Determining the Causes of Divorce in Perlis Using Fuzzy Analytic Hierarchy Process

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ABSTRACT

Divorce is one of the most common problems in the world and Malaysia is also considered as one of the countries that has many divorce cases. By definition, divorce is the legal dissolution of a marriage by a court or other competent body. Divorce is also categorized as an unfortunate occurrence as it would cause negative feelings and behaviors to someone who experienced it. Furthermore, there are nine factors of divorce used in the study which are infidelity, emotional problem, drugs problem, sexual problem, communication problem, problem with in-law, married too young and job conflict. Hence, the strongest factor needs to be determined as a precaution to people who want to get married and people who are already married. Therefore, the best and suitable method to determine the strongest factor of divorces in Perlis is by using Fuzzy Analytic Hierarchy Process (FAHP). This is due to the capability and the ability of the FAHP in achieving better accuracy and consistency in the decision makers' judgment. The method was conducted by using questionnaires and interview sessions with six selected respondents from Perlis State Islamic Affairs and Malay Customs and Perlis Syariah Judiciary Department. After that, the respondents were asked to rate the pairwise comparisons by using Saaty Scale which is from one to nine. Then, all the surveys were collected and converted into triangular fuzzy number prior further analysis by using Microsoft Excel. The analysis shows that the strongest factor of divorces in Perlis is drugs problem with the normalized relative weight of 0.203. Hence, Perlis residents need to be aware of the factors of divorce in the state and they can try to reduce the number of divorce cases in Perlis as well.

Keywords: *Divorce; Fuzzy Analytic Hierarchy Process; triangular fuzzy number*

INTRODUCTION

BACKGROUND OF THE STUDY

According to Malay Mail Online article, the number of divorce cases in Malaysia has been increasing rapidly year by year and 56769 cases were recorded in 2012 and it was similar to the occurrence of a marriage problem for every 10 minutes. As defined in Merriam-Webster Dictionary, divorce is the action or an instance of legally dissolving a marriage. Chan et al. (2008) stated that the word divorce is stated as "Dissolution of Marriage" in legal term since the action cannot come without having a legal marriage. As we can see, divorce is a very common issue in Malaysia and it needs to be reduced. Zainab et al. (2014) stated that the problem of divorce in Malaysia should be given serious attention even though it is not that critical. This is because divorce could lead to negative feelings and behaviors to people who experienced it and people who are affected by it, for example, children.

Based on the article in Malay Mail Online, the statistics provided by Sharia Judiciary Department Malaysia (JKSM) showed that the number of Muslim couples getting divorced increased by 2.3 times from 20,916 in 2004 to 47,740 in 2012 and to 49,311 in 2014. This shows that the problem is getting

serious year by year and it needs to be reduced since it could lead to negative feelings and behaviors to someone who experienced it and people who are affected with the divorce cases. According to D'onofrio (2011), poverty, educational failure, early and risky sexual activity, non-marital childbirth, earlier marriage, cohabitation, marital discord and divorce could be experienced by children of divorce. Other than that, the consequences of divorce will not only lessen the family value such as the concept of fidelity, family dinner and feminism, but it will also create various problems like family conflict and community stability.

There are many factors that contribute to the increasing number of divorce cases in Malaysia. According to Chan et al. (2008), from various foreign literatures related to marriage and family, the top three usual factors of divorce were infidelity, no longer in love and emotional problem. Among factors of divorce include drugs problem, sexual problem, communication problem, problem with in-law, married too young, job conflict and others. Thus, people need to be aware of these factors in order to avoid facing divorce situation.

Related Works

Zainab et al. (2014) stated that divorce is the way to end up a marriage by most couples. The study aims to describe the cases of divorce in Muslim Community in Malaysia by using a content analysis approach using secondary materials like reports from Population and Housing Census of Malaysia and record files of the Department of Islamic Development Malaysia. Based on the study, it shows that the divorce rates among Muslims in Malaysia between the ages of 18 and 50 in the country has increased rapidly and the highest divorce rates are mostly found in the Federal Territory Kuala Lumpur, Terengganu, Perlis and Kedah.

Chan et al. (2008) stated that the complicated legal process of divorce in Malaysia is the reason why many people may not receive much information about divorce in Malaysia. The study was conducted to determine the factors of divorce, the impacts of divorce and the existence of prevention program to reduce the divorce cases in Malaysia. Furthermore, the paper also stated that divorce would not happen without a reason and they found that the three common factors of divorce are infidelity, no longer in love and emotional problem. Other factors that contributed to divorce are drugs problem, sexual problem, problem with in-law, communication problem, married too young, job conflict and many more. Based on the impacts and the preventions, the paper stated that divorce will lessen the family value such as the concept of fidelity, feminism, family dinner and so on and also will create many problems like family conflict and community stability. Other than that, the strongest impact of divorce is children since children with divorced parents will often experience poor scores in academic. Some of them will also experience separate anxiety, regressive behavior, somatic complaint and so on. Furthermore, another impact to be considered is the financial hardship. Therefore, the paper stated that Malaysia government has actively promoted Pre-Marital Educational Program to almost the whole country partnership and it showed positive feedback which is the divorce rate among Muslims has become stable after the introduction of Pre-Marital Educational Program. Thus, the program is considered to be a good program to prevent divorce.

Based on the study done by Sam and Ghani (2014), the anomaly of divorcement has turned into a major concern to the demographers and people. Many studies regarding divorce had been handled in the West to study the divorce's pattern and the factors of divorce as well. Unfortunately, Malaysia is experiencing a lack of research on divorce cases. Hence, the goal of the study is to investigate the trend of divorce based on the data supplied by the Department of Islamic Development Board and National Registration Department of Malaysia. The rate of divorce in Malaysia has been rising within a period of 17 years from 1995 to 2010 based on the analysis of the divorce trend. Furthermore, there is a divergent pattern of the trend of divorce between Muslim and non-Muslim couples specifically during the economic downturn. Based on the data provided by the National Population and Family Development Board, the factors of divorce among women in Peninsular Malaysia can be identified. By using Cox-Regression analysis, it shows that age, age at marriage, the number of marriages and the existence of children are considered as the important factors related to

divorce. Other than that, careless husbands, irreconcilable differences and the interference of the in-laws family are the causes why most people end their marriages as found from the MPFS IV data.

According to D'onofrio (2011), parental detachment or separation is identified with the addition of hazard for different mental, scholastic and social issues for the duration of the life-course. Encountering parental separation is identified with about a two-crease increment on the normal. In any case, a greater part of children and young people do not display impeding issues once parental separation takes place. In other words, recent study features inflated risk for negative results, however, parental separation does not basically fate a tyke to claim major disabling issues. Moreover, children and teenagers who encounter parental separation, in any case, frequently encounter huge intense pain all throughout the separation and aftermath. Previous investigation that utilizes different styles to check the fundamental causative instruments proposes that the raised hazard for debilitating issues is not expected only to decision factors (chances that expansion both parental partition and issues inside the posterity). Or maybe, in advance clashes between the co-guardians after separation, issues with poor child rearing, cash troubles resulting from the partition and loss of contact with the non-private parent encourage to legitimize the relationship between parental separation and posterity working.

Muhammad Fakhrul Azim and Aina (2017) stated that there are a lot of divorce cases occurring among Muslims in Malaysia presently. Based on the paper, a demographic study of divorce cases was conducted that occurred among 94 Muslims couples in the South West of Penang. The results of the study showed that in Phase 1, there are 36 cases occurred during the first five years of marriage and the divorces are said to be having external or internal factors that might came across during the period of marriage. Furthermore, it was found that the minimum year of marriage was only a year as the husband and wife were 19 and 18 years old respectively based on the data. The divorce mostly happened during the first phase of marriage life and this might be due to lack of commitment and the responsibility among couples. Next, the number of divorce cases for Phase 2 and Phase 3 has decreased which were 22 and 25 cases respectively. This might be due to the increment of confidence level and commitment among couples to solve the problems in their marriages. After 15 years of marriage, there are only 11 divorce cases were reported.

The Analytic Hierarchy Process (AHP), introduced by Thomas Saaty in 1980, is a multiple criteria decision-making approach that has been utilized in almost all the applications related with decision-making (Vaidya & Kumar, 2006). According to Saaty (1980), the AHP helps to apprehend both subjective and objective features of a decision by reducing complex decisions to a series of pairwise comparisons and incorporating the results. The important factors are then selected in order to be arranged in a hierarchic form decreasing from an overall goal to criteria, sub-criteria and alternatives in successive levels. Then, the pairwise comparisons are used to retrieve the weights of importance of the decision criteria and the relative performance measures of the alternatives regarding the decision criterion of each individual. Comparison are done among alternatives in absolute measurement and the upper level includes the grades and thus, the summation of weighting manner leads to the very last rank among alternatives (Singh, 2016). The strength of AHP is the flexibility to be combined with other various techniques such as Quality Function Deployment, Linear Programming, Fuzzy Logic and so on (Vaidya & Kumar, 2006).

A study done by Wang and Chin (2011) stated that Fuzzy Analytic Hierarchy Process is proven to be the most convenient methodology for Multiple Criteria Decision-Making among all the methods of fuzzy. Furthermore, the study stated that Fuzzy Analytic Hierarchy Process will be more applicable in the future since the fuzzy judgments are easier to be utilized than crisp judgments. Fuzzy Analytic Hierarchy Process for multiple criteria decision-making needs scientific ways to derive the weights from the fuzzy pairwise comparison matrices and there are two categories of existing ways for Fuzzy Analytic Hierarchy Process derivation of weight. One of them is by deriving a set of fuzzy weights from a fuzzy pairwise comparison matrix and the other one is by deriving a set of crisp weights based on the fuzzy pairwise comparison matrix. According to Asuquo and Onuodu (2016), since the AHP is lack on the capability to handle with vague and personal judgment in the process obtaining the pair wise-comparison, it will create another problem. Thus, the problem can be solved by using Fuzzy Analytic Hierarchy Process model. The model mentioned can be optimized by using

triangular fuzzy numbers and linguistic variables are used to obtain better accuracy and consistency in the decision makers' judgment. By using this model, an architecture system is developed in solving problems. The study uses Chang's analysis based on triangular fuzzy number to improve the decision made by human experts during obtaining information. A range of values is then computed to incorporate decision makers' uncertainty.

METHODOLOGY

Data Collection

The data is collected by using questionnaires and interview sessions with six selected experts from Perlis State Islamic Affairs and Malay Customs and Perlis Syariah Judiciary Department. The selection of the experts is based on some criteria such as knowledge that is their amount of important knowledge and information, next is experience like age and historical depth in the decision problem and another one is relevance that is the degree of how much they have knowledge pertaining to the decision problem. Then, the data collected is calculated in the next steps.

Fuzzy Analytic Hierarchy Process (FAHP)

Fuzzy Analytic Hierarchy Process (FAHP) is the addition of the fuzzy hypothesis into the fundamental of Analytic Hierarchy Process which is known as AHP and was developed by Thomas Saaty (1980). AHP is commonly used as a tool to make decision in the issues of multi-criteria decision making. Next, the implementation of this approach is by taking the pairwise comparisons of different alternatives with respect to various criteria. It also gives a support tool of decision for multi-criteria decision issues. For Analytic Hierarchy Process model, the first level is the objective, followed by the criteria as the second level and sub-criteria as the third level. Thus, the alternatives of the study are defined as the fourth level.

However, a basic Analytic Hierarchy Process model does not involve distinctness for personal judgments. Therefore, fuzzy logic approach is introduced into the AHP model to improvise the model. In Fuzzy Analytic Hierarchy Process, the pairwise comparisons and the alternatives are carried out by using the linguistic variables. They are also constituted by triangular numbers. The Fuzzy Analytic Hierarchy Process application was firstly introduced by Van Laarhoven and Pedrycz (1983) by defining the membership functions in triangular for the pairwise comparisons. Next, Buckley (1985) has discovered more by finding out the fuzzy priorities of comparison ratios proportion possessing triangular membership functions. Chang (1996) developed another approach related with the utilization of triangular numbers in pairwise comparisons. Additionally, even if there are some more techniques embedded in Fuzzy Analytic Hierarchy Process, within the range compass of the study, Buckley's method is utilized to obtain the relative weights of importance for both the criteria and the alternatives.

A triangular fuzzy number, M denoted by a triple of real numbers (a, b, c) is shown in figure 1, with parameters $a \leq b \leq c$ where a indicates the smallest possible value, b is the most promising value and c indicates the largest possible value of membership function $\mu_M(x)$. The membership function of a triangular fuzzy number is given in equation 1 as:

$$\mu_M(x) = \begin{cases} \frac{x-a}{b-a}, & a \leq x \leq b \\ \frac{c-x}{c-b}, & b \leq x \leq c \\ 0, & otherwise \end{cases} \qquad (1)$$
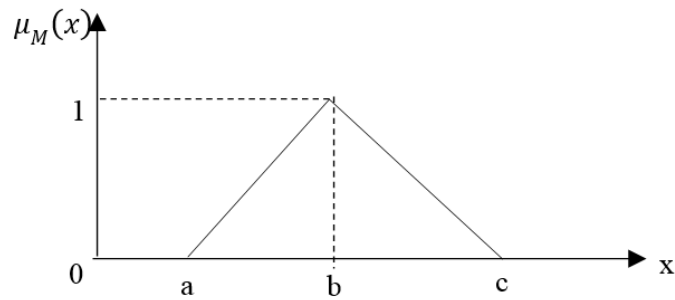
Figure 1: A triangular fuzzy number, M

The steps of FAHP are as follows:

Step 1: Comparing the criteria via linguistic terms.

Table 1: Linguistic terms and the corresponding triangular fuzzy numbers

Linguistic Variable	Triangular Fuzzy Number	Reciprocal of Triangular Fuzzy Number
Equally Important (EI)	(1,1,1)	(1,1,1)
Weakly Important (WI)	(2,3,4)	$\left(\frac{1}{4},\frac{1}{3},\frac{1}{2}\right)$
Fairly Important (FI)	(4,5,6)	$\left(\frac{1}{6},\frac{1}{5},\frac{1}{4}\right)$
Strongly Important (SI)	(6,7,8)	$\left(\frac{1}{8},\frac{1}{7},\frac{1}{6}\right)$
Absolutely Important (AI)	(9,9,9)	$\left(\frac{1}{9},\frac{1}{9},\frac{1}{9}\right)$
The intermittent values between two adjacent scales	(1,2,3)	$\left(\frac{1}{3},\frac{1}{2},\frac{1}{1}\right)$
	(3,4,5)	$\left(\frac{1}{5},\frac{1}{4},\frac{1}{3}\right)$
	(5,6,7)	$\left(\frac{1}{7},\frac{1}{6},\frac{1}{5}\right)$
	(7,8,9)	$\left(\frac{1}{9},\frac{1}{8},\frac{1}{7}\right)$

Based on the comparable triangular fuzzy numbers of these linguistic circumstances from Table 1, for instance if the decision maker says, "Criterion 1 (C1) is Strongly Important (SI)", then the fuzzy triangular scale used is (6, 7, 8). In contrast, the comparison comparability of C2 to C1 will obtain the fuzzy triangular scale as $\left(\frac{1}{8},\frac{1}{7},\frac{1}{6}\right)$.

The pairwise comparison matrix denoted as S_{ij}^k, of the weights (importance) of criteria is shown as follows:

$$
S_{ij}^k =
\begin{array}{c}
\\
C_1 \\
C_2 \\
\vdots \\
C_n
\end{array}
\begin{array}{cccc}
C_1 & C_2 & \cdots & C_n \\
\left[
\begin{array}{cccc}
\left(a_{11}^k, b_{11}^k, c_{11}^k\right) & \left(a_{12}^k, b_{12}^k, c_{12}^k\right) & \cdots & \left(a_{1n}^k, b_{1n}^k, c_{1n}^k\right) \\
\left(a_{21}^k, b_{21}^k, c_{21}^k\right) & \left(a_{22}^k, b_{22}^k, c_{22}^k\right) & \cdots & \left(a_{2n}^k, b_{2n}^k, c_{2n}^k\right) \\
\vdots & \vdots & \cdots & \vdots \\
\left(a_{n1}^k, b_{n1}^k, c_{n1}^k\right) & \left(a_{n2}^k, b_{n2}^k, c_{n2}^k\right) & \cdots & \left(a_{nn}^k, b_{nn}^k, c_{nn}^k\right)
\end{array}
\right]
\end{array}. \tag{2}
$$

According to the equation above, the pairwise contribution matrix is shown where S_{ij}^k, indicates that k^{th} is the decision maker's preferences of ith criterion over j^{th} criterion by using fuzzy triangular numbers. For instance, S_{12}^k represents the first decision maker's preference for the Criterion 1(C_1) over Criterion (C_2), then it is equal to $S_{12}^k = (6, 7, 8)$.

Step 2: Calculating the average fuzzy number of preferences.

Moreover, if the situation involves more than one respondent, let m be the number of respondents and the calculation is made by finding the average of preferences of decision maker. The equation below shows how it is calculated.

$$
Average, \left(a_{ij}, b_{ij}, c_{ij}\right) = \frac{\sum_{k=1}^{m}\left(a_{nn}^k, b_{nn}^k, c_{nn}^k\right)}{m} \qquad \text{for } i, j, m = 1, 2, 3, \ldots \tag{3}
$$

Step 3: Updating the version of pairwise comparison matrix.

Based on the average preferences of decision maker, pairwise comparison matrix is updated as shown below:

$$
S_{ij} =
\begin{array}{c}
\\
C_1 \\
C_2 \\
\vdots \\
C_n
\end{array}
\begin{array}{cccc}
C_1 & C_2 & \cdots & C_n \\
\left[
\begin{array}{cccc}
\left(a_{11}, b_{11}, c_{11}\right) & \left(a_{12}, b_{12}, c_{12}\right) & \cdots & \left(a_{1n}, b_{1n}, c_{1n}\right) \\
\left(a_{21}, b_{21}, c_{21}\right) & \left(a_{22}, b_{22}, c_{22}\right) & \cdots & \left(a_{2n}, b_{2n}, c_{2n}\right) \\
\vdots & \vdots & \cdots & \vdots \\
\left(a_{n1}, b_{n1}, c_{n1}\right) & \left(a_{n2}, b_{n2}, c_{n2}\right) & \cdots & \left(a_{nn}, b_{nn}, c_{nn}\right)
\end{array}
\right]
\end{array}. \tag{4}
$$

Step 4: Calculating the geometric mean of fuzzy comparison values.

Buckley (1985) stated that the geometric mean of fuzzy comparison values for each criterion is given as shown in equation (5). Furthermore, r_i still denotes the triangular values.

$$
\begin{aligned}
r_i &= \left(\prod_{j=1}^{n} d_{ij}\right)^{\frac{1}{n}} \\
&= \left[\left(a_{i1}, b_{i1}, c_{i1}\right) \times \left(a_{i2}, b_{i2}, c_{i2}\right) \times \ldots \times \left(a_{in}, b_{in}, c_{in}\right)\right]^{\frac{1}{n}} \\
&= \left(a_{ri}, b_{ri}, c_{ri}\right).
\end{aligned} \tag{5}
$$

Step 5: Calculating the fuzzy weights.

By including the next three sub steps, each criterion will have its fuzzy weights by using equation (8).

Step 5a: Finding the vector summation of each r_i

$$Vector\,Summation = \sum r_i. \tag{6}$$

Step 5b: Calculating the (-1) power of summation vector.

The calculation of the (-1) power of summation vector is shown below. The fuzzy triangular is then replaced to make it in the form of increasing order.

$$s^{-1} = \left(\frac{1}{\sum c_{ri}}, \frac{1}{\sum b_{ri}}, \frac{1}{\sum a_{ri}} \right). \tag{7}$$

Step 5c: Finding the fuzzy weight of criterion.

The fuzzy weight of criterion i (W_i) can be found by multiplying each r_i with the reverse vector.

$$\begin{aligned} W_i &= r_i \times s^{-1} \\ &= \left(a_{wi}, b_{wi}, c_{wi} \right), \\ \text{where, } s^{-1} &= \left(\frac{1}{\sum c_{ri}}, \frac{1}{\sum b_{ri}}, \frac{1}{\sum a_{ri}} \right). \end{aligned} \tag{8}$$

Step 6: Defuzzifying the fuzzy weight of criterion.

The fuzzy weights of each criterion need to be de-fuzzified by using Centre of Area method that was introduced by Chou and Chang (2008) because W_i are still fuzzy triangular numbers. The calculation is shown below.

$$P_i = \frac{a_{wi} + b_{wi} + c_{wi}}{3}. \tag{9}$$

Step 7: Normalizing the de-fuzzified weight of criterion.

The normalization of the de-fuzzified weight of criterion is required as P_i is a non-fuzzy number. The equation below shows how the normalization is done.

$$Q_i = \frac{P_i}{\sum_{i=1}^{n} P_i}. \tag{10}$$

By performing these seven steps, the criteria will have its normalized weights. Then, the scores for each criterion are ranked based on the normalized weights.

RESULTS AND DISCUSSION

In order to determine the criteria of factors of divorce, six experts have been selected to voice their opinion regarding the survey. All the surveys were collected and converted into triangular fuzzy number prior further analysis by using Microsoft Excel. The preference for each of the survey was then averaged among the six experts. After that, the new matrices of pairwise comparison between all

the factors were created. The updated fuzzy evaluation matrix with respect to the goal with triangular fuzzy numbers is shown in Table 3.

The criteria represent the factors of divorce based on numbers. Table 2 shows the labels for each factor involved in the study.

Table 2: The labels of the criteria

Labels	Criteria
1	Infidelity
2	No longer in love
3	Emotional problem
4	Drugs problem
5	Sexual problem
6	Communication problem
7	Problem with in-law
8	Married too young
9	Job conflict

Table 3: The updated pairwise comparison matrices

Factors	1	2	3	4	5	6	7	8	9
1	(1,1,1)	(6.417, 6.556, 6.708)	(3.083, 3.733, 4.389)	(1.241, 1.407, 1.574)	(4.708, 5.033, 5.361)	(1.57, 1.907, 2.241)	(1.28, 1.593, 1.912)	(1.30, 1.603, 1.917)	(1.07, 1.233, 1.394)
2	(0.491, 0.630, 0.782)	(1,1,1)	(2.528, 3.357, 4.188)	(0.435, 0.698, 0.762)	(1.079, 1.402, 1.727)	(0.73, 0.894, 1.056)	(0.85, 0.972, 1.112)	(1.63, 2.097, 2.579)	(0.92, 1.075, 1.231)
3	(1.486, 1.790, 2.104)	(1.325, 1.394, 1.510)	(1,1,1)	(1.616, 1.607, 1.602)	(1.375, 1.644, 1.944)	(1.26, 1.423, 1.581)	(0.96, 1.097, 1.112)	(2.13, 2.603, 3.083)	(0.33, 0.471, 0.618)
4	(6.194, 6.190, 6.188)	(7.083, 7.222, 7.375)	(6.685, 6.852, 7.019)	(1,1,1)	(4.519, 5.019, 5.519)	(4.02, 4.104, 4.241)	(3.083, 3.389, 3.708)	(2.750, 3.056, 3.375)	(2.685, 3.185, 3.685)
5	(0.978, 1.113, 1.264)	(3.472, 3.931, 4.408)	(1.625, 2.089, 2.569)	(1.718, 1.668, 1.640)	(1,1,1)	(1.57, 1.729, 1.885)	(2.190, 2.313, 2.452)	(1.802, 1.693, 1.649)	(3.079, 3.563, 4.052)
6	(6.075, 6.061, 6.052)	(4.250, 4.556, 4.875)	(4.694, 5.190, 5.688)	(1.579, 1.904, 2.231)	(2.194, 2.524, 2.854)	(1,1,1)	(0.463, 0.358, 0.316)	(1.639, 1.937, 2.250)	(0.663, 0.618, 0.594)
7	(3.625, 3.756, 3.903)	(3.389, 4.042, 4.700)	(3.056, 3.542, 4.033)	(0.782, 0.927, 1.080)	(2.741, 3.394, 4.052)	(4.33, 5.000, 5.667)	(1,1,1)	(1.917, 2.222, 2.542)	(1.583, 1.639, 1.764)
8	(2.625, 3.089, 3.569)	(2.917, 3.317, 3.778)	(2.464, 2.936, 3.418)	(0.894, 0.969, 1.102)	(3.852, 4.685, 5.519)	(2.58, 3.069, 3.557)	(0.92, 1.069, 1.224)	(1,1,1)	(1.117, 1.250, 1.399)
9	(3.875, 4.200,	(3.389, 3.875,	(4.500, 5.250,	(1.954, 1.929,	(1.852, 2.144,	(2.50, 3.000,	(1.03, 1.361,	(1.722, 2.042,	(1,1,1)

	4.528)	4.367)	6.056)	1.913)	2.452)	3.500)	1.690)	2.367)	

The data was collected then analyzed using Fuzzy Analytic Hierarchy Process to find the geometric mean of fuzzy comparison values for every criterion. For instance, the geometric mean of fuzzy comparison value for all criterions was computed in Microsoft Excel by using equation (5). Next, the geometric means of fuzzy comparison values of every criterion are shown in Table 4 where each column represents the fuzzy triangular number denoted as (l, m, u). In addition, the total values, the reverse values and the values in increasing order are also presented in Table 4.

Table 4: Geometric mean of fuzzy comparison values

Criteria	Geometric Mean		
	L	**m**	**u**
1	1.904	2.164	2.420
2	0.935	1.148	1.361
3	1.160	1.326	1.494
4	3.672	3.899	4.125
5	1.783	1.928	2.079
6	1.813	1.881	1.972
7	2.168	2.441	2.723
8	1.773	2.020	2.286
9	2.143	2.429	2.709
Total	17.350	19.236	21.169
Reverse(-1)	0.058	0.052	0.047
Increasing Order	0.047	0.052	0.058

Next, fuzzy weights of each criterion are calculated by using equation (8) and the results are shown in Table 5.

Table 5: Relative fuzzy weights of the criteria

Criteria	Relative Fuzzy Weights		
	l	**m**	**u**
1	0.090	0.102	0.114
2	0.044	0.054	0.064
3	0.055	0.063	0.071
4	0.173	0.184	0.195
5	0.084	0.091	0.098
6	0.086	0.089	0.093
7	0.102	0.115	0.129
8	0.084	0.095	0.108
9	0.101	0.115	0.128

Table 6: Non-fuzzy and normalized relative weights of criteria

Criteria	P_i	Q_i	Ranking
1	0.102	0.112	4
2	0.054	0.060	9
3	0.063	0.069	8
4	0.184	0.203	1
5	0.091	0.100	6
6	0.089	0.098	7
7	0.115	0.127	2
8	0.096	0.105	5
9	0.115	0.126	3

The relative non-fuzzy weight of each criterion P_i is calculated in Table 6 by taking the average of fuzzy numbers for each criterion which is based on equation (9). Then, it needs to be normalized by using equation (10) and the normalized weights of each criterion Q_i are calculated and tabulated in Table 6.

The results indicate that drugs problem is the strongest factor of divorce in Perlis with the normalized relative weight of 0.203. Other than that, the normalize relative weight of problem with in-law, job conflict, infidelity, married too young, sexual problem, communication problem and emotional problem are 0.127, 0.126, 0.112, 0.105, 0.100, 0.098 and 0.069 respectively. The least important criterion chosen by the experts are no longer in love with the normalized weight of 0.060.

Based on the results, it can be assumed that drugs problem is the main factor of divorce in Perlis. It is also said to be the main problem in marriage since it affects most of the marriages in Perlis based on the judgment of experts. The excessive intake of drugs can be dangerous to people physically and emotionally. Other than that, the least impact factor of divorce is no longer in love. This is because marriage is the union between a man and a woman to be together in a personal relationship. Therefore, it would be hard for them to be no longer in love with their partners since they have agreed to be together in a personal relationship.

CONCLUSION

The factors of divorce are chosen based on the opinion of experts from Perlis Sharia Judiciary Department and Perlis State Islamic Affairs and Malay Customs. The study was conducted as it is considered to be beneficial for the residents in Perlis in avoiding divorce mostly for Muslim couples. They can also be aware of the strongest factor of divorce unless it is inevitable by them. Based on the factors, the study was conducted to seek for the strongest factor of divorce in Perlis. Therefore, the combination of Analytical Hierarchy Process technique and fuzzy approach was being used in the study and it is called Fuzzy Analytic Hierarchy Process. Unfortunately, the experts' preferences may contain indistinctness and uncertainty. Therefore, the linguistic variables shall be maintained by using Fuzzy Set Theory as the representatives of the linguistic variables. Furthermore, the method used is more appropriate than the basic Analytic Hierarchy Process since it gives a clear indication of finding the strongest factor of divorce in Perlis.

The experts' preferences for the study involve three officers from Perlis Syariah Judiciary Department and three officers from Perlis State Islamic Affairs and Malay Customs. The respondents have aided the study magnificently to evaluate the factors of divorce in Perlis. There are nine factors of divorce which are infidelity, no longer in love, emotional problem, drugs problem, sexual problem, communication problem, problem with in-law, married too young and job conflict.

Based on the results, drugs problem is said to be the strongest factor of divorce and affects most couples in Perlis to be involved in divorce cases. Last but not least, the study is hoped to be beneficial for Perlis residents so that they can be aware of the factors of divorce in Perlis and they can try to reduce the divorce cases in Perlis as well.

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