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Disaster preparedness behaviour among rural people in Gaafu Dhaalu Atoll, Maldives

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ABSTRACT

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A cross-sectional descriptive study was conducted to identify disaster preparedness behaviour among rural people in Gaafu Dhaalu Atoll, Maldives. A structured questionnaire was used to collect data from two hundred and thirteen inhabitants of ten islands from 15-20 January 2008. Chi-square test was performed to describe the association among related factors and disaster preparedness behaviour.

The results revealed that more than one-half of the respondents had a good level of disaster preparedness behaviour. The following factors have statistically significant association with preparedness behavior namely gender, occupation, income, education, types of houses lived, knowledge, perception, tidal flood experiences, experience of tsunami, frequency tidal flood experiences, involvement of community-based tidal flood disaster preparedness activities, availability of information on tidal flood disaster preparedness and accessibility to information on tidal flood disaster preparedness.

It is recommended that sustaining a good level of knowledge and preparedness behaviour is paramount for disaster preparedness in rural areas. Further enhancing and strengthening of community-based awareness activities must be emphasized and implemented. Disaster preparedness must be kept as a priority at national and atoll (provincial) level planning for development and improving the quality of life of people.

Keywords Disaster preparedness behaviour, rural people

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พฤติกรรมการเตรียมความพร้อมเกี่ยวกับอุบัติภัยของประชาชนในชนบท หมู่เกาะกาฟู ดาลู ประเทศมัลดิฟ

บทคัดย่อ

ฮุสเซน ลาชิด, บุญยง เกี่ยวการค้า, จิราพร ชมพิกุล. พฤติกรรมการเตรียมความพร้อมเกี่ยวกับอุบัติภัยของประชาชนในชนบท หมู่เกาะกาฟู ดาลู ประเทศมัลดิฟ. ว.สาธารณสุขและการพัฒนา, 2553; 8(1) : 9-20.

การศึกษาแบบตัดขวางนี้มุ่งศึกษาพฤติกรรมการเตรียมความพร้อมเกี่ยวกับอุบัติภัยของประชาชน ในชนบทหมู่เกาะกาฟู ดาลู ประเทศมัลดิฟ เก็บข้อมูลจากกลุ่มตัวอย่าง จำนวน 213 คน โดยวิธีการสัมภาษณ์ตามแบบสอบถาม ระหว่างวันที่ 15-20 มกราคม พ.ศ. 2551 ใช้สถิติไค-สแคว์ในการวิเคราะห์ความสัมพันธ์ระหว่างพฤติกรรมการเตรียมความพร้อมเกี่ยวกับอุบัติภัยกับปัจจัยที่เกี่ยวข้อง และยอมรับนัยสำคัญทางสถิติที่ระดับน้อยกว่า 0.01

ผลการศึกษา พบว่า เกินกว่าครึ่งหนึ่งของกลุ่มตัวอย่างมีพฤติกรรมการเตรียมความพร้อมในระดับดี นอกจากนี้ยังพบปัจจัยต่าง ๆ ที่มีความสัมพันธ์กับพฤติกรรมการเตรียมความพร้อม ได้แก่ เพศ อาชีพ รายได้ ระดับการศึกษา ลักษณะพื้นที่อาศัย ความรู้ การรับรู้ ประสบการณ์เกี่ยวกับน้ำทะเลท่วม ประสบการณ์เกี่ยวกับสึนามิ ประสบการณ์เกี่ยวกับความถี่ของน้ำทะเลท่วม การมีส่วนร่วมของชุมชนในกิจกรรมเตรียมความพร้อมสำหรับน้ำทะเลท่วม การมีไว้ใช้ของข้อมูลเกี่ยวกับการเตรียมความพร้อมสำหรับน้ำทะเลท่วม และการเข้าถึงข้อมูลเกี่ยวกับการเตรียมความพร้อมสำหรับน้ำทะเลท่วม

ข้อเสนอแนะจากการศึกษา ได้แก่ การส่งเสริมให้เกิดความยั่งยืนของความรู้และพฤติกรรมการเตรียมความพร้อมสำหรับน้ำทะเลท่วมในกลุ่มคนชนบท การมุ่งเน้นด้านการยกระดับความเข้มแข็งของกิจกรรมชุมชนเกี่ยวกับการสร้างความตระหนักเรื่องการเตรียมความพร้อมสำหรับน้ำทะเลท่วม รวมถึงการคงความสำคัญของการเตรียมความพร้อมรวมทั้งแผนสำหรับการพัฒนาและปรับปรุงคุณภาพชีวิตของประชาชนทั้งระดับชาติ และระดับท้องถิ่น

คำสำคัญ พฤติกรรมการเตรียมความพร้อมสำหรับอุบัติภัย ประชาชนชนบท

INTRODUCTION

Climate Change and Health has become a major topic for debate during the last decade with almost two billion people across the globe being affected by natural disasters. All of these natural disasters caused heavy loss of lives, affects the livelihood of individuals, affects the economy of the country and hampers the developmental process as well as the quality of life of people [1].

Natural disasters of meteorological origins, such as river floods, flashfloods, tidal floods, tropical storms, cyclones, and droughts, generally affect a larger geographical area than geological disasters [2].

In December 2004, Asia witnessed the most catastrophic natural disaster of tsunami. In Maldives, a total of 83 people died during the tsunami, while 25 were missing up-to-date. With a population of 300,000 living in the whole country, a third of the population was severely affected[3]. Tsunamis have been relatively rare in the Indian Ocean, at least in human memory. However, sea surges and tidal wave flooding is experienced in many island nations. In the aftermath of the Tsunami of December 2004, several international meetings were held among countries in the Indian Ocean to concertedly address threats from tsunamis and tidal surging [4].

Tidal flooding is considered as the second most probable disasters to be faced by the low-lying island nations including Maldives. Globally, more than 100 million people are at risk of various forms of flooding, including tidal flooding [5]. Average global temperatures are expected to rise, and as a result average sea levels could be as much as 40cm higher by 2080 leading to more tidal flooding episodes annually [6]. Authorities and agencies are tirelessly working to implement disaster mitigating and preparedness measures to reduce damages to economy and losses to human life.

Maldives is an archipelago of nearly 1196 low-lying islands and during the tsunami of 2004, most of the islands suffered severely. After 2004, tsunami, government established the National Disaster Management Center and formulated the first National Disaster Plan.

Research showed that people with better knowledge and preparedness behaviour could help in preventing the severe losses and damages. However, there have been no studies conducted to identify the level of knowledge, behaviour and perception of the rural people towards disaster preparedness in the country. Hence, by studying the level of knowledge and disaster preparedness behaviour among rural islanders in Maldives will help authorities to take measures to mitigate and prevent tidal flood disasters in the future.

The main objective of this study was to describe disaster preparedness behaviour and related factors among rural people in Gaafu Dhaalu Atoll. Maldives. The specific objectives were: 1) To describe disaster preparedness behaviour among rural people in Gaafu Dhaalu Atoll, Maldives, 2) To describe socio demographic factors, predisposing factors, reinforcing factors, and enabling factors towards disaster preparedness among rural people in Gaafu Dhaalu Atoll, Maldives and 3) To explain disaster preparedness behaviour by socio-demographic factors, reinforcing factors and enabling factors.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted in 10 islands of Gaafu Dhaalu Atoll, from January 15-20, 2008. A total of 213 respondents were selected simple random sampling and were interviewed by using a structured questionnaire. The questionnaire consisted of five parts (64 questions) including socio-demographic factors part, predisposing

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factors part, enabling factors part and disaster preparedness behaviour part. To determine knowledge, behaviour and perception levels, Bloom's cut-off point, and Best's group rating criteria [7] were used.

Pre-testing was conducted for reliability of the questionnaire among 30 respondents from the near by Gaafu Alifu Atoll, by using Kuder Richardson's 20 for the knowledge (with KR = 0.712) and behaviour part (KR = 0.675) and Cronbanch's Alpha for perception part (with α = 0.767). Data was collected by researcher and assisted by community and family health workers. Orientation was given to the health workers by researcher before the data was collected. Descriptive statistics analysis was used for describing individual characteristics of each factor. Chi-square test was performed to determine association between independent variables and dependent variable.

RESULTS

Table 1 presented the general characteristics of respondents, it revealed that majority of the respondents (78.9%) were between age 40 to 59 years with a mean age of 49.6 years. More than one-half of the respondents (53.5%) were females. More than two-third (67.3%) was living with extended families, while 56.3 percent of the families had larger size of members with an average of five members per family. Regarding the occupation, around one-third of the respondents (33.8%) were housewives and similar proportion were farmers. The rest were fisherman (8.9%) and government employees (8.5%) respectively. Regarding monthly family income, slightly more than one-half of them (54.5%) earned a moderate income between 5001-10,000 Rufiyaas per month. The median of monthly family income was 4700 Rufiyaa. Nearly one-half of the respondents (46.6%) had obtained schooling up to primary school level and 37.7 percent had less than primary school level of education. Only 7.4 percent had lower than secondary school level while a mere 8.3 percent had graduated with upper secondary education. Hundred percent of the respondents were Muslims. In relation to type of houses, nearly two-thirds (65.7%) lived in single one story houses and the rest 34.4 percent lives in traditional style Maldivian houses (built on ground with roof made of leafs).

Table 1 Numbers and Percentage of respondents by Socio-Demographic Factors

Socio-Demographic Factors				Number (n=213)	Percent
Age group					
≤39				09	04.2
40-49				67	31.5
50-59				101	47.4
≥60				36	16.9
(Median= 50	S.D = 7.32	Minimum = 34	Maximum = 64)		
Gender					
Male				80	46.5
Female				133	53.5

Table 1 Numbers and Percentage of respondents by Socio-Demographic Factors (Cont.)

Socio-Demographic Factors	Number (n=213)	Percent
Type of family		
Nuclear	70	32.7
Extended	143	67.3
Number of family member		
Small (≤4)	93	43.7
Large (>4)	120	56.3
Occupation		
Fisherman	19	8.9
Government Employee	18	8.5
Farming	77	36.2
Labourer	10	4.7
Housewives	72	33.8
Others	17	7.9
Income (per month)		
<5,000 Rufiyaa (Low)	87	40.8
5,000 – 10,000 Rufiyaa (Moderate)	116	54.5
>10,000 Rufiyaa (High)	10	4.7
(Mean: 4700 Q.D = 700 Minimum = 3,000 Maximum = 13,500)		
Education		
Less than primary	80	37.7
Primary	99	46.6
Lower secondary school	16	7.4
Upper secondary school	18	8.3
Types of house		
Single storey house	140	65.7
Maldivian style	73	34.3

* **Note**: exchange rate for Maldivian Rufiyaa is 12.85 Rf = 1 US$

Predisposing factors

To determine the level of knowledge on tidal flood disaster preparedness of respondents, fourteen questions were asked. Table 2 showed that more than one-half of the respondents (58.7%) had good level of knowledge, slightly more than one-third (36.6%) had moderate level of and only a few (4.7%) had low level. For the level of perception, respondents were requested to reveal their perception on 16 statements about the benefits and barriers for tidal flood disaster preparedness. Table 2 also demonstrated that 46 percent of the respondents had high perception level, follow by moderate level (37.6%) and only 16.4 percent had low level.

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Reinforcing factors

A large majority of the respondents (86.9%) had tidal flood experiences and knew the term Tsunami, while 88.3 percent of the respondents having experienced the Tsunami in December 2004. Regarding the frequency of tidal flood experiences, 68.6 percent of the respondents had during the past five years experienced 1-3 episodes of tidal flooding, while nearly one-third (31.4%) had experienced more than 4 episodes of tidal flood. Slightly more than one-third of the respondents (34.7%) stated they attend community-based disaster preparedness activities, which included sharing information (39.2%), rehearsals (33.8%) and workshops (27%) were the main activities respectively.

Enabling factors

Most of the respondents (86.9%) had received information about tidal flood through mass media. Regarding to source of information, 91.9 percent received from Radio, 69.2 percent received from Television, 16.2 percent from Newspaper, and 5.4 percent from Internet respectively. However, 72.8 percent of the respondents stated that information about tidal flood is available and provided in the islands. According to sources of information, 75.5 percent from local government, 57.4 percent from Community leaders, 42.6 percent from Islanders, and only 15.5 percent from Friends.

Table 2 Percentage of respondents by study variables

Socio-Demographic Factors	Number (n=213)	Percent
Predisposing factors Knowledge		
Good	125	58.7
Moderate	78	36.6
Poor	10	4.7
Perception		
High	98	46.0
Moderate	80	37.6
Low	35	16.4
Reinforcing factors		
Tidal flood experiences		
Yes	185	86.9
No	28	13.1
Frequency of tidal flood experiences (n=185)		
1-3	127	68.6
≥ 4	58	31.4
Tsunami experience		
Yes	188	88.3
No	25	11.7

Table 2 Percentage of respondents by variables (Cont.)

Socio-Demographic Factors	Number (n=213)	Percent
Community-based tidal flood disaster preparedness activities		
Have activities	74	34.7
Don't have activities	139	65.3
Enabling factors		
Availability of information on tidal flood through mass media		
Yes	185	86.9
No	28	13.1
Sources of information		
TV.	128	69.2
Radio (AM/FM)	170	91.9
Newspaper	30	16.2
Internet	10	5.4
Availability of info. on disaster preparedness through person		
Receive information	155	72.8
Not receive information	58	27.2
Sources of information		
Local government	117	75.5
Community leaders	89	57.4
Islanders	66	42.6
Friends	24	15.5

Disaster preparedness behaviour of the respondents in this study was good as it showed 61.5 percent with good preparedness behavior. (Table 3).

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Table 3 Disaster preparedness behaviour of respondents

Disaster preparedness behaviour	Number (n=213)	Percent
Good	131	61.5
Poor	82	38.5

For the association between socio-demographic factors and disaster preparedness behavior, there were five variables that are significantly associated: gender, occupation, the level of income, education and type of house respondents live in. (see Table 4).

Regarding the behaviour among gender, male respondents had higher proportion of good behavior (83.8%) than female respondents (48.1%). This showed a statistically significant association with a P-value of <0.001. With regards to the occupations, fishermen, farmers, and housewives had good behavior at 68.4 percent, 53.2 percent and 68.1 percent respectively. Notably, government employees had a higher proportion of good behavior (88.9%), and labourers had a high proportion of poorest behavior level (60%). It had a moderate statistical significance with a P-value of 0.023.

The higher income group had a highest proportion of good behavior (90%), followed by moderate income (75%), and the low income group (59.8%). There was a significant association with level of income and disaster preparedness behaviour with a P-value of <0.001. Similar pattern was found with higher level of education showed better behavior than the lower education level. With statistical significant at P-value <0.001.

Only type of housing was found to associate with disaster preparedness behavior, respondents living in single storey houses had better preparedness behaviour (69.3%) compared with 53.4 percent living in traditional houses who had poorer preparedness behavior, with a statistical significance at p-value <0.001.

However, the rest of socio-demographic factors had no association with the disaster preparedness behaviour.

Table 4 Disaster Preparedness Behavior by Socio-Demographic Factors

Socio-Demographic Factors	Good behavior (n = 131) No.(%)	Poor Behavior (n = 82) No.(%)	χ^2 (df)	P-value
Age group				
34-39	06(4.6)	03(3.7)	0.51	0.917
40-49	43(32.8)	24(29.3)	(3)	
50-59	61(46.6)	40(48.8)		
60-64	21(16.0)	15(18.3)		
Gender				
Male	67(83.8)	13(16.2)	26.78	0.001**
Female	64(48.1)	69(51.9)	(1)	
Type of family				
Nuclear	42(60.0)	28(40.0)	0.09	0.753
Extended	89(62.2)	54(37.8)	(1)	
Number of family members				
Small	56(60.2)	37(39.8)	0.12	0.734
Large	75(62.5)	45(37.5)	(1)	
Occupation				
Fisherman	13(68.4)	06(31.6)	13.06	0.023*
Government Employee	16(88.9)	02(11.1)	(5)	
Farming	41(53.2)	36(46.8)		
Labourer	04(40.0)	06(60.0)		
Housewives	49(68.1)	23(31.9)		
Others	8(47.1)	9(52.9)		
Income (per month)				
<5,000 Rf (low)	35(40.2)	52(59.8)	28.98	<.001**
5,000-10,000 Rf (Moderate)	87(75.0)	29(25.0)	(2)	
>10,000 Rf (High)	9 (90.0)	01(10.0)		
Education				
Less than primary	59(73.6)	21(26.4)	32.78	<.001**
Primary	42(42.4)	57(57.6)	(3)	
Lower secondary school	12(75.0)	04(25.0)		
Upper secondary school	18(100)	00(0.00)		
Type of house				
Single storey house	97(69.3)	43(30.7)	10.45	<.001**
Traditional Maldivian style	34(46.6)	39(53.4)	(1)	

* P-value <0.05 ** P-value<0.01

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The Chi-square test showed significant association between the level of knowledge, involved in community activities and disaster preparedness behavior with p-value < 0.001. However, it was p-value 0.038 for the association between level of perception and disaster preparedness behavior (see Table 5).

Table 5 Association between Level of Knowledge, Perception, Involvement in Community – based Activities and Disaster Preparedness Behavior.

Socio-Demographic Factors	Good behavior (n = 131) No.(%)	Poor Behavior (n = 82) No.(%)	χ^2 (df)	P-value
Level of Knowledge				
blood	96(76.8)	29(23.2)	29.9	<0.001**
Moderate/Poor	35(39.7)	53(60.3)	(1)	
Level of Perception				
High	68(69.4)	30(30.6)	6.57	0.038*
Moduate	48(60.0)	32(40.0)	(2)	
Low	15(42.9)	20(57.1)		
Involvement in Community based activities				
Involved	58(78.4)	16(21.6)	13.6	< 0.001**
Not involve	73(52.5)	66(47.5)	(1)	

* P-value < 0.05 ** P-value < 0.001

DISCUSSION & CONCLUSION

From the findings, it can be concluded that nearly two-third of the respondents (61.5%) had a good level of behavior. Among five indicators, four of them reached good levels, 1) Listening to weather information, 2) Listening to warnings, 3) Preparing the house for preventing from tidal flood damage, and 4) Having an evacuation plan. Only preparing goods for tidal flood emergency was poor. It can be concluded that the tidal flood disaster preparedness level is fairly good in this study area. This result is showed slightly higher in percentage on the level of knowledge and perception in comparison to Takahara [8] and Tomabechi's [9] study on flood disaster preparedness behaviour among rural people in Thailand. There are some explanations to it. This study was conducted in an area where tidal flooding occurs quite frequently and the population had experienced tsunami just over three years ago.

However, there is some room for further improvement especially in preparing goods for tidal flooding. It was found that the study population had good knowledge with poor practices and therefore, to sustain the knowledge level and practically performing preparedness activities is essential. Community-based disaster risk reduction measures must be considered as a priority and need to focus on practical aspects of preparedness. Also there are risky people who don't have access to disaster preparedness information and who does not receive information on disaster preparedness.

RECOMMENDATIONS

From the result, involvement community activities had a strong association with disaster preparedness behavior. Providing support for community based activities will further enhance the capacity of people, improve their knowledge and skills to be better prepared. Therefore, local government has a huge responsibility for organizing and supporting the community based tidal flood preparedness activities for further improvement. It is also evident that there is strong need for strengthening present activities such as sharing information, rehearsals and workshops. Proper planning and preparedness always can reduce burden and damages of disasters and, central government is responsible for raising awareness of its importance in tidal flood disaster preparedness and emphasize on strengthening of community-based disaster preparedness activities at each community level from central level. Disaster Response emphasizes the need to build disaster response on local capacities, better informed and prepared communities have coped well in management of disasters. The approach to disaster risk planning, known as the vulnerability and capacity assessment should be conducted by central government and Disaster Management Center. As the result showed that there were good levels of knowledge and perception among respondents, sustaining the same level among members of the community is crucial and should be a priority. It is also recommended that mapping of tidal flood risk area of the country is conducted by National Disaster Management Center at the earliest in order to effectively implement and disburse the resources for tidal flood disaster preparedness in the country.

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