

# Impact of break hours on work quality among respiratory care providers in Saudi Arabia's eastern province

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## ABSTRACT

The effect of working hours and break periods have been studied among different health care professionals; however, limited studies have been performed on respiratory care providers all over the world. This study aims to investigate the impact of the break time among respiratory providers and to determine whether there are any differences in the break time between the 8-hour shifts and 12-hour shifts and if differences in the break time rules and timing among different hospital categories in the Eastern province of Saudi Arabia will impact the quality of the work. The study was a cross-sectional, descriptive-analytical, questionnaire-based study targeting all respiratory care providers in the Eastern province of Saudi Arabia. The population was 183. The majority agreed that taking a break affects the quality of provided care, and the tendency to make errors increases when they do not have a break (59%). Their physical health and psychological health improve when they take a break. More than one-third of the 8 to 9 hour shift providers and day shift providers (39.6%) agreed on the fixed timing for breaks in their work area, while 66.9% of providers who worked 12 hour shifts and both (day/night) shift providers (69.3%) disagreed on that. This study demonstrated the influence of break hours on work quality among respiratory care providers in the Eastern Province of Saudi Arabia.

**Keywords:** Break time, Working shifts, Respiratory, Quality, Healthcare, Health organizations

## Introduction

A respiratory provider is a specialized healthcare provider working in advanced critical care to treat patients suffering from acute critical respiratory problems and cardiac and pulmonary conditions [1]. They work with all age categories, from premature infants to elderly adults in all hospital departments, and respiratory care providers are found in all intensive care units (Adult, Pediatric, and Neonatal), in hospital wards, in emergency departments, in pulmonary function test clinics (PFTs), in sleep labs (polysomnography), and even in-home care [2]. Respiratory care providers provide life support for patients

in intensive care units and emergency departments, stabilizing, curing, and organizing patient transport by air or ground transportation [3]. For that, a respiratory care provider must be available in the hospital twenty-four hours a day, and their working hours average between 35–40 hours per week, covering day, evening, and night shifts on weekdays, weekends, and holidays. Respiratory care providers usually work 12-hour shifts per day, and they spend most of the shift time standing on their feet [4].

Hospital healthcare providers often work long hours and sequential shifts, without a sufficient meals or rest breaks [5]. Serious declines in productivity related to provider fatigue can result in safety issues for both patients and providers. The risks of performing an error were remarkably raised when work shifts were more than twelve hours, when health care providers worked overtime, or when they spent more than forty hours working per week. Most respiratory care providers work prolonged hours, with most of them working at least 12 sequential hours. These long hours may affect patient safety and quality of care [6]. Additionally, healthcare providers working shifts of more than 10 hours were related to poor reports of

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patient care quality and safety performance in comparison with healthcare providers working eight- to nine-hour shifts [7].

Most of the studies showed that taking a one-hour lunch break has a positive effect on employees' physical well-being, psychological health, performance, and functionality and a decrease in work-related stress. More fruitful results for both organizational and labor levels can be obtained through scheduled one-hour lunch breaks. Moreover, this might result in the prevention of absenteeism, ameliorate work satisfaction, and improve employees' affirmative attitude toward their work [8]. Unfortunately, shortened rest breaks and meal periods free of responsibility, conditions that are taken for granted by numerous workers, are not guaranteed for hospital providers. Many healthcare providers feel that having a break will imperil patient care and/or make it hard to finish their assigned work before the end of the shift [6].

The effect of working hours and break periods have been studied among different healthcare professionals; however, limited studies have been performed on RTs, not only in Saudi Arabia but also internationally. Thus, for this research, we will study the impact of break hours on work quality among respiratory care providers in the Eastern Province of Saudi Arabia. It will focus on the respiratory care providers working in the first health cluster in Eastern province, which provides health care services to patients through 22 tertiary and secondary hospitals with a total capacity of 3,400 beds and more than 130 primary health care centers extend all across the Eastern Province of Saudi Arabia [9]. Additionally, private hospitals provide health care services to Eastern Province patients with a total bed capacity of 4,065 beds [10] as well as to other sectors; for example, military, educational, and others. Respiratory care providers in the Eastern province work in different health care departments, inpatient and outpatient departments, and in-home care handling serious critical care units in incentive care units, regular hospital wards, pulmonary function test clinics, education clinics, transport patients, and emergency room departments.

## Objectives

This study aims to investigate the impact of the break time among respiratory providers and to determine whether there are any differences in the break time between the 8-hour shifts and 12-hour shifts. Moreover, it has been observed that there are differences in the break time rules and timing among different hospital categories in the Eastern province of Saudi Arabia such as governmental hospitals, private hospitals, and providers from different sectors (e.g., military, educational, Johns Hopkins Aramco Health Care (JHAH), and the Royal Commission). This paper will study these differences and their impact on the quality of work.

## Materials and Methods

### Research design

The study was a cross-sectional, descriptive-analytical, questionnaire-based study targeting all respiratory care providers in the Eastern province of Saudi Arabia from the governmental sector (Ministry of Health (MOH)/cluster hospitals), private sector, and other sectors (e.g., military, educational, JHAH, and the Royal Commission). The information was collected at one point in time to explore the impact of break hours on work quality among respiratory care providers in the Eastern Province of Saudi Arabia.

### Study population and sampling technique

According to the MoH statistical book for 2020, 1027 allied health professionals work in the Eastern Province [10]. However, this number represents different specialties of allied health professionals, which also include respiratory care providers. In the Saudi research literature, 337 respiratory care providers in Eastern Province work in different areas, including respiratory equipment, ward units, critical care units, respiratory clinics, administration offices, home care, sleep labs, and transportation [11]. With a 95% confidence level, a margin of error of 5%, and using the Raosoft sample size calculator available online, the calculated sample size was 180 respiratory care providers. The inclusion criteria were all respiratory care providers working in the Eastern Province. Exclusion criteria are any health care providers other than respiratory care providers and respiratory care providers outside the Eastern Province. Statistics were descriptive (percentages, mean, median, mode, and frequencies) and correlation tests, such as t-test, ANOVA, and chi-square tests. Additionally, tables and figures were used to present the data.

The anonymous questionnaire contained four sections. Section #1: Demographic data. Section #2: Questions regarding the impact of break hours on the quality of work among respiratory care providers according to previous studies [5, 6, 8]. Section #3: Questions about the differences in the break hours between the 8-hour shifts and 12-hour shifts according to previous studies [5-7, 12, 13]. Section #4: Questions related to the differences in the break rules and timing among different hospital categories. The questions were in the form of multiple-choice questions. All collected data were analyzed by Excel to ensure the correct representation of our population and study variables.

The information sheet that contains the aim of the study, contact information for inquiries, and the right to withdraw questionnaires were given to each participant; thus, informed consent was obtained from participants to participate in this study at the beginning of the questionnaires. Participants' confidentiality and data privacy were ensured by maintaining completely anonymous involvement in the study and were written on the questionnaire's face sheet. Participation in the survey was voluntary, and there were no risks involved. There was no cost to participate in this study. The data were collected from respiratory care providers who are working at different hospitals during August 2022 using a self-administered questionnaire in the English language.

### Statistical analysis and study variables

After the collection of the questionnaires, each was coded into serial numbers using Excel. The variables were transferred as categorical data to the variable sheet of SPSS. Descriptive analysis was performed for demographic data such as gender, nationality, marital status, number of children, age of children, level of education, employment status, registered profession, work area, work hours, and nature of working hours, which were reported as frequencies and percentages. Chi-square analysis was used to find the association between dependent and independent variables. The dependent variables were work hours, respiratory care providers' demographic characteristics, and respiratory care providers' work characteristics, while the independent variables were work hours, break rules and timing among different hospital categories, and the total impact of break time on work quality. All statistical tests were considered significant with a p-value less than 0.05.

## Results and Discussion

### Demographic analysis

A total of 206 providers completed the survey. Twenty-three responses were excluded because they came from providers, not in Eastern Province leading to a total study population of 183. **Table 1** shows the demographic characteristics of the respiratory care providers and shows that more than half (58.5%) were female, the majority (87.4%) were Saudi, and 43.2% were married and had children. Additionally, less than one-third (29.5%) of them had 1 to 2 children, and 55.7% of them had children aged 0–6 years. Most (82.5%) had a bachelor's degree.

**Table 1. Frequency Distribution of Respiratory Care Providers According to Demographic Characteristics (N=183)**

Demographic Characteristics	Frequency	%
<i>Gender</i>		
Male	76	41.5
Female	107	58.5
<i>Nationality</i>		
Saudi	160	87.4
Non-Saudi	23	12.6
<i>Marital status:</i>		
Single	70	38.3
Married with no children	34	18.6
Married with children	79	43.2
<i>Children number</i>		
0	105	57.4
1	28	15.3
2	26	14.2
3	11	6.0
4	9	4.9
≥5	4	2.2

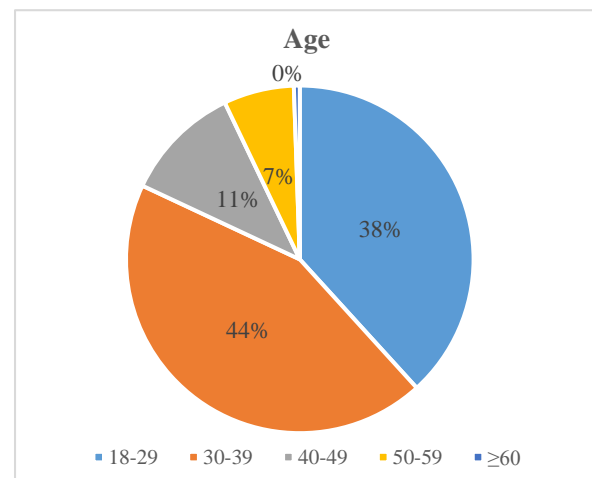
**Children age: (n=83)**

0–6 Years	46	55.4
0–6 Years and 7–15 Years	21	26.6
7–15 Years	16	19.2

**Level of education:**

Diploma	3	1.6
Bachelor's degree	151	82.5
Master's degree	26	14.2
Ph.D. degree	3	1.6

Regarding the age group of respiratory care providers, **Figure 1** shows that (44%) were aged 30 to 39 years, followed by (38%) of them with ages ranging from 18 to 29 years.



**Figure 1. Percentage Distribution of Respiratory Care Therapists by Age, N = 183**

**Table 2** presents the work characteristics of respiratory care providers; it shows that nearly half (45.4% and 53%) worked in governmental institutions as respiratory therapists I. Regarding working hours, nearly three-quarters (71.1%) of them worked 12-hour shifts, and nearly two-thirds (69.4%) of them worked both day and night shifts.

**Table 2. Frequency Distribution of Respiratory Care Providers Based on Work Characteristics (N= 183)**

Work Characteristics	Frequency	%
<i>Employment status</i>		
Governmental employee	83	45.4
Private Sector employee	35	19.1
Student	10	5.5
Other Sectors employee	55	30.1
<i>Job Title</i>		
Assistant Technician	4	2.2
Technician	13	7.1
Respiratory Therapist I	97	53.0
Respiratory Therapist II	23	12.6
Senior Respiratory Therapist I	19	10.4
Senior Respiratory Therapist II	19	10.4

Respiratory Consultant	8	4.4
<b>Work hours</b>		
8- to 9-hour shift	53	28.9
12-hour shift	130	71.1
<b>Nature of working hours</b>		
Day shift	48	26.2
Night shift	8	4.4
Both Day and Night shifts	127	69.4

### The impact of the break on patient care provided

Regarding the effect of the break on patient care, **Table 3** reveals that (59%) of respiratory care providers agreed that taking a break affects the quality of care provided, and (67.2%) felt stressed if they did not have the break. Additionally, the majority (87.5% and 83.1%, respectively) agreed that their physical and psychological health is improved by being able to take a break. Moreover, more than half (64%) revealed that the timing of the break affects the quality of their social and personal life.

**Table 3. The effect of break hours on the quality of work among respiratory care providers (N= 183)**

Item	Agree		Neutral		Disagree	
	N	%	N	%	N	%
My break time affects the quality of care I provide.	108	59	26	14.2	49	26.8
I feel guilty when I have my break and stop my patient care.	70	38.2	38	20.8	75	41
I feel stressed if I do not have the chance to go on break.	123	67.2	33	18	27	14.8
The chance of making an error is raised when I don't take my break.	108	59	41	22.4	34	18.5
My physical health is improved by being able to take a break.	160	87.5	13	7.1	10	5.4
My psychological health and stress level are improved by being able to take a break.	152	83.1	16	8.7	15	8.2
My breaks affect the quality of my social and personal life.	117	64	38	20.8	28	15.3
Generally, I am satisfied with my break time.	90	49.2	20.8	20.8	55	30.1

### The differences in the break time between 8- and 12-hour shifts

Regarding differences in the effect of taking a break between 8-hour and 12-hour shifts, **Table 4** reflects that more than half (67.8%) of respiratory care providers agreed that they could finish all their assigned tasks even if they had their break, while 78.8% and 74.3% reported that they could not go on break due

to the high workload and the urgency of their work affected taking a break, respectively.

**Table 4. The differences in the break hours between 8 and 12-hour shifts (N= 183)**

Item	Agree		Neutral		Disagree	
	N	%	N	%	N	%
I usually have the chance to go on break during my work hours.	99	54.1	18.6	18.6	50	27.4
I can finish all my assigned tasks even if I have had my break.	124	67.8	26	14.2	33	18
Sometimes I cannot go on break due to the high workload that is assigned to me.	144	78.8	24	13.1	15	8.2
The urgency of my work affects my chance to take a break.	136	74.3	23	12.6	24	13.1

### The differences in break rules and break timing among different hospital categories in eastern province hospitals

Regarding differences in the break rules and timing among different hospital categories, **Table 5** shows that (59.5%) of respiratory care providers disagreed that they had a fixed time for breaks in the work area, and (51.9%) disagreed that they could have a break any time during the shift. A total of (45.9%) of the respiratory care providers disagreed that their colleagues covered their tasks at break time, and (53%) disagreed that there were clear rules and guidelines for the break times in their unit.

**Table 5. The differences in the break rules and timing among different hospital categories in the Eastern province hospitals: Governmental sector, Private sector, and other health sectors (N= 183)**

Item	Agree		Neutral		Disagree	
	N	%	N	%	N	%
During my break, my tasks are covered by my colleague.	62	33.9	37	20.2	84	45.9
I can have my break any time during the shift.	54	29.5	34	18.6	95	51.9
I have fixed a time for my break in my work area.	47	25.7	27	14.8	109	59.5
There are clear rules and guidelines for the break times in my unit.	47	25.7	39	21.3	97	53

### Association among study variables

Association was tested by applying a Chi-square test analysis between the demographic data of the participants and the impact of the break on the patient care provided (**Table 6**). There was a significant association between the provider's nationality, number of children, level of education, job title registration level, work hours, and the nature of working hours and the effects of quality on care provided (**Table 6**). Additionally, there was a significant association between the stress level when they

did not have the chance to go on break and the job title registration level (Table 6). Additionally, there was a strong correlation between physical health improvement when they took a break and the provider's level of education, job title registration level, and work hours (Table 6). Moreover, there was a significant association between the improvement of

psychological health and stress levels when the providers took a break and their nationality, level of education, job title registration level, work hours, and the nature of working hours (Table 6). Overall satisfaction with the provider's break time was significantly associated with their nationality, marital status, and work hours (Table 6).

Table 6. Percentages of demographics and the impact of the break on the patient care provided (N = 183)

Item	My break time affects the quality of care I provide.			I feel guilty when I have my break and stop my patient care.			I feel stressed if I do not have the chance to go on break.			The chance of making error is raised when I don't have my break.			My physical health is improved by being able to take a break.			My psychological health and stress level are improved by being able to take a break.			My breaks affect the quality of my social and personal life.			Generally, I am satisfied with my break time.		
	A*	N†	D§	A	N	D	A	N	D	A	N	D	A	N	D	A	N	D	A	N	D	A	N	D
<i>Gender</i>																								
Male	57.9	14.5	27.6	32.9	22.4	44.7	61.8	22.4	15.8	61.8	25	13.2	86.8	6.6	6.6	78.9	9.2	11.8	56.6	28.9	14.5	56.6	15.8	27.6
Female	59.8	14	26.2	42.1	19.6	38.3	71	14.9	14	57	20.6	22.4	87.8	7.5	4.7	86	8.4	5.6	69.2	14.9	15.9	43.9	24.3	31.8
Overall fit $\chi^2$	(P value = 0.965)			(P value = 0.453)			(P value = 0.366)			(P value = 0.269)			(P value = 0.839)			(P value = 0.300)			(P value = 0.068)			(P value = 0.196)		
<i>Nationality</i>																								
Saudi	63.7	11.3	25	38.8	20.6	40.6	68.7	17.5	13.8	60.6	21.2	18.2	88.8	5.6	5.6	83.7	6.9	9.4	66.3	20	13.7	52.5	17.5	40
Non-Saudi	26.1	34.8	39.1	34.8	21.7	43.5	56.5	21.7	21.7	47.8	30.4	21.7	78.3	17.4	4.3	78.3	21.7	0	47.8	26.1	26.1	26.1	43.5	30.4
Overall fit $\chi^2$	(P value = 0.000)			(P value = 0.934)			(P value = 0.468)			(P value = 0.482)			(P value = 0.120)			(P value = 0.025)			(P value = 0.180)			(P value = 0.009)		
<i>Marital status</i>																								
Single	58.6	12.8	28.6	37.1	20	42.9	67.1	21.4	11.4	64.3	22.9	12.8	85.7	10	4.3	84.3	7.1	8.6	62.8	21.4	15.7	45.7	25.7	28.6
Married with no children	50	17.6	32.4	35.3	26.5	38.2	73.5	8.8	17.6	52.9	29.4	17.6	88.2	5.9	5.9	85.3	11.8	2.9	52.9	20.6	26.5	32.4	14.7	52.9
Married with children	63.3	13.9	22.8	40.5	19	40.5	64.6	19	16.4	57	19	24	88.6	5.1	6.3	681	8.9	10.1	69.6	20.3	10.1	59.5	19	21.5
Overall fit $\chi^2$	(P value = 0.728)			(P value = 0.909)			(P value = 0.517)			(P value = 0.368)			(P value = 0.791)			(P value = 0.708)			(P value = 0.263)			(P value = 0.010)		
<i>Number of Children</i>																								
0	55.2	14.3	30.5	36.2	22.9	40.9	69.5	17.1	13.3	60.9	24.8	14.3	89.7	8.6	4.8	84.8	8.6	6.7	60	20.9	19.1	41.9	21.9	36.2
1	75	7.1	17.9	39.3	17.9	42.8	67.9	25	7.1	60.7	25	14.3	100	0	0	85.7	3.6	10.7	75	21.4	3.6	53.6	21.4	25
2	76.9	11.5	11.5	34.6	7.7	57.7	76.9	15.4	7.7	61.5	15.4	23.1	88.5	3.8	7.7	80.8	7.7	11.5	76.9	7.7	15.4	69.2	7.7	23.1
3	36.4	9.1	54.5	45.4	36.4	18.2	54.5	9.1	36.4	45.4	9.1	45.4	90.9	9.1	0	90.9	9.1	0	45.4	36.4	18.2	54.5	36.4	9.1
4	33.3	44.4	22.2	55.5	22.2	22.2	44.4	22.2	33.3	55.5	22.2	22.2	66.7	11.1	22.2	55.5	22.2	22.2	66.7	22.2	11.1	55.5	33.3	11.1
≥5	50	25	25	50	25	25	25	25	50	25	25	50	50	25	25	75	25	0	50	50	0	50	0	50

Overall fit $\chi^2$	<b>(P value = 0.037)</b>		<b>(P value = 0.471)</b>		<b>(P value = 0.127)</b>		<b>(P value = 0.348)</b>		<b>(P value = 0.092)</b>		<b>(P value = 0.509)</b>		<b>(P value = 0.316)</b>		<b>(P value = 0.186)</b>	
<i>Children age: (n=84)</i>																
0–6 Years	73.9	10.9	15.2	32.6	19.6	47.8	65.2	21.7	13	56.5	21.7	21.7	91.3	2.2	6.5	80.4
0–6 Years and 7–15 Years	47.6	23.8	28.6	57.1	14.3	28.6	57.1	9.5	33.3	57.1	9.5	33.3	90.5	4.8	4.8	81
7–15 Years	162.5	18.8	18.8	50	6.3	43.8	68.8	18.8	12.5	50	18.8	31.3	75	12.5	12.5	87.5
Overall fit $\chi^2$	<b>(P value = 0.336)</b>		<b>(P value = 0.286)</b>		<b>(P value = 0.283)</b>		<b>(P value = 0.698)</b>		<b>(P value = 0.429)</b>		<b>(P value = 0.934)</b>		<b>(P value = 0.141)</b>		<b>(P value = 0.529)</b>	
<i>Level of education</i>																
Diploma	100	0	0	33.3	66.7	0	33.3	66.7	0	33.3	66.7	0	33.3	66.7	0	66.7
Bachelor's degree	60.3	11.3	28.5	40.4	17.2	42.4	68.2	16.6	15.2	61.6	21.2	17.2	89.4	6	4.6	84.8
Master's degree	61.5	15.4	23.1	30.8	30.8	38.5	69.2	19.2	11.5	53.8	23.1	23.1	84.6	3.8	11.5	76.9
PhD degree	0	100	0	0	66.7	33.3	33.3	33.3	33.3	0	33.3	66.7	66.7	33.3	0	33.3
Overall fit $\chi^2$	<b>(P value = 0.000)</b>		<b>(P value = 0.077)</b>		<b>(P value = 0.326)</b>		<b>(P value = 0.124)</b>		<b>(P value = 0.001)</b>		<b>(P value = 0.011)</b>		<b>(P value = 0.733)</b>		<b>(P value = 0.554)</b>	
<i>Employment status</i>																
Governmental employee	60.2	12	27.7	32.5	19.3	48.2	63.9	21.7	14.5	51.8	28.9	19.3	85.5	8.4	6	85.5
Private Sector employee	45.7	25.7	28	40	28.6	31.4	62.9	14.3	22.9	57.1	22.9	20	85.7	8.6	5.7	85.7
Student	60	10	30	20	30	50	60	30	10	70	10	20	90	0	10	90
Other Sectors	65.5	10.9	23.6	49.1	16.4	34.5	76.4	12.7	10.9	69.1	14.5	16.4	90.9	5.5	5.5	76.4
Overall fit $\chi^2$	<b>(P value = 0.440)</b>		<b>(P value = 0.243)</b>		<b>(P value = 0.445)</b>		<b>(P value = 0.435)</b>		<b>(P value = 0.948)</b>		<b>(P value = 0.620)</b>		<b>(P value = 0.516)</b>		<b>(P value = 0.666)</b>	
<i>Job title</i>																
Assistant Technician	25	50	25	0	50	50	25	50	25	50	50	0	50	50	0	75
Technician	30.8	46.2	23.1	46.2	15.4	38.5	30.8	53.8	15.4	69.2	23.1	7.7	84.6	15.4	0	69.2
Respiratory Therapist I	62.9	7.2	29.9	35.1	20.6	44.3	73.2	13.4	13.4	57.7	21.6	20.6	88.7	6.2	5.2	88.7
Respiratory Therapist II	60.9	8.7	30.4	47.8	13	39.1	82.6	8.7	8.7	56.5	30.4	13	91.3	4.3	4.3	91.3
Senior Respiratory Therapist I	68.4	10.5	21.1	42.1	10.5	47.4	68.4	15.8	15.8	73.7	5.3	21.1	94.7	0	5.3	68.4
Senior Respiratory Therapist II	73.7	5.3	21.1	47.4	26.3	26.3	68.4	15.8	15.8	68.4	21.1	10.5	94.7	0	5.3	68.4
Respiratory Consultant	12.5	75	12.5	25	50	25	25	37.5	37.5	12.5	37.5	50	50	25	25	37.5

Overall fit $\chi^2$	(P value = 0.000)			(P value = 0.406)			(P value = 0.009)			(P value = 0.158)			(P value = 0.007)			(P value = 0.001)			(P value = 0.594)			(P value = 0.061)		
Work hours																								
8- to 9-hour shift	47.2	26.4	0	41.5	20.8	37.7	60.4	20.8	18.9	54.7	22.6	22.6	77.4	17	5.7	75.5	20.8	3.8	64.2	20.8	15.1	56.6	26.4	17
12-hour shift	63.8	9.2	26.9	36.9	20.8	42.3	70	16.9	13.1	60.8	22.3	16.9	91.5	3.1	5.4	86.2	3.8	10	63.8	20.8	15.4	46.2	18.5	35.4
Overall fit $\chi^2$	(P value = 0.000)			(P value = 0.819)			(P value = 0.431)			(P value = 0.638)			(P value = 0.003)			(P value = 0.000)			(P value = 0.998)			(P value = 0.044)		
Nature of working hours																								
Day shift	47.9	22.9	29.2	37.5	25	37.5	62.5	18.8	18.8	54.2	22.9	22.9	79.2	12.5	8.3	72.9	18.8	8.3	60.4	18.8	20.8	54.2	22.9	22.9
Night shift	37.5	37.5	25	12.5	0	87.5	50	25	25	50	37.5	12.5	75	25	0	87.5	12.5	0	62.5	12.5	25	50	37.5	12.5
Both Day and Night shifts	64.6	9.4	26	40.2	20.5	39.4	70.1	17.3	12.6	61.4	21.3	17.3	91.3	3.9	4.7	86.6	4.7	8.7	65.4	22	12.6	47.2	18.9	33.9
Overall fit $\chi^2$	(P value = 0.039)			(P value = 0.090)			(P value = 0.659)			(P value = 0.722)			(P value = 0.052)			(P value = 0.050)			(P value = 0.617)			(P value = 0.408)		

A\* = Agree  
 N† = Neutral  
 D§ = Disagree

Furthermore, when the chi-square test analysis was applied to find the association between the demographic data of the participants and the impact of the break and workload, there was a significant association between the chance of taking a break during work hours and the provider's nationality and health organization employment status (Table 7). Additionally, there was a significant association between the provider's ability to finish the assigned tasks even if they had a break and their

nationality (Table 7). There was a significant correlation between the provider's inability to take a break due to the high workload and job title registration level (Table 7). Moreover, there was a significant association between the provider's chance to take a break due to work urgency and the number of children they had, job title registration level, their work hours, and the nature of working hours (Table 7).

Table 7. Percentages of demographic data of the participants and the impact of the break and workload (N = 183)

Item	I usually have the chance to go on break during my work hours.			I am able to finish all my assigned tasks even if I have had my break.			Sometimes I cannot go on break due to the high workload that is assigned to me.			The urgency of my work affects my chance to take a break.		
	Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree
<i>Gender</i>												
Male	53.9	17.1	28.9	68.4	14.5	17.1	73.7	18.4	7.9	71.1	17.1	11.8
Female	54.2	19.6	26.2	67.3	14	18.75	82.2	9.3	8.4	76.6	9.3	14
Overall fit $\chi^2$	(P value = 0.870)			(P value = 0.962)			(P value = 0.200)			(P value = 0.290)		
<i>Nationality</i>												
Saudi	53.8	21.3	25	71.3	12.5	16.3	78.8	13.1	8.1	75.6	11.3	13.1
Non-Saudi	56.5	0	43.5	43.5	26.1	30.4	78.3	13	8.7	65.2	21.7	13
Overall fit $\chi^2$	(P value = 0.024)			(P value = 0.028)			(P value = 0.995)			(P value = 0.358)		
<i>Marital status</i>												
Single	54.3	15.7	30	72.9	12.9	14.3	81.4	12.9	5.7	77.1	12.9	10
Married with no children	44.1	23.5	32.4	52.9	11.8	35.3	85.3	8.8	5.9	79.4	11.8	8.8
Married with children	58.2	19	22.8	69.6	16.5	13.9	73.4	15.2	11.4	69.6	12.7	17.7
Overall fit $\chi^2$	(P value = 0.603)			(P value = 0.065)			(P value = 0.556)			(P value = 0.604)		

<i>Children number</i>												
0	51.4	18.1	30.5	66.7	12.4	21	81.9	12.4	5.7	77.1	13.3	9.5
1	64.3	14.3	21.4	71.4	10.7	17.9	85.7	10.7	3.6	85.7	7.1	7.1
2	53.8	23.1	23.1	61.5	19.2	19.2	69.2	15.4	15.4	76.9	7.7	15.4
3	54.5	9.1	36.4	72.7	18.2	9.1	63.6	18.2	18.2	27.3	36.4	36.4
4	55.5	33.3	11.1	77.8	22.2	0	66.7	22.2	11.1	77.8	11.1	11.1
≥ 5	50	25	25	75	25	0	75	0	25	25	0	75
Overall fit $\chi^2$	(P value = 0.887)			(P value = 0.849)			(P value = 0.566)			(P value = 0.000)		
<i>Children age: (n=84)</i>												
0–6 Years	56.5	23.9	19.6	69.6	15.2	15.2	67.4	21.7	10.9	78.3	8.7	13
0–6 Years and 7–15 Years	61.9	14.3	23.8	76.2	14.3	9.5	71.4	9.5	19	66.7	4.8	28.6
7–15 Years	50	12.5	37.5	50	31.3	18.8	87.5	6.3	6.3	56.3	25	18.8
Overall fit $\chi^2$	(P value = 0.561)			(P value = 0.481)			(P value = 0.340)			(P value = 0.153)		
<i>Level of education</i>												
Diploma	66.7	33.3	0	33.3	33.3	33.3	66.7	33.3	0	33.3	66.7	0
Bachelor's degree	53.6	19.9	26.5	68.9	14.6	16.6	78.1	13.9	7.9	74.2	13.2	12.6
Master's degree	57.7	11.5	30.8	73.1	7.7	19.2	84.6	3.8	11.5	80.8	7.7	11.5
PhD degree	66.7	0	33.3	33.3	33.3	33.3	33.3	0	0	66.7	0	33.3
Overall fit $\chi^2$	(P value = 0.811)			(P value = 0.611)			(P value = 0.700)			(P value = 0.132)		
<i>Employment status</i>												
Governmental employee	53	26.5	20.5	67.5	19.3	13.3	75.9	15.7	8.4	71.1	13.3	15.7
Private Sector employee	54.3	25.7	20	68.6	14.3	17.1	80	11.4	8.6	274.3	17.1	8.6
Student	70	0	30	90	10	0	90	10	0	90	10	0
Other Sectors	52.7	9.1	38.2	63.6	7.3	29.1	80	10.9	9.1	76.4	9.1	14.5
Overall fit $\chi^2$	(P value = 0.005)			(P value = 0.089)			(P value = 0.927)			(P value = 0.672)		
<i>Job title</i>												
Assistant Technician	0	25	75	0	50	50	0	75	25	25	50	25
Technician	53.8	30.8	15.4	69.2	30.8	0	61.5	15.4	23.1	53.8	23.1	23.1
Respiratory Therapist I	58.8	12.4	28.9	71.1	10.3	18.6	81.4	13.4	5.2	78.4	12.4	9.3
Respiratory Therapist II	39.1	34.8	26.1	69.6	17.4	13	95.7	0	4.3	91.3	4.3	4.3
Senior Respiratory Therapist I	73.7	15.8	10.5	73.7	10.5	15.8	73.7	15.8	10.5	68.4	0	31.6
Senior Respiratory Therapist II	47.4	26.3	26.3	63.2	10.5	26.3	78.9	15.8	5.3	73.7	15.8	10.5
Respiratory Consultant	37.5	12.5	50	50	25	25	75	0	25	50	25	25
Overall fit $\chi^2$	(P value = 0.062)			(P value = 0.125)			(P value = 0.002)			(P value = 0.004)		
<i>Work hours</i>												
8- to 9-hour shift	62.3	15.1	22.6	69.8	17	13.2	67.9	18.9	13.2	56.6	15.1	28.3
12-hour shift	50.8	20	29.2	66.9	13.1	20	83.1	10.8	6.2	81.5	11.5	6.9
Overall fit $\chi^2$	(P value = 0.366)			(P value = 0.493)			(P value = 0.071)			(P value = 0.000)		
<i>Nature of working hours</i>												
Day shift	64.6	12.5	22.9	64.6	18.8	16.7	70.8	12.5	16.7	62.5	14.6	22.9
Night shift	75	0	25	75	12.5	12.5	87.5	12.5	0	50	37.5	12.5
Both Day and Night shifts	48.8	22	29.1	68.5	12.6	18.9	81.1	13.4	5.5	80.3	10.2	9.4
Overall fit $\chi^2$	(P value = 0.195)			(P value = 0.856)			(P value = 0.161)			(P value = 0.020)		

In addition, the association was tested by applying a Chi-square test analysis between the provider's demographics and the health organizational rules regarding taking a break; it was found that there was a significant association between the willingness of the provider's colleague to cover while a provider took a break and the provider's nationality and health organizations' employment status (**Table 8**). Additionally, there was a significant association between the ability of the providers to take a break at any time during the shift and their marital status and children's ages

(**Table 8**). There was also a significant association between the providers establishing a fixed time for the break in their work area and their children's age, their level of education, job title registration level, work hours, and the nature of working hours (**Table 8**). Finally, there was a significant association between the availability of clear rules and guidelines for the break in their unit and their level of education, job title registration level, work hours, and the nature of working hours (**Table 8**).



Table 8. Percentages of demographics and the health organizational rules regarding break time (N = 183)

Item	During my break time, my tasks are covered by my colleague.			I can have my break any time during the shift.			I have a fixed time for my break in my work area.			There are clear rules and guidelines for break times in my unit.		
	Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree	Agree	Neutral	Disagree
<i>Gender</i>												
Male	9.5	19.7	40.8	28.9	22.4	48.7	25	17.1	57.9	26.3	19.7	53.9
Female	29.9	20.6	49.5	29.9	15.9	54.2	26.2	13.1	60.7	25.2	22.4	52.3
Overall fit $\chi^2$	(P value = 0.376)			(P value = 0.527)			(P value = 0.751)			(P value = 0.907)		
<i>Nationality</i>												
Saudi	37.5	19.4	43.1	30.6	17.5	51.9	25	15	60	25.6	19.4	55
Non-Saudi	8.7	26.1	65.2	21.7	26.1	52.2	30.4	13	56.5	26.1	34.8	39.1
Overall fit $\chi^2$	(P value = 0.023)			(P value = 0.512)			(P value = 0.850)			(P value = 0.202)		
<i>Marital status:</i>												
Single	28.6	18.6	52.9	25.7	20	54.3	24.3	17.1	58.6	21.4	20	58.6
Married with no children	29.4	11.8	58.8	38.2	14.7	47.1	823.5	11.8	64.7	20.6	20.6	58.8
Married with children	40.5	25.3	34.2	29.1	19	51.9	27.8	13.9	58.2	31.6	22.8	45.6
Overall fit $\chi^2$	(P value = 0.076)			(P value = 0.045)			(P value = 0.916)			(P value = 0.473)		
<i>Children number</i>												
0	29.5	16.2	54.3	29.5	19	51.4	23.8	15.2	61	21	20	59
1	39.3	21.4	39.3	32.1	21.4	10.7	25	7.1	67.9	28.6	17.9	53.6
2	34.6	34.6	30.8	26.9	15.4	57.7	30.8	11.5	57.7	46.2	15.4	38.5
3	63.6	18.2	18.2	27.3	18.2	54.5	36.4	9.1	54.5	9.1	45.5	45.5
4	33.3	11.1	55.5	33.3	11.1	55.5	33.3	33.3	33.3	44.4	33.3	22.2
≥ 5	25	50	25	25	25	50	0	50	50	0	25	75
Overall fit $\chi^2$	(P value = 0.130)			(P value = 0.505)			(P value = 0.384)			(P value = 0.077)		
<i>Children age: (n=84)</i>												
0–6 Years	39.1	28.3	32.6	21.7	21.7	56.5	23.9	15.2	60.9	39.1	17.4	43.5
0–6 Years and 7–15 Years	42.9	9.5	47.6	28.6	0	71.4	28.6	61.9	9.5	19	19	61.9
7–15 Years	25	37.5	37.5	37.5	31.3	31.3	31.3	18.8	43.8	37.5	31.3	31.3
Overall fit $\chi^2$	(P value = 0.297)			(P value = 0.049)			(P value = 0.000)			(P value = 0.294)		
<i>Level of education</i>												
Diploma	33.3	33.3	33.3	0	66.7	33.3	0	66.7	33.3	0	66.7	33.3
Bachelor's degree	31.8	21.2	47	27.8	19.2	53	25.2	11.9	62.9	22.5	19.2	58.3
Master's degree	53.8	7.7	38.5	38.5	7.7	53.8	26.9	26.9	46.2	46.2	26.9	26.9
PhD degree	0	33.3	66.7	66.7	33.3	0	66.7	0	33.3	33.3	66.7	0
Overall fit $\chi^2$	(P value = 0.271)			(P value = 0.097)			(P value = 0.031)			(P value = 0.006)		
<i>Employment status</i>												
Governmental employee	43.4	26.5	30.1	25.3	18.1	56.6	26.5	15.7	57.8	30.1	25.3	44.6
Private Sector employee	22.9	22.9	54.3	34.3	20	45.7	22.9	14.3	62.9	22.9	14.3	62.9
Student	30	20	50	30	20	50	10	40	50	10	20	70
Other Sectors	27.3	9.1	63.6	32.7	18.2	49.1	29.1	9.1	61.8	23.6	20	56.4
Overall fit $\chi^2$	(P value = 0.005)			(P value = 0.942)			(P value = 0.301)			(P value = 0.458)		
<i>Job title</i>												
Assistant Technician	0	75	25	0	25	75	0	50	50	25	50	25
Technician	23.1	15.4	61.5	30.8	38.5	30.8	7.7	23.1	69.2	46.2	15.4	38.5
Respiratory Therapist I	37.1	19.6	43.3	30.9	19.6	49.5	24.7	13.4	61.9	16.5	22.7	60.8

<b>Respiratory Therapist II</b>	39.1	8.7	52.2	26.1	8.7	65.2	21.7	0	78.3	26.1	13	60.9
<b>Senior Respiratory Therapist I</b>	36.8	15.8	47.4	31.6	10.5	57.9	31.6	10.5	57.9	52.6	5.3	42.1
<b>Senior Respiratory Therapist II</b>	26.3	26.3	47.4	21.1	21.1	57.9	42.1	10.5	47.4	31.6	26.3	42.1
<b>Respiratory Consultant</b>	25	37.5	37.5	37.5	12.5	37.5	37.5	62.5	0	25	50	25
<b>Overall fit <math>\chi^2</math></b>	<b>(P value = 0.318)</b>			<b>(P value = 0.621)</b>			<b>(P value = 0.001)</b>			<b>(P value = 0.022)</b>		
<i>Work hours</i>												
<b>8 hrs. shift-9 hrs.</b>	32.1	24.5	43.4	28.3	18.9	52.8	35.8	22.6	41.5	37.7	30.2	32.1
<b>12 hrs. shift</b>	34.6	18.5	46.9	30	18.5	51.5	21.5	11.5	66.9	20.8	17.7	61.5
<b>Overall fit <math>\chi^2</math></b>	<b>(P value = 0.650)</b>			<b>(P value = 0.974)</b>			<b>(P value = 0.006)</b>			<b>(P value = 0.001)</b>		
<i>Nature of working hours</i>												
<b>Day shift</b>	27.1	25	47.9	29.2	16.7	54.2	39.6	25	35.4	35.4	31.3	33.3
<b>Night shift</b>	37.5	37.5	25	0	12.5	87.5	50	0	50	37.5	50	12.5
<b>Both Day and Night shifts</b>	36.2	17.3	46.5	31.5	19.7	48.8	18.9	11.8	69.3	21.3	15.7	63
<b>Overall fit <math>\chi^2</math></b>	<b>(P value = 0.412)</b>			<b>(P value = 0.276)</b>			<b>(P value = 0.000)</b>			<b>(P value = 0.000)</b>		

In this study, a majority (63.8%) of the 12-hour shift providers and (47.2%) of the 8- to 9-hour shift providers agreed that taking a break affects the quality of care provided, and the tendency to make errors increases when they do not have a break (59%). This finding corresponds with previous studies [6, 7], which found that prolonged hours with most of the providers working at least 12 sequential hours affected patient safety and quality of care. Healthcare providers working shifts of more than 10 hours were also related to poor reports of patient care quality and safety performance in comparison with healthcare providers working eight- to nine-hour shifts [7].

Additionally, this study reveals that the providers become stressed when they do not have the chance to go on break (67.2%), their physical health improves when they take a break (87.5%), and there is an improvement in their psychological health (83.1%), which is consistent with a study by Hakro *et al.* [8] that emphasizes the positive effect of a one-hour lunch break on a worker's physical well-being, psychological health, performance, functionality, and decreased work-related stress. However, Rogers *et al.* reported that many healthcare providers feel that taking a break will imperil patient care and/or make it hard to finish their assigned work before the end of the shift [6], which was not significant in this study since the providers did not report feeling guilty when they had a break and stopped their patient care. They agreed (67.8%) on their ability to finish all their assigned tasks even if they took a break. The respiratory care providers agreed that the nature of their work, such as the high assigned workload (78.8%) and the urgency of their work (74.3%), affects their ability to go on break. This finding was also observed in previous studies [5, 6]. These effects, the high workload, and the urgency of the work were found to be more frequent for providers who work 12-hour shifts (83.1% and 81.5%, respectively) than in the 8- to 9-hour shift providers (67.9% and 56.6%, respectively).

Regarding the break time and the health organizational rules, more than one-third (35.8%) of the 8- to 9-hour shift providers and day shift providers (39.6%) agreed on the fixed timing for breaks in their work area, while (66.9%) of providers who worked 12-hour shifts and both (day/night) shift providers (69.3%) disagreed on that. Furthermore, more than one-third of

the 8- to 9-hour shift providers (37.7%) and (35.4%) of day shift providers report the availability of clear rules and guidelines for the break times in their unit, while (61.5%) of those who work 12-hour shifts and both (day/night) shift providers (63.0%) disagree on that. The willingness of the provider's colleague to cover during the break was found more (43.4%) among the governmental institutions' providers (MOH Employees or Cluster Employees), unlike the private sector employee (54.3%) and the other sector providers (63.6%), which they disagree on.

## Conclusion

This study demonstrated the influence of break hours on work quality among respiratory care providers in the Eastern Province of Saudi Arabia, the differences in the break practices between those who work 8-hour shifts and 12-hour shifts, and the variations in the break time rules and timing among various hospital categories in Eastern Province. This study shows that there is an association between the nature of working hours and the quality of care provided, the respiratory care provider's chance to have a break, and the providers' stress level, physical health, and psychological health. Additionally, there is an association between their ability to finish their assigned tasks, their high workload, and their work urgency with their break time. Furthermore, there were significant findings in the health organization's rules regarding taking breaks, such as the willingness of the providers to cover each other during breaks, their ability to have a break at any time during the shift, the availability of fixed break times in their work area, and the availability of clear rules and guidelines for the break times in their unit.

The current study has some strengths. It is a unique study on the impact of break hours on work quality among respiratory care providers, as the effect of working hours and breaks have been studied among different health care professionals; however, limited studies have been done on respiratory care providers globally. Moreover, this study covers all respiratory providers in the Eastern Province of the Kingdom of Saudi Arabia. A limitation of this study is the time constraint of less than one week to carry out data collection for the required sample size.

The key recommendations revealed by this study are to 1) encourage respiratory care providers to designate time free from responsibilities during their shift hours; 2) provide clear rules and guidelines for breaks in respiratory care units in the different hospital categories in the Eastern Province of Saudi Arabia; 3) assign a fixed break time for the respiratory care providers in their work area; 4) provide coverage for the respiratory care provider during his or her break time; and 5) engage in a periodic evaluation of taking breaks by the respiratory care managers and leaders to ensure safe and healthy environments for both respiratory care practitioners and their patients.

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