Demographic Factors in the Disaster-Related Information Seeking Behaviour

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Abstract. Although demographics are important factors in the investigation of disaster studies, existing work on disaster-related information seeking behaviour (ISB) does not offer quantitative insight into the relationship between them. This paper investigates the demographic factors such as age, gender, location, and occupation, and their relationship with information needs, information sources, and information channels. Content analysis was performed on the testimony of 262 people who experienced the Great East Japan Earthquake and Tsunami in 2011. The results suggest that a large effect was observed between (1) age and active information needs and (2) gender and information sources. Our findings can be useful for designing policies and programmes at risk of major disaster events as they offer multiple ideas about how to optimise disaster-coping plans for diverse communities.

Keywords: Disaster-related information seeking behaviour · Demographic factors

1 Introduction

Natural disasters do not stop for an epidemic. Several studies identify infectious-disease outbreaks that happened following natural disasters [14, 36, 37]. For example, a few weeks after the Great East Japan Earthquake and Tsunami in 2011, announcements of epidemics of influenza-infection cases reached evacuation shelters [14]. Accordingly, confronting information science is researchers need to pay more attention to information behaviours and their environment to understand the abilities of individuals to obtain information during pandemics [19, 38]. Individuals, social networks, situations, and context shape information-behaviour during natural disasters [24, 32]. These have also created an urge to understand demographic factors in disaster-related context of research.

Previous research have identified instances of disaster-related information seeking behaviour, such as passive and active information needs, information sources and information channels. Their studies also identify two factors that influence the behaviour, namely, temporal stages of a disaster and human senses [23, 24]. The findings suggest

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that demographic characteristics might influence disaster-related information seeking behaviour and thus, represent an important factor to investigate [23, 24]. For instance, the risk of death may vary with such demographic factors as age and gender, which reflect differences in vulnerability resulting from physical differences or the likelihood of exposure [8]. Other demographic factors, such as location and occupation, may also carry risks of exposure—for example, when the poorest people live in particularly vulnerable areas (e.g. during a flood) or when damage that the disaster causes depends on the quality of housing (as in earthquakes). Studies also have examined disasters that cause substantial numbers of deaths, on a scale with the potential to affect regional or national populations [8, 20, 31]. Key parameters of interest include age, gender, location and occupation, which, in turn, have implications for population size and composition. Previous studies did not obtain the quantitative evidence from measuring and evaluating the effects of demographics on disaster-related information seeking behaviour [24, 28, 29, 31]. Quantitative indexes to measure vulnerabilities across scales using demographic data are useful planning tools to characterize regions at risk of major disaster events [40].

We aim to use quantitative methods to analyse the effect of each demographic characteristics in the disaster-related information seeking behaviour instances. Hence, we collected datasets from a leading broadcasting company in Japan that would allow us to examine effects of demographic factors, such as age, gender, location and occupation, on disaster-related information seeking behaviour, including active and passive information needs, information sources and information channels [23]. This study used datasets by analysing 1,936 sentences from the testimony of 262 local people in areas affected by the Great East Japan Earthquake and Tsunami in 2011. Our investigation in data collection is expected to provide evidence broadens the depth and scope of disaster research, advances understanding of demographic factors and informs policy interventions [8]. As a result, disaster specialists can tailor their design of interventions towards specific demographic groups.

This paper is organised as follows. Section 2 describes the related work used to identify demographic characteristics of disaster research. Section 3 introduces the methodology used throughout this paper. Sections 4 describe the effect sizes of demo-graphic factors and instances of disaster-related information-seeking behaviour. Section 5 then discusses the findings, implications, and limitations. Finally, Sect. 6 presents our conclusions.

2 Literature Review

Studies on demographic consequences of natural disasters have a 40-year history [31]. For example, studies have been shed light on differential impacts of disaster associated with demographic characteristics that include age, gender, location and occupation that have changed over the years [9, 29, 31]. This knowledge helps to inform disaster preparedness, response, recovery and mitigation activities. However, these studies have also created a blind spot in our understanding of demographic change and disaster-related information seeking behaviour.

Among other demographic factors, age and gender are effective at classifying and differentiating factors [28]. Gender norms influence disaster studies on morbidity and mortality [1]. For instance, in the 2004 tsunami, females died three times more than males, disaster-related suicide rates were higher among men than females [3]. Due to gendered skill sets and division of labor roles in local economies, physical location at the time of the tsunami, females suffered higher mortality rates that limit by their mobility [11].

Another example is the investigation of media use during the I-35W Mississippi River bridge collapse in 2007, which determined that young people were more likely to use social media than older people, while people in urban areas, particularly females, were more likely to use television [15]. The effects of gender and age on disaster-related information seeking behaviour have been suggested that females regard television and radio as more useful than males do, while males were more likely to use the Internet in the aftermath of the 2001 World Trade Center (WTC) disaster [33]. Another study has also investigated demographic characteristics, such as age, gender and location, as well as the use of sight, hearing and touch in the context of disaster-related information seeking behaviour [23]. Her findings show a significant effect of the senses of sight and hearing on gender, yet no significant association between senses and age. According to her results, the proportion of sight seems to decrease as age increases and, on the contrary, the proportion of hearing increases. Researchers also have examined age relative to a variety of cognitive (memory impairment), psychomotor (vision loss), physical (mobility decline), economic (increased poverty) and social (increased social isolation) resources [21, 34].

Other demographic factors that the present study analyses are location and occupation. Location in disaster prone areas centre more on studying one or a small number of communities and has varied over the years, including displacement [6]. Relocation to distant sites can lead to the loss of social networks, access to employment, healthcare and other services. For example, a visitor to the Hiroshima Peace Memorial Museum today can see in the windows behind the circular photographs many signs of a bustling city and its population, based on the 1945 atomic bombings of Hiroshima [22]. Furthermore, it is common in the social sciences for people to be assigned a class position based on a variety of quantified indicators, including occupation [40], the activity in which people engage for pay. Those people who generate their income directly from their own business, trade or profession are led to higher levels of risk-taking, compared to the people who receive a straight salary working for others and who have low risk-taking ability, who choose low-ranked professions [17, 26, 41]. Dynamic pressures such as occupation related to income inequality have aggravated disaster vulnerability among the population in unprecedented and profound ways.

The limitation was identified from those existing works mentioned above. For example, previous studies on demographic aspects have been identified from the fields of disaster-related information seeking behaviour research [16, 23, 33], yet they have not been examined quantitative assessment of the 2011 Great East Japan earthquake and tsunami. Although demographic data are of a quantitative nature, we use crowdsourcing platform to assign tasks-annotation fit of the information seeking behaviour in disaster-related context [23, 27]. Thus, empirical studies must establish behavioural differences regarding such demographic characteristics as gender, age, location and occupation, in the context of disaster-related information seeking behaviour.

3 Methods

Our previous work has established the following instances of information seeking behaviour (ISB) in the context of natural disaster: active and passive information needs, information sources, and information channels [24]. As for information needs, two prominent modes of fulfilling them emerged from the analysis of instances of disaster-related information seeking behaviour. One was through purposeful, active seeking of information [42]; the other was a result of passively receiving or encountering the information [43]. 'Active information needs' refers to a set of needs inferred from the description of purposeful ISB, to answer a specific query [42]. On the other hand, 'passive information needs' refers to a set of needs inferred from the description of the information that people passively receive or encounter when they are not actively seeking [24]. Readers should refer to Rahmi, Joho and Shirai (2019) for detailed description of these ISB concepts.

Table 1. A summary of the testimony collections ($N = 262$)

ID	Document title	Publication date	Number of testimonies
1	Record of Testimony on The Great East Japan Earthquake: 1	February, 2013	144
2	Record of Testimony on The Great East Japan Earthquake: 2	February, 2014	68
3	Record of Testimony on The Great East Japan Earthquake: 3	February, 2015	50

Although the previous study, the testimony of several people was sufficient to establish a set of concepts related to disaster-related information seeking behaviour (e.g. passive and active information needs, information sources and information channels) in the distribution of such demographic characteristics as age and location was skewed, and thus, excluded from research questions a larger sample. In this work, however, we built and analysed a much bigger sample to investigate the demographic factors. This study provides evidence from the content analysis of 1,936 sentences, retrievable from the NHK digital archive (nhk.or.jp/archives/311shogen/) in testimony collected from 262 people who were affected by the 2011 Great East Japan Earthquake and Tsunami (see Table 1).

In our investigation the next step involved coding instances of disaster-related information seeking behaviour in a set of the testimony texts, using a crowdsourcing service (lancers.jp) from July 2017 until August 2018. We followed the current best practice of crowdsourcing for the annotation [30], as follows. First, we ran screening tasks on instances of disaster-related information seeking behaviour separately, before labelling 262 people's testimony. The goal of this screening was to find reliable crowd workers, i.e. individuals who achieved test accuracy with a score of 80% or above, before annotating our dataset. Screening and project tasks had similar instructions.

Table 2. Age, gender, location and occupation group testimony ($N = 262$, $n = 1{,}936$)

Variables		N	%	n	%
Gender	Male	191	73	1,499	77
	Female	71	27	437	23
Age	Adolescence (13–19)	4	2	26	1
	Early adulthood (20–39)	32	12	216	11
	Adulthood (40–64)	144	54	1,165	60
	Maturity (>65)	78	30	513	26
	Not available	4	2	16	1
Location	Iwate Prefecture	90	34	620	32
	Miyagi Prefecture	93	36	643	33
	Fukushima Prefecture	79	30	673	35
Occupation	Managers	35	13	261	14
	Professionals	45	18	366	19
	Technicians and Associate Professionals	8	3	74	4
	Clerical Support Workers	10	4	66	3
	Services and Sales Workers	17	6	138	7
	Skilled Agricultural, Forestry and Fishery Workers	5	2	43	2
	Craft and Related Trades Workers	3	1	16	1
	Plant and Machine Operators and Assemblers	6	2	57	3
	Elementary Occupations	20	8	117	6
	Not available	113	43	798	41

In the screening task, we invited 200 crowd workers for each round of information seeking behaviour concepts. Information channels were easy to categorise; passive and active information needs and information sources were difficult category screening tasks to pass. Other screening tasks were needed for passive and active information needs and information source, until we fulfilled the adequate number of workers to assign to project tasks. We paid incentives of 2.8 USD per person, per screening task.

Those workers who passed the screening test were then invited to code people's testimony texts, the project task. A total of 6,566 sentences from 269 people's testimony were divided into 300 lines on 20 pages in a.pdf file. The labelling results were written in the given.xls file, and diverse workers were assigned to separately label a set of disaster-related ISB instances. Those workers had to complete the task within five days, to receive payment of 17.3 USD. To annotate sentences with a reliable label, we recruited three workers per sentence. Researchers commonly hire two or more coders to ensure consistency and reproducibility of labelling in content analysis [10]. Voting was used to determine the final label suggested by the crowd [39]. If agreement among the three workers was not achieved, we recruited another worker to annotate until a majority consensus was reached. We repeated this process for all ISB labels across all sentences. In our case, one sentence was judged by three crowd workers' votes for four information seeking behaviour instances; thus, a total of approximately 96,660 votes were collected. The use of crowd intelligence makes it possible to complete tasks that cannot be automated, such as providing input labels for initial training [39, 44].

We then removed those sentences without disaster-related ISB instances from the analysis. Of those, 262 people's items of testimony, consisting of 1,936 sentences, were selected for analysis. Table 2 shows the age, gender, location and occupation group of 262 people, individually checked as independent factors, while Table 3 shows disaster-related information seeking behaviour instances, such as active and passive information needs, information sources, and information channels, considered dependent variables.

Table 3. Disaster-related information seeking behaviour instances

Variables		*n*	%
Active Information Needs ($n = 505$)	Current Status	351	70
	Disaster Information	50	10
	Nuclear Explosion	35	7
	Evacuation Instruction	32	6
	Post-Disaster Supplies	19	4
	Warning	15	3
	Transportation	3	1
Passive Information Needs ($n = 977$)	Current Status	494	51
	Evacuation Instruction	136	14
	Story	115	12
	Warning	63	6
	Disaster Information	62	6
	Nuclear Explosion	57	6
	Post-disaster Supplies	50	5
Information Sources ($n = 832$)	Family/Neighbourhood	390	47
	Work community/Colleagues	197	24
	Health and Safety	88	11
	Local Government	70	8
	Broadcast Media	64	8
	JMA (Japan Meteorological Agency)	23	3
Information Channels ($n = 760$)	Face to Face	583	77
	Phone	59	8
	Speakers and Signage	43	6
	Radio	35	5
	Television	24	3
	E-mail	15	2
	Internet	1	0

For age, we used Erikson's lifespan-stages psychosocial-development theory to divide the age categories into adolescence (13–19), early adulthood (20–39), adulthood (40–64) and maturity (>65) [4, 5], since this is one of the most well-known categorisations of ages in social studies. For location, the datasets were sampled from three affected areas: Iwate, Miyagi and Fukushima Prefectures, respectively. For occupation, the International Labour Organisation (ILO) classification structure for organising information on labour and jobs, called The International Standard Classification of Occupations (ISCO-08), was used for the analysis [12]. The ISCO-08 structure divides jobs into ten major groups: (1) Managers, (2) Professional, (3) Technicians and associate professionals, (4) Clerical support workers, (5) Service and sales workers, (6) Skilled agricultural, forestry and fishery workers, (7) Craft and related trades workers, (8) Plant and machine operators and assemblers, (9) Elementary occupations and (10) Armed forces occupations.

We employed descriptive analysis between the demographic characteristics and instances of disaster-related information seeking behaviour, and a *t*-test statistical analysis to uncover any associations between demographic characteristics and those instances using the IBM SPSS Statistics software [7]. For significant results ($p < 0.05$), we inveastigate the effect sizes through the paired sample *t*-test (Cohen's *d*), also using the IBM SPSS Statistics, following the steps described in Field (2009).

4 Findings

4.1 The Effect Sizes of Demographic Factors and Instances of Disaster-Related Information Seeking Behaviour

A paired-samples *t*-test was conducted with all significant results ($p < 0.05$) between demographic characteristics and instances of disaster-related information seeking behaviour. Furthermore, the effect size of a paired sample *t*-test, known as Cohen's *d*, was employed [7, 13, 25].

Table 4 shows the effect sizes of demographic factors and disaster-related information seeking behaviour. If the value of *d* equals 0, then the difference scores equal 0. However, the greater than 0 the *d* value is, the greater is the effect size. The value of *d* is usually categorised as $d = 0.8$ and higher, large effect (green); $d = 0.5$ to 0.8, medium effect (yellow); and $d = 0.2$ to 0.5, small effect (red) [7, 13, 25].

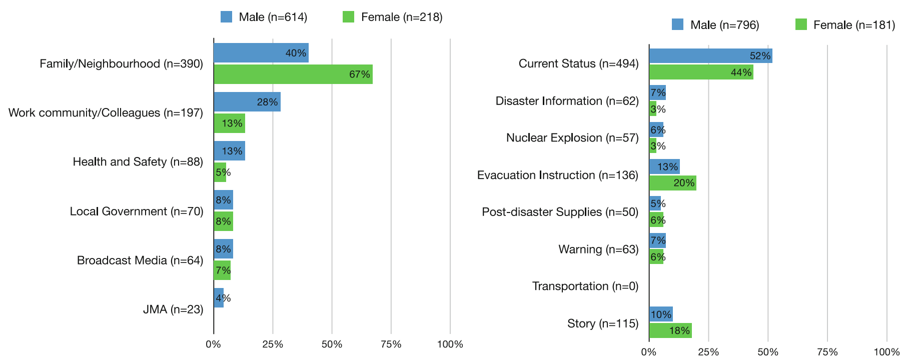
Table 4 shows that large effects were identified between (1) age and active information needs and (2) gender and information sources. Medium effects were identified between (1) age and information channels, (2) gender and passive information needs, (3) location and information sources and (4) occupation and passive information needs and information channels. Small effects were identified between (1) gender and active information needs and information channels, (2) age and passive information needs and information sources, (3) location and active information needs, passive information needs and information channels and (4) occupation and passive information needs and information sources. Therefore, this paper will discuss demographic factors that have large and medium effects in the context of disaster-related information seeking behaviour instances.

Table 4. Paired samples *t*-test and effect sizes (*d*) of demographic factors and disaster-related information seeking behaviour instances

Disaster-related Information seeking behaviour instances	Gender	Age	Location	Occupation
Active Information Needs	$t(505) = -8.537$, $p < 0.001$	$t(505) = 17.954$, $p < 0.001$	$t(505) = 4.347$, $p < 0.001$	$t(505) = 25.699$, $p < 0.001$
d	0.4	0.8	0.2	0.5
Passive Information Needs	$t(977) = -22.544$, $p < 0.001$	$t(977) = 7.029$, $p < 0.001$	$t(977) = -11.601$, $p < 0.001$	$t(977) = 24.046$, $p < 0.001$
d	0.7	0.2	0.4	0.4
Information Sources	$t(832) = -30.238$, $p < 0.001$	$t(832) = -7.017$, $p < 0.001$	$t(832) = -19.881$, $p < 0.001$	$t(832) = 14.228$, $p < 0.001$
d	1.0	0.2	0.7	0.3
Information Channels	$t(760) = -9.088$, $p < 0.001$	$t(760) = 17.945$, $p < 0.001$	$t(760) = 2.677$, $p = 0.008$	$t(760) = 29.273$, $p < 0.001$
d	0.3	0.7	0.1	0.5

4.2 Gender in Disaster-Related Information Seeking Behaviour

Figure 1 shows the gender distribution in the instances of disaster-related information seeking behaviour. Figure 1(a) shows the gender distribution sources between males ($n = 614$) and females ($n = 218$) has a large effect on information sources ($d = 1.0$).



(a) Information sources **(b)** Passive information needs

Fig. 1. Gender in disaster-related information seeking behaviour

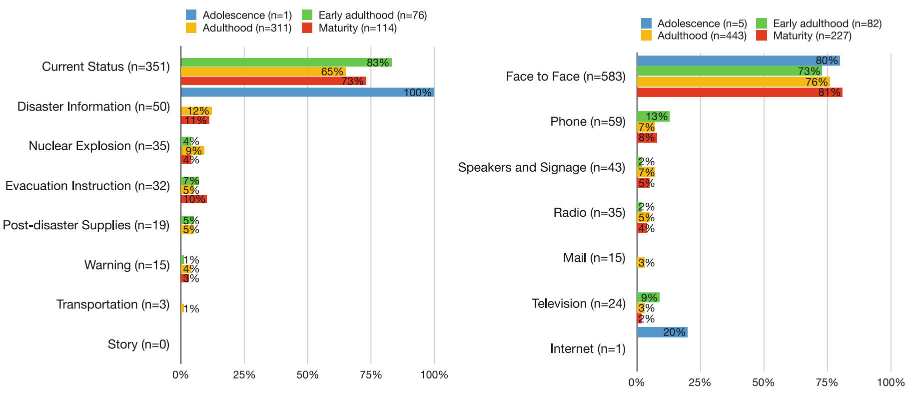
The largest proportion of sources belongs to the family/neighbourhood. Work community/colleagues, health and safety and Japan Meteorological Agency (JMA) categories were common among males, and family/neighbourhood was common among females.

Figure 1(b) shows the gender distribution of passive information needs between males ($n = 796$) and females ($n = 181$) has a medium effect ($d = 0.7$). The largest passive needs proportion is the ‘current status’ segment in gender categories. Disaster information and nuclear explosion categories were common among males, while evacuation instruction and story were common among females.

4.3 Age in Disaster-Related Information Seeking Behaviour

Figure 2 shows the age distribution of instances of disaster-related information seeking behaviour. Figure 2(a) shows age distribution of testimony in active-information-needs categories, in order of size, as adulthood ($n = 311$), maturity ($n = 114$), early adulthood ($n = 76$) and adolescence ($n = 1$) which has a large effect ($d = 0.8$). One common pattern is the large proportion that the ‘current status’ category represents in early adulthood, adulthood and maturity.

Figure 2(b) shows age distribution for information channels, again organised as adulthood ($n = 443$), maturity ($n = 227$), early adulthood ($n = 82$) and adolescence ($n = 5$) that has a medium effect ($d = 0.5$). The face-to-face category is the largest channel among age categories, and phone and television are common in early adulthood.



(a) Active information needs **(b)** Information channels

Fig. 2. Age in disaster-related information seeking behaviour

4.4 Location in Disaster-Related Information Seeking Behaviour

Figure 3 shows location distribution for information-sources categories for Fukushima ($n = 335$), Iwate ($n = 287$) and Miyagi ($n = 210$) that has a large effect ($d = 1.0$). Family/neighbourhood was the source with the largest proportion among location categories, followed by work community/colleagues and broadcast media. Information sources from the health-and-safety sector and local government are more common in Fukushima.

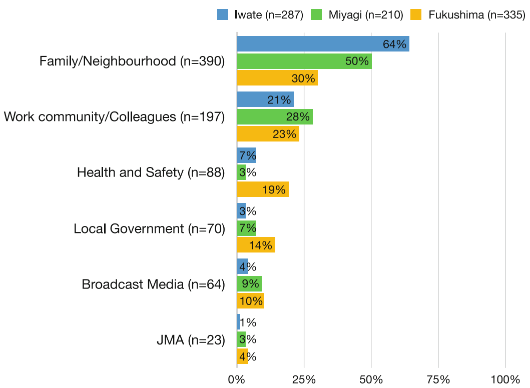
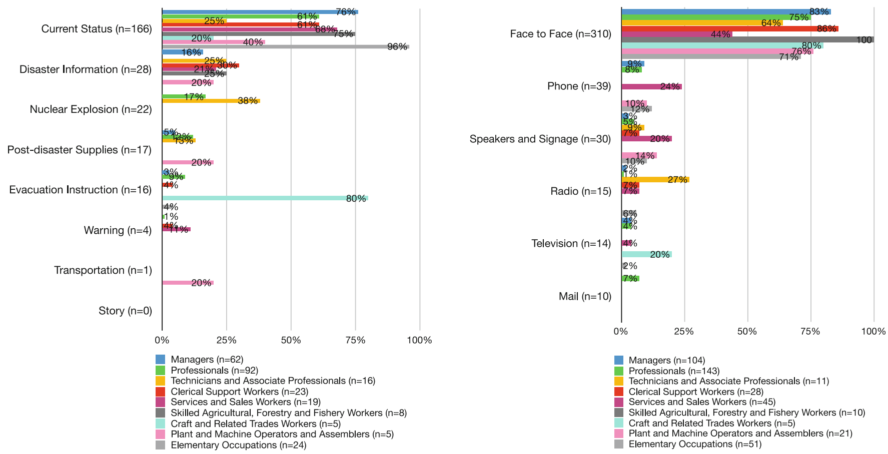


Fig. 3. Location in information sources

4.5 Occupation in Disaster-Related Information Seeking Behaviour

Figure 4 shows the occupation distribution of instances of disaster-related information seeking behaviour. Figure 4(a) shows the occupation distribution for active-information-needs categories that has a medium effect ($d = 0.5$). The current-status category was the largest active-needs proportion among occupation categories, except for ‘Technicians and associate professionals’ and ‘Craft and related trade workers’. ‘Professionals’ and ‘Technicians and associate professionals’ actively search for nuclear-explosion information.

Figure 4(b) shows the occupation distribution in information channel categories that has a medium effect ($d = 0.5$). A clear common pattern appears in the large proportion of the face-to-face category among occupation categories. However, ‘Technicians and associate professionals’ used radio; ‘Service and sales workers’ used the phone and speakers and signage more than other occupation categories. Patterns in remaining occupations for instances of disaster-related information seeking behaviour varied.



(a) Active information needs **(b)** Information channels

Fig. 4. Occupation in disaster-related information seeking behaviour

5 Discussion

5.1 Demographic Characteristics of Disaster-Related Information Seeking Behaviour

Our findings first showed demographic characteristics, such as gender, age, location and occupation, varied significantly across instances of disaster-related information seeking behaviour, i.e. passive and active information needs, information sources and information channels (see Table 4).

Gender is a key element of human experience that shapes identity and other aspects of social life [3]. In terms of gender (see Fig. 1), our analysis shows that both males and females engage in goal-directed behaviour aimed at ensuring personal and family safety, as well as that of those around them, in the proportion of current status in active and passive information needs. For information sources, females had a higher proportion of using family/neighbourhood, while males had a higher proportion of work community/colleagues, health and safety and JMA. Among information channels, the face-to-face category is the largest channel proportionately in gender categories. Our results echo the findings of existing studies, in that gender differences further influence the creation of disaster-related information seeking behaviour and the practice of disaster management itself [3, 9].

One of the principal receiver demographic characteristics that most studies examine is reflected in age categories (see Fig. 2). Our analysis considered that based on passive information needs, the younger a person is, the more other persons search for information about their current status. As people get older, they search less for information about evacuation instruction and more for information on post-disaster supplies. Regarding active information needs, information channels and information sources, the age proportion was slightly similar and significantly varied across early adulthood, adulthood and maturity. This shows the ageing population in Japan in sharp contrast to the very young populations in most developing countries. This is also important because the very young and the very old disproportionately incur the greatest number of fatalities in disasters [22].

In Fig. 3, location-based capabilities can permeate a multitude of virtual applications and have transformed the ways in which technology could support location-based knowledge generation and decision-making [35]. In terms of location relating to active information needs, ‘current status’ represents the largest proportion. However, people in Fukushima search for more information about a nuclear explosion and evacuation instruction than in Miyagi and Iwate Prefectures. In Fukushima, a different pattern of information channels and sources appears, perhaps because people in Fukushima experienced an earthquake, a tsunami, and a nuclear explosion. Occupation connects closely with the types of resources people have available for use in crises and the types of public resources available, and they have a strong spatial dimension [40]. Our analysis showed occupation significantly varied across instances of disaster-related information seeking behaviour (see Fig. 4).

Our findings also highlight the effect size (Cohen’s d) of demographic factors on the instances of disaster-related information seeking behaviour instances. Furthermore, the results were divided into three effects, i.e. large, medium, and small. The large effects were identified between (1) age and active needs and (2) gender and sources. The medium effects were identified between 1) age and channels, (2) gender and passive needs, (3) location and sources and (4) occupation and passive needs and channels. The small effects were identified between (1) gender and active needs and channels, (2) age and passive needs and sources, (3) location and active needs, passive needs and channels and (4) occupation and passive needs and sources.

The potential for feedback mechanisms among these processes is not clear yet from a theoretical perspective, and relatively little empirical work has attempted to examine the interconnections and, thereby, test hypotheses about and provide a better understanding of the disaster-related information seeking behaviour that underlies demographic factors and its processes. Moreover, due to demographers often focusing more on reporting the significant (p) value when presenting the results, we emphasise the size of the effect rather than its statistical significance, to promote a more scientific approach to the accumulation of knowledge in reporting and interpreting effectiveness [2, 25]. Policies and programmes related to disaster preparedness and response can affect the outcomes we have considered, as well as their interconnections [8, 20]. Thus, the creation and development of active and passive information needs, sources and channels can alter the immediate consequences of disasters for age, gender, location and occupation as demographic factors.

5.2 Limitation

Since we used published testimonial data, there was little control over how interviews were carried out and their transcripts edited. Although the published data allowed us to access a large collection of testimony, it is possible that the occurrence of some senses was undermined in our datasets. Also, it was difficult to balance data size since this was an underline distribution of data. However, due to the nature of the research methodology adopted, the findings of this study remain at the level of analysing descriptions of self-recollection and self-reporting [23].

6 Conclusion

Disaster-related information seeking behaviour takes on added importance with demographic characteristics, where each instance of that behaviour has come to guide how people's gender, age, location and occupation interplay. We identified the size effects in three categories—large, medium and small effects. The large effects were identified between (1) age and active needs and (2) gender and sources. The medium effects were identified between (1) age and channels, (2) gender and passive needs, (3) location and sources and (4) occupation and passive needs and channels. The small effects were identified between (1) gender and active needs and channels, (2) age and passive needs and sources, (3) location and active needs, passive needs and channels and (4) occupation and passive needs and sources.

The above findings highlight the importance of examining demographic factors in disaster-related information seeking behaviour.This shows the manner of categorising demographics characteristics for information seeking behaviour aligned with active and passive information needs, sources and channels in a disaster. And those demographics—including age, gender, location and occupation—can greatly affect if and how people receive and act upon preparedness or response communications. For example, this research could be a guide to reach particular demographics concerning which medium will be most effective (some technologies or programmes are more likely to reach younger people than older persons) and have a general awareness of how to access them [18]. Also, developing relationships with some occupational groups from various locations can help improve awareness and preparedness while also facilitating more effective communications among people who may not have access to social media, Internet and other modern communication technologies.

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Appendix A

Disaster-related information seeking behaviour instances by gender, age, and location.

Disaster-related Information Seeking Behaviour Instances	Gender				Age										Location					
	Male	%	Female	%	Adolescence	%	Early adulthood	%	Adulthood	%	Maturity	%	Undefined	%	Miyagi	%	Iwate	%	Fukushima	%
Active Information Needs ($N = 505$)																				
Current Status	278	70.6	73	65.8			63	82.9	202	65	83	72.8	3	100	112	73.2	126	80.8	113	57.7
Disaster Information	47	11.9	3	2.7	1	100			37	11.9	12	10.5			25	16.3	20	12.8	5	2.6
Evacuation Instruction	16	4.1	16	14.4			5	6.6	16	5.1	11	9.6			8	5.2	1	0.6	23	11.7
Nuclear Explosion	27	6.9	8	7.2			3	3.9	27	8.7	5	4.4							35	17.9
Post-disaster Supplies	10	2.5	9	8.1			4	5.3	15	4.8					6	3.9	2	1.3	11	5.6
Transportation	3	0.8							3	1							2	1.3	1	0.5
Warning	13	3.3	2	1.8			1	1.3	11	3.5	3	2.6			2	1.3	5	3.2	8	4.1
***p*-value**		**<0.001**							**0.044**									**<0.001**		
Cohen's *d*		**0.4**							**0.8**									**0.2**		
Passive Information Needs ($N = 977$)																				
Current Status	414	52	80	44.2	17	70.8	45	55.6	318	54.4	108	38.7	6	75	266	67.9	106	38.4	122	39.5
Disaster Information	56	7	6	3.3			8	9.9	32	5.5	22	7.9			18	4.6	34	12.3	10	3.2
Evacuation Instruction	100	12.6	36	19.9			16	19.8	89	15.2	31	11.1			29	7.4	44	15.9	63	20.4
Nuclear Explosion	51	6.4	6	5.8			1	1.2	36	6.2	20	7.2							57	18.4
Post-disaster Supplies	40	5	10	5.5	2	8.3	1	1.2	23	3.9	24	8.6			37	9.4	7	2.5	6	1.9
Story	82	10.3	33	18.2	5	20.8	4	4.9	47	8	57	20.4	2	25	28	7.1	62	22.5	25	8.1
Warning	53	6.7	10	5.5			6	7.4	40	6.8	17	6.1			14	3.6	23	8.3	26	8.4
***p*-value**		**0.002**							**<0.001**									**<0.001**		
Cohen's *d*		**0.7**							**0.2**									**0.4**		
Information Sources ($N = 832$)																				
Broadcast Media	49	8	15	6.9			7	7.4	40	8	17	7.4			19	9	12	4.2	33	9.9
Family/Neigbourhood	244	39.7	146	67	3	75	37	38.9	225	45	124	53.7	1	50	106	50.5	183	63.8	101	30.1
Health and Safety	77	12.5	11	5			8	8.4	54	10.8	26	11.3			7	3.3	19	6.6	62	18.5
JMA	23	3.7			1		5	5.3	10	2	7	3			6	2.9	4	1.4	13	3.9
Local Government	52	8.5	18	8.3		25	4	4.2	47	9.4	18	7.8	1	50	14	6.7	8	2.8	48	14.3
Work community/Colleagues	169	27.5	28	12.8			34	35.8	124	24.8	39	16.9			58	27.6	61	21.3	78	23.3
***p*-value**		**<0.001**							**0.015**									**<0.001**		
Cohen's *d*		**1**							**0.2**									**0.7**		
Information Channels ($N = 760$)																				
Face to Face	392	74.1	191	82.7	4	80	60	73.2	335	75.6	183	80.6	1	33.3	172	78.5	219	92	192	63.4
Internet	1	0.2			1	20									1	0.5				
E-Mail	5	0.9	10	4.3					13	2.9	1	0.4	1	33.3	4	1.8			11	3.6
Phone	46	8.7	13	5.6			11	13.4	30	6.8	18	7.9			12	5.5	2	0.8	45	14.9
Radio	29	5.5	6	2.6			2	2.4	23	5.2	10	4.4			10	4.6	6	2.5	19	6.3
Speakers and Signage	36	6.8	7	3			2	2.4	29	6.5	11	4.8	1	33.3	17	7.8	8	3.4	18	5.9
Television	20	2.6	4	0.5			7	8.5	13	2.9	4	1.8			3	1.4	3	1.3	18	5.9
***p*-value**		**0.001**							**<0.001**									**<0.001**		
Cohen's *d*		**0.3**							**0.7**									**0.1**		

Appendix B

Disaster-related information seeking behaviour instances by occupation.

Disaster-related Information Seeking Behaviour Instances	Occupation																			
	Managers	%	Professionals	%	Technicians and Associate Professionals	%	Clerical Support Workers	%	Services and Sales Workers	%	Skilled Agricultural, Forestry and Fishery Workers	%	Craft and Related Trades Workers	%	Plant and Machine Operators and Assemblers	%	Elementary Occupations	%	Undefined	%
Active Information Needs ($N = 505$)																				
Current Status	47	75.8	56	60.9	4	25	14	60.9	13	68.4	6	75	1	20	2	40	23	95.8	185	73.7
Disaster Information	10	16.1			4	25	7	30.4	4	21.1	2	25			1	20			22	8.8
Evacuation Instruction	2	3.2	8	8.7			1	4.3					4	80			1	4.2	16	6.4
Nuclear Explosion			16	17.4	6	37.5													13	5.2
Post-disaster Supplies	3	4.8	11	12	2	12.5									1	20			2	0.8
Transportation															1	20			2	0.8
Warning			1	1.1			1	4.3	2	10.5									11	4.4
***p*-value**											**<0.001**									
Cohen's *d*											**0.5**									
Passive Information Needs ($N = 977$)																				
Current Status	78	56.1	54	34.2	51	81	12	46.2	65	65.7	25	71.4	6	66.7	11	25.6	41	59.4	151	44.9
Disaster Information	15	10.8	8	5.1	4	6.3	5	19.2			4	11.4	1	11.1	8	18.6	3	4.3	14	4.2
Evacuation Instruction	17	12.2	28	17.7	1	1.6	2	7.7	8	8.1	1	2.9	1	11.1	2	4.7	6	8.7	70	20.8
Nuclear Explosion			29	18.4					1	1							3	4.3	24	7.1
Post-disaster Supplies			15	9.5	4	6.3									17	39.5	2	2.9	12	3.6
Story	19	13.7	17	10.8	1	1.6	3	11.5	17	17.2	5	14.3	1	11.1	2	4.7	8	11.6	42	12.5
Warning	10	7.2	7	4.4	2	3.2	4	15.4	8	8.1					3	7	6	8.7	23	6.8
***p*-value**											**<0.001**									
Cohen's *d*											**0.4**									
Information Sources ($N = 832$)																				
Broadcast Media	8	7.6	11	5.5	4	20	2	7.7	4	10.8			1	20			3	7.1	31	8.6
Family/Neigbourhood	65	61.9	39	19.4	1	5	14	53.8	10	27	12	92.3	4	80	7	31.8	22	52.4	216	59.8
Health and Safety	11	10.5	35	17.4	1	5	1	3.8	8	21.6					3	13.6	2	4.8	27	7.5
JMA	2	1.9	1	0.5	1	5			2	5.4					3	13.6	4	9.5	10	2.8
Local Government	2	1.9	19	9.5	6	30	2	7.7	4	10.8					4	18.2			33	9.1
Work community/Colleagues	17	16.2	96	47.8	7	35	7	26.9	9	24.3	1	7.7			5	22.7	11	26.2	44	12.2
***p*-value**											**<0.001**									
Cohen's *d*											**0.3**									
Information Channels ($N = 760$)																				
Face to Face	86	82.7	107	74.8	7	63.6	24	85.7	20	44.4	10	100	4	80	16	76.2	36	70.6	273	79.8
Internet																			1	0.3
E-Mail			10	7															5	1.5
Phone	9	8.7	11	7.7					11	24.4					2	9.5	6	11.8	20	5.8
Radio	2	1.9	2	1.4	3	27.3	2	7.1	3	6.7							3	5.9	20	5.8
Speakers and Signage	3	2.9	7	4.9	1	9.1	2	7.1	9	20					3	14.3	5	9.8	13	3.8
Television	4	3.8	6	4.2					2	4.4			1	20			1	2	10	2.9
***p*-value**											**<0.001**									
Cohen's *d*											**0.5**									

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