DEMOGRAPHIC CHARACTERISTICS AND TRADITIONAL KNOWLEDGE OF FORECASTING NATURAL DISASTER (A CASE STUDY OF DISTRICT SWAT KHYBER PAKHTUNKHWA)

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Original Article

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Abstract

This study was sought to investigate community ability of forecasting flood and association with their demographic characteristics. The study was conducted during 2021, in high risk and low risk area to flood in district Swat, Khyber Pakhtunkhwa, Pakistan. A total of 190 households were interviewed through structure questionnaire. Data were analyzed through Statistical Package for the Social Science (SPSS) version 19. The Chi-square test was used to determine association between some characteristics of respondent and traditional knowledge of forecasting flood. Main finding of this study revealed that 90% of the respondents were aware of Traditional Knowledge of Forecasting Flood (TKFF) and 93% were acknowledging it effectiveness. Education level, age and residency at high risk and low risk area were significantly associated with TKFF.

Keywords: demographic characteristic, chi-square, traditional knowledge of forecasting flood, high risk and low risk area, flood.

Introduction

Flood is one of most serious environmental hazards in the Glob. Human being failed to evade the damages and worst effect of the flood. Improvement in scientific techniques and experience of dealing with flood event of the people did not eliminate the destruction of flood in the world. Flood destroy livelihood of the land and affect hundred thousand of people economically. Flood also affects industrial and other business activities (Annual flood report, 2011; Dulo et al., 2010 and Cheng et al., 2004).

Flood and other disaster are common in the world. Disaster happens not only in poor countries but it severely effects the infrastructure, crops, human being and industries of the developed countries like China, France, United Kingdom (UK), Australia (Shi et al., 2012; Lammel, et al., 2011; Crompton, 2008). In the decade of 2000, USA has loss 10 billion Dollars due to disaster (Agbola et al., 2010). It would be likely always that extreme or unpredictable event can happen throughout the world. But reduction in the severely effects are possible and is very necessity. By proper planning, safety of human life and their property is feasible (Annual flood report, 2011 and Mirfenderesk, 2009).

In Pakistan, total of nineteen major flood events observed in this country. In seventies, flood occurredthree times; 1973, 1976 and 1978. In nineties, two times heavy flow of flood occurred, on 1992 and 1996. In the decade of 2000, flood destroyed people and infrastructures, in 2005, 2007 and 2010. The nineteen major flood event effected total area of 594713 sq.km and some of 166075 villages were damaged/destroyed (Annual flood report, 2011; Khan et al, 2012). In 2010, flood severely affected; Food, Water, Shelter, Sanitation, the core gateway transport, communication,

energy, health, and institutional systems. Khyber Pakhtunkhwa also affected by the flood in 2010. The severity could be reflected form the high rain fall, within one week the province received 9000 millimeters of rainfall, ten time as much as the province normally received (Khan et al., 2012).

Traditional Knowledge of Forecasting Flood

The people over the world enable themselves to survive natural calamities by predicting disaster through careful observations and identifying effective techniques and approaches by trial and error (Acharya and Prakash 2019; Ngwese et al., 2018; Danladi et al., 2018; Irfan Ullah et al., 2011). The knowledge of forecasting disaster helps in understanding climate change and weather prediction on the basis of animals and plants behavior, clued density, moon, sun, stars and other nature phenomena. The knowledge is helpful in planning of people for natural disaster in both short term and long term (Nadeem et al., 2009; Sing, 2011; Lemmel et al., 2011; Jha et al., 2011; Chinlampianga, 2011; Lammel, et al., 2011 and Acharya et al., 2011). In all of these indicators, behavior of plant for forecasting climate change is very important. Bucherie et al. (2022) found some indicators for forecasting floods which are; wind direction, changes in clouds, and rainfall patterns, and distinct hydro-meteorological processes that lead to flash flood events at the beginning and end of the wet season. Thirty plants species were found by Nedelcheva et al, (2011), using for weather indicators in Bulgaria. Similarly, Irfanullah et al. (2011) found that the major indictors of flood were, high temperature and heavy rainfall in Bangladesh. According to Barayazarra and Puri (2011) TKFF exist in Sarawak, East Malysia. The farmers of the country forecastbehavior of cloud, temperature, wing and humidity and rain by using; sight, sound, touch and smell.According to Nyakundi et al, (2010) concluded that a huge number of people have such knowledge of forecasting flood namely 83%.

This study aims to find the presence of traditional knowledge of forecasting flood (TKFF) in the resident of district Swat, Khyber Pakhtunkhwa, Pakistan. Also, the study intendsto find the proportion of people having TKFF. The study also investigates the relationship of demographic characteristics of respondent and TKFF, in the study area.

Material and Method

The aim of this study was to estimate the number of experts of TKFF in district Swat Khyber Pakhtunkhwa. Primary data was used in this study, which was collected through structure interview schedule. The schedule was pretested and modified accordingly. Sample of 190 persons of high risk and low risk was interviewed by the researchers. Information about TKFF and demographic characteristics of the respondent were collected. The demographic characteristics included, age, education level and residency at high risk/low risk area. Data were coded before analyzing.

The study also aims to explore the association of demographic characteristics of the respondents and TKFF. Both of the characteristics and TKFF were categorical variable. For testing association among categorical variables Chi-square test was used. Test statistics chi-square was calculated as;

$$\chi 2 = \sum_{i=0}^{n}\sum_{j=1}^{m}\frac{\left(O_{ij}-e_{ij}\right)^2}{e_{ij}}$$

Where O_{ij} were observed value of the variable of interest and e_{ij} were the expected value of the variable calculated as

$$e_{ij}=\frac{culumn\ totla\ of the\ varible\ of\ interst \times row\ total\ of\ the\ variable\ of\ interst}{grand\ total\ of\ observed\ values}$$

The variable was considered significant at 10%, 5% and 1% level of significant. P-value approach was used for significant of the variable. Statistical Package for Social Science (SPSS) version 19 was used for statistical analysis.

Result and Discussion

Respondent of age 16-80 were interviewed. Table 1 indicates the number of respondent age wise. Eighty one percent of respondent have age 16-45 years.

Table 1: Frequency distribution of age of respondent

Age	Frequency	Percent	Cumulative percent
16—25	62	32.63	32.7
26—35	49	25.78	58.41
36—45	44	23.16	81.57
46—55	11	5.79	87.36
56—65	19	10.0	97.36
66 and above	5	2.63	100.00

Education is very necessary for every human being. It increases wisdom and provide experience. Information related to education level of the respondent was collected to explore the association between persons havingTKFF and their education level. Table 2shows that 40(21.1%) of the respondents were illiterate, respondent got education up to primary were 18(9.74%), up to medal were 14 (7.37%), up to metric were 19(10%), intermediate, Bachelor and higher education were; 23(12.1%), 30(15.8%) and 41(21.5%) respectively.

Table 3: Education level of the respondent

S.NO	Education level	Frequency	percentage
1	Illiterate	40	21.10
2	Primary	18	9.74
3	Meddle	14	7.37
4	Metric	19	10.00
5	Intermediate	23	12.10
6	Bachelor	30	15.80
7	Higher education	41	21.50
	Total	**190**	**100**

Further, some of the areas were at high risk to flood and other was low risk. Usually, beach of the river or straight to river area is more to at risk of flood than far away area. Sample of 111(58.4%) respondents were selected from high-risk area and 79(41.6%) was from the low-risk area.

Traditional Knowledge on Flood Forecasting

This study found that 171 (90%) of the respondent were able to forecast flood. They were using different indicators for such knowledge. Further, some people of the area were not usingTKFF but they were acknowledged effectiveness of such knowledge. Total number of 177 (93%) respondent accepted that TKFF was effective in forecasting flood in the area.

This study also focused on the sources of TKFF. They learned that knowledge either from their elder or from their personal observation. Most of the respondent 179(94.2%) learned TKFFfrom their elders. This result is matched to Pareek et al, (2011) that most of the people believed on saying of their elder for prediction of weather.And very few number 11(5.8%) of respondent had the knowledge through their personal observation.

Demographic Characteristics and Traditional Knowledge of Flood forecasting (TKFF)

According to Nyakundi et al., (2010) demographic characteristic of people plays key role in enhancing TKFF. Table 3 indicates Chi-square value for association of some demographic characteristics of respondent and TKFF. The table reveals that education level of the respondent was associated with TKFF. The coefficient was significant at 5% level of significance. Thus, the result was valid not only in sample but also in population of the study area. The table further revealed that age of the respondents was significantly associated with TKFF. Also, residency at low and high-risk area of the people significantly associated withTKFF. Both of the last two results were matched to Nyakundi et al., (2010).

Table 3. Association Between Demographic Characteristics and Local Knowledge of Flood Forecasting.

	Demographic characteristics		
	Age	Education	High risk/ low risk area
Local Knowledge of forecasting flood	1.995*	14.034*	3.662**
Sig.(2-tailed)	1.062	.051	.056
N	190	190	190

*Significant at 0.05 level of significance

**Significant at 0.01 level of significance

Conclusion

The study found that TKFF was existed in the area. People of the area trusted on this knowledge and they do not depend on the government flood warning system. The people got TKFF in inherent from their elders. Educated people were more aware of the TKFF and this knowledge was associated with high risk and low risk area. People of high-risk area were more aware of TKFF than low risk area.

TKFF of the people of the area should be utilized positively by government. Literacy ratio should be increase in the study area. Number of Educational institutes should be increase in the area. Thus, by increasingliteracy rate the TKFF would be high in the area and the people would be more secure from the adverse effect of flood.

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