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Effect of the jigsaw technique as a cooperative learning approach on motivation and job performance of community health workers: A quasi-experimental study

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Abstract:

BACKGROUND: In Iran, community health workers (CHWs) are native and are only employed in the health-care system. Therefore, the training and empowerment of these staff are essential. The present study was aimed to develop cooperative learning techniques in CHWs to improve both cognitive and noncognitive aspects such as accountability and other social skills in learners.

METHODOLOGY: This study employed a quasi-experimental pre- and post-test design with a control group that was conducted in Kangavar City, Iran, in 2019. Forty-four CHWs were selected using a two-stage cluster sampling, of whom 22 were randomly assigned to the experimental group where the jigsaw technique was applied and the rest to the control group where the lecture method was applied. The aim was to identify job performance and motivation among the CHWs after instruction and compare the two groups. Pre- and posttests were applied to the groups before and after an in-service training course using valid questionnaires. Data analysis was performed on both descriptive and inferential statistics such as mean and standard deviation, paired *t*-test, and covariance analysis with the confidence level of 95%.

RESULTS: The findings showed that the intervention significantly increased the mean score of motivation and performance in the experimental group. Covariance analysis with the removal of the pretest effect was also statistically significant ($P = 0.01$). Moreover, the MANCOVA test showed the jigsaw technique effect considering motivation and performance with a confidence level of 95%.

CONCLUSION: Given the well-known effect of cooperative learning techniques and since CHWs have multi roles and tasks, it is necessary to use such techniques so that they can be accountable for developing health indicators in local areas.

Keywords:

Community health worker, cooperative learning, jigsaw technique, job performance, lecture method, motivation

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Introduction

Efficient human resources can be considered the most critical asset of an organization, and training is the process that plays this central role.^[1] Learning is the basis of human understanding and behavior, and one's performance depends on what

they have learned.^[2] Dessler identified factors affecting employee performance in the following order: individual behavior, motivation, positive reinforcement, redesign, targeting, interpersonal communication and evaluation, learning, and training. Accordingly, education and enrichment could be useful in improving personal achievement and motivation. Motivation is

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the engine of one's movement.^[3,4] Therefore, it is essential to pay attention to the teaching methods that develop cooperative skills in addition to engaging cognition. Currently, there exist a large number of teaching and learning methods. Cooperative learning methods are based on the scientific and theoretical principles as well as on a variety of learning models that can be used in different contexts.^[5] Slavin introduced some of the most successful methods in 1991, including student group learning, competition team development, team and individual learning, team competition with the help of team reading and collaborative writing, subject sharing, learning together, and group research. The jigsaw technique is one of the cooperative learning methods, which was first designed by Aaron *et al.* in 1978 and modified by Slavin in 1986. Scholars (Johnson and Holubeck, 2002) have developed this teaching approach whose primary focus is on the positive effects of purposeful conflict resolution on the scientific success and social interactions of learners. This teaching technique is an evolved form of "learning through discussion," which was first introduced in 1938.^[6] In this technique, first, learners are divided into small groups of two or four. In the next step, they are assigned to activities on various issues that are divided into different sections. Finally, they learn by working collaboratively. The jigsaw technique consistently improves self-esteem, students' performance, and social skills through interactive and collaborative learning.^[5]

Health centers are one of the most interactive organizations, in which the speed of knowledge transfer and learning is extremely high. In addition to their primary purpose of promoting and ensuring the health, these centers also function as learning organizations, which continually interact with their work and social environment, create new knowledge, and integrate it into communication networks so that others can use these values.^[7] Therefore, health staff needs continuous professional development.

Community health workers (CHWs) are selected from communities. CHWs are called differently within and across countries. CHWs have many different roles and tasks and also implement numerous diverse programs. They not only perform various tasks in the health system such as preventive, curative, and interventional tasks but also act as an advocate for community development and social change. CHWs also function as a feasible link between formal health sectors and the community. They improve health service coverage and equity in impoverished areas.^[8] CHWs are trained to provide developmental/promotional tasks in all aspects of health needs and social mobilization. In Iran, a CHW (known as *behvarz*) performs multiple roles and activities, ranging from health promotion to social

resource mobilization and community development.^[9,10] To this end, they must have cognitive and non-cognitive abilities such as social skills, self-regulation, self-efficacy, and so on. In this regard, the training process of health-care staff should be designed according to the expectations and health needs of communities. Iranian CHWs are trained through preservice education and in-service training at the District Behvarz Training Center (DBTC) by the Iranian primary health-care system.^[11] In Iran, CHWs are native and are only employed in the health-care system. CHWs currently run about 73 health programs in centers for rural health services at primary health care level. Moreover, Iranian CHWs must act under the Ministry of Health standards, demonstrating the importance of empowering these health staff.^[2] Many studies showed that education in CHWs improved health indicators.^[2]

Today in Iran, the lecture method is the most prevalent teaching/learning strategy in medical education. Research findings have revealed that conventional teaching strategies, such as lectures, do not provide the basis for improving noncognitive abilities. On the other hand, the literature shows that cooperative learning strategies emphasize the involvement of students as well as the development of communication and social skills.^[12]

The purpose of this study was to introduce and apply new cooperative teaching/learning strategies, i.e., jigsaw technique, to improve in-service training and develop CHWs in Iran's Health System.

Methodology

The research employed a quasi-experimental pre- and post-test design with a control group.

The study was carried out in the rural area of Kangavar City, Iran, in 2019, after receiving ethics approval (IR.SBMU.SME.RCE.1397.016). Ethical considerations, including confidentiality of participants' information and consent to participate in the study, were respected.

Kangavar City has six rural districts, 46 centers for health services, and 53 CHWs. Each district and each health center in the city were considered as a cluster. Of the total 53 CHWs employed in the six rural districts of Kangavar City, 44 were included in the study. The remaining nine CHWs were excluded due to dissatisfaction and other reasons. From the population of CHWs under study, 22 were randomly assigned to the experimental group and received the jigsaw technique and the rest to the control group and received the lecture method [Figure 1].

First aid and occupational health courses were implemented and assessed using two teaching methods, i.e., jigsaw technique and the conventional lecture

method, under Iranian CHW in-service training courses, routinely held by the Iranian primary health-care system at DBTC. The courses were delivered in 8 weeks, with three 1-h sessions/week according to the common practice of DBTC. The control group was trained according to the conventional lecture method, while the experimental group was trained using the jigsaw technique. During the training period, the participants were divided into four small groups (two groups of five persons and two groups of six persons). Then, the scientific material was divided into many interesting sections. Each CHW in a group received a particular section of the scientific material and was required to learn the section well and explain it to other members of the group. In specialized groups, people carefully study, discuss, and exchange ideas to achieve mastery. In the present study, the key themes of the first aid and occupational health courses were assigned to the groups to be learned through self-study. After gathering their knowledge during meetings, they would be able to pass on their findings to and share their knowledge with the other groups.

The measurement tools were Paterson’s job performance questionnaire and the standard motivation questionnaire. The 15-item job performance questionnaire was developed by Paterson (1990) and validated in many studies. The items were rated on a 5-point Likert scale (strongly disagree = 1 to strongly agree = 5), with each participants score ranging from 15 to 75. Scores between 15 and 30 show poor performance, between 30 and 45 average performance, between 45 and 60 good performance, and over 60 excellent performance. The standard motivation questionnaire as the other tool in the present study has 25 items with a Cronbach’s alpha coefficient of 0.91, as obtained by Ghazanfari and Abedi (2009) In the questionnaire, each subject’s score ranges from 25 to 125, with scores between 25–50 showing poor motivation,

50–75 moderate motivation, 75–100 high motivation, and 100–125 excellent motivation.

Both the experimental and control groups answered two questions as a pretest before starting the training and received a posttest after the 8 weeks of training. The groups were also asked to answer both questionnaires.

Data were analyzed separately for each outcome, and also common variances were analyzed using the SPSS software v. 22) IBM Inc., Chicago, IL, USA (with the confidence level of 0.95%. Descriptive tests (mean, standard deviation and variance, data distribution tables, and frequency percentage) were used. A paired *t*-test and analysis of covariance were also used in the inferential statistics section.

Results

Of the 22 CHWs in the control group, 59% ($n = 13$) were female and 41% ($n = 9$) were male. However, 67% ($n = 14$) of participants in the experimental group were female, and the rest were male. The two groups were almost similar in terms of education level (diploma and associate’s degree), with 77% ($n = 17$) and 73% ($n = 16$) having a diploma in the experimental and control groups, respectively. Table 1 shows the mean scores and standard deviation of the CHWs’ job performance and motivation and also comparisons of the mean scores before and after the training in the experimental and control groups. The results of this study showed that job motivation scores of both groups were in the range of 25–50, indicating an unacceptable level. However, the posttest mean motivation score in the experimental group was significantly higher than that in the control group. Accordingly, the experimental group score ranged from 50 to 75, indicating a moderate level of utility. However, the control group’s posttest score showed an unacceptable motivation level [Table 1]. The pretest means job performance score was almost the same, in the range of 15–30, in the control and experimental groups, and indicating poor job performance. However, the

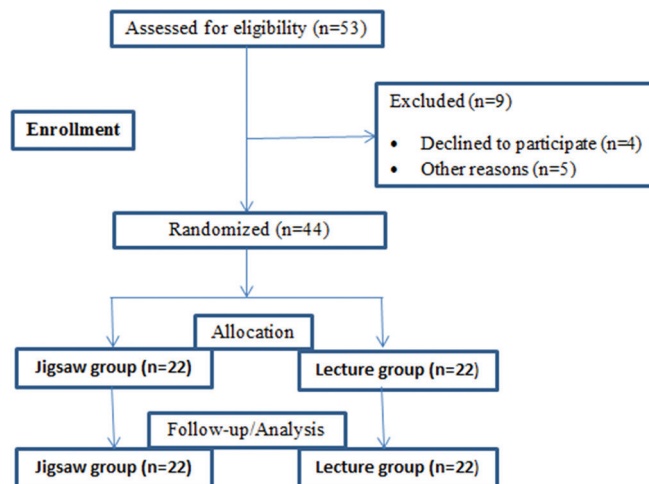


Figure 1: Consort diagram of the study

Table 1: The mean total motivation and job performance scores in the experimental and control groups before and after the intervention

Group	P	Pretest		Posttest	
		Jigsaw	Control	Jigsaw	Control
Motivation					
<i>n</i>		22	22	22	22
Mean	0.03	41.15	00.15	90.20	66.15
SD		02.2	62.2	831.0	46.2
Job performance					
<i>n</i>		22	22	22	22
Mean	0.02	71.16	19.16	75.20	90.16
SD		79.2	43.2	01.1	39.2

SD: Standard deviation

posttest mean performance score in the experimental group was significantly higher than that in the control group. In this regard, the experimental group score ranged from 45 to 60, indicating good performance, whereas the control group's posttest score indicated poor performance. This difference was significant in both outcomes [Table 1].

Table 2 shows the pretest effect on the motivation variable at $P < 0.01$ level. Therefore, with the elimination of the pretest effect, it was observed that F was higher than the F table between the groups (45 and 1). On the other hand, $P < 0.01$ indicated that there was a statistically significant difference between the experimental and control groups at $P < 0.01$ level, indicating the effectiveness of the intervention in increasing motivation. This confirms that jigsaw as a teaching technique is effective in increasing CHWs' motivation.

Analysis of covariance (Wilks' lambda test) considering two factors of motivation and performance improvement showed that the significance level of all the tests was <0.05 with the confidence level of 95%. That is, the jigsaw teaching technique led to the improvement of motivation and of the job performance of the health workers [Table 3].

Analysis of variance showed no statistically significant relationship ($P < 0.24$) between education level with the motivation and job performance scores ($P < 0.18$).

Discussion

The results of the present study showed that the jigsaw technique had a significant effect on the job performance and motivation scores in the experimental group, as

compared to the control group. Moreover, the results of covariance analysis with pretest effect removal showed a significant difference between the control and experimental groups. In line with this study, Araghiyan Moharad *et al.* showed that cooperative learning, especially jigsaw, was more effective than conventional methods in practical training. This technique, by engaging individuals, increases their motivation and desire for further learning and can have a more favorable impact on individual performance.^[3] In addition, Rehab Soliman Abd showed the jigsaw technique effectiveness on enhancing maternity nursing students' attitudes and achievements in comparison with students exposed to the lecture method at the Benha University (Egypt) in the academic year 2018–2019.^[13]

Sulisworo *et al.* also stated in a study that using active teaching and learning methods would reduce negative emotions and increase learners' motivation for improvement.^[14]

Similarly, Nirvani Goolsarran demonstrated the jigsaw technique's effectiveness on the improvement of collaborative learning and engagement in 96 residents at the Stony Brook University Hospital.^[15]

Moreover, another study by Buhr *et al.* showed that the jigsaw technique was more effective than other methods in teaching medical students about long-term and postacute care and increasing knowledge results.^[16] In this regard, the study showed that teachers could improve their teaching quality using cooperative techniques.^[16]

The findings of the present study are in line with those of many studies on the Iranian nursing students by

Table 2: The covariance test for the determination of the jigsaw technique effect by removing the pretest effect

Outcome	Sum of squared	Df	Mean of squared	F	Significant (P)	F ²	Test power
Motivation							
Pretest effect	325.569	1	369.200	289.978	<0.01	0.836	1
Between group	681.87 87.681	1	894.681	189.916	<0.01	0.612	1
Error	297.578 578.297	45	2.619				
Total	78954.0	48					
Job performance							
Pretest effect	478.10	1	478.103	131.780	<0.01	0.698	1
Between group	942.7	1	942.710	259.581	<0.01	0.820	1
Error	269.6	45	3.633				
Total	86298.0	4					

Df: Degree freedom

Table 3: The MANCOVA results of the Jigsaw impact on the improvement of motivation and job performance among the community health workers

Test	Amount	F	Degrees of freedom error	Degrees of freedom group	Significant	n ²
Wilks's lambda test	0.539	14.96	35	2	0.001	0.640

Javaheri and Sanaie *et al.* in Tehran and also by Seyed Bagheri in Urmia.^[17-19]

Based on these findings, it is clear that the jigsaw technique has a positive effect on improving performance and increasing motivation. The jigsaw technique, as a cooperative learning approach, emphasizes collaborative, independent, and automated learning. Engaging students, motivating them to solve challenging problems, and enhancing their cognitive, metacognitive, and motivational skills are among other goals of the jigsaw technique. Students exposed to the jigsaw technique are also better able to plan their learning than those exposed to the lecture method. They can also increase their self-awareness and become self-regulated by overseeing their classroom assignments and their classmates, providing them with high motivation for improvement.^[15] Since motivation is both a goal and a means, all curricula for which emotional activity is intended to have motivational goals. As a tool, motivation, such as mental fitness or input behaviors, is a prerequisite for learning, and its effect on learning is quite apparent.^[20] Rajabi also showed that need-based training with practical skill training and practical work was one of the essential strategies for motivating employees and changing their attitudes and behaviors.^[2] Many studies revealed that despite overtraining, learning could not be achieved at a desirable level. Thus, today, educational approaches have shifted toward appropriate teaching strategies such as interactive and cooperative approaches. Cooperative approaches are believed to strengthen noncognitive skills. These approaches are based on the theory and have many techniques for different contexts.^[11] Since CHWs have multiple roles and tasks, they encompass multi-competency domains such as cognitive and noncognitive skills. They should also engage with the community, and thus it is essential to improve communication and social skills in them.^[8] Implementing new methods help CHWs to become highly efficient and act effectively.^[21,22]

One limitation of the present study included biased information due to the use of self-reporting tools. Limited sample size was another limitation of the study, which was due to the fact that CHWs were native and thus limited in number in the region. Thus, further research is suggested to be conducted with larger sample size and in different areas to extend it to different communities. Further research is also recommended to apply other cooperative learning/teaching techniques such as group learning, team development, team competition, and cooperative integrated reading and writing. The cooperative method of learning is the most effective way of learning, which, in addition to improving knowledge, and helps learners acquire social skills such as self-management and problem-solving skills.

Conclusion

The present study showed that the jigsaw technique had a significant effect on the intended outcomes. Iranian CHWs are trained based on national plans (the Iranian primary health system) using conventional methods and should act according to community health needs. Therefore, the education system must make use of new and interactive methods. It has been shown that CHWs act to improve the quality of health services. Thus, it is necessary to use up-to-date and efficient methods, and hence that they can be accountable for the developing health indicators in local areas.

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Conflicts of interest

There are no conflicts of interest.

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