

1 Article

2 Relationship of Work Context and Work Stress 3 among Sonographers in Riyadh, KSA

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16 **Abstract:** Work context is essential to understand in relation to handle the stress at work that
17 ultimately creates a feeling of satisfaction or dissatisfaction among health professionals. The
18 current study was conducted to investigate the relationship of work context and work stress among
19 sonographers (n=153) in Riyadh, Saudi Arabia. Additionally, the study provided a gender-based
20 comparison of both variables among sonographers. Work context was measured by administering
21 subscale of work context derived from Work Design Questionnaire. Whereas, work stress was
22 measured by Job Stress Scale. In addition, relationship of lifestyle was explored with work context
23 and work stress. Data was collected through survey research forms. Results revealed the significant
24 relationship of work context and work stress ($r=.251$, $p=.002$). Among lifestyle variables, perceived
25 good health ($r=.214$, $p=.008$) and sleep ($r=.242$, $p=.003$) were found positively related with
26 satisfaction toward work. Whereas, the strong positive correlation was found between work context
27 and frequency of physical activity ($r=.255$, $p=.005$). No significant difference was found among male
28 and female sonographers. The findings of this study contributed to evaluating the working
29 condition of sonographers in relation to work stress. Effective strategies for better working settings
30 as well as strategies for achieving satisfaction in work will be discussed to enhance the performance
31 of sonographers.

32 **Keywords:** work context; work conditions; work stress; job satisfaction; lifestyle; sonographers;
33 ergonomics

35 1. Introduction

36 Healthcare professionals are exposed to the risk of work stress due to many reasons, that can
37 affect their mental health status [1]. Several studies have explored various kinds of mental health
38 aspects that formed by the work design and work structure [2]. Working context can enhance and
39 impair mental health simultaneously [3,23,4]. Some studies investigated the effects of 'work-life
40 balance', have proved the existence of interactions among waged work, family, public and social life
41 [5]. Health professionals particularly, sonographers if not having excellent work context can suffer
42 from several health issues, for example, musculoskeletal injuries (MSI) [6]. The literature revealed
43 that health professionals face an elevated level of stress which leads to low self-esteem, low mood,
44 somatic complaints, sleep disturbances, and burnout [7]. This high level of stress of health
45 professional's grounds for both individual and organizational problems. Moreover, it can negatively
46 affect the standards of the expected health care services.

47 Work stress is one of the elements that negatively affect the performance of healthcare providers.
48 It is caused by many reasons; sometimes it is related to personal characteristics, habits, lifestyle,
49 personal incompetence and perceptual predispositions. Sometimes it arises from external sources, for
50 instance, social interactions at the workplace which are specifically the work relationships and
51 interactive contacts which have a significant effect on the quality of life at the workplace [8].
52 Sometimes work context including ergonomics, equipment used, working conditions provoke stress
53 [9,10]. Health care professionals cannot provide the best of their potentials if the level of stress is high
54 due to either reason [10,11].

55 Sonographers as professional health care providers have reported a high prevalence of work-
56 related musculoskeletal pain and discomfort [12,13]. Some latest studies indicated the high
57 prevalence of neck and shoulder pain among female sonographers [14,15]. Other researchers also
58 studied the stress-related risk factors such as disproportionate workload, time pressure, tough or
59 difficult tasks, insufficient rest breaks, monotony in conducting the same tasks, and the physically
60 poor work environment conditions are considered as additional factors affecting health care
61 professionals [16]. Further, there are other elements that cause stress such as long duration of
62 standing required by the service, sleeplessness due to being on night shifts, and eating disorders [17].

63 Job stress is common among health care providers rather than any other profession, i.e. the
64 increased workload, work environmental factors and work disparities [18]. Radiologist in New
65 Zealand, have experienced reduced levels of stress in the private clinics rather than their counterparts
66 in the public ones [19]. This is beside their exposure to distinctive kinds of stressors which are mainly
67 the intensive contact with patients who undergo pains and death [20]. Studies showed that people
68 suffered from occupational stress have also suffered from poor psychological well-being [21]. Work
69 stress may get increased among female professionals due to the family responsibilities that compel
70 them to respond in an imbalanced manner. Work stress and dissatisfaction of job might be greater
71 among female professionals or sonographers due to the family, social and professional demands [22].

72 The work environment includes many dimensions having biopsychosocial features of the work
73 setting [23]. These dimensions determine the satisfaction level of workers and their level of stress
74 [24]. The working conditions are representing the central aspects that induce the level of stress [1, 23].
75 For the clinical intervention to get effective outcomes; the personal characteristics of the healthcare
76 providers are significantly related to the positive change that these healthcare providers must leave
77 in promoting the health of their clients. The current study reflects on the outcomes of an investigation
78 that explores the sonographers' work experiences at the work environment and its relations to mental
79 health. Furthermore, various lifestyles have been studied in relation to work context and work stress.
80 After reviewing literature following hypotheses were formulated:

- 81 • There will be significant relationship of work context and work stress among sonographers
82 in Riyadh.
- 83 • There will be significant relationship between lifestyle, work context and work stress among
84 sonographers in Riyadh.
- 85 • There will be significant difference among male and female sonographer on work context
86 and work stress level.

87 2. Materials and Methods

88 The present study used correlational research design. The research method applied is
89 quantitative in nature in which survey technique using two standardized self-report questionnaires
90 were employed. The study was conducted to investigate the relationship of work context and work
91 stress among sonographers in Riyadh during May 2016-April 2017.

92 The sample of this study was comprised of (n=153) sonographers of Riyadh. Participants were
93 approached in governmental as well as private sectors. Qualified sonographer appointed at various
94 hospitals were included. Minimum work experience was at least 6 months. The tenure of 6 months
95 was considered to avoid adjustment problem.

96 A brief rating scale was prepared to measure the lifestyle. It included the factors of perceived
97 health, the frequency of physical activity and average sleep. Work Stress Scale [25], measures the level

98 of job satisfaction and opportunity for expression and achievement. It has 20 items. It can be scored
 99 as yes or no (0 and 1). Every yes reply scored as 1 score. More than 16 has been considered as
 100 satisfaction. Meanwhile, less than 10 scores signify stress at the job. Work Context Subscale is derived
 101 from Work Design Questionnaire developed by Morgeson and Humphrey in 2006 [26]. It contains 14
 102 items altogether. Work Context Subscale has further 4 domains namely Ergonomics (3 items),
 103 Physical Demand (3 items), Work Conditions (5 items), and Equipment Use (3 items). This
 104 instrument uses a 5-point Likert scale. Responses range from strongly disagree (score 1) to strongly
 105 agree (score 5). The third item of ergonomics domain has reversed scoring. A higher score indicates
 106 satisfaction with work setting.

107 All the ethical considerations were fulfilled before conducting the study. Ethical approval from
 108 the Departmental scientific sub-committee and Research Ethical committee of College of Health and
 109 Rehabilitation Sciences (application code: Z-F004), Princes Nourah Bint Abdulrahman University
 110 was sought. Before approaching participants, a letter explained the purpose of the study was sent to
 111 hospital administration for getting permission. Consent forms were provided to the subjects to
 112 indicate their willingness to participate in the study and to gather demographic information.
 113 Participants were assured about the confidentiality of their information. Then standardized scales
 114 were administered to individuals. Data was collected by using both means of individual
 115 administration and by online survey forms.

116 Collected data was analyzed by using SPSS (V. 24). Regression analysis was used to measure the
 117 predictive association of work context and work stress among sonographers. Additionally, one
 118 sample t-test was calculated to confirm the tendency of scores in the group. Pearson coefficient of
 119 correlation was conducted to measure the relationship between lifestyle variables with work context
 120 and work stress. Lastly, for comparison purpose among male and female sonographers on the
 121 variable of work context and work stress, independent sample t-test was calculated.

122 3. Results

123 Regression analysis was conducted to measure the predictive association of work context and
 124 work stress. Initially, Pearson's Correlation was conducted to measure the relationship of subscales
 125 of work context with the sum of scores and with work stress. Results in (Table1) indicated that the
 126 subscales of work context are having inter consistency with the total score of the work context.
 127 Subscale of ergonomics ($r=.580$, $p < .01$), physical demand ($r=.499$, $p < .01$), work conditions ($r=.781$, p
 128 $< .01$) and equipment use ($r=.689$, $p < .01$) were found strongly correlated with total work context
 129 scores. Further job satisfaction (work stress) scores also found highly significant correlation with
 130 subscale of work condition ($r=.261$, $p < .01$) and ergonomics ($r=.201$, $p < .05$). Results are also
 131 approving that there was a significant positive correlation between work context and work stress
 132 ($r=.251$, $p < .01$) among sonographers. Furthermore, regression analysis confirmed the predictive
 133 relationship $F(1,151)=10.193$, $p<.002$, $R^2=.063$. of work context on stress level.

134 **Table 1.** Regression Analysis of Subscales of work context, total work context score and work stress
 135 among sonographers.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Ergonomics	-					
(2) Physical demand	.140	-				
(3) Work conditions	.296**	.071	-			
(4) Equipment use	.243**	.302**	.320**	-		
(5) Work Context	.580**	.499**	.781**	.689**	-	
(6) Work Stress	.201*	.025	.261**	.114	.251**	-

136 ** $p < .01$, * $p < .05$

137 Model Summary of Multiple Regression Analysis

Variable	R	R ²	R ² Adjusted
Work Stress	.251 ^a	.063	.057

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ANOVA for the Regression Equation, work context on work stress among sonographers

Model	Ss	df	MS	F	p
Regression	217.424	1	217.24	10.193**	.002
Residual	3220.786	151	21.330		
Total	3438.209	152			

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**p < 0.01

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Beta Coefficients for predictors of Work stress among sonographers

Predictors	B	SE B	β	t	p
(Constant)	4.594	2.992		1.536	.127
Work Context	.187	.059	.251	3.193**	.002

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**p < 0.01

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One sample t-test was conducted to confirm the comparative results for the variables of work context and work stress. Results (table 2) indicated that sonographers of Riyadh scored high on both variables that showed high satisfaction toward their job context (t=98.02, p < .05) and toward their job (t=36.59, p < .05). Moreover, the mean score on work stress is higher than cut off point that confirms the higher job satisfaction level of sonographers in general (M=14.07>10).

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Table 2. Results of One-sample t-test and Descriptive Statistics for Work context and work stress among sonographers in Riyadh.

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Variables	M	SD	n	Comparison Value	95% CI for Mean Difference		t	df
Work Context	50.65	1.391	153	-	50.647,	51.67	98.02*	152
Work Stress	14.07	2.756	153	10	13.31,	14.83	36.59*	152

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* p < .05

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To measure the relationship of lifestyle variables with work context and job satisfaction, Pearson's product moment correlation was conducted. Results (Table 3) are showing the strong positive relationship between physical activity and satisfaction with work context (r=.225, p<.01). Whereas, job satisfaction was found highly correlated with perception of health (r=.214) and healthy average sleep (r=.242, p<.01).

158

Table 3. Correlation between lifestyle, work context and work stress.

Variables	Health	Physical activity	Sleep	Work Context	Work Stress
Health	-				
Physical activity	-.116	-			
Sleep	.250**	-.066	-		
Work Context	.139	.225**	.053	-	
Work Stress	.214**	-.109	.242**	.251**	-

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**p < .01, *p < .05

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To permit comparison across domains, results (Table 4) shows that there is no statistically significant difference among male and female sonographers on the variables of work context and

162 work stress. Although cutoff score for work stress is 10 but male sonographers (M=15.36) were found
163 more satisfied with their job as compared to female sonographers (13.72).

164 **Table 4.** Gender difference in Work context and work stress among sonographers in Riyadh.

Variables	Gender	Group						
		M	SD	N	Comparison Value	95% CI for Mean Difference	t	df
Work Context	Male	51.21	1.256	33	-	-1.767, 3.208	.572	151
	Female	50.49	1.835	120				
Work Stress	Male	15.36	2.869	33	10	-1.187, -3.481	1.774	151
	Females	13.72	2.629	120				

165 p> .05

166 4. Discussion

167 Work design or work context represent the satisfaction and self-motivational aspect of workers
168 [27]. Furthermore, it is related to the efficiency and level of performance. If the person finds working
169 environment or context appropriate to work that will increase the motivation, satisfaction and
170 performance level. Work context including standardized ergonomics, appropriate physical
171 workload, good working conditions, and use of equipment under controlled procedures, can enhance
172 the work efficiency [28]. All the factors in work contexts are equally important. Ergonomics allows
173 the sonographers to complete their tasks in an appropriate manner that can help to maintain their
174 physical health and protect them from work-related injuries. Therefore, the factor of ergonomic is
175 found having (33%) effect on satisfaction with work context. Second variable of physical demand is
176 explaining the load of work and explaining the variation of 24%. Working condition was found the
177 most influencing factor with the variation of 61%. Fourth variable was equipment use that is related
178 to technology and complexity. This variable was found having the second greatest impact factor
179 (47%). This has been statistically supported in this current study. All the subscales of work context
180 were highly correlated with total scores. It represents that sonographer in Riyadh were experiencing
181 high quality of working environment under standardized application of procedural protocol. It was
182 found in previous researches that if health professionals were not having good working settings that
183 affects their satisfaction level and performance as well [24, 29]. Additionally, another result is
184 valuable to explain regarding significant relationship of job satisfaction with work conditions and
185 ergonomics. These variables were found contributing to the satisfaction level or alternately
186 decreasing the stress level among sonographers. Predictive association of work context with stress
187 level strengthened the results.

188 Lifestyle has been found impacting the physical and psychological health of health care
189 professionals [7]. In referring to the sonographers, healthy lifestyle of physical exercise it was found
190 correlated with satisfaction to work context. It is similar to previous studies that addressed the issue
191 of reducing the chances of injuries by providing recommendations to improve the lifestyle of
192 sonographers. Morton and Delf in 2008 [9], have discussed various themes related to musculoskeletal
193 injury among sonographers and suggested that muscle strengthening exercises, stretches and
194 relaxing can help to prevent injuries. Other studies [12, 6] also recommended to raise the awareness
195 of sonographers due to high ratio of MSI occurrence, ergonomics, psychological effects on health.
196 Moreover, average sleep and perception of good health was found correlated with job satisfaction. It
197 is consistent with previous studies, where sonographers perceived that their life had been
198 compromised by their work and impact upon their sleep patterns [30].

199 Although in previous studies it was found that female sonographer were having higher
200 occurrences of MSI thus it was hypothesized to measure the difference of satisfaction with work
201 context and job among male and female sonographers. However, no significant difference was found
202 on both of the variables. It can be explained by having less number of male participant in the study.

203 Whereas, difference of mean scores is providing some valuable results. Mean score of male
204 sonographers is high on satisfaction with the working environment as well as on job satisfaction
205 (work stress). On job satisfaction, both groups scored higher mean than the comparison value. It can
206 be explained due to conducting the standardized procedure of protocol approved by Ministry of
207 Health for all sonographer that yields no difference.

208 There are some limitations of the study. The respondents of this current study were
209 predominantly female sonographers which demands for increasing male sonographers in future
210 similar studies to compare the different responses between males and female sonographers.

211 A similar study should be extended to other regions in the Kingdom of Saudi Arabia to obtain a
212 broader interpretation of the factors that influence sonographers' psychophysiological wellbeing as
213 well as job satisfaction. Furthermore, the sonographers' job satisfaction and overall organizational
214 contexts mainly the psychological correlates of work context particularly the social and interpersonal
215 interaction among sonographers need to be investigated for specific socio-economic and
216 development purposes. The lifestyle of diet, work/rest cycle, taking care of health and smoking
217 (health-harming behaviours) can be included.

218 To improve the work context for sonographers, it is recommended to provide hands-on,
219 multidisciplinary training programs to offer essential information for machine users experience
220 through ongoing proven evaluation techniques. It is also recommended for sonographers to
221 demonstrate several bodily exercises for example; stretching techniques to enable them to avoid
222 repetitive strain injuries. It is essential to take frequent breaks at work, to get up and walk or stretch,
223 to break the extended sitting cycle and to reduce the severe effects of sitting. Awareness regarding
224 work/rest cycle to administration and sonographers can increase the satisfaction level towards work.

225 5. Conclusions

226 It can be said that work context is neither just related to physical comfort (i.e. avoiding fatigue)
227 nor with work efficiency solely. Satisfaction with the working environment can be directly related to
228 psychological factors just like stress. It was found that if sonographers are satisfied with ergonomics,
229 physical demand of work, work conditions and equipment use it may lead toward the satisfaction of
230 work context, increased motivation and productivity. On the other hand, satisfaction with work
231 context can lead toward satisfaction towards job or lesser levels of stress. Some essential life-styles
232 were highlighted in this study. Physical exercise, average sleep and perception of health were
233 correlated with work context and work satisfaction. Specific, considerations should be given to
234 regulate the extreme work assignments and time pressures as it has been proved from the literature
235 that these factors may augment the work stress and increase or worsen the emotional/psychological
236 reactions of sonographers and might lead to stress and MSI. This study has also recommended that
237 healthcare settings must work to create conducive work conditions for its employees that are
238 conducive to employees' satisfaction with autonomy, competence, and affiliation.

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242 and contacted to hospitals via email; S.S.A and S.M.A.E released and the recruited email and survey; H.D.Q and
243 U.Z analysis and interpreted the data; U.Z and S.S.A have drafted the work and revised it.

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