

A Systematic Review on Knowledge, Attitude and Practices towards Single-Use Plastic

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Abstract

Revisiting the knowledge, attitude and practices toward single-use plastic before the COVID-19 pandemic may be helpful to reduce single-use plastic usage in the endemic community. This systematic review aims to identify factors associated with single-use plastic usage before the COVID-19 pandemic. Five primary electronic databases namely, Scopus, EMBASE, PubMed, Web of Science and CINAHL were used to search from inception to 30 April 2020, for studies pertaining to the investigation of factors (i.e. knowledge, attitudes, practice) associated with single-use plastic usage. Twenty-nine (29) articles were identified and five (5) studies meeting eligible criteria were reviewed and remained in this systematic review. The present review found that younger generations and females had a more pro-environmental attitude and practices toward SUP while only youngsters were associated with a high knowledge level. Results also showed that a high education level does not necessarily result in good practices. Single-use plastics pollution is a worldwide problem and most of us are aware of its impact on us, our environment and our surrounding, however, SUP reduction practices are still low. To remedy this pressing situation, better interventions and more alternative materials to plastics are needed. Furthermore, we need more people to adopt a sustainable attitude and behaviour to make a change.

Keywords single-use plastics, disposable plastics, systematic review, good practice

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1.0 INTRODUCTION

Plastic is a miracle material with a ubiquitous nature which can be moulded into different forms. Reason why it is one of the main raw materials in factories used to manufacture several useful items such as bottles, plastic bags, and cutleries used on an everyday basis. Moreover, plastic has a long lifespan and is very versatile. Unfortunately, it also comes with disadvantages in the form of plastic pollution which makes it one of our planet's biggest challenges. Due to plastics' undeniable presence in our lives, we are living in the "Plastic Age" with approximately 300 million tons of plastic waste produced in our factories worldwide, half of which are single-use plastics [1]. Single-use plastics (SUP) refer to disposable plastics such as plastic bags, plastic packaging and plastic bottles which are used once and then discarded afterwards, a trait that makes them a source of significant serious plastic pollution [2]. Plastic use and production have been on an increasing slope for years [3] and the consequences of this abused usage can now be seen all over the world, including in Malaysia [4]. This material can be defined as non-

biodegradable due to its long lifespan, moreover, the chemicals used to manufacture the plastic materials are hazardous not only to the environment but also to human health [5]. Health literacy on the detrimental effects of the usage of plastic materials is limited and understudied.

Besides being an aesthetic problem, plastic waste ends up in our waters, seas and rivers causing marine pollution. The marine animals living in the polluted areas are affected by illness and some even die as they consume the plastics floating in the water which are mistaken for food and some even get entangled in them thus restricting their movements [6]. These incidents are also present among wildlife animals where their habitats were also exposed to plastic pollution due to the poor management of plastic waste [7]. Furthermore, the ingestion of plastics by animals such as fish eventually intrudes into our food chain [8]. In cities around the world, the amassed plastic waste clogs drains or sewers, creating breeding sites for mosquitoes, pests and diseases. Moreover, these clogged drains are also responsible for several floods and the aggravation of natural disasters [8]. There is also growing evidence of the detrimental effect of plastics on the human population due to the associated health risks. Chemicals used to manufacture plastics were found to be harmful to human health, thus the accumulation of plastics in the body through inhalation of microplastics or the toxic carcinogen released by burning plastic can have a ravaging effect on our health [9]. Due to these harmful chemicals, plastics can neither be burned nor buried to dispose of them and can only be recycled to be reused. At present, plastic residues form part of our surroundings, invading our streets, parks, forest, lakes and seas killing animals, affecting humans and destroying the aesthetics of our ecosystem.

Statistics show that Europe, the USA and Asia are responsible for 85% of plastic production with Asia being the main contributor (80%) of plastic leakage from the land into the ocean [9]. Back in 2011, Malaysia took action and discouraged the use of plastic bags, especially in grocery stores. In 2019, Malaysia encouraged the use of metal straws as an alternative to plastic straws [10]. But until now, plastic is still being extensively used in Malaysia and causing a lot of damage. In February 2020, the World Wildlife Fund (WWF) declared Malaysia as the top plastic consumer in Asia and was ranked the highest among the six countries analysed in terms of annual per-capita plastic packaging consumption (16.8kg/person) [11]. This confirms that the previous and present preventive actions have not been as effective as expected, and we believe there could be many reasons behind that failure. Hence, new target points to form new interventions to tackle the plastic pollution issues need to be investigated. Most are unaware of the damaging effect of plastics, while a minority are aware but do not know that the consequences of SUPs usage will eventually affect our planet. It is worth mentioning that a study conducted by Shaira et al. in India also found that some participants were even unaware of the category of single-use plastics [1].

Several studies mentioned the contribution of knowledge level, attitude and practice to plastic usage or pollution [1, 12-14]. The population's knowledge of SUPs, how it impacts us and our surrounding, the negative consequences of overuse and how to properly discard them is very significant as it will eventually impact our attitude and behaviour or practice towards them [15]. However, there are mixed findings on the relationship between knowledge, attitude and environmentally friendly behaviour. Scott and Willits (1994) also showed that the more highly knowledgeable someone is, the more likely he is prone to engage in environmentally positive behaviours [16]. Still, Alp and colleagues' findings showed that behavioural attitude but not knowledge was associated with environmentally friendly behaviour [17]. This suggests that knowledge about the issue will determine people's attitude towards plastic usage and also help to change and have appropriate practices towards it. With a higher knowledge level, we can educate people on how to change their mindset about plastic overuse due to its convenience and thus increase their health literacy on the side effects of using plastic. Changing their attitudes towards single-use plastic is how we can change their actions regarding it. However, some studies also showed that a good knowledge might not necessarily result in good practice. For example, in a study conducted by Srinivasan et al., although the participants had a high knowledge level, the practice level was still less [8].

2.0 METHODS

2.1 Protocol registration

This study was approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia (registration number: NMRR-20-1913-54568) and it is conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline [18].

2.2 Literature search

A search for potential studies was performed by the primary investigator with five electronic databases namely, Scopus, EMBASE, PubMed, Web of Science and CINAHL and there were screened for relevant articles. Some articles were also hand-searched via Google scholar. An electronic search of the databases was performed with no limitations and language restrictions for each database. However narrative studies and reviews were excluded and included published studies until 30 April 2020.

2.3 Search strategies

Search strategies were developed to identify studies assessing knowledge, attitude and practices towards single-use plastic. A combination of Medical Subject Headings (MeSH) terms was applied to the screen title, abstract and keywords of articles in each database. The first search term combination was “single-use plastic”, “disposable plastics”, “non-reusable plastics” and “one-use plastics”. The second search terms were, “knowledge”, “knowledge level”, “awareness”, “understanding”, “perception”, “comprehension”, and “belief” followed by the third search using the following search term “attitude”, “perspective”, “mindset”, “view-point”, “sentiment”, “thoughts”, “reaction”. The fourth search used these search term combinations: “practices”, “behaviours”, “actions”, “approach”, and “measures”. The following searches followed specific query combinations of the MeSH terms (**Appendix 1**).

2.4 Study Screening

Any research studies published in English or English translation concerning single-use plastic were used. Peer-reviewed studies and those using qualitative or quantitative methodology were included. First, the title and abstract were screened, and those relevant ones were exported to Endnote X9. The studies were then screened for full-text articles and categorised as eligible. Studies were included if they investigated behaviour, perceptions, and knowledge towards single-use plastic or other equivalent terms. The full-text articles were then screened and the non-relevant and non-primary articles, such as review articles, plastic surgery research, plastic components research and narrative studies were excluded.

2.5 Study selection

The documents were verified for duplicates from the 29 studies obtained from the databases. Those with the electronic format were downloaded and each paper's title and keywords were assessed for relevance. From the papers selected, only cross-sectional studies were selected and each of their abstracts was evaluated. Only those related to SUP, KAP and sustainability, which provided information about the role of knowledge, attitude and practice concerning SUPs usage, were selected. Thus, five articles were selected in total to proceed with data extraction.

2.6 Data extraction and disagreement

The relevant data were then extracted from each paper. The information were transferred onto an excel sheet and categorised in several columns as follows: title, author, year, country, location, sample size, participant characteristics, study design/setting, methodology, data analysis, results/discussion includes, questionnaire/ test scores, findings, conclusion and limitations. Both detailed and summarised data extraction were created using excel sheets. The data was then duplicated by a second reviewer (PBO) in the standardised format. Any conflicting results obtained were resolved through further discussion involving a third reviewer (LTG) acting as a moderator who helped tally the results.

2.7 Quality assessment

Two independent researchers performed a quality assessment of the included studies via the checklist Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist. A third reviewer was also present to resolve any disagreement in scoring the STROBE. The checklist consists of 22 items assessing the different components of the articles such as the abstract, methodology and others and whether the information provided was enough to make any judgement. When the information provided was not adequate to make a statement respective to the item assessed, the items were given a score of '0' which showed a high risk of bias while those with enough information were given a score of '1'. Each article was then graded over 22, if the STROBE score was greater or equal to 14/22, the articles were evaluated as 'good' quality and those with a STROBE score lower than 14/22 were evaluated as 'poor' quality. In this systematic review, 5 articles graded as good quality with a STROBE score greater or equal to 14 were included.

2.8 Description of included studies

As shown in **Figure 1**, 29 articles were screened. After the removal of duplicates, 27 articles remained. The title and abstract of 27 articles were then screened, and those not relevant were excluded.

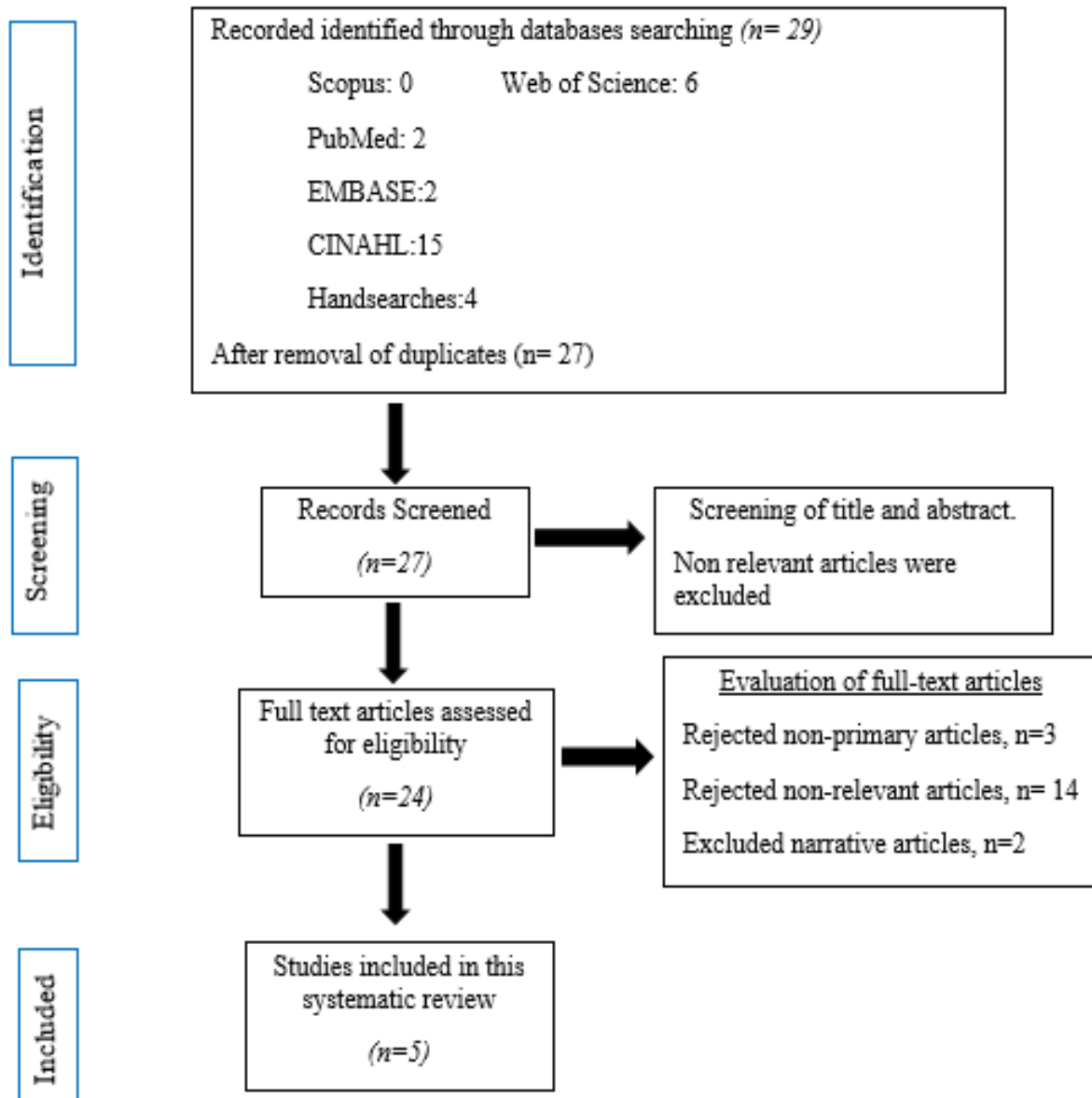


Figure 1 Prisma flowchart: The studies identified and included in the final screening.

Out of 27, 24 were relevant and then downloaded. Full-text articles were categorised as eligible. Subsequently, the eligibility of full text was evaluated, and non-primary research articles such as review articles, narrative studies and articles with non-relevant content were excluded which resulted in five (5) articles being included and used for data extraction and analysis (Table 1).

Table 1 List of studies with its characteristic, instrument variables and results.

Author (Years)	Place, Country/ participants	Study design/ Setting	Sample size	Participants Characteristics	Instrument - Variable	Results
Ahmad & Ariffin (2018)	Selangor, Malaysia	Cross-sectional	390	<ul style="list-style-type: none"> Age: 18-30 years, Median age=21 (Most 19, n = 82). Gender: 290 Females & 100 Males. Education: Undergraduate students (Year 1= 28.7%, Year 2= 25.4%, Year 3/4= 22.3% & Year 5= 1.3%). 	<ul style="list-style-type: none"> Sustainable consumption knowledge (SCK) Attitude towards sustainable consumption (ASC) Sustainable consumption practices (SCP) 	<ul style="list-style-type: none"> 74.1% of participants reported a high level of knowledge of sustainable consumption. 65.5% of participants reported a moderate level of attitude toward sustainable consumption. 49.2% of the participants reported a moderate level of practice on sustainable consumption. Students with high sustainable consumption knowledge tend to practice moderately. Students with moderate attitude levels tend to practice moderately. Students with high sustainable consumption knowledge levels tend to have moderate attitudes. There is a positive association between knowledge, attitude, and practice ($p < 0.05$).
O'Brien & Thondhlana (2019)	South Africa South Africa Residents.	Cross-sectional	1758	<ul style="list-style-type: none"> Age: 18 - 85 years, mean age= 33(16). Gender: 69% Female & 29% Male (2% Not indicated). Income: Monthly income (79%), No income (11%) & Did not indicate (10%). High education level (97%) 	<ul style="list-style-type: none"> New Environmental Paradigm approach (NEP) - Assess general environmental values, knowledge, and attitudes. 	<ul style="list-style-type: none"> 62% of the participants are aware that there are plastic bag problems in the country. 13% of the participants purchased plastic bags when they forgot to use reusable ones. 89% of the participants would reduce the use of SUP if the price increased by more than 4 times. Only gender, age and education yielded significant relationships with the willingness to pay (WTP) for SUP. A weak significant negative relationship between gender and WTP- females are less likely to pay. A weak significant negative relationship between age and WTP- The younger generation is more pro-environment. A positive relationship between education and WTP- higher education individuals would pay more for plastic bags.

Van Rensburg, S'phumelele & Dube (2020)	Durban, South Africa	Cross-sectional (mixed method)	120	<ul style="list-style-type: none"> • Age: <20 to >50. • Gender: Male (62, 52%,) & Female (58, 48%). • Education level: Primary level (5, 4%), Secondary level (47, 39%), Tertiary level (67, 56%) & other (1, 1%). • Ethnicity: Black (56, 47%), White (34, 28%), Indian (22, 18%) & Colored (8, 7%) 	<ul style="list-style-type: none"> • Sustainability science theoretical approach (4 sections) • Demographic Information • Consumption habits toward plastic bags and bottles • Environmental impact awareness • Willingness to reduce consumption of single-use plastics. 	<ul style="list-style-type: none"> • 90% of the participants reported a high level of awareness of how SUP could cause harm to their environment. • 71% of the participants reported a positive attitude and willingness to reduce their consumption of single-use plastic. • Action: 48% of the participants reported a low consumption habit of plastics (purchased less than 5 per week). • 51% reused plastic bags at least once before discarding them. • 34% used reused plastic bags on every shopping occasion. • The top reason for not using: Forget to bring with them
Bartolotta & Hardy (2018)	Ohio, USA Participants from five counties that form to make CESMA (surrounding city of Cleveland):	Cross-sectional, snowballing	1139	<ul style="list-style-type: none"> • Lake County = (83, 8.5%), • Lorain County = (60, 6.1%) • Medina County = (25, 2.6%) • Geauga County = (23, 2.3%). • Age: ≥18. • Gender: Not specified by the majority of females • Education level: majority high level of education. • Income: Majority ≥ \$30,000 annual income. 	<ul style="list-style-type: none"> • Online survey (focus -Plastic bags & bottles) -) use and disposal behaviour for both plastic items • The role of the local council is to support reusable alternatives to single-use plastic bags and plastic water bottles 	<ul style="list-style-type: none"> • 75% of respondents voted for Ban on plastic bags and plastic water bottles. • 42% of respondents selected financial incentives as the way to influence behaviour change • Suggestion: Location-specific solutions focused on education and outreach.
Kabir et al. (2019)	Bauchi, Nigeria	Cross-sectional; Mixed methods	300	<ul style="list-style-type: none"> • Age: Adult 57 (19%) & Youth 243 (81%). • Gender: Male (152, 50.7%) & Female (148, 49.3%). 	<ul style="list-style-type: none"> • Socio-demographic characteristics 	<ul style="list-style-type: none"> • 59.3% have good knowledge of the adverse effects of plastic bag usage. • A positive attitude was reported by 153 (51%).

				<ul style="list-style-type: none"> • Marital Status: Married (140, 46.7%), Single (160, 53.3%). • Educational Level: Higher Education (194, 64.7%), Lower Education (106, 35.3%). • Income: Majority \geq N18,000. • Attitude score: M= 49.46; S.D.=7.929 	<ul style="list-style-type: none"> • Knowledge regarding plastic bag usage • Attitude towards bag usage. 	<ul style="list-style-type: none"> • Age and income were associated positively with knowledge of the adverse effects of plastic bag usage ($p < 0.05$) • However, no mean score was reported for each factor. • Suggestions: creating awareness and intervention in these two groups (Age and income groups)
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M-mean; SD= Standard deviation; SUP= single used plastic; WTP= Willingness to pay

3.0 RESULTS AND DISCUSSION

3.1 Demographics (age, gender, education level), trends & associations

All 5 studies involved participants aged an average of 18 years old and above and three of the studies had a majority of younger participants categorised as youth [19-21]. As for gender, three of the studies had an overrepresentation of females (Bartolotta & Hardy, 2018; O'Brien & Thondhlana, 2019; (Ahmad & Ariffin, 2018), while the two others had an almost equal number of males and females (Van Rensburg, S'phumelele & Dube (2020); Kabir et al. (2019). In all five of the studies, the sample participants had a high level of education and only one study [19] did not assess the level of education as the study was conducted among undergraduate students.

3.2 Age and its association with KAP

For most of the studies, overall, the participants were aged between 18 and 85, but only Kabir et al. [21] categorised them as youth and adults instead of age range. Ahmad and Ariffin's (2018) study was conducted only with university students representing the younger generation [19]. The results showed that they had a high level of knowledge, with 80% correct answers on the sustainable consumption knowledge questionnaire. This might be the result of having access to good environmental education in terms of green actions. Moreover, these students have tertiary-level education, which indicates that they already have a high level of understanding and logical thinking. As for Kabir et al. study, they found a significant association between age and knowledge and also found that youth had a higher level of knowledge concerning the adverse effects of plastic bags compared to adults [21]. Youth were more exposed to different kinds of media especially social media which can act as an informative platform to acquire knowledge about plastic. Moreover, youngsters are most likely still attending a school where they are more educated about this topic and more exposed to educative workshops or campaigns which help further boost their knowledge level. The older generation are less exposed and if the sample includes very old people, they might not have all attained high education level. Ahmad and Ariffin [19] also demonstrated an affirmative attitude; the majority was categorised as having a moderate attitude level. In terms of practice, most of them had moderate and poor practice levels, of which most agreed that recycling was difficult. O'Brien and Thondhlana (2019) found a weak negative significant correlation between age and willingness to pay for plastic bags, indicating that younger generations were more likely to act pro-environmentally. It might be due to them being more exposed to sustainable environment campaigns, and information compared to older people who were less exposed maybe because plastic pollution was not as present and damaging as it is now [20].

Studies also showed that the younger generations had a more pro-environmental attitude and behaviour. Most of the study sample consisted of younger participants, we observed that most of them had a high education level and also a higher knowledge level implying that youngsters were well-equipped and environmentally knowledgeable. This might be due to the youngsters nowadays being constantly educated regarding the harms caused by SUP. Social media and various programs were conducted to educate people about reducing the use of SUP as frequently as possible, and thus, the younger generation has a higher awareness of SUP problems and knows their social responsibility than the older generations [22]. Moreover, a study found that youngsters had a good relationship with green purchasing initiatives, stating that they pay more attention to what they are buying as well as their actions and attitude. They believed that they are an essential part of the ecosystem as their actions will provide a better and more sustainable future for all humankind [23].

3.3 Gender and its association with KAP

Out of the five studies, three conducted by Ahmad and Ariffin, O'Brien and Thondhlana & Bartolotta and Hardy had a sample skewed toward female participants. Ahmad and Ariffin [19] conducted their study at a university in Malaysia, and they had more female participants due to the prevailing gender disparity in most public universities in Malaysia. O'Brien and Thondhlana's [20] study which aims to investigate the perception of plastic use and the effect of price on consumer behaviour found a significant negative correlation between gender and willingness to pay for plastic bags. In Bartolotta and Hardy's [24] study, no significant correlation was found between gender and consumers' knowledge of the adverse effect of plastic bag use.

From the studies, we found that females were found to be less willing to pay for plastic. This may be due to the more conservative nature of females compared to males and therefore have a tendency to spend less, or it may also be due to females having a more pro-environmental attitude [25]. Thus, we found women have a lesser propensity to use single-use plastic and prefer to use recyclable bags to carry their consumables as compared to men. This agrees with Vincente et al. [25] study suggesting that females have a more pro-environmental attitude and behaviour than men due to their higher level of socialisation and social responsibility [25]. This behaviour might be due to the more nurturing and reproducing role and thus are more sensitive and concerned about the environment [26]. Moreover, they were more active in consumer behaviour, such as recycling and waste segregation [25]. This might also be because women are more exposed to household work which includes the following, reasons why they have better attitudes and practices than males [27]. However, this might also differ now due to

gender equality in work and household chores. In terms of knowledge, it is mostly linked to the level of education and exposure to proper environmental education rather than gender, hence there is no significant relationship between the two variables. Though some studies do find that men are more knowledgeable in terms of environment though this might be due to discrepancies between gender in selected places whereby males are given better and higher education compared to females [25].

3.4 Higher education and its association with KAP

For all the studies reviewed (**Table 1**), most participants had a high level of education. Kabir et al. [21] found no correlation between knowledge and education level. Since all the participants in Ahamad and Ariffin's [19] study were tertiary-level students, the results showed that participants had a high knowledge level which shows that those attaining higher education levels might be knowledgeable in environmental awareness. O'Brien and Thondhlana's [20] study showed that participants acknowledge the presence of a plastic usage issue, and since 97% of the participants had a high education level these might be related. Similarly, the study by Van Rensburg et al. [28] found that participants were quite aware of single-use plastic adverse effects on the environment and had a negative perception of its use. However, no significant correlation was analysed to state that high education usually results in a high level of knowledge. O'Brien and Thondhlana's study revealed a positive association between education level and an individual's willingness to pay for plastics [20], i.e., those with higher education were more likely to pay more for plastic bags. In this instance, attainment of a higher education level does not result in higher environmental consciousness or a reduction in single-use plastic usage directly.

3.5 Knowledge, attitude and practice (KAP)

3.5.1 Knowledge

The studies show that most participants had a high knowledge level concerning sustainable consumption and the detrimental effect of plastic usage. Kabir et al. [21] found that youth had a higher level of knowledge than adults. Similarly, Ahamad and Ariffin's [19] results also showed that student was generally very knowledgeable in terms of sustainable consumption. Moreover, a study conducted in 2020 in South Africa also showed a high acknowledgement of the plastic problem in the country. On the contrary, Kabir et al. [21] found that the participants had good knowledge regarding plastic's adverse effects but still lack basic knowledge.

3.5.2 Attitude

Some studies showed that participants have a positive attitude towards the adverse impacts of single-use plastic and a negative perception towards SUPs. Their willingness to reduce single plastic use or to limit their usage and even their support for SUPs ban policy shows their good attitude level. Ahamad and Ariffin [19] showed that the participants had a moderate level of attitude and similarly. O'Brien and Thondhlana [20] found that all the participants were willing to pay for the continued use of plastic bags.

3.5.3 Practice

As for practice, only one of the five studies examined the triangulation relationship among knowledge, attitude and practice [19] with almost half of the participants reporting a moderate level of practice on sustainable consumption. Furthermore, a positive correlation was also observed between individuals with higher sustainable consumption knowledge and the practice of using recycled bags. Bartolotta and Hardy (2018) found that plastic bags and reusable bags are used for approximately the same amount of time. Moreover, less polluting paper bags are still being used less than plastic bags [24]. Still, in some cases, SUPs are being reused as alternatives, as shown in O'Brien and Thondhlana [20] and Van Rensburg et al. [28] studies. Overall, the most common reason some participants still use SUPs is forgetfulness [28].

Ahamad and Ariffin [19] assessed the relationship between knowledge, attitude and practices of university students in Malaysia towards sustainable consumption (SC), which is their way to minimise environmental impacts. The gap between knowledge and practice was found in several previous studies whereby even if the knowledge level was high, but the practice was still less [8, 29-31]. This gap between practices and knowledge could be a lack of motivation to practice or an inability or unwillingness to retain the environmental knowledge obtained to act on it eventually [29]. As for attitude, Ahamad and Ariffin [19] found a significant relationship between knowledge and attitude and practice and attitude. Eventually, people develop attitudes by being in contact with objects, experiences or information they are exposed to [32]. Therefore, acquiring increasing knowledge about environmental issues will lead to a more positive attitude towards a sustainable environment including plastic reduction.

3.6 Strengths and limitations

This is the first systematic review of KAP toward SUP. The findings explicitly indicate that high knowledge is not necessarily coupled with a good attitude and practice. This review has some limitations: Firstly, only five articles met our inclusion criteria; we know that more studies could provide us with more details and theories. Notwithstanding this limitation, we obtained substantial information and saw the direction and results of similar previous studies. Secondly, the pooled sample size was small and consisted of a high percentage of female respondents. From previous studies, we could see that gender was an associative factor. However, the skewed samples of the studies might therefore be more biased towards women. Moreover, most of the studies included in the systematic review used self-reported measurements in terms of plastic use and sustainable practices. These measurements are not considered fully reliable due to participant bias. The reported practices such as plastic bag consumption don't always match the actual consumption rate [33]. Thirdly, although some relationships were found between KAP and the demographics data, correlation doesn't necessarily mean causation. However, it does provide us with some insight into the target points of future intervention.

4.0 CONCLUSION AND WAY FORWARD

Due to the COVID-19 pandemic, the excessive use and consumption of single-use plastics, including personal protective equipment such as masks and gloves, and multiple movement control restrictions, the KAP of users during this period may not be suitable to be considered in the development of an intervention.

Based on the review of the five articles, we found that firstly, younger people have good knowledge of SUP. Secondly, females and the younger generation showed more pro-environmental attitudes and practices toward SUP. We also found that a high education level doesn't necessarily result in good practices. This shows that having more knowledge about SUPS impacts and effects may lead to a good attitude towards its use; however it doesn't necessarily result in better practices.

SUPs are one of the most common sources of plastic pollution and are now seen in our surroundings. Even though we know that we have a plastic issue all around the world and most people know all about its detrimental effects on our world, SUP reduction and health literacy levels among individuals remained relatively poor and low. It could be due to the busy lifestyle and routine we are all living in, where the need to earn money is much higher on our priority list than being environmentally friendly and cautious. People may have an ignorant attitude toward SUP reduction and are more preoccupied with their own life that they do not see the need to care about their surroundings.

To better develop interventions on single-use plastic reduction in the endemic communities, we consider KAP before the pandemic would produce more relatable, acceptable and effective interventions. The government should also strengthen their plastic policies, increase the price of SUP and impose plastic waste management taxation to discourage people from using plastics. We should also make more effort towards organising awareness campaigns, and support groups and use the social platform to spread awareness among the public. We may begin to educate and promote the increase of health literacy by making a conscious effort in public policymaking to encourage the public to make baby steps towards reduction of SUP's usage as we do not need a handful of people practising zero waste perfectly, we need millions of people doing it imperfectly.

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Appendix 1 Search strategies.

Searches	Search Items	Scopus	PubMed	EMBASE	Web of Science	CINAHL
#1	Single-used plastic OR Disposable plastics OR Non-reusable plastics OR One-use plastics	6	19	15	230	1 128
#2	Knowledge OR Knowledge level OR Awareness OR Understanding OR Perception OR Comprehension OR Belief	642 359	1 711 936	2 116 562	611 960	69 086
#3	Attitude OR Perspective OR Mindset OR View-point OR Sentiment OR Thoughts OR Reaction	7 164 502	1 187 205	1 384 467	1 226 147	14 461
#4	Practices OR Behaviours OR Actions OR Approach OR Measures	15 833 181	2 362 008	2 913 800	2 673 614	61 042
#5	#2 OR #3 OR #4	21 353 693	4 730 243	5 755 337	4 374 139	91 719
#6	#1 AND #5	0	2	2	6	15