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## RESEARCH ARTICLE

### Association between the Nurses' Productivity and Quality of Work Life in Covid-19 Referral Hospital: Evidence from Iran

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#### Abstract:

#### Introduction:

Nurses' productivity is assumed as a determinant factor affecting patients' health promotion. The productivity of the nurses can be influenced by many factors.

#### Objectives:

This study aims to determine the association between the nurses' productivity and their quality of work life (QWL) in the south of Iran.

#### Methods & Materials:

This was a cross-sectional study conducted in 2021. 312 nurses by census were included. A researcher-made questionnaire was used to collect the data. Data were analysed by descriptive and analytical statistics, including Independent T-test, ANOVA, Pearson correlation, and multiple linear regression applying SPSS<sub>23</sub> at the significant level of 0.05.

#### Results:

According to the results, the mean score of productivity and QWL were 89.32±9.24 out of 125 and 91.63±7.01 out of 160, respectively. There was a positive significant statistical correlation between the nurses' productivity and QWL ( $r=0.621$ ,  $p<0.0001$ ). Based on the results of linear regression, the following dimensions of QWL were identified as the predictor of nurses' productivity respectively: problem-solving, willingness and motivation to work, engagement in decision making ( $p<0.0001$ ), employment promotion, communication, job security ( $p=0.001$ ), salary and payments, and employment proud and honour ( $p=0.002$ ).

#### Conclusion:

As the present results show, the studied nurses' productivity was evaluated at a good level. There was a positive correlation between the nurses' productivity and QWL and the dimensions of QWL were identified as the predictors of productivity. Planning for improvement and promotion of each of these dimensions according to the contextual determinants are recommended to improve the nurses' productivity to an excellent level.

**Keywords:** Productivity, Quality of work life, Nurses, Hospitals, Frontline Healthcare workers, CVI.

#### Article History

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## 1. INTRODUCTION

Nurses were among those Frontline Healthcare workers (FHCW) with the most significant roles and impacts during COVID-19 pandemic [1]. At the same time, they experienced a broad range of individual, organizational and extra-organiza-

tional challenges during the pandemic [2]. Such a spectrum at one side demonstrates the nurses' concerns and restrictions in their social relationships with their families, friends, and employers and, at the same time, illustrates economic, professional, and organizational challenges because of changes in their responsibilities and emerging expectations and definitions of the work [3]. Mental challenges such as stress and anxiety are among other problems that employed nurses

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face during the pandemic [4].

As nurses play a significant role in the resilience of healthcare systems, their productivity can be mentioned as a determinant factor of success during the pandemic [5].

The nurses' productivity is very important therefore health care organizations cannot succeed without efficient nursing staff [6]. The productivity of this occupational group is one of the biggest concerns of managers of health organizations who are trying to increase quality and reduce costs [7].

Nurses' productivity is complex both in concept and measurement and is defined as the ratio of output, like the patient care hours per patient day, to the input, such as paid salary and benefits [8]. Considering the available literature, there are many different factors affecting the healthcare workers as well as nurses' productivity and performance among them, management methods and leadership, organizational culture, organizational justice, professional attitude as well as work-related stress, and quality of work life (QWL) can be noted [9, 10].

QWL, as a multidimensional and complex concept, not only determines the relationship between the nurses' needs, emotions and expectations, and organizational performance but also defines the extent to which this relationship influences the nursing productivity and patient outcome in attaining the organizational and hospital goals [8]. QWL also refers to the conceptual and intellectual picture of a nurse and his/her satisfaction with the physical and mental environment of the workplace and the degree to which his/her needs are being satisfied using resources, activities, processes, and outcomes of the engagement among the nurse and the workplace such as a hospital [11]. In this regard, the high QWL is mentioned as a basic prerequisite of empowering healthcare workers (HCW) in the health systems so that increasing the productivity of the nurses mainly depends on the effective actions implemented and planned from their workplace with the aim of improving their safety, promoting their working conditions and QWL [12].

To the best of our knowledge, QWL is considered from dual sides. On one hand, the organizational facilities, reward plans, work fitness, and work design, including job enrichment and job development, attention to the nurse's role and position in the hospital, and appropriate support for their improvement have brilliant impacts on the nurses' QWL [13] and on the other hand, QWL can affect the nurses' behavioural reactions, their sense of organizational belonging and identity, job satisfaction, collaboration and engagement, and job performance as well as the employee turnover rate [14].

The results of some previous studies in Iran indicate a medium to low level of QWL. In this regard, the results of Shafipour *et al.*'s study indicated that 27.2% and 66.1% of nurses working in teaching hospitals affiliated with Mazandaran University of Medical Sciences had low to moderate QWL [15]. Also, the results of Mohammadi *et al.*'s study showed that only 4.9% of nurses working in hospitals in Ardabil province had a favorable QWL level [16].

Similarly, evidence shows the relationship between low QWL among nurses and their low level of job satisfaction, high

turnover intention, burnout, and low-performance level and quality of healthcare [17].

According to the evidence, nurses' health and QWL were affected negatively during COVID-19 pandemic due to the disorders in their life and workload. In other words, the balance between their personal life and their responsibilities during their work shifts was disturbed during the pandemic because of increase in workload, stress, and multitasking [18]. All of these can affect their productivity and quality of healthcare.

Despite the great importance of QWL and the impact it may have on nurses' productivity, this issue has not been explored as much as it should be. On the other hand, most of the productivity measurements have been used in terms of resources, which are adapted from the theories of industry and economics, and the consequences of nursing practice have not been carefully considered [19, 20]. So, this study was conducted to investigate the productivity of the nurses employed in COVID-19 referral hospitals and its association with their QWL in the south of Iran which has experienced seven waves of the outbreak till the beginning of the pandemic. Such a piece of evidence can shed light for health policymakers and hospital managers to seek local and applied solutions for improving the nurses' productivity and quality of healthcare services as well as increasing their QWL.

## 2. METHODS

### 2.1. Design and Setting

It was a cross-sectional study conducted in the largest COVID-19 referral hospital in the south of Iran from May to August 2021.

### 2.2. Study Population

The study population includes all the nurses who were employed at the largest COVID-19 referral hospital in the south of Iran during the mentioned period. 312 nurses were included to participate in a census method. The inclusion criteria were defined as employment as a nurse in one of the clinical units of the aforementioned hospital and a tendency to participate in the study. Those nurses who were employed in official wards or non-clinical units were excluded.

### 2.3. Data Collection

The data collection tool was a researcher-made three-part questionnaire. The first section of the questionnaire consisted of demographic information of the studied participants, such as age, working experience, gender, marital status, education level, type of employment, number of monthly work shifts, and number of patients supervised by a nurse in each work shift.

The second section of the questionnaire was adapted from Nayeri *et al.* [12]. It includes 25 questions for assessing the nurses' productivity in a 5-point Likert scale. Those questions with the positive concept were categorized from (5= Completely agreed, 4= Agreed, 3= No opinion related to the concept) to (2= Disagreed, 1= Completely disagreed). This category then became reversed for those questions with negative concepts. The general status of nurses' productivity

was ranked from Excellent category (101-125 points) to Good (76-100 points), Moderate (51-75 points), and Poor (25-50 points).  $\alpha$ 0.88 indicated the reliability of the questionnaire and face and content validity were confirmed by Nayeri *et al.* [12].

The third section of the questionnaire was adapted from Ravangard *et al.* [21] to assess the QWL of the studied nurses. It contains 32 questions in 8 dimensions as follows: engagement in decision-making, employment promotion, problem-solving, communication, willingness, and motivation to work, job security, salary and payments, employment pride and honour. Each of the dimensions contained 4 questions. A 5-point Likert scale was defined in a variety of very low (1), low (2), moderate (3), high (4), and very high (5). The overall status of the nurses' QWL was categorized as Excellent (129-160 points), Good (97-128 points), Moderate (65-96 points), and Poor (32-64 points). The validity and reliability of the questionnaire were confirmed ( $\alpha$ 0.87) by Ravangard *et al.* [21].

In order to confirm the validity and reliability of the whole study instrument, a full version containing all the mentioned triple parts was distributed among 15 experts in the field of healthcare management from different Iranian Medical Universities. Content Validity Index (CVI) and Content Validity Ratio (CVR) were assessed 0.84 and 0.88, respectively for the productivity questionnaire and CVI=0.83 and CVR=0.86 for the QWL questionnaire. Meanwhile, to confirm the reliability of the research instrument, 40 questionnaires were distributed among the nurses in a pilot study and Cronbach  $\alpha$  was achieved 0.87 for the productivity questionnaire and 0.89 for QWL questionnaire.

In order to collect the data, two of the researchers (SA and PN) were referred to the hospital during morning, afternoon, and night shifts and distributed the questionnaires in person. To increase the response rate, the questionnaires were collected at the end of each work shift.

#### 2.4. Data Analysis

Data were analysed using SPSS software version 23. Pearson correlation was applied to analyse the correlation between nurses' productivity and QWL and the correlation of these two main variables with the demographic variables of the nurses' age and work experience. For analysing the statistical difference among the main two variables of the study according to the nurses' gender and marital status, independent T-test was applied. ANOVA was similarly used to reveal the statistical difference among these variables based on the participants' education level, type of employment, monthly works shift, and the number of patients in each work shift. Finally, multiple linear regression was used to identify the simultaneous impacts of QWL's dimensions on the nurses' productivity. In the regression model, R-squared shows what percentage of the dependent variable changes are explained by the independent variables. The value of this index is between zero and one, and if it is more than 0.6, it shows that the independent variables have been able to explain the changes of the dependent variable to a large extent [22]. In addition, one of the presuppositions of multiple linear regression is the absence of collinearity or correlation between independent

variables. VIF index was used to check for non-alignment. According to statistical logic, if the VIF is greater than 10, then alignment is possible [23].

#### 2.5. Ethical Considerations

Nurses were thoroughly justified about the aims and necessity of the study before the invitation to complete the questionnaires. They were also assured that the participation was voluntary, all the data was kept anonymous, and confidentiality of the data was emphasized. The participants then filled out the questionnaires after signing the informed written consent forms. This study is approved by the ethical committee of Shiraz University of Medical Sciences with the number of IR.SUMS.REC.1399.466. Also, the reported experiments are in accordance with the Helsinki Declaration of 1975, as revised in 2013.

### 3. RESULTS

The average age of the studied nurses was  $31.32 \pm 7.18$  years and most of them (53.20%) were in the age group of under 30 years old. The average work experience of the participants was  $6.24 \pm 6.38$  and the majority of them (71.47%) have been working for less than 10 years. Other descriptive results show that 65.06% of the studied nurses were female and the rest of them were male. Most of the participants (88.46%) were categorized with bachelor's degrees (BSc). 58.34% were employed under Conscription law with the experience of 10 to 20 working shifts monthly (45.84%). For most of the studied nurses (83.98%), the number of patients supervised in each work shift was more than three. Table 1 describes the study population in detail.

Other descriptive results of the study demonstrated that the mean score of productivity was  $89.32 \pm 9.24$  out of 125 which indicated a good level of the nurses' productivity (Table 2).

Results of the nurses' QWL show that their mean score was  $91.63 \pm 7.01$  out of 160 that implied a moderate level. Among the QWL's dimensions, "communication" had the highest score ( $13.86 \pm 3.21$  out of 20), while the lowest score belonged to "job security" ( $9.16 \pm 2.11$  out of 20). Table 4 describes the scores of each dimension.

As Table 4 indicates, there was a positive significant correlation between the nurses' QWL and their productivity ( $r=0.621$ ,  $p<0.001$ ). Such a result emphasizes that their nurses' productivity increased, accompanied with the improvement in their QWL (Table 4).

Results of multiple linear regression for determining the simultaneous impact of different dimensions of the nurses' QWL and demographic variables on their productivity, showed that the significant variables of the model applying Enter method were as follows according to their importance: problem-solving, willingness and motivation to work, number of patients under the nurse's direct supervision, engagement in decision making, employment promotion, communication, job security salary and payments, employment proud and honour and number of works shift.

$\beta$  related to affecting variables that implies the priority of impact on the nurses' productivity reports in Table 3. At the

same time, R<sup>2</sup> Adjusted was 0.61 that means 61% of the variations in productivity score can be determined by the variables in the model. The Linear equation of the nurses' productivity score was determined by the variables of the model. This linear equation was achieved based on multiple linear regression as shown in (Table 3).

$$Y = 0.742 + 0.575X_1 + 0.558X_2 + 0.547X_3 + 0.529X_4 + 0.509X_5 + 0.479X_6 + 0.463X_7 + 0.431X_8 + 0.422X_9 + 0.396X_{10}$$

Y: Nurses' productivity score

X<sub>1,2,3,4,5,6,7,8,9,10</sub>: Variables affected on nurses' productivity

**Table 1. Demographic variables' distribution of the studied nurses.**

| Variable                                      | Category               | Frequency | %     |
|---|------------------------|-----------|-------|
| Age (year)                                    | <30                    | 166       | 53.20 |
|   | 30-40                  | 127       | 40.71 |
|   | >40                    | 19        | 6.09  |
| Work experience (year)                        | <10                    | 223       | 71.47 |
|   | 10-20                  | 76        | 24.36 |
|   | >20                    | 13        | 4.17  |
| Gender  | Male                   | 109       | 34.94 |
|   | Female                 | 203       | 65.06 |
| Marital status                                | Single                 | 69        | 22.12 |
|   | Married                | 243       | 77.88 |
| Education level                               | Bachelor of nursing    | 276       | 88.46 |
|   | Master of nursing      | 36        | 11.54 |
| Type of employment                            | Permanent              | 82        | 26.28 |
|   | Temporary to permanent | 7         | 2.24  |
|   | Contractual            | 19        | 6.09  |
|   | Conscription law       | 182       | 58.34 |
|   | Corporative            | 22        | 7.05  |
| Number of works shift                         | <10                    | 28        | 8.97  |
|   | 10-20                  | 143       | 45.84 |
|   | >20                    | 141       | 45.19 |
| Patients under the nurse's direct supervision | 2                      | 7         | 2.24  |
|   | 3                      | 43        | 13.78 |
|   | >3                     | 262       | 83.98 |

**Table 2. Mean score of productivity items from the studied nurses' perspective.**

| Productivity Items   | Completely Agree |       | Agree |       | No Difference |       | Disagree |       | Completely Disagree |       | Mean ± SD    |
|--|------------------|-------|-------|-------|---------------|-------|----------|-------|---------------------|-------|--------------|
|  | N                | %     | N     | %     | N             | %     | N        | %     | N                   | %     |              |
| My tasks are effective for patients' recovery during hospitalization**                                 | 57               | 18.27 | 199   | 63.79 | 43            | 13.78 | 9        | 2.88  | 4                   | 1.28  | 98.71±9.74   |
| With my provided health care all the necessary patient education is fulfilled for his/her discharge    | 36               | 11.54 | 159   | 50.96 | 41            | 13.14 | 49       | 15.71 | 27                  | 8.65  | 85.25±7.09   |
| My tasks don't have significant impacts in hospital's improvement                                      | 14               | 4.48  | 39    | 12.5  | 41            | 13.15 | 137      | 43.91 | 81                  | 25.96 | 93.58±8.83   |
| My tasks are really efficient for the organization comparing with my payments                          | 55               | 17.63 | 91    | 29.17 | 49            | 15.7  | 62       | 19.87 | 55                  | 17.63 | 77.32±7.59   |
| Regarding the available facilities I have applied all my capabilities to provide healthcare services** | 108              | 34.62 | 162   | 51.92 | 24            | 7.69  | 12       | 3.85  | 6                   | 1.92  | 103.36±10.24 |
| Patient healthcare is professionally considered in our hospital unit**                                 | 64               | 20.51 | 166   | 53.21 | 19            | 6.09  | 37       | 11.86 | 26                  | 8.33  | 91.42±9.41   |
| My tasks are so professional that unless an expert nurse nobody else couldn't participate**            | 46               | 14.74 | 187   | 59.94 | 33            | 10.58 | 29       | 9.29  | 17                  | 5.45  | 92.31±9.33   |
| I have some routine duties and the tasks are irrelevant to patient healthcare services                 | 32               | 10.26 | 59    | 18.91 | 47            | 15.06 | 102      | 32.69 | 72                  | 23.08 | 84.85±7.10   |
| My tasks as a team member are significant in patients' recovery**                                      | 84               | 26.92 | 197   | 63.14 | 16            | 5.13  | 9        | 2.89  | 6                   | 1.92  | 102.56±9.65  |

(Table 2) contd....

| Productivity Items   | Completely Agree    |       | Agree |       | No Difference |       | Disagree |       | Completely Disagree |       | Mean ± SD   |
|--|---------------------|-------|-------|-------|---------------|-------|----------|-------|---------------------|-------|-------------|
|  | N                   | %     | N     | %     | N             | %     | N        | %     | N                   | %     |             |
| I prefer choosing basic, accurate and proper methods even though the results will be challenging | 65                  | 20.83 | 193   | 61.86 | 19            | 6.09  | 23       | 7.37  | 12                  | 3.85  | 97.11±9.23  |
| I know the ethical considerations of my job and respect them**                                   | 74                  | 23.72 | 208   | 66.67 | 14            | 4.48  | 10       | 3.21  | 6                   | 1.92  | 101.76±9.41 |
| I can obey the obligations and have commitment towards regulations**                             | 64                  | 20.52 | 204   | 65.38 | 31            | 9.94  | 8        | 2.56  | 5                   | 1.6   | 100.16±9.29 |
| I respect the principals of equality in my profession  | 78                  | 25    | 194   | 62.18 | 19            | 6.09  | 14       | 4.49  | 7                   | 2.24  | 100.8±9.37  |
| I have the ability of choosing the best approach for healthcare provision                        | 68                  | 21.79 | 200   | 64.1  | 27            | 8.65  | 13       | 4.18  | 4                   | 1.28  | 100.24±9.86 |
| I assess the outcomes of my tasks  | 51                  | 16.35 | 164   | 52.56 | 30            | 9.62  | 43       | 13.78 | 24                  | 7.69  | 89.02±7.46  |
| I am responsive to my supervisor without any obligation  | 48                  | 15.38 | 184   | 58.97 | 34            | 10.9  | 31       | 9.94  | 15                  | 4.81  | 92.55±9.46  |
| I cover and fulfil my tasks and duties without any need to direct supervision or push            | 52                  | 16.67 | 217   | 69.55 | 21            | 6.73  | 15       | 4.81  | 7                   | 2.24  | 98.39±9.25  |
| I always keep on improving my professionalism and development                                    | 73                  | 23.39 | 176   | 56.41 | 31            | 9.94  | 19       | 6.09  | 13                  | 4.17  | 97.89±9.31  |
| I try to update my knowledge by routine studies**  | 56                  | 17.95 | 167   | 53.53 | 35            | 11.21 | 32       | 10.26 | 22                  | 7.05  | 91.27±9.41  |
| I have sufficient competencies in my work tasks  | 41                  | 13.14 | 169   | 54.17 | 27            | 8.66  | 46       | 14.74 | 29                  | 9.29  | 86.78±8.72  |
| I can manage the most tasks with the minimum possible time dedicated                             | 48                  | 15.38 | 197   | 63.14 | 34            | 10.9  | 19       | 6.09  | 14                  | 4.49  | 94.71±8.87  |
| I have such huge workload that difficultly can think to the quality                              | 59                  | 18.91 | 157   | 50.53 | 28            | 8.79  | 47       | 15.06 | 21                  | 6.74  | 60.09±6.59  |
| Irrelevant tasks in my unit prevent me to have an efficient clinical role                        | 26                  | 8.33  | 52    | 16.67 | 36            | 11.54 | 131      | 41.99 | 67                  | 21.47 | 87.90±8.81  |
| In my opinion, the quality of tasks is more important than timeliness                            | 64                  | 20.52 | 166   | 53.2  | 29            | 9.29  | 31       | 9.94  | 22                  | 7.05  | 92.55±9.11  |
| I have a serious sense of commitment towards my duties**   | 84                  | 26.92 | 205   | 65.71 | 14            | 4.49  | 6        | 1.92  | 3                   | 0.96  | 103.92±9.53 |
| <b>Total mean</b>  | <b>89.32 ± 9.24</b> |       |       |       |               |       |          |       |                     |       |             |

Note: \* Questions Reference: Dehghan Nayeri N, Salehi T, Asadinoghaby AA. Quality of work life and productivity of clinical nurses and their relationship with each other. Nurse Res. 2009;8(9):27-37.

\*\*Questions represent for the special factors connecting to the pandemic.

Table 3. The mean score of QWL and its dimensions from the studied nurses' viewpoints.

| Quality of Work Life               | Dimensions                    | Score Range | Mean ± SD |
|------------------------------------|-------------------------------|-------------|-----------|
|                                    | Engagement in decision making | 4-20        | 32-160    |
| Willingness and motivation to work | 12.37 ± 2.79                  |             |           |
| Employment proud and honour        | 13.78 ± 3.09                  |             |           |
| Communication                      | 13.86 ± 3.21                  |             |           |
| Employment promotion               | 10.72 ± 2.44                  |             |           |
| Job security                       | 9.16 ± 2.11                   |             |           |
| Salary and payments                | 11.26 ± 2.58                  |             |           |
| Problem solving                    | 10.14 ± 2.11                  |             |           |
| <b>Total</b>                       | <b>32-160</b>                 |             |           |

According to the present results, the mean score of QWL showed a significant statistical difference based on some of the demographic variables as follows: gender ( $p=0.01$ ), marital status ( $p=0.002$ ), education level ( $p=0.03$ ), and the number of work shifts monthly ( $p=0.04$ ). Post hoc tests show that the mean score of nurses' QWL among female nurses (92.77±7.04 out of 160) who were married (91.90±7.14 out of 160) with a bachelor's of education (93.42±7.19 out of 160) and with less than 10 works shift monthly (92.76±7.12 out of 160) were higher than other groups. At the same time, the mean score of

nurses' productivity increased with rising their work experience ( $p=0.04$ ). The mean score of nurses' productivity was also statistically different according to the number of work shifts per month ( $p=0.004$ ) and the number of patients under the nurses' supervision per work shift ( $p=0.001$ ). The mean score of productivity among female nurses (91.50±9.36 out of 125) was higher than males. Meanwhile, the mean score of productivity was higher among the following groups compared with the others: those nurses with less than 10 works shift per month (92.43±9.40 out of 125) and those nurses who had two patients under their supervision per work shift (91.51±9.34) (Table 6).

Table 4. Correlation between the nurses' productivity and QWL.

| QWL          | Dimensions                              | Productivity       |
|--------------|---|--------------------|
|              | Engagement in decision making           | $r=0.630, p<0.001$ |
|              | Willingness and motivation to work      | $r=0.634, p<0.001$ |
|              | Employment proud and honour             | $r=0.573, p=0.001$ |
|              | Communication                           | $r=0.615, p<0.001$ |
|              | Employment promotion                    | $r=0.625, p<0.001$ |
|              | Job security                            | $r=0.588, p=0.001$ |
|              | Salary and payments                     | $r=0.576, p=0.001$ |
|              | Problem solving                         | $r=0.641, p<0.001$ |
| <b>Total</b> | <b><math>r=0.621, p&lt;0.001</math></b> |                    |

Table 5. Variables affecting nurses' productivity applying multiple linear regression.

| Variables  | Unstandardized Coefficients |            | Standardized Coefficient $\beta$ | P-value |
|--|-----------------------------|------------|----------------------------------|---------|
|  | B                           | Std. Error |                                  |         |
| --- Constant Amount  | 0.724                       | 1.072      | -                                | 0.02    |
| X <sub>1</sub> Problem solving   | 0.575                       | 0.092      | 0.512                            | <0.001  |
| X <sub>2</sub> Willingness and motivation to work                      | 0.558                       | 0.089      | 0.486                            | <0.001  |
| X <sub>3</sub> Number of patients under the nurse's direct supervision | 0.547                       | 0.088      | 0.449                            | <0.001  |
| X <sub>4</sub> Engagement in decision making                           | 0.529                       | 0.078      | 0.436                            | 0.001   |
| X <sub>5</sub> Employment promotion                                    | 0.509                       | 0.072      | 0.365                            | 0.001   |
| X <sub>6</sub> Communication   | 0.479                       | 0.067      | 0.341                            | 0.001   |
| X <sub>7</sub> Job security  | 0.463                       | 0.063      | 0.309                            | 0.002   |
| X <sub>8</sub> Salary and payments                                     | 0.431                       | 0.059      | 0.294                            | 0.002   |
| X <sub>9</sub> Employment proud and honour                             | 0.422                       | 0.055      | 0.285                            | 0.002   |
| X <sub>10</sub> Number of works shift                                  | 0.396                       | 0.047      | 0.277                            | 0.003   |

Table 6. Relationship among demographic variables and the nurses' productivity and QWL.

| Variable               | Category               | QWL                      |         | Productivity             |         |
|------------------------|------------------------|--------------------------|---------|--------------------------|---------|
|                        |                        | Mean $\pm$ SD (From 160) | P-Value | Mean $\pm$ SD (From 125) | P-Value |
| Age (year)             | 30>                    | 90.84 $\pm$ 6.73         | 0.14    | 86.53 $\pm$ 8.64         | 0.11    |
|                        | 30-40                  | 91.58 $\pm$ 6.91         |         | 90.26 $\pm$ 9.29         |         |
|                        | 40<                    | 92.47 $\pm$ 7.12         |         | 91.17 $\pm$ 9.32         |         |
| Work experience (year) | 10>                    | 88.69 $\pm$ 6.22         | 0.06    | 88.61 $\pm$ 9.02         | 0.04    |
|                        | 10-20                  | 92.65 $\pm$ 7.09         |         | 89.22 $\pm$ 9.10         |         |
|                        | 20<                    | 93.55 $\pm$ 7.17         |         | 90.13 $\pm$ 9.30         |         |
| Gender                 | Male                   | 90.49 $\pm$ 6.93         | 0.01    | 88.14 $\pm$ 8.83         | 0.06    |
|                        | Female                 | 92.77 $\pm$ 7.04         |         | 90.50 $\pm$ 9.36         |         |
| Marital status         | Single                 | 91.36 $\pm$ 6.84         | 0.002   | 88.38 $\pm$ 8.54         | 0.19    |
|                        | Married                | 91.90 $\pm$ 7.14         |         | 90.26 $\pm$ 9.28         |         |
| Education level        | Bachelor of nursing    | 93.42 $\pm$ 7.19         | 0.03    | 91.14 $\pm$ 9.39         | 0.06    |
|                        | Master of nursing      | 89.84 $\pm$ 6.31         |         | 87.50 $\pm$ 8.74         |         |
| Type of employment     | Permanent              | 92.83 $\pm$ 7.01         | 0.15    | 90.62 $\pm$ 9.24         | 0.24    |
|                        | Temporary to permanent | 92.59 $\pm$ 7.01         |         | 90.31 $\pm$ 9.24         |         |
|                        | Contractual            | 91.45 $\pm$ 7.01         |         | 89.41 $\pm$ 9.24         |         |
|                        | Conscription law       | 91.66 $\pm$ 7.01         |         | 88.52 $\pm$ 9.24         |         |
|                        | Corporative            | 89.62 $\pm$ 7.01         |         | 87.74 $\pm$ 9.24         |         |

(Table 6) contd.....

| Variable                                      | Category | QWL                  |         | Productivity         |         |
|---|----------|----------------------|---------|----------------------|---------|
|   |          | Mean ± SD (From 160) | P-Value | Mean ± SD (From 125) | P-Value |
| Number of works shift                         | <10      | 92.76 ± 7.12         | 0.04    | 92.43 ± 9.40         | 0.004   |
|   | 10-20    | 92.41 ± 6.91         |         | 89.14 ± 9.09         |         |
|   | >20      | 89.72 ± 6.73         |         | 86.39 ± 8.27         |         |
| Patients under the nurse`s direct supervision | 2        | 92.55 ± 7.12         | 0.07    | 91.51 ± 9.34         | 0.001   |
|   | 3        | 91.97 ± 6.91         |         | 89.09 ± 8.87         |         |
|   | >3       | 90.37 ± 6.73         |         | 87.36 ± 8.65         |         |

4. DISCUSSION

Results of the present study indicate a good level of productivity among the studied nurses. Comparing this finding with those of the available literature demonstrates a wide range of differences. For instance, while Banidavoodi *et al.* [24], Farsi *et al.* [25] and GU *et al.* [26] have reported the employed nurses` productivity more than the average level, the results of Karimi *et al.* [5] and Doostmohammadi *et al.* [27] have indicated an average level of productivity and those of Carvalho *et al.* [28] and Saber *et al.* [29] implied a low level of productivity among the studied nurses. Such a variety can be justified by different management styles, characteristics of the studied nurses, geographical conditions, financial regulations, and the hospitals` policies.

Other results demonstrate an average level of the studied nurses' QWL. Similar to the above, a variety of results are obvious in the literature. According to Banidavoodi *et al.* [24] and Lee *et al.* [30], the studied nurses` QWL was at an average level, while those related to Nasirizade *et al.* [31] had reported the nurses` QWL at a low level and Callus and Considine [32] stated it at a high spectrum. Differences related to the nature and characteristics of the samples can justify these variations. At the same time, the condition of working during COVID-19 pandemic and its related pressure and tensions can be another reason that needs to be further studied.

The present results indicate a positive correlation between the nurses` productivity and QWL that clarifies the increasing in productivity accompanied with improving their QWL. It seems that those nurses who experience an appropriate level of QWL have better concentration on their tasks and duties. Job satisfaction and a higher sense of freshness and enjoyment at the workplace can be other outcomes of higher QWL that all may reinforce the nurses` productivity with a positive correlation. According to these findings, it is strongly recommended to improve the work standards of the nurses and all the other determinants that may affect their QWL, including the payments, working hours and work-life balance determinants [33].

Considering the present results, some of the QWL dimensions have been identified as the predictors of the nurses` productivity, among them problem-solving, willingness and motivation to work, engagement in decision-making, employment promotion, communication, job security, payments, and employment proud and honour are notifiable respectively.

Similar relationships are reported in other studies; among them the followings are considerable: the relationship among

management methods and leadership, organizational culture, organizational justice, professional attitude, and work-related stress and the nurses` productivity [9, 10], the correlation between engagement in decision making, communication and collaboration and productivity and self-efficiency [34] and the association among dignity, collaboration of the healthcare workers for problem-solving and decision-making and their productivity [35]. Considering all, it seems that when the nurses have sensible collaboration in their unit`s decision-making and have the opportunity of a fruitful clinical team working accompanied by positive communication with their colleagues and managers, their level of QWL may be increases and with a better QWL, higher job satisfaction and a positive sense of collaboration their productivity may be increased in the form of high-quality health care services to the patients. Although such a result has been achieved during the time and in a variety of studies, its significance should not be underestimated in the particular period of the pandemic when the nurses in COVID-19 centres have experienced higher tension, pressure and stress along with higher workload and extended hours of services and a number of patients. For instance, results of a systematic review and a meta-analysis have shown that long working hours, particularly in intensive units and quarantine areas, along with working in high-risk clinical units with insufficient human, equipment and physical resources material and an increase in the nurses` workload without sufficient training and readiness all led to experiencing burnout and decreasing QWL among nurses during the pandemic [36]. All these considerations, along with serious attention to preparing an appropriate working condition, equal compensation system, job security, and a defined system for the nurses` promotion, should be mentioned by the healthcare managers and hospital executives, and leadership team.

When considering the association among the demographic characteristics of the studied nurses with their QWL and productivity, the present results indicate that those nurses with higher working experience, those who handled less than 10 work shifts monthly, and those who only had two patients under their direct supervision had a higher level of productivity comparing the other studied groups. Other studies have also confirmed the association between nurses` productivity and their higher working experience and shorter working hours with less workload [37, 38]. Such evidence can indicate the necessity of more attention of the clinical leaders to set a combination of nurses with different working experiences in the teams during the rush hours and outbreak conditions, as well as a serious consideration of the nursing schedule from the number of the work shift and the responsibility of direct supervision of the patients.

From the QWL aspect, the present results indicate a higher score of the nurses` QWL among the female nurses, those who

were married, nurses with bachelor's degree, and those with less than 10 work shifts monthly. Association among nurses' gender and their QWL are also confirmed by the other studies [39, 40] that may be due to the personal expectations of the female nurses, their more positive perceptions of their QWL or the more difficult condition of employment for female nurses in the studied context. As a justification for the higher QWL among the married nurses as indicated in the study of Almalki *et al.*, it can be due to the higher financial needs for a family or the lower tendency of changing workplace and risk acceptance among these groups [41]. And finally, it may justify the reason for higher QWL among those nurses with lower grades (BSc) than the others if saying that those with a higher level of education may have higher expectations of their workplace and working conditions that may affect their QWL. Such a situation may be intensified at those hospitals which cannot assure the promotion pathway for the nurses or satisfy their expectations to improve their knowledge and skills due to the repetitive nature of the tasks or high workload.

Although the certainty and generalization of the results should be mentioned in a cross-sectional study, these findings are considerable for clinical leaders and hospital managers to be aware of the personal characteristics of the nurses and plan for increasing their QWL and productivity considering their expectations, needs, and individual differences.

## LIMITATIONS

The present study has both strengths and limitations. This study is the only study during the covid-19 pandemic in Iran that provides evidence of the productivity and quality of work life of nurses. Nonetheless, this study also has some limitations. In this study, data collection was done by self-reporting, which may have an effect on the reporting of data by the nurses. Also, it was a cross-sectional study, so caution should be exercised in generalizing the results.

## CONCLUSION

The results of this study showed the impact of nurses' QWL and its dimensions on their productivity. Therefore, managers can improve QWL and its dimensions in nurses by adopting appropriate solutions, and emphasizing its dimensions, including problem-solving, willingness and motivation to work, engagement in decision-making, employment promotion, communication, job security salary and

payments, and employment pride and honour, and provide the necessary conditions to improve nurses' productivity.

## LIST OF ABBREVIATIONS

|             |   |                              |
|-------------|---|------------------------------|
| <b>FHCW</b> | = | Frontline Healthcare workers |
| <b>QWL</b>  | = | Quality of Work Life         |
| <b>HCW</b>  | = | Healthcare Workers           |
| <b>CVI</b>  | = | Content Validity Index       |
| <b>CVR</b>  | = | Content Validity Ratio       |

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study is approved by the ethical committee of Shiraz University of Medical Sciences with the number of

IR.SUMS.REC.1399.466. Informed consent was obtained from all participants. All the methods were performed in accordance with the relevant guidelines and regulation.

## HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committee and with the 1975 Declaration of Helsinki, as revised in 2013.

## CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

## STANDARDS OF REPORTING

STROBE guidelines were followed.

## AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analysed during the current study are available from the corresponding author [A.Y] upon reasonable request.

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None.

## CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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Declared none.

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