik dalam memilih produk penjagaan diri adalah 65.51 %. Sementara itu, peratusan pelajar yang mengambil tahu mengenai pencemaran manik mikro adalah 75.68 % dan peratusan pelajar yang mempunyai kesedaran mengenai pencemaran manik mikro adalah 72.96 %. Hasil daripada kajian ini menunjukkan bahawa pelajar mempunyai pengetahuan yang baik mengenai pencemaran manik mikro dan mengambil tahu mengenai pencemaran manik mikro. Walau bagaimanapun, sikap mereka dalam mengurangkan penggunaan manik mikro adalah lebih rendah daripada kesedaran mereka terhadap isu pencemaran manik mikro.

UNIVERSITI
MALAYSIA
KELANTAN

TABLE OF CONTENT

	PAGE
DECLARATION	i
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
ABSTRAK	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURE	viii
LIST OF ABBREVIATIONS	ix
LIST OF SYMBOL	x
CHAPTER 1 INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Objective	3
1.4 Scope of Study	3
1.5 Significance of Study	4
CHAPTER 2 LITERATURE REVIEW	
2.1 Personal Care Products	5
2.2 Microbeads Pollution	6
2.3 Knowledge on Microbeads Pollution	7
2.4 Attitudes in Choosing Personal Care Products	7
2.5 Perception on Microbeads in Personal Care Products	8

2.6	Awareness on Microbeads Pollution	9
2.7	Application of Analysis for Awareness	11
2.7.1	T-test	11
2.7.2	Analysis of Variance (ANOVA)	11
2.7.3	Correlation Analysis	12
CHAPTER 3 MATERIALS AND METHODS		
3.1	Study Area	13
3.2	Sample Size	14
3.3	Sampling Method	15
3.4	Questionnaire Design	16
3.5	Content Validation	16
3.6	Pilot Test	17
3.7	Normality Test	18
3.8	Data Analysis	18
3.8.1	T- Test	18
3.8.2	Analysis of Variance (ANOVA)	19
3.8.3	Pearson's Correlation Analysis	19
CHAPTER 4 RESULTS AND DISCUSSIONS		
4.1	Demographic Information	21
4.2	Knowledge on Microbeads Pollution	24
4.3	Attitudes in Choosing Personal Care Products	27
4.4	Perception on Microbeads in Personal Care Products	31
4.5	Awareness on Microbeads Pollution From Personal Care Products	34
4.6	Correlation Between Knowledge, Perception, Attitudes and Awareness	37

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS

5.1	Conclusion	39
5.2	Recommendations	40
	REFERENCES	41
	APPENDIX A	45



UNIVERSITI
MALAYSIA
KELANTAN

LIST OF TABLES

No.	TITLE	PAGE
3.1	Table for determining sample size from a given population.	15
3.2	The result of Pilot Test	17
3.3	The result of Normality Test	18
4.1	Distribution of respondents by faculty.	22
4.2	Knowledge on microbeads pollution.	25
4.3	Students' knowledge based on gender and residential area.	25
4.4	ANOVA of students' knowledge based on age, faculty, year of studies and courses.	26
4.5	Attitudes in choosing personal care products.	29
4.6	Students' attitudes based on gender and residential area.	29
4.7	ANOVA of students' attitudes based on age, faculty, year of study and courses.	30
4.8	Perception on microbeads in personal care products.	32
4.9	Students' perception based on gender and residential area.	32
4.10	ANOVA of students' perception based on age, faculty, year of study and courses.	33
4.11	Awareness on microbeads pollution from personal care products.	35
4.12	Students' awareness based on gender and residential area.	36
4.13	ANOVA of students' awareness based on age, faculty, year of study and courses.	36
4.14	Correlation between knowledge, perception and attitudes towards awareness.	38

LIST OF FIGURE

No.	TITLE	PAGE
3.1	The location of study area.	14
4.1	The number of students against gender and age.	23
4.2	The number of students against year of study and residential area.	23

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
FBKT	Faculty of Bioengineering and Technology
FIAT	Faculty of Agro Based Industry
FSB	Faculty of Earth Science
UMK	Universiti Malaysia Kelantan
SBF	Food Security Course
SBH	Husbandry Science Course
SBL	Agro technology Course
SBP	Product Development Technology Course
SBT	Bio industrial Technology Course
SEB	Material Sciences Course
SEG	Geosciences Course
SEH	Forest Resources Management Course
SEL	Sustainable Science Course
SEN	Natural Resources Science Course

UNIVERSITI
MALAYSIA
KELANTAN

LIST OF SYMBOL

α	Alpha
$>$	Greater than
$<$	Less than
\geq	Equal and more than
\leq	Equal and less than
%	Percentage
N	Frequency
N	Population size
p	Significant value
S	Sample size
n	Number of pairs data
r	Correlation coefficient
$\sum xy$	Sum of the products of paired data
$\sum x$	Sum of x data
$\sum y$	Sum of y data
$\sum x^2$	Sum of squared x data
$\sum y^2$	Sum of squared y data

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Microbeads, tiny bits of plastic or synthetic organic polymers mostly can be found in exfoliating personal care product such body washes, facial scrub, shampoo and also sunscreen. Microbeads are known as microplastic produce by cosmetic and non-prescription drug products with size smaller than 5 millimetre (Duis & Coors, 2016). However, wastewater treatment plants unable to filter microbeads that flows in drains as the size are too small. Thus, microbeads are able to flows into aquatic system. The accumulation of microbeads in water will caused environmental issues as it create microbeads pollution and plastic debris.

The awareness on microbeads pollution began in 2012 and many countries starts making policy to ban the usage of microbeads in personal care products and cosmetic. However, some parts in Malaysia ban the usage of single-use plastic such as groceries plastic bag and polystyrene food packaging but not microbeads. The awareness of Malaysian towards microbeads should be enhance especially students in college to avoid microbeads pollution that end up entering our food chain.

The knowledge on microbeads towards attitudes and perception on choosing personal care products among University Malaysia Kelantan (UMK) Jeli Campus students will be evaluated by conducting the survey in order to study their awareness

on microbeads pollution. Towards improving the awareness among UMK students, their level of understanding on the effect of microbeads should be determined to get the best approach to improve their awareness.

1.2 Problem Statement

Microbeads in personal care products is one of the environmental issue as they can causes microbeads pollution (Lei *et al.*, 2017). The existence of microbeads in river and ocean able to kill marine life as they bringing harmful chemicals into the aquatic food chain. However, in Malaysia the awareness of microbeads pollution still in doubt. Malaysian only focus on reducing the single-use plastics that mostly being used for food packaging and groceries plastic bags. This situation is caused by lack of awareness in community and students (University of Plymouth, 2016). The poor level of awareness is resulted from lack of knowledge, poor practices and individual perception on products containing microbeads.

The awareness from the consumers are crucial as usage of personal care products in daily life are increasing every year. The consumers' knowledge is fundamental as the manufacturing of microbeads products depends on the market demand. The factors that influence consumer attitude in choosing products are based on their knowledge and justified belief (Norazah, 2016). The microbeads pollution can be reduced when the awareness on microbeads pollution increases. The young generation should be emphasized because they are pioneer in creating healthy lifestyle by choosing eco-friendly product. Thus, it is significant to evaluate the awareness level of UMK Jeli Campus students on microbeads in personal care products.

1.3 Objectives

The objectives of this study are as following:

- i. To analyse the knowledge on microbeads pollution among UMK Jeli Campus students.
- ii. To analyse the attitudes in choosing personal care products among UMK Jeli Campus students.
- iii. To analyse the perception on personal care products containing microbeads among UMK Jeli Campus students.

1.4 Scope of Study

The study on awareness of microbeads in personal care products was conducted among UMK Jeli Campus's students. The questionnaire were distributed to the Faculty of Earth Science (FSB), Faculty of Agro Based Industry (FIAT) and Faculty of Bioengineering and Technology (FBKT) students. The purpose of the questionnaires is to obtain students' knowledge on microbeads pollution, the attitude in choosing personal care products and their perception on personal care products containing microbeads. The data collection were analysed using Statistical Package for Social Sciences (SPSS) version 20.0 software and the correlation between the dependent and independent variables were determined.

1.5 Significance of Study

The students' awareness on environment are crucial as students are knowledgeable individual that will lead the country towards sustainable development. In this study, students' knowledge towards their attitudes in choosing personal care products and perception on microbeads products were evaluated. Result from this research can be used by other researchers to educate students on microbeads pollution and to determine the suitable approach to increase awareness on the danger posed by microbeads. Thus, this research is significant in improving students' awareness and reducing microbeads pollution that eventually give benefits to community.

CHAPTER 2

LITERATURE REVIEW

2.1 Personal Care Products

Personal care products (PCP) are products that used by consumer for personal hygiene and for beauty purpose. PCP includes cotton swabs, facial cleanser, body wash and shampoo. PCP containing a lot of chemicals that helps in managing personal hygiene. The ingredients for PCP must be followed the guidelines from Food and Drug Administration (FDA). FDA is responsible in ensuring the safety of public health in term of food supply, cosmetic and products that contain chemicals (U.S Food and Drug Administration, 2018).

FDA has banned some chemicals that threat public health and limit the use of some chemicals to reduce public health's risk. The ingredients that restricted to be used in PCP are mercury compounds, bithionol and etc. (U.S Food and Drug Administration, 2018). United State FDA also prohibit the use of microbeads in PCP as stated in The Microbead-Free Waters Act of 2015 (U.S Food and Drug Administration, 2018). Most of the prohibited ingredients are carcinogenic that causes cancer to human and even animals. Some of the ingredient causes hormonal disruption and organs damaged.

FDA does not test every product that being manufacturing. FDA only listed the approval ingredients and it is companies' responsible to sale only safe products. There

are some company that does not follow the guidelines from FDA. Thus, every PCP required ingredients label that listed the ingredients from highest to lowest quantity. This label helps the customers to check the ingredients and taking care of their health by themselves. Some of the consumer has allergy to certain ingredients, thus this helps consumers to identify whether that products are suitable or not for them.

2.2 Microbeads Pollution

Microbeads are widely can be found in personal care products and cosmetic. The size of microbeads are too small to be filtered during treatment process in sewage treatment plant. The microbeads that passed through the drainage and sewage treatment will flow to the water sources such as river and ocean. The microbeads pollution will first affect marine organisms as they might be ingesting microbeads and caused difficulties in digestion. Microbeads that being ingested by fish will eventually enter our food chain. The past study in Tokyo Bay found that 49 from 64 Japanese anchovy were detected to ingest plastic and 11 of them were detected to ingest microbeads (Tanaka & Takada, 2016). The irregular shape of microbeads can damaged and clogged intestinal tract of marine organism especially small marine organisms such as planktivorous.

Microbeads are made by hazardous chemical and also one of pollution agent. Microbeads are made of plastic and are able to bioaccumulate. Microbeads absorb hydrophobic organic pollutants such as polychlorinated biphenyls (PCBs) and hexachlorinated hexanes (Napper *et al.*, 2015). The previous research found that phenanthrene and nonylphenol were detected in lugworm's tissues after being exposed to microplastic for 10 days (Browne *et al.*, 2013). Thus, it is proven that chemical

compounds in microbeads absorbed pollutants and transferred the pollutants to organisms' tissue.

2.3 Knowledge on Microbeads Pollution

The information on microbeads are abundant as there are a lots of books, journals, short articles and online reading materials that discuss on the definition, properties, manufacturer and the negative effect of microbeads towards environment and public health. University students are provided with reading materials at their university's library. Every students get to access, to read and borrow books from library, and also able to surf internet to seek information about the microbeads.

The previous study on knowledge among students in Annamalai University, India found that less than half students have good knowledge on plastic (Srinivasan *et al.*, 2019). The students at Annamalai University are studying on agriculture, engineering, medicine, dentistry and physiotherapy. Most of the students are from courses that not related to environment and nature. However, UMK Jeli Campus students are from science-based programmes.

2.4 Attitudes in Choosing Personal Care Products

Consumer attitudes in choosing the products are one of the effective way to reduce microbeads pollution (Chang, 2015). The same research also found that approximately 5000 g of microbeads are discharged from student's residential area. This shown that students attitude in choosing the personal care products are crucial. Study in one of the universities in India stated that only 27.6 % from 563 students have good practices in avoiding usage of plastic (Srinivasan *et al.*, 2019).

The factors that influence consumer attitude in choosing products are based on their knowledge and justified belief (Norazah, 2016). The study stated that social value influenced the consumer on environmental issues. Understanding the causes, bad effects and good practice affect behaviour of consumer in making decision.

2.5 Perception on Microbeads in Personal Care Products

Anderson *et. al* (2016) have conducted a research on studying the perceptions towards microplastic in personal care products among students, beauticians and environmentalists. Based on their findings, it can be concluded that the respondents did not expected that the amount of microbeads in ocean are too high. After knowing that microbeads in personal care products causes microbeads pollution and threat the consumers' health, the respondents are willing to ban or avoid from using personal care products that contains microbeads.

From the same research, it is stated that the environmentalists believed that non-government organizations plays crucial role in forcing government to educate public awareness and urge the industry to stop producing microbeads products. The national report on microbeads in Bangladesh submitted by Environment and Social Development Organization (2016) or known as ESDO stated that facial scrub that containing microbeads is preferred by the consumer (30 %). Meanwhile, the least preferred products is cream (2 %). Half of the consumer believed that public awareness should be improved and 15 % of the consumer said they will avoid purchasing products containing microbeads.

Findings from interviewed 10 retailers in Bangladesh, showed that 92 % of them does not know about microbeads in products and only 35 % of them willing to

avoid selling products that containing microbeads. However, 25 % of them does not interested in knowing the impact of microbeads as they only concerned about their profit (ESDO, 2016).

2.6 Awareness on Microbeads Pollution

Dauvergne (2018) stated on his research paper that the awareness of microbeads removal from personal care products has been gaining global influence since 2012. This can be seen from the upsurge in anti-microbeads activisms, public concern, voluntary corporate phasedowns and governmental bans. Some of the countries that already ban the use of microbeads are France, Canada, Taiwan and United States that mostly starts in January 2018. However, in Malaysia the awareness of microbeads pollution still in doubt. Malaysian only focus on reducing the single-use plastics that mostly being used for food packaging and groceries plastic bags. Some of the consumer are ignorant on the ingredients of their products. The consumers are unaware on the facts that microbeads are one of the microplastic that can harm environment and human health.

In 2015, a study found that microbeads in personal care products are source of marine pollution. However, the existence of microbeads in the environment is rarely reported (Cheung & Fok, 2016). The floating microbeads at the sea surface are originated from facial scrub that escaped the sewage treatment system in Hong Kong. It is estimated that up to 9.4 billion microbeads are emitted to coastal waters in Hong Kong per day. Thus in 2016, Sa Sa International Holdings Limited, a Hong Kong based cosmetic retailing group, had committed to ban the use of microbeads in its exfoliating and cleansing products by December 2018.

In 18 December 2015, United State enacted The Microbeads-Free Waters Act of 2015 that amend the Federal Food, Drug and Cosmetic Act (United State Food and Drug Administration, 2017). This act prohibit the manufacture of rinse-off cosmetic that also categorize as non-prescription drugs that containing microbeads by July 2018 and also prohibit distribution of microbeads products by July 2019. Use of plastic microbeads in toothpaste, anti-dandruff shampoos and anti-bacterial soaps are also prohibited.

In 2015, Ontario parliament, Canada has enacted legislation to prohibit manufacture of microbeads and ban the use of microbeads in Ontario start from June 2017 (Legislative Assembly of Ontario, 2015). Furthermore, in 2016, Canada list microbeads as toxic substance and be the first country that listed microbeads as toxic substance. By 2019, Canada will banned all the activities starts from the manufacturing, distributing and selling of products that containing microbeads (Environment and Climate Change Canada, 2016).

In Malaysia there are still no action taken by the government to make policy on microbeads. The non-government agencies (NGOs) that emphasize the bad effects of microbeads are only in a small number. In February 2011, The Plastic Soup Foundation has been established to reduce the plastic pollution in water (Plastic Soup Foundation, 2018). This foundation has been running the campaign to prevent the pollution of microbeads from personal care products in the sea since 2012. However, there is only one NGO from Malaysia that participate this campaign while other country such as Netherlands has nine NGOs participated (Beat The Microbead, 2019). The Reef Check Malaysia was established in 2007 to improve the awareness on coral threat and has joined this campaign as microbeads are one of the threat to the coral

(Reef Check Malaysia, 2013). Therefore, there are lack of push factor such as pressure from NGOs and people for the governments to initiate the action to ban microbeads.

2.7 Application of Analysis for Awareness

2.7.1 T-test

Student's t-test are used to determine the differences of means between two mutual independent groups of data (Kim, 2017). In 2017, the survey on awareness of sustainable development by implementation of mobile application was conducted (Turan Çimşir & Uzunboylu, 2019). The researcher used t-test to analyse the result of pre-test and post-test of the control group. The researcher used this method as the two variables are from the same population. The researcher able to determine the mean of awareness level of control pre-test (40.1613) and mean of awareness level of control post-test (80.9677) (Turan Çimşir & Uzunboylu, 2019). From the result, the researcher can conclude that the awareness level is increasing after implementation of mobile application.

2.7.2 Analysis of Variance (ANOVA)

Analysis of Variance (ANOVA) are used in various research to determine the differences of means between more than two groups (Kim, 2017). The past study used ANOVA to observed the significant difference between five different courses with knowledge and practice (Srinivasan *et al.*, 2019). Using this statistical analysis method, the researcher found that medicine students has better practices (2.68 standard deviation) on reducing the use of plastic and agriculture students has more knowledge on plastics (2.79 standard deviation).

2.7.3 Correlation Analysis

Correlation analysis are used in scientific research data as correlation coefficient calculate the strength of the relationship between two variables. Strong relationship are shown by correlation coefficient that more than 0.90 (Statistic Solution, 2013). Past study by Sabrina *et. al* (2018) used correlation analysis to determine whether the concentration of marine microplastic is increasing in last three decades. The researchers found that there is strong relationship between the size of fish and the amount of ingested microplastic. The correlation coefficient for herring size fish is 0.64 and herring size fish is 0.80. Thus, using correlation coefficient, researchers found that size of fish are significant to amount of ingested marine microplastic.

CHAPTER 3

MATERIALS AND METHOD

3.1 Study Area

Universiti Malaysia Kelantan Jeli Campus (UMK Jeli Campus) is located in naturally forest area, at 5°44'42"N latitude and 101°51'50"E longitude. UMK has three campus that based on different field. Basically, UMK Jeli Campus are science based programme with three faculties; Faculty of Earth Science (FSB), Faculty of Agro Based Industry (FIAT) and Faculty of Bioengineering and Technology (FBKT).

Faculty of Earth Science educate their students more on manage natural resources and environment in sustainable way and use their knowledge in entrepreneurship. Faculty of Agro Based Industry educates their students more on research and commercialize of agro based industry for human well-being. Meanwhile Faculty of Bioengineering and Technology educate students more on entrepreneurship and technology that based on natural resources and nature (Fakulti Biokejuruteraan dan Teknologi, 2017). However, these three faculties have the same objective to improve the societies' standard of living and provide knowledgeable human capital.



(Source : Google Imagery, 2019)

Figure 3.1 : The location of study area.

3.2 Sample Size

The formula in determining the sample size from number of population requires a deep understanding. Thus, in this study the given sample size from the table provided Krejcie & Morgan (1970) by was used as reference. The population size of UMK Jeli Campus students are 2500 (UMK Kampus Jeli, 2019) and based on Table 3.1, the sample size are between 331 and 335. Thus, the chosen sample size were 333. However, the number of respondents were changed to 270 respondents due to lack of commitment and cooperation from the respondent. Thus, the number of respondents for each faculty were 90 respondents.

Table 3.1: Table for determining sample size from a given population.

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	85	70	220	140	440	205	1200	291	4000	351
15	14	90	73	230	144	460	210	1300	297	45000	354
20	19	95	76	240	148	480	214	1400	302	5000	357
25	24	100	80	250	152	500	217	1500	306	6000	361
30	28	110	86	260	155	550	226	1600	310	7000	364
35	32	120	92	270	159	600	234	1700	313	8000	367
40	36	130	97	280	162	650	242	1800	317	9000	368
45	40	140	103	290	165	700	248	1900	320	10000	370
50	44	150	108	300	169	750	254	2000	322	15000	375
55	48	160	113	320	175	800	260	2200	327	20000	377
60	52	170	118	340	181	850	265	2400	331	30000	379
65	56	180	123	360	186	900	269	2600	335	40000	380
70	59	190	127	380	191	950	274	2800	338	50000	381
75	63	200	132	400	196	1000	278	3000	341	75000	382
80	66	210	136	420	201	1100	285	3500	346	1000000	384

Note : *N* is for population size, *S* is sample size

(Source : Krejcie & Morgan, 1970).

3.3 Sampling Method

This study used survey method by using questionnaire to obtain on students' knowledge on microbeads pollution towards their attitudes in choosing personal care products and their perception on products containing microbeads. The target respondents were students from Faculty of Earth Science, Faculty of Agro Based Industry and Faculty of Bioengineering and Technology. The non-probability sampling which is stratified sampling method was used, where the population were divided into several groups (Neyman, 1934). The respondents were divided by three strata which are based on their faculty. The number of questionnaire for Faculty of

Earth Science, Faculty of Agro Based Industry, and Faculty of Bioengineering and Technology were distributed equally.

3.4 Questionnaire Design

The survey was conducted from June to July 2019. Well-designed questionnaire was used in collecting the data. The questionnaire consist Section A for demographic which includes gender, age, education level, faculties, year of study and geographic area of their home either rural or urban. The next four sections are for collection of data that needed to achieve the objective and each of the section consists of 6 to 10 questions that based on Likert scale from 1 to 5. Section B consists of questions on respondents' knowledge on microbeads pollution. Section C consists of questions on attitudes of respondents in choosing personal care products. Section D consists questions towards students' perception on microbeads products. Section E consists of questions on the awareness of respondents towards microbeads pollution from personal care products. The data were collected by distributing the questionnaire to class representative to be answered within a week.

3.5 Content Validation

The purpose of questionnaire validation is to review the questionnaire to determine whether the questionnaire measure the objective and address the overall topic (Verial, 2019). In this study, the questionnaire was validated by the expert which is my final year report supervisor. The validated questionnaire then was used in this study for pilot study.

3.6 Pilot Test

The purposes of conducting pilot study are to determine whether the respondents are able to understand the questions and whether the question comply with the objective. Every research has flawed and reassessing the instruments and participants are required (Hassan *et.al*, 2006). Pilot study is crucial as it helps in identify the problem and imperfection. Pilot test was carried out on May 2019 before distributing the actual questionnaire. The sample size for pilot study were 10 % from the sample size (Connelly, 2008). In this study, 33 questionnaire were distributed for pilot test. The reliability or internal consistency of the questionnaire were tested by Cronbach' Alpha. Cronbach 'Alpha shows the internal consistency of a test by a number between 0 to 1 (Tavakol & Dennick, 2011). The acceptable internal consistency for Cronbach's Alpha is between 0.7 and 0.8 (Rosnah & Mohd Nazri, 1986). Questions that below acceptable internal consistency were removed. The finalize questionnaire then was used for data collection.

Table 3.2 : The result of Pilot Test

Section	Cronbach's Alpha (α)	Internal Consistency
Students' Knowledge on Microbeads Pollution	.865	Good
Students' Attitude in Choosing Personal Care Products	.713	Acceptable
Students' Perception on Microbeads in Personal Care Products	.854	Good
Students' Awareness on Microbeads Pollution From Personal Care Products	.812	Good

3.7 Normality Test

The distribution of collected data from answered questionnaire were analysed with normality test. The data is normally distributed if the significant value of Shapiro-Wilk is greater than 0.05. The result for Shapiro-Wilk in this study was below than 0.05. However, it was stated by Ghasemi & Zahediasi (2012) that non normal distributed data that more than 20 items still able to run t-test and ANOVA.

Table 3.3 : The result of Normality Test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Awareness	.083	270	.000	.974	270	.000

a. Lilliefors Significance Correction

3.8 Data Analysis

The data from the questionnaire were analysed using t-test, Analysis of Variance (ANOVA) and Pearson’s correlation analysis using SPSS version 20.0 software.

3.8.1 T-Test

T-test was used when independent groups are subjected to the comparison under the assumptions of normal distribution and equal variances (Kim, 2014). In this study, t-test was used to indicate the differences of awareness level between male and female. T-test has three different types which are one-sample t-test, two-sample t-test and paired t-test (Skaik, 2015). Two-sample t-test were used to determine whether the means of two groups from the same population are different from each other (Skaik, 2015). Thus, in this study, two-sample t-test or also known as independent sample t-test was used. An independent samples t-test was conducted to compare students’

knowledge, attitudes, perception and awareness on microbeads in personal care products in male and female also to compare in rural area and urban area.

3.8.2 Analysis of Variance (ANOVA)

ANOVA was used in various study to determine the differences between more than two means of data (Kim, 2014). One-way ANOVA is used for one categorical independent variable (Statistic Solution, 2013). In this study, one-way ANOVA was used to compare the mean differences in knowledge, attitude, perception and awareness among the three faculties, among different level of education, among age and among year of studies. The ANOVA method compared the relative size of variance among means of faculty to the average variance within the faculty (Kim, 2014).

3.8.3 Pearson's Correlation Analysis

The relationships between students' knowledge on microbeads pollution, attitudes in choosing personal care products, perception towards microbeads products and awareness on microbeads pollution were determined using Pearson's correlation. The strength of the relationship was shown by its correlation coefficient, r . The value of correlation coefficient starts from -1 to 1. Zero correlation confidents represents no relationship between the two data. Strong positive relationship will be shown by $r = 0.7$ and perfect correlation by $r = 1$ (Taylor, 1990).

Based on the final result, the correlation between students' knowledge on microbeads pollution, students' attitudes in choosing personal care products,

perception towards microbeads products and awareness on microbeads pollution among UMK Jeli Campus students were determined.

The formula for correlation coefficient, r :

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}} \quad (\text{Equation 1})$$

Where :

n = number of pairs data

$\sum xy$ = sum of the products of paired data

$\sum x$ = sum of x data

$\sum y$ = sum of y data

$\sum x^2$ = sum of squared x data

$\sum y^2$ = sum of squared y data

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Demographic Information

Parameters used for demographic data are gender, age, year of study, faculty, programme and residential area. A random stratified sampling method was used which the population was divided into several groups with the number of student for each of the faculty are 90 students respectively.

Table 4.1 showed the distribution of gender respondents where, male were 59 (21.85 %) while for female respondents were 211 (78.15 %). The majority of male participants were from FBKT (8.15 %). Meanwhile, the majority of female participants were from FSB (26.67 %). Majority of respondents aged 21-22 years old and only 2 respondents aged 25 years old and above. The questionnaire were distributed to degree students only. Thus, most of the respondents were 19 to 24 years old.

Most of the respondents from FSB were year 2 students (29). Meanwhile, the majority of respondents for FBKT and FIAT were year 4 students (43) and year 3 students (33) respectively. As a whole, the majority of respondents were from year 4 students (87) and the minority were from year 1 students (51).

Most of the respondents were from SBT programme (43) in FBKT while the least of the respondents were from SEB programme (16) in FBKT. The total number of programme offered in UMK Jeli Campus were 10. From the result in Table 4.1, it showed that the questionnaire were thoroughly distributed to all programme.

Table 4.1 : Distribution of respondents by faculty

Factors		Faculty (Frequency)			Percentage (%)	Total
		FSB	FBKT	FIAT		
Gender	Male	18	22	19	21.85	59
	Female	72	68	71	78.15	211
Age	19-20 years old	35	21	26	30.37	82
	21-22 years old	50	44	44	51.11	138
	23-24 years old	4	25	19	17.78	48
	25 years old and above	1	0	1	0.74	2
Year of Study	Year 1	13	21	17	18.89	51
	Year 2	29	10	19	21.48	58
	Year 3	25	16	33	27.41	74
	Year 4	23	43	21	32.22	87
Residential Area	Rural Area	48	55	55	58.52	158
	Urban Area	42	35	35	41.48	112

Note : FSB = Faculty of Earth Science, FBKT = Faculty of Bioengineering and Technology, FIAT = Faculty of Agro Based Technology

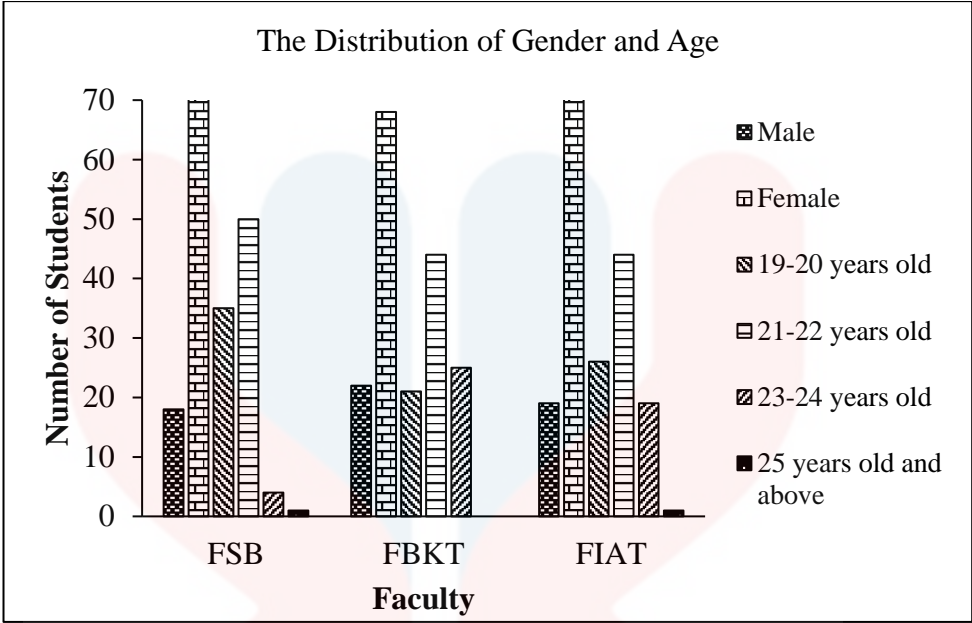


Figure 4.1 : The number of students against gender and age.

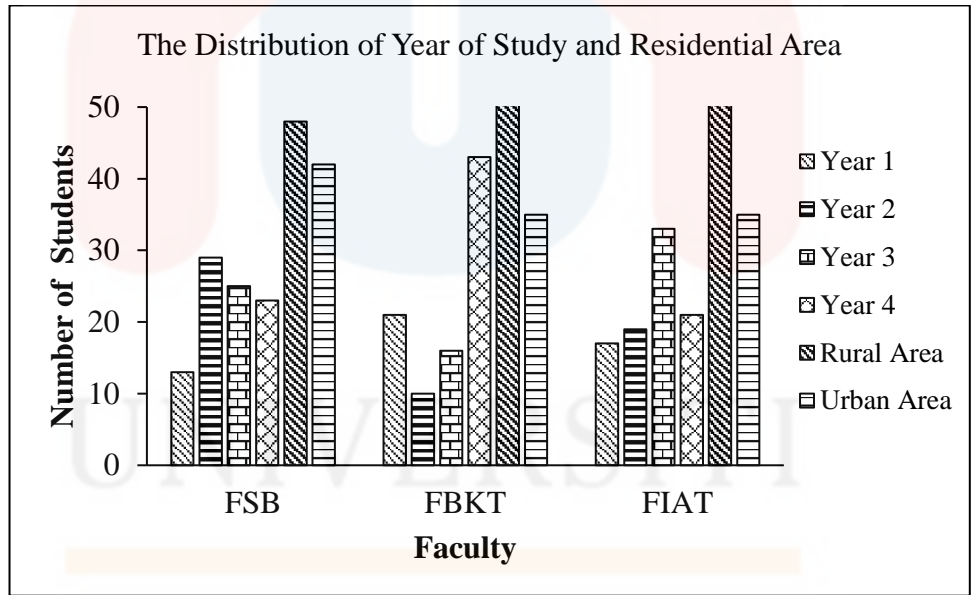


Figure 4.2 : The number of students against year of study and residential area.

MALAYSIA
KELANTAN

4.2 Knowledge on Microbeads Pollution

About 65.43 % showed positives knowledge on microbeads pollution with 89 respondents agreed that personal care products contains microbeads and 76 respondents mentioned microbeads were made from the plastic (Table 4.2). From the result obtained, 74 students agreed that sewage treatment cannot filter microbeads while 31 students strongly agreed with that. On November 2017 to January 2018, a study was conducted by Wolff *et al.* (2019) to determine the microplastic (between 30 μm to 100 μm size range) emission in the effluent of a municipal waste water treatment plant using Raman microspectroscopy. The study found that 5900 m^{-3} of microplastic particles on wet weather days and 3000 m^{-3} of microplastic particles on dry weather days.

The variations in the overall knowledge based on gender, residential area, age, faculty, year of study and courses were examined. A one-way between subjects ANOVA was conducted to compare students' knowledge in microbeads pollution for age, faculty, year of study and course. An independent samples t-test was conducted to compare students' knowledge in microbeads pollution in male and female also to compare in rural area and urban area. The significance level for this study was set at 0.05. The results showed that only residential area, faculty and courses were significance. There were no significant different between gender and year of study. This showed that students' education background play crucial role in environmental education.

Table 4.2 : Knowledge on microbeads pollution.

Knowledge on Microbeads Pollution	Strongly Disagree		Disagree		Moderately Agree		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%	N	%
Know some personal care products contain microbeads.	9	3.3	31	11.5	90	33.3	89	33.0	51	18.9
Know microbeads are made of plastic.	19	7.0	45	26.7	91	33.7	76	28.1	39	14.4
Know microbeads are bad for biodiversity.	17	6.3	30	11.1	86	31.9	94	34.8	43	15.9
Know sewage treatment cannot filter microbeads.	23	8.5	46	17.0	96	35.6	74	27.4	31	11.5
Know microbeads caused microbeads pollution.	20	7.4	32	11.9	87	32.2	87	32.2	44	16.3
Know marine life can ingest microbeads.	29	10.7	45	16.7	78	28.9	73	27.0	45	16.7
Know microbeads ending up enter our food chain.	24	8.9	32	11.9	95	35.2	75	27.8	44	16.3
Know microbeads can accumulate in my body.	19	7.0	20	7.4	98	36.3	96	35.6	37	13.7
Know ways to reduce the use of microbeads.	40	14.8	60	22.2	116	43.0	39	14.4	15	5.6
Know should avoid purchasing products that contain microbeads.	14	5.2	31	11.5	91	33.7	79	29.3	55	20.4

Note : *n* : 270, Std. Deviation : 0.80, Percentage : 65.43 %

Table 4.3 : Students' knowledge based on gender and residential area.

Factor		N	Mean	Std. Deviation	<i>t</i> -Test	Sig
Gender	Male	59	3.198	0.934	-.798	0.175
	Female	211	3.292	0.765		
Residential Area	Rural area	158	3.257	0.739	-.345	0.037
	Urban area	112	3.292	0.891		

The students from FSB have more knowledge on microbeads pollution than students in FIAT. The highest mean for knowledge was from FSB students, SEL [$F(2,267) = 3.480, p = 0.005$] and the lowest mean was from FIAT students, SBL [$F(2,267) = 2.859, p = 0.005$] (Table 4.4). This is because students in course SEL were more exposed to environmental pollution since their courses is sustainable science.

The finding from past study in University Tun Abdul Razak stated that students have good knowledge on environmental. However, students were unfamiliar with concepts of biodegradability and other certain terminology (Bayaah *et al.*, 2010). Thus, can be concluded that FSB students have more knowledge on microbeads pollution because they learned basic terminology of environment as environment and natural resources were their core subjects.

Table 4.4 : ANOVA of students' knowledge based on age, faculty, year of studies and courses.

Factor		N	Mean	Std. Deviation	F	Sig
Age	19-20 years old	82	3.173	0.792	0.932	0.426
	21-22 years old	138	3.280	0.837		
	23-24 years old	48	3.417	0.733		
	25 years old and above	2	3.278	0.079		
	Total	270	3.272	0.804		
Faculty	FSB	90	3.469	0.835	5.410	0.005
	FBKT	90	3.264	0.742		
	FIAT	90	3.082	0.794		
	Total	270	3.272	0.804		
Year of study	Year 1	51	3.132	0.676	1.149	0.330
	Year 2	58	3.295	0.810		
	Year 3	74	3.224	0.906		
	Year 4	87	3.380	0.773		
	Total	270	3.272	0.804		

Table 4.4 (Continued)

Factor	N	Mean	Std. Deviation	F	Sig	
Year of study	Year 1	51	3.132	0.676	1.149	0.330
	Year 2	58	3.295	0.810		
	Year 3	74	3.224	0.906		
	Year 4	87	3.380	0.773		
	Total	270	3.272	0.804		
Courses	SEN	25	3.716	0.868	2.364	0.014
	SEG	27	3.226	0.934		
	SEL	38	3.480	0.700		
	SBT	43	3.320	0.757		
	SEB	16	3.208	0.678		
	SEH	31	3.215	0.769		
	SBL	33	2.859	0.876		
	SBH	17	3.327	0.555		
	SBP	21	3.116	0.778		
	SBF	19	3.211	0.800		
	Total	270	3.272	0.804		

4.3 Attitudes in Choosing Personal Care Products

Based on the Table 4.5, it shows that only 65.51 % of students had a good attitudes in choosing personal care products. About 229 students agreed that they did not buy personal care product that contain microbeads while only 41 students disagreed. This shown that students from UMK Jeli Campus had great attitudes and thoughtful in choosing personal care products that did not contain microbeads. This attitudes helps in reduction of supplying of personal care products that contain microbeads as the demand for the product was low. The past study conducted by Yatish & Zillur (2015) found that demand for eco-friendly products are increases as more customers practicing green purchase.

The majority of students (178 students), read the ingredients of the products before buying and 122 students refer to Food and Drug Administration (FDA) to avoid from consuming restricted ingredients (Table 4.5). This attitude helps in reducing the demand for microbeads in personal care products as FDA already has ban the use of microbeads in 'rinse-off' cosmetics (U.S Food and Drug Administration, 2018). However, only 48 students already stop buying products that contain microbeads and majority of them (99 students) still buying products that contain microbeads. The past study in Bangladesh also found that only 15% of the respondent avoid purchasing products that contain microbeads (ESDO,2016). Thus, it is not surprising that researchers found microbeads that floating at the sea comes from facial scrub which is one of personal care products (Cheung & Fok, 2016).

The variations in the overall attitudes based on gender, residential area, age, faculty, year of study and courses were examined. A one-way between subjects ANOVA was conducted to compare students' attitudes in choosing personal care products for age, faculty, year of study and course. An independent samples t-test was conducted to compare students' attitudes in choosing personal care products in male and female also to compare in rural area and urban area. The results showed that only students' attitudes between gender and age were significant. The mean of attitudes for male was $M = 3.172$, $SD = 0.746$ while for female was $M = 3.305$, $SD = 0.587$ (Table 4.6). This showed that female student was more concerned in choosing personal care products than male. The previous study in 1997 by Bord and O'Connor also showed same results. The study observed the gender gap in environmental attitudes and the findings showed that female was more concerned than male to a specific environmental risk.

Table 4.5 : Attitudes in choosing personal care products.

Attitudes in Choosing Personal Care Products	Strongly Disagree		Disagree		Moderately Agree		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%	N	%
Not buy personal care products containing microbeads.	12	4.4	29	10.7	114	42.2	75	27.8	40	14.8
Read the ingredients of the products before buying.	9	3.3	26	9.6	57	21.1	91	33.7	87	32.2
Buy personal care products that only contains biodegradable microbeads.	16	5.9	34	12.6	147	54.4	54	20.0	17	7.0
Do some research before buying personal care products.	11	4.1	33	12.2	82	30.4	77	28.5	67	24.8
Only buy products that is safe for the environment.	4	1.5	17	6.3	97	35.9	92	34.2	60	22.2
Refer to Food and Drug Administration	17	6.3	36	13.3	95	35.2	79	29.3	43	15.9
Still buy personal care products that contain microbeads.	34	12.6	65	24.1	123	45.6	38	14.1	10	3.7
Do not mind buying personal care products containing microbeads as long as it keeps me hygienic.	49	18.1	77	28.5	96	35.6	38	14.1	10	3.7

Note : n : 270, Std. Deviation : 0.63 , Percentage : 65.51 %

Table 4.6 : Students' attitudes based on gender and residential area.

Factor		N	Mean	Std. Deviation	t -Test	Sig
Gender	Male	59	3.172	0.746	-1.444	0.030
	Female	211	3.305	0.587		
Residential Area	Rural area	158	3.267	0.618	-.251	0.402
	Urban area	112	3.287	0.640		

The highest mean for age was between 23-24 years old [$F(2,267) = 3.435$, $p = 0.038$] and the lowest mean for age was between 25 years and above [$F(2,267) = 2.875$, $p = 0.038$]. However, this result was not accurate as the number of respondent for age 25 years old and above was only 2 (Table 4.7). According to Steven (2019), people aged between 17 to 35 were more concerned on environment than people aged between 55 and above. That finding clearly can be seen in this study also as the overall mean for attitudes based on age were 3.276.

Table 4.7 : ANOVA of students' attitudes based on age, faculty, year of study and courses.

Factor		N	Mean	Std. Deviation	F	Sig
Age	19-20 years old	82	3.352	0.670	2.480	0.038
	21-22 years old	138	3.180	0.608		
	23-24 years old	48	3.435	0.565		
	25 years old and above	2	2.875	0.354		
	Total	270	3.276	0.626		
Faculty	FSB	90	3.265	0.628	0.130	0.878
	FBKT	90	3.303	0.578		
	FIAT	90	3.258	0.675		
	Total	270	3.276	0.626		
Year of study	Year 1	51	3.321	0.663	1.598	0.190
	Year 2	58	3.334	0.652		
	Year 3	74	3.340	0.577		
	Year 4	87	3.155	0.621		
	Total	270	3.276	0.626		
Courses	SEN	25	3.470	0.450	1.410	0.184
	SEG	27	3.347	0.699		
	SEL	38	3.072	0.634		
	SBT	43	3.326	0.552		
	SEB	16	3.469	0.606		
	SEH	31	3.186	0.592		
	SBL	33	3.178	0.622		
	SBH	17	3.404	0.755		
	SBP	21	3.137	0.707		
	SBF	19	3.401	0.658		
Total	270	3.276	0.626			

4.4 Perception on Microbeads in Personal Care Products

The majority of students which had bad perception towards microbeads in personal care products. Students agreed with the statement microbeads is dangerous to human health were 254 and only 16 students disagreed (Table 4.8). This showed that despite the students studied in different courses, they know the fact that microbeads is harmful to human. Students that agreed with the statement microbeads is not necessary in personal care products were 232 and 258 students agreed that small amount of microbeads in personal care products still affects the environment (Table 4.8). The report from Environment and Social Development Organization (ESDO) in 2016 stated that microbeads is a toxic accumulators. Due to its small size, microbeads have large surface area that efficient in accumulate toxic.

The statement public should be educated on microbeads pollution was agreed by 261 students. The study from ESDO (2016) also found that 50 % of the respondents agreed that awareness of microbeads among consumers should be raise. The report from Global Education Monitoring (GEM) in 2015 stated educated people or society tend to be more concerned about environment and more interested to protect environment.

Table 4.8 : Perception on microbeads in personal care products.

Perception on Microbeads in Personal Care Products	Strongly Disagree		Disagree		Moderately Agree		Agree		Strongly Disagree	
	N	%	N	%	N	%	N	%	N	%
Microbeads is dangerous to human health.	5	1.9	11	4.1	103	38.1	85	31.5	66	24.4
Microbeads is not necessary in personal care products.	6	2.2	32	11.9	115	42.6	69	25.6	48	17.8
Small amount of microbeads in personal care products still affect the environment.	4	1.5	17	6.3	101	37.4	100	37.0	48	17.8
Consumer should stop buying microbeads products.	3	1.1	23	8.5	103	38.1	87	32.2	54	20.0
Retailer should stop selling microbeads products.	5	1.9	17	6.3	99	36.7	92	34.1	57	21.1
Public should be educated on microbeads pollution.	1	0.4	8	3.0	55	20.4	85	31.5	121	44.8
Media should expose on microbeads pollution issue to public.	2	0.7	13	4.8	42	15.6	77	28.5	136	50.4

Note : *n* : 270, Std. Deviation : 0.745, Percentage : 75.68 %

Table 4.9 : Students' perception based on gender and residential area.

Factor		N	Mean	Std. Deviation	<i>t</i> -Test	Sig
Gender	Male	59	3.705	0.910	-.927	0.167
	Female	211	3.806	0.693		
Residential Area	Rural area	158	3.784	0.754	-.006	0.498
	Urban area	112	3.784	0.737		

The variations in the overall perception based on gender, residential area, age, faculty, year of study and courses were examined. A one-way between subjects ANOVA was conducted to compare students' perception on microbeads in personal care products for age, faculty, year of study and course. An independent samples t-test was conducted to compare students' perception on microbeads in personal care products in male and female also to compare in rural area and urban area. The study found that only faculty ($p = 0.001$) and courses ($p < 0.001$) were significant (Table 4.10). This showed that, faculty and courses will influenced students' perception on environment. There was a past study on gaps in sustainability education that found the type of courses significantly influenced students' conceptualize environment (Brian & Eric, 2015).

Table 4.10 showed that SEL students from FSB have better conceptualize on environment compare to other courses. This is due to their exposure in coursework which related more to environment. Thus, these students have better understanding in environmental and sustainability. It can be concluded that students in UMK Jeli Campus should be exposed more on environment in academic to improve their integrated understanding of environment or sustainability.

Table 4.10 : ANOVA of students' perception based on age, faculty, year of study and courses.

Factor		N	Mean	Std. Deviation	F	Sig
Age	19-20 years old	82	3.718	0.666	0.323	0.809
	21-22 years old	138	3.817	0.834		
	23-24 years old	48	3.807	0.609		
	25 years old and above	2	3.714	0.606		
	Total	270	3.784	0.745		
Faculty	FSB	90	3.997	0.741	7.573	0.001
	FBKT	90	3.781	0.681		
	FIAT	90	3.575	0.760		
	Total	270	3.784	0.745		

Table 4.10 (Continued)

Factor	N	Mean	Std. Deviation	F	Sig	
Year of study	Year 1	51	3.654	0.739	0.918	0.432
	Year 2	58	3.746	0.673		
	Year 3	74	3.863	0.849		
	Year 4	87	3.819	0.700		
	Total	270	3.784	0.745		
Courses	SEN	25	4.469	0.592	4.767	<0.001
	SEG	27	3.556	0.686		
	SEL	38	4.000	0.686		
	SBT	43	3.784	0.657		
	SEB	16	3.571	0.698		
	SEH	31	3.885	0.701		
	SBL	33	3.546	0.849		
	SBH	17	3.378	0.805		
	SBP	21	3.626	0.757		
	SBP	19	3.744	0.538		
	Total	270	3.784	0.745		

4.5 Awareness on Microbeads Pollution From Personal Care Products

The mean percentage for students' awareness on microbeads pollution was 72.96 % (Table 4.11). This showed that majority of the students in UMK Jeli Campus aware that microbeads pollution comes from personal care products. There were 88.9 % of students aware that some personal care products contain microbeads (Table 4.11). In 2015, ESDO has interviewed retailers about their awareness on microbeads in products. However, only 5 % of them aware on the presence of microbeads in some product. The result from this study was contrast with the study from ESDO. Thus, it can be concluded that students have better awareness on microbeads than retailers.

The statement of awareness on avoiding from buying microbeads containing products can reduce chemical pollutants was agreed by 247 students (Table 4.11). Table 4.11

showed that 241 of students aware that biodegradable microbeads products are good for environment. The past study in Bangladesh showed only 15 % of interviewed consumer will purchase safe and natural alternatives products (ESDO, 2015). This showed that almost half of the students in UMK Jeli Campus aware on environment than in Bangladesh, only a few of consumer aware on biodegradable microbeads.

Table 4.11 : Awareness on microbeads pollution from personal care products.

Awareness on Microbeads Pollution From Personal Care Products	Strongly Disagree		Disagree		Moderately Agree		Agree		Strongly Agree	
	N	%	N	%	N	%	N	%	N	%
Aware that some personal care products contain microbeads.	9	3.3	21	7.8	84	31.1	97	35.9	59	21.9
Aware that microbeads causes environmental pollution.	7	2.6	22	8.1	78	28.9	101	37.4	62	23.0
Aware that microbeads affect human health.	8	3.0	18	6.7	84	31.1	104	38.5	56	20.7
Aware that avoid buying microbeads containing products can reduce chemical pollutants.	3	1.1	20	7.4	75	27.8	109	40.4	63	23.3
Aware that biodegradable microbeads products are good for environment.	6	2.2	23	8.5	108	40.0	81	30.0	52	19.3
Aware government should ban microbeads products.	4	1.5	21	7.8	126	46.7	65	24.1	54	20.0

Note : *n* : 270, Std. Deviation : 0.78, Percentage : 72.96 %

Table 4.12 : Students' awareness based on gender and residential area.

Factor		N	Mean	Std. Deviation	t-Test	Sig
Gender	Male	59	3.616	0.931	-.361	0.424
	Female	211	3.657	0.729		
Residential Area	Rural area	158	3.662	0.754	.359	0.362
	Urban Area	112	3.628	0.810		

The variations in the overall awareness based on gender, residential area, age, faculty, year of study and courses were studied. A one-way between subjects ANOVA was conducted to compare students' awareness on microbeads pollution from personal care products for age, faculty, year of study and course. An independent samples t-test was conducted to compare students' awareness on microbeads pollution from personal care products in male and female also to compare in rural area and urban area. The findings showed that only courses was significantly with $p = 0.001$. There were no significant difference for gender, residential area, age, faculty and year of study. Students from course SEL was expected to be more aware on microbeads pollution from personal care products. However, from Table 4.13, it showed that students in SEN courses was more aware than other students. This is because, SEN students also was exposed to environmental pollution as their core subjects was natural resources. SEN students learned the basic of sustainability concept in other to maintain and protect natural resources.

Table 4.13 : ANOVA of students' awareness based on age, faculty, year of study and courses.

Factor		N	Mean	Std. Deviation	F	Sig
Age	19-20 years old	82	3.626	0.664	0.074	0.974
	21-22 years old	138	3.646	0.865		
	23-24 years old	48	3.688	0.708		
	25 years old and above	2	3.750	0.354		
	Total	270	3.648	0.776		

Table 4.13 (Continued)

Factor	N	Mean	Std. Deviation	F	Sig	
Faculty	FSB	90	3.828	0.745	4.096	0.18
	FBKT	90	3.609	0.779		
	FIAT	90	3.507	0.777		
	Total	270	3.648	0.776		
Year of study	Year 1	51	3.552	0.639	0.365	0.778
	Year 2	58	3.670	0.733		
	Year 3	74	3.696	0.868		
	Year 4	87	3.649	0.802		
	Total	270	3.648	0.776		
Course	SEN	25	4.187	0.787	3.101	0.001
	SEG	27	3.432	0.694		
	SEL	38	3.873	0.625		
	SBT	43	3.562	0.726		
	SEB	16	3.385	0.847		
	SEH	31	3.790	0.802		
	SBL	33	3.475	0.794		
	SBH	17	3.441	0.533		
	SBP	21	3.397	0.974		
	SBF	19	3.746	0.692		
Total	270	3.648	0.776			

4.6 Correlation Between Knowledge, Perception, Attitudes and Awareness

The correlation between knowledge, perception, attitudes and awareness were studied. The overall correlation between knowledge, perception, attitudes and awareness was moderate correlation. Most of the correlation coefficient was between $r = 0.336$ to $r = 0.430$ (Table 4.14). The correlation between knowledge and awareness was moderate correlation ($r = 0.505$, $n = 270$, $p < 0.05$). Meanwhile, correlation between attitudes and awareness was $r = 0.430$, $n = 270$, $p < 0.05$. Perception and awareness have strong correlation ($r = 0.695$, $n = 270$, $p < 0.05$). This showed that only perception was strong correlate with awareness. However, knowledge, attitudes and perception significantly correlate to awareness. Thus, students' knowledge, attitudes and perception were influenced by awareness. Past study from Cheung *et al.* (2012)

also found the same result. They found that speech perception is directly involved in the development of phonological awareness in two languages.

Table 4.14 : Correlation between knowledge, perception and attitudes towards awareness.

Factor	Knowledge	Attitudes	Perception	Awareness
Knowledge	1	0.336**	0.389**	0.505**
Attitudes	0.336**	1	0.342**	0.430**
Perception	0.389**	0.342**	1	0.695**
Awareness	0.505**	0.430**	0.695**	1

N = 270
p < 0.05 level
 **. Correlation is significant at the 0.01 level (2-tailed).

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In this study, it showed that students in UMK Jeli Campus do have knowledge on microbeads pollution. The knowledge and information about microbeads pollution easily obtain from reading materials, lectures and social media. However, students' attitudes towards microbeads pollution was not equivalent with their knowledge. The results showed that students were not practicing their knowledge in daily lives.

In addition, this study showed that there was a gap between gender towards environmental attitudes. Female students practicing their knowledge more frequently compared than male. Female students choose personal care products more meticulous to ensure that their products are safe for environment and also safe for their health.

The study also found that students were concerned on microbeads pollutions and they aware on microbeads pollution that comes from personal care products. However, students' attitudes showed the opposite. Students' attitudes were not reflected to their awareness. This might be because students were not exposed to microbeads pollution as it was rarely reported on newspaper and televisions. Thus, it can be concluded that, in order to increase students' awareness on microbeads pollution, students' knowledge, attitudes and perception should be improved first.

5.2 Recommendations

Based on the findings in this study, there are several improvements that needed to enhance environmental awareness among students. First, environmental coursework such as environmental education subject should be included in all courses in university. This is because, the result showed that only students that involved in environmental coursework have better understanding on environmental and pollution. The field activity can be included in the coursework such as awareness campaign helps students to practice theory they learned on real life. Teachers also can share their knowledge and skills to make the learning process fun.

Next, issues that related to environmental pollution, microbeads pollution especially should be reported more frequently by electronic and mass media. The size of microbeads are too small and cannot be filtered by conventional sewage treatment plant. Microbeads are accumulated at water bodies, being ingested by marine life and eventually entered human bodies. Thus, issues on microbeads pollution should be reported more often not only to protect environment but also human health.

REFERENCES

- Anderson, A.G., Grose, J. , Pahl, S., Thompson, R.C., Wyles, K.J. (2016), Microplastics in Personal Care Products: Exploring Perceptions of Environmentalists, Beauticians and Students, *Marine Pollution Bulletin*, Volume 113, Issues 1–2, 2016, Pages 454-460, ISSN 0025-326X, doi.org/10.1016/j.marpolbul.2016.10.048.
- Bayaah A., Juhdi N. & Awadz A. (2010). Examination of Environmental Knowledge and Perceived Pro-Environmental Behavior Among Students of University Tun Abdul Razak, Malaysia. *International Journal of Multidisciplinary Thought*. Volume 1, Issues 1, Pages 328-342, ISSN 2156-6992,
- Beat The Microbeads (2019). Partner NGOs. Retrieved March 23, 2019 from <https://www.beatthemicrobead.org/partner-ngos/>.
- Bord, R., & O'Connor, R. (1997). The Gender Gap in Environmental Attitudes: The Case of Perceived Vulnerability to Risk. *Social Science Quarterly*, 78(4), 830-840. Retrieved from www.jstor.org/stable/42863734
- Brian F., Erin M. (2015). Gaps in Sustainability Education. *International Journal of Sustainability in Higher Education*. ISSN: 1467-6370.
- Browne, M. A., Niven, S. J., Galloway, T. S., Rowland, S. J. & Thompson, R. C. (2013). Microplastic Moves Pollutants and Additives to Worms, Reducing Functions Linked to Health and Biodiversity. *Current Biology* Volume 23, Issue 23, Pages 2388-2392, doi.org/10.1016/j.cub.2013.10.012
- Chang, M. (2015). Reducing Microplastics From Facial Exfoliating Cleansers in Wastewater Through Treatment Versus Consumer Product Decisions. *Marine Pollution Bulletin*, 101(1), 330–333. doi.org/10.1016/J.MARPOLBUL.2015.10.074
- Cheung, H., Chung, K. K. H., Wong, S. W. L., McBride-Chang, C., Penney, T. B., & Ho, C. S.-H. (2010). Speech perception, metalinguistic awareness, reading, and vocabulary in Chinese–English bilingual children. *Journal of Educational Psychology*, 102(2), 367–380. doi.org/10.1037/a0017850
- Cheung, P. K., & Fok, L. (2016). Evidence of Microbeads From Personal Care Product Contaminating The Sea. *Marine Pollution Bulletin*, 109(1), 582–585. doi.org/10.1016/j.marpolbul.2016.05.046
- Connelly, L. M. (2008). Pilot studies. *Medsurg Nursing*, 17(6), 411-2
- Dauvergne, P. (2018). The Power Of Environmental Norms: Marine Plastic Pollution and The Politics of Microbeads. *Environmental Politics*, 27(4), 579–597. doi.org/10.1080/09644016.2018.1449090
- Duis, K. & Coors, A. (2016). Microplastics in The Aquatic and Terrestrial Environment: Sources (With A Specific Focus On Personal Care Products), Fate and Effects. *Environmental Sciences Europe*. doi.org/10.1186/s12302-015-0069-y

- Environment and Climate Change Canada (2016). Proposed Regulations for Microbeads in Personal Care Products Used to Exfoliate or Cleanse. Retrieved from <https://www.ec.gc.ca/lcpecepa/default.asp?lang=En&n=3A8EA7D71&offset=5&toc=show>.
- ESDO (2016), Microbeads Pollution Scenario in Bangladesh, National Report : Microbeads! Unfold Health Risk and Environmental Pollutant, Environment and Social Development Organization. Retrieved May 2, 2019 from <http://esdo.org/wp-content/uploads/2017/03/Microbead-pollution-scenario-in-Bangladesh-2016-15-ESDO.pdf>
- Fakulti Biokejuruteraan dan Kejuruteraan (2017). Visi dan Misi. Retrieved March 13, 2019 from <http://fbkt.umk.edu.my/index.php/ms/>
- Ghasemi A., Zghediasl S. (2012). Normality Tests for Statistical Analysis : A Guide for Non-Statisticians. *Int J Endocrinol Metab.* 2012;10(2):486–489. doi:10.5812/ijem.3505
- Global Education Monitoring (2015). Education Increases Awareness and Concerned For The Environment. World Education Blog. Retrieved November 15, 2019 from <https://gemreportunesco.wordpress.com/2015/12/08/education-increases-awareness-and-concern-for-the-environment/>
- Hassan, Z. A., Schattner, P., & Mazza, D. (2006). Doing A Pilot Study: Why Is It Essential?. *Malaysian family physician : the official journal of the Academy of Family Physicians of Malaysia*, 1(2-3), 70–73.
- Kennedy, T., Regehr, G., Rosenfield, J., Roberts, S. W., & Lingard, L. (2004). Exploring the Gap between Knowledge and Behavior: A Qualitative Study of Clinician Action Following an Educational Intervention. *Academic Medicine*, 79(5), 386–393. doi.org/10.1097/00001888-200405000-00006
- Kim, H. (2014). Analysis Of Variance (ANOVA) Comparing Means of More Than Two Groups. *Restorative Dentistry and Endodontics*. ISSN 2234-7658
- Kim, T. K. (2017). Understanding One-Way Anova Using Conceptual Figures. *Korean Journal of Anesthesiology*, 70(1), 22–26. <https://doi.org/10.4097/kjae.2017.70.1.22>
- Krejcie, R. V, & Morgan, D. W. (1970). Determining and Psychological Measurement. *Educational and Psychological Measurement*, 30, 607–610. doi.org/10.1177/0013164405285548
- Legislative Assembly of Ontario (2015). Microbead Elimination and Monitoring Act, 2015. Bill 75.
- Lei, K., Qiao, F., Liu, Q., Wei, Z., Qi, H., Cui, S., ... An, L. (2017). Microplastics Releasing From Personal Care and Cosmetic Products in China. *Marine Pollution Bulletin*, 123(1–2), 122–126. doi.org/10.1016/J.MARPOLBUL.2017.09.016
- Mohd Suki, N. (2016). Consumer Environmental Concern and Green Product Purchase in Malaysia: Structural Effects of Consumption Values. *Journal of Cleaner Production*, 132, 204–214. doi.org/10.1016/J.JCLEPRO.2015.09.087

- Napper, I. E., Bakir, A., Rowland, S. J., & Thompson, R. C. (2015). Characterisation, Quantity and Sorptive Properties of Microplastics Extracted From Cosmetics. *Marine Pollution Bulletin*, 99(1–2), 178–185. doi.org/10.1016/j.marpolbul.2015.07.029
- Neyman, J. (2006). On the Two Different Aspects of the Representative Method: The Method of Stratified Sampling and the Method of Purposive Selection. *Journal of the Royal Statistical Society*, 97(4), 558. doi.org/10.2307/2342192
- Norazah, M. S. (2016). Consumer Environmental Concern and Green Product Purchase in Malaysia: Structural Effects of Consumption Values. *Journal of Cleaner Production*, 132, 204–214. doi.org/10.1016/j.jclepro.2015.09.087
- Plastic Soup Foundation (2018). Mission and Vision, Plastic Soup Foundation. Retrieved March 23, 2019 from <https://www.plasticsoupfoundation.org/en/organisation/mission/>
- Reef Check Malaysia (2013). Our History, Reef Check Malaysia. Retrieved March 23, 2019 from <https://www.reefcheck.org.my/about-us/our-history>
- Rosnah, M. ., & Mohd Nazri, L. . (1986). The Reliability of Foreign Language Anxiety Scale in Malay Version Based on Cronbach's Alpha, 37–47. doi.org/10.30743/consists
- Sabrina, B., Anders, G., Bastian H., Dierking J., Nielsen, T.G. (2018). No Increase in Marine Microplastic Concentration Over The Last Three Decades – A Case Study From The Baltic Sea, *Science of The Total Environment*, Volume 621, 2018, Pages 1272-1279, ISSN 0048-9697, doi.org/10.1016/j.scitotenv.2017.10.101.
- Skaik, Y. (2015). The Bread and Butter of Statistical Analysis “T-Test”: Uses and Misuses. *Pakistan Journal of Medical Sciences*, 31(6), 1558–1559. doi.org/10.12669/pjms.316.8984
- Srinivasan, N., Swarnapriya, V., Felix, A. J. W., & Pravin, T. (2019). Assessment of Knowledge and Practice on Plastics Among The Professional Course Students of Annamalai University, Tamil Nadu. *International Journal Of Community Medicine And Public Health*. doi.org/10.18203/2394-6040.ijcmph20190099
- Statistics Solutions (2013). ANOVA. Retrieved March 3, 2019 from <http://www.statisticssolutions.com/academic-solutions/resources/directory-of-statistical-analyses/anova/>
- Steven C. (2019). The Age Gap in Environmental Politics. *State of the Planet*. Retrieved November 16, 2019 from <https://blogs.ei.columbia.edu/2019/02/04/age-gap-environmental-politics/>
- Tanaka, K., & Takada, H. (2016). Microplastic Fragments and Microbeads in Digestive Tracts of Planktivorous Fish From Urban Coastal Waters. *Scientific Reports*. doi.org/10.1038/srep34351
- Taylor, R. (1990). Interpretation of the Correlation Coefficient: A Basic Review. *Journal of Diagnostic Medical Sonography*. 6. 35-39. 10.1177/875647939000600106.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's Alpha. *International Journal of Medical Education*, 2, 53–55. doi.org/10.5116/ijme.4dfb.8dfd

- Turan Çimşir, B., & Uzunboylu, H. (2019). Awareness Training for Sustainable Development: Development, Implementation and Evaluation of a Mobile Application. Sustainability . doi.org/10.3390/su11030611
- UMK Kampus Jeli (2019). Bilangan Pelajar. Retrieved March 8, 2019 from <https://kampusjeli.umk.edu.my/>
- United State Food and Drug Administration (2017). The Microbead-Free Waters Act: FAQs, Food and Drug Administration. Retrieved March 7, 2019 from <https://www.fda.gov/cosmetics/cosmetics-laws-regulations/microbead-free-waters-act-faqs>
- United State Food and Drug Administration (2018). What We Do, U.S. Food and Drug Administration. Retrieved March 19, 2019 from <https://www.fda.gov/aboutfda/whatwedo/>
- United State Food and Drug Administration (2018). Cosmetics Safety Q&A: Prohibited Ingredients, U.S. Food and Drug Administration. Retrieved from <https://www.fda.gov/cosmetics/resourcesforyou/consumers/ucm167234.htm>. Accessed on March 19,2019
- University of Plymouth. (2016). Potential support for ban on microbeads in cosmetics. ScienceDaily. Retrieved December 22, 2019 from www.sciencedaily.com/releases/2016/11/161110124235.htm
- Verial, D. (2019). Questionnaire Validation Method. The Classroom. Retrieved from <https://www.theclassroom.com/questionnaire-validation-methods-8421878.html> Accessed on December 21, 2019.
- Wolff, S., Kerpen, J., Prediger, J., Barkmann, L., & Müller, L. (2019). Determination of The Microplastics Emission in The Effluent of A Municipal Waste Water Treatment Plant Using Raman Microspectroscopy. Water Research X. doi.org/10.1016/j.wroa.2018.100014
- Yatish. J., Zillur. R., (2015). Factors Affecting Green Purchase Behaviour and Future Research Directions, International Strategic Management Review, Volume 3, Issues 1-2,2015, Pages 128-143, ISSN 2306-7748, doi.org/10.1016/j.ism.2015.04.001

MALAYSIA

KELANTAN

APPENDIX A

Serial No.



QUESTIONNAIRE

BORANG SOAL SELIDIK

STUDY ON AWARENESS OF MICROBEADS POLLUTION FROM PERSONAL CARE PRODUCTS

*KAJIAN MENGENAI KESEDARAN TERHADAP PENCEMARAN MANIK MIKRO
DARIPADA PRODUK PENJAGAAN DIRI*

All personal information and answer will be used for this study only.

Semua maklumat peribadi dan jawapan hanya akan digunakan untuk kajian ini sahaja.

SECTION A: DEMOGRAPHIC INFORMATION

BAHAGIAN A : MAKLUMAT DEMOGRAFI

Please put a tick in the box for your answer.

Sila masukkan tanda ke dalam kotak untuk jawapan anda.

Gender : () Male () Female

Jantina

Lelaki

Perempuan

Residential area : () Rural area

Kawasan Perumahan *Kawasan luar bandar*

() Urban area

Kawasan bandar

Please put a tick in the box for your answer.

Sila masukkan tanda ke dalam kotak untuk jawapan anda.

Assessment description :

Deskripsi penilaian :

1 - Strongly Disagree

4 – Agree

Sangat tidak bersetuju

Bersetuju

2 – Disagree

5 – Strongly agree

Tidak bersetuju

Sangat bersetuju

3 – Moderately Agree

Sederhana bersetuju

SECTION B : STUDENT’S KNOWLEDGE ON MICROBEADS POLLUTION

BAHAGIAN B : PENGETAHUAN PELAJAR MENGENAI PENCEMARAN MANIK MIKRO

QUESTIONS	1	2	3	4	5
1. I know some personal care products contain microbeads. <i>Saya tahu sesetengah produk penjagaan diri mengandungi manik mikro.</i>					

QUESTIONS	1	2	3	4	5
2. I know microbeads are made of plastic. <i>Saya tahu manik mikro diperbuat daripada plastik.</i>					
3. I know microbeads are bad for biodiversity. <i>Saya tahu manik mikro tidak baik untuk kepelbagaian bio.</i>					
4. I know sewage treatment cannot filter microbeads. <i>Saya tahu rawatan kumbahan tidak boleh menapis manik mikro.</i>					
5. I know microbeads caused microbeads pollution. <i>Saya tahu manik mikro menyebabkan pencemaran manik mikro.</i>					
6. I know marine life can ingest microbeads. <i>Saya tahu hidupan laut boleh makan manik mikro.</i>					
7. I know microbeads ending up enter our food chain. <i>Saya tahu manik mikro akan masuk dalam rantai makanan manusia.</i>					
8. I know microbeads can accumulate in my body. <i>Saya tahu manik mikro boleh berkumpul di dalam badan.</i>					
9. I know ways to reduce the use of microbeads. <i>Saya tahu cara untuk mengurangkan penggunaan manik mikro.</i>					
10. I know I should avoid purchasing products that contain microbeads. <i>Saya tahu saya sepatutnya mengelak daripada membeli produk yang mengandungi manik mikro.</i>					

SECTION C : STUDENT'S ATTITUDES IN CHOOSING PERSONAL CARE PRODUCTS

BAHAGIAN C : SIKAP PELAJAR DALAM MEMILIH PRODUK PENJAGAAN DIRI

QUESTIONS	1	2	3	4	5
1. I do not buy personal care products containing microbeads. <i>Saya tidak membeli produk penjagaan diri yang mengandungi manik mikro.</i>					
2. I read the ingredients of the products before buying. <i>Saya membaca senarai kandungan produk sebelum membeli.</i>					
3. I buy personal care products that only contains biodegradable microbeads. <i>Saya hanya membeli produk penjagaan diri yang mengandungi manik mikro yang biodegradasi.</i>					
4. I do some research before buying personal care products. <i>Saya membuat kajian sebelum membeli produk penjagaan diri.</i>					
5. I only buy products that is safe for the environment. <i>Saya hanya membeli produk yang selamat untuk alam sekitar.</i>					
6. I refer to Food and Drug Administration guidelines before buying personal care products. <i>Saya merujuk garis panduan Pentadbiran Makanan dan Ubat-Ubatan sebelum membeli produk penjagaan diri.</i>					
7. I still buy personal care products that contain microbeads. <i>Saya masih membeli produk penjagaan diri yang mengandungi manik mikro.</i>					

QUESTIONS	1	2	3	4	5
8. I do not mind buying personal care products containing microbeads as long as it keeps me hygienic. <i>Saya tidak kisah membeli produk penjagaan diri yang mengandungi manik mikro selagi ia menjadikan saya bersih.</i>					

SECTION D : STUDENT'S PERCEPTION ON MICROBEADS IN PERSONAL CARE PRODUCTS

BAHAGIAN D : PERSEPSI PELAJAR TERHADAP MANIK MIKRO DI DALAM PRODUK PENJAGAAN DIRI

QUESTIONS	1	2	3	4	5
1. I think microbeads is dangerous to human health. <i>Saya berpendapat manik mikro berbahaya kepada kesihatan manusia.</i>					
2. I think microbeads is not necessary in personal care products. <i>Saya berpendapat manik mikro tidak diperlukan dalam produk penjagaan diri.</i>					
3. I think small amount of microbeads in personal care products still affect the environment. <i>Saya berpendapat jumlah manik mikro di dalam produk penjagaan diri yang sedikit tetap memberi kesan kepada alam sekitar.</i>					
4. I think consumer should stop buying microbeads products. <i>Saya berpendapat pengguna seharusnya berhenti membeli produk manik mikro.</i>					
5. I think retailer should stop selling microbeads products. <i>Saya berpendapat penjual seharusnya berhenti menjual produk manik mikro.</i>					

QUESTIONS	1	2	3	4	5
6. I think public should be educated on microbeads pollution. <i>Saya berpendapat orang awam seharusnya dididik mengenai pencemaran manik mikro.</i>					
7. I think media should expose on microbeads pollution issue to public. <i>Saya berpendapat media seharusnya mendedahkan isu pencemaran manik mikro kepada orang awam.</i>					

SECTION E : STUDENT'S AWARENESS ON MICROBEADS POLLUTION FROM PERSONAL CARE PRODUCTS

BAHAGIAN E : KESEDARAN PELAJAR TERHADAP PENCEMARAN MANIK MIKRO DARIPADA PRODUK PENJAGAAN DIRI

QUESTIONS	1	2	3	4	5
1. I am aware that some personal care products contain microbeads. <i>Saya sedar sebahagian produk penjagaan diri mengandungi manik mikro.</i>					
2. I am aware that microbeads causes environmental pollution. <i>Saya sedar manik mikro menyebabkan pencemaran kepada alam sekitar.</i>					
3. I am aware that microbeads affect human health. <i>Saya sedar manik mikro memberi kesan kepada kesihatan manusia.</i>					
4. I am aware that avoid buying microbeads containing products can reduce chemical pollutants. <i>Saya sedar bahawa tidak membeli produk yang mengandungi manik mikro dapat mengurangkan pencemar kimia.</i>					

QUESTIONS	1	2	3	4	5
5. I am aware that biodegradable microbeads products are good for environment. <i>Saya sedar manik mikro yang biodegradasi baik untuk alam sekitar.</i>					
6. I am aware government should ban microbeads products. <i>Saya sedar kerajaan seharusnya mengharamkan produk manik mikro.</i>					

THANK YOU

Terima kasih

UNIVERSITI
 MALAYSIA
 KELANTAN