

Determining Expert Consensus on Post-Divorce Crisis Symptoms through the Delphi Fuzzy Method

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Abstract

Divorce can trigger psychosocial crises that significantly impact individual well-being. This research employs the Fuzzy Delphi Method (FDM) to determine expert consensus on post-divorce crisis symptoms. Four main constructs were employed: physical, emotional, behavioral, and cognitive symptoms. A total of eight experts in the fields of counseling and psychology participated in this study. Data was assessed utilising the FDM used to reach a consensus on the symptom items. The findings indicated a high level of consensus across all constructs. This study makes a significant contribution to the development of an early assessment instrument for individuals experiencing post-divorce crises.

Keywords: Divorce; Psychosocial crisis; Crisis symptoms; Fuzzy Delphi method

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1.0 Introduction

Divorce is a stressful life transformation that involves post-divorce phases, stages of decision-making, and divorce proceedings. The current data on divorce from the Organization for Economic Cooperation and Development (OECD) revealed that there is a steady increase in the number of divorces among 1000 people each year commencing from the last 50 years (OEDC, 2019). The data indicated that there may be several factors at play, for example in terms of social, cultural, economic, and psychological. Previous research discovered that divorced partners, especially women, will likely experience immense pain and depressive symptoms stemming from societal stigma, prejudice, and discrimination (Hald et al., 2022). Such prominent life changes can likely cause adverse effects on mental health for instance, low mood, abusing substances, poor work performance, anger, guilt, helplessness, and hopelessness (Kim, 2023). Meanwhile, different studies reported more severe psychological symptoms such as loneliness, lower engagement in activities, sleep disturbance, nostalgic and longing moments (Jeong et al., 2024), ruminations, intrusive and recurrent thoughts with regard to the relationship or the partner (Mohagheh & Rajabi 2022). Additionally, post-divorce crisis symptoms can have overlapping symptoms with other psychological or life issues. For example, losing a partner to death might not be equivalent to experiencing divorce, although the perspectives could be used to describe the distress following the divorce. This situation can be considered as a crisis that demands a

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thorough inspection. Hence, this research aims to examine symptoms during the post-divorce period involving cognitive and emotional aspects to develop an appropriate scale in relation to post-divorce crisis symptoms.

Nomenclature	
CER	Cognitive-Emotion Regulation Questionnaire
DSAQ	Divorce-Separation Adaptation Questionnaire
FDAS	Fisher Divorce Adjustment Scale
FDM	Fuzzy Delphi Method
IELC	Internal and External Locus of Control Scale
IHN	Impact Hoax News
JKM	Jabatan Kebajikan Masyarakat
KKM	Kementerian Kesihatan Malaysia
KPM	Kementerian Pendidikan Malaysia
LPPKN	Lembaga Penduduk dan Pembangunan Keluarga Negara
OEDC	Organization for Economic Development and Co-operation
PTSD	Post-Traumatic Stressful Events

2.0 Literature Review

Previous research primarily focused on non-adaptive responses to post-divorce, like recurrent thoughts, arousal, negative cognition, as well as avoidance behaviors (Wong, 2018). However, most of the symptoms showed similarity to Post-Traumatic Stressful Events (PTSD), for instance, anxiety, stress, depression, unhappiness, abandonment, fear, guilt, loneliness, pessimism, anger, low activity, as well as efficiency (Perrig-Chiello et al., 2015), low immune system, excessive intake of alcohol and health issues (Greene et al., 2012). The comorbidity of post-divorce crisis symptoms can affect the diagnosis and potentially cause a wrong diagnosis. Prior inappropriate treatments due to incorrect diagnosis could worsen the outcome and waste time also resources. Periods of delayed correct diagnosis could link to relapses and hospitalizations (Hong et al., 2016). Several questionnaires used to evaluate the symptoms shown by divorced individuals for example Divorce-Separation Adaptation Questionnaire (DSAQ) (Yarnoz-Yaben & Comino, 2010), Fisher Divorce Adjustment Scale (FDAS) (Fisher, 1976), Post-Divorce Problems and Stress Scale, Cognitive-Emotion Regulation Questionnaire (CER) (Garnefski et al., 2001), Internal and External Locus of Control Scale (IELC) (Kovaleva et al., 2014) and etc. DSAQ has 20 items focusing on four dimensions: Psychological challenges in adjusting to divorce, issues with the ex-partner, negative effects of separation, and the willingness to co-parent; however, it focuses more on the collective experience of the family. FDAS has 115 items with seven dimensions: self-worth, emotional attachment, fear of the future, anger, loneliness, guilt and rejection, and hope and personal growth (Fisher, 1976) that covers a holistic dimension of symptoms but relies excessively on self-report. CER is not a specific inventory to examine post-divorce crisis symptoms however, it evaluates the cognitive strategies employed to adapt to negative life events such as divorce (Gross & John, 2003). CER comprises nine subscales: other-blame, self-blame, catastrophizing, rumination, positive refocusing, putting into perspective, acceptance, positive reappraisal, as well as refocusing on planning (Gross & John, 2003) but focuses solely on the cognitive aspect. IELC analyzes the control belief an individual has over life outcomes, either internally or externally (Kovaleva et al., 2014). Although IELC offers a direct approach, the questionnaire is overly simplistic and lacks sensitivity in important areas. Consequently, there is less good-suited scale for examining the post-divorce crisis symptoms. Understanding the symptoms specific to a post-divorce crisis contributes to accurate treatment and intervention strategies and eases the differentiation between overlapping symptoms.

3.0 Methodology

This research adopted the Multi Research Method approach developed by Richie and Klein (2007). The analysis was performed in two stages. The first stage involved reviewing relevant literature to organize the major impacts of hoax news on society. The second stage used the Fuzzy Delphi Method (FDM) to gather expert consensus. Once the data was analyzed, a list of the major effects of hoax news was developed based on expert agreement.

3.1 Sampling procedure

In this analysis, purposeful sampling was utilized. This approach was ideal for obtaining expert consensus on pre-determined items. Purposeful sampling is considered the most appropriate strategy in the FDM (Hasson et al., 2000). A total of eight experts were selected, relying on their expertise as well as qualifications. Here, the experts who agreed to participate were outlined in Table 1.

Table 1. List of experts

Experts	Lists of expertise	Institution
1 Senior Lecturer	Counselling and Islamic Studies	Public university
6 Counsellor	Counselling and Islamic Studies	2 Jabatan Kebajikan Masyarakat (JKM), 1 Kementerian Pendidikan Malaysia (KPM), 2 Lembaga

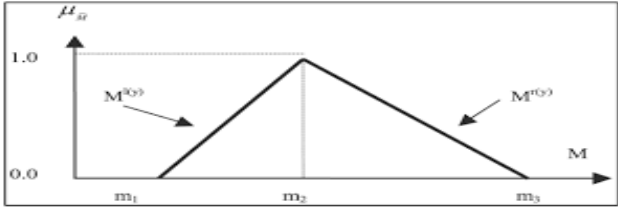
		Penduduk dan Pembangunan Keluarga Negara (LPPKN), 1 Kementerian Kesihatan Malaysia (KKM) 1 Islamic Religious Office
1 Islamic Religious Affairs Officer	Counselling and Islamic Studies	

3.2 Sampling criteria

Kaynak and Macauley (1984) emphasized that experts should either possessed in-depth knowledge of or represented the area being investigated. Therefore, this study gathered experts with a minimum of seven years of experience who demonstrated recognized expertise relevant to the focus of the study, guided by stringent selection standards.

3.3 Fuzzy Delphi Step

Table 2. Fuzzy Delphi step

Step	Formulation
1. Expert selection	Eight experts were gathered to evaluate the importance of the assessment parameters on the factors to be assessed, utilising linguistic variables as well as definitions of possible issues with the items.
2. Determining linguistic scale	This procedure involved translating linguistic variables into the counting of fuzzy triangles (triangular fuzzy numbers) and adding fuzzy numbers to the translation of linguistic variables (Hsieh et al., 2004). Note that the Triangular Fuzzy Number represented values m1, m2, and m3, written as: m1, m2, m3. M1 represented the smallest possible value, m2 represented a rational value, and m3 represented the largest possible value. The Triangular Fuzzy Number was utilized to generate a Fuzzy Scale for converting linguistic variables into fuzzy numbers.
<p>Figure 1. Illustration of Triangular Fuzzy Number (Source: Mustapha & Darusalam, 2017)</p> 	
3. The Determination of Linguistic Variables and Average Responses	The input obtained had been translated into Fuzzy scale values commonly referred to as the interpretation or recognition of each response (Benitez et al., 2007).
4. The determination of threshold value "d"	The threshold value played a key role in assessing the level of agreement among experts (Thomaidis et al., 2006). The distances for each fuzzy integer m = (m1, m2, m3) and n = (m1, m2, m3) were calculated using the formula given below: $d(\bar{m}, \bar{n}) = \sqrt{\frac{1}{3} [(m1 - n1)^2 + (m2 - n2)^2 + (m3 - n3)^2]}$
5. Identify the alpha cut the aggregate level of fuzzy assessment	Upon achieving expert consensus, a corresponding fuzzy numerical value was allocated to each item (Mustapha & Darussalam, 2017). The methodology for computing and quantifying the fuzzy values were as follows: (1) $4 (m1 + 2m2 + m3)$ Amax
6. Defuzzification process	The procedure employed the formula $Amax = (1) / 4 (a1 + 2am + a3)$. Within this framework, three alternative computational expressions were utilized to derive the A value: i. $A = 1/3 * (m1 + m2 + m3)$, or ii. $A = 1/4 * (m1 + 2m2 + m3)$, or iii. $A = 1/6 * (m1 + 4m2 + m3)$. The α -cut threshold was determined as the median of the binary set {0, 1}, yielding $\alpha = (0 + 1) / 2 = 0.5$. Items yielding an A value below this α -cut threshold (i.e., < 0.5) were excluded from further consideration due to the absence of consensus among expert evaluations. This criterion aligned with the recommendation by Bojdanova (2006), who posited that the α -cut value must exceed 0.5. Similarly, Tang and Wu (2010) corroborated this threshold, asserting that the α -cut should be greater than 0.5 to ensure validity.

7. Ranking process

The ranking process was conducted by determining elements according to their defuzzification values, based on expert consensus, where the element with the highest value was considered the most significant for decision-making (Fortemps & Roubens, 1996).

3.4 Instrumentation

The Fuzzy Delphi research instrument was developed relying on existing related literature, utilising a 7-point scale. Note that the 7-point scale was chosen for its ability to provide more precise results (Chen et al., 2011). Hence, to expedite responses from professionals, the Fuzzy values in Table 4 were replaced with corresponding values on a 1–7 scale, as demonstrated below:

Table 3. Fuzzy scale

Item	Fuzzy number
Strongly disagree	(0.0, 0.0, 0.1)
Disagree	(0.0, 0.1, 0.3)
Somewhat disagree	(0.1, 0.3, 0.5)
Neutral	(0.3, 0.5, 0.7)
Somewhat agree	(0.5, 0.7, 0.9)
Agree	(0.7, 0.9, 1.0)
Strongly agree	(0.9, 1.0, 1.0)

3.5 The List of the Post-Divorce Crisis Symptoms

Researchers highlighted the critical features of post-divorce crisis symptoms in a literature review. Here, the FDM was used to assess the validity and agreement among the experts to decide the inclusion of these symptoms.

Table 4. List of Post-Divorce Crisis Symptoms

	Early item rank	Hoax news impact
The impact of hoax news	IHN1	Physical symptoms
	IHN2	Emotional symptoms
	IHN3	Behavioural symptoms
	IHN4	Cognitive symptoms

4.0 Findings

This section presented experts' consensus on the key impacts of hoax news. A set of Fuzzy Delphi questions was distributed to seven experts in significant fields, with the findings relying on their responses. The results were outlined below:

Table 5. The findings of physical symptoms

Results	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Expert 1	0.01	0.05	0.02	0.03	0.06	0.12	0.11	0.04	0.07	0.03
Expert 2	0.10	0.16	0.09	0.07	0.18	0.10	0	0.04	0.04	0.07
Expert 3	0.36	0.05	0.02	0.03	0.06	0.10	0	0.07	0.15	0.03
Expert 4	0.10	0.16	0.15	0.13	0.06	0.10	0	0.12	0.04	0.13
Expert 5	0.01	0.35	0.09	0.07	0.33	0.10	0.11	0.07	0.30	0.07
Expert 6	0.10	0.29	0.36	0.38	0.28	0.41	0.11	0.38	0.07	0.38
Expert 7	0.01	0.05	0.02	0.07	0.06	0	0	0.12	0.04	0.07
Expert 8	0.10	0.16	0.09	0.07	0.18	0.10	0.11	0.07	0.15	0.07

Table 6. Statistics of physical symptoms

Statistics	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Value of the item	0.10	0.16	0.10	0.11	0.15	0.13	0.05	0.11	0.11	0.11
Value of the construct										
Item < 0.2	7	6	7	7	6	7	8	7	7	7
% of item < 0.2	87%	75%	87%	87%	75%	87%	100%	87%	87%	87%
Average of % consensus										85
Defuzzification	0.72	0.61	0.73	0.76	0.58	0.71	0.7	0.77	0.62	0.76
Ranking	4	8	3	2	9	5	6	1	7	2
Status	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept

Table 7. The analysis result of emotional symptoms

Results	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Expert 1	0.20	0.23	0.02	0	0.08	0.01	0.02	0.01	0.04	0.02
Expert 2	0.02	0.10	0.09	0.11	0.02	0.10	0.13	0.01	0.07	0.08
Expert 3	0.02	0.00	0.13	0	0.02	0.01	0.02	0.01	0.07	0.02
Expert 4	0.13	0.16	0.15	0.17	0.20	0.15	0.13	0.15	0.12	0.14

Expert 5	0.13	0.16	0.15	0	0.02	0.01	0.20	0.10	0.07	0.08
Expert 6	0.38	0.41	0.42	0.40	0.37	0.41	0.38	0.41	0.44	0.43
Expert 7	0.13	0.10	0.09	0	0.14	0.10	0.13	0.10	0.07	0.08
Expert 8	0.13	0.10	0.09	0.11	0.02	0.10	0.13	0.10	0.07	0.08

Table 8. Statistics of emotional symptoms

Statistics	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Value of the item	0.14	0.16	0.14	0.10	0.11	0.11	0.14	0.11	0.12	0.12
Value of the construct										0.12
Item < 0.2	6	6	7	7	6	7	6	7	7	7
% of item < 0.2	75%	75%	87%	87%	75%	87%	75%	87%	87%	87%
Average of % consensus										82
Defuzzification	0.66	0.71	0.73	0.7	0.65	0.72	0.66	0.72	0.77	0.75
Ranking	7	5	3	6	8	4	7	4	1	2
Status	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept	Accept

Table 9. The analysis result of behavioural symptoms

Results	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Expert 1	0.05	0.04	0.09	0.09	0.05	0.05	0	0.19	0.17	0
Expert 2	0.05	0.04	0.09	0.09	0.05	0.16	0.2	0.03	0.05	0
Expert 3	0.05	0.04	0.09	0.02	0.05	0.16	0.10	0.19	0.05	0.11
Expert 4	0.23	0.10	0.09	0.09	0.10	0.16	0.10	0.07	0.17	0
Expert 5	0.17	0.10	0.09	0.09	0.05	0.23	0.12	0.20	0.23	0.17
Expert 6	0.34	0.41	0.42	0.42	0.41	0.23	0.29	0.20	0.23	0.40
Expert 7	0.05	0.04	0.02	0.02	0.05	0.23	0.23	0.20	0.17	0
Expert 8	0.05	0.04	0.02	0.09	0.05	0.16	0.22	0.19	0.28	0.11

Table 10. Statistics of behavioural symptoms

Statistics	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Value of the item	0.12	0.10	0.11	0.11	0.10	0.17	0.16	0.16	0.17	0.10
Value of the construct										0.13
Item < 0.2	6	7	7	7	7	5	4	5	5	7
% of item < 0.2	75%	87%	87%	87%	87%	62%	50%	62%	62%	87%
Average of % consensus										74
Defuzzification	0.6	0.82	0.73	0.73	0.81	0.41	0.51	0.36	0.4	0.7
Ranking	5	1	3	3	2	7	6	9	8	4
Status	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject	Reject

Table 11. The analysis result of cognitive symptoms

Results	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Expert 1	0.02	0	0.12	0.07	0.04	0.01	0.02	0.02	0.01	0.01
Expert 2	0.08	0.11	0.23	0.03	0.07	0.12	0.08	0.13	0.10	0.12
Expert 3	0.08	0.11	0	0.19	0.04	0.10	0.02	0.02	0.01	0.01
Expert 4	0.14	0.17	0.12	0.09	0.12	0.01	0.08	0.02	0.15	0.18
Expert 5	0.08	0.11	0.10	0.09	0.12	0.18	0.14	0.02	0.10	0.21
Expert 6	0.43	0.40	0.28	0.09	0.44	0.38	0.43	0.38	0.41	0.38
Expert 7	0.02	0	0.22	0.07	0.12	0.01	0.08	0.02	0.01	0.12
Expert 8	0.08	0.11	0.12	0.03	0.07	0.12	0.08	0.13	0.10	0.12

Table 12. Statistics of cognitive symptoms

Statistics	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Value of the item	0.12	0.12	0.15	0.08	0.13	0.12	0.12	0.09	0.11	0.15
Value of the construct										0.12
Item < 0.2	7	7	5	8	7	7	7	7	7	6
% of item < 0.2	87%	87%	62%	100%	87%	87%	87%	87%	87%	75%
Average of % consensus										84
Defuzzification	0.75	0.7	0.48	0.83	0.77	0.67	0.75	0.66	0.72	0.67
Ranking	3	5	8	1	2	6	3	7	4	6
Status	Accept	Accept	Reject	Accept	Accept	Accept	Accept	Accept	Accept	Accept

The bold threshold value exceeded the 0.2 threshold (> 0.2) (see table 5,6,7,8). The findings demonstrated strong consensus among experts on the psychological effects of hoax news across three main domains: physical, emotional, and cognitive symptoms. In the physical domain, all 10 items were accepted with an average consensus of 85%, highlighting symptoms such as fatigue, restlessness, and somatic stress responses as commonly associated with misinformation. The emotional domain showed high agreement (82%), with all items accepted, indicating that emotional distress such as fear, anxiety, and frustration was immediate and showed significant reactions to hoax exposure. The cognitive domain recorded 84% consensus, with 9 out of 10 items accepted, suggesting that confusion, overthinking, and impaired decision-making were widely recognized as consequences of false or misleading information. The strong defuzzification values across these domains affirmed the reliability of these symptoms as core indicators of psychological strain linked

to hoax news. In contrast, the behavioral domain presented lower consensus (74%), and none of the items were accepted despite high defuzzification scores. This inconsistency suggested that behavioral responses such as avoidance, aggression, or compulsive checking are less uniformly recognized by experts.

Table 13. The new post-divorce symptom rank

	Early item rank	New item rank	Hoax news impact
	IHN1	IHN1	Emotional symptoms
The impact of hoax news	IHN2	IHN3	Physical symptoms
	IHN3	1HN4	Cognitive symptoms
	IHN4	IHN3	Behavioural symptoms

5.0 Discussion

The analysis showed strong expert consensus on most items (scores ranging from 6 to 7), supporting their relevance to the post-divorce crisis symptoms scale. Defuzzification results were generally favorable, with most items scoring above 0.5. However, all items under the behavioral dimension were rejected due to failing to meet the threshold, particularly Items 6 to 9, which had both low defuzzification and consensus scores. In the cognitive dimension, only one item (Perceived as if there was no reason to live) was excluded. Variations in expert judgment may be attributed to differing sociocultural, contextual, and personal interpretations, especially in an Asian context where humility and emotional restraint are culturally emphasized (Chen et al., 2012). Subjectivity in interpreting mental and behavioral symptoms further explains these discrepancies (Forbush et al., 2013). Former research revealed that differing cultural zones could have translated into unique psychological characteristics, therefore, particular symptoms may not stand out as important to certain experts and so on (Kitayama & Salvador, 2024). Each household has a unique upbringing, including the dimension of social norms that are widely shared or strictly undisclosed. In Asian contexts, emotional expression is usually suppressed (Liw et al., 2022), thus behavioural signs such as self-destructive actions or overt expression might be considered as too extreme. Behaviour is considered as a complex dimension that is rarely caused by a single factor. Therefore, such symptoms can be overlapping with multitude of factors for example biological, or social influences (Bandhu et al., 2024). Counsellors and mental health practitioners should be cautious when analyzing symptoms for example, the absence of overt behaviors can be translated differently due to the differing social context. Alternative approach to assessing these symptoms can be used to provide a more context-appropriate and efficient indication. Methodologically, limitations such as the use of convenience and homogenous samples restrict generalizability (Morgado et al., 2017), and the behavioral items may benefit from reformulation.

6.0 Conclusion and Recommendations

Therefore, it is important to develop a culturally sensitive scale particularly among experts with Asian backgrounds. Future studies should consider increasing sample size and diversity, possibly adopting the 10:1 participant-to-item ratio recommended by Nagy et al. (2014), to enhance the scale's robustness. The sample size may not represent the broader divorce population; therefore, it is recommended to integrate a standardized gender representation and incorporate a more diverse population.

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Paper Contribution to Related Field of Study

This paper contributes to the field of psychology by determining the likelihood of post-divorce crisis symptoms that could be seen among divorced individuals. The findings will be helpful for the use of counsellors and other related professions which would act as a toolbox for working with divorced individuals. Standardized guidelines can strengthen the quality and consistency of counselling services to these types of individuals thus providing a stable resource of reference for future interventions and improvements

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