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ORIGINAL RESEARCH ARTICLE

Perception of water pollution among Malaysian university students: A case study

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ABSTRACT

The present study aimed to understand the perception and knowledge of university students toward water pollution. In the present study, demographic profile, knowledge of water pollution, university students' perceptions of water pollution, and attitudes towards water pollution prevention were included in the survey questions. This survey on water pollution was conducted among a diverse group of Malaysian university students using Google Forms. The results showed that almost 50% of the respondents had basic knowledge of water pollution and agreed that industrial activities were the main factor causing water pollution in Malaysia, followed by the accumulation of organic chemical waste and heavy metals. It was also revealed that the water pollution campaign was a key factor in spreading awareness among Malaysians and increasing knowledge about water pollution problems. The results further confirmed that water pollution needs to be aware of, which showed that respondents were well aware of the water pollution issue in Malaysia and felt obligated to spread awareness and take action towards water pollution regardless of their surrounding community.

Keywords: water pollution; survey; awareness; understanding; university students

1. Introduction

According to Liu et al.[1], rivers are an essential part of the global water cycle, providing a vital link in the biogeochemical cycle and connecting the two main ecosystems on land and at sea. The ecosystem that a river

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runs through can be inferred from the spatial distribution of water quality. Natural elements, including temperature, lithology, soil, vegetation, and anthropogenic activities, all have an impact on the chemical composition of rivers.

Malaysia, a Southeast Asian nation, is famed for its diverse culture, bustling cities, and abundant rainforests. It shares borders with Thailand, Singapore, and Indonesia, and its coastline stretches along the South China Sea. Key water bodies encompass the Strait of Malacca and the Gulf of Thailand. Rivers, lakes, and reservoirs serve as primary water sources, though water pollution poses a mounting challenge, affecting resource availability and quality. The government is proactively tackling water population issues with conservation and management initiatives[2].

Water is deemed contaminated when pollutants like chemicals, toxins, pathogens, or excessive nutrients surpass safe levels, causing harm to aquatic ecosystems and human health[3]. Such pollutants disrupt the natural balance, degrade water quality, and endanger aquatic life. To protect water resources for present and future generations, it is crucial to monitor and control pollution[4]. Water contamination in Malaysia is caused by both point and non-point sources. Sewage treatment plants, manufacturing and agro-based businesses, and animal farms have all been identified as point sources. Non-point sources are mostly diffuse, like agricultural activities and surface runoff. Rapid expansion in areas such as industry, agriculture, plantations, townships, land clearance, logging, mining, and other human activities all help to introduce pollutants into rivers that are too large for them to handle, which leads to pollution of the rivers[5]. Pollutant control from both point and non-point sources is equally vital for the long-term management of water resources.

The present study aimed to understand the perception and knowledge of university students toward water pollution.

2. Materials and methods

The survey on perceptions and knowledge of water pollution was performed among tertiary students from different fields of study. The respondents are qualified from foundation education level until PhD education level, ranging from 18 years old until 25 years old and above. This survey on perceptions and knowledge of water pollution was distributed among university students from various universities in Malaysia. Namely, Universiti Putra Malaysia (UPM), Universiti Teknologi Malaysia (UiTM), Universiti Pertahanan Nasional Malaysia (UPNM), Universiti Kebangsaan Malaysia (UKM), INTI International University, and Universiti Kuala Lumpur Malaysia (UniKL). This group of university students is randomly selected from different demographic profiles in terms of ethnicity, educational background, gender, age, and economic status.

This study was performed through an online platform, namely Google Forms, in the form of a self-administered questionnaire. The questions were designed in the English language, as English is the standard language for international communication. The survey was composed of four sections that addressed respondents' demographic profile, knowledge of water pollution, perceptions of water pollution, and'attitudes towards pollution.

The first section of the survey, Section A, documented the demographic profile of the tertiary students. A total of seven questions were asked in this section: age range, gender, ethnicity, family economic status, current education level, background field of education, and main information source on water pollution. Next, Section B covered the knowledge of participants on water pollution. The questionnaire consists of multiple-choice answers, including yes, no, and not sure options. Some inquiries involved respondents' knowledge of the causes of water pollution, the effects of water pollution, and water pollution issues in Malaysia.

Section C of this survey recorded the respondents' perceptions of water pollution. This section was designed with six statements with 1–5 scale-like rating agreements from strongly disagree to strongly agree on options. The statements consisted of respondents' perceptions or opinions on the awareness and approach of the water pollution campaign, water pollution issues, and modes of preventing water pollution in Malaysia. The final section of this questionnaire addressed tertiary students' attitudes towards water pollution prevention. This segment used the same application of answering the survey as Section C, which involved rating agreements on a 1–5 scale. This section covers the stance of respondents towards water pollution and the respondents' willingness to prevent water pollution in Malaysia.

This survey was conducted from 5 November 2022, until 22 November 2022, and was distributed through various social media platforms via shortened links. Depending on the respondents, each survey takes an average of 10 to 15 min to be completed. At the end of this survey, a total of 231 respondents were recorded as participating in this study.

3. Results and discussion

3.1. Section A: Demographic profile

Table 1 shows all the demographic statistics from the study sites and the percentage (%) data of the whole sample. Based on the data collection demographics, the majority of the respondents were students in the age range of 21–25 years old, followed by 18–20-year-olds. The least number of respondents were over 25 years old. Out of all the respondents, most were females, which make up 63.2%, while 36.8% were males. Based on the data, the majority of the respondents were Malays at 50.6%, followed by Chinese at 40.3%, Indians at 5.6%, and others at 3.5%. The other races of the respondents include indigenous peoples from Borneo and even an international student from Morocco. Most of the respondents were from M40 families, at 45.0%. Nevertheless, the percentage is similar to the percentage of B40 families that contribute 43.7% of the individuals. The other 11.3% involve T20 families. The highest percentage of education level is 84.4% from a degree level, followed by diploma background students with 10%. While others are dominated by another educational level such as master, PhD, STPM, and matriculation levels. 62.3% of the respondents were from a science background, while the other 37.7% comprised respondents from various backgrounds such as social science, engineering, accounting, IT, business, the arts, international studies, and others. Results from the study show that almost half of the respondents (50.2%) gained exposure to water pollution from internet resources. While other respondents mostly received water pollution information and resources from education and news, with the respective percentages of 26% and 22.1%, Half of the respondents are able to access excess information on water pollution via internet resources as there is more internet availability and freedom of access[6], followed by the worldly impacts of globalization.

Table 1. Demographic statistics from the study sites and the percentage data of the whole sample.

Demographic variables	Number of respondents	Percentage of respondents (%)	Total (%)
Gender			100
Male	85	36.8	
Female	146	63.2	
Age range (years)			100
18–20	43	18.6	
21–25	173	74.9	
Above 25	15	6.5	

Table 1. (*Continued*).

Demographic variables	Number of respondents	Percentage of respondents (%)	Total (%)
Ethnicity			100
Malay	117	50.6	
Chinese	93	40.3	
Indian	13	5.6	
Bajau	2	0.9	
Nigerian/African	1	0.4	
Indigenous Sabah	1	0.4	
Dusun	1	0.4	
Siam	1	0.4	
Mix	1	0.4	
Moroccan	1	0.4	
Current education level			100
Diploma/Foundation	23	10.0	
Degree/Bachelor	195	84.4	
Master	8	3.5	
PhD	1	0.4	
Matriculation	1	0.4	
SPM	1	0.4	
STPM	1	0.4	
Physiotherapy	1	0.4	
Background of education			100
Science	171	74.0	
Arts	17	7.4	
Engineering	8	3.5	
Business	8	3.5	
Accountancy	4	1.7	
Language	4	1.7	
IT	4	1.7	
Mathematic	1	0.4	
Architecture	1	0.4	
Medical	2	0.9	
DITN	1	0.4	
Industrial technology	1	0.4	
Education	3	1.3	
Logistic	1	0.4	
Financial	2	0.9	
Economic	1	0.4	
Islamic studies	1	0.4	
Agriculture	1	0.4	

Table 1. (*Continued*).

Demographic variables	Number of respondents	Percentage of respondents (%)	Total (%)
Family economic status			100
B40	101	43.7	
M40	104	45.0	
T20	26	11.3	
Main information source about water pollution			100
Parents	0	0.0	
Education	60	26.0	
News	51	22.1	
Internet	116	50.2	
Friends	1	0.4	
Campaigns	2	0.9	
Intervention programs	0	0.0	
All Above	1	0.4	

3.2. Section B: Knowledge and awareness of water pollution

Table 2 shows the results of a questionnaire on awareness of water pollution information. It is also worth noting that most of the respondents (97.4%) rated the water quality in Malaysia as a pollution issue, while only 2.6% rated it another way. In addition, when respondents were asked to choose the main factors causing water pollution, industrial activities (96.5%), the accumulation of organic chemical waste (74%), and heavy metal accumulation (54%). The result is in contrast with other factors, sedimentation and burning of peat, with respective respondents' percentages of 38.5% and 19.0%. Researchers have also supported the respondents' views that these factors can lead to water pollution issues. For instance, a case study in Punjab (India) has proven that industrial and urban activities subsequently lead to water pollution problems[7]. On the other hand, Yap et al.[8] stated that the accumulation of heavy metals and organic chemical pollutants such as polyaromatic hydrocarbon (PAH) has contributed to contamination in the Pasir Gudang area of Peninsular Malaysia. In the survey of Malaysia's water quality rating, 79.6% of respondents rated water quality in Malaysia as polluted, and not any respondents agreed to show that water quality in Malaysia is still well conserved without any contamination. Nevertheless, 3.5% of respondents, or eight of them, have not confirmed the pollution status of their water quality. Goi[9] clarified that the majority option above from respondents is compatible with his studies. He stated that the river ecosystem in Malaysia is alarming due to contamination of aquatic and limnological resources.

Figure 1 shows the bar graph of the respondent's perception of the effects of water pollution. Among the respondents, 90.9% were aware of the negative effects of water pollution that lead to respiratory and health problems. This statement is also suggested by other findings. For instance, water pollution has been associated with mental and physical health effects in China[10]. Meanwhile, "increasing acidity in water sources" (81.4%) and "decline in diversity of aquatic species" (72.4%) are among the effects of water pollution, with more than 50%. However, there are also respondents who choose unrelated water pollution factors such as global warming (26.8%), haze episodes (13.4%), and depletion of the ozone layer (13.4%).

Table 2. The results of a questionnaire on the awareness of water pollution information.

Questions	Choices of respondents in number			Actual answer	Percentage of actual answer
	Yes	No	Not sure		
Do you know that some macrobenthos such as snails and worms can be used as bioindicators of water pollution?	98	85	48	Yes	42.42
Water pollution can affect aquatic organisms directly or indirectly.	224	0	7	Yes	97.0
Water pollution can cause spreading of zoonotic disease such as cholera and dysentery.	187	2	42	Yes	81.0
Water pollution are mainly caused by human activities.	222	7	2	Yes	96.1
Water pollution are mainly caused by mother nature.	28	158	45	No	68.4

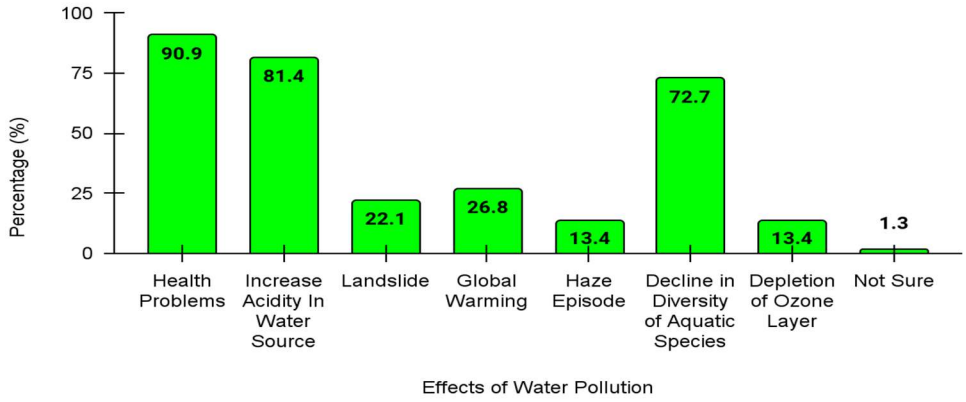

Figure 1. The results of respondents' knowledge and awareness (%) of the effects of water pollution.

In terms of general knowledge of water pollution, only 42.4% of respondents recognized snails and worms as suitable bioindicators or biomonitors of water pollution. The respondents' outcomes do not have a significant contrast with the inverted response (36.8%). There are more than 20% of respondents that are confused with the accurate answer, although findings show that snails have been applied as bioindicators for Cu heavy metals in the Pasir Gudang area of Malaysia[8]. While 97% of respondents agree that water pollution can affect aquatic organisms either directly or indirectly, In another question, "Water pollution can cause the spread of zoonotic diseases such as cholera and dysentery", 81% of respondents agreed with the above statement. The World Health Organization (WHO)[11] has stated that microbiologically contaminated water sources such as ponds, streams, rivers, or even drinking water can cause the spreading of zoonotic disease with diarrheal death every year. On the other hand, 96.1% of respondents agree that water pollution is mainly caused by human activities, and only 12.1% acknowledge that water pollution is mostly caused by mother nature. Water contamination by natural disasters such as earthquakes, hurricanes, and volcano eruptions is relatively less compared to human activities[12].

3.3. Section C: University student perception of water pollution

Figure 2 shows the bar graph of the respondent's perception of the affected sector by water pollution. Among these 231 respondents, most of them consider the environment to be the most affected by water pollution, with 45.9%, followed by agriculture (24.7%), health (19.5%), and social economy (10.0%).

Based on the results of university students' perceptions and responses to air pollution issues in Malaysia in **Table 3**, more individuals agreed that the water pollution campaign "*Cintailah Sungai kita*" [Love Our Rivers] is a key factor in spreading awareness among Malaysians. From the figure shown, only two respondents, or 0.9%, opted for the rating agreement for "1" while 89 respondents, or 38.5%, had chosen the fifth rating agreement. A water pollution campaign is important in order to raise awareness among residents,

especially those from rural areas[13]. These campaigns spread awareness of the importance of limnological sources as well as educate residents about ways to conserve aquatic ecology.

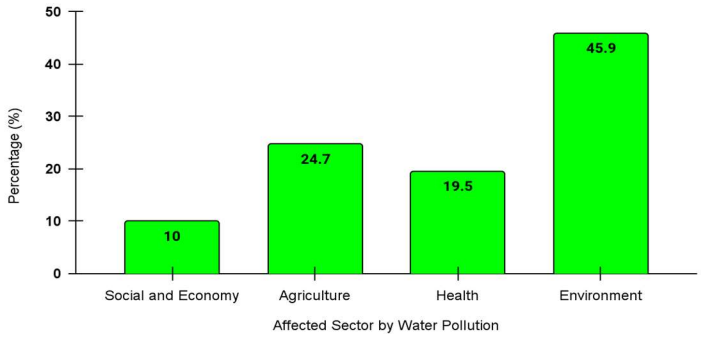

Figure 2. The results of respondents' perception (%) on the most affected sector by water pollution.

Table 3. The perception scales from respondents on the prevention of pollution in Malaysia.

Statements	**Perception scales from respondents (Number)**					
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly agree (5)**	**Mean number**
In my opinion, water pollution campaign is a key factor to spread the awareness among Malaysian.	2	10	54	76	89	5
In my opinion, water pollution problem will arise together with industrialization and urbanization.	2	3	36	76	114	5
In my opinion, schools have taught us effectively on the ways in preventing water pollution.	7	41	73	66	44	3
In my opinion, bad water quality has caused problems of drought and water shortage in residential areas.	6	8	44	75	98	5
In my opinion, water pollution problem in Malaysia has been solve thoroughly.	53	85	69	16	8	3
In my opinion, clean water supply is a main issue in Malaysia.	3	21	76	74	57	3
Water pollution prevention is something I need to be aware of.	2	5	20	78	126	5
I believe that I am capable of contributing to the improvement of water quality even as a student.	2	9	58	90	72	4
I believe that as part of the education community, I am obligated to spread awareness towards water pollution regardless of the surrounding condition.	1	7	37	105	81	4
I have taken part in any activities that would help in preventing water pollution.	16	37	93	54	31	3
I will participate in any campaigns "*Cintailah Sungai*" in Malaysia.	16	21	71	78	45	4
I always get updated on the current issues of water pollution in Malaysia especially near my housing area.	16	26	71	74	44	4
I can reduce water pollution by avoiding dumping rubbish in water sources such as streams and rivers.	4	2	23	56	146	5
I am so concern with the water pollution problem and effects on particular site of aquatic biodiversity.	2	10	45	76	98	5

Besides, the respondents' agreement also increased by acknowledging that water pollution problems correspond with industrialization and urbanisation. Based on the analysis, there are 82.3% of respondents who agree or highly agree with the statement. When there is more development in a particular area, more water contamination problems may occur. For example, due to industrialization such as transportation, logistics, shipbuilding, petrochemicals, heavy industries, and palm oil plantations, the Kim Kim River in Pasir Gudang

was highly polluted, and the pollutants were transferred through limnological sources such as rivers and streams to the Straits of Johor[14]. Other findings by Wong et al.[15] also highlighted that urban domestic waste of heavy metals increases contamination in aquatic areas.

Nevertheless, most of the respondents (31.6%) stayed firm and neutral on the statement "School has taught us effective ways of preventing water pollution". Not more than 50% of respondents (47.6%) agreed with the statement above. This is because, besides school education, parents' education and self-awareness are also capable ways of preventing water contamination problems. The analysis of responses also strongly shows that the results may be correlated with the educational background of the respondents. For instance, Ramli and Talib[16] suggested that the lack of implementation and application of STEM elements in educational backgrounds may continuously lead to a lack of interest in the science stream and involvement in community activities. A basic understanding and exposure to a specific topic or learning outcome could enable an individual to work out the life-long learning process through education.

Besides, the questionnaire reports show a greater emphasis on water pollution issues via the given question of "bad water quality has caused problems of drought and water shortage in residential areas". There are less than 10% of respondents (6.1%) who consider that water contamination leads to drought problems; however, it shows a big contrast when 74.9% of respondents rate the statements "4" and "5". Thus, it clearly shows that it is a main issue that occurs in Malaysia. This was also supported by several studies and scenarios from a few years ago until recently. For example, the water pollution in the Semenyih River, which is the main source of water supply in the Selangor area, has subsequently caused a water shortage[17]. The water shortage was due to the higher level of coliform and *E.coli* bacteria that exceeded the classified threshold level. If the water sources were continuously contacted by the nearby residents, it may create public and environmental health issues. However, the responses may fluctuate according to the location where the respondents live or are concerned with.

On the other hand, in terms of solving the water pollution issue in Malaysia, the responses do not indicate a positive sign. Only eight respondents, or 3.5%, view that the water contamination problem has been solved thoroughly in Malaysia. The respondent's quantity that opted for "1 to 3" is highly contrasted with the other option. This is because water pollution problems are always hard to solve fully and require commitments from every party. The water pollution crisis first required stricter governmental policies, such as enforcing stricter laws and regulations. Besides, it also required sufficient incentive in order to resolve other problems that arise with water contamination issues. Educators, as parents and educational centers, should play their role by providing significant and impactful education to students. Education is important in order to build a civilized and respectful attitude towards the environment. Even the role of the media is necessary to provide sufficient awareness by spreading problems concerning water pollution in hard-copy articles or even online news. Thus, water pollution in Malaysia still remains a concerned issue due to a lack of commitment and collaboration among different parties[18]. Furthermore, limnological pollution management and conservation are time-consuming, especially via the application of governmental practices and the allocation of funds or particular resources[19].

In the last question on determining the respondent's views on water pollution in Malaysia, they are required to rate the water supply issue in Malaysia. Based on the results, it clearly indicates that few respondents are aware that clean water sources are not a problem, as only 10.3% of respondents rated "1" and "2" in the rating agreements. On the other hand, more than 50% of respondents (56.7%) agree that contaminated water supply is a problem faced in Malaysia, while the other 32.9% of respondents acted neutral. Clean and thoroughly uncontaminated limnological supply and resources are always a challenge faced in Malaysia due to several reasons, such as heavy metal accumulation, organic chemical pollutants, industrial

waste, or sewage waste. In a study by Goi[9], he stated that the main rivers in Malaysia, Sungai Buloh (Selangor), Sungai Semenyih (Selangor), Sungai Petani (Kedah), and Sungai Jelutong (Penang), are no longer a clean water supply for residents as they are mostly contaminated with industrial and sewage waste. Furthermore, the response from the questionnaire survey could also be analyzed by the water quality pollution tragedies that occur locally from time to time. Goi[9] elaborated on the correlation of water supply with pollution tragedy when he emphasized that clean water supply is an issue in Malaysia by bringing up the tragedy of Kim River pollution occurring on 7 March 2019. Due to illegal chemical waste dumping, more than 6000 individuals were affected by the closure of the clean water supply to the residents nearby.

In conclusion, the perception of university students towards the water pollution issue in Malaysia is still negative. Most of them believe that water pollution in Malaysia is still able to lead to several problems in water supply, drought, and water shortage. They also partially agreed that water pollution arises with urbanisation and industrialization as natural water resources such as streams, lakes, rivers, and ponds are partially or thoroughly disrupted by human activities. Nevertheless, it shows a positive tendency when most of them agree that the water pollution campaign is the key factor in spreading awareness among Malaysians.

3.4. Section D: Attitudes of university student towards water pollution prevention

Table 4 also shows the perception scales of respondents on the prevention of pollution in Malaysia. Based on the results of the questionnaire, this section will assess the stance of university students' attitudes towards water pollution prevention. Based on question 1, which is about the students' awareness of water pollution and something that needs to be prevented, the results show that 126 students out of the total of 231 respondents, or 54.5%, agreed that water pollution is something that needs to be aware of. The least amount was only 2 students, which was 0.9%, who felt that the water pollution was not important and not to be aware of. The addition of the students that strongly agree and agree, which had a percentage of 54.5% and 33.8%, respectively, having the majority idea on water pollution prevention, was something that needed to be aware of, for a total of 88.3% combined. Hence, based on this question, most of the students are well aware of the water pollution issue in Malaysia.

Table 4. The perception scales from respondents on the Attitudes of University student towards water pollution prevention in Malaysia.

Statements	**Perception scales from respondents (number)**					
	Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly agree (5)**	**Mean number**
Water pollution prevention is something I need to be aware of.	2	5	20	78	126	5
I believe that I am capable of contributing to the improvement of water quality even as a student.	2	9	58	90	72	4
I believe that as part of the education community, I am obligated to spread awareness towards water pollution regardless of the surrounding condition.	1	7	37	105	81	4
I have taken part in any activities that would help in preventing water pollution.	16	37	93	54	31	3
I will participate in any campaigns "*Cintailah Sungai*" in Malaysia.	16	21	71	78	45	4
I always get updated on the current issues of water pollution in Malaysia especially near my housing area.	16	26	71	74	44	4
I can reduce water pollution by avoiding dumping rubbish in water sources such as streams and rivers.	4	2	23	56	146	5
I am so concern with the water pollution problem and effects on particular site of aquatic biodiversity.	2	10	45	76	98	5

Moving on to the second question, this question was to evaluate the respondents' capability of contributing to the improvement of water quality even as students. Not all students think that they are capable of doing something that will contribute to better water quality. The highest percentage of students chose option 4, which was 39%, or about 90 respondents. The addition of options 4 (39%) and 5 (31.2%), agree and strongly agree, has a majority capability of 70.2%. Most but not all students believe that they are capable of contributing to the improvement of water quality, even as students. Out of the 58 respondents, 25.1% chose option 3. They are not sure whether they can contribute something to the improvement of water quality even as students or not; hence, they chose to be in the middle of the answer. This may be because they are interested in contributing something but have no exposure or ideas to do so, or even because they do not know where and how they should start. The date is almost evenly distributed among option 3, option 4, and option 5.

Next, the majority of the students (35.1% and 45.5%) answered that they are obligated to spread awareness about water pollution regardless of the surrounding conditions. 81 students, which is 35.1%,, and 105 students, which is 45.5%, respectively, mentioned that they are playing a major role in spreading the awareness of water pollution regardless of the surrounding conditions. This means that the students are very much obligated to spread awareness about water pollution regardless of their surroundings in the community, while only 3.4% have the audacity to mention that spreading awareness about water pollution is not part of their role in the community.

Furthermore, based on the results of university students' perceptions and responses to air pollution issues in Malaysia, more individuals agreed that the water pollution campaign "*Cintailah Sungai kita*" is a key factor in spreading awareness among Malaysians. On the fourth question, only a total of 36.8% of the respondents (23.4% agree and 13.4% strongly agree) have taken part in this campaign. 40.3% of the respondents are in a neutral mode, which probably means that they have taken part in the campaign to spread awareness about preventing water pollution, but only once in a while. There are many projects regarding the provision of clean rivers that have been done in Malaysia. For instance, the MSU Sungai Damansara National River Trail Project. Goal 15 of the UNSDGs, for Life on Land, is supported by the pilot project that carries out environmental appreciation and sustainable development activities along Sungai Damansara. MSU[20] stated on its official website that the MSU Sg Damansara National River Trail Project has fifteen projects under construction in Phase 1 and is prepared to contribute to the target total of 10,000km of national river trails countrywide.

Moreover, the majority of the respondents (53.3%) stated that they will get involved in the upcoming *"Cintailah Sungai Kita"* campaign. Only a quarter of the respondents (16%) will not join any of the *"Cintailah Sungai Kita" campaigns.* This shows that the educated community, especially university students, is well aware of the effectiveness of the campaign in controlling the pollution of water bodies, especially rivers in Malaysia. In addition, there are several inventions that have been created in order to help in cleaning the river in Malaysia. For instance, University Malaysia Sabah (UMS) has come up with a fresh and inventive approach by creating a "river cleaning machine" that can collect trash and sewage that pollutes rivers. Janaun[21] mentioned that the production of the prototype costs RM100,000 and was completed last February, and it is capable of collecting up to 90% of the garbage floating in the river, adding that the machine, which is shaped like a rotating swing, has so far been used by UMS only for research work.

Apart from that, 51% of the respondents (32% agree and 19% strongly agree) are well aware of the water pollution issues around their residential areas. In this modern technological era, it shows that most of the respondents may have unlimited access to information and news regarding water pollution that occurs in their surroundings. Only a minority of the respondents (a total of 18.2%) stated that they are not receiving any updates regarding water pollution issues in their residential area. This might be due to the fact that they never try to get involved or updated regarding the water pollution issues. It is also probably due to the inefficiency

of the media in spreading awareness regarding pollution due to limited access to the internet in certain areas, such as Sabah and Sarawak. Ling[22] mentioned that Sabah and Sarawak can have full discoverable internet access across the state only by 2024.

In addition, 24.2% of the respondents stated that they can reduce water pollution by avoiding dumping rubbish in water sources such as streams and rivers, while the vast majority of the respondents (63.2%) strongly believed in the statement. Only 2.5% of the respondents think that preventing the rubbish from going into the water bodies of the river may reduce pollution. On the other hand, 32.9% of the respondents are concerned with the water pollution problem and its effects on particular sites of aquatic biodiversity, while 42.4% are strongly concerned with the problem. A minority of 5.2% of the respondents are not concerned with the issues. The water pollution problem definitely affects aquatic life and the marine ecosystem. Insecticides, pesticides, heavy metals, mill waste, and crude oil are just a few of the toxic compounds that are routinely discharged into the aquatic ecosystem from contaminated water bodies. When a significant amount of these contaminants is dumped into any body of water, it has an acute effect by causing quick, widespread aquatic creature mortalities. Pollutants that are released at low concentrations build up in the body composition of fish species, and those chemicals will be returned to humans through the consumption of the fish as daily needs.

4. Conclusions

Water pollution, its effects, and the worldwide water crisis have serious negative effects on community health and safety; thus, they must be acknowledged and respected in order to address environmental issues. This study intends to gauge university students' understanding of water contamination as a conscientious group in society. From this case study, it can be seen that the majority of the respondents are aware that water pollution is an ongoing issue in Malaysia and are willing to take the necessary actions to improve it. Both the public and private sectors should launch marketing campaigns to raise awareness. To ensure that the younger age groups, independent of education and family economic background, are exposed to the knowledge and behaviour in utilising the water sources, individuals with science background groups are urged to educate and spread awareness regarding this issue. This is because the survey results may be useful in educating Malaysians about the problem of water contamination. It also aims to urge Malaysians to take action to protect the health of aquatic ecosystems, in addition to increasing their awareness of clean water resources.

The findings point to a lack of knowledge in both general and environmental education since instruction places a greater emphasis on theoretical than on practical considerations. The contamination of water supplies is one of the most difficult environmental issues since it affects society's security, particularly in developing nations. Because of this, university students who learn about water contamination and become interested in environmental concerns have the potential to have a significant impact.

Author contributions

Conceptualization, CKY; methodology, CKY, TYAH, MESA and MD; software, WMS; validation, CKY; formal analysis, WMS, JMC, DKAS and MNAR; investigation, TYAH, MESA and MD; resources, HO and YH; data curation, WMS, JMC and DKAS; writing-original draft preparation, WMS, JMC, DKAS and SAW; writing—review and editing, CKY, SAW, MCO, MSI, ADS, KK and WHC.; visualization, KK. and MCO; supervision, CKY; project administration, CKY and WHC; funding acquisition, CKY. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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