# PSYCHOMETRIC EVALUATION OF FLOOD DISASTER MANAGEMENT QUESTIONNAIRE-(FloodDMQ-BM©): CONFIRMATORY FACTOR ANALYSIS AND ITEM RESPONSE THEORY ANALYSIS

**DR MOHAMAD MASYKURIN BIN MAFAUZY**

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# ABSTRAK

## Pengenalan

Bencana banjir merupakan bencana alam semula jadi yang paling kerap terjadi dan mendatangkan impak yang besar dalam perkhidmatan kesihatan di Malaysia. Justeru itu, borang soal selidik FloodDMQ-BM© telah dibuat sebagai media untuk menilai tahap pengetahuan, sikap dan amalan pengamal perubatan terhadap pengurusan pesakit semasa bencana banjir. Kajian ini bertujuan untuk mengadakan pengesahan lanjut terhadap borang soal selidik FloodDMQ-BM© dengan menggunakan teknik *Confirmatory Factor Analysis* (CFA) dan *Item Response Theory* (IRT) dalam mengesahkan keupayaannya menilai tahap pengetahuan, sikap dan amalan pengamal perubatan terhadap pengurusan pesakit semasa bencana banjir.

## Metodologi

Kajian observasi keratan rentas ini melibatkan pengamal perubatan yang berkhidmat di Jabatan Kecemasan Hospital Universiti Sains Malaysia (HUSM), Hospital Raja Perempuan Zainab II (HRPZ2) dan Hospital Kuala Krai (HKK). Borang soal selidik FloodDMQ-BM© yang telah dijawab dengan sempurna dianalisa dengan menggunakan teknik CFA dan IRT untuk melihat kesahihan dan kebolehpercayaannya.

## Keputusan

Seramai 209 peserta mengambil bahagian dalam kajian ini dan memberikan kadar respon sebanyak 84%. Teknik CFA pada komponen sikap dan amalan menghasilkan keputusan faktor muatan yang baik (>0.5) kepada hampir kesemua item dan nilai indeks muatan yang baik (CFI = 0.96-0.98, TLI = 0.95-0.96, SRMR = 0.04-0.05, RMSEA = 0.07).

Manakala analisa IRT pada komponen pengetahuan menghasilkan indeks marginal dua arah berdasarkan S-X2 dan indeks muatan yang baik dengan nilai RMSEA 0.08. Item juga mempunyai nilai muatan standard yang baik (>0.3) dan kebolehpercayaan marginal 0.651.

**Kesimpulan**

Hasil kajian kami mendapati borang soal selidik FloodDMQ-BM© mempunyai nilai psikometrik yang sah dan dipercayai.

**Kata kunci**

Banjir, Bencana, Soal Selidik, Kajian Pengesahan

## ABSTRACT

### Background

Flood disaster is the commonest natural disaster with a huge impact on health care services in Malaysia. Therefore, the FloodDMQ-BM© questionnaire is developed as a tool to assess the knowledge, attitude, and practice of health care providers regarding patient management during a flood disaster. This work aimed to further validate the FloodDMQ-BM© questionnaire by using Confirmatory Factor Analysis (CFA) and Item Response Theory (IRT) in order to confirm its validity in assessing the knowledge, attitude, and practice of health care providers regarding patient management during a flood disaster.

### Materials and Methods

This observational cross-sectional study involved health care workers in the Emergency Department (ED) of Hospital Universiti Sains Malaysia (HUSM), Hospital Raja Perempuan Zainab II (HRPZ2), and Hospital Kuala Krai (HKK). The completed FloodDMQ-BM© questionnaire was analysed by using CFA and IRT to establish its validity and reliability.

### Result

A total of 209 respondents participated in this study, yielding an 84% response rate. CFA method subjected on the attitude and practice components resulted in good factor loadings (>0.5) in nearly all items and good model fit indices values (CFI = 0.96-0.98, TLI = 0.95-0.96, SRMR = 0.04-0.05, RMSEA = 0.07). Meanwhile, IRT analysis on the knowledge section showed a good two-way marginal fit based on S-X2, and a good model fit with

RMSEA of 0.08. The items had good standardised loadings (>0.3) and marginal reliability of 0.651.

**Conclusion**

Our results confirmed that the FloodDMQ-BM© questionnaire displayed valid and reliable psychometric properties.

**Keyword**

Flood, Disaster, Questionnaire, Validation studies

# CHAPTER 1: INTRODUCTION

Flood disasters are the most frequently occurring natural disaster worldwide over the last 10 years, killing 59,092 people and causing economic losses amounting to 342,836 million USD [1]. Most cities and urban areas in the world are located in the flood basin area as the land is fertile and flat, which is suitable for urban development [2]. As health care facilities such as government or private general clinics and hospitals are mostly centred in the cities, they are at risk of being immersed during a flood. During flood disaster, health care facilities and common roads can be totally disrupted, causing the flood victims to encounter troubles in getting the medical treatment they require at the nearest health care centre. Not only medical attention towards flood victims is affected during flood disaster, health care providers such as doctors and paramedics are also flood victims themselves, thus resulting in a disruption of medical treatment to the surrounding community, as well as in-house patients [3].

Malaysia is one of the countries in South East Asia with the tropical climate, which experiences flood almost every year. Due to the influence of strong northeast monsoon, flood disasters happen regularly from October until the following January [4]. In year 2014, Malaysia experienced the worst flood disaster recorded in the eastern states of Peninsular Malaysia with thousands of victims displaced. The “tsunami-like” disaster was the most significant and largest recorded flood in the history of Kelantan state. This alarming situation denied patients from receiving medical treatment in a timely manner. The problem was further compounded with the lack of medical directives and protocols to handle flood disaster of such magnitude, which enhanced the overall community vulnerability [5].

A few important issues have been identified in managing patients during the response phase of flood disaster, namely alert and warning systems, transportation, communication, and command and control. These are the findings discovered and frequently highlighted by the participants in a qualitative study among health care providers managing patients during flood disaster in Kelantan [5]. As flood disaster causes damage to the health care services, it is important to have a tool to assess the knowledge, attitude, and practice of health care providers in managing patients throughout a flood disaster, specifically during the response phase.

The FloodDMQ-BM© is a questionnaire to assess the knowledge, attitude, and practice of health care providers regarding patient management during a flood disaster. Thirty-four items are included in the questionnaire to assess the knowledge (K), attitude (A), and practice (P) of health care providers based on four domains, namely alert systems, communication, standard operating procedure (SOP), and transportation. It has been used and tested for its validity and reliability, whereby the Exploratory Factor Analysis (EFA) of FloodDMQ-BM© on both attitude and practice sections has shown a good factor loading (>0.5) and satisfactory internal consistency of 0.925 and 0.935, respectively. Meanwhile, the knowledge section has been analysed by using Item Response Theory (IRT) and revealed a good marginal fit and adequate Root Mean Square Error of Approximation (RMSEA) of 0.08. These results have suggested that the FloodDMQ-BM© possess valid and reliable psychometric properties [6].

Factor analysis is widely used in the field of education and considered the best method for interpreting questionnaires [7]. It reduces a large number of variables into a smaller set of variables and establishes the underlying dimensions between the measured variables and latent constructs, thus allowing the formation and refinement of a theory.

Lastly, it justifies and provides the evidence of construct validity for the questionnaires [8]. Meanwhile, EFA is a statistical method used to examine the covariance relationship amongst a large number of observed items and derive latent factors so as to account for these relationships [9]. In EFA, the investigator has no expectations of the number or nature of the variables, and as the title suggests, is exploratory in nature. It allows the researcher to explore the main dimensions in generating a theory or model from a relatively large set of latent constructs [10].

In contrast, Confirmatory Factor Analysis (CFA) is a multivariate statistical procedure utilised to test how well the measured variables represent the number of constructs [11]. CFA is optimal for investigating the construct validity of a scale when a strong theoretical hypothesis is present about the structure of the scale. In fact, it is often regarded as a stronger source of evidence compared to more exploratory approaches in scale validation [12]. By performing CFA, the researcher will be able to test the hypothesis that a relationship between the observed variables and their underlying latent constructs exists. Thus, a more conclusive and valid result can be obtained by using CFA [13].

Item Response Theory (IRT) allows comparisons to be made between the latent traits of individuals from different populations when subjected to tests with common features. This is only possible because it is focused on the items as a whole, as opposed to the test or questionnaire. Therefore, the level of an individual's response can be compared to specific features of an item, which facilitates the interpretation of the scale created. Furthermore, the researcher can recognise which items on the scale are generating information. It is a model-based method of estimating the parameters for each item included in the scale that separates an individual’s responses to the items from their underlying level [14].

## 1.1 Justification of Study

The purpose of this study is to further validate the FloodDMQ-BM© by using CFA and IRT with a larger sample size. Abdul Ghani *et al.* [6] have recommended for recruiting more samples so that the IRT components, standard loading, and marginal reliability are improved. According to Kenny [15], IRT requires a sample size of at least 200. A larger sample size will diminish the error in the data and works better [16].

# CHAPTER 2: STUDY PROTOCOL

## 2.1 Introduction

The world disasters report in 2015 showed that flood disasters were the most frequently occurred natural disasters worldwide for the last 10 years killing 59,092 of people and economic losses amounting to 342,836 million USD (World Disasters Report, 2015). The occurrence of flood disasters around the world has increased in severity and economic cost. Malaysia, one of a country in South East Asia with tropical climate experiences flood almost every year. In year 2014, Malaysia experienced the worst flood disaster in the east states of Peninsula Malaysia evacuating thousands of victims. The 2014 flood was the most significant and largest recorded flood in the history of Kelantan. It was considered to be a "tsunami-like disaster" in which 202,000 victims were displaced (Baharuddin, K.A. et al., 2015). Not only infrastructure was damaged, healthcare facilities also were severely affected by the flood and patients had difficulties receiving medical treatment in a timely and effective manner as most of the healthcare facilities and public amenities were located on the flood plain. The main general hospital of Kelantan, Hospital Raja Perempuan Zainab II, were among the earliest hospital being malfunctioned followed by many district hospitals leaving Hospital Universiti Sains Malaysia as the only referral hospital that stood on dry ground during the whole disaster period (Abdul Ghani, M.N. et al., 2016). As flood disaster causes damage to healthcare facilities, hence, it is important to have a tool to assess the preparedness of healthcare provider in managing flood disaster during response phase.

FloodDMQ-BM©, a questionnaire to assess on flood disaster preparedness among healthcare providers was developed and validated by Abdul Ghani, M.N. et al. (2016) in his study published in International Journal of Public Health and Clinical Sciences. Thirty

four items were generated for FloodDMQ-BM© to assess knowledge (K), attitude (A) and practice (P) of healthcare providers based on 4 domains namely alert systems, communication, SOP and transportation. These were the findings discovered and frequently highlighted by participants in a qualitative study among healthcare providers managing patient during flood disaster Kelantan (Baharuddin, K.A. et al., 2015). The results showed both attitude and practice items, the exploratory factor analysis (EFA) have good factor loading (>0.5) and satisfactory internal consistency of 0.925 and 0.935 respectively. The remaining items in the knowledge section analyzed using item response theory (IRT) have good marginal fit and adequate Root Mean Square Error of Approximation of 0.08. All the remaining items have good standardized loading (>0.3) and marginal reliability of 0.623. These results suggested that the FloodDMQ-BM© has valid and reliable psychometric properties (Abdul Ghani, M.N. et al., 2016).

## 2.2 Literature review

### 2.2.1 FLOOD

A flood can be defined as any high water flow that dominates the natural or artificial banks in any part of the river system and when a river bank is overtopped, the water extends over the flood plain and generally becomes hazard to the society (Sani G. D/iya, 2014). Flood is amongst the most common of natural disasters, gravely affecting the lives of humans and the environment from the beginning of time.

Generally, flood disaster is a worldwide problem and burdened to each country. As an example, Pakistan facing 7 major flood disasters affecting 40 million people since 1973 (Deen 2015). For a well-developed country in United Kingdom per se, they also experienced the same problem (Keshishian, 2014). Similar incident when Hurricane Katrina struck Louisiana in 2005 causing 80 per cent of New Orleans to be flooded, the damage was estimated at USD200 billion (Hamin, Othman et al. 2013),(Mohamad Sukeri Bin Khalid 2015). In western Europe, floods occur each year several times as an example, in 2010, France, Germany and Belgium were hit by floods during which more than 30 people died. The estimated damage was more than 1.8 billion US$ (Leskens, Brugnach et al. 2014).

Malaysia also encountered the same problem. Malaysia is of no exception due to its annual experience with flood during the monsoon season. Due to the influence of strong northeast monsoons, flood disasters happen regularly from October to the following January (Jiang, Deng et al. 2009). Kelantan, Terengganu and Pahang as one of the east coasts of peninsular Malaysia state, unfortunately affected by this monsoon almost every year. The severities vary each year.

Retrospectively, flood in Kelantan including those of 1927 and 1967, were considered significant in the history. The 1967 flood had a major impact on the Kelantan population; it has been estimated that 70% of the kampungs (villages) in Kelantan, or nearly half of the state's population, were affected (Baharuddin, K.A. et al., 2015). The 2014 flood was the most significant and largest recorded flood in the history of Kelantan. It was considered to be a "tsunami-like disaster" in which 202,000 victims were displaced (SU-LYN 2015). This flood was called 'Bah Kuning' (yellow-coloured flood) because of its high mud content (Bernama 2015).

The most recent incidence of flood disaster was considered the worst unexpected natural disaster in the country. Worsening flood prompted the government to evacuate the victims to safer places from the middle to the end of December 2014. Healthcare facilities including general and district hospital, clinics as well as transportation and communication network were badly crippled by the flood. This alarming situation had denied the patients from receiving medical treatment in a timely manner. The government through its various agencies, NGOs and other rescue service had to struggle in coping with extraordinary surge of patient numbers with limited facilities and human resources. The problem was very much compounded with lack of medical directives and protocols to handle flood disaster of such magnitude that enhance the overall community vulnerability (Baharuddin, K.A. et al., 2015).

### 2.2.2 QUESTIONNAIRE

The questionnaire is a well-developed tool within social science research to acquire information on participant social characteristics, present and past behaviour, standards of behaviour or attitudes and their beliefs and reasons for action with respect to the topic under investigation (Bulmer, 2004). They are particularly useful for non-experimental

descriptive designs that seek to describe reality. The questionnaire is a popular and fundamental tool for acquiring information on knowledge, perception, attitudes and behaviour (D.K. Bird, 2009; Nigel Mathers et al., 2009).

The principal requirement of questionnaire format is that questions are sequenced in a logical order, allowing a smooth transition from one topic to another. This will ensure that participants understand the purpose of the survey and they will carefully answer questions to the end of the survey. This can be accomplished by grouping related questions under a short heading describing the section's theme (Bird, 2009).

### 2.2.3 VALIDITY

Validity is defined as the ability of a test or instrument measuring what it is intended to measure and has the ability to express its ability to measure the concept it supposed to measure (Streiner and Norman, 2008). Measurement validity is the degree to which the data measure what they were intended to measure (Fletcher, Fletcher et al., 2012). It is synonymous to accuracy. Validity of questionnaire is important to ensure the questionnaire have essential quality before use.

### 2.2.4 FACTOR ANALYSIS

Factor analysis is widely used in the fields of education and is considered the best method for interpreting questionnaires (Byrant F.B., Yarnold P.R. & Michelson E., 1999). Factor analysis is a multivariate statistical procedure that has many uses. Firstly, factor analysis reduces a large number of variables into a smaller set of variables (also referred to as factors). Secondly, it establishes underlying dimensions between measured variables and latent constructs, thereby allowing the formation and refinement of theory. Thirdly, it provides construct validity evidence of questionnaires (Thompson B., 2004). There are

two major classes of factor analysis namely Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA).

### 2.2.5 EXPLORATORY FACTOR ANALYSIS

The Exploratory Factor analysis (EFA) is a statistical method used to examine the covariance relationship amongst a large number of observed items and to derive latent (unobserved) factors to account for these relationships (Mulaik, 2009; Field, 2009). EFA assumes that the variance in the observed variables is due to the presence of one or more latent factors that exert causal influence on these observed variables. Thus, we can distinguish or classify the variables according to the contributions of the latent factors to individual variables (Sung Eun Kim et al., 2017).

In EFA, the investigator has no expectations of the number or nature of the variables and as the title suggests, is exploratory in nature. That is, it allows the researcher to explore the main dimensions to generate a theory, or model from a relatively large set of latent constructs often represented by a set of items (Williams et al., 2010).

### 2.2.6 CONFIRMATORY FACTOR ANALYSIS

Confirmatory factor analysis (CFA) is a multivariate statistical procedure that is used to test how well the measured variables represent the number of constructs (Statistics Solutions, 2013). CFA is optimal for investigating the construct validity of a scale when there is a strong theoretical hypothesis about the structure of the scale; and it is often regarded as a stronger source of evidence compared to more exploratory approaches in scale validation (Fabrigar, Wegener, MacCallum, & Strahan, 1999). CFA allows the researcher to test the hypothesis that a relationship between the observed variables and their underlying latent construct(s) exists. The researcher uses knowledge of the theory,

empirical research, or both, postulates the relationship pattern a priori and then tests the hypothesis statistically (Diana, D.S., 2006).

### 2.2.7 ITEM RESPONSE THEORY

Item Response Theory (IRT) allows comparisons between the latent traits of individuals from different populations when subjected to tests or questionnaires with common features. It also allows the comparison of individuals from the same population subjected to totally different tests. This is only possible because IRT is focused on central items, not the test or questionnaire as a whole. IRT enables a better analysis of each item as it takes into account the fact that items and individuals are part of the same scale. This means that the level of an individual's response can be compared to specific features of an item, which facilitates the interpretation of the scale created. It also allows researcher to recognize which items on the scale are generating information (Hambleton et al., 1991). It is a model-based method of estimating parameters for each item included in a scale that separates the person's responses to the items from the person's underlying level (or ability) of the latent construct that is being measured by the scale (Hambleton RK, Swaminathan H, Rogers HJ, 1991).

## 2.3 Problem statement and study justification

This study is to further validate the FloodDMQ-BM© by using Confirmatory Factor Analysis (CFA) and Item Response Theory (IRT) with a larger sample size. Abdul Ghani, M.N. et al. (2016) in their study recommended recruiting more samples so that the IRT components, standard loading and marginal reliability will be improved. According to Kenny (2015), IRT requires a sample size of at least 200. A larger sample size will diminish the error in the data and works better (An Gie Yong & Sean Pearce, 2013). Abdul Ghani, M.N. et al. (2016) in their study managed to get sample size only 131 due to availability of healthcare providers willing to spend time completing the questionnaire.

The validated FloodDMQ-BM© questionnaire developed by Abdul Ghani, M.N. et al. (2016) is to know the level of KAP of the healthcare provider in Kelantan in management of patient during flood disaster, so that a proper solution can be carried out in the future. Unfortunately, Kelantan experience flood disaster almost every year in varies of severity. The consequences of flood disaster toward the health care services are unavoidable. The questionnaire itself is designed to know how far our healthcare providers are well known to complications of flood toward the services. The result of this survey is essential so that the interventions can be carried out to improve the services when the disaster approaching later.

## 2.4 Research Questions, Objectives

**Research Questions**

Is the Flood Disaster Management Questionnaire (FloodDMQ-BM©) valid to be used to assess the knowledge, attitude and practice of healthcare providers in managing flood disaster?

**Objectives**

**General objective:**

To evaluate internal structure of flood disaster management questionnaire. (FloodDMQ-BM©)

**Specific objectives:**

1. To evaluate psychometric properties on attitude and practice section of FloodDMQ-BM© by confirmatory factor analysis
2. To evaluate psychometric properties on knowledge section of FloodDMQ-BM© by item response theory analysis

## 2.5 Methodology

### Study Design

This is a validation study and observational cross-sectional study which include all healthcare workers in Emergency Department HUSM, HRPZ2 and HKK. This includes doctors, nurses and paramedics.

### Study area

1. Hospital Universiti Sains Malaysia (HUSM)
2. Hospital Raja Perempuan Zainab II (HRPZ2)
3. Hospital Kuala Krai (HKK)

These hospitals were chosen as the place of study as they were the hospitals which were severely affected during the flood disaster in Kelantan in year 2014.

### Study Population

Healthcare workers in Emergency Department Hospital USM, HRPZ2 and HKK. This includes doctors, nurses and paramedics.

### Inclusion criteria

1. Healthcare workers which include doctors, nurses, medical assistants and health care assistants
2. Subject who are currently working in Emergency Department HUSM, HRPZ2 and HKK
3. Subject who consented to participate in the study

**Exclusion criteria**

1. Incomplete questionnaire form
2. Subject who are already participated in the previous study

**Withdrawal Criteria**

1. Subject who feel uncomfortable when answering the questionnaire form and request to withdraw from the study

**Study Sample Size**

200 with 20% drop out = 250 sample respondent

Structural equation modeling (SEM) research optimally needs sample size of 200-400, however the large sample sizes are not always possible. Other research has suggested that simplified designs can still be optimal with less than 200 samples when there are strong factor loadings (Kline, 2011).

**Sampling method**

Non-probability convenient sampling will be used in this study. Researcher will meet The Head of Emergency Department HUSM, HRPZ2 and HKK to get the full list of their staff. This includes doctors, nurses and paramedics. Researcher will go to the Emergency Department after the participants working shift hour ended in HUSM and during CME hour at HRPZ2 and HKK to explain regarding the study and obtain their consent. Staffs who agree to take part in the study will be given consent form and the FloodDMQ-BM© questionnaire.

**Research Tool**

Researcher will be using the FloodDMQ-BM© questionnaire that had been validated in the study by Abdul Ghani, M.N. et al., (2016). The FloodDMQ-BM© questionnaire consists of 4 sections, which are demographic data and general data followed by attitude, practice and knowledge. A total of 34 items were generated for the questionnaire. The attitude part contains 13 questions and rated on 5-point Likert scale. Points were given on ascending order as following: 1= "strongly disagree" (*sangat tidak setuju*), 2= "disagree" (*tidak setuju*), 3= "neutral" (*neutral*), 4= "agree" (*setuju*) and 5= "strongly agree" (*sangat setuju*). The possible score for this section ranging from 13 to 65. The practice part contains 12 questions and rated on a 5-point Likert scale. Points were given on ascending order as following: 1= "never" (*tidak pernah*), 2= "seldom" (*jarang*), 3= "sometimes" (*kadang-kadang*), 4= "often" (*kebanyakan masa*) and 5= "always" (*selalu*). The possible score for this section ranging from 12 to 60. The knowledge section, containing 9 items were scored on "true" (*betul*), "false" (*salah*) and "don't know" (*tidak tahu*) options. One point is given for a correct answer and zero point is given to an incorrect or "don't know" answer. Thus, the possible score for this section ranging from 0 to 9.

**Data Collection Method**

Researcher will go to the Emergency Department after the participants working shift hour ended in HUSM and during CME hour at HRPZ2 and HKK to explain regarding the study and obtain their consent. The FloodDMQ-BM© questionnaire and the consent form will be given to the staff that agrees to participate in the study. Each of the FloodDMQ-BM© questionnaires will be given a code number. All the respondent will be identified via the code number given; hence their identity will be hidden. Researcher will give time to the respondent to fill up the FloodDMQ-BM© questionnaire and allow them to ask for any questions pertaining to the questionnaire. The time taken to complete the questionnaire is approximately 10 minutes. The FloodDMQ-BM© questionnaires that have been returned back to the researcher will be checked for completeness.

**Data Entry and Analysis**

**Descriptive Analysis**

Data will be entered and analyzed using SPSS version 24.0. Descriptive statistics will be used to summarize the socio-demographic characteristics of subjects. Numerical data will be presented in mean (SD). Categorical variables will be described in frequency and percentage.

**Statistical Analysis**

1. Knowledge - IRT using SPSS 24.0 and R Studio
2. Attitude - CFA using SPSS 24.0 and R Studio
3. Practice - CFA using SPSS 24.0 and R Studio

**Measures**

CFA relies on several statistical tests to determine the adequacy of model fit to the data. The chi-square test indicates the amount of difference between expected and observed covariance matrices. A chi-square value close to zero indicates little difference between the expected and observed covariance matrices. In addition, the probability level must be greater than 0.05 when chi-square is close to zero. The Comparative Fit Index (CFI) is equal to the discrepancy function adjusted for sample size. CFI ranges from 0 to 1 with a larger value indicating better model fit. Acceptable model fit is indicated by a CFI value of 0.90 or greater (Hu & Bentler, 1999). Root Mean Square Error of Approximation (RMSEA) is related to residual in the model. RMSEA values range from 0 to 1 with a smaller RMSEA value indicating better model fit. Acceptable model fit is indicated by an RMSEA value of 0.08 or less (Hu & Bentler, 1999). If model fit is acceptable, the parameter estimates are examined. The ratio of each parameter estimate to its standard error is distributed as a z statistic and is significant at the 0.05 level if its value exceeds 1.96 and at the 0.01 level it its value exceeds 2.56 (Hoyle, 1995). Unstandardized parameter estimates retain scaling information of variables and can only be interpreted with reference to the scales of the variables. Standardized parameter estimates are transformations of unstandardized estimates that remove scaling and can be used for informal comparisons of parameters throughout the model. Standardized estimates correspond to effect-size estimates. In CFA, if unacceptable model fit is found, an EFA can be performed.

**Expected Results**

Socio-demographic tables

| Variables | Mean (SD) | Frequency (%) |
|---|---|---|
| Gender | | |
| Age | | |
| Ethnics | | |
| Place of working | | |
| Working experience | | |
| Profession | | |

Confirmatory Factor Analysis tables

| Factor | Item Code | $X^2$ | TLI | CFI | RMSEA |
|---|---|---|---|---|---|
| Factor 1 | | | | | |
| Factor 2 | | | | | |
| Factor 3 | | | | | |

**Subject Vulnerability**

1. The objective and purpose of this study will be explained to the subject before recruiting them.

2. Participation of the subject are absolutely on voluntary basis. Hence, they are free to accept or reject to be recruited into the study without repercussion.

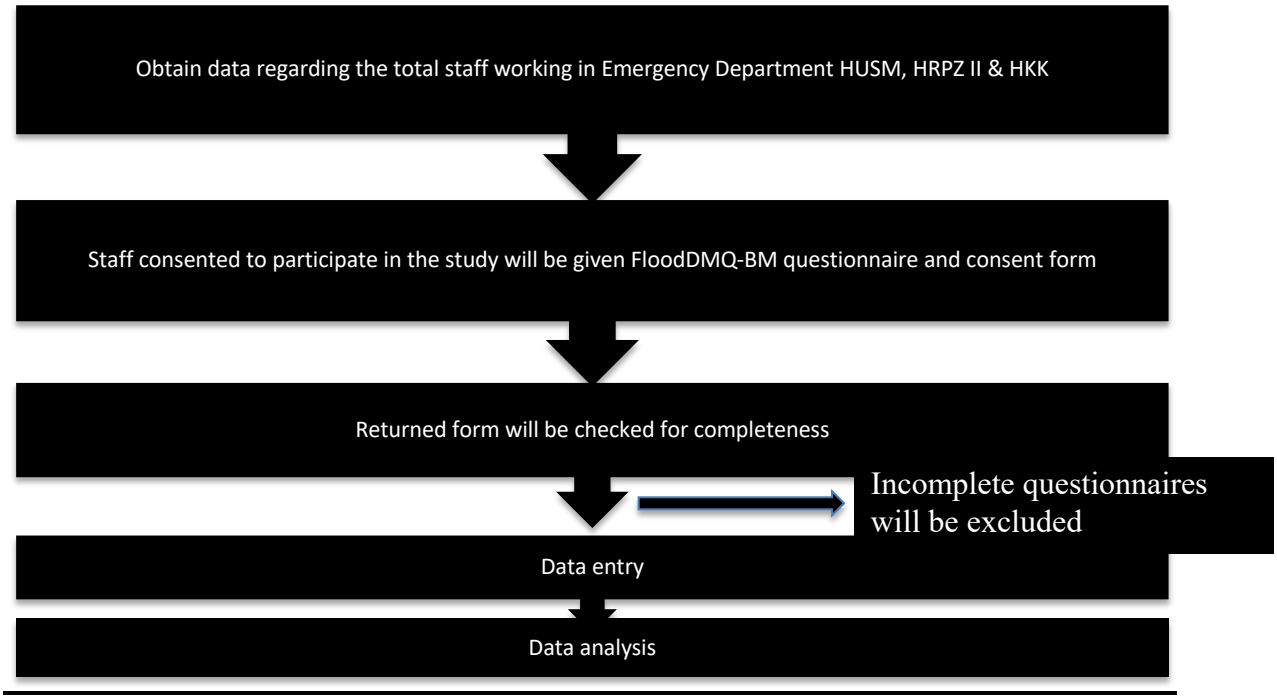
3. There is no health implication to the subject since there are no drugs given or any intervention done to the subject.

4. Subject can also stop at the middle of the study if they feel uncomfortable without any penalty affecting their work.

## 2.6 Ethical Consideration

1. There is no conflict of interest when proposing this study.
2. All forms are anonymous and will be entered into SPSS 24.0 and analyzed using R studio. Only the principal investigators are allowed to access the data. The data will be presented as a grouped data and will not identify the respondents individually.
3. There is no token of appreciation or incentives

## 2.7 Flow chart



## 2.8 Gantt Chart

| PROJECT | | 2017 | | 2018 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
| 1 | Data Collection | | | | | | | | | | | |
| 2 | Data Entry | | | | | | | | | | | |
| 3 | Data Analysis | | | | | | | | | | | |
| 3 | Report Preparation & submission of Draft | | | | | | | | | | | |
| 5 | Manuscript writing and submission for publications | | | | | | | | | | | |

**PROJECT MILESTONE**

3 Data collection: 31/12/2017

4 Data entry: 28/2/2018

5 Data analysis: 30/04/2018

6 Report Preparation & submission of Draft : 30/6/2018

7 Manuscript writing and submission for publications : 31/8/2018

## 2.9 References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