PUBLIC HEALTH RESEARCH

Post-Flood Impact on the Quality of Life of Victims in East Coast Malaysia

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ABSTRACT

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Introduction
This study aimed to evaluate the quality of life among flood victims exposed at three worst districts in Pahang, Malaysia.

Methods
Semi-guided questionnaires were distributed randomly to a total of 602 flood victims. Quality of life (QOL) was measured using WHO Quality of Life-BREF (WHOQOL-BREF), which was assessed based on four domains, i.e. physical activity, psychological, social relationships and environment.

Results
Victims of the flood had a poorer quality of life in all the domains especially physical (59.0%) and psychological (53.3%) domain. The impact of the flood on QOL was higher among women, those who reside in the urban area, the elders and persons with high education and income.

Conclusions
Flood event has reduced the QOL of victims. The impact of flood has been found to be mitigated over the time and relief efforts. Interventions aimed to reduce these concerns in acute post-flood areas are essential to minimize poor QOL among the affected victims.

Keywords
Flood - WHOQOL-BREF - Malaysia - victim - QOL - urban.
INTRODUCTION
Floods occur almost every year and leads to number of deaths especially in the low-income countries. Climate change is the main reason for the increased flood occurrence, and the impact would be high in the south and east Asia including Malaysia.

Flood occurrence has become a national issue in Malaysia as it poses a threatened to the life and property as well as disrupts the social and economic activities. Flood has been listed as the major and the most severe threat among all the disasters in Malaysia. There are more than 85 water basins have been identified as prone to flood. The prevalence of floods occurrence seems to be higher in recent years. This phenomenon may be due to the anthropogenic activities that leads to natural disasters in which occurs not only in this country but all around the world. In 1886, severe flood with gale-force winds caused extensive damages in Kelantan. The flood in 1926, has affected most of the Peninsular Malaysia, resulting in the worst disaster to the health, property and crops. Subsequently in 1967, another severe flood event occurred in Kelantan, Terengganu and Perak which has caused 55 deaths.

Following that, in 1971, many parts of the country especially Pahang were affected by a catastrophic flood. In October 2003, major flooding affected a large area in the northwestern part of the Peninsular Malaysia, including the states of Kedah, Penang and Northern Perak. In another event, the 2007 floods were considered worst in the recent history of Malaysia after more than 30 years since 1971. It has caused severe damage to the northern region of Peninsular Malaysia particularly in Kota Tinggi, Johor. However, there was an unprecedented flooding occurred in the late December, 2014 in Malaysia which has resulted in severe damage throughout Kelantan, Terengganu, Pahang and Perak. In Pahang, although flood occur almost every year, Puteh et al. (2018) stated that the community was still not able to adapt to the flood events. The recognition of an area that contributes to the flood 2014 in Pahang was the main issues aimed to be addressed in this paper.

Floods have been widely acknowledged to increase the potential of vacate risk and impacts on human health. The health part includes factors such as the increase in the burden of disease, morbidity, mortality, social and economy. The flooding affects on health depends on a country's geographical and socio-economic status as well as the underlying weakness among the affected population. Many epidemiological studies have been carried out to investigate the health effects in such situation. It can be divided into short-term effects and long term effects. Short term effects occurs during the floods or in the first months of flooding. The effects were including death, drowning, injury, toxic exposure and infectious diseases, especially water-borne diseases such as typhoid, hepatitis, leptospirosis, cholera and food poisoning. Long-term effects were such as post-traumatic stress disorder (PTSD), non-communicable diseases, malnutrition, anxiety or depression.

Tan et al. (2004) believed that the quality of life (QOL) of an individual might be affected due to the flood event. QOL is a comprehensive index of health status. The World Health Organization (WHO) defines QOL as the individual’s perception of their position in the life, in the context of the culture and value systems in which they live. In addition, perception about their goals, expectations, standards and concerns were also valued in assessing the QOL. The QOL has been widely used in social science as a measure of social development and living standard. In recent years, QOL has been used as a tool to access the impact of natural disasters such as earthquake, flood and wildfires. Although flood occurs frequently, the level of awareness and preparedness among communities in the state of Pahang were questionable. Thus, the primary goal of this study is to analyse the impact on quality of life of flood-affected communities in Temerloh, Pekan and Kuantan.

METHODS
Study area and study population
A cross-sectional study was conducted among 602 flood victims from 3 worst flood districts in Pahang namely Pekan, Kuantan and Temerloh. The study was conducted for five months from May to September, 2015. The selection of the respondents were conducted via stratified random sampling based on the data from respective district offices.

Study Instrument
The impact of the flooding on the quality of life (QOL) was assessed through the WHOQOL instruments. The WHOQOL-BREF is a self-report which consist of 26-items on QOL inventory developed by the World Health Organization. This self-report assess four major domains including physical, psychological, social relationship and environment. The local validation of the tool used in this study was evaluated to be compatible with a local setting. All the questions in the WHOQOL-BREF report were scored in such a way that the higher scores indicates a better QOL. Subsequently, the total scores were divided into low and high QOL based on the overall means of these findings.

Statistical Analysis
All the data collected from the questionnaire were statistically analysed by using SPSS version 21, to determine the percentage, frequency and cross-tabulation (chi-square). Analysis of Multiple logistic
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regression was conducted to get an adjusted odds ratio (aOR) of the factors towards QOL.

RESULTS

Respondents Characteristics

Table 1 showed the characteristics of the respondents' in this study. The gender distributions showed that male population dominated with percentage of 63.8% (n=384) and females with percentage of 36.2% (n=218). The majority of the respondents’ age were ranged between 19 to 88 years old with the highest respondents were belonging to the age group between 41-65 years old. A total of 55.3% of the respondents were classified as ruralites, and the remaining were urbanites. The grouping by ethnicity, shows that Malays predominated with 97.8% while other races were minority in this vicinity. Many of the respondents were married (80.4%) and received primary and secondary education (84.2%). Majority of the flood victims had an income below than MYR2000.

Table 1: Summary of demographic characteristics

| Variables (n=602) | Frequency (N) | Percent (%) |
|------------------|---------------|-------------|
| Gender | | |
| Male | 384 | 63.8 |
| Female | 218 | 36.2 |
| Age (Years) | | |
| 0 – 18 | 1 | 0.2 |
| 19 – 40 | 181 | 30.1 |
| 41 – 65 | 353 | 58.6 |
| 66 and above | 67 | 11.1 |
| Strata | | |
| Urban | 269 | 44.7 |
| Rural | 333 | 55.3 |
| Ethnicity | | |
| Malay | 589 | 97.8 |
| Chinese | 4 | 0.7 |
| Indian | 2 | 0.3 |
| Orang Asli (Indigenous) | 2 | 0.3 |
| Others | 5 | 0.8 |
| Religion | | |
| Islam | 598 | 99.3 |
| Hindu | 2 | 0.3 |
| Buddha | 2 | 0.3 |
| Marital Status | | |
| Single | 31 | 5.1 |
| Married | 484 | 80.4 |
| Divorced | 10 | 1.7 |
| Widowed | 76 | 12.6 |
| Others | 1 | 0.2 |
| Level of Education | | |
| Never Schooled | 17 | 2.8 |
| Primary School | 147 | 24.4 |
| Primary School | 115 | 19.1 |
| Secondary School | 245 | 40.7 |
| Diploma | 36 | 6.0 |
| Vocational | 3 | 0.5 |
| Degree | 35 | 5.8 |
| Others | 3 | 0.5 |
| Not Answered | 1 | 0.2 |
| Household Income (MYR/Month) | | |
| No Income | | |
| < MYR 1000 | 19 | 3.2 |
| MYR 1001 – 2000 | 240 | 39.9 |
| MYR 2001 – 3000 | 201 | 33.4 |
| MYR 3001 – 4000 | 67 | 11.1 |
| > MYR 4001 | 38 | 6.3 |
| | 37 | 6.1 |
Impact on Quality of Life

There were four domains seen on the quality of life (QOL) study of the flood victims. The percentage of the low QOL of these domains were as follows; i.e. low physical activity at 59.0%, low psychological (53.3%), low social relationships (43.0%), and low environment (45.2%) (Table 2).

Table 2: Quality of life by district in Pahang, Malaysia

| Quality of Life (n=602) | PEKAN | KUANTAN | TEMERLOH | Overall Mean | Low Quality of Life (<mean) | High Quality of Life (>mean) |
|------------------------|-------|---------|----------|--------------|-----------------------------|-----------------------------|
| Physical Activity      | 70.21 | 63.35   | 74.79    | 69.45        | 355                         | 247                         |
| (14.70)                | (12.22)| (13.23) | (14.21)  | (59.0%)      | (41.0%)                     |                             |
| Psychological          | 72.63 | 64.62   | 76.78    | 71.36        | 321                         | 281                         |
| (15.52)                | (13.15)| (13.09) | (14.83)  | (53.3%)      | (46.7%)                     |                             |
| Social Relationship    | 70.33 | 61.02   | 78.34    | 68.00        | 272                         | 330                         |
| (18.37)                | (15.78)| (16.68) | (18.52)  | (43.0%)      | (57.0%)                     |                             |
| Environment            | 67.05 | 62.66   | 74.22    | 68.00        | 272                         | 330                         |
| (15.84)                | (13.16)| (13.76) | (15.05)  | (45.2%)      | (54.8%)                     |                             |

Counfounders were controlled via multiple logistic regression to determine the predictors contributing towards low QOL. The analysis (Table 3) showed that factors related to residing in the urban area, female gender, high education status and high household income level were associated with the reduced QOL of flood victims. In detail, low physical activity was associated with victims staying in the urban area, females, higher education level and high income. Besides, low psychology domain were associated with the victim’s from urban and females. Meanwhile victim’s living in an urban area was the only predictor for the low social relationship domain. Lastly, a low environment was associated with victim living in an urban area, females and higher education level.

Table 3: Significant factors associated with four domain of QOL

| Variables | Quality of Life - Physical Activity (n=602) Low | Quality of Life - Psychological (n=602) Low | 95% CI Lower | Upper |
|-----------|-----------------------------------------------|--------------------------------------------|---------------|-------|
| Gender    |                                               |                                            |               |       |
| Male      | 205 (53.4)                                   | 179 (46.6)                                 | 13.669        | < 0.001 | 1.926 | 1.358 | 2.733 |
| Female    | 150 (68.8)                                   | 68 (31.2)                                  |               |         |       |       |       |
| Urban     | 200 (74.3)                                   | 69 (25.7)                                  |               |         |       |       |       |
| Strata    |                                               |                                            |               |         |       |       |       |
| Rural     | 155 (46.5)                                   | 178 (53.5)                                 | 47.539        | < 0.001 | 0.300 | 0.212 | 0.426 |
| Low       | 302 (57.2)                                   | 226 (42.8)                                 |               |         |       |       |       |
| Education |                                               |                                            |               |         |       |       |       |
| High      | 53 (71.6)                                    | 21 (28.4)                                  | 5.581         | 0.018   | 1.889 | 1.107 | 3.222 |
| Low       | 257 (55.9)                                   | 203 (44.1)                                 |               |         |       |       |       |
| Income    |                                               |                                            |               |         |       |       |       |
| High      | 98 (69.0)                                    | 44 (31.0)                                  | 7.748         | 0.005   | 1.759 | 1.179 | 2.626 |
| Age       |                                               |                                            |               |         |       |       |       |
| 0-18 years| 192 (50.0)                                   | 192 (50.0)                                 | 4.702         | 0.030   | 1.449 | 1.036 | 2.028 |
| 19-40 years| 129 (59.2)                                   | 89 (40.8)                                  |               |         |       |       |       |
| 41 – 65 years| 171 (63.6)                                   | 98 (36.4)                                  |               |         |       |       |       |
| 66 and above| 150 (45.0)                                   | 183 (55.0)                                 | 20.513        | < 0.001 | 0.470 | 0.338 | 0.658 |
| Strata    |                                               |                                            |               |         |       |       |       |
| Rural     | 139 (51.7)                                   | 130 (48.3)                                 | 14.842        | < 0.001 | 0.527 | 0.380 | 0.731 |
| Urban     | 120 (36.0)                                   | 213 (64.0)                                 |               |         |       |       |       |
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| Gender | Quality of Life - Environment |
|--------|-------------------------------|
|        | Male                      | Female                  |
|        | 156 (40.6)                | 116 (53.2)              |
|        | 228 (59.4)                | 102 (46.8)              |
|        | 8.894                     | 0.003                   |
|        | 1.662                     | 1.189                   |
|        | 2.324                     |                         |
| Strata | Urban                     | Rural                    |
|        | 148 (55.0)                | 124 (37.2)              |
|        | 121 (45.0)                | 209 (62.8)              |
|        | 18.995                    | <0.001                  |
|        | 0.485                     | 0.350                   |
|        | 0.673                     |                         |
|        | Low                       | High                     |
|        | 230 (43.6)                | 42 (56.8)               |
|        | 298 (6.4)                 | 32 (43.2)               |
|        | 4.563                     | 0.033                   |
|        | 1.701                     | 1.041                   |
|        | 2.779                     |                         |

*aOR - adjusted odds ratio controlling gender, strata, education, income, age; CI confidence interval

DISCUSSION

Generally, flood events will reduce the quality of life and all the flood victims would experience this effect. The severity of the quality of life was the only range that differ between one victim to another victim. This study has found that the impact of QOL was more profound in the physical and psychological domain. This finding was in accordance with previous studies findings. Previous findings on QOL among the victims was not only restricted to the floods but also covers other disasters such as wildfire and earthquake; these tragedies had major impact too. The immediate implications of floods involve loss of family members, property damage, destruction of crops and loss of livestock which may contribute to the lower QOL score in the two domains. Besides, the bad experience from floods such as shock and high level of stress could also adds to these scenarios. The aspects in mental health especially in relation to the emotional problems were the main issues and may be experienced by any victims of disaster including floods.

The more significant impact of low QOL among flood victims in this study were among people living in the urban area, women and those with higher socioeconomic level. Urbanisation itself could increase the pluvial and fluvial flood risk due to an unplanned development and urban migration. This leads to a disastrous flood to occur in the urban area and indirectly give more impact on QOL among the residents. Lower QOL is not the only effect of post-flood event, but also influenced by other disasters.

Women were highly affected in terms of their QOL after a natural disaster such as flood. This could be due to the fact that women plays an essential role in providing for the family livelihood. However, their tasks and workload may increase after the disaster and this may affect their well-being status. A recent qualitative study has also found that two main themes were closely related to mental health among women post-disaster, including physical and external environment. The mental health problem does also include psychological factors. Both the theme or domain have significant effect towards the psychological factors among women as compared to the men.

Victims with low income suffer greater losses from floods than the households with high income. However, this may be different in terms of their QOL status. The relationship between disaster losses and the level of economic development is nonlinear, suggesting that a country is more disaster resilient at a lower income level, but at a higher income level, a country become less disaster resistant. Thus, this supports the poorer QOL in a lower socioeconomic situation.

CONCLUSION

The quality of life of the community is vital to regain back the socio-economic strength for the community to strive. In addition, the need of endorsement of future preventive measures through risk assessment and impacts with solutions, are needed to uphold a better adaptive strategies. Such plan also includes ways to reduce hazards and risks of flood disaster within the potential areas of flood risk in the country. One of the important strategies that we recently found was through community empowerment. Through this study, we hope to clarify the details and issues regarding the health and well-being of the community for public concerns and future initiatives agendas.

COMPLIANCE WITH ETHICAL STANDARDS

This study was approved by the Department of Community Health and the Research and Ethics Committee of Universiti Kebangsaan Malaysia Medical Centre (UKMMC). All respondents were given pertinent information and informed consent to participate. There were no competing interests to be declared.

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