

# Microplastics pollution understanding of beachgoers in Cape Town: South Africa

Xolisiwe Sinalo Grangxabe<sup>1</sup>, Thabang Maphanga<sup>1</sup>, Benett Siyabonga Madonsela<sup>1</sup>, Siviwe Elvis Yuyu<sup>2</sup>, Tshidi Precious Baloyi<sup>1</sup>

1. Department of Environmental and Occupational Studies, Faculty of Applied Sciences, Cape Peninsula University of Technology, Corner of Hanover and Tennant Street, Zonnebloem, Cape Town 8000, South Africa
2. Department of Conservation and Marine Sciences, Faculty of Applied Sciences, Cape Peninsula University of Technology, Cape Town, South Africa

Corresponding author: [Grangxabex@cput.ac.za](mailto:Grangxabex@cput.ac.za) and [Maphangat@cput.ac.za](mailto:Maphangat@cput.ac.za)

## Abstract

Plastic pollution is a global issue with microplastics gaining international attention from NGOs, the government, the public, media and academia, microplastics are a growing source of concern. This research paper aims to explore the Cape Town beachgoers' general knowledge and understanding of microplastic pollution in terms of its potential effects on the environment and human health. Using a questionnaire, the study was conducted at Muizenberg and Lagoon Beach, the study involved participants belonging to the age group of <18-64 years. A sampling technique known as convenience sampling was used, this technique allowed individuals to be selected based on their willingness to be part of the sample and their availability, it allowed participants with no obvious knowledge of microplastics to take part. The data was recorded in Excel and analysed with Statistical Package Social Sciences (SPSS). Although the public was relatively familiar with microplastics at the time of the study, with 40% of the participants from Muizenberg Beach does not know what microplastics are, while 60% knew. In Lagoon Beach, 26.67% did not know what microplastics are, while 73.33% did. Environmental education and the prohibition of microplastics were identified by the majority of respondents as necessary measures for reducing microplastic pollution and further research was suggested, with some of the respondents believing that the lack of strict regulations on plastic use was the greatest difficulty in reducing the pollution from microplastics.

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## 30 **Impact statement**

31 Microplastics are emerging contaminants posing significant threats to the environment and human  
 32 health, with nanoplastics being even smaller and potentially impacting biological systems. These  
 33 nonbiodegradable particles can build up in the digestive tracts of living things, with diverse effects on  
 34 both biology and physics throughout food chains. Inflammation, metabolic problems, oxidative stress,  
 35 and decreased enzyme activity in animals are among the effects. Microplastics have drawn interest from  
 36 researchers worldwide and have been considered a major problem related to global plastic pollution  
 37 that has existed for some time, including in South Africa. Since recent scientific evidence has increased  
 38 the urgency of the issue of microplastics, the public has become increasingly concerned about them as  
 39 an environmental issue. Several natural science studies have investigated microplastics from  
 40 perspectives such as basic knowledge of microplastics.

41 **Keywords:** Microplastics, Environmental awareness, Social behaviour, Beach goers; Knowledge.

## 42 **1. Introduction**

43 Plastic pollution is a global environmental issue which has impacts on livelihoods, biodiversity, and  
 44 public health due to its non- biodegradable nature making it persistent to the environment. Plastics are  
 45 a wide variety of combinations of properties when viewed as a whole; they are used for rubber, fibre,  
 46 asphalt. Plastics are formed by elongated chains of polymeric molecules that are created from organic  
 47 and inorganic raw materials, such as chloride, silicon, oxygen, hydrogen, and carbon (Robinson, 2024;  
 48 Shah et al., 2008). Nevertheless, plastic pollution is growing at an exponential rate and has become an  
 49 area of concern due to its potential to cause serious environmental consequences. The discarded plastics  
 50 waste accumulate in landfills and natural environments (Wojnowska-Baryła et al., 2022; Heller, 2022).  
 51 The increased use of plastic for its various purposes worldwide and waste mismanagement of plastic in  
 52 societies has caused the prevalence of microplastics across the globe, the issue of microplastics has  
 53 gained significant attention from the global scientific communities (Furtunov, 2024; Yuan et al., 2020),  
 54 with microplastic pollution gaining more international attention as it poses environmental and health  
 55 risks. Muthuvairavasamy (2022), reported that plastic debris can be classified according to their sizes  
 56 namely Mega, Macro, Meso, Micro, and Nano plastics. Microplastics are smaller pieces of plastics that  
 57 are approximately 5mm and smaller (Arif et al., 2024; Sharma and Kaushik, 2021; Khan, et al., 2018).  
 58 These MPs are present in two forms, either primary or secondary form (Soares et al., 2021). The primary  
 59 form are those produced in their original size and are commonly found in cosmetic products such as  
 60 face scrubs, body wash, toothpaste and ointments (Patil et al., 2024; Bouwman et al., 2018; Giustra et  
 61 al., 2024), while secondary MPs are associated with the plastic fragments as a result of plastic pollution  
 62 from grocery bags, garbage bag, and other plastics as they breakdown into smaller particles (An et al.,  
 63 2020; Kurniawan et al., 2023; Yuan et al., 2022).

Over the past few years, research on microplastic pollution has gained significant attention all around the globe (Omoyajowo et al., 2022; Hossain., 2024; Akande, 2023), some mainly focusing on the coastal environment (Van Ryan Kristopher et al., 2021; Harris, 2020; Ryan et al., 2020), estuaries (Boshoff et al., 2023; Govender et al., 2020; Samuels et al., 2024) and microplastic impacts on human health (Blackburn and Green, 2022; Ghosh et al., 2023) and public awareness levels of microplastics pollution (Henderson and Green., 2020) to name a few. Although microplastics have been extensively researched in the scientific community, there is a large gap between academic studies and public awareness especially in Africa where environmental awareness is lower compared to other continents and is slowly increasing due to NGOs and international aid. South Africa is no exception, where the population and the environment are highly susceptible to MP pollution due to the country's poor waste management techniques (Julius et al., 2023; Malematja et al., 2023), lack of waste management services in some areas (informal settlements), heavy reliance on plastic among the populace (Furtunov, 2024; Khangale et al., 2020) and insufficient environmental awareness/education. A number of literature has shown that understanding public knowledge, attitude and perception about microplastic pollution could help to mind the gap towards proper management of inland waste and beachgoers behaviours towards the marine environment (Omoyajowo et al., 2022; Ghosh et al., 2023) and further lead to the mitigation of microplastics.

Although there are policies and initiatives in place at national and international level such as public campaigns to raise awareness and address the knowledge gap, for instance the United Nations has taken action to address microplastic pollution through its Clean Seas campaign (Usman et al., 2022; Ghosh et al., 2023), but there are also challenges that need to be overcome, such as lack of awareness, ineffective regulations and lack of public willingness to participate. A study in Shanghai by Deng et al (2020) showed that only 26% of the respondents had heard of microplastics before the survey, and the majority were relatively unfamiliar with microplastics. Although, studies have shown that some region like Japan and China have shown high awareness while others are less informed. The public's understanding of plastics is not comprehensive enough in some Asian countries for instance another study conducted in Bangladesh by Hossain (2024) on people's attitudes regarding plastics and microplastics pollution showed that only a small percentage of participants (22%) had prior knowledge of the term microplastics while a large proportion of them (66%) had never heard of them and 12% were not sure. Therefore, such evidence support studies that states that there is a need to understand public perceptions of plastics in society and their environmental impacts if we are to develop appropriate interventions to reduce the input of plastic waste into the ocean (Soares et al., 2021; Dilkes-Hoffman et al., 2019; Pahl and Wyles, 2017). Which is why countries in Europe and Asia have pushed on campaigns focusing on promoting the reduction and elimination of single-use plastics, improving waste management, and increasing public awareness (Akande, 2023; Borg et al., 2022). Nevertheless, the discovery of microplastics in the marine food chain has led to concerns for human consumption of seafood (Unuofin

and Igwaran., 2023; Lehel and Murphy., 2021) although adverse effects on human health is “limited, difficult to assess and still controversial” (Barboza et al., 2018; Henderson and Green., 2020). Nations like Canada and the United States, have also proposed or implemented bans on microbeads in personal care products (Deng et al., 2022), while in Europe, the European Union has also banned it and also proposed a ban on single-use plastics, use of plastic straws and cutlery (Lee and Kim., 2022; Guzik, 2023; Grosso, 2022). With all these regulations and policies, it is still understood that the public is still relatively unfamiliar with microplastics. A study conducted by Deng et al (2020), revealed that most respondents believe that the lack of knowledge and environmental awareness of micro- plastics is the greatest difficulty in reducing the pollution from micro- plastics. Therefore, it is imperative and crucial that human behaviour is considered the sole source of marine litter, changing perceptions and behaviour is key to tackling litter in the natural environment (Pahl and Wyles, 2017). In a study on community awareness and perceptions on microplastics, majority of respondents (67%) were aware of MPs, and their responses were closely linked to their level of education although their knowledge on regulatory measures was not enough or insufficient (Premarathna et al., 2023), meaning there was still lack of regulation understanding used to mitigate impacts of plastic usage in Sri Lanka.

Microplastics pose a severe threat to natural ecosystems, more especially the aquatic ecosystem. Therefore, exploring public opinion and knowledge about plastic litter is essential for the successful implementation of policies targeting plastic pollution (Forleo and Romagnoli, 2021). A number of studies carried out in other countries noted that the young generation is more mindful of environmental issues than the older generation and their use of social media is crucial as it helps to shape public and policy discourses with implications for public awareness and political action (Lassen, 2018; Laskar and Kumar., 2019), therefore media coverage plays a vital part in spreading awareness. Literature suggests that attitudes and knowledge about microplastics can predict various behaviours that contribute to the mitigation of related emissions (Deng et al., 2020). at the individual level, human behaviour is associated to awareness, perception, attitude, level of concern about this environmental issue therefore causing them to engage in solutions that are key elements for policy makers to introduce and implement effective pollution control measures. Environmental aware consumers are a typical example as they have the power to reject products and decrease the demand leading to the manufacture to listen to their demands and government intervention. Additionally, societal level behaviour is influenced by policies and legislations (Beeharry et al., 2017). According to Bouwman et al (2018) producers, consumers, government and other affected parties can address the plastic issues in South Africa and the world with an intensive effort. However, the knowledge gap between the government and society in developing countries such as South Africa is huge. South Africa is one of the countries that is on its way to put more efforts into microplastics research (Boucher and Friot, 2017; Bonthuys, 2018).

Microplastic pollution is a growing study and receives worldwide attention, although microplastics have been extensively researched in the scientific community public perceptions, attitudes and behavioural

preferences towards microplastics remain underexplored in the research on microplastics, this study will be serving as a baseline study in South Africa to understand the issues, distribution, and fate of microplastics. The research provides knowledge and understanding of microplastic pollution and its pathways, to academics and non-academics. plastic waste is problematic as this pertains to mismanagement and lack of knowledge from the local communities. With that in mind, this study seeks to widen the understanding of the impact of microplastics and get a view from the people.

## 2. Materials and Methods

### 2.1 Study area

This study was conducted at two different locations, namely Muizenberg beach and Lagoon beach. These two sites differ in coastal dynamics as well in beach activities. Also, the industrial activities found in these two selected sites differ, the study area is further explained in Figure 1 and 2.

Figure 1:

The two locations that the survey took occur are namely, Muizenberg and Lagoon beach. Muizenberg beach with coordinates (34.1087° S, 18.4702° E) is a side suburb of Cape Town located on the coast of False Bay. It is on the east side of the coast, on the curve of the Cape Peninsula. The place is known for its popular surfing activities and kiting. The area is one of Cape Town's tourist attraction points and it is about 35km away from Cape Town. Fishing and angling are also common activities that one would find in Muizenberg beach. Muizenberg has an estimated population size of 36,857 with English as the first dominant language (Lehohla, 2015; Stats SA, 2011).

Figure 2:

The second site is Lagoon beach (33.8922°S, 18.4834°E) that is located in Milnerton and is a prime site of Rietvlei estuary. The lagoon is a sandy beach on the West Coast of Cape Town and is in proximity with hotels and commercial apartments. Milnerton has an approximate population size of 95630 (Lehohla, 2015; Stats SA, 2011).

### 2.2 Data collection method

According to Taherdoost, (2022), the advantage of a qualitative approach is that it considers the big picture in a way that quantitative methods cannot. Rather than assessing a list of potential challenges facing research participants, it was determined that a qualitative approach would be more appropriate

for this study, which sought to get the understanding of microplastic pollution. The research was conducted using qualitative technique which in the form of a questionnaire, which was used as an instrument for data collection. According to Shamsudin et al (2024) and Whitehead and Whitehead (2020), questionnaires are a cost-effective research tool for data collection. A sampling technique known as convenience sampling was used, this type of procedure is non-probability. This technique allowed individuals to be selected based on their willingness to be part of the sample and their availability (Kumar, 2019; Whitehead and Whitehead, 2020). This technique was employed to ensure that every group of the population is eligible to be part of the sample. The convenience sampling was achieved through walking around the sites and stopping people or in some cases to disturb them and ask if they willing to take part in the research. Convenience sampling is cost-effective, requires fewer resources, fast and saves time. Small-scale quantitative surveys have been undertaken to explore public perceptions and understanding of marine litter. The research design was meticulously selected to meet the study's research aims, objectives, and research questions. The section that follows provides additional information about the case study methodology, data collection instrument, and data collection procedure. The study was conducted at Muizenberg beach and Lagoon beach, the survey focused on the people that were around the beach either the beachgoers, residents, and people who work around the two beaches. This includes recreational water sports participants and lifesavers. Random questioning did not cover other areas beyond the specified areas in these two sites. Before participating in the study, the participants were informed of its nature and that their participation was voluntary. During the introduction, they were also informed that they could withdraw from the study at any time. Participants were assured of anonymity and confidentiality.

### 2.3 Validity and Reliability

Through questionnaires, the data collection method has been outlined according to the study's well-defined objectives. Experts (co-authors, such as Siyabonga Madonsela) within the specific field dealing with bush encroachment management as well as pre-field administration validated and endorsed these structured interviews and questionnaires. As part of the pre-test, questionnaires were given to participants to determine how they would respond to questionnaires before heading to the field. After the pilot phase, feedback provided a useful basis for adjusting the questionnaires and structured interviews. Following the pilot study, Cronbach's Alpha was 0.76, which was acceptable and satisfactory.

### 2.4 Data Analysis

Using IBM Statistical Package for the Social Sciences (SPSS) version 26, a program for editing and analysing data (Verma, 2012) that ensures the meaningful and symbolic content of qualitative data, we analysed questionnaire data such as demographic information (Creswell, 2007). The significance of the

significant statements and phrases regarding the studied phenomenon was then formulated into significant statements.

### 3. Results and Discussion

#### 3.1 Demographic profile of Muizenberg beach and Lagoon beach

The participants from Muizenberg beach, the majority were male participants with a percentage of 66.67%, while 33.33% were female shown in Figure 3. This is supported by 2011 data from stats SA which showed that Muizenberg beach had more males than females, with 19,012 (51.58%) males and 17,845 (48.42%) females in 2011. However, the whole Western Cape was recorded to have approximately 5.8 million people and more than half of the population, about 51% of the population was females (stats SA, 2011)

Figure 3

Results from Lagoon beach, the minority were male participants with a percentage of 46.67% of the sample size. Female participants found in Lagoon beach contributed about 53.33% of the total sample size. Stats SA of 2011 contradicts the above information; they state that there were approximately 48,258 (50.46%) males and 47,371 (49.54%) females in Lagoon beach (Figure 4). However, in findings by the Western Cape population profile (2017) states that Cape Town has 51.5% females.

Figure 4

Majority of the participants in Lagoon beach were in age groups of 25-34 and 45-54, with 23.33% respectively of the total sample size as shown in Figure 5 below. Participants at age group 35-44 and those below 18 years were the second most participants in the survey with 13.33%. The lowest percentage was observed for the age group 55-64 with 10%. The majority Lagoon participants were in their early 20s to late 30s, referred to as youth and there was also a high number of middle-aged participants. The fewest participants were teenagers (<18) and older-aged adults (>55) (Figure 5). While in the Muizenberg beach it was found that majority of the participants were in the age groups of 25-34 and 18-24, both age groups having 30% of the sample size shown in Figure 6 below. Furthermore, this meant that the population is predominated by young adults (youth). The remaining 40% was split into the age group of 35-44 accounted for 23.33% while the participants younger than 18 years and those in age groups of 55-64, both represented 6.67% of the sample size (Figure 6). While the fewest participants were found in the age group 45-54 with 3.33% of the population (Figure 6). This shows



that the representative population is made up of young adults (18-34) and has few middle-aged adults (36-55 years) while it also has older adults that are twice the number of middle-aged adults (Figure 6).

Figure 5:

Figure 6:

There were a couple of similarities and differences between the two sites. Here is a comparison of demographics between the two sites. Young adults, from the age range of 18-35, were the dominating participants from both sites. However, Lagoon Beach had a high number of older adults compared to Muizenberg, with age range above 55 years. In terms of the employment status of the participants, there were more employed participants in the survey in both areas. Although South Africa is suffering from the high unemployment rate, the selected sample size was merely affected by this issue. With the increasing number of tertiary students in South Africa, students were the second dominant in the surveys employment status. According to stats SA of 2011 there were more females in South Africa than males. This was further published by stats SA of 2019, showing that there are still more females than males. Although stats SA provided such information, Muizenberg had more males in the survey than females compared to Lagoon beach, which was dominated by females.

### **3.2 The knowledge of microplastics and the sources of information, from Muizenberg beach respondents.**

The participants were asked if they have an idea what is and where did they hear about it, options were given for them to choose from. About 40% of the respondents did not know what are microplastics, while 60% did know shown in Figure 7. Out of the 60% that has knowledge on microplastics they were further asked where they learnt about microplastics. Approximately 16.67% of the participants that know microplastics identified radio/TVs as their source of information about microplastics (below Figure 7). Approximately 44.44% of the participants responded that they know microplastics and they learned about microplastics on social media, It is evident that the rises on the use of social media platforms have an educational contribution. About 5.56% of the participants that know microplastics have indicated that they obtained their knowledge via lecture. Over 33.33% of the 18 participants that know microplastics have indicated "other" as their source of information, which could be friends, newspapers, or other sources of information. The above results are in line with Kapoor's study (2011) that showed how mass media plays an important role in creating environmental awareness and distributing information. During Kapoor's study (2011) study, it was shown that a majority of people were gaining environmental education through radios and most of them were found to be illiterate,



community radio stations have been playing a key role in promoting environmental issues and raising awareness( Mbangati, 2020).

Many studies including this one have showed that media in general plays a vital role in educating people about environmental issues, particularly social media and radio. Some people use social media and other media channels as their sources of self-educating, so the high numbers of social media users may be linked with the interest of self-education. However, this is not surprising because the world has become more digital as Figures are on social media. Several studies found major media channels were found to be effective for educational purpose and that was in line with results found in this study (Kushwaha, 2015; Kapoor, 2011; Chen and Wang, 2021). Although majority of people indicated that people must be educated more on microplastics, and they have human health impacts. A smaller percentage have stated that microplastics have no human health impacts and there is no necessity for education. However, Hammami et al. (2017) contradicted the results by stating that the use of education to reduce microplastic pollution is an effective method. Those who indicated that microplastics have human health impacts may have been guessing the response or their sources of information about microplastics may have highlighted human health impacts. The above results are not a true reflection of the entire population and there were missing aspects during the study.

Figure 7:

### **3.3 The knowledge of microplastics and the sources of information, from Lagoon beach respondents.**

The Figure is the correlation about whether people know microplastics or not and where they learned about microplastics. The graph shows that out of all the people that participated in the study in Lagoon Beach, 26.67% do not know what microplastics are while 73.33% have knowledge on the subject. Those who have knowledge of microplastic pollution were then asked to identify their source of knowledge. Roughly, about 36.36% of them identified radio/TVs as their source of information about microplastics. Furthermore, another 36.36% of people from those who indicated that they know microplastics selected social media as their source of knowledge while 18.18% participants in the sample indicated that they learned about microplastics during lectures and only a few 9.09% participants have indicated that they have learned about microplastics from other sources. In support of the above results, Kushwaha (2015) states that the approach to using different media sources to address environmental issues is a promising development. Targeting social media and radio/TV was suggested to be a better way of reaching a larger part of society than using flyers and websites (Kushwaha, 2015). The issue with websites and flyers

was the fact that not everyone has access on websites and some people are illiterate to read on flyers. Völker et al. (2020) conducted an empirical analysis of media framings and concluded that three main narratives are used in media reports: (i) that microplastics are abundant in the environment, (ii) that microplastics are present in food and beverages, and (iii) that microplastics contain toxic chemicals that animals may ingest. Many respondents associated microplastics with their presence in the environment, primarily in marine habitats, as well as environmental pollution and animal distress, according to our findings.

Figure 8:

### 3.4 Education about microplastic pollution and its impacts on the Environment.

The majority of respondents associated microplastics with potential consequences, frequently in relation to environmental impacts and less frequently with personal impacts. Although it was also mentioned where microplastics can be found, such as in aquatic environments and the ocean, opinions regarding potential causes/sources appeared to be somewhat hazy. This is consistent with previous research indicating that the general public may not be aware of the origins of microplastics (Anderson et al., 2016; Deng et al., 2020; Henderson and Green, 2020).

Figure 9:

While some responses to the close-end question on microplastics define the issue rather explicitly, others suggest merely a hazy grasp. This current study assumed that a higher understanding of microplastics leads to decreased levels of fear based on respondents' familiarity with various media narratives about microplastic consequences (Fiene, 2014: 41; Renn, 1998). Subsequently in this study did not examine the accuracy of the public's knowledge of microplastics, but rather inquired about self-assessed knowledge and understanding of microplastics information. Based on the results obtained from the data analysed from Muizenberg data, 20% of respondents indicated that there is no need for education while 80% participants indicated that there is a need for education on the subject as shown in the below Figure 8. The need for more education on microplastics and plastic disposal is supported in a study by hammani et al (2017). Several scientists (Choy and Drazen, 2013; Wright and Kelly, 2017) conducted studies which are in line with the results obtained in this research. The studies state that the knowledge on the impacts of microplastics on human health is limited (Choy and Drazen, 2013; Wright

and Kelly, 2017). In support of the results, Smith et al., (2018) stated that they have a potential of causing lung cancer on humans depending on quantity of consumption.

Figure 10:

In the above Figure representing Lagoon beach data, 27.27% of respondents indicated that microplastics have no impact human and 72.73% of the participants said the there is an impact on human health (Figure 9 left). A maximum of 84.21% of the participants of the total sample have indicated that people need to be educated more on the subject while 36.67% of the participants of the total sample indicated that there is no need for education about microplastics. Approximately 66.67% (16 out of 24 participants) that indicated that microplastics have an impact on human health was on those who indicated that there is a need for education on the subject. About 33.33% (8 out of 24 participants) of those indicated that microplastics have human health impacts were on those who indicated that there is no need for education about microplastics. Wals et al. (2014) indicated that urgent issues such as environmental pollution and climate change should be addressed through science education by sharing teaching knowledge and skills through various media. Majority of Lagoon beach has agreed to the need for more education on microplastics, this is supported by Hammami et al. (2017) who also marked environmental education and awareness campaign as better methods of educating the public about environmental issues of concern. The studies indicate that human health impacts depend on dosage (Smith et al., 2018). Similar findings have been reported by other researchers (Anderson et al., 2016; Henderson and Green, 2020), for example even though people frequently associated evaluations with our research, the types of evaluations they made primarily concentrated on attributing a negative affective valence to microplastics and, to a lesser extent, on the viability of resolving the problem. As a result, only a few respondents mentioned or were unaware of the possibility of other forms of evaluation, which may explain the lack of a wider range of evaluations. Providing participants with more comprehensive knowledge about effective strategies to decrease microplastics contamination could lead to a wider range of opinions on different aspects of microplastics, such as the importance of the issue and the effectiveness of the suggested solutions. This adds to the existing corpus of research that calls for increased communication efforts focusing on both the risks and solutions associated with microplastics (Veiga et al., 2016).

#### 4. Conclusion

If they were well-versed in media narratives, women, middle-aged individuals, and the elderly exhibited relatively elevated risk perception. Environmental consciousness and media literacy strongly predicted perceptions of the dangers that microplastics pose to the environment and human health. Media

messages and established social norms influence the public's perceptions of plastic pollution and the newly discussed issue of microplastics. Rather than focusing primarily on potential negative effects, information campaigns may benefit from combining data about specific sources of microplastics with practical advice on how people can take everyday steps to help mitigate the problem. This is consistent with the theory that knowledge of behavioural options and prospective action methods is one of the most important categories of information associated with pro-environmental behaviours (e.g., Kollmuss and Agyeman, 2002). The findings of this study highlight the need for increased scientific literacy that utilizes media in compelling and accurate ways to engage diverse audiences in innovative and creative ways. The issue of microplastics must be presented with consideration for cultural specificity, media preferences, scientific comprehension, and perceptions of plastics.

#### **Ethical approval statement**

The study, which involved human participants, was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Cape Peninsula University of Technology (231059965; 28 August 2023).

#### **Consent to participate and to publish**

All authors have read and agreed to the published version of the manuscript.

#### **Author Contribution Statement**

X.S.G: Writing- original draft preparation

T.M: Writing- review and editing, supervision

B.S.C: Writing- review and editing, project administration

S.E.Y: Writing- review and editing, graphics and visualisation editing

T.P.B: Writing- review and editing

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#### **Conflict of interest**

The authors declare no potential conflict of interest.

#### **Availability of data**

Not applicable.

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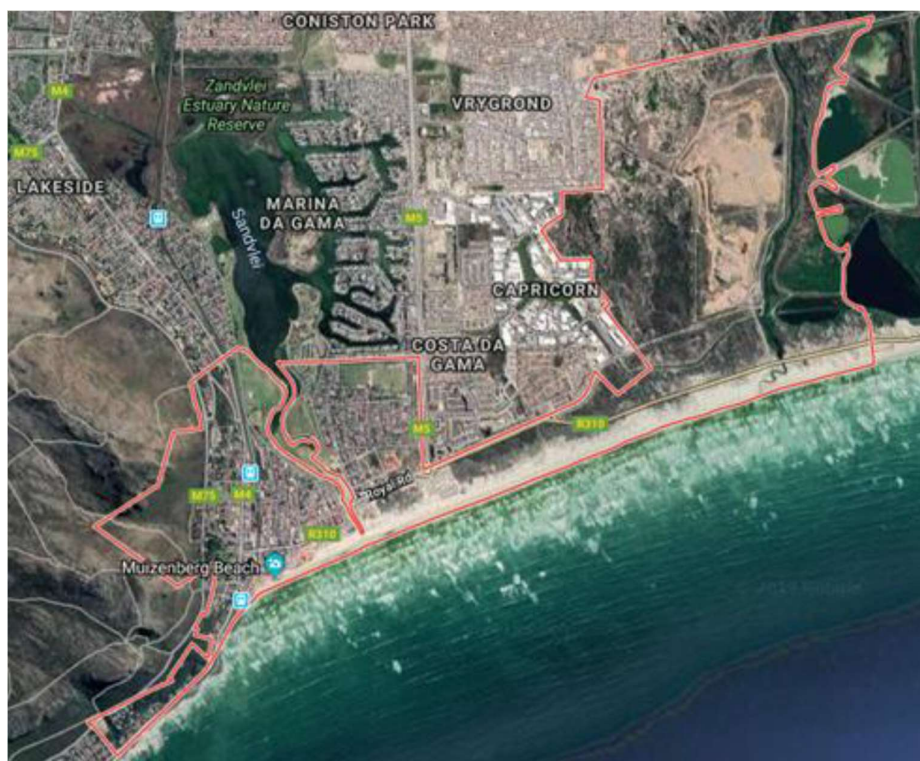


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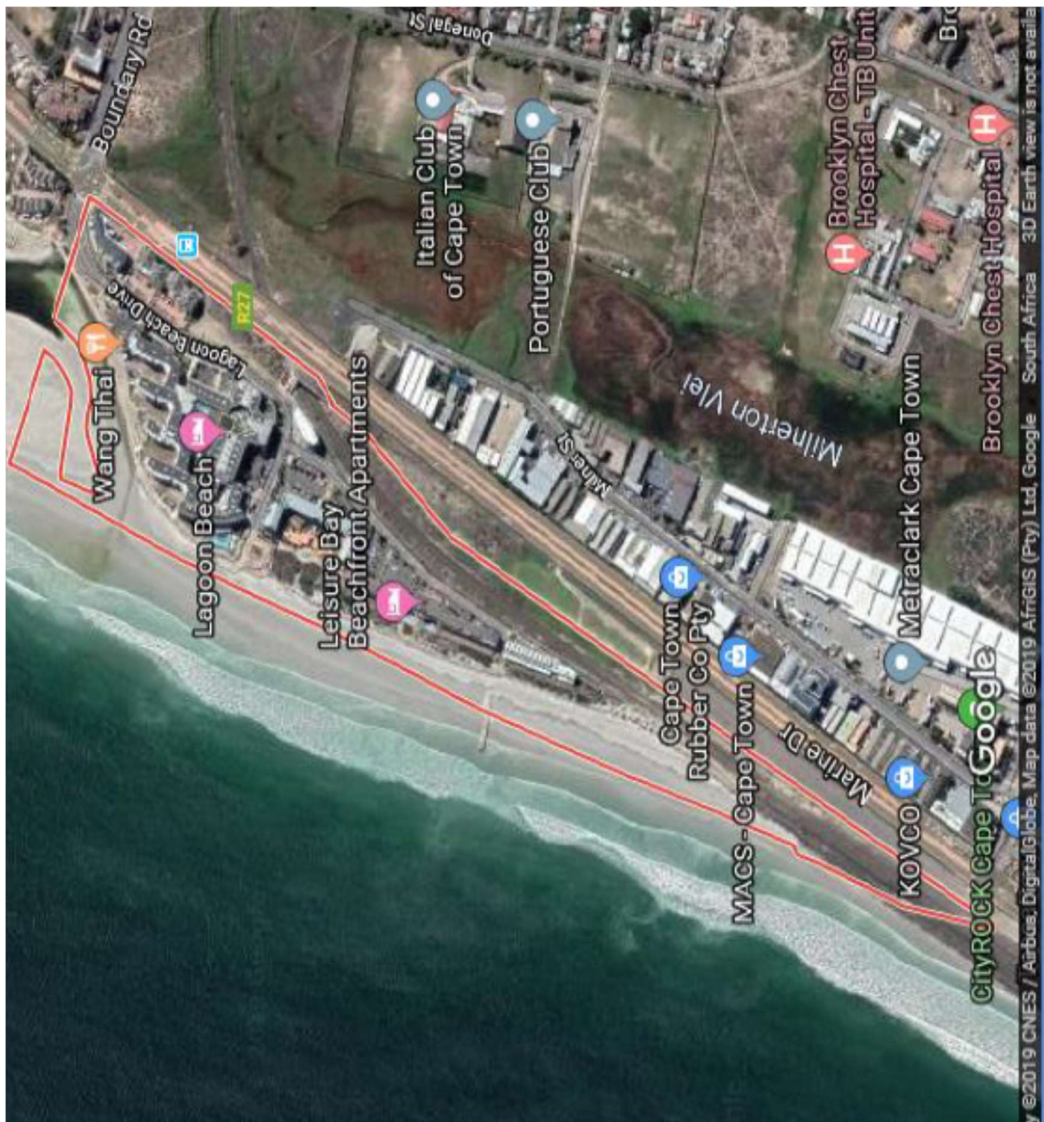
572 Figure 1: Satellite image of Muizenberg beach demarcated by a red line



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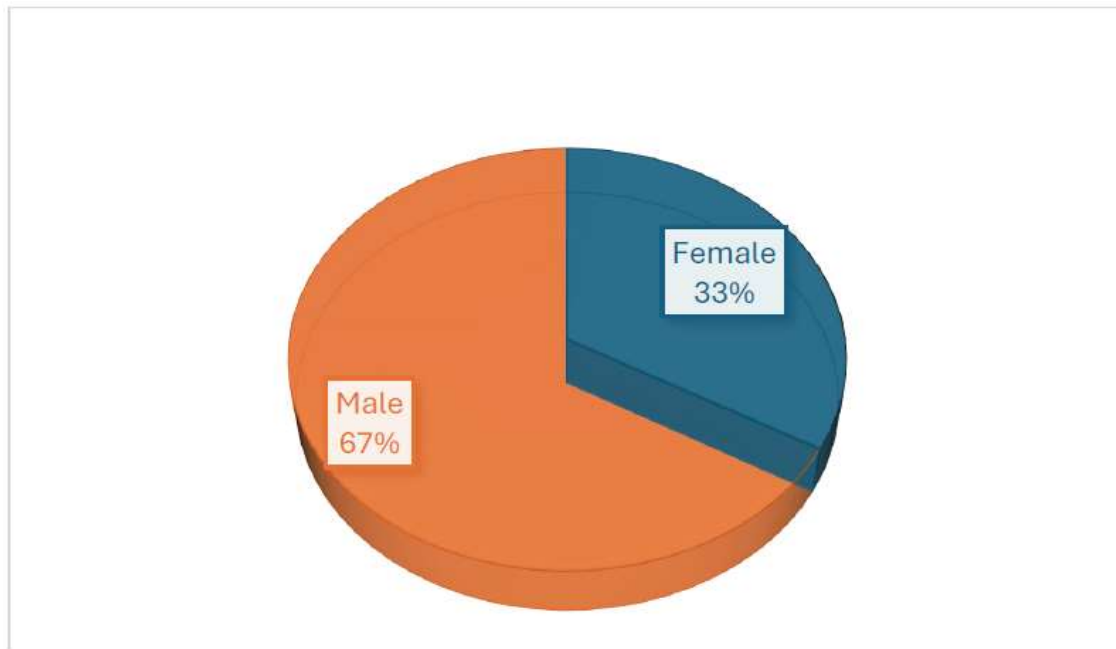
575 Figure 2: Lagoon Beach demarcated by a red line



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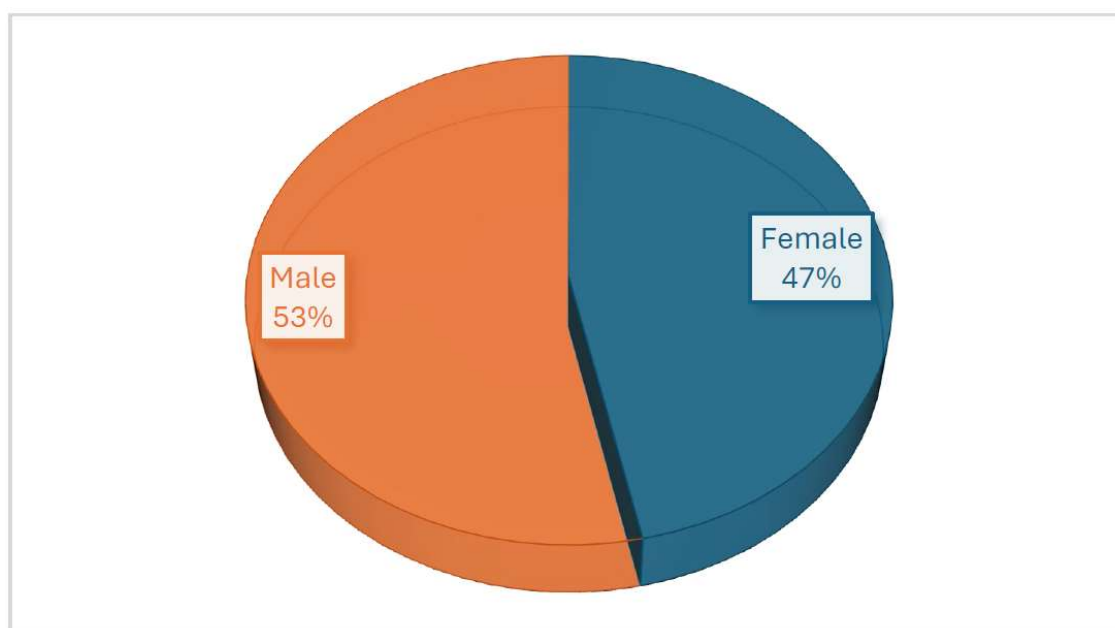
578 Figure 3: Shows the gender distribution of the beachgoers who participated in this study in Muizenberg beach.



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581 Figure 4: Shows the gender distribution of the beachgoers who participated in this study in Lagoon beach.

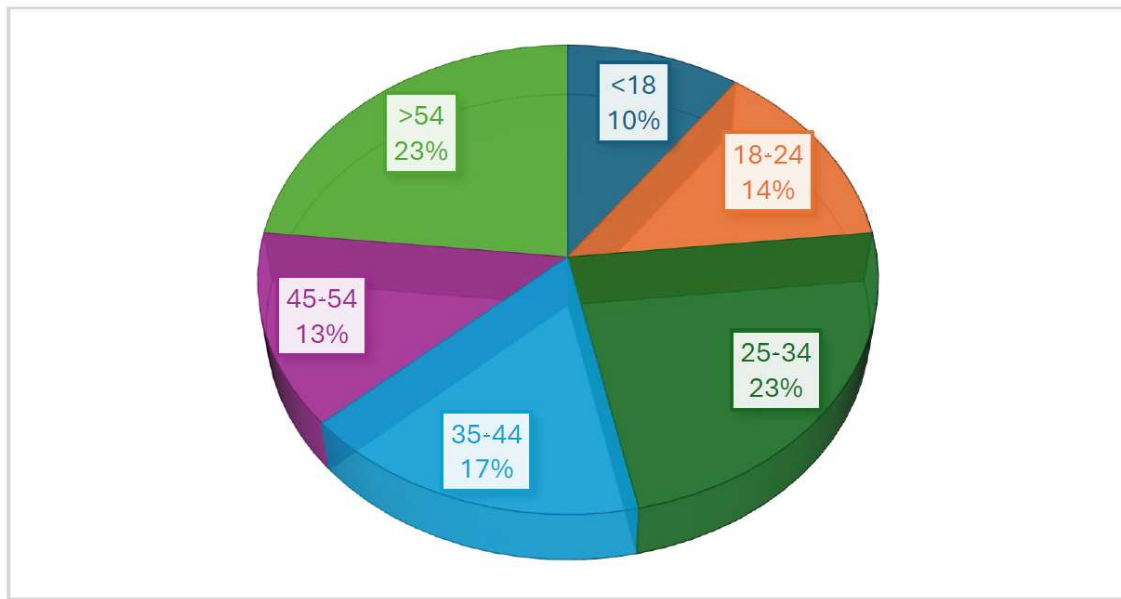


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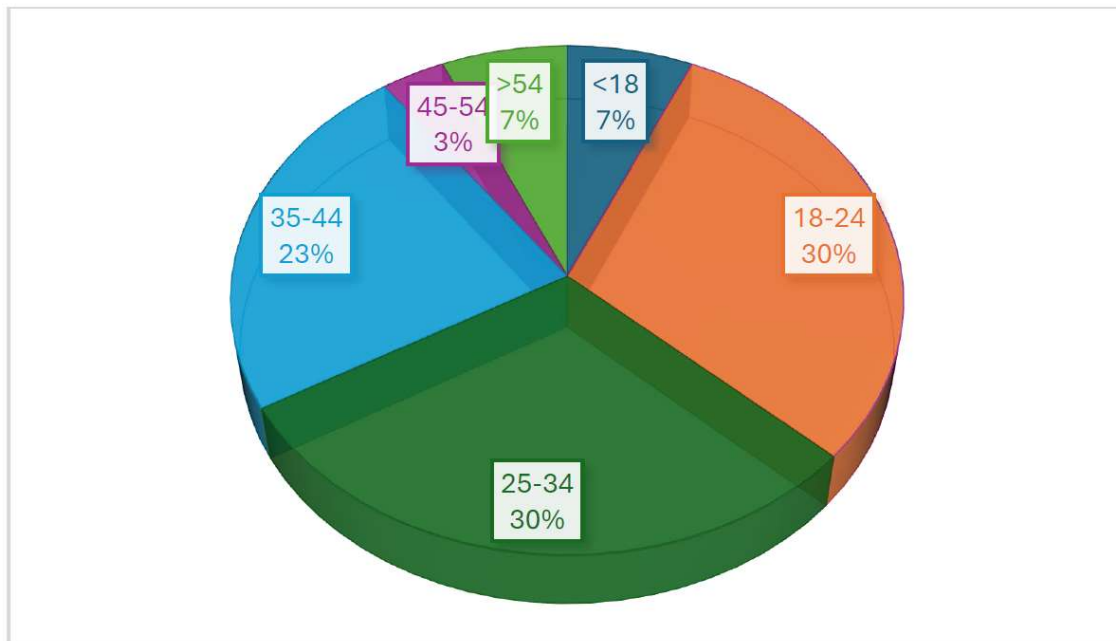
584 Figure 5: illustrate the age distribution of the beachgoers who participated in this study in Lagoon beach.



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587 Figure 6: Shows the age distribution of the beachgoers who participated in this study in Lagoon beach.

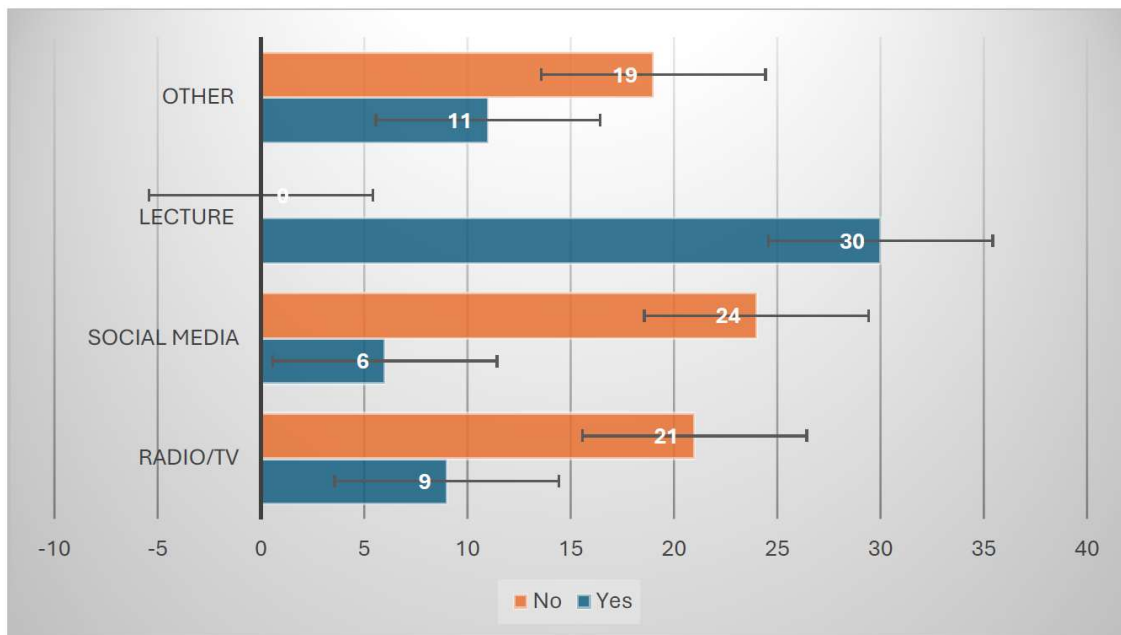


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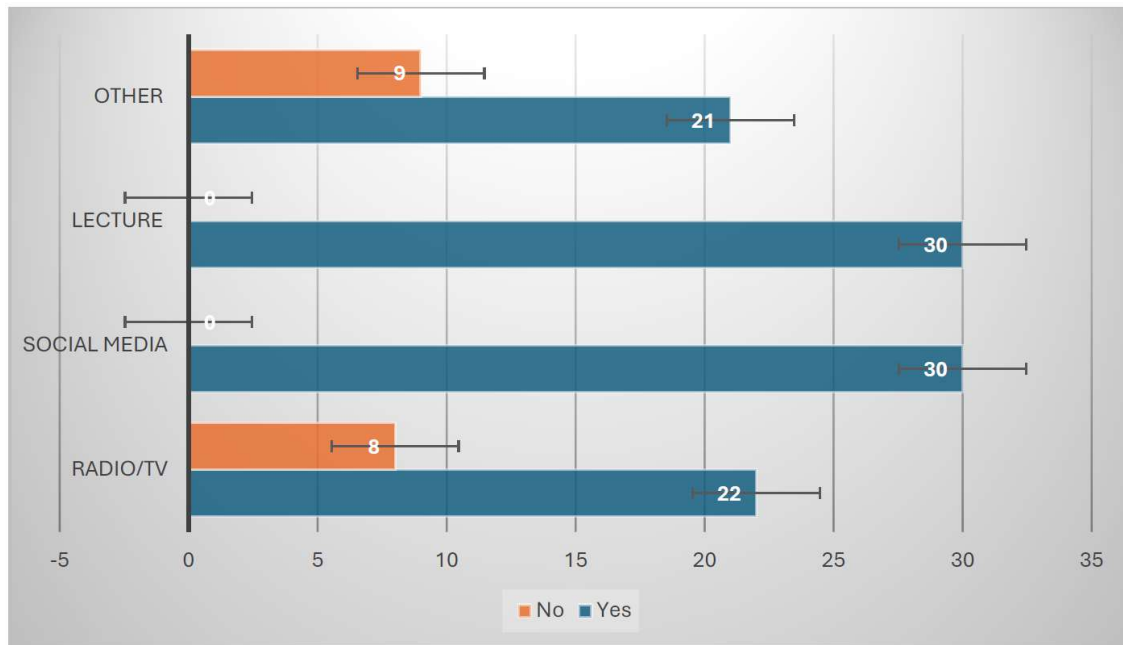
590 Figure 7: The knowledge of microplastics and the respondent's sources of information about microplastics, from Muizenberg  
591 beach respondents.



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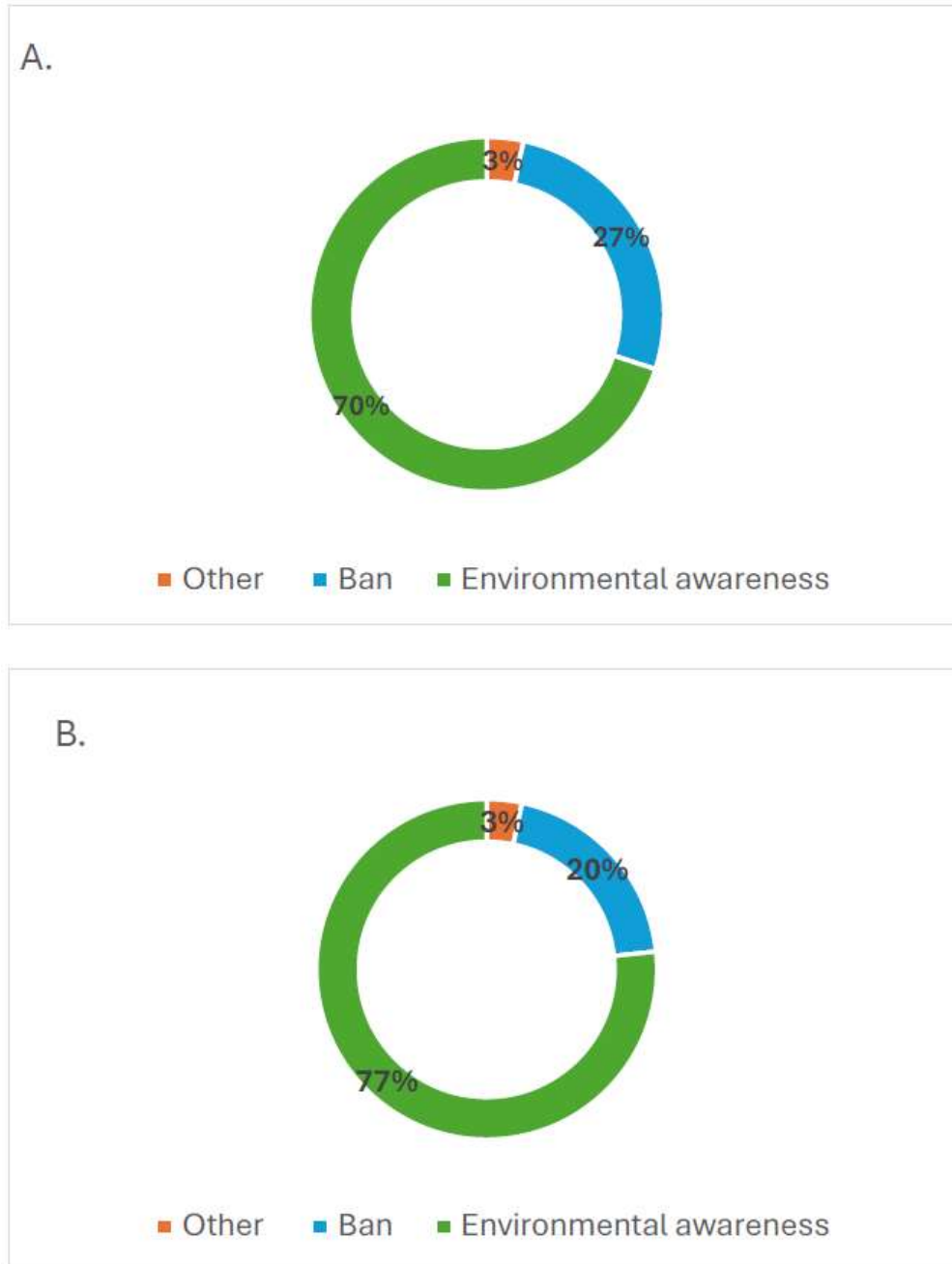
594 Figure 8: The knowledge of microplastics and the respondent's sources of information about microplastics, from Lagoon  
595 beach respondents.



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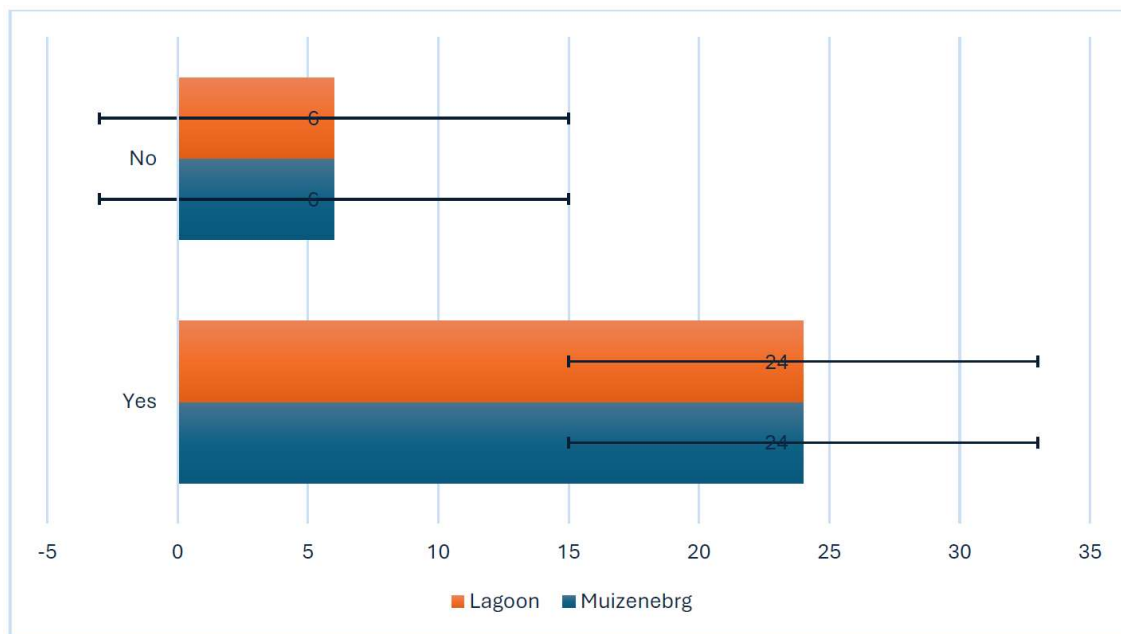
598 Figure 9: Relationship between the need for more education on microplastics and human health impacts, based on  
599 respondents at Muizenberg beach (A); Lagoon beach (B)



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602 Figure 10: Participants response on whether microplastics has impact on human health.



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