## Fuzzy based analysis for behavioral factors (altruism, courtesy, sportsmanship,

## civic virtue, and conscientiousness) to investigate impact of gender on

## **Organizational citizenship behavior (OCB)**

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Abstract: This paper aims to investigate impact of employees' gender on OCB as per the employees' perception in Jordanian governmental hospitals. A convenient sample of 126 employees working in the three main governmental hospitals in north of Jordan has been taken for the purpose of this study. The collected data includes linguistic terms that suffer from uncertainty which, in turn, cannot be dealt with traditional numerical values. The result prove that gender impact on OCB has shown statistically significant differences at ( $\alpha$ =0.05) as far as altruism, courtesy, and civic virtue are concerned; and this variable stands in favor of males with the total score of 0.011%. Similarly, as far as the effect of age factor on OCB is concerned, there have been statistically significant differences at ( $\alpha$ =0.05) in relation to courtesy, sportsmanship, and civic virtue with the total score of 0.27%. Finally, the results provide a baseline data for further studies which may contribute more significant in the field of OCB.

**Keywords:** behavioral factors; fuzzy analysis; gender; employees' demographics; organizational citizenship behavior (OCB)

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#### 1. Introduction

Recently, behavioral science (BS) has emerged as a scientific study; and researchers have started giving more attention to organizational citizenship behavior (OCB) due to its working performance effects [1]. At the beginning of the past decade researchers simply described the term of OCB as "willingness to cooperate" [2], and referred to the employee behavior that is comparatively discretionary and contributes towards making the organizations functioning effective [3]. The word "discretionary" means that behavior is not an enforceable requirement of the role or the job description. The behavior is rather a matter of personal choice, such that its omission is not generally understood as punishable [2]. OCB was initially presented by Organ [4] with its five dimensions as: altruism is a helping behavior; courtesy is a communicating and commitment behavior; sportsmanship is forgiveness behavior; civic virtue is a shared governance behavior; and finally, conscientiousness is an attendance and compliance behavior [5].

OCB is deemed such as the produced notion by the modern administrative idea, it is believed as one of many researchers, and initial obsessions offered the positive effects of OCB. It is adoption by many government and private of its employees to get better competence and efficiency, out of the employ of resources with less expenses level [6]. However, the organization must play a main role in satisfying and encouraging its employees because they are very important and their efforts drive a long way in influencing the economic of the country [7]

This paper aims to investigate impact of employees' gender on OCB as per the employees' perception in Jordanian governmental hospitals and study the variations in behavior patterns according to demographic variables such as Job title, age, educational level, and length of service from the employees' point of view working in the targeted hospitals. Finally, it is proposing a

fuzzy approach to find out impact of employees' demographic variables such as gender on OCB at workplace.

#### 2. Organizational Citizenship Behavior and Employees' Demographics

There are many factors which contribute towards enhancing the practice of OCB among employees. The most important variables explored were employees' characteristics in addition to job attitude, task characteristics, and leadership behaviors [1]. Significant relations have been found between gender of managers, and their education level with OCB [8]; and between some employees' demographics such as age, work position, and institutional experience in addition to professional characteristics and OCB [9]. However, Francis [10] reported that employees' gender, educational level, and marital status had not affected their practicing of OCB. Beyond the employees' demographics, working environment had also influenced OCB; and psychological empowerment had a positive impact on OCB [11]. Mahnaz, Mehdi, Jafar, & Abbolghasem [12] studied the effect of employees' demographic characteristics including gender, marital status, academic qualification, and type of profession, age, salary and wages, ethnicity, type of employment, department/office, job position, and duration of employment on OCB. Their study showed OCB can be affected by all demographic characteristics; including gender, marital status, academic qualification, and type of profession, age, salary and wages, type of employment, department/office, job position, and duration of employment with the exception of ethnicity.

Francis [10] studied OCB and demographic factors among oil workers in Nigeria. It was reported that some personal issues such as gender, educational level, and marital status did not affect practicing of OCB. A similar study was conducted by El-Badawy, Trujillo-Reyes, & Magdy [13] to assess and compare the effect of demographics on OCB between Egypt and

Mexico. Two samples were taken; one from Egypt (127 participants), and the other from Mexico (116 participants). The results of study provided evidence that OCB level was comparatively higher in Mexico than in Egypt. The results provided that there was no significant relationship among gender, age and years of experience, and education level and OCB in both the Egyptian and Mexican employees. Keeping the inconclusively of recent research studies in view, the current work proposes a second hypothesis that has been used to find the effect of employees' demographics on OCB.

H1: employees' gender, employees' age, employees' education level and employees' length of service affect the perception of OCB significantly.

#### **3. Proposed Works**

Firstly, this section provides a brief review of fuzzy set theory, fuzzy hypothesis testing, fuzzy t-test and fuzzy one-way ANOVA. Then, the proposed approach, and fuzzy hypothesis testing are given in detail.

#### 3.1 Fuzzy Hypothesis Testing

The data is collected from employees or a group of participants through a questionnaire for testing the hypothesis [14]. Their participant is obtained on a Likert scale range from strongly agree to strongly disagree with the numerical values in the range of 4to1. However, Zadeh [15] pointed out that these numerical values do not handle the impreciseness/vagueness in these linguistic variables. Moreover, Zadeh introduced the concept of fuzzy set theory to handle such type of situations; and one way, followed by several researchers like Manton, Woodbury and Tolley [16], Buckley [17], and Wu [18] to handle impreciseness/vagueness in these linguistic

variables is to use fuzzy numbers instead of positive integers for representing the linguistic terms.

According to Bodjanova [19], and Arefi & Taheri [20], fuzzy hypothesis testing is a statistical technique that empowers us to test the hypothesis. Due to the quality and flexibility of the technique, it has a wide range of applications especially in social science research and other areas [16,17,18]. In this paper, the methods proposed by Wu [21], and Parthiban & Gajivaradhan [22] have been used for the purpose of the current study. The tools and concepts of fuzzy set theory have been discussed in the next subsection.

#### 3.1.1. Preliminaries

The definitions of fuzzy set are given as hereunder:

**Definition 1:** Let U be a universal set and a set  $\tilde{A} = \{\langle x, \mu_{\tilde{A}}(x) \rangle | x \in U\}$  is called a fuzzy set, where  $\mu_{\tilde{A}}: U \to [0,1]$  indicates the degree of membership of x in  $\tilde{A}$ .

**Definition 2:** Let  $\tilde{A}$  be a fuzzy set in U and  $\alpha \in [0, 1]$ . Then, the crisp set  $A_{\alpha} = \{x \in X : \mu_{\tilde{A}}(x) \ge \alpha\}$  as shown in Figure 1.



Figure 1. α-cut of a triangular fuzzy number

**Definition 3:** Let  $\tilde{A}$  be a fuzzy set in U. Then, the crisp set  $S(\tilde{A}) = \{x \in X : \mu_{\tilde{A}}(x) > 0\}$  is called the support of the fuzzy set  $\tilde{A}$ .

**Definition 4:** Let  $\tilde{A}$  be a fuzzy set in U. Then,  $h(\tilde{A}) = \sup_{x \in X} \{\mu_{\tilde{A}}(x)\}$  is called the height of the

fuzzy set  $\tilde{A}$ . If  $h(\tilde{A}) = 1$ , then the fuzzy set  $\tilde{A}$  is called a normal fuzzy set.

**Definition 5:** A fuzzy set  $\tilde{A}$ , defined on the universal set U, is said to be a convex, if  $\mu_{\tilde{A}}(\lambda x_1 + (1 - \lambda)x_2) \ge \min(\mu_{\tilde{A}}(x_1), \mu_{\tilde{A}}(x_2))$ , for all  $x_1, x_2 \in X$  and  $\lambda \in [0, 1]$ .

**Definition 6:** A fuzzy set  $\tilde{A}$ , defined on the universal set of real numbers, is called a fuzzy number if it satisfies the following conditions:

- (i)  $\tilde{A}$  is a normal fuzzy set,
- (ii)  $A_{\alpha}$  is a closed interval for every  $\alpha \in [0, 1]$ ,
- (iii)  $S(\tilde{A})$  is a bounded set.

**Definition 7:** A fuzzy set  $\tilde{A}$  is said to be a triangular fuzzy number, if its membership function  $\mu_{\tilde{A}}(x)$  is defined as:

$$\mu_{\tilde{A}}(x) = \begin{cases} \frac{x-a}{b-a}, & a < x \le b\\ \frac{c-x}{c-b}, & b \le x < c\\ 0, \text{ otherwise.} \end{cases}$$

A triangular fuzzy number  $\tilde{A}$  is generally denoted by  $\tilde{A} = (a, b, c)$  and represented as shown in Figure 2.



Figure 2. Triangular fuzzy numbers

## 3.1.2 Arithmetic Operations on Interval Fuzzy Numbers

Let  $\tilde{A} = [L_1, U_1]$  and  $\tilde{B} = [L_2, U_2]$  be two interval fuzzy numbers. Then,

(i) 
$$\tilde{A} + \tilde{B} = [L_1 + L_2, U_1 + U_2],$$

(ii)  $\tilde{A} \times \tilde{B} = [L, U]$  where,  $L = minimum\{L_1L_2, L_1U_2, U_1L_2, U_1U_2\}$  and  $U = maximum\{L_1L_2, L_1U_2, U_1L_2, U_1U_2\}$ 

(iii) 
$$\tilde{A} - \tilde{B} = [L_1 - U_2, U_1 - L_2].$$

(iv)  $\tilde{A}^{-1} = \left[\frac{1}{U}, \frac{1}{L}\right].$ 

## 3.1.3 Fuzzy ANOVA method

In this section, the proposed method is illustrated as follows:

1. Collected the data from employees or a group of participants through a questionnaire in terms of linguistic variables like Strongly agree, Agree, Disagree, Strongly disagree, etc. Transformed the linguistic data into triangular fuzzy numbers, using the fuzzy triangular scale as shown in Table 1.

Linguistic Variable	Code	Triangular Fuzzy Number (TFN)
Strongly disagree	SDA	$\tilde{1} = (0, 1, 2)$
Disagree	DA	$\tilde{2} = (1, 2, 3)$
Agree	A	$\tilde{3} = (2, 3, 4)$
Strongly agree	SA	$\tilde{4} = (3, 4, 5)$

Table 1. The fuzzy triangular scale of fuzzy ANOV	riangular scale of f	zy ANOVA
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The triangular fuzzy number  $\tilde{A} = (a, b, c)$ , and represents the information of employees or a group of participants as shown in Figure 3:



Figure 3. Response of participants

Let  $\tilde{A}$  be a fuzzy random variable, using the relation  $[a + (b - a)\alpha, c - (c - b)\alpha]$ ,

 $\alpha \in [0, 1]$  to replace the triangular fuzzy number  $\tilde{A} = (a, b, c)$  with the interval fuzzy number  $[A_{\alpha}^{L}, A_{\alpha}^{U}]$ .

2. Assumed the following fuzzy testing hypothesis:

$$H_0: \tilde{\mu}_1 = \tilde{\mu}_2 = \dots = \tilde{\mu}_n$$
$$\tilde{H}_1: \tilde{\mu}_1 \neq \tilde{\mu}_2 \neq \dots \neq \tilde{\mu}_n$$

Where,  $\widetilde{H}_0$  is the null hypothesis; and  $\widetilde{H}_1$  is the alternative hypothesis. Let

$$\tilde{X}_{ij} = \tilde{\mu}_i \bigoplus \tilde{1}_{\{\varepsilon_{ij}\}} \qquad (1)$$

Where,  $\tilde{1}_{\{\varepsilon_{ij}\}}$  is the crisp random variable; and  $(N, \sigma^2)$  is the normal distribution. Then, using the relation  $[a + (b - a)\alpha, c - (c - b)\alpha], \alpha \in [0, 1]$  and (1) to obtain the following two crisp ANOVA models  $(\tilde{X}_{ij})^L_{\alpha} = (\tilde{\mu}_i)^L_{\alpha} \oplus \varepsilon_{ij}$  and  $(\tilde{X}_{ij})^U_{\alpha} = (\tilde{\mu}_i)^U_{\alpha} \oplus \varepsilon_{ij}$ embrace the following notation:

$$\widetilde{X}_i = \bigoplus_{j=1}^{n_i} \widetilde{X}_{ij} \text{ and } \widetilde{X}_{\dots} = \bigoplus_{i=1}^r \bigoplus_{j=1}^{n_i} \widetilde{X}_{ij}.$$
 (2)

3. Using (2) as mentioned above and subsection 3.1, to transform the fuzzy ANOVA model into two crisp ANOVA models, this can be written as follows:

$$\left(\tilde{X}_{i}\right)_{\alpha}^{L} = \sum_{j=1}^{n_{i}} \left(\tilde{X}_{ij}\right)_{\alpha}^{L} \text{ and } \left(\tilde{X}_{i}\right)_{\alpha}^{U} = \sum_{j=1}^{n_{i}} \left(\tilde{X}_{ij}\right)_{\alpha}^{U}$$
$$\left(\tilde{X}_{...}\right)_{\alpha}^{L} = \sum_{i=1}^{r} \sum_{j=1}^{n_{i}} \left(\tilde{X}_{ij}\right)_{\alpha}^{L} \text{ and } \left(\tilde{X}_{...}\right)_{\alpha}^{U} = \sum_{i=1}^{r} \sum_{j=1}^{n_{i}} \left(\tilde{X}_{ij}\right)_{\alpha}^{U}$$

4. Applied crisp ANOVA method to obtain sums of squares based on the interval valued observations  $(\tilde{X}_{ij})^{L}_{\alpha}$  and  $(\tilde{X}_{ij})^{U}_{\alpha}$  as follows:

$$SSTO_{\alpha}^{L} = \sum_{i=1}^{r} \sum_{j=1}^{n_{i}} \left[ \left( \tilde{X}_{ij} \right)_{\alpha}^{L} \right]^{2} - \frac{\left[ (\tilde{X}_{...})_{\alpha}^{L} \right]^{2}}{n_{T}}, SSTO_{\alpha}^{U} = \sum_{i=1}^{r} \sum_{j=1}^{n_{i}} \left[ \left( \tilde{X}_{ij} \right)_{\alpha}^{U} \right]^{2} - \frac{\left[ (\tilde{X}_{...})_{\alpha}^{U} \right]^{2}}{n_{T}} \\ SSTR_{\alpha}^{L} = \sum_{i=1}^{r} \frac{\left[ (\tilde{X}_{ij})_{\alpha}^{L} \right]^{2}}{n_{i}} - \frac{\left[ (\tilde{X}_{...})_{\alpha}^{L} \right]^{2}}{n_{T}}, SSTR_{\alpha}^{U} = \sum_{i=1}^{r} \frac{\left[ (\tilde{X}_{ij})_{\alpha}^{U} \right]^{2}}{n_{i}} - \frac{\left[ (\tilde{X}_{...})_{\alpha}^{U} \right]^{2}}{n_{T}} \\ SSE_{\alpha}^{L} = \sum_{i=1}^{r} \sum_{j=1}^{n_{i}} \left[ \left( \tilde{X}_{ij} \right)_{\alpha}^{L} \right]^{2} - \sum_{i=1}^{r} \frac{\left[ (\tilde{X}_{ij})_{\alpha}^{L} \right]^{2}}{n_{i}}, SSE_{\alpha}^{U} = \\ \sum_{i=1}^{r} \sum_{j=1}^{n_{i}} \left[ \left( \tilde{X}_{ij} \right)_{\alpha}^{U} \right]^{2} - \sum_{i=1}^{r} \frac{\left[ (\tilde{X}_{ij})_{\alpha}^{U} \right]^{2}}{n_{i}} \text{ and also relations } SSTO_{\alpha}^{L} = SSTR_{\alpha}^{L} + SSE_{\alpha}^{L} \\ \text{and } SSTO_{\alpha}^{U} = SSTR_{\alpha}^{U} + SSE_{\alpha}^{U}. \end{cases}$$

5. Computed the mean squares using Step 5  $MSTR_{\alpha}^{L} = \frac{SSTR_{\alpha}^{L}}{r-1}$  and  $MSTR_{\alpha}^{U} = \frac{SSTR_{\alpha}^{U}}{r-1}$ ,  $MSE_{\alpha}^{L} =$ 

$$\frac{SSE_{\alpha}^{L}}{n_{T}-1}$$
 and  $MSE_{\alpha}^{U} = \frac{SSE_{\alpha}^{U}}{n_{T}-1}$  and also constructed the two crisp ANOVA in Table 2 and Table 3

respectively as follows:

#### Table 2. Lower crisp ANOVA table

Source of Variation	SS	<i>d</i> . <i>f</i> .	MS
Between treatments	$SSTR^{L}_{\alpha}$	r-1	$MSTR^L_{\alpha}$
Error(within treatments)	$SSE_{\alpha}^{L}$	$n_T - r$	$MSE_{\alpha}^{L}$
Total	$SSTO_{\alpha}^{L}$	$n_T - 1$	

## Table 3. Upper crisp ANOVA Table

Source of variation	SS	<i>d</i> . <i>f</i> .	MS
Between treatments	$SSTR^{U}_{\alpha}$	r-1	$MSTR^{U}_{\alpha}$
Error(within treatments)	$SSE^{U}_{\alpha}$	$n_T - r$	$MSE^U_{\alpha}$
Total	$SSTO^{U}_{\alpha}$	$n_{T} - 1$	

6. Finally, in order to test whether the hypothesis is accepted or not, the following test statistic was used:

$$\tilde{F}^* = [F^L_{\alpha}, \quad F^U_{\alpha}] = \left[\frac{MSTR^L_{\alpha}}{MSE^L_{\alpha}}, \frac{MSTR^U_{\alpha}}{MSE^U_{\alpha}}\right].$$

Using the defuzzification function  $m_{\alpha} = \omega \left( \frac{1}{a_{ij} + (b_{ij} - a_{ij})\alpha} \right) + (1 - \omega) \left( \frac{1}{c_{ij} - (c_{ij} - b_{ij})\alpha} \right)$ ,

 $\omega \in [0, 1]$  to obtain crisp $F^* = \frac{MSTR}{MSE}$ , the following cases arose:

**Case I:** If  $F^* \leq F_{1-\alpha;r-1,n_T-r}$ , then we accept the null hypothesis  $\widetilde{H}_0$ .

**Case II:** If  $F^* > F_{1-\alpha;r-1,n_T-r}$ , then we accept the alternative hypothesis  $\widetilde{H}_1$ .

#### 3.1.4 Fuzzy t-test

Let  $\tilde{X} = (a_i, b_i, c_i); i = 1, 2, ..., m$  be a random sample of triangular fuzzy numbers with size m and  $\tilde{Y} = (a_j, b_j, c_j); j = 1, 2, ..., n$  be a random sample of triangular fuzzy numbers with size n. Using the relation  $[a + (b - a)\alpha, c - (c - b)\alpha], \alpha \in [0, 1]$  to replace the triangular fuzzy number  $\tilde{A} = (a, b, c)$  with the interval fuzzy number  $[A_{\alpha}^L, A_{\alpha}^U]$  and suppose that  $[\eta_1^L, \mu_1^U]$ and  $[\eta_2^L, \mu_2^U]$  be mean of normal population of  $\tilde{X}$  and  $\tilde{Y}$  respectively.

Now for the null hypothesis  $\widetilde{H}_0$ :  $[\eta_1^L, \mu_1^U] = [\eta_2^L, \mu_2^U]$  and alternative hypotheses are given.  $\widetilde{H}_1$ :  $[\eta_1^L, \mu_1^U] > [\eta_2^L, \mu_2^U]$  or  $\widetilde{H}_1$ :  $[\eta_1^L, \mu_1^U] < [\eta_2^L, \mu_2^U]$  or  $\widetilde{H}_1$ :  $[\eta_1^L, \mu_1^U] \neq [\eta_2^L, \mu_2^U]$ . The sample means and standard deviations of  $\widetilde{X}$  and  $\widetilde{Y}$  have been collected as follows:

**Case I:** If the standard deviations of population are assumed to be equal, then the null hypothesis  $\widetilde{H}_0$ :  $[\eta_1^L, \mu_1^U] = [\eta_2^L, \mu_2^U]$  is expressed as follows:

$$\tilde{t} = [t_l, t_u] = \left[ \frac{\bar{X}_L - \bar{Y}_L}{s_L \sqrt{\frac{1}{m} + \frac{1}{n}}}, \frac{\bar{X}_U - \bar{Y}_U}{s_U \sqrt{\frac{1}{m} + \frac{1}{n}}} \right]$$

Where,

$$\tilde{S} = [s_L, s_L] = \left[ \sqrt{\frac{(m-1)s_{X_L}^2 + (n-1)s_{Y_L}^2}{m+n-2}} , \sqrt{\frac{(m-1)s_{X_U}^2 + (n-1)s_{Y_U}^2}{m+n-2}} \right]$$

**Case II:** If the standard deviations of population are assumed to be unequal, then the null hypothesis $\tilde{H}_0$ :  $[\eta_1^L, \mu_1^U] = [\eta_2^L, \mu_2^U]$  is expressed as follows:

$$\tilde{t} = [t_l, t_u] = \begin{bmatrix} \frac{\bar{X}_L - \bar{Y}_L}{\sqrt{\frac{s_{X_L}^2}{m} + \frac{s_{Y_L}^2}{n}}}, & \frac{\bar{X}_U - \bar{Y}_U}{\sqrt{\frac{s_{X_U}^2}{m} + \frac{s_{Y_U}^2}{n}}} \end{bmatrix}$$

Finally, by using the defuzzification function  $m_{\alpha} = \omega \left(\frac{1}{a_{ij} + (b_{ij} - a_{ij})\alpha}\right) + (1 - \omega)$ 

 $\omega)\left(\frac{1}{c_{ij}-(c_{ij}-b_{ij})\alpha}\right), \omega \in [0, 1] \text{ to transform the fuzzy } \tilde{t} = [t_l, t_u], \text{ value into the crisp } t \text{ value}$ and use the crisp t-test (Devore, 2008) to check that the null hypothesis  $\tilde{H}_0: [\eta_1^L, \mu_1^U] = [\eta_2^L, \mu_2^U]$  whether stands accepted or rejected.

#### **3.2 Population and Sampling**

As this study aims to assess the levels of OCB among employees at Jordanian governmental hospitals, the general population of the current study is all employees from governmental hospitals in Jordan; and their number is 2355 [23]. The target population includes all employees who work in the selected governmental hospitals located in North of Jordan (Irbid city). For the purpose of sampling, probability sampling method was used. After briefing about the purpose of the study, and ensuring that this data will be treated confidentially, the data was collected to make it more realistic and not presumptive. The sample size of the study was based on Cohen power primer; the sample size for Medium Sample Effect Size (ESs), at Power (P) of 0.08 with significant criterion Alpha of 0.05, for ANOVA tests was 52 for each group that resulted in at least 126 employees [24]. The inclusion creations included all selected employees included those providing direct and indirect patient care, i.e., physicians, nurses, radiologists, pharmacists, laboratory technicians and managers.

#### 3.3 Research Design and Data Collection

A descriptive and cross-sectional research design was used to collect the data related to the current research study. The questionnaire prepared for the target group was well structured. These questionnaires were distributed directly to all the employees who were on duty in the selected hospitals at the time of data collection. A brief clarification about the study was given to employees before distributing the questionnaires.

The participants were assured that the data collected them would be used solely for the purpose of this research study with confidentiality. Their voluntary consent was also obtained in this regard. In all, 210 questionnaires were distributed. However, only 126 employees participated in the sample with a response rate of 60%. Some of them expressed their inability to participate due to their own compulsions.

#### **3.4 Study Instrument**

The OCB questionnaire of Podsakoff, Ahearne, & MacKenzie [25] was used to achieve the objectives of this study. The respondents' respond was rated on a 5-Point Likert scale (5 for strongly agree and 1 for strongly disagree). Five dimensions, viz. altruism, conscientiousness, sportsmanship, courtesy and civic virtues were considered for the purpose of this study. Each dimension was consisted of four sections. Thus, there were 20 sections in the questionnaire related to OCB. The content validity was based on the judgment of ten experts including physicians and faculty members of different universities. They reported that the instrument related items sufficiently measured OCB and its dimensions.

#### 3.5 Pilot Study

A pilot study with 40 employees of the selected hospitals was conducted. A suitable pilot study sample size was prepared for Medium Sample Effect Size (ESs) at significance criterion Alpha of 0.05 with 40 participants [26]. The pilot study aimed to assess the feasibility of the study (reliability, validity, applicability, readability, and the precise amount of time needed to fill in the questionnaire), and find out any obstacle that could hinder the data collection process and

make necessary modifications, if any. The pilot study showed that all items of the instrument were clear, readable, and easily understandable. The time needed to fill the questionnaire was 10-15 minutes for each person which was considered quite sufficient in view of the limited information to be provided therein.

The reliability of the current study instrument was assessed by computing the Cronbach's Alpha with a score of 0.89 for the entire questionnaire which showed that the instrument had acceptable internal consistency [27]. This pre-test process involved the subsequent analysis of the collected data which confirmed that the questionnaire items matched the research objectives. Also, it ensured the content validity based on the judgment of ten experts, including physicians and faculty members of different universities. They reported that the instrument related items effectively measured OCB and its dimensions.

#### 3.6 Setting

The current study was conducted in the northern part of Jordan at the main three governmental hospitals. All these three hospitals have the specializations in medical-surgical, pediatric, and gynaecological ailments which provide a comprehensive care to about 1.77 million individuals living in this part of Jordan [28]. Further, these hospitals also extended teaching facilities to a number of medical students.

#### 4. Results

The experimental analysis and results pertaining to the proposed work identify the level of employees' perceptions and their demographics information on OCB using fuzzy mean, standard deviation, t-test, and One-way ANOVA. Tables represent the final transformed crisp results as follows:

## H1(a): Gender Affects OCB Perception Significantly

Table 4 shows the final transformed crisp results of means and stander deviation. The total means score of 3.07 due to gender variable stands in favour of males. While females lag behind in all the dimensions with total mean score of 2.86. There were statistically significant differences at ( $\alpha$ =0.05) in altruism of 0.006, civic virtue of 0.012 and courtesy of 0.045 respectively. While, sportsmanship and conscientiousness have no statistically significant differences at ( $\alpha$ =0.05). The total statistically significant difference is 0.011, as reported in Table 5.

		Male	Female			
	Crisp Mean	Fuzzy Mean	Crisp S.D.	Crisp Mean	Fuzzy Mean	Cris p S.D.
Altruism	3.34	[1.00,4.68]	0.476	3.06	[2.03,4.09]	0.588
Courtesy	3.29	[2.09,4.49]	0.414	3.12	[1.60,5.18]	0.465
Sportsmanship	3.30	[1.33,5.27]	0.467	3.11	[3.00,3.22]	0.539
Civic Virtue	2.93	[1.86, 4.00]	0.697	2.62	[1.2,4.04]	0.619
Conscientiousness	2.57	[1.5,3.64]	0.748	2.49	[1.49,3.49]	0.748
Total Score	3.07	[2.05,4.09]	0.414	2.86	[1.72,4]	0.457

Table 4. Means, standard deviations sample responses related to participants' gender

#### Table 5. T-test results of sample responses related to participants' gender

	t-value	Fuzzy t-value	Sig.
Altruism	2.801	[1.500,4.102]	0.006
Courtesy	2.030	[1.015,3.045]	0.045
Sportsmanship	1.945	[1.940,1.950]	0.054

Civic Virtue	2.551	[1.051,4.051]	0.012
Conscientiousness	0.586	[0,1.172]	0.559
Total Score	2.583	[1.050,4.116]	0.011

## H2 (b): Employees' Age is significantly related to Perception of OCB

Table 6 displays the final transformed crisp results of means and standard deviation. 41 and above has the highest mean score in altruism of 3.22, courtesy of 3.29, sportsmanship of 3.31 and conscientiousness of 2.61. The total mean score is 3.03.

Table 6. Means and standard deviation result of sample responses related of their age variable.

	Less than 30		ss than 30		31-40		41 and	above	
	Crisp Mean	Fuzzy Mean	S.D.	Crisp Mean	Fuzzy Mean	S.D.	Crisp Mean	Fuzzy Mean	S.D.
Altruism	3.17	[1.97,4.37]	0.674	3.05	[1.85,4.25]	0.503	3.22	[2.02,4.42]	0.548
Courtesy	3.01	1.81,4.21]	0.502	3.10	[1.90,4.30]	0.453	3.29	[2.09,4.49]	0.406
Sportsmans- hip	3.05	[1.85,4.25]	0.579	3.04	[1.84,4.24]	0.573	3.31	[2.11,451]	0.435
Civic Virtue	2.90	[1.70,4.10]	0.698	2.44	[1.244,3.644]	0.622	2.82	1.62,4.02]	0.630
Conscienti- ousness	2.52	[1.32,3.72]	0.800	2.37	[1.17,3.57]	0.762	2.61	[1.41,381]	0.714
Total Score	2.92		0.504	2.77		0.421	3.03		0.426

Table 7. One-way ANOVA result of sample responses related of their age variable

	t-value	Fuzzy t-value	Sig.
Altruism	0.958	[0.838,1.078]	0.387
Courtesy	4.602	[3.402,5.802]	0.012
Sportsmanship	4.268	[3.068,5.468]	0.016

Civic Virtue	5.050	[3.85,6.25]	0.008
Conscientiousness	1.150	[0.13,2.17]	0.320
Total Score	3.732		0.027

Table 8. Pair-wise multiple comparisons Post Hoc tests using Scheffe method due to	age
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		variabic			
Dependent Variable	(I) Age	(J) Age	Mean	Std.	Sig.
	In years	In years	Deviation	Error	
			(I-J)		
Courtesy	30 or less	31-40	-0.09	0.115	0.718
		41 and above	-0.28 (*)	0.102	0.024
	31-40	30 or less	0.09	0.115	0.718
		41 and above	-0.19	0.093	0.131
	41 and above	30 or less	0.28(*)	0.102	0.024
		31-40	00.19	0.093	0.131
Sportsmanship	30 or less	31-40	0.01	0.132	0.996
		41 and above	-0.26	0.117	0.095
	31-40	30 or less	-0.01	0.132	0.996
		41 and above	-0.27(*)	0.107	0.046
	41 and above	30 or less	0.26	0.117	0.095
		31-40	0.27(*)	0.107	0.046
Civic Virtue	30 or less	31-41	0.46(*)	0.167	0.026
		41 and above	0.08	0.149	0.878
	31-40	30 or less	-0.46(*)	0.167	0.026
		41 and above	-0.38(*)	0.136	0.021
	41 and above	30 or less	-0.08	0.149	0.878
		31-40	0.38(*)	0.136	0.021
<b>Total Score</b>	30 or less	31-40	0.15	0.115	0.418
		41 and above	-0.10	0.102	0.610
	31-40	30 or less	-0.15	0.115	0.418
		41 and above	-0.25 (*)	0.093	0.027
	41 and above	30 or less	0.10	0.102	0.610
		31-40	0.25(*)	0.093	0.027
* The mean difference	e is significant at	0.05 level			

Table 7 shows statistically significant differences at ( $\alpha$ =0.05) in relation to courtesy of 0.012, sportsmanship of 0.016, and civic virtue of 0.008. While, there were no statistically

significant differences at ( $\alpha$ =0.05) in altruism of 0.387 and conscientiousness of 0.387 due to age. The total significant score is 0.027.

Pair-wise multiple comparisons Post Hoc Test using Scheffe method was conducted as shown in Table 8. Table shows that there are statistically significant differences at ( $\alpha$ =0.05) between less than 30 and 41 and above age categories in favor of 41 and above in courtesy. Moreover, there were statically significant difference at ( $\alpha$ =0.05) between 31-40 and 41 and above in favor of 41 and above in sportsmanship and total score. In addition, there are statistically significant difference at ( $\alpha$ =0.05) between 31-40 and each of 30 or less and above in favor of each of 30 or less and above in civic virtue. Also, it shows that employees in the 31-40 age categories are more concerned about OCB.

#### H2 (c): The Level of Education of an Employee Affects Perception of OCB

Using the proposed fuzzy approach, Table 9 means and standard deviations result and postgraduate has the highest mean score in all variables with total mean score of 3.25, followed by Bachelor with total mean score of 2.95.

	Diploma or Less		Bachelor			Postgraduate			
	Crisp Mean	Fuzzy Mean	S.D.	Crisp Mean	Fuzzy Mean	S.D.	Crisp Mean	Fuzzy Mean	S.D.
Altruism	3.05	[1.85,4.25]	0.610	3.20	[2.00,4.4]	0.531	3.48	[2.28,4.68]	0.395
Courtesy	3.18	[1.98,4.38]	0.467	3.13	[1.93,4.33]	0.445	3.48	[2.28,4.68]	0.325
Sportsmans- hip	3.16	[1.96,4.40]	0.575	3.19	[1.99,4.39]	0.486	3.24	[2.04,4.44]	0.474
Civic Virtue	2.62	[1.42,4.32 4]	0.653	2.76	1.56,3.96]	0.675	3.18	[1.98,4.38]	0.442
Conscientio-	2.40	[1.20,3.60]	0.699	2.57	[1.37,3.77]	0.777	2.86	[1.66,4.06]	0.701

Table 9. Means and standard deviations result related to education level variable

usness						
<b>Total Score</b>	2.85	0.444	2.95	0.455	3.25	0.341

## Table 10. One-way ANOVA result of sample responses related of their education level variable

	t-value	Fuzzy t-value	Sig.				
Altruism	2.970	[1.77,4.17]	0.055				
Courtesy	2.803	[1.603,4.003]	0.064				
Sportsmanship	0.109	[0.097,0.121]	0.897				
Civic Virtue	3.491	[2.291,4.691]	0.034				
Conscientiousness	2.014	[0.814,3.214]	0.138				
<b>Total Score</b>	3.589		0.031				

Table 10 shows that statistically significant differences exist at ( $\alpha$ =0.05) in civic virtue of 0.034 and total mean score of 0.031 due to educational level variable. Pair-wise multiple comparisons post hoc tests using Scheffe method was conducted in Table 11. The table shows that statistically significant differences exist at ( $\alpha$ =0.05) between diploma or less and postgraduate categories in favour of postgraduate category with civic virtue and total score. So, postgraduate employees have shown better OCB perception.

 Table 11. Pair-wise multiple comparisons Post Hoc tests using Scheffe method due to education variable

Dependent	(L)	(J)	Mean	Std. Error	Sig.
Variable	Educational	Educational	Difference (I-J)		
	Level	Level			
	Diploma or	Bachelor	-0.14	0.122	0.517
Civic Virtue	less	Postgraduate	-0.57(*)	0.216	0.035
	Bachelor	Diploma or	0.14	0.122	0.517
		less			
			-0.43	0.212	0.138
	Postgraduate	Diploma or	0.57(*)	0.216	0.035
		less			
		Bachelor	0.43	0.212	0.138
	Diploma or	Bachelor	-0.09	0.083	0.536
Total Score	less	Postgraduate	-0.39(*)	0.147	0.032
Bachelor		Diploma or	0.09	0.083	0.536
		less			
		Postgraduate	-0.30	0.144	0.122
	Postgraduate	Diploma or	0.39(*)	0.147	0.032

	less Bachelor	0.30	0.144	0.122			
* The mean difference is significant at 0.05 level							

## H2 (d): The Length of Service of an Employee Perception is related to OCB

Table 12 displays the final transformed crisp results of means and standard deviation. More than 10 years has highest mean score in all variables except sportsmanship was in favour of 6-10 years. Table 13 shows there are no statistically differences at ( $\alpha$ =0.05) in all the variables due to length of service variable.

	Less t	han 5 years		6-10 ye	ears	0	More	than 10 year	rs
	Crisp	Fuzzy	S.D.	Crisp	Fuzzy	S.D.	Crisp	Fuzzy	S.D.
	Mean	Mean		Mean	Mean		Mean	Mean	
Altruism	3.17	[1.97,4.37]	0.700	3.10	[1.90,4.30]	0.483	3.19	[1.99,4.39]	0.575
Courtesy	3.08	[1.88,4.28]	0.472	3.13	[1.93,4.33]	0.505	3.23	[2.03,4.43]	0.419
Sportsmanshi	3.13	[1.93,4.33]	0.607	3.20	[2.00,4.40]	0.530	3.18	[1.98,4.38]	0.500
р									
Civic Virtue	2.62	[1.42,3.82]	0.674	2.62	[1.42,3.82]	0.701	2.74	[1.54,3.94]	0.637
Conscientiou	2.45	[1.25,3.65]	0.848	2.44	[1.24,3.64]	0.759	2.58	[1.38,3.78]	0.722
s-ness									
<b>Total Score</b>	2.95		0.848	2.87		0.458	2.96		0.440

Table 12. Means and standard deviations results related to length of service variable

# Table 13. One-way ANOVA result of sample responses related of their length of service variable

	t-value	Fuzzy t-value	Sig.
Altruism	0.274	[0.154,0.394]	0.761
Courtesy	1.056	[0.044,2.068]	0.351
Sportsmanship	0.127	[0.007,0.247]	0.881

Civic Virtue	1.480	[0.28,2.68]	0.232
Conscientiousness	0.527	[0.407,0.647]	0.592
Total Score	0.516		0.598

#### 5. Conclusion

The findings of the proposed work identify how OCB behavior patterns vary according to employees' demographic factors such as gender, age, educational level, and length of service. As illustrated in Table 14:

		Frequency	Valid Percent
	Male	47	37.3
Gender			
	Female	79	62.7
	Less than 30	26	20.6
Age in years	31-40	34	27.0
	41 and above	66	52.3
	Diploma or less	51	40.5
Educational Level	Bachelor	64	50.8
	Postgraduate	11	8.0
	5 or less years	16	12.7
Length of Service	6-10 years	36	28.6
	More than 10 years	74	58.7
<b>Total Score</b>		126	100.0

Table 14. Frequencies of demographic information

Of the total 126 participants, 37.3 % were male; and the remaining 62.7 % were female. The respondents in the technician and nurse categories were higher than other categories with the respective percentages of 37.3% and 31.0%. Age-wise, majority of the respondents, i.e., 52.1%

belonged to the age category of 41 and above years, followed by those in the age categories of 31 to 40 years and 30 or less years with the respective percentages of 27.0% and 20.6%. Educationwise, 40.5 % respondents belong the diploma or less category; 50.8 % were holding a bachelor's degree; 8.8 % were postgraduate. Data relating to the length of service showed that majority of the respondents, i.e., 58.7 % had more than 10 years length of service, while 28.6% and 12.7% represented the categories of 6 to 10 years and 5 or less years respectively. For examining the normal distribution of data, Kolmogorov-Smirnov test was conducted as shown in Table 15 and these were normally distributed.

N	126
Normal Parameters Mean	2.94
Std. Deviation	0.451
Most Extreme Differences Absolute	0.072
Positive	0.072
Negative	-0.055-
Test statistic	0.088
Sig. (2-tailed)	0.000

Table 15. Kolmogorov-Smirnov test

*H2* was related to the employees' gender, age, education level, and length of service which had positive effects on OCB at ( $\alpha = 0.05$ ). The male employees possessed more positive perception of OCB than their female counterparts. Age and education significantly affected their perceptions of OCB at ( $\alpha = 0.05$ ). These results are consistent with those produced by Farzianpour et al. [8] relating to gender factor, and Altuntas & Baykal [9] regarding the impact of employees' age. However, the result appeared contrary to those of Francis [10] who reported that employees' gender had no impact on OCB. Similarly, El-Badawy et al. [13] found no significant relationship between gender, age, years of experience and education level, and OCB among Egyptian and Mexican employees. Finally, there were found statistically significant differences at ( $\alpha = 0.05$ ) concerning gender, Age and education level in employees' perception related to OCB. While length of service in employees' perception was no statistically significant differences at ( $\alpha = 0.05$ ). It may have been for this reason that selected hospitals are providing comprehensive care under the same rules and policies.

#### 6. Further Scope

It was found that employees' gender, age, and education level significantly affected their perception of OCB. However, the study had some limitations which need to be taken into consideration when examining the findings. These can be addressed in future studies. Some of the main limitations include using convenience sampling method which restricts the generalizability of the findings. Thus, a randomized sample may be used in further studies. The study takes into consideration only three government hospitals. Comprehensive studies involving all the Jordanian hospitals may be conducted in the further to have a larger size of the population. It would enhance the reliability of the results.

Future studies should investigate how the OCB norms could be developed in government hospitals to increase the employees' efficiency to provide a high quality of services. Further, such studies are required to be conducted in other hospitals with a large sample representative sample in more locations considering the variables such as organizational justice, job satisfaction, loyalty and effectives human resource managements, etc.

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#### References

- [1]. Podsakoff, N. P.; Whiting, S. W.; Podsakoff, P. M.; Blume, B. D. Individual and Organizational Level Consequences of Organizational Citizenship Behaviors: A Metaanalysis. Journal of applied Psychology. 2009, 94, 1, 122-141.
- [2]. Organ, D. W.; Podsakoff, P. M.; MacKenzie, S. B. Organizational Citizenship Behavior: Its Nature, Antecedents, and Consequences. SAGE Publications, Inc, California. 2006.
- [3]. Klotz, A. C.; Bolino, M. C.; Song, H.; Stornelli, J. Examining the Nature, Causes, and Consequences of Profiles of Organizational Citizenship Behavior. Journal of Organizational Behavior. 2018, 39, 5, 629-647.
- [4]. Organ, D. W. Organizational Citizenship Behavior: It's Construct Clean-Up Time. Human Performance. 1997, 10, 2, 85–97.
- [5]. O'Grady, S. Organisational Citizenship Behaviour: Sensitization to an Organisational Phenomenon. Journal of Nursing Management. 2018, 26, 7, 795-801.
- [6]. Kamel, B.; Ilyes, S.; Zohra, S. The Relationship between Demographic Characteristics and Organizational Citizenship Behavior in the National Company for Distribution of Electricity and Gas. International Journal of Innovative Research in Engineering & Management (IJIREM). 2015, 2, 6, 8-11.
- [7]. Uzonwanne, F. Organizational Citizenship Behaviour and Demographic Factors among Oil Workers in Nigeria. Journal of Humanities and Social Science. 2014, 19, 8, 87-95.
- [8]. Farzianpour, F.; Foroushani, A. R.; Kamjoo, H.; Hosseini, S. S. Organizational Citizenship Behavior (OCB) among the Managers of Teaching Hospitals. American Journal of Economics and Business Administration. 2011, 3, 3, 534.

- [9]. Altuntas, S.; Baykal, U. Organizational Citizenship Behaviour Levels of Nurses and Effective Factors. Journal of Health and Nursing Management. 2014, 1, 2, 89-98.
- [10]. Francis, U. C. Organizational Citizenship Behaviour and Demographic Factors among Oil Workers in Nigeria. Journal of Humanities and Social Science. 2014, 19, 8, 87-95.
- [11]. Abazeed, R. The Effect of Psychological Empowerment on Citizenship Behavior of Employees in Social Security Corporation in Jordan. Najah University Journal for Research Humanities. 2010, 24, 2, 494-519.
- [12]. Mahnaz, M. A.; Mehdi, M.; Jafar, K. M.; Abbolghasem, P. The Effect of Demographic Characteristics Teaching Hospitals in Tehran. African Journal of Business Management. 2013, 7, 34, 3324-3331.
- [13]. El-Badawy, T. A.; Trujillo-Reyes, J. C.; Magdy, M. M. The Demographics' Effects on Organizational Culture, Organizational Citizenship Behavior and Job Satisfaction: Evidence from Egypt and Mexico. Business and Management Research. 2017, 6, 1, 28.
- [14]. Devore, J. L. Probability and Statistics for Engineering and the Sciences. Cengage Learning. 2008.
- [15]. Zadeh, L. A. Fuzzy Sets. Information and Control. 1965, 8, 3, 338-353.
- [16]. Manton, K. G.; Woodbury, M. A.; Tolley, H. D. Statistical Applications Using Fuzzy Sets, New York: John Wiley & Sons. 1994.
- [17]. Buckley, J. J. Fuzzy Statistics, Springer-Verlag, New York. 2005.
- [18]. Wu, H. C. Statistical Confidence Intervals for Fuzzy Data. Expert Systems with Applications. 2009, 36, 2, 2670-2676.
- [19]. Bodjanova, S. Median Value and Median Interval of a Fuzzy Number. Information Sciences. 2005, 172, 1-2, 73-89.

- [20]. Arefi, M.; Taheri, S. M. Testing Fuzzy Hypotheses using Fuzzy Data based on Fuzzy Test Statistic. Journal of Uncertain Systems. 2011, 5, 1, 45-61.
- [21]. Wu, H. C. Analysis of Variance for Fuzzy Data. International Journal of Systems Science. 2007, 38, 3, 235-246.
- [22]. Parthiban, S.; Gajivaradhan, P. A Comparative Study of Two-Factor ANOVA Model under Fuzzy Environments using Trapezoidal Fuzzy Numbers. International Journal of Fuzzy Mathematical Archive. 2016, 10, 1, 1-25.
- [23]. Ministry of Health. Ministry of Health Strategic Plan (2013-2017) in Jordan, 2017 PP:1-62.(LinkRef), (accessed in 10 Feb 2019).
- [24]. Cohon, J. Quantitative Method in Psychology: A Power Primer. Psychological Bulletin. 1992, 112, 1, 55-59.
- [25]. Podsakoff, P. M.; Ahearne, M.; MacKenzie, S. B. Organizational Citizenship Behavior and the Quantity and Quality of Work Group Performance. Journal of Applied Psychology. 1997, 82, 2, 262-270.
- [26]. Whitehead, A. L.; Julious, S. A.; Cooper, C. L.; Campbell, M. J. Estimating the Sample Size for a Pilot Randomised Trial to Minimise the Overall Trial Sample Size for The External Pilot and Main Trial for a Continuous Outcome Variable. Statistical Methods in Medical Research. 2016, 25, 3, 1057-1073.
- [27]. Polit, D. F.; Beck, C. T. Essentials of Nursing Research: Appraising Evidence for Nursing Practice. Lippincott Williams & Wilkins. 2010.
- [28]. Census of Population and Housing. Population and Social Statistics Directorate Department of Population Statistics. The Population of the Kingdom by Administrative Divisions, Kingdom of Jordan Report 2015. (Accessed 2 Feb 2019). (RefLink)