

# 1 **Microplastics pollution understanding of beachgoers in Cape Town: South** 2 **Africa**

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## 11 **Abstract**

12 Plastic pollution is a global issue with microplastics gaining international attention from NGOs, the  
13 government, the public, media and academia, microplastics are a growing source of concern. This  
14 research paper aims to explore the Cape Town beachgoers' general knowledge and understanding of  
15 microplastic pollution in terms of its potential effects on the environment and human health. Using a  
16 questionnaire, the study was conducted at Muizenberg and Lagoon Beach, the study involved  
17 participants belonging to the age group of <18-64 years. A sampling technique known as convenience  
18 sampling was used, this technique allowed individuals to be selected based on their willingness to be  
19 part of the sample and their availability, it allowed participants with no obvious knowledge of  
20 microplastics to take part. The data was recorded in Excel and analysed with Statistical Package Social  
21 Sciences (SPSS). Although the public was relatively familiar with microplastics at the time of the study,  
22 with 40% of the participants from Muizenberg Beach does not know what microplastics are, while 60%  
23 knew. In Lagoon Beach, 26.67% did not know what microplastics are, while 73.33% did. Environmental  
24 education and the prohibition of microplastics were identified by the majority of respondents as  
25 necessary measures for reducing microplastic pollution and further research was suggested, with some  
26 of the respondents believing that the lack of strict regulations on plastic use was the greatest difficulty  
27 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).

64 Over the past few years, research on microplastic pollution has gained significant attention all around  
65 the globe (Omoyajowo et al., 2022; Hossain., 2024; Akande, 2023), some mainly focusing on the coastal  
66 environment (Van Ryan Kristopher et al., 2021; Harris, 2020; Ryan et al., 2020), estuaries (Boshoff et  
67 al., 2023; Govender et al., 2020; Samuels et al., 2024) and microplastic impacts on human health  
68 (Blackburn and Green, 2022; Ghosh et al., 2023) and public awareness levels of microplastics pollution  
69 (Henderson and Green., 2020) to name a few. Although microplastics have been extensively researched  
70 in the scientific community, there is a large gap between academic studies and public awareness  
71 especially in Africa where environmental awareness is lower compared to other continents and is  
72 slowly increasing due to NGOs and international aid. South Africa is no exception, where the population  
73 and the environment are highly susceptible to MP pollution due to the country's poor waste  
74 management techniques (Julius et al., 2023; Malematja et al., 2023), lack of waste management services  
75 in some areas (informal settlements), heavy reliance on plastic among the populace (Furtunov,  
76 2024; Khangale et al., 2020) and insufficient environmental awareness/education. A number of literature  
77 has shown that understanding public knowledge, attitude and perception about microplastic pollution  
78 could help to mind the gap towards proper management of inland waste and beachgoers behaviours  
79 towards the marine environment (Omoyajowo et al., 2022; Ghosh et al., 2023) and further lead to the  
80 mitigation of microplastics.

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

100 and Igwaran., 2023; Lehel and Murphy., 2021) although adverse effects on human health is “limited,  
101 difficult to assess and still controversial” (Barboza et al., 2018; Henderson and Green., 2020). Nations  
102 like Canada and the United States, have also proposed or implemented bans on microbeads in personal  
103 care products (Deng et al., 2022), while in Europe, the European Union has also banned it and also  
104 proposed a ban on single-use plastics, use of plastic straws and cutlery (Lee and Kim., 2022; Guzik,  
105 2023; Grosso, 2022). With all these regulations and policies, it is still understood that the public is still  
106 relatively unfamiliar with microplastics. A study conducted by Deng et al (2020), revealed that most  
107 respondents believe that the lack of knowledge and environmental awareness of micro- plastics is the  
108 greatest difficulty in reducing the pollution from micro- plastics. Therefore, it is imperative and crucial  
109 that human behaviour is considered the sole source of marine litter, changing perceptions and behaviour  
110 is key to tackling litter in the natural environment (Pahl and Wyles, 2017). In a study on community  
111 awareness and perceptions on microplastics, majority of respondents (67%) were aware of MPs, and  
112 their responses were closely linked to their level of education although their knowledge on regulatory  
113 measures was not enough or insufficient (Premarathna et al., 2023), meaning there was still lack of  
114 regulation understanding used to mitigate impacts of plastic usage in Sri Lanka.

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

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

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

## 142 **2. Materials and Methods**

### 143 **2.1 Study area**

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

147

148 **Figure 1:**

149

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

157

158 **Figure 2:**

159

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

164

### 165 **2.2 Data collection method**

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

169 for this study, which sought to get the understanding of microplastic pollution. The research was  
170 conducted using qualitative technique which in the form of a questionnaire, which was used as an  
171 instrument for data collection. According to Shamsudin et al (2024) and Whitehead and Whitehead  
172 (2020), questionnaires are a cost-effective research tool for data collection. A sampling technique  
173 known as convenience sampling was used, this type of procedure is non-probability. This technique  
174 allowed individuals to be selected based on their willingness to be part of the sample and their  
175 availability (Kumar, 2019; Whitehead and Whitehead, 2020). This technique was employed to ensure  
176 that every group of the population is eligible to be part of the sample. The convenience sampling was  
177 achieved through walking around the sites and stopping people or in some cases to disturb them and  
178 ask if they willing to take part in the research. Convenience sampling is cost-effective, requires fewer  
179 resources, fast and saves time. Small-scale quantitative surveys have been undertaken to explore public  
180 perceptions and understanding of marine litter. The research design was meticulously selected to meet  
181 the study's research aims, objectives, and research questions. The section that follows provides  
182 additional information about the case study methodology, data collection instrument, and data collection  
183 procedure. The study was conducted at Muizenberg beach and Lagoon beach, the survey focused on the  
184 people that were around the beach either the beachgoers, residents, and people who work around the  
185 two beaches. This includes recreational water sports participants and lifesavers. Random questioning  
186 did not cover other areas beyond the specified areas in these two sites. Before participating in the study,  
187 the participants were informed of its nature and that their participation was voluntary. During the  
188 introduction, they were also informed that they could withdraw from the study at any time. Participants  
189 were assured of anonymity and confidentiality.

### 190 **2.3 Validity and Reliability**

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

### 199 **2.4 Data Analysis**

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

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

### 205 3. Results and Discussion

#### 206 3.1 Demographic profile of Muizenberg beach and Lagoon beach

207 The participants from Muizenberg beach, the majority were male participants with a percentage of  
208 66.67%, while 33.33% were female shown in Figure 3. This is supported by 2011 data from stats SA  
209 which showed that Muizenberg beach had more males than females, with 19,012 (51.58%) males and  
210 17,845 (48.42%) females in 2011. However, the whole Western Cape was recorded to have  
211 approximately 5,8 million people and more than half of the population, about 51% of the population  
212 was females (stats SA, 2011)

213

214 Figure 3

215

216 Results from Lagoon beach, the minority were male participants with a percentage of 46.67% of the  
217 sample size. Female participants found in Lagoon beach contributed about 53.33% of the total sample  
218 size. Stats SA of 2011 contradicts the above information; they state that there were approximately  
219 48,258 (50.46%) males and 47,371 (49.54%) females in Lagoon beach (Figure 4). However, in findings  
220 by the Western Cape population profile (2017) states that Cape Town has 51.5% females.

221

222 Figure 4

223

224 Majority of the participants in Lagoon beach were in age groups of 25-34 and 45-54, with 23.33%  
225 respectively of the total sample size as shown in Figure 5 below. Participants at age group 35-44 and  
226 those below 18 years were the second most participants in the survey with 13.33%. The lowest  
227 percentage was observed for the age group 55-64 with 10%. The majority Lagoon participants were in  
228 their early 20s to late 30s, referred to as youth and there was also a high number of middle-aged  
229 participants. The fewest participants were teenagers (<18) and older-aged adults (>55) (Figure 5).  
230 While in the Muizenberg beach it was found that majority of the participants were in the age groups of  
231 25-34 and 18-24, both age groups having 30% of the sample size shown in Figure 6 below. Furthermore,  
232 this meant that the population is predominated by young adults (youth). The remaining 40% was split  
233 into the age group of 35-44 accounted for 23.33% while the participants younger than 18 years and  
234 those in age groups of 55-64, both represented 6.67% of the sample size (Figure 6). While the fewest  
235 participants were found in the age group 45-54 with 3.33% of the population (Figure 6). This shows



236 that the representative population is made up of young adults (18-34) and has few middle-aged adults  
237 (36-55 years) while it also has older adults that are twice the number of middle-aged adults (Figure 6).

238

239

240 Figure 5:

241

242 Figure 6:

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

### 254 **3.2 The knowledge of microplastics and the sources of information, from Muizenberg** 255 **beach respondents.**

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



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

272 Many studies including this one have showed that media in general plays a vital role in educating people  
273 about environmental issues, particularly social media and radio. Some people use social media and other  
274 media channels as their sources of self-educating, so the high numbers of social media users may be  
275 linked with the interest of self-education. However, this is not surprising because the world has become  
276 more digital as Figures are on social media. Several studies found major media channels were found to  
277 be effective for educational purpose and that was in line with results found in this study (Kushwaha,  
278 2015; Kapoor, 2011; Chen and Wang, 2021). Although majority of people indicated that people must  
279 be educated more on microplastics, and they have human health impacts. A smaller percentage have  
280 stated that microplastics have no human health impacts and there is no necessity for education.  
281 However, Hammami et al. (2017) contradicted the results by stating that the use of education to reduce  
282 microplastic pollution is an effective method. Those who indicated that microplastics have human  
283 health impacts may have been guessing the response or their sources of information about microplastics  
284 may have highlighted human health impacts. The above results are not a true reflection of the entire  
285 population and there were missing aspects during the study.

286

287

Figure 7:

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289

### 290 **3.3 The knowledge of microplastics and the sources of information, from Lagoon beach** 291 **respondents.**

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

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

311

312

Figure 8:

313

314

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

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

321

322

323

Figure 9:

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

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

338

339

Figure 10:

340

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

366

#### 4. Conclusion

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

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

#### 380 **Ethical approval statement**

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

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

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

#### 386 **Author Contribution Statement**

387 X.S.G: Writing- original draft preparation

388 T.M: Writing- review and editing, supervision

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

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

391 T.P.B: Writing- review and editing

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#### 394 **Conflict of interest**

395 The authors declare no potential conflict of interest.

#### 396 **Availability of data**

397 Not applicable.

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400

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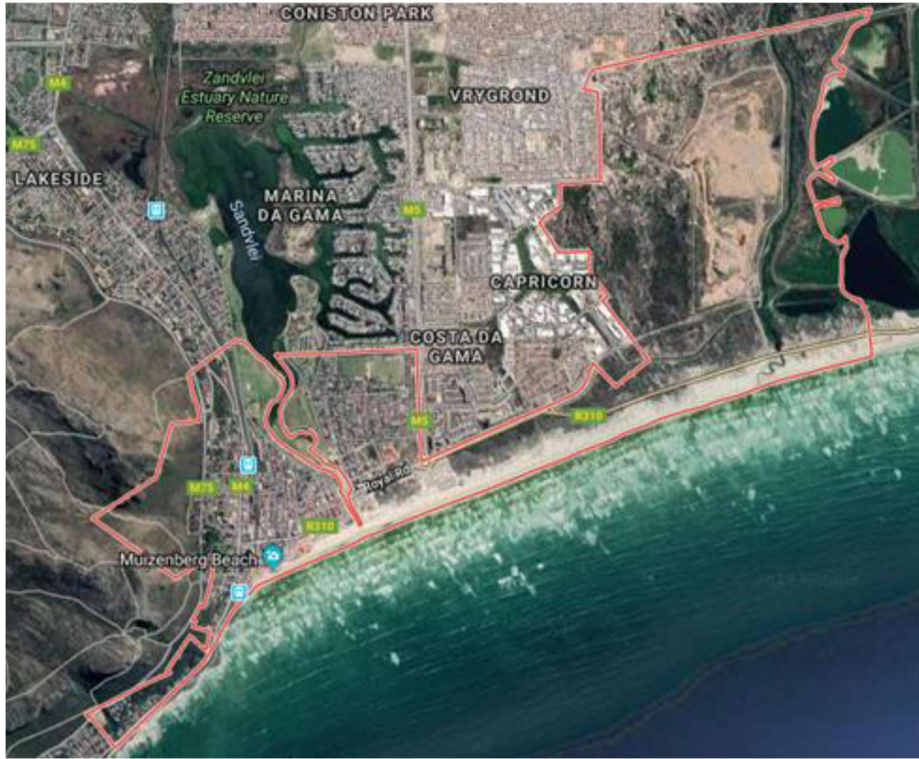


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572 Figure 1: Satellite image of Muizenberg beach demarcated by a red line



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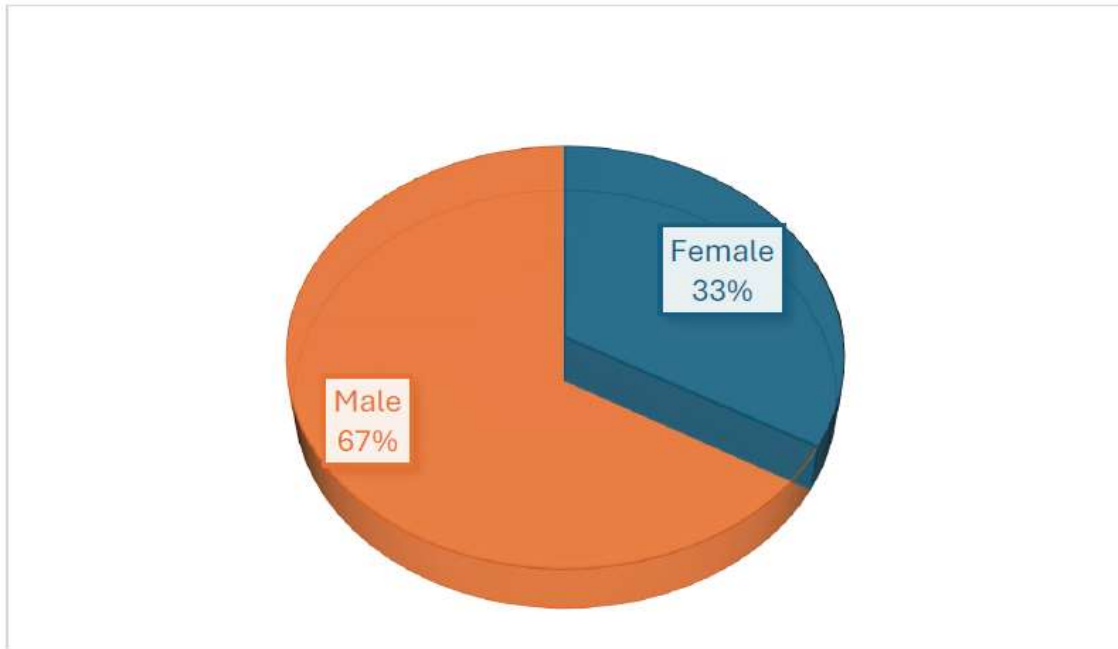
575 Figure 2: Lagoon Beach demarcated by a red line



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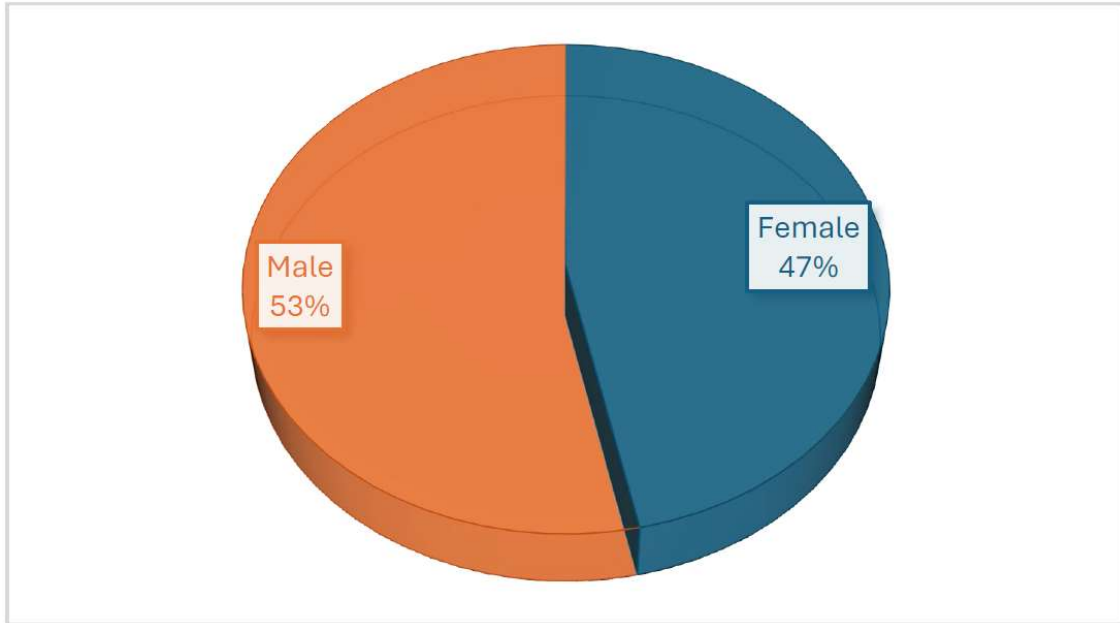
578 Figure 3: Shows the gender distribution of the beachgoers who participated in this study in Muizenberg beach.



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

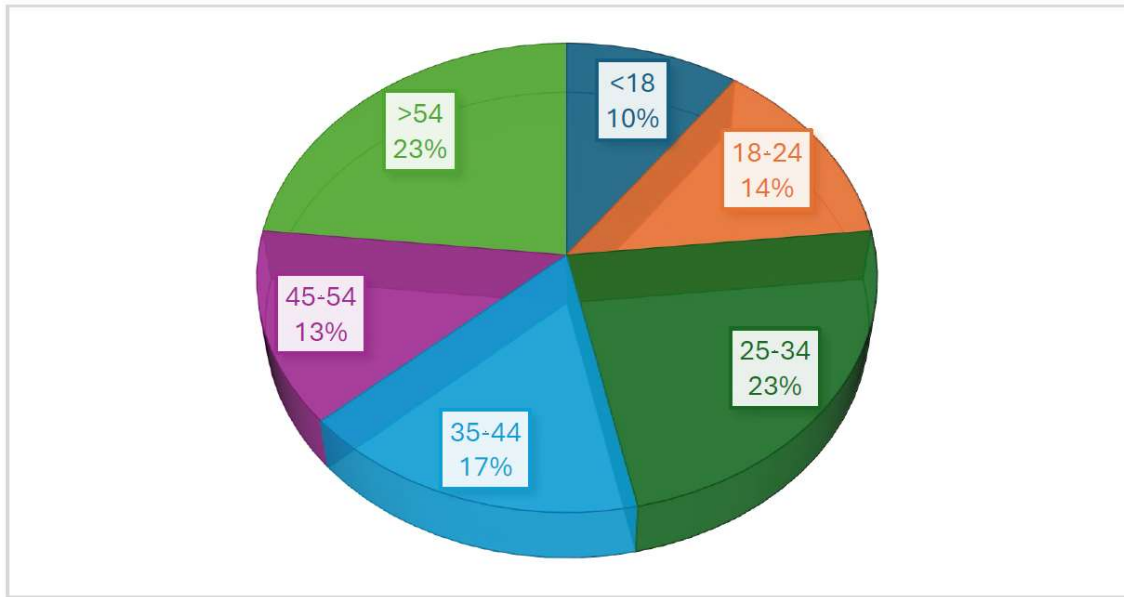


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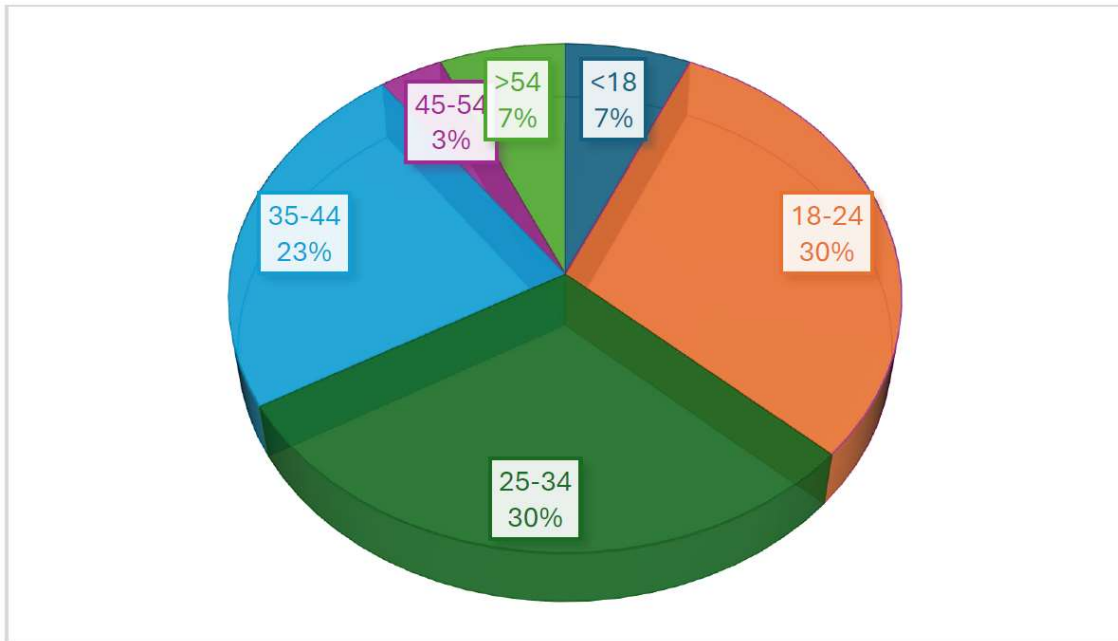
584 Figure 5: illustrate the age distribution of the beachgoers who participated in this study in Lagoon beach.



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

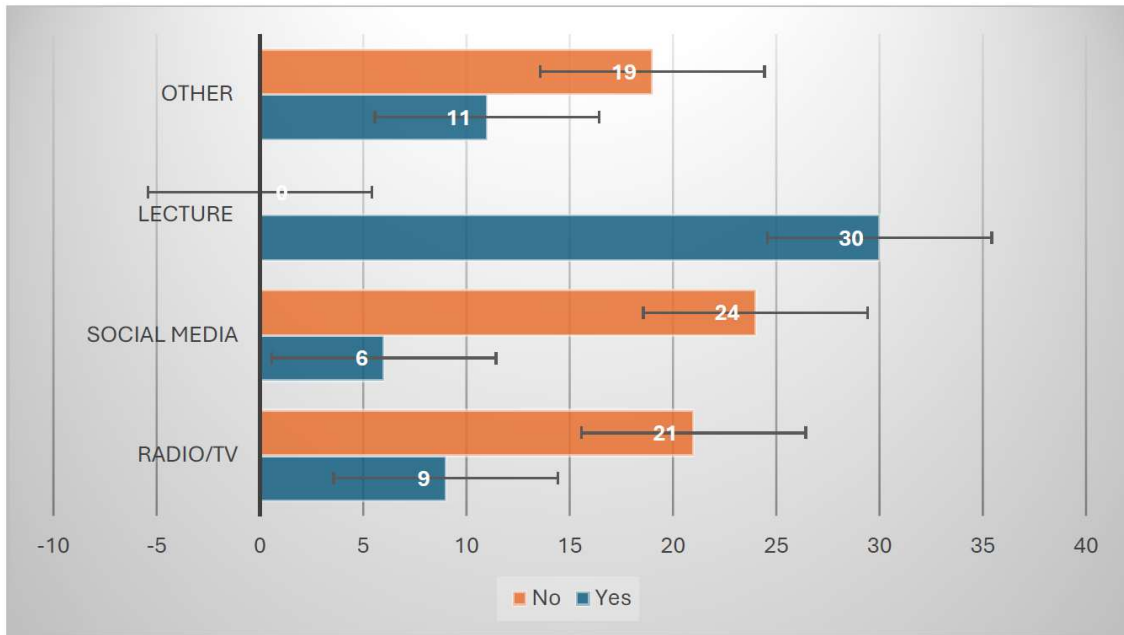


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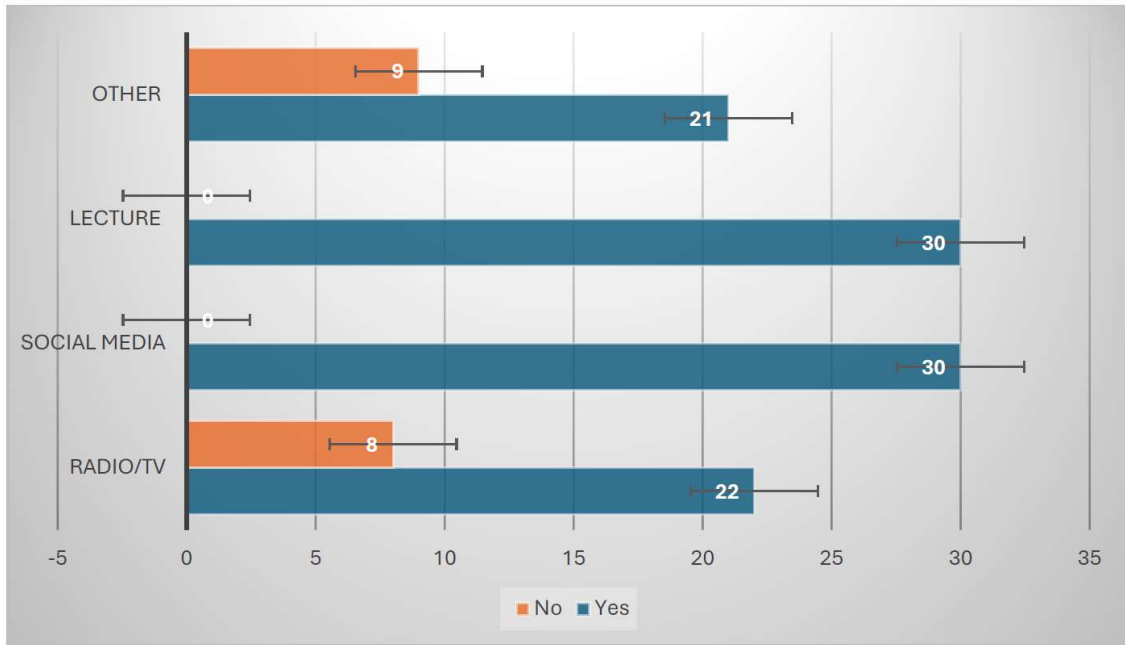
590 Figure 7: The knowledge of microplastics and the respondent's sources of information about microplastics, from Muizenberg  
591 beach respondents.



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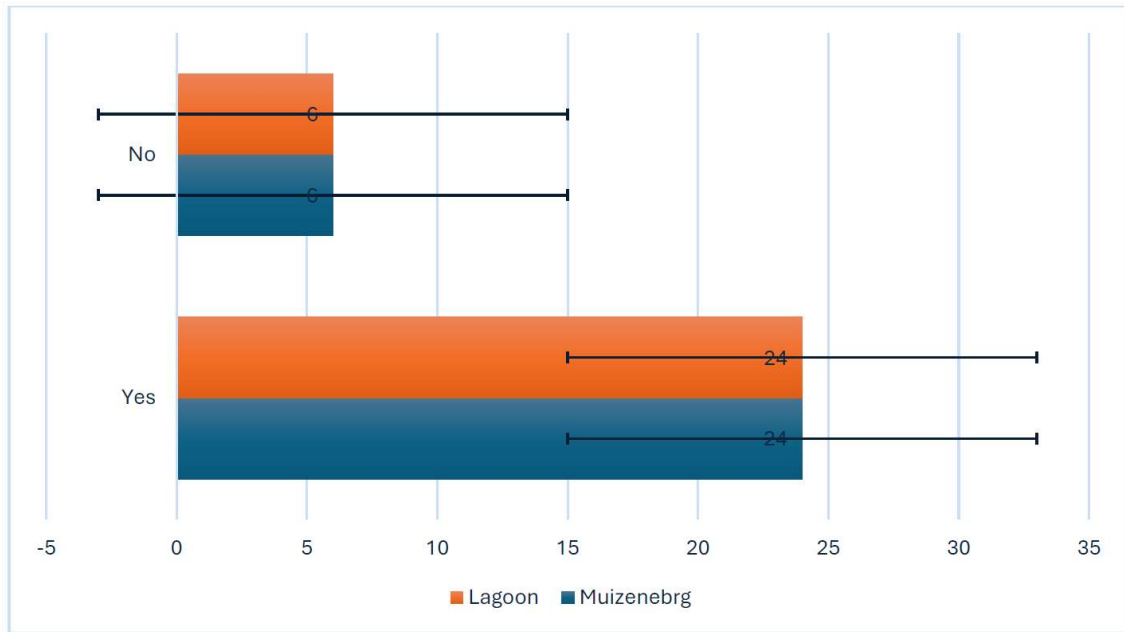
598 Figure 9: Relationship between the need for more education on microplastics and human health impacts, based on  
599 respondents at Muizenberg beach (A); Lagoon beach (B)



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



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