

□原著論文□

An analysis of the influence of earthquakes on women's quality of life: a case of the earthquakes in Nepal in 2015

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Abstract

Background: Women could be prone to get vulnerable by natural disasters like earthquake. Two massive earthquakes hit Nepal in April and May 2015. The quality of life (QOL) for women has worsened up after the earthquakes. This study aimed to analyze the influences of the earthquakes in Nepal on the QOL of women and to discuss the factors influencing on the QOL.

Method: This cross-sectional study analyzed the QOL of women 33 months after the 2015 earthquakes in Nepal. A hundred women aged 18 years or older from two areas, namely earthquakes severely hit area (hereinafter Area-1) and not affected area (hereinafter Area-2), were selected as the sample of this study. WHOQOL-BREF was the tool to gather the data. QOL was estimated and compared between and within the study groups, using factors influencing it such as age, marital status and educational status. Descriptive analysis, unpaired *t*-test and Pearson's chi-square test were performed to compare the study groups using SPSS software.

Result: All domains and overall QOL had significantly higher scores in Area-2 than in Area-1 ($p < 0.05$). Overall QOL and most of the domains had significantly higher scores by age groups, marital status and educational status in Area-2 than in Area-1 ($p < 0.05$). Within the area-2, overall QOL and most of the domains had similar scores. Within Area-1, women aged 35 years or older had significantly lower score in overall QOL, Physical and Psychological domains ($p < 0.05$) than women aged 34 years or younger. The illiterate women in Area-1 also had significantly lower score in overall QOL and Physical.

Discussion: This study indicated that the earthquakes in Nepal had an impact on women's QOL. Education and age could be important factor on influencing their QOL in the earthquake-traumatized areas. The formation and the implementation of various programs to improve the lower QOL of the women seem essential in earthquake-affected areas.

Keywords : earthquake, quality of life (QOL), WHOQOL-BREF, Hill low caste women, Nepal

I. Introduction

Earthquakes are one of the major natural catastrophic disasters that kill many living creatures, destroy houses and the infrastructure over a wide area, and displace thousands of people. It is well known that earthquakes greatly influence the quality of life (QOL) of the victims and create psychological distress, such as depression, somatization, and anxiety¹⁾. Research studies have documented that the QOL of the victims of an earthquake is lower than that of those who were not affected²⁾. The level of the effect varies based

on gender and the victim's age at the time of the earthquake³⁾.

Two massive earthquakes occurred in Nepal in April and May 2015, which left more than 8,622 dead, **resulted** in precarious situation for millions, and destroyed many houses. Nepal's government categorized women, people with lower socio-economic status, children, and the elderly as being more vulnerable than other groups⁴⁾. Among the survivors of earthquakes and other kinds of natural disasters, the health and social conditions of women are worse than those

受付日：2018年6月14日 受理日：2018年8月3日

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of men⁵).

Generally, women are vulnerable in terms of education, health, and participation in decision-making and this particularly occurs in developing countries⁶. More significantly, women with lower socio-economic status fall into the more exposed group subsequent to any kind of natural disaster, including an earthquake⁷. In Nepal, women classified as being at “socio-economic level 2”⁸), which is the so-called Hill low caste who are considered the weakest segment⁸), were affected greatly during and after the earthquake⁷. However, very few studies have analyzed how a natural disaster influences the QOL of these women who have lower socio-economic status. Therefore, this study aimed to analyze the influence of the earthquakes on the QOL of the Hill low caste women in Nepal and to discuss the factors influ-

encing their QOL.

II. Methods

This was a cross-sectional study that analyzed the QOL of Hill low caste women 33 months after the earthquakes in Nepal. The brief version of the World Health Organization Quality of Life Scale (WHOQOL-BREF), which is a questionnaire developed by the World Health Organization, was used to gather information on socio-demographic characteristics and QOL of the study participants. It contains 26 questions to provide a broad and comprehensive assessment of QOL⁹) (Table 1). The scores of the 26 questions across the four domains are measured on a scale of 4–20. A higher score indicates a higher QOL.

Table 1 Domains of the brief version of the World Health Organization Quality of Life Scale

Domain	Facets incorporated within domains
Physical	Pain and discomfort Sleep and rest Energy and fatigue Mobility Activities of daily living Dependence on medicinal substances and medical aids Work capacity
Psychological	Positive feelings Thinking, learning, memory and concentration Self-esteem Bodily image and appearance Negative feelings Spirituality / Religion / Personal beliefs
Social relationships	Personal relationships Social support Sexual activity
Environment	Freedom, physical safety and security Home environment Financial resources Health and social care: accessibility and quality Opportunities for acquiring new information and skills Participation in and opportunities for recreation / leisure activity Physical environment (pollution / noise / traffic / climate) Transport

1. Study setting

The government of Nepal has categorized all districts of Nepal into six categories following the 2015 earthquakes based on the level of impact of the earthquakes, which includes “severely hit” for seven districts, “crisis hit” for seven districts, “hit with heavy loss” for five districts, “hit” for six districts, “slightly affected” for six districts, and “not affected” for 44 districts⁴⁾. From these, two districts were selected as the study areas: namely, Dolakha District, which was severely hit by the earthquakes (hereinafter Area 1), and Bardiya District, which was not affected by the earthquakes (hereinafter Area 2). The Baiteshwor Rural Municipality of Dolakha District and Madhuban Municipality of Bardiya District were specifically selected for data collection based on the access to transportation and availability of the sample.

2. Study sample

Of the total sample of 100 Hill low caste women, 55 were recruited from Area 1 and 45 from Area 2, irrespective of their religion, marital status, income, political affiliation, and so on. The purposive sampling method was used to select the sample. The Hill low caste in both areas includes the Kami, Damai, Badi, and Gaine⁸⁾. Of these, only the Kami and Damai were selected for the sample because they were inhabitants of both areas. The data collection was conducted in February 2018 in Area 1 and Area 2, 33 months after the second earthquake. The Nepali version of the WHOQOL-BREF was used. Considering their literacy, the WHOQOL-BREF questions were completed through direct interviews.

3. Definition of the variables

The scores of the WHOQOL-BREF, which reflect four aspects of life (the physical, psychological, social, and environmental domains), and the overall QOL were calculated and analyzed as the dependent variables. Age, marital status, and educational status were the independent vari-

ables used for analyzing the QOL in both areas. Each independent variable was divided into two categories for the analysis as follows: age as 34 years or younger and 35 years or older on the basis of the mean age of both areas (Table 1), educational status as either illiterate or primary level and above, and marital status as either single or married.

4. Data analysis

The data were analyzed using IBM SPSS Statistics for Windows version 25 (IBM Corp, Armonk, NY, USA). Descriptive analysis was used to determine frequencies, percentages, and means with standard deviations. To compare the study groups, unpaired *t*-test and Pearson’s chi-square tests were performed. The level of significance was $p < 0.05$ for all analyses.

5. Ethical approval

The ethical approval was obtained from the International University of Health and Welfare Graduate School, Japan (approval number: 15-Ig-74) and from the Nepal Health Research Council (registration number: 405/2017). All the data were gathered with the prior informed consent of the participants.

III. Results

The differences between the two areas with respect to the demographic variables, including the mean age of 38.3 years in Area 1 and 39 years in Area 2 ($p > 0.05$) (Table 2), were not found to be significant. The scores for all domains and the overall assessment were significantly higher in Area 2 than in Area 1 ($p < 0.05$) (Table 3). The overall QOL and most of the domains had significantly higher scores in Area 2 than in Area 1 according to the age groups, marital status, and educational status ($p < 0.05$), except for the score of the women aged 35 and older in the social domain ($p = 0.073$) and the single women’ score in the physical domain ($p = 0.304$) (Table 4).

Table 2 Summary of the sample's characteristics in each area

	Area 1		Area 2		<i>p</i> value
Mean age (SD)	38.3 (13.4)		39 (12.7)		0.790
Age group (years) (<i>n</i> %)					
34 years or younger	22	40.00%	20	44.40%	0.654
35 years or older	33	60.00%	25	55.60%	
Education (<i>n</i> %)					
Illiterate	29	52.70%	26	57.80%	0.614
Primary and above	26	47.30%	19	42.20%	
Marital Status (<i>n</i> %)					
Single	5	9.10%	5	11.10%	0.738
Married	50	90.90%	40	88.90%	

Table 3 Comparison of the quality of life of women between the two areas

	Area 1 (<i>n</i> =55)	Area 2 (<i>n</i> =45)	<i>p</i> value
	Mean (SD)	Mean (SD)	
Overall QOL	10.4 (1.3)	12.4 (1.5)	0.000
Physical	11.0 (1.6)	12.9 (2.1)	0.000
Psychological	10.7 (1.2)	12.4 (1.7)	0.000
Social	10.9 (2.4)	12.4 (2.4)	0.002
Environmental	9.6 (1.9)	12.0 (1.6)	0.000

Within the areas, woman aged 35 and older had a significantly lower score for the overall QOL and the other domains, except for the social and environmental domains in Area 1 ($p < 0.05$), whereas the scores of both age groups in Area 2 were similar. There was no significant difference between the domain scores according to marital status within Area 1 ($p > 0.05$), whereas a lower score was found for the married women in the social domain in Area 2 ($p = 0.044$). The illiterate women in Area 1 reported a significantly lower score in the overall assessment ($p = 0.037$) and in the physical domain ($p = 0.036$); however, there was no significant difference between the domain scores of the illiterate and literate women in Area 2 ($p > 0.05$) (Table 5).

IV. Discussion

This study indicates that the earthquakes in Nepal adversely affected the victims' QOL. The women living in the earthquake-affected area (Area 1) scored lower for QOL

compared with the women living in the non-affected area (Area 2). Similar results have been seen in other studies; a lower QOL in the psychological and environmental domains has been observed in Northern China¹⁾ and in Turkey³⁾, and a lower QOL has been found in the psychological, social, and environmental domains in China¹⁰⁾. The lower scores can be considered to have various causes, including devastated housing, loss of grain, and other psychological effects occurring during and after the earthquakes^{11,12)}.

The illiterate women in the severely hit area had a lower QOL than the women who have primary education or above. Similar outcomes were seen in an existing study in Italy¹³⁾. Illiterate women and women with lower education tend to have poorer QOL due to poor management skills¹⁴⁾, and a more unstable personal and family life, than highly educated women¹⁵⁾. The Women's greater suffering caused by the earthquake could be the result of poor coping skills, a lower level of understanding, and the lack of empower-

Table 4 Comparison of the quality of life of women between the two areas by age group, education, and marital status

	34 years or younger			35 years or older		
	Area 1 (mean (SD), n=22)	Area 2 (mean (SD), n=20)	p value	Area 1 (mean (SD), n=33)	Area 2 (mean (SD), n=25)	p value
Overall QOL	10.9 (1.2)	12.8 (1.5)	0.000	10.1 (1.3)	12.1 (1.4)	0.000
Physical	11.8 (1.5)	13.3 (2.3)	0.017	10.5 (1.4)	12.6 (1.9)	0.000
Psychological	11.2 (1.3)	12.7 (1.7)	0.002	10.4 (1.0)	12.3 (1.6)	0.000
Social	11.1 (2.4)	13.1 (2.0)	0.007	10.7 (2.4)	11.9 (2.5)	0.073
Environmental	10.0 (1.8)	12.4 (1.6)	0.000	9.3 (1.9)	11.7 (1.5)	0.000
	Single			Married		
	Area 1 (mean (SD), n=5)	Area 2 (mean (SD), n=5)	p value	Area 1 (mean (SD), n=50)	Area 2 (mean (SD), n=40)	p value
Overall QOL	10.6 (0.7)	12.9 (1.6)	0.018	10.4 (1.3)	12.3 (1.5)	0.000
Physical	12.2 (1.4)	13.4 (1.8)	0.304	10.9 (1.5)	12.9 (2.0)	0.000
Psychological	11.5 (0.7)	13.5 (1.3)	0.016	10.6 (1.2)	12.3 (1.7)	0.000
Social	10.4 (3.3)	14.4 (1.7)	0.042	10.9 (2.3)	12.2 (2.3)	0.012
Environmental	10.0 (1.0)	13.2 (2.1)	0.018	9.5 (1.9)	11.9 (1.5)	0.000
	Illiterate			Primary and above		
	Area 1 (mean (SD), n=29)	Area 2 (mean (SD), n=26)	p value	Area 1 (mean (SD), n=26)	Area 2 (mean (SD), n=19)	p value
Overall QOL	10.0 (1.2)	12.1 (1.3)	0.000	10.8 (1.3)	12.7 (1.6)	0.000
Physical	10.6 (1.5)	12.9 (1.9)	0.000	11.5 (1.5)	12.9 (2.4)	0.016
Psychological	10.4 (0.8)	12.1 (1.6)	0.000	11.0 (1.4)	12.9 (1.7)	0.000
Social	10.4 (2.2)	12.0 (2.6)	0.019	11.4 (2.5)	13.0 (1.9)	0.021
Environmental	9.2 (1.7)	11.7 (1.2)	0.000	10.0 (1.9)	12.5 (2.0)	0.000

ment. However, another study in China has reported that higher education results in a lower QOL following an earthquake¹¹. The women's level of understanding and their social context may play a crucial role when dealing with a disastrous situation.

Age was significantly associated with a lower QOL following the earthquakes in the severely hit area in this study, which is consistent with the results of a study of earthquake victims in Italy¹⁶; this finding implies that people with higher age are affected more by earthquakes. Marital status was not significantly associated with a lower QOL in both the severely hit and non-affected areas in this study. A similar result was reported in a study in Italy¹³. This finding could be linked to the common ways in which women

tackle the disastrous situation. Most single women in Nepal live with their family, which led to the finding that there was little difference in QOL between the single and married women.

This study has several limitations. First, although it demonstrated the differences in the QOL of women in two districts in Nepal, it would be better to include more areas and districts in future studies. Second, this study selected one hundred women in two areas. It would be advantageous to have a larger sample population in further studies. Third, as we selected only age, marital status, and educational status as the variables of the QOL in this study, further detailed studies should include other factors, such as ethnicity, income, occupation, medical history, and physical function.

Table 5 Comparison of the quality of life of women by age group, education, and marital status within the same area

	Area 1			Area 2		
	34 years or younger (mean (SD), n=22)	35 years or older (mean (SD), n=33)	<i>p</i> value	34 years or younger (mean (SD), n=20)	35 years or older (mean (SD), n=25)	<i>p</i> value
Overall QOL	10.9 (1.2)	10.2 (1.3)	0.025	12.8 (1.5)	12.1 (1.4)	0.126
Physical	11.8 (1.5)	10.5 (1.4)	0.002	13.3 (2.3)	12.6 (1.9)	0.326
Psychological	11.2 (1.3)	10.7 (2.4)	0.018	12.7 (1.7)	12.3 (1.6)	0.427
Social	11.1 (2.4)	10.7 (2.4)	0.513	13.1 (2.0)	11.9 (2.5)	0.081
Environmental	10.0 (1.8)	9.3 (1.9)	0.150	12.4 (1.6)	11.7 (1.5)	0.152

	Area 1			Area 2		
	Single (mean (SD), n=5)	Married (mean (SD), n=50)	<i>p</i> value	Single (mean (SD), n=5)	Married (mean (SD), n=40)	<i>p</i> value
Overall QOL	10.6 (0.7)	10.4 (1.3)	0.653	12.9 (1.6)	12.3 (1.5)	0.432
Physical	12.2 (1.4)	10.9 (1.5)	0.063	13.4 (1.8)	12.9 (2.0)	0.606
Psychological	11.5 (0.7)	10.6 (1.2)	0.125	13.5 (1.3)	12.3 (1.7)	0.146
Social	10.4 (3.3)	10.9 (2.3)	0.654	14.4 (1.7)	12.2 (2.3)	0.044
Environmental	10.0 (1.0)	9.5 (1.9)	0.581	13.2 (2.1)	11.9 (1.5)	0.084

	Area 1			Area 2		
	Illiterate (mean (SD), n=29)	Primary and above (mean (SD), n=26)	<i>p</i> value	Illiterate (mean (SD), n=26)	Primary and above (mean (SD), n=19)	<i>p</i> value
Overall QOL	10.0 (1.2)	10.8 (1.3)	0.037	12.1 (1.3)	12.7 (1.6)	0.181
Physical	10.6 (1.5)	11.5 (1.5)	0.036	12.9 (1.9)	12.9 (2.4)	0.974
Psychological	10.4 (0.8)	11.0 (1.4)	0.051	12.1 (1.6)	12.9 (1.7)	0.136
Social	10.4 (2.2)	11.4 (2.5)	0.143	12.0 (2.6)	13.0 (1.9)	0.144
Environmental	9.2 (1.7)	10.0 (1.9)	0.127	11.7 (1.2)	12.5 (2.0)	0.081

V. Conclusion

This study indicates that the women’s QOL was adversely influenced by the earthquakes in Nepal. Education and age were important factors influencing their QOL in the area that was severely hit by the earthquakes; the women with a lower level of education and who were aged above 35 years showed a lower QOL. As an earthquake may result in the poor QOL of women, this study suggests the need to emphasize the formation and implementation of programs that enhance the QOL of women affected by earthquakes. Furthermore, women who have a lower level of education and higher age in areas that are severely hit by an earthquake

should be prioritized in order to improve their condition.

Competing interests

There are no significant competing financial, professional, or personal interests that might have influenced the work described in this manuscript in any form.

Funding information

There was no funding for this research.

Authors’ contributions

Design of the research: JK and TO. Data collection: JK.

Data analysis and interpretation: JK and TO. Writing the manuscript: JK.

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地震が女性の生活の質に与える影響に関する一考察： 2015年のネパール大地震におけるケーススタディ

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抄 録

はじめに：2015年のネパールでの大地震は生活の質（QOL）を悪化させたと考えられるが、未だ十分には分析されていない。本研究は、女性のQOLへの地震の影響を分析し、その要因について考察することを目的とする。
方法：地震の影響が大小の2地域の18歳以上の100人の女性に対して、WHOQOL-BREFを用いてQOLを推計し、*t*検定およびカイ二乗検定により解析した。

結果：地震の影響の大きい地域では女性の背景要因にかかわらずQOLが低く、特に年齢が高いあるいは教育水準の低い女性においてQOLが有意に低いと推計された（ $p < 0.05$ ）。

考察：本研究により、ネパールの震災が女性のQOLに影響を与え、また震災の影響が大きい地域では教育水準と年齢がQOLに影響を与える要因と示唆された。震災後は、女性の教育水準や年齢などを考慮したQOLの改善プログラムが必要である。

キーワード：地震, 生活の質, WHOQOL-BREF, 女性, ネパール