



The Roles and Responsibilities of Community-Based Organizations in Responding to Public Health Emergencies: A Systematic Review

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Received 2019 February 23; Revised 2019 March 27; Accepted 2019 April 03.

Abstract

Context: Alongside the re-emergence of public health emergencies, increasing displaced population in the world contributes to worsening the situation.

Evidence Acquisition: We reviewed the partnerships of community-based organizations (CBOs) with health systems to identify the roles and responsibilities of CBOs in public health emergencies. The research team searched articles in Web of Science, PubMed, Science Direct, Scopus, Wiley, Google Scholar, World Health Organization (WHO), and Centers for Disease Control and Prevention (CDC) websites. Two independent reviewers decided to include articles if they addressed the role of CBOs in the happened public health emergencies. STROBE and Case Study checklists were used to examine the quality of the studies.

Results: After reaching 542 articles, 34 of them met the eligibility criteria. Articles mostly focused on high-income countries and the epidemics as disasters. Primary health care, logistic services, and communication were the most participatory services. However, just 14% of articles in childcare and 3% in elderly care services showed a partnership with the health system. Also, the emergence of influenza pandemics in the years after 2010 was a starting point for increased participation of the CBOs in public health emergencies.

Conclusions: Health authorities should lead the CBOs' participation to provide childcare and elderly services in public health emergencies. Moreover, low-income countries should promote the responsibility of protecting communities by considering the supportive role of CBOs in public health emergencies based on all potential capabilities.

Keywords: Community-Based Organizations, Community Health Centers, Disasters, Emergencies, Partnerships, Public Health, Role, Support

1. Context

International policies as Sendai, Yokohama, and Hyogo encourage community engagement in managing risks and responding to emergencies in order to empower community-based organizations (CBOs) (1, 2). In fact, CBOs are non-profit organizations that represent a specific part of a larger community and targets meeting specific needs in that community (3, 4). In other words, CBOs serve as liaisons between health authorities and the community and increase communication with outreach clients (3, 5-8). In a disaster, CBOs can equip public health officials with information about vulnerable groups and how to meet their particular needs. Representatives of CBOs know information on required staff and supply that impact the effectiveness and feasibility of mitigation measures (9, 10).

In this study, a public health emergency is a threat of

an illness caused by bioterrorism, epidemic or pandemic, or (a) novel and highly fatal infectious agent or a biological toxin (11). During a public health emergency, whether caused by natural or intentional means, CBOs can offer community-based primary and critical health services for their clients (12, 13). To achieve this goal, Gagnon et al. recommended defining clear expectations of CBOs involvement through a partnership structure (14). Additionally, Acosta et al. and Glik et al. suggested establishing a partnership structure through the memorandum of understandings (MOUs) before disasters to clarify roles and responsibilities for CBOs (13, 15). However, a few studies have looked at the evidence of CBOs activities during happened public health emergencies and disasters. This could be due to the nature of top-down governmental instructions in public health emergencies. Thus CBOs may not be prepared expertly in these emergencies (16, 17).

Although international policies and formal agreements are necessary for directing partnerships with CBOs in disasters, involvement in disaster fields may reveal hidden gaps. Therefore, authorities need to recognize the roles that were experienced in a real situation to compare with expected results and find out gaps that need to be handled. The purpose of this study was to review experiences and interventions of CBOs during previously happened public health emergencies to determine to what extent CBOs have addressed their target populations in emergency situations.

2. Data Sources

We systematically reviewed published and in-press articles in the English language. The search included studies up to December 2018, obtained through databases, including Web of Science, PubMed, Science Direct, Scopus, Wiley, Google Scholar, SID, Iranmedex, World Health Organization (WHO), and Centers for Disease Control and Prevention (CDC) websites. Keywords in the search were: "Community", "NGOs", "Emergencies", "Public Health", "Biologic Hazard", "FBOs", "Community network", "Disease Outbreak", "Disasters", "Voluntary Health Agencies", "Community Participation" and "Health Care coalitions". We used the MeSH service in Medline to select search terms.

3. Study Selection

Studies focusing on the role and responsibilities of CBOs in the emergence of pandemics, and public health emergencies during disasters were included. Secondly, experienced role and responsibilities in a happened public health emergency were considered. Diverse role and responsibilities of CBOs were extracted based on the results of the previous studies. Then the research team merged overlappings and extracted a complete list of services from community-based organizations. Finally, we re-categorized them by service types in discussion meetings to the following 9 categories: Social services (SS), Primary health care (PHC), Childcare (CC), Eldercare (EC), Rehabilitation services (RS), Medical care (MC), Communication (C), Donation management (DM), and logistic services (LS). Target populations were clients served by CBOs in a public health emergency.

4. Data Extraction

Independent reviewers (FR and MK) used task separation method to screen abstracts and titles for eligibility. When both reviewers felt that the abstract or title was potentially useful, full copies of the article were retrieved and considered for eligibility. At both stages of selection, a kappa score was calculated. If discrepancies occurred between reviewers, the reasons were identified, and a final decision was made based on the third reviewer's (MRM) agreement.

5. Quality Assessment and Risk of Bias

The quality of the included cross-sectional studies was examined using the statement of strengthening the reporting of observational studies in epidemiology (STROBE), which was approved by the STROBE Initiative (an international collaboration of epidemiologists, methodologists, statisticians, researchers and journal editors with the aim to assist authors when writing up analytical observational studies) (18). It assigns 22 items to score based on yes/no/not applicable options in each observational study. Items related to the following sections included: title and abstract (item 1), the introduction (items 2 and 3), methods (items 4 - 12), results (items 13 - 17), and discussion sections (items 18 - 21) and other information (item 22 on funding). It contained 8 checkboxes for each case study. The guideline of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) consisting of a 27-item checklist was used to prepare scientific writing (19). Finally, the quality of qualitative studies was evaluated by COREQ checklist, which has 32-items checkbox for interviews and Tong et al. developed it (20). The COREQ checklist was designed in three main parts and eight subordinating sections as follows: (1) Research team and reflexivity (personal characteristics (5 items), relationship with participants (3 items)), (2) Study design (theoretical framework (1 items), participant selection (4 items), setting (3 items), data collection (7 items)), (3) Analysis and findings (data analysis (5 items), and reporting (4 items)).

6. Results

We identified a relatively large number of articles ($n = 653$) addressing topics related to the roles and responsibilities of community-based organizations and networks ($\kappa = 65\%$). Out of these articles, 542 were considered for full review ($\kappa = 0.88$). Thirty-four articles were included finally (Figure 1). The CBOs were active at international (10.2%), national (35.8%), and local (53.8%) levels. The CBOs could be formed for a short time with the specific objectives like Marine Resources for Future Generations (MRFFG) coalition and cholera/hepatitis B campaigns. However, for mega-disasters like war, national and international CBOs adopting all disaster approach and having a long organizational history participated more.

Table 1 shows that qualitative studies contributed to determining the roles of CBOs in three epidemics, one natural, and one man-made disasters.

Table 2 shows that cross-sectional studies explored the roles of CBOs in 11 epidemics. Also, Table 3 shows 14 studies searched on epidemics, one natural, and three on man-made disasters. Table 4 provides examples of evidence-based interventions during disasters.

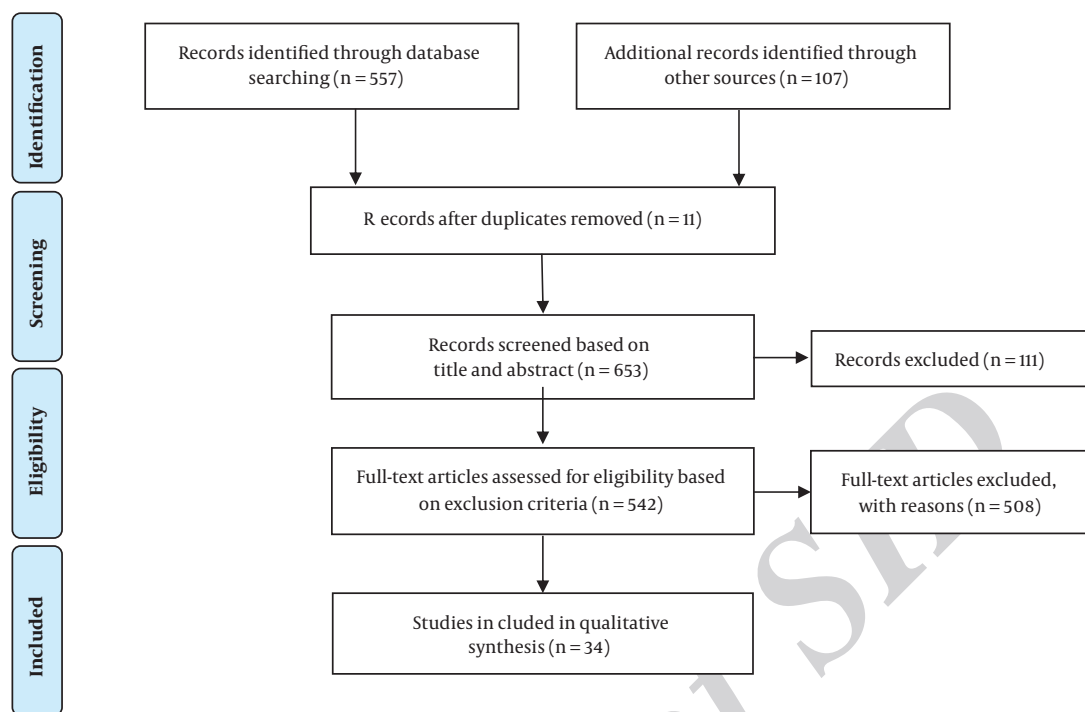


Figure 1. The PRISMA 2009 flow diagram

Table 1. An Overview of the Characteristics of Qualitative Studies

Author(s)	Year	Sample Size	Types of Emergency	Organization Type/Number	Location	Target Population	Type of Services	COREQ Score (0-32)
Salve et al. (21)	2018	68	Tuberculosis	NGOs/not mentioned	A southern state of India	Marginalized, vulnerable, TB affected communities	MC, C, LS	16
Heyerdahl et al. (22)	2018	313	A cholera outbreak	NGOs (MSF and AMP)/2	Chilwa lake, Africa	Fishing-dependent communities	PHC, LS	15
Cuervo et al. (23)	2017	7	Hurricane Sandy	A workgroup of CBOs (IWDRWG)/7	New York, New Jersey, U.S.	Latino immigrant day laborers	PHC, SS, LS	15
Charania et al. (24)	2012	27	Influenza A (H1N1)	A community-based advisory group/3	Ontario, Canada	Remote and isolated First Nations communities	SS, PHC, C, LS	20
Abdelmoneium (25)	2010	129	Displacement	An international NGO (HEALTH)/1	Khartoum, Sudan	Displaced Children	PHC, MC, CC, LS	21

Abbreviations: AMP, Agence de Médecine Préventive; C, communication; CBO, community-based organization; CC, childcare; DM, donation management; EC, eldercare; IWDRWG, Immigrant Worker Disaster Resilience Workgroup; LS, logistic services; MC, medical care; MSF, Médecins Sans Frontières; NGO, non-governmental organization; PHC, primary health care; RS, rehabilitation services; SS, social services.

7. Discussion

This study showed that the most identified articles had focused on high-income countries (about 52% in the U.S, Canada, Hong Kong, Korea, and New Zealand) and the epidemics as disasters (about 82%). Epidemics after natural disasters and human-made disasters were studied in 2 and five articles, respectively.

This systematic review demonstrated PHC (82%), logistic services (76%), communication and medical care (47%) as the most participatory services in CBOs/Networks (Tables 1 - 3). This study showed that focus on elders (3%), and children (14%) were not adequate. As these are the most vulnerable target groups, research on them is expected to be higher than this amount. Recently, the role of

Table 2. An Overview of the Characteristics of Cross-Sectional Studies

Author(s)	Year	Sample Size	Types of Emergency	Organization Type/Number	Location	Target Population	Type of Services	STROBE Score (0 -22)
Benwic et al. (26)	2018	399	E. coli	NGO/1	Villages in Cambodia	Households practicing water treatment	PHC	17
Colavita et al. (27)	2017	210	Ebola virus	NGO (EMR)/1	Sierra Leone	EBOV patients, hospitalized at the EMR ETC*	LS	17.33
Biava et al. (28)	2017	87	Ebola virus	NGO (EMR)/1	Sierra Leone	EBOV patients, hospitalized at the EMR ETC*	MC,LS	19
Das et al. (29)	2017	121	Malaria	NGOs/3	Odisha state, India	Rural population	PHC, C, RS, MC, CC, LS	18.22
Shaikh et al. (30)	2016	268	AIDS, Tuberculosis, and Malaria	CBOs/186	Six states, India	South Asian subgroup of the transgender community and hijra persons	SS, PHC, RS, C	19.05
Gist et al. (31)	2016	31	Avian influenza	A national community-based groups (MRC)/1	New York, U.S.	Patients potentially exposed to avian influenza	MC, LS	15.19
Mccabe et al. (32)	2014	56	Public Health Emergency	FBOs/10	Maryland, Illinois, and Iowa, U.S.	Adults recruited by FBO representing Christian faiths	SS, RS, PHC, LS	14.55
McCabe et al. (33)	2012	72	Public Health Emergency	FBOs/3	Baltimore, U.S.	Leaders of Christian, Jewish and Muslims FBOs	SS, PHC, RS, LS	14.16
Drobnik et al. (34)	2011	503	Hepatitis C virus (HCV)	CBOs/1	New York, U.S.	Populations at high risk for HCV infection	PHC, SS, LS	16.35
Danforth et al. (35)	2010	3	Pandemic influenza A (H5N1)	Community & business organization/3	Pasco County, FL, U.S.A	All community	PHC, C, EC, SS, CC, RS, LS	13.19
Chen et al. (36)	2002	44	Syphilis	CBOs/3	Los Angeles, U.S	Bathhouses, Sex clubs, Bars care facilities, Community health centers, Gay and lesbian center, Colleges, Adult schools Drug treatment facilities, Parks, Motels, Street-based sites, Mobile van	C, PHC, MC	14.85

Abbreviations: C, communication; CBO community-based organization; CC, childcare; DM, donation management; EC, eldercare; EMR, Emergency Onlus NGO; ETC, Ebola Treatment Center; FBO, faith-based organization; HCV, hepatitis C virus; LS, logistic services; MC, medical care; MRC, Medical Reserve Corps; NGO, non-governmental organization; PHC, primary health care; RS, rehabilitation services; SS, social services.

CBOs appeared to be more critical in the years after 2010. In other words, of the 390 CBOs in the articles, 98% have been involved in public health emergencies since 2010. Community-based organizations have participated mostly in 2010 (34%) in responding to pandemic influenza.

The CBOs were active more in high-income countries during public health emergencies. Although it is expected to have CBOs more active in low-income countries, a study by Wilson et al. showed the same results (35). There might be slow progress in participatory activities of CBOs in low-income countries due to lack of “cultural technologies” (55-57). This concept demonstrates understanding the responsibility for protecting a community in disasters. Therefore, “cultural technologies” would lead to more participation of all sectors of a community more efficiently and effectively (58, 59).

This review also revealed that childcare had not received enough attention. Inadequate services may stem from the specialized nature of childcare services. However, the CBOs can provide rehabilitation services such as

mental health, nutrition, and other special health needs of children (32, 54, 60). Acosta et al. also showed that childcare and eldercare were the least participatory services after Hurricane Sandy (13). The CBOs should enhance their emergency’s capabilities for children as one of the most vulnerable groups in public health emergencies.

The review showed that the lowest offered services were related to eldercare. Since elder services are much costlier than others, service providers often ignore this vulnerable group at the time of disasters and emergencies (61). The scarce resource in Hurricane Sandy and hard to reach services in Canterbury earthquakes for elders limited their access to care (13, 62). Furthermore, although CBOs are essential partners of a health system, they are not used efficiently. Several barriers were lack of awareness of their resources, the challenge of reimbursement, and the lack of coordination with the health system (61). Therefore, research on the challenges of using the CBOs’ capabilities in elder services during disasters should be explored more in the future.

Table 3. An Overview of Characteristics of Case Studies

Author(s)	Year	Sample Size	Types of Emergency	Organization Type/Number	Location	Target Population	Type of Services	STROBE Score (0-22)
Albahari et al. (37)	2017	1	Flood	The spontaneous volunteer group (Nafeer)/1	Khartoum, Sudan	All community	PHC, C, RS, DM, LS	13.99
Santibanez et al. (38)	2017	1	Zika virus	FBOs/not mentioned	U.S.	Community faith leaders	SS, C, PHC, LS	9.50
Colavita et al. (39)	2016	1	Ebola virus	NGO (EMR)/1	Sierra Leone	EBOV patients, hospitalized at the EMR ETC	C,PHC,MC,LS	13.60
Kilianski et al. (40)	2014	1	Anthrax bioterrorism	A national community-based groups (MRC)/1	Cook, U.S.	All community	SS, PHC, MC, LS	14.66
Conley et al. (41)	2014	1	Public Health Emergency	A nonprofit entity/1	Carolina, U.S.	State and local health department	SS	17.91
Cohen et al. (42)	2013	1	Hepatitis B virus (HBV)	Coalitions/ not mentioned	U.S.	Asian American, Native Hawaiian, and Other Pacific Islander	SS, PHC, C, RS, MC, DM, LS	51.5
Mills et al. (43)	2013	1	Meningococcal serogroup C	Community outreach campaigns/3	Northland, New Zealand	Child and youth population aged 12 months to <20 years	PHC, CC, LS	19.65
Mazzeo et al. (44)	2013	1	Cholera	A Campaign/1	Borgne, Haiti, U.S.	Hard to reach the rural population	PHC, MC, LS	17.88
Lawrenz et al. (45)	2013	1	Pandemic influenza	Education-community coalition/1	Wisconsin, U.S.A	"At-risk population," including the homeless, medically uninsured, and individuals who qualified for services at the organizations of the coalition (i.e., food pantry)	PHC, C, MC, DM, LS	16.52
Murphy (46)	2012	1	Dengue, malaria, Influenza A (H1N1)	CBO/1	Huaquillas, Ecuador	Las Mercedes community	C, PHC, MC, DM, LS	15.19
O'Hanlon et al. (47)	2011	1	Conflict	An international community-based groups (MRC)/1	Kosovo	Kosovar primary healthcare doctors,	PHC	18.26
Bailey et al. (48)	2011	1	Hepatitis B virus (HBV)	A campaign/1	San Francisco, U.S.	Asian/Pacific Islanders	PHC, C, MC, DM, LS	20.45
Drake et al. (49)	2010	1	HPV	An international NPO PATH/1	India, Peru, Uganda, and Vietnam	young adolescent girls with the HPV	PHC	10.78
Judd (50)	2005	1	Contaminated seafood	MRFFG coalition/1	Washington, U.S.	Asian and Pacific Islander	C, PHC, DM	9.99
Goe et al. (51)	2005	1	Tuberculosis	A non-profit, humanitarian-based, Christian NGO (EBF)/1	Seoul, Korea	All community	PHC, MC, CC, LS	14.26
Lamunu et al. (52)	2004	1	Ebola virus	NGO hospital/1	Gulu, Uganda	All community	PHC, C, MC, LS	13.92
Lee et al. (53)	2004	1	SARS	A VO (UNITE)/1	Hong Kong	All community	C, PHC	8.29
Brennan et al. (54)	2001	1	Epidemic following the war	International NGOs (IRC & IMC)/2	Kosovo	Internally displaced population and refugees	MC, LS	15.19

Abbreviation: C, communication; CBO, community-based organization; CC, childcare; DM, donation management; EC, eldercare; FBO, faith-based organization; HPV, human papillomavirus; IMC, International medical corps; LS, logistic services; MC, medical care; MRC, Medical Reserve Corps; MRFFG, Marine Resources for Future Generations; NGO, non-governmental organization; NPO, non-profit organization; PHC, primary health care; RS, rehabilitation services; SARS, severe acute respiratory syndrome; SS, social services; VO, voluntary organization.

Table 4. Examples of the Nine Categories of the Roles and Responsibilities

Categories	Examples
Social services (SS)	Undertaking community mobilization activities for preventative and care-seeking behavior; Holding "Zika Action Days" at retail stores and shopping malls; Creating a disaster resilience workgroup for the immigrant worker; Addressing illegal harvesting issues from closed and contaminated beaches.
Primary health care (PHC)	Distribution of insecticide-treated nets; Use of diagnostic tests; Development of training curriculum for target group; Training volunteers in preparing hygiene messages; Communication skills; water chlorination techniques; Teaching people how to properly eliminate mosquito breeding sites; Assigning a local health team who provide prevention and education workshops; Establishing environmental sanitation campaigns; Victim decontamination; House-to-house visits to detect hazardous places; and organizing an OCV campaign.
Rehabilitation services (RS)	Supportive supervision of community health workers; Providing other NGOs with volunteers; facilitating outreach efforts at community health centers; Gay and lesbian centers; Medical and early intervention providers through community forums and meetings; Mental health and psychosocial counseling; Encouraging neighborhood solidarity and commitment to help each other.
Communication (C)	Sustaining health behaviors by providing information; Motivation and skills; Informing free testing, diagnostic, treatment, and reporting guidelines; Participating in media campaign; Distributing alert information about the outbreak and locations for testing or medical treatment; Use of community knowledge to establish the location of fixed- and mobile clinics; Coordinating aid distribution by the NGOs to avoid overlaps; Establishing preparedness relationships with local businesses, employers, schools, and other organizations.
Donation management (DM)	Providing access to low-cost prevention; Following-up care to uninsured patients; Collecting money through the creation of a Web site and e-mail solicitations; Public presentations at churches and universities; Fundraising events; and personal contacts.
Logistic services (LS)	Delivering food and non-food items (WASH) and shelter; Distributing condoms; prophylaxis; personal protective equipment; hygiene and pregnancy kits; and insect repellent; Providing mobile X-ray diagnostic equipment; A temporary field-screening laboratory; Darkroom; Water source; Latrines; Essential drugs and generator for screening patients; Providing an isolation unit; Screening sites; a point of distribution site; operating theatres; mass casualty decontamination tents; Fixed and mobile clinics (powered by generators and solar panels) to cover urban and rural localities; Disseminating free testing; Diagnostic, treatment, and reporting guidelines; Aiding; Providing cold chain for vaccination; Participating in development of field diagnostic tools for Ebola virus; and Establishing a sputum collection center.
Medical care (MC)	Triaging and registering patient during a disaster; Focusing on the prevention and early treatment of disease by home visits; Assigning a training team of local health promoters who assist the medical doctors; Medical consult; Reviewing the complicated patients; and Decision on the most appropriate drug.
Eldercare (EC)	Developing methods of nutrition delivery among older adults in the event of social distancing measures during a pandemic.
Childcare (CC)	Prioritizing net use by pregnant women and young children; School visits; Providing sufficient supplies of vaccines against measles, tuberculosis, polio, chicken pox, whooping cough, diphtheria, and tetanus for children.

Abbreviations: OPV, oral polio vaccine; WASH, water, sanitation, and hygiene.

We found that CBOs have been activated more since 2010. Studies showed that the influenza A pandemic (H1N1) in 2009 caused more partnerships of CBOs in public health emergency. The CBOs increased accessibility to vaccination, and their clinicians knew high-risk groups and treatment procedures (63, 64). However, health authorities should clear communication procedures with CBOs (65) as a major channel of information during H1N1 pandemic for the deprived community (66). Thus the experience of H1N1 pandemic showed that CDC was successful in applying community-based procedure during public health emergencies.

The results of this review can be useful for decision-makers and officials in the field of disaster management. In this regard, governments should give the opportunity for growth and development to CBOs. The results can apply mostly to low-income countries in which financial management is crucial to responding to emerging and re-emerging biological hazards.

7.1. Limitation and Strength

The main limitation of this review was the eligibility criteria. The first criterion focused on CBOs that participated in responding to public health emergencies. Secondly, there are a large number of CBOs/networks in the field of non-communicable diseases which were not eligible. We also may not have retrieved all relevant articles, as

several terms in the literature referred to CBOs. The primary strength of this review is the methods we used to review. All the authors should study the full texts of articles independently and find services provided and then code them.

7.2. Conclusions

Increasing the number of displaced people and refugee in current decades can cause future outbreaks. Thus the results showed that countries need to enhance the capabilities of CBOs in the field of childcare, eldercare, rehabilitation, donation management, and social services such as legal consultation. The significant point is that there is no need for all community-based organizations to work in all areas. However, for example, if an agency is working on environmental health, it should be aware of how to play a role in bio-environmental hazards. Finally, we proposed that licensure of CBOs need to depend on a defined role and responsibility for disaster situations.

Footnotes

Authors' Contribution: Conception and design of the work: Fatemeh Rezaei and Mohammad H Yarmohammadian; data collection: Fatemeh Rezaei; data analysis and interpretation: Mohammad R Maracy; drafting the article:

Fatemeh Rezaei and Mahmood Keyvanara; critical revision of the article: Mohammad R Maracy and Fatemeh Rezaei; final approval of the version to be published: Ali Ardalan.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approval: This research was approved by the Research Committee at Isfahan University of Medical Science with registration number: 396525.

Financial Disclosure: The authors have no financial interests related to the material in the manuscript.

Funding/Support: The authors declare that they received no funding/support.

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