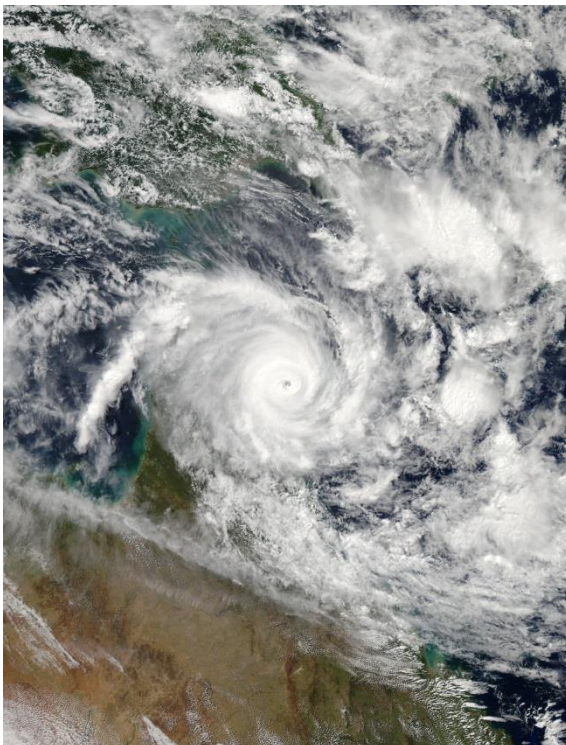


Disaster Preparedness: Community preparedness & impact 2013 – 2014 Tropical Cyclone Season

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**NURSING, MIDWIFERY and NUTRITION,
&
CENTRE FOR NURSING AND MIDWIFERY RESEARCH**

JAMES COOK UNIVERSITY

RESEARCH REPORT NO. 2

Disaster Preparedness:

Community preparedness & impact

2013 – 2014 Tropical Cyclone Season

By

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Executive Summary

The North Queensland coastline and inland communities are subjected to cyclone or threat of cyclone on a yearly basis. Although there is often ample warning of cyclones, even at lower rated categories they cause disruption and damage to local communities.

Across the region there are a number of groups on local and state levels involved in prevention, preparedness, and response and recovery strategies relating to natural disasters. Overriding, the aim is to ensure residents of Northern and Far Northern Queensland are well educated and well prepared, that effective and speedy response efforts are made and that security and normalcy is returned as soon and as safely possible.

This project, funded by a Far North Queensland Hospital Foundation grant, focused firstly on the preparedness of community members for the 2013/2014 cyclone season. Of the 301 respondents, four (4) were non-North Queensland residents and 94% (n= 278) respondents had previously experienced a cyclone. It was these experiences and tacit knowledge gained from being raised in a cyclone prone region that provided the most valuable form of preparedness education for residents.

Secondly this project looked at the impact of experiencing a stressful life event such as a cyclone. Cyclones can cause widespread and extensive damage to homes, infrastructure, crops and vegetation. The impact is not purely financial as residents can suffer from acute psychological stress and in some cases ongoing post-traumatic stress events that require further support and help. Although the majority of participants (63%; n=188) reported no ongoing adverse effects, just over one quarter of participants reported some form of ongoing effect from having experienced a cyclone in the last 10 years. This knowledge

creates valuable insight into populations subjected to frequent natural disasters and provides a platform for community assistance and recovery programs.

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The authors wish to acknowledge that the views expressed in this report are those of the authors alone and do not represent the views of others or organisations contacted by the authors.

Background



Figure 1 2013/14 Australian cyclone season map. Courtesy of the Bureau of Meteorology

The official 2013/14 Australian cyclone season commenced on the 1st of November and ended on the 30th of April with a total of 24 tropical cyclone (TC) systems forming Australia wide. Five systems formed on the Queensland coastline of which three directly impacted on North Queensland and Far North Queensland communities ~ TC Dylan (category 2), TC Hadi (category 1), and TC Ita (category 5). Tropical cyclone Ita was by far the most intense TC system of the 2013/14 season with wind speeds in excess of 280 km/hr prior to landfall. Crossing the coastline near Cooktown significant flooding and vegetation damage was experienced across the region (Australian Government Bureau of Meteorology, 2014ab; Brisbane Tropical Cyclone Warning Centre, 2014).

For residents of northern and far northern Queensland it had only been two years since severe tropical cyclone Yasi (category 5) had wreaked havoc on northern towns and communities. TC Yasi caused major damage to infrastructure, homes, crops and vegetation resulting in monumental economic and psychosocial impacts, many of which were still being experienced by the residents of affected towns (Australian Government Bureau of Meteorology, 2011; Usher, et al, 2013).

Meteorological Information & History

Annually tropical cyclones pose serious threats to north Queensland communities with the most significant impact being floods caused by storm surges and heavy rains (Australian Government Bureau of Meteorology, 2014b). On average 4.7 tropical cyclone systems impact on the Queensland coast annually, and research shows clear links between Eastern Australian tropical cyclone formation and the El Niño-Southern Oscillation phenomenon

resulting in less impacts. Tropical cyclone impacts double during La Niña weather patterns (significance level 99%) (Australian Government Bureau of Meteorology, 2014c).

Since recording commenced in 1858, 207 tropical cyclones have impacted on northern coastal communities including Australia's most devastating tropical cyclone Mahina (Category 5) which made landfall near Cooktown in 1899 and resulted in 307 known fatalities (Australian Government Bureau of Meteorology, 2014c). Fortunately in recent years the number of deaths directly related to cyclone impacts has decreased significantly with official recordings attributing no deaths to severe Tropical Cyclone Yasi in 2011.

Preparedness

Preparedness is paramount to increasing successful post-disaster outcomes. This is particularly true with disasters such as cyclones and floods where communities often have hours or days of pre-impact awareness (Woods, West, Buettner, & Usher, 2014). In northern Queensland there has been a concerted push by local government and disaster agencies to ensure residents are adequately prepared prior to the commencement of each cyclone season. Utilising all available forms of media and social media, residents are 'flooded' with preparation advice, emergency contact information and the support services available.

Although it is clear from previous research that people access multiple sources of information during the preparation stage, they primarily rely on family and friends to validate decisions, such as whether to evacuate when impact is imminent (Mileti, Sorensen, Sorensen, & Sutton, 2002; Wachtendorf & Kendra, 2006; Woods, West, Buettner, & Usher, 2014).

Aim

Far North Queensland residents' perceptions of their preparedness for the 2013/14 cyclone season, and their preparedness actions were examined. The impact of previous cyclones on individuals together with their perception of risk was also evaluated.

Survey

Ethical approval to conduct the study was granted by the James Cook University Human Research Ethics Committee. The Community Disaster Preparedness survey consists of three parts. The first part asks demographic questions such as gender, age, educational attainment, residential location, occupation, marital status and number of children usually residing in the home. Part two asks about perceptions of preparedness, sources of information for preparedness, the existence of a family disaster plan, preparation actions prior to a cyclone, perceptions of risk and previous cyclone experience. Part three examines the psychosocial impact of previous cyclones using the Impact of Event (IES-R) scale - an instrument that measures stress reactions after a traumatic event (Sundin & Horowitz, 2003).

Demographics

The Community Disaster Preparedness survey was completed by 301 people although not all participants answered all questions. Seventy-six percent ($n = 224$) of participants are female and 24% ($n = 71$) are male. The average of participants is 47 years. A majority of

participants are married ($n = 138$, 47%), 26% are single ($n = 75$), 13% ($n = 38$) are living as a couple, 11% ($n = 32$) are separated or divorced, and 3% ($n = 9$) are widowed.

The most common educational qualification of participants was a post graduate qualification (29%, $n = 85$), followed by a trade, technical certificate or diploma (25%, $n = 72$). Eighteen percent of participants ($n = 54$) have a university degree and 14% have completed senior high school, 9% have completed junior high school, and 5% have not completed primary school.

In terms of occupation, 59% ($n = 176$) of survey participants are employed. Other occupation categories are shown below:

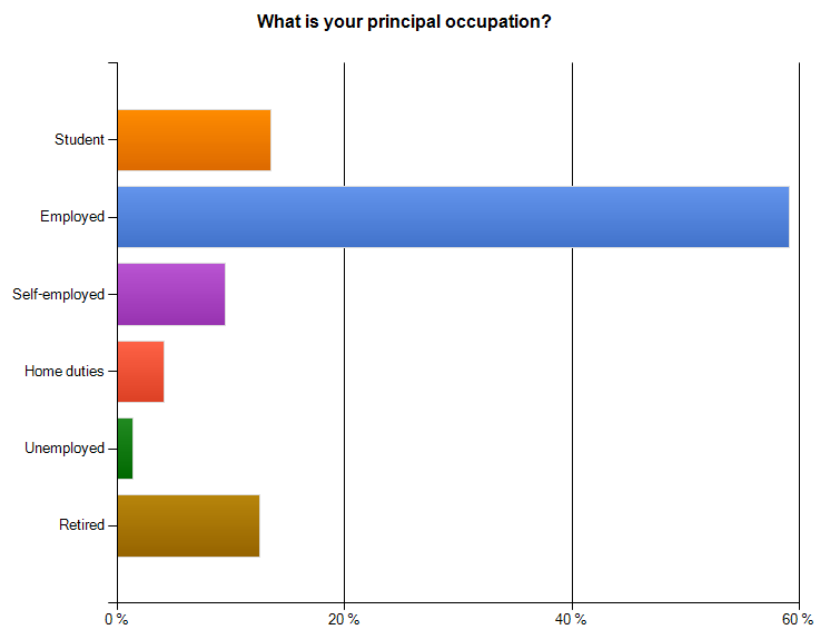


Figure 2 principal occupations of participants

The majority of participants (59%, $n = 161$) resided in Cairns at the time they completed the survey, 22% ($n = 59$) resided in Townsville, 10% ($n = 26$) resided in Innisfail, and the remainder resided in small towns between Cairns and Townsville. Overall, 1.5% of participants ($n = 4$) were tourists visiting the region during the 2003/14 cyclone season and completed the survey. On average, 0.6 children resided with residents.

Preparedness

Preparing for a cyclone is a responsibility that many people living in cyclone prone regions take very seriously. Planning and preparation can minimise property damage and help to ensure resident safety and survival. Participants were asked if they felt prepared for the 2013/2014 cyclone season. Responses were scored on a scale ranging from 1 = strongly disagree to 5 = strongly agree. Overall, 83% ($n = 247$) of participants agree or strongly agree that they were prepared for the 2013/14 cyclone season. The mean (average) score was 4.0 ($SD \pm 0.89$), indicating strong perceptions of preparedness.

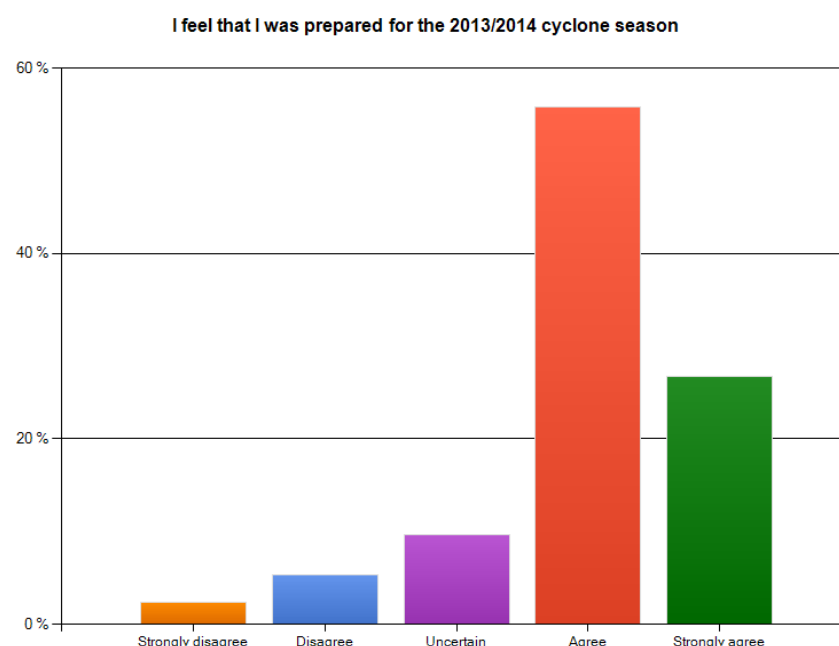


Figure 3 level of preparedness of participants

Sources of Information

Each year, local and state governments and departments advise cyclone prone communities about the dangers of cyclones and how to take necessary precautions to prepare property and protect family members. Participants were asked where they got information from on how to prepare for the 2013/2014 cyclone season. Previous experience was the main source of information on how to prepare for 33% ($n = 96$) of participants, followed by internet sources and the radio. Other sources of information are shown in the figure below:

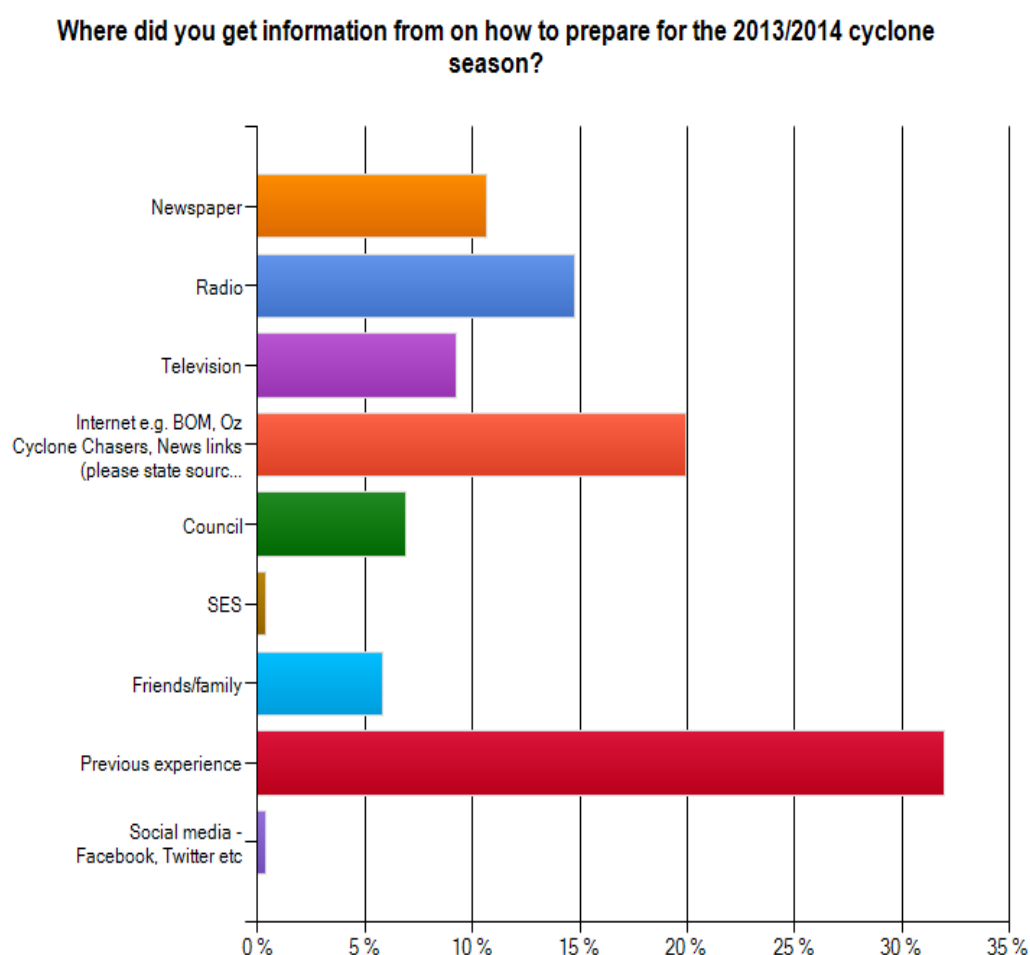


Figure 4 Accessing cyclone preparedness information

Previous Cyclone Experience

According to the literature, previous cyclone experience strongly affects an individual's perception of the risk associated with the threat of another such event (Berry & King, 1998; Smith, 2013). Direct personal experience is the most powerful influence of perceptions of risk, followed closely by the experiences of close family members, then the experiences of neighbours and friends. Individuals decide how they will prepare for, and respond to, the threat of a cyclone based on the level of risk they perceive (Smith, 2013). The greater the estimation of the likelihood of the event and the perceived risk, the more precautionary behaviours will be undertaken in response to the threat. Therefore, individuals and families who have previously experienced a cyclone are more likely to undertake more precautionary activities in response to the threat compared with those who have not previously experienced a cyclone.

Participants were asked if they have experienced a cyclone in the last 10 years. Overall, 94% ($n = 278$) of participants reported they have experienced a cyclone in the last 10 years.

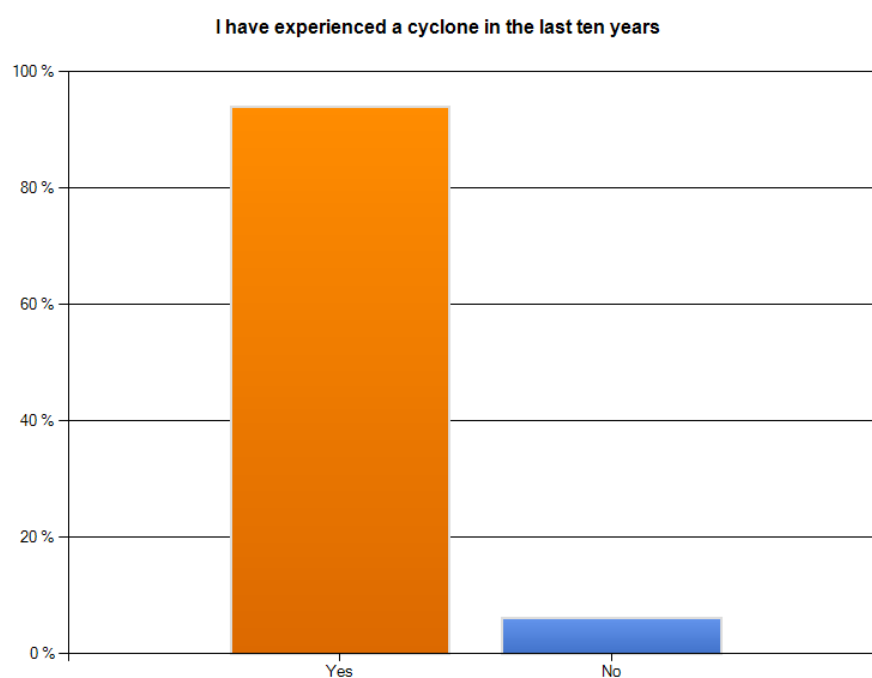


Figure 5 Previous cyclone experience

Tropical cyclones are ranked from 1 to 5 depending on their intensity, defined by the maximum mean wind speed over open flat land or water. This is sometimes referred to as the maximum sustained wind and will be experienced around the eye-wall of the cyclone. In Northern Australia, cyclones of varying intensity generally occur between November and April each year. The chance of a very dangerous category 4 or 5 cyclone is highest in March and April. The cyclone category system is explained in the table below.

Table 1 Australian Tropical Cyclone Category System

Category 1	Tropical cyclone	Negligible house damage. Damage to some crops, trees and caravans. Craft may drag moorings. A Category 1 cyclone's strongest winds are gales with typical gusts over open flat land of 90 - 125 km/h.
Category 2	Tropical cyclone	Minor house damage. Significant damage to signs, trees and caravans. Heavy damage to some crops. Risk of power failure. Small craft may break moorings. A Category 2 cyclone's strongest winds are destructive winds with typical gusts over open flat land of 125 - 164 km/h.
Category 3	Severe tropical cyclone	Some roof and structural damage. Some caravans destroyed. Power failures likely. A Category 3 cyclone's strongest winds are very destructive winds with typical gusts over open flat land of 165 - 224 km/h.
Category 4	Severe tropical cyclone	Significant roofing loss and structural damage. Many caravans destroyed and blown away. Dangerous airborne debris. Widespread power failures. A Category 4 cyclone's strongest winds are very destructive winds with typical gusts over open flat land of 225 - 279 km/h.

Category 5	Severe tropical cyclone	Extremely dangerous with widespread destruction. A Category 5 cyclone's strongest winds are very destructive winds with typical gusts over open flat land of more than 280 km/h.
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* Data provided by the Bureau of Meteorology (BoM).

When asked about personal cyclone experience, 65% ($n = 182$) of participants reported they had experienced Cyclone Larry, a category 4 cyclone (when it made landfall) in 2006.

Cyclone Larry devastated coastal areas between Innisfail and Tully, damaging thousands of homes, buildings, agriculture (predominantly bananas and sugarcane) and infrastructure.

The cost of the damage was estimated at A\$1.5 billion.

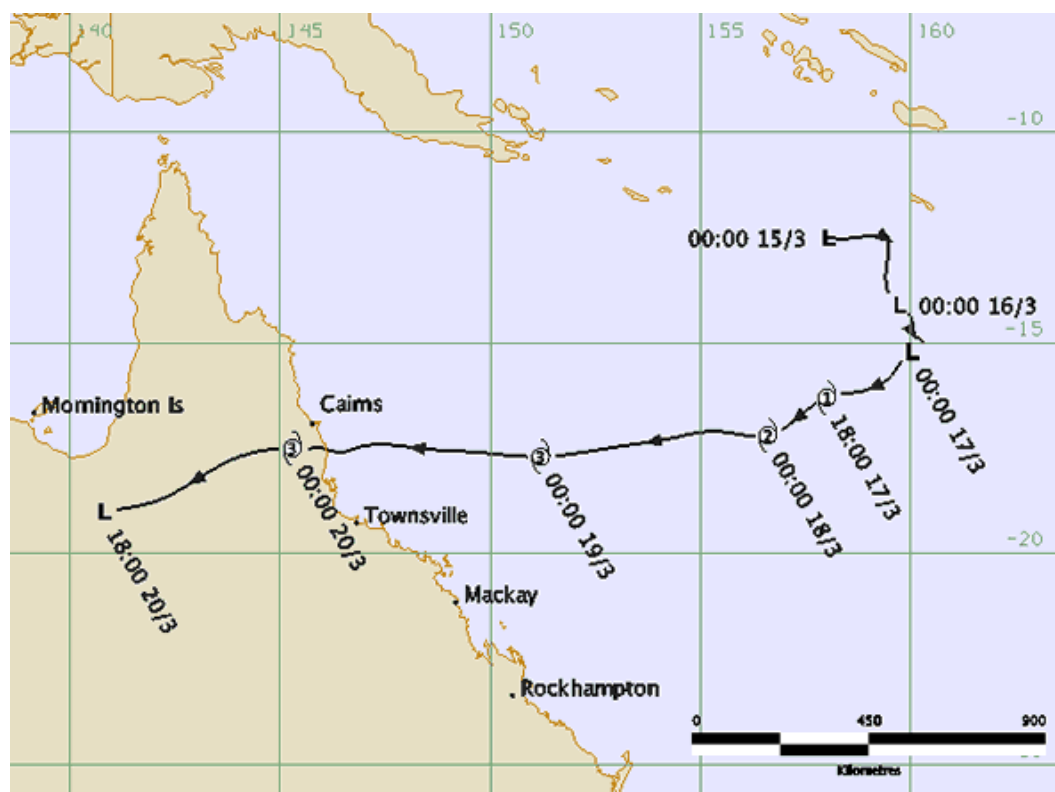


Figure 6 Cyclone Larry tracking map: courtesy of the Bureau of Meteorology

Ninety-one percent ($n = 257$) of participants reported experiencing Cyclone Yasi in 2011, a category 5 cyclone that made landfall at Mission Beach and caused severe damage to regions between Cairns and Townsville. A storm surge of over 2 metres was recorded. The estimated cost of Cyclone Yasi was A\$3.5 billion.

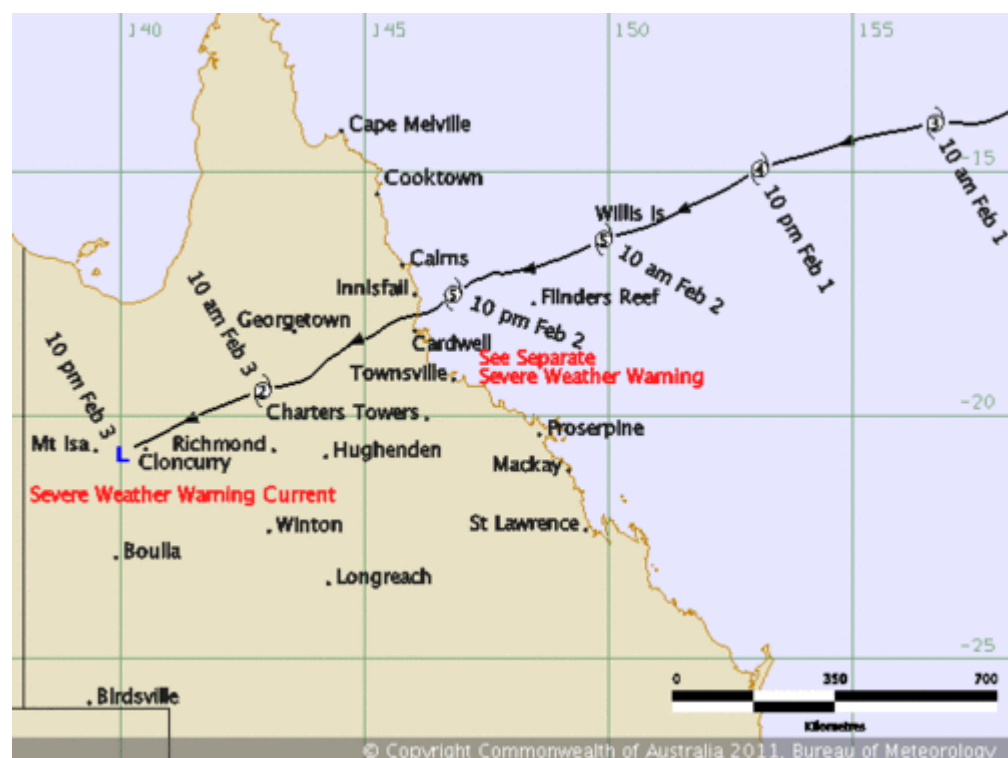


Figure 7 Cyclone Yasi tracking map: courtesy of the Bureau of Meteorology

Seventy-six percent ($n = 215$) of participants reported experiencing Cyclone Ita in 2014, a category 4 cyclone (when it made landfall). Cyclone Ita affected regions between Cape Melville and Innisfail on the Far North Queensland coast. Cyclone Ita caused damage to homes and uprooted trees in Cooktown, and heavy rains caused flooding throughout most of North Queensland. Damage from Cyclone Ita was estimated at A\$1 billion.

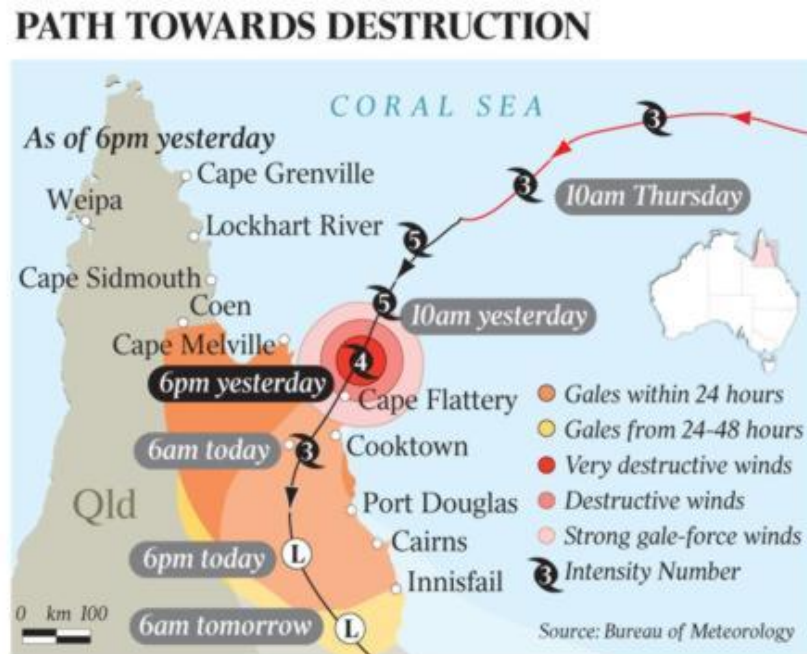


Figure 8 Cyclone Ita tracking map: courtesy of the Bureau of Meteorology

Previous personal experience combined with a sound understanding of cyclone hazards are key determinants that form and shape an accurate perception of the risk associated with a cyclone.

Previous personal experience can also be considered in terms of length of residence. The longer a person has lived in Far North Queensland, or other cyclone prone areas, the more likely it is that they have been exposed to the threat of cyclones (Berry & King, 1998). Length of residence also affects opportunities to develop networks of friendships with other residents that have had direct personal experience of cyclones impacting the region, thereby reducing vulnerability and increasing resilience in the event of a cyclone threat.

Risk of a cyclone

A Community Household Study found an alarming proportion of Cairns residents (40%) believed the region was naturally protected from cyclones, most commonly by the surrounding mountains or the reef (Berry & King, 1998). This local myth has been strengthened over time by 'near misses', when cyclones predicted to strike Cairns have veered away prior to landfall.

In the current study, Far north Queensland residents were asked about their perceptions of the risk of a major cyclone impacting them and their family. Responses were scored on a five-point scale ranging from 1 = highly unlikely to 5 = highly likely. Overall, 72% ($n = 216/299$) of residents agreed it was likely or highly likely a major cyclone would impact them. Just over one-quarter of participants were unsure ($n = 43$, 15%) or thought it unlikely or highly unlikely ($n = 40$, 13%), demonstrating a low perception of risk of a hazard event in the Far North Queensland region.

Those who have previously experienced a cyclone reported a higher perception of risk ($M = 3.77$, $SD \pm 0.97$) than those who had not previously experienced a cyclone ($M = 3.39$, $SD \pm 0.85$) but the difference was not significant.

At the beginning of the 2013/2014 cyclone season 71% of participants reported discussing the possibility of being affected by a cyclone.

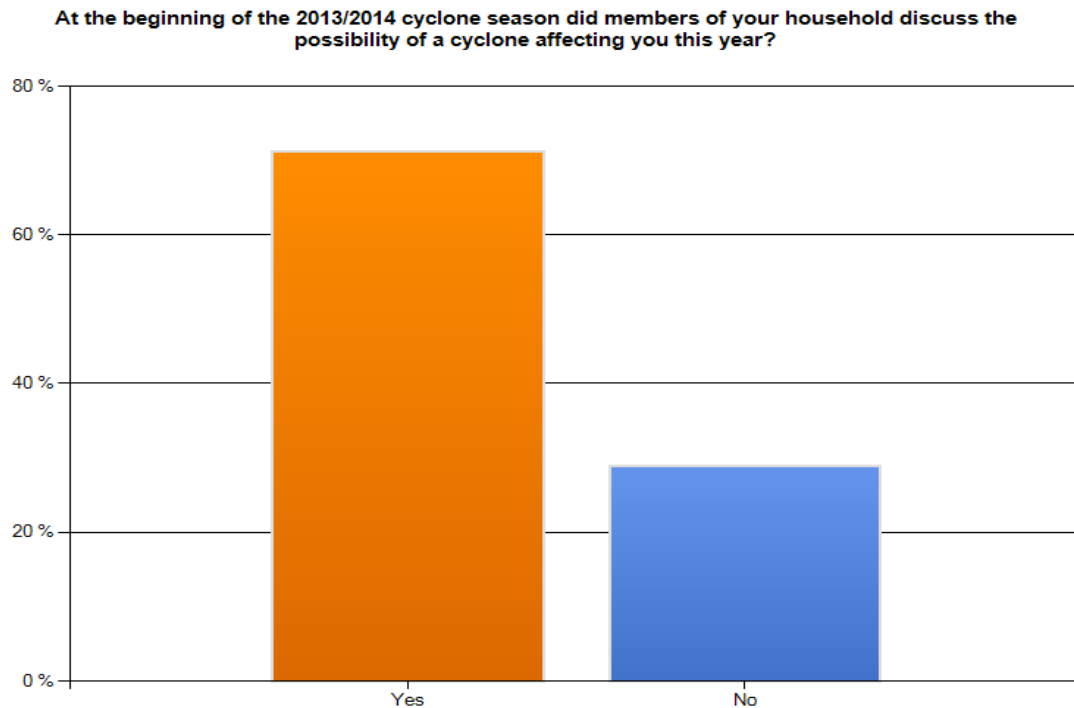


Figure 9 Pre-cyclone season family discussions regarding preparedness

Just over 60% of participants reported they have a family disaster plan for a cyclone event, while almost 40% do not, indicating that a substantial proportion of participants have a misperception of the cyclone hazard in the Far North Queensland region.

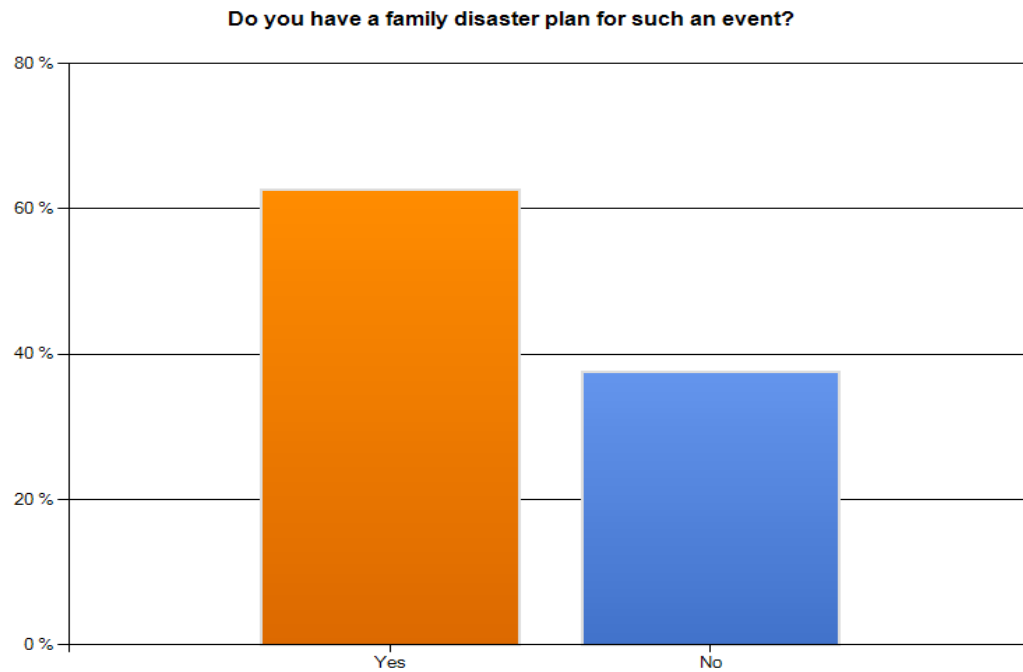


Figure 10 Pre-cyclone season family disaster plan

Emergency Cyclone Supplies

Participants generally demonstrated a good knowledge of the supplies necessary for an emergency cyclone kit. The most common emergency supplies participants had ready for the cyclone season were a torch and extra batteries, a radio and extra batteries, a three day supply of food and a first aid kit. Three-quarters of participants had fuelled their car, had cash money and a three day supply of water. However, only 35% of participants had organised an electronic or hard copies of important documents in a waterproof container, and 2% of participants did not have any emergency kit supplies prepared.

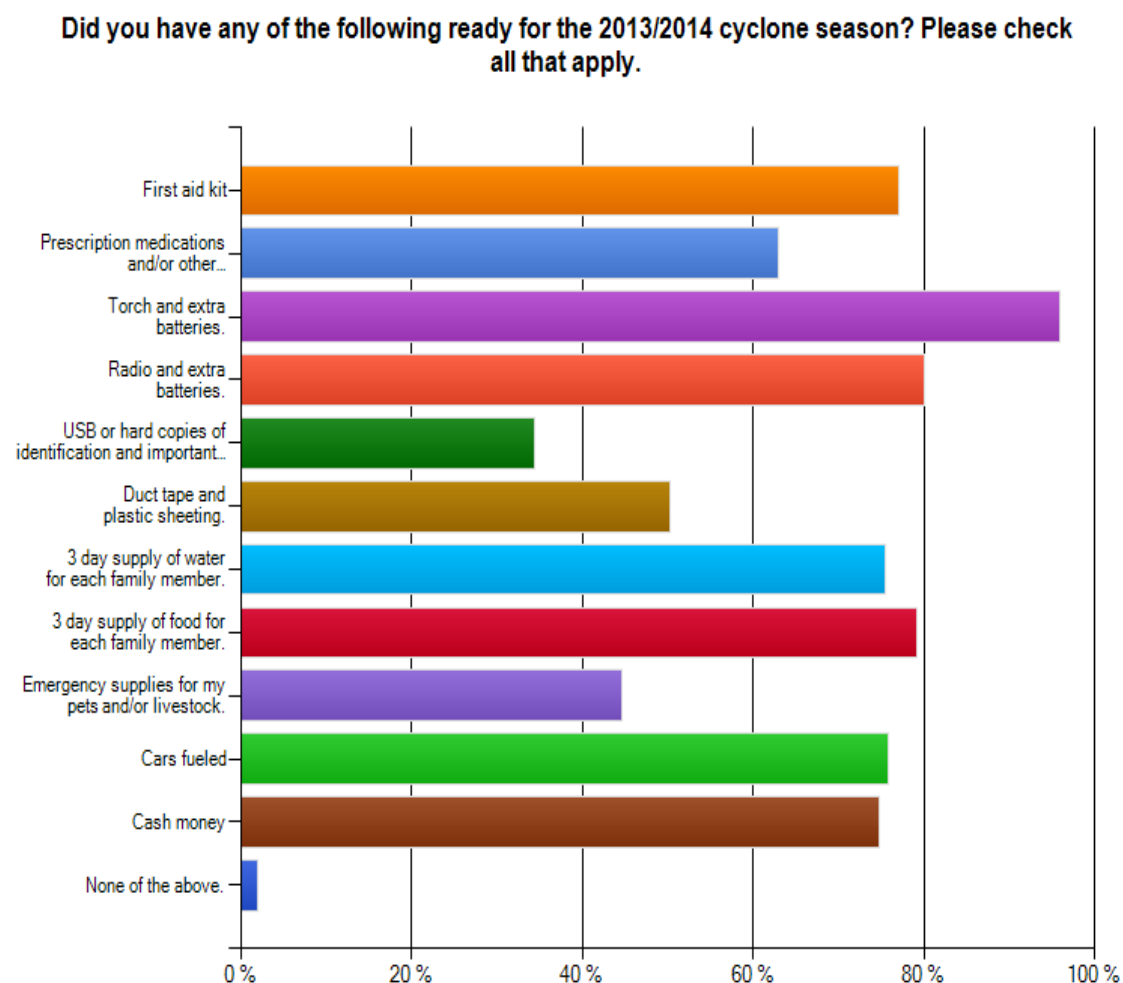


Figure 11 Disaster planning and readiness

Precautionary actions

Recent public education campaigns have focused on how to physically prepare households in the event of a cyclone warning advice being issued. These campaigns appear to have been relatively successful judging by the physical tasks participants reported undertaking to prepare their household. The most frequent actions participants took to reduce the impact of cyclone damage included storing outdoor furniture (89%, $n = 255$), removing or tying down items in the yard (81%, $n = 231$), and securing pot plants (75%, $n = 215$). However, less

than half of the participants reported they taped their windows, cleaned their gutters, or trimmed back trees around their home.

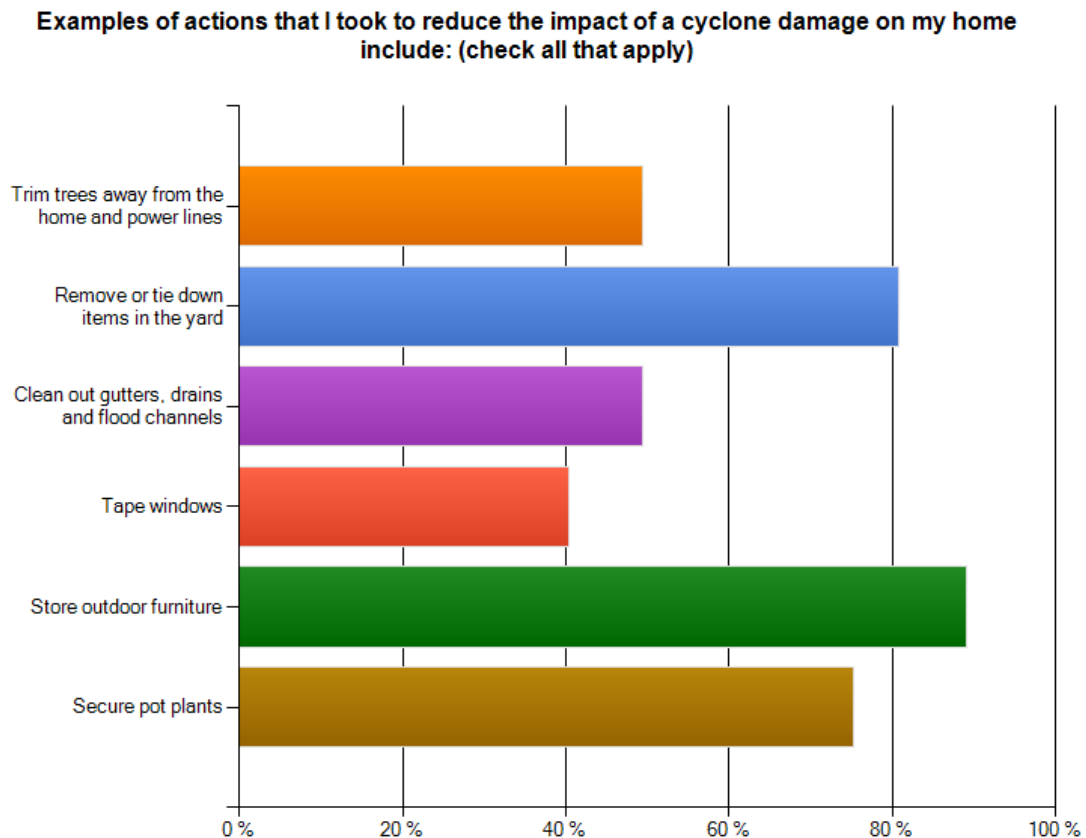


Figure 12 Actions to reduce cyclone impacts on the home

Data shows that during cyclones, participants took precautionary actions predominantly through common sense, which is likely to be associated with public education campaigns and length of residence in a cyclone prone region. Evidently, participants were also concerned about protecting the family home.

Conversations with family and friends, as well as direct personal experience of cyclones were strong motivations that promoted precautionary actions aimed at reducing vulnerability and increasing resilience in the event of a cyclone threat.

What prompted you and your household to take steps towards preparing for a cyclone?

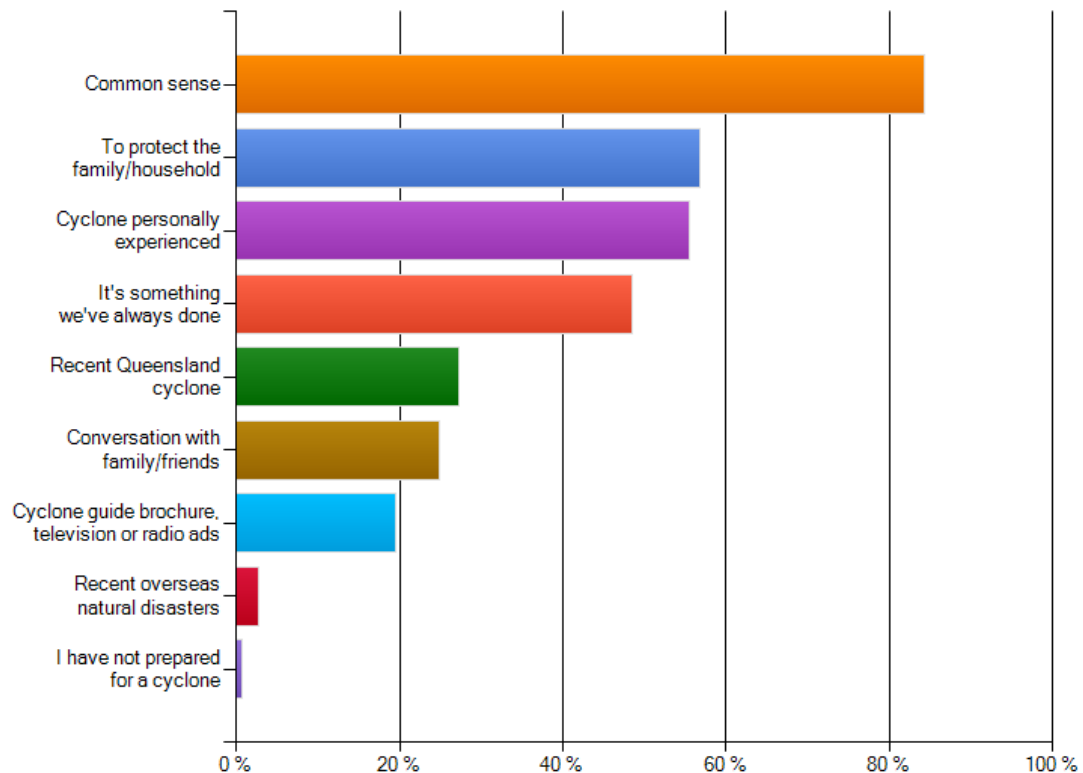


Figure 13 Prompts that trigger cyclone preparation

Factors preventing participants from preparing, or preparing fully, predominantly concerned lack of time (5.7%, $n = 15$), lack of money (4.2%, $n = 11$), and a low perception of risk (unlikely to happen to us) (4.2%, $n = 11$).

Impact of a stressful life event

Experiencing a severe cyclone can be frightening and traumatic. Cyclones can cause injury and loss of life, major structural damage to homes and disruption to electricity, water and gas supplies for long periods. There is likely to be extensive road closures due to fallen trees, fallen power lines or flooding, loss of communications (mobile phones and landlines), airport and port closures, food shortages, vegetation damage and soil erosion.

Feelings of distress are a normal response to a disaster such as a cyclone, most commonly caused by yourself or your family being at direct risk during a cyclone, worry and concern about the safety of friends and extended family, destruction or loss of property, injuries to yourself or others, witnessing others' distress, and feelings of panic and confusion in the aftermath of the cyclone.

During the disaster, many people experience acute stress, however, sometimes it is only after the event, sometimes weeks or months after, that some of the stressful effects start to show and extra help and support may be needed.

Participants were asked if they have suffered ongoing affects from cyclones they have experienced. A majority of participants (63%, $n = 188$) reported they have not been affected at all. Just over one-quarter of participants (28%, $n = 85$) were slightly affected, 8% ($n = 23$) were moderately affected and 1% ($n = 3$) have experienced major ongoing affects.

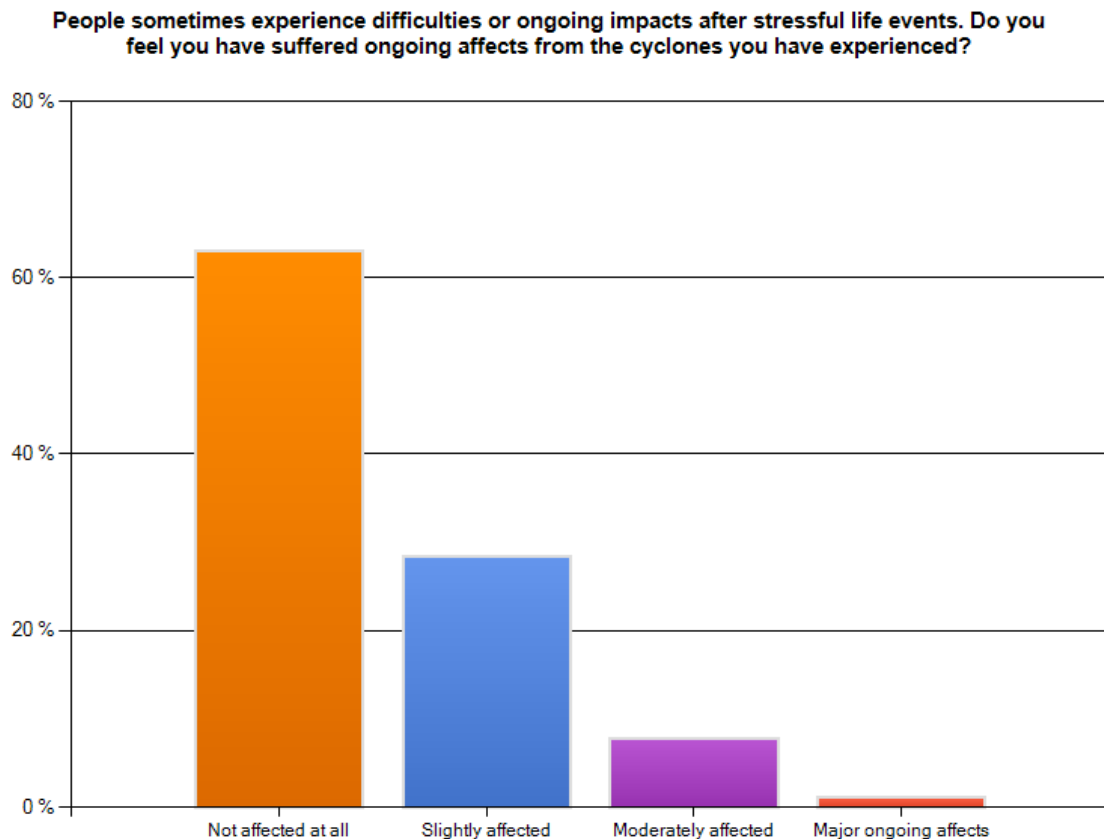


Figure 14 Ongoing impacts from previous cyclones experienced

Participants were asked to complete the Impact of Event Scale-Revised (IES-R) if they had slight, moderate, or major ongoing effects from the cyclones they have experienced. The IES-R measures the ongoing effects of a stressful life event. It asks questions about how much an individual was distressed by different reactions and symptoms of stress. Responses to the questions are scored on a 5-point scale ranging from 1 = not at all to 5 = extremely. The median score on a 5-point scale is 3. Responses below 3 indicate low levels of ongoing distress. Responses above 3 indicate moderate to high levels of ongoing distress. The higher the score is, the higher the level of ongoing distress. Forty-one percent ($n = 121$) of participants chose to complete the IES. The table below shows the mean (average) response scores to the IES-R questions.

Table 2 IES-R mean response scores

Question	Mean score
Any reminder brought back feelings about it.	2.05
I had trouble staying asleep.	1.63
Other things kept making me think about it.	1.68
I felt irritable and angry.	1.41
I avoided letting myself get upset when I thought about it or was reminded of it.	1.71
I thought about it when I didn't mean to.	1.53
I felt as if it hadn't happened or wasn't real.	1.43
I stayed away from reminders of it.	1.49
Pictures about it popped into my mind.	1.74
I was jumpy and easily startled.	1.53
I tried not to think about it.	1.62
I was aware that I still had a lot of feelings about it, but I didn't deal with them.	1.59
My feelings about it were kind of numb.	1.59
I found myself acting or feeling like I was back at that time.	1.36
I had trouble falling asleep.	1.56
I had waves of strong feelings about it.	1.57
I tried to remove it from my memory.	1.46
I had trouble concentrating.	1.46
Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	1.34
I had dreams about it.	1.41
I felt watchful and on-guard.	1.64
I tried not to talk about it.	1.42

The above table shows all mean responses to the IES-R are below 3 indicating low levels of distress. The item that caused the most distress was reminders of the cyclone that brought back feelings about it. Of the responses, 13% of participants reported they were moderately distressed by this, 8% were distressed quite a bit, and 3% were extremely distressed. Often, insurance claims can take some time to be finalised and damage to the home or

outbuildings are not repaired immediately. Also, trees and other vegetation take time to regrow. Daily visual reminders of a cyclone can cause distress long after the event. In addition, strong winds and rain are also reminders of a stressful event that can provoke feelings of uneasiness and distress.

The next item that caused a higher level of distress was when pictures about the cyclone popped into the mind. Of the responses, 8% of participants were moderately distressed by this, 9% were distressed quite a bit and 2% were extremely distressed. Unwanted images and memories of a stressful event are also a form of visual reminders that can cause distress after a traumatic event.

Gender differences in dealing with stressful life events

Post disaster stress can be ongoing and can affect physical and mental health and wellbeing. However, men and women manage stress differently. Men tend to withdraw and internalise their stress, whereas women are more likely to turn to family and friends for social support.

The results of this study show that men are more likely than women to avoid letting themselves get upset when they think about the traumatic event or are reminded of it. Men are more likely than women to think about the traumatic event when they don't mean to. Men are also more likely than women to be aware they still have a lot of feelings about the traumatic event but have not dealt with them.

Conclusion

Disaster preparedness and ongoing public education and awareness regarding disaster is paramount in cyclone affected regions. Clearly in Far North and Northern Queensland communities there is heightened awareness of the dangers due to natural disasters associated with living in the region, but there also remains an element of complacency. This could be due to significant time periods in which some towns and cities have not experienced direct hit cyclones, or the transient tourist populations that visit the regions often during the cyclone season. None-the-less there is a proportion of the population (28%) that do not perceive any real or likely risk of being impacted on by a cyclone, which leads to inadequate preparation and poor emergency response strategies. In the event of a cyclone occurring perceptions such as these not only endanger the safety of those individuals and but also the safety of emergency response teams. It is important that disaster education and information continues to be disseminated so residents, new residents and visitors are motivated to actively prepare.

It is clear that cyclones are stressful and traumatic events and for some can trigger lasting stress responses (PTSD), especially if a major cyclonic event has been experienced (Category 4 or 5). Government agencies, emergency response groups and the bureau of meteorology are responsible for conveying up to date information, reporting updates and communicating preparedness and response strategies. Importantly these communications must be conveyed in a manner that does not create overwhelming fear and panic either locally or on a broader scale. Sensationalist media reporting styles such as “killer cyclone” and

“catastrophic monster” only exacerbate feelings of despair for individuals with ongoing stress responses to previous disasters (Woods et al, 2014).

In some natural disaster events such as TC Yasi (Cat 5) and TC Larry (Cat 5) the outcome could never truly be prepared for. The impact was devastating and the effects long lasting, and for some too great to remain in the region. This study shows the importance of having robust recovery strategies in communities affected by cyclones that remain active not just for the short-term post disaster period.

It is said that the people of Northern and Far Northern Queensland are ‘a resilient bunch, bred tough’ (personal comment, Cardwell resident, 2014) and this is evidenced by the community support and commitment to rebuilding towns and communities post disaster. But in order to maintain this resilience and community spirit, preparedness, response plans and recovery strategies must be present, as they are the key to successful outcomes.

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