Factors Affecting Human Resources’ Productivity in a Military Health Organization

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Abstract
Aims: The goal of this study was to survey the factors influencing the productivity of human resources in a military health organization.
Methods: It was a cross-sectional descriptive-analytical study carried out in 2012 with 400 participants. A researcher-made questionnaire was used for data collection. For data analysis, SPSS 18.0 and Amos software were used.
Results: In the path analysis done, the following path coefficients were observed: mental, intellectual, and personal growth with $\beta=0.57$, organizational support with $\beta=0.49$, organizational culture with $\beta=0.45$, motivation with $\beta=0.33$, evaluation and performance feedback with $\beta=0.27$, ability with $\beta=0.20$, environment with $\beta=0.19$, individual health with $\beta=0.19$, training with $\beta=0.17$, and job clarity with $\beta=0.17$.
Conclusions: The results showed that for the assessment of the productivity of human resources in military health system, mental and intellectual growth, organizational support, and organizational culture need to be considered.

Keywords: Productivity, Human Resources, Military Health System

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Introduction

One of the major priorities for managers is the improvement of productivity and the offered health care services in order to meet people’s expectations and increase their satisfaction with the services they receive. It is possible for managers to pave the way for achieving organizational goals and improve the health care system by increasing the productivity in their organizations. As such, it can be said that the ultimate goal for organizations is achieving higher efficiency and productivity [1]. For doing so, having a systematic, contextualized, and applied perspective is necessary. In other words, intra-organizational factors such as working culture, personnel selection, motivation, mental hygiene, effective leadership, scientific evaluation, and similar factors cannot lead to improvement in productivity by themselves; these factors should be attended systematically and their interaction with each other should be examined [2].

The most important factor affecting productivity in any organization is human resources to the extent that this factor has been one of the main variables in determining productivity in any country. The most successful organizations and the developed countries are those that have paid enough attention to this factor [3].

The efficiency of human resources has been one the basic and major variables in achieving scientific, industrial, and economical advances in any country. Improving the quality of human resources is very necessary for development, and planning for the improvement of human resources is of utmost importance. Planning must be scientific, long term, and inclusive. It must be based on precise information from the past, present, and the possible future. Economical development is not possible without such a planning [4,5].

During the past decades, a sudden social and economical development has occurred in many countries which do not have a lot of natural resources. Today, such countries are among the developed countries while many other countries with a wealth of natural resources are still among developing countries. It seems that the main reason for such a development is the improvement in productivity in their human resources. Improving productivity in a country has considerable effects on the political, social, and economical conditions in that country. The important effects of such an improvement demonstrate themselves in the form of higher welfare, a lower inflation rate, and a higher employment rate in the society [6,7].

According to official reports, the useful work hour in Japan is 49-60 hours per week, 54-72 hours in South Korea, and 36-40 hours in US, but it is only 6-9 hours in Iran [8]. However, productivity in health care system is a new subject because in the past productivity was mostly assessed in the private sector, industries, and factories [9]. Evaluation of productivity, especially the element of efficiency, in health care system is not as easy as doing so in business or production organization. It is quite complicated. Services cannot be stored [10] and in a health care system it is not possible to change outputs into numbers and figures easily [11].

Today, in some of the health care organizations a fall in productivity is the main challenge, which could be due to inefficient use of human resources in that organization. Therefore, in case the variables affecting productivity in human resources are identified, it is possible to improve productivity through strengthening those variables [12].

The importance of productivity in health care systems is doubled because the human resources in such organizations, in addition to their routine responsibilities, are assigned
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...some especial missions for which they must be quite ready to face possible crises [13].

Productivity in human resources is affected by many variables. There have been numerous studies in this regard. Alvanii and Ahmadi [14] designed a model for that in which leadership, motivation, experience, creativity, education, competitiveness, and individual characteristics were among the most important factors affecting productivity. In another study the most important factors were identified as organizational culture, incentives, contextual conditions, personnel strengthening, and leadership style [15]. Bahadori et al. identified such variables as strength, clarity, performance, evaluation, motivation, and environment [13]. Health Electronic records as an organizational support variable was found to have a great effect in productivity [16]. In addition, the nursing productivity committee was observed to be able to lower costs and increase satisfaction [17].

Since health care organizations are different from other organizations in nature, investigating the effective factors in the productivity of human resources is one of the most important elements in the development of human resources in this sector [13,18]. The present study was an attempt to investigating the effective factors in the productivity of human resources in a military health organization using Structural Equation Modeling (SEM). The results of the present study can help policy makers, decision makers, and managers in developing human resources in their organizations.

Methods

The present study was a cross-sectional descriptive-analytic study done in 2010 in a military health organization. After the literature on the factors affecting productivity was reviewed and variables involved in productivity were extracted, a 10 component model was designed (Figure 1).

In order to validate the variables in the initial model, a questionnaire was designed and distributed among 30 experts in Human Sciences. The inclusion criteria for the experts were having a PhD in Human Science, being a faculty member of a university, and having experience of working in the field of human sciences. The items in the questionnaire had a five-point Likert scale ranging from ‘completely agree’ with 5 points to ‘completely disagree’ with 1 point. According to the researchers’ initial agreement, any variable with 70% agreement or above among the experts was kept in the model. In addition, the suggested variables by experts including education and leadership style were added to a second round of surveying. The results showed that the mean score of all variables was above 75% of the total score. As such, 12 components were identified as factors affecting productivity by experts (Figure 2).

After identifying the factors, the items assessing each variable were determined by the researchers and the resulted questionnaire was prepared for data collection. The
questionnaire had two sections; the first section comprised of 11 items on the personal and demographical information including age, gender, marital status, type of employment, work experience, management experience, field of study, degree, and scientific ranking. The second section included 48 items regarding the variables identified as affecting productivity in human resources. The items were assessed in a five point Likert scale as in the first section. The reliability of the questionnaire was checked using both combined and internal consistency (Cronbach alpha) procedures. As it is evident in Table 1, the minimum reliability estimates for each component is 0.70 which is quite acceptable.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Combined reliability</th>
<th>Cronbach alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Culture</td>
<td>0.88</td>
<td>0.89</td>
</tr>
<tr>
<td>2 Growth</td>
<td>0.91</td>
<td>0.91</td>
</tr>
<tr>
<td>3 Help</td>
<td>0.88</td>
<td>0.88</td>
</tr>
<tr>
<td>4 Motivation</td>
<td>0.89</td>
<td>0.87</td>
</tr>
<tr>
<td>5 Training</td>
<td>0.81</td>
<td>0.81</td>
</tr>
<tr>
<td>6 Health</td>
<td>0.78</td>
<td>0.77</td>
</tr>
<tr>
<td>7 Evaluation</td>
<td>0.84</td>
<td>0.83</td>
</tr>
<tr>
<td>8 Job clarity</td>
<td>0.81</td>
<td>0.81</td>
</tr>
<tr>
<td>9 Ability</td>
<td>0.78</td>
<td>0.77</td>
</tr>
<tr>
<td>10 Environment</td>
<td>0.70</td>
<td>0.70</td>
</tr>
</tbody>
</table>

The research population included 2,076 individuals. For data collection, stratified random sampling was used. The sample included 400 personnel in a military health organization in Tehran, Iran. As a general rule, the number of participants should be 4 or 5 times more than the number of items in the questionnaire. In order to check the suitability of sample size, the Bartlett’s and KMO tests were used. KMO was found to be larger than 0.7 and the Bartlett’s test was found significant, which confirm the sufficiency of the sample size.

For data analysis, both exploratory and confirmatory factor analyses were used. The exploratory factor analysis was used to identify the main variables in productivity, and the confirmatory factor analysis was run with AMOS for maximum likelihood. Moreover, in order to identify the loadings of each variable on the main factor, an exploratory factor analysis was performed using Principal Component Analysis with Varimax rotation.

### Results

The sample’s age ranged from 22 to 56 with a mean age of 39.87 and the highest aggregation in the ‘30-45’ group (66.3%) and the lowest aggregation in ‘below 30’ group (22.3%). From among the participants, 343 (93.3%) were married, and 27 (6.7%) were single.

36 participants (9%) had less than 5 years of experience, 31 (7.8%) had 5-10 years of experience, 157 (39.3%) had 11-20 years of experience, 162 (40.5%) had 21-30 years of experience, and 14 (3.5%) had more than 30 years of experience. From among these, 73 (18.3%) had no management experience, 99 (24.8%) had less than 5 years of experience in management, 88 (22%) had 5-10 years of experience in management, 101 (25.3%) had 11-20 years of management experience, and 39 (9.8%) had more than 20 years of experience in management. Regarding the field of study, the participants’ majors were divided into four general categories: Medicine, Paramedics, Basic Sciences, and Others, with 81 (20.3%) majoring in medical sciences, 94 (23.5%) in paramedics, 170 (42.5%) in basic sciences, and 55 (13.8%) in other majors.

Exploratory factor analysis was used to identify the major variables in productivity. In order to determine the loadings of each variable, another exploratory factor analysis was run using primary component analysis with Varimax rotation (See Table 2).
### Table 2. Total Variance Explained for each Variable

<table>
<thead>
<tr>
<th>Main Factors</th>
<th>items</th>
<th>Eigenvalues</th>
<th>% of variance</th>
<th>Cumulative%</th>
<th>Eigenvalues</th>
<th>% of variance</th>
<th>Cumulative%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td>9</td>
<td>15.792</td>
<td>32.900</td>
<td>32.900</td>
<td>4.749</td>
<td>9.893</td>
<td>9.893</td>
</tr>
<tr>
<td>Help</td>
<td>8</td>
<td>1.628</td>
<td>3.392</td>
<td>43.191</td>
<td>3.487</td>
<td>7.265</td>
<td>26.388</td>
</tr>
<tr>
<td>Motivation</td>
<td>5</td>
<td>1.524</td>
<td>3.175</td>
<td>46.366</td>
<td>3.269</td>
<td>6.810</td>
<td>33.198</td>
</tr>
<tr>
<td>Training</td>
<td>3</td>
<td>1.391</td>
<td>2.898</td>
<td>49.264</td>
<td>2.813</td>
<td>5.861</td>
<td>39.059</td>
</tr>
<tr>
<td>Health</td>
<td>3</td>
<td>1.250</td>
<td>2.603</td>
<td>51.867</td>
<td>2.390</td>
<td>4.980</td>
<td>44.039</td>
</tr>
<tr>
<td>Evaluation</td>
<td>4</td>
<td>1.222</td>
<td>2.574</td>
<td>54.414</td>
<td>2.352</td>
<td>4.901</td>
<td>48.939</td>
</tr>
<tr>
<td>Job clarity</td>
<td>2</td>
<td>1.168</td>
<td>2.433</td>
<td>56.846</td>
<td>2.211</td>
<td>4.606</td>
<td>53.545</td>
</tr>
<tr>
<td>Ability</td>
<td>3</td>
<td>1.107</td>
<td>2.306</td>
<td>59.152</td>
<td>2.117</td>
<td>4.410</td>
<td>57.955</td>
</tr>
<tr>
<td>Environment</td>
<td>2</td>
<td>1.002</td>
<td>2.087</td>
<td>61.239</td>
<td>1.576</td>
<td>3.284</td>
<td>61.239</td>
</tr>
</tbody>
</table>

**Figure 3.** The Model confirmed in confirmatory factor analysis
Extraction model: Principal Component Analysis
Culture, Growth, Help, Motivation, Training, Health, Evaluation, Job Clarity, Ability, and Environment
As a result of exploratory factor analysis, the two variables of Validity and Leadership Style were omitted from the model, and the ten main variables were identified: Culture, Growth, Help, Motivation, Training, Health, Evaluation, Job Clarity, Ability, and Environment. These 10 variables could explain about 61.24 percent of the variance in productivity. In order to determine the model fit and the accuracy of the loadings obtained in the previous stage, a confirmatory factor analysis was run using AMOS 20 with maximum likelihood. Fitting model was confirmed as presented in Figure 3.
As evident in Figure 3, the loading for all items except for item number 12, 28, 35, and 48 were above 0.5. As such, these four items were deleted after the confirmatory factor analysis and there remained 44 items assessing 10 variables involved in determining productivity in human resources in an organization.
In the case of Fit Indices, AGFI was found to be 2607.97 which is acceptable. RMR was 0.062 which is lower than 0.08 and shows fitness of the model. CFI was found to be 0.929 and IFI was 0.930 which are higher than 0.80 and indicate fitness of the model. However, p was found significant for the model which can be due to large sample size. This index is very sensitive to sample size.
The predictive ability of these ten factors was determined using path analysis. In the obtained model, based on their predictive ability, the studied variables were ranked from first (highest predictive ability) to tenth (the lowest predictive ability) as: Growth (9 items, \( \beta = 0.57 \)), Help (7 items, \( \beta = 0.49 \)), Culture (7 items, \( \beta = 0.45 \)), Motivation (5 items, \( \beta = 0.33 \)), Evaluation (4 items, \( \beta = 0.27 \)), Ability (3 items, \( \beta = 0.20 \)), Environment (3 items, \( \beta = 0.19 \)), Health (3 items, \( \beta = 0.19 \)), Training (2 items, \( \beta = 0.17 \)), Job clarity (2 items, \( \beta = 0.17 \)). The interaction among these ten variables and their effect on each other is demonstrated in Figure 4.

**Discussion**
The promotion of the efficiency in health care organizations will result in efficient use of all the financial and spiritual resources in those organizations and will help human resources prosper [19]. As such, the present study was an attempt to identify the variables affecting productivity in human resources’ productivity in military health organizations using Structural Equation Modeling. The obtained model included ten variables: Growth, Help, Culture, Motivation, Evaluation, Ability, Environment, Health, Training, and Job clarity. All the variables present in Hersi and Goldsmith’s ACHIEVE model but for validity, including ability,
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clarity, help, incentives, evaluation, and environment, were present in the present study. Instead, other variables such as Growth, Culture, Health, and Training were added [13]. Sharifzadeh et al. [20] concluded that Training, Incentives, and Culture can affect productivity in human resources, which does correspond the findings of the present study to a large extent. The effect of organizational culture on productivity has been emphasized in many studies [7, 23-25]. Many have found a close relationship between productivity in an organization and that organization’s culture [21,22].

Farshadfar [26] believes that training and incentives are among the most important factors affecting productivity in human resources. Some other studies also emphasize the effect of these two factors on productivity [27,28]. Other studies have also mentioned the effect of other productivity indices such as Ability, Clarity, Help, Incentives, Evaluation, Validity, and Environment, which were all included in the present study except for Validity which was omitted in the factor analysis [13, 29]. The omission of Validity could be due to the military nature of the studied organization in which decisions enjoy a high validity by nature. As such, this variable was not found important and was deleted from the model.

Allahverdi et al. [30] have pointed to the effect of the person-related variables, Culture, Organizational structure, Rewarding mechanism, Training programs, and the physical context. The person-related variables in that study can be compared with Health factor in this study. The Rewarding mechanism can be compared with Motivation, and the Physical context can be correlated with Help in the present study. The Leadership style was omitted from the model in the factor analysis. This could be due to the military atmosphere dominant in such organizations.

Another factor influencing the improvement of productivity in human resources is an individual’s health. A better health condition in nurses was shown to result in higher efficiency and better medical services [31]. The omission or reduction of stressful factors as part of organizational support was shown to be able to increase efficiency and quality of the offered services [32]. Workplace environment can also lead to an increase in productivity [33]. In a study done on nurses in Iran, it was observed that nurses with low efficiency were not satisfied with the quality of their working life. This indicates the importance of environment and organizational support in productivity of human resources [34].

In a study done in a medical sciences university, culture, incentives, environment, personnel strengthening, and leadership style ranked as the most important factors affecting productivity [35]. However, leadership style was omitted in the factor analysis in the present study, but some factors were included which were not present in that study.

The input-like perspective of the present study can be regarded as one of the limitations this study faced with. All the personnel working in the health care system were regarded as the research population and the variables affecting efficiency were checked from these personnel’s perspective. If the participants were divided into two groups with high and low efficiency and then the variables affecting productivity were checked from these groups’ perspective, a more precise image could be obtained.

Conclusion
The personnel’s performance has a critical role in any organization. As such, identifying variables affecting the performance and efficiency of human resources is of high importance. Determining the personnel selection criteria can help organizations reach
their goals and have an acceptable level of efficiency.

The finding of the present study showed that factors such as cognitive development, organizational support, organizational culture, motivation, evaluation, ability, environment, health, training, and job clarity were among the most influential factors affecting productivity of the human resources in any health care organization. Therefore, it seems necessary that managers and authorities pay enough attention to these variables and pave the way for improving the efficiency of the organizations. Since mental, intellectual, and personal growth was found to be the most important factor affecting productivity, it is suggested that managers pay more attention to this factor and make the best use of their human resources’ potential. They should also provide their personnel with organizational support through making the appropriate rules and principles needed for having a better productivity.

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