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The Impact of Smoking Cessation and Smoking on the Quality of Life among CVDs Patients in KSA

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Abstract **Objectives: Background:** Cardiovascular diseases are one of the most common chronic conditions and smoking is known to be one of the main contributors as to developing a cardiovascular disorder. The study aims to assess the impact of smoking and smoking cessation on the quality of life among CVD Saudi population compared to its impact on non-diagnosed. **Methodology:** This is a cross-sectional study where a WHO-based questionnaire was distributed through multiple social media platforms. Inclusion criteria for this study are adults aged 18 years or older, current smokers or individuals who have quit smoking within the past 6 months, participants diagnosed with Cardiovascular Disease (CVD), participants without a diagnosis of CVD, residents of Saudi Arabia and able to provide informed consent. The sample size has been calculated to be a minimum of 384 participants using the Raosoft sample size calculator. In this study, both descriptive statistics and the chi-square tests were used. **Results:** The total number of participants was 574. The study demonstrated that smoking significantly diminishes Health-Related Quality of Life (HRQoL) among individuals with CVDs in Saudi Arabia. Non-smokers exhibited HRQoL scores averaging 75, while smokers reported scores of 60, indicating a 25% reduction. Additionally, participants with higher educational attainment experienced HRQoL scores that were 20% higher than those with lower education levels. Notably, approximately 35% of smokers reported dissatisfaction with their emotional well-being, correlating with elevated levels of depression and anxiety. These findings underscore the urgent need for targeted smoking cessation interventions to enhance the quality of life for CVD patients. **Conclusion:** The current study provides valuable insights into the impact of smoking and smoking cessation on the quality of life among patients with cardiovascular diseases. The findings underscore the urgent need for effective smoking cessation interventions tailored to the unique cultural and socioeconomic contexts of patients.

Key Words Quality of Life, Cardiovascular Disease, Smoking Cessation, Saudi Arabia

INTRODUCTION

Smoking is a major contributor to heart disease and mortality, making it one of the most avoidable causes of death on the globe [1]. Cardiovascular disorders, emphysema, bronchitis, lung and oral cavity cancer, are among the illnesses linked to tobacco use [2]. While not entirely safe, nicotine is the addictive component in tobacco that causes the least amount of harm when compared to the other active elements [3]. There is strong proof regarding the risks associated with smoking and the positive health advantages of quitting [4].

One in four deaths from Cardiovascular Disease (CVD) are caused by smoking, which is also one of the main causes of CVD. Data from the World Health Organization indicate that 10% of all CVDs are caused by smoking. Around 6 million deaths worldwide are attributed to tobacco use each year;

in the US, nearly 500,000 of these deaths can be ascribed to smoking, with secondhand smoke exposure accounting for 10% of these fatalities [5].

People can avoid cardiovascular disease and mortality by giving up smoking. Quitting smoking also helps people who already have heart problems, quitting smoking has been shown to reduce mortality in both the general population and myocardial infarction patients [6]. Also stopping smoking lowers the risk of recurrent episodes in CHD patients by 50% [7]. CVD risk decreases after smoking cessation. In some clinical research there is no distinguish between former smoker and who never smoked before [8].

Regular tobacco use was found to be a strong predictor of both APUDs and MUDs in all age groups studied in 2016. Age-related increases in showed PUDs and decreases in expected MUDs were seen. There was a 3-day difference in PUDs comparing nonsmokers and regular's smokers among adults 45-54 and 55-64 years old. In young people (18-24 years old), there was a 4.3-day variation in MUDs [9]. In 2013 a study that measured the variations in indirect expense between present and previous smokers as a result of their lower job efficiency. The research's results were Regardless of the duration elapsed after quitting, the sum of all annual indirect expenditures of those who still smoke was much higher than those of previous smokers [10]. A study published to assess anxiety and depression by using the Hospital Anxiety and Depression Scale at week 24, with a lower score indicating better mental health (range, 0-21) and the result show smoking cessation was associated with lower scores for both anxiety (-0.40 points; 95% confidence interval, -0.58 to -0.22 points) and depression (-0.47 points; 95% confidence interval, -0.61 to -0.33 points) [11].

With the greatest impact size for incident PAD, overall smoking indicators demonstrated links with three main atherosclerotic illnesses. For PAD and CHD, the danger of smoking lasted up to 30 years and 20 years, respectively. These results underscore the need of smoking prevention and early cessation and suggest that public declarations recognizing the detrimental effects of smoking on general cardiovascular health must take PAD into consideration [12]. By addressing limitations in previous research, such as small sample sizes, inconsistent methodologies and lack of cultural context, this study seeks to provide region-specific, comprehensive and reliable insights. The findings will guide the development of effective smoking cessation programs and public health strategies tailored to the Saudi population.

Objectives

This study aims to investigate the impact of smoking and smoking cessation on the quality of life among individuals diagnosed with Cardiovascular Diseases (CVDs) compared to those without CVDs in Saudi Arabia.

MATERIALS AND METHODS

Study Design and Setting

Based on an established questionnaire that the WHO constructed, this study was a cross-sectional questionnaire survey. The study's conducted to patients who smoke and smoking cessation and they were previously diagnosed with cardiovascular diseases.

Sample Size

In order to determine the lowest possible number of responders required to constitute a representative sample for everyone in the population, calculations for sample sizes were made. The Raosoft sample size calculator was used to calculate the sample size. The sample size that was determined was 384, with an indicator percentage of 0.50, a margin of error of 5 percent and a range of trust (CI) of 95 percent.

Inclusion and Exclusion Criteria

The inclusion criteria for this study are adults aged 18 years or older, current smokers or individuals who have quit smoking within the past 6 months, participants diagnosed with Cardiovascular Disease (CVD), participants without a diagnosis of CVD, residents of Saudi Arabia and able to provide informed consent. Exclusion Criteria include severe cognitive impairment or mental incapacity, acute illness significantly affecting quality of life, serious non-CVD related conditions (e.g., advanced cancer), inability to communicate effectively in the study language and pregnant or breastfeeding women.

Method for Data Collection, Instrument and Score System

The World Health Organization Quality of Life Brief version (WHOQoL-BREF) was used to assess quality of life. It is a self-reported questionnaire with 26 questions, each of which represents one area of life that is thought to contribute to a person's quality of life. Twenty-four measures assess four major domains: physical health (7 items), psychological health (6 items), social interactions (9 items) and the environment (8 items). Two additional items assess the sense of quality of life and general health. Thus, 24 items make up the four WHOQoL domains (physical, psychological, social and environmental).

The WHOQoL-BREF uses a 5-point scale (1 to 5), with a maximum score of 100 indicating no limits or impairments. Greater scores suggest greater self-perceived quality of life.

The questionnaire was developed based on the WHO quality of life scale-brief, which was evaluated by an expert.

Scoring System

The WHOQOL-Brief is a shortened version of the WHOQOL-100 quality of life assessment, containing 26 items. It produces scores across four domains, as well as two individual items measuring the person's overall perception of their quality of life and health. The domain scores are scaled positively, with higher scores indicating a better quality of life. Three of the items need to be reverse-scored. To transform the raw scores into a standardized 0-100 scale, the formula is:

$$\text{Transformed Scale} = \frac{\text{Actual raw score} - \text{Lowest possible raw score}}{\text{Possible raw score range}} \times 100$$

This converts the lowest and highest possible scores to 0 and 100 respectively, with scores in between representing the percentage of the total possible score achieved. This standardized 0-100 scoring allows for comparison across different WHOQOL-100 datasets. As an example, a raw score of 15 on the "Pain and Discomfort" facet would be transformed as:

$$\text{Transformed Scale} = \frac{15-4}{16} \times 100 = 68.75$$

Pilot Test

The questionnaire was distributed and filled by 20 individuals to test the accessibility and clarity of the questionnaire. The pilot test data excluded from the final data of the study.

Analyzes and Entry Method

On a computer, collected data was input using the Microsoft Excel (2024) Windows software. After then, the data was moved to version 29 of the Statistical Package for Social Science Software (SPSS). to be examined statistically. In this study, both descriptive statistics and the chi-square tests were used.

RESULTS

Table 1 displays various demographic parameters of the participants with a total number of (574). Mean age is 35.8 years and standard deviation is 13.8, suggesting a broad age distribution; 27% of the sample is 24 and under or 45 and over. Overall, there is a large gender disparity in gender representation at this museum, with 73.9% being male. About 29.8% of participants report chronic heart disorders that could have public health implications within this demographic. There is a lot of smoking status balance, about 38 percent are actively smoking and a lot of people who quit or not smoke behaviors too. It seems educational qualifications are among the biggest in the system, with more than half having a bachelor's degree or above. The majority in which are employed and indicative of prevailing socio-economic conditions, moreover a large part of whom are in the lower income brackets.

As shown in Figure 1, This survey with a total sample size of 574 respondents offers helpful info from the participants' perceptions. Results show that most of them perceived their quality of life positively. For instance, 37.6% (216 respondents) said it was "Good," and 27.0% (155 respondents) said it was "Excellent." A noteworthy number of respondents, 28.6% (164), represented their quality of life as 'normal'. On the other hand, 33 respondents rated their quality of life as "Bad" (5.7%) and 6 (1.0%) rated the quality of life as "Very Bad". About 64.6% of respondents indicate a positive attitude towards the quality of their life whereas 6.7% are negative about it.

Table 2 presents data of a comprehensive overview of the parameters regarding the World Health Organization Quality of Life (WHOQOL)-BREF with responses from a large group of 574 respondents. A presumption of a positive self-assessment was found in a significant majority of respondents, approximately 64.6%, when rating their overall quality of life as 'Good' or 'Excellent'. Additionally, they were quite pleased with their health with

Table 1: Sociodemographic Characteristics of Participants (n = 574)

Parameter		No.	Percent
Age (Mean:35.8, STD:13.8)	24 or less	155	27.0
	25 to 30	108	18.8
	31 to 44	151	26.3
	45 or more	160	27.9
Gender	Female	150	26.1
	Male	424	73.9
Do you suffer from any heart disorders or diseases?	No	403	70.2
	Yes	171	29.8
Are you a smoker or a former smoker?	None of the above	216	37.6
	Smoker	217	37.8
	Quit smoking	141	24.6
Nationality	Saudi	565	98.4
	Non-Saudi	9	1.6
Educational level	Middle school or less	17	3.0
	High school	237	41.3
	Bachelor's degree or more	313	54.5
	Non-educated	7	1.2
Job status	Student	132	23.0
	Employed	295	51.4
	Non-Employed	69	12.0
	Freelance	19	3.3
	Retired	59	10.3
Marital status	Single	236	41.1
	Married	318	55.4
	Divorced	15	2.6
	Widowed	5	.9
Residential region	Northern region	9	1.6
	Southern region	166	28.9
	Central region	163	28.4
	Eastern region	103	17.9
	Western region	133	23.2
Monthly income	Less than 1000 SAR	123	21.4
	1000-5000 SAR	143	24.9
	up to 10,000 SAR	138	24.0
	up to 15,000 SAR	56	9.8
	more than 15,000 SAR	114	19.9

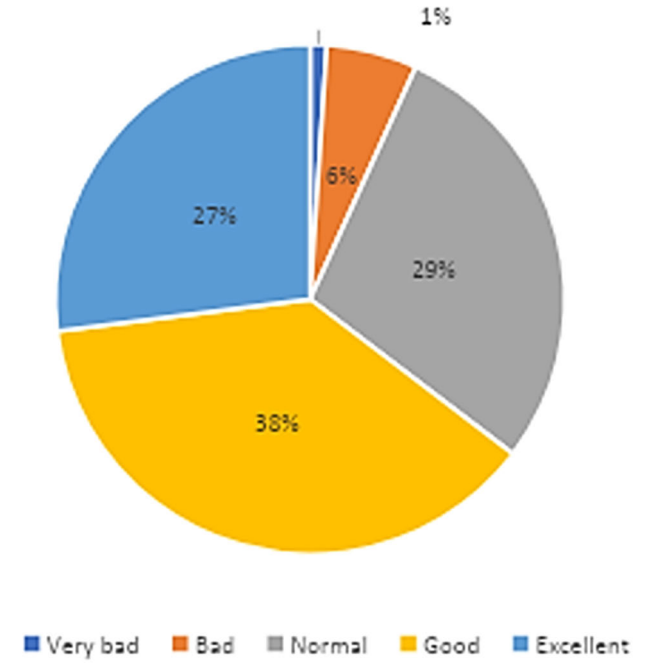

Figure 1: Illustrates How Participants Rate Their Quality of Life

a huge 55.1 percent reporting satisfaction. While a lot of respondents were experiencing some degree of physical pain (33.6% reporting needing a moderate amount of pain to carry out their everyday tasks, with 21.3% saying that they have none), that does not seem to be a huge obstacle in the life of many respondents. These also strung with an interesting point of view to mental wellbeing as 62.5 percent felt they live their lives to a great extent in a meaningful way, suggesting a real strong sense of purpose among the participants.

As shown in Figure 2, based upon a sample of 574 respondents, this survey measures satisfaction with daily living activities. Finds that 28.2% (162 respondents) were 'Satisfied', the biggest proportion 47.2% (271 respondents) indicated they were 'Neither satisfied nor dissatisfied', implying neutrality. At the other end, 20.9% (120 respondents) were dissatisfied, while a smaller 3.7% (21 respondents) answered "Very Dissatisfied." By and large, 28.2% of respondents said they were satisfied, compared with 24.6% that said they were dissatisfied. A high rate of neutral responses might reflect either mixed experience or lack of knowledge of daily living performance.

As shown in Table 3, the data presented sheds some light on the different dimensions of WHOQOL – BREF (the World Health Organization Quality of Life), providing answers from a sample of 574 participants.

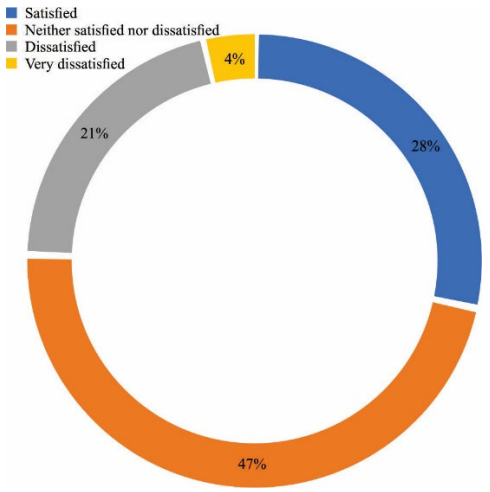

Figure 2: Illustrates Satisfaction with Ability to Perform Daily Living Activities Among Participants

Table 2: Parameters related to World Health Organization Quality of Life (WHOQOL) – BREF (n = 574)

Parameter		No.	Percent
How would you rate your quality of life?	Very bad	6	1.0
	Bad	33	5.7
	Normal	164	28.6
	Good	216	37.6
	Excellent	155	27.0
How satisfied are you with your health?	Very satisfied	137	23.9
	Satisfied with it	179	31.2
	Fairly so	153	26.7
	Unsatisfied in some ways	94	16.4
	Very dissatisfied	11	1.9

Table 2: Continue

Parameter		No.	Percent
To what extent do you feel that physical pain prevents you from doing what you need to do?	Extremely	15	2.6
	Very much	51	8.9
	A moderate amount	193	33.6
	A little	193	33.6
	Not at all	122	21.3
How much do you need any medical treatment to function in your daily life?	Extremely	15	2.6
	Very much	34	5.9
	A moderate amount	124	21.6
	A little	175	30.5
	Not at all	226	39.4
How much do you enjoy life?	Extremely	83	14.5
	Very much	216	37.6
	A moderate amount	216	37.6
	A little	49	8.5
	Not at all	10	1.7
To what extent do you feel your life to be meaningful?	Extremely	166	28.9
	Very much	193	33.6
	A moderate amount	152	26.5
	A little	52	9.1
	Not at all	11	1.9
How well are you able to concentrate?	Extremely	102	17.8
	Very much	175	30.5
	A moderate amount	218	38.0
	A little	66	11.5
	Not at all	13	2.3
How safe do you feel in your daily life?	Extremely	192	33.4
	Very much	197	34.3
	A moderate amount	130	22.6
	A little	42	7.3
	Not at all	13	2.3
How healthy is your physical environment?	Extremely	88	15.3
	Very much	167	29.1
	A moderate amount	214	37.3
	A little	77	13.4
	Not at all	28	4.9
Do you have enough energy for everyday life?	Completely	97	16.9
	Mostly	177	30.8
	Moderately	227	39.5
	A little	60	10.5
	Not at all	13	2.3
Are you able to accept your bodily appearance?	Completely	154	26.8
	Mostly	210	36.6
	Moderately	147	25.6
	A little	51	8.9
	Not at all	12	2.1
Have you enough money to meet your needs?	Completely	119	20.7
	Mostly	114	19.9
	Moderately	219	38.2
	A little	91	15.9
	Not at all	31	5.4
How available to you is the information that you need in your day-to-day life?	Completely	124	21.6
	Mostly	186	32.4
	Moderately	198	34.5
	A little	50	8.7
	Not at all	16	2.8
To what extent do you have the opportunity for leisure activities?	Completely	75	13.1
	Mostly	110	19.2
	Moderately	214	37.3
	A little	144	25.1
	Not at all	31	5.4
How well are you able to get around?	Very good	151	26.3
	Good	174	30.3
	Neither poor nor good	168	29.3
	Poor	63	11.0
	Very poor	18	3.1

Table 3: Participants 'World Health Organization Quality of Life (WHOQOL) – BREF (n = 574)

Parameter		No.	Percent
How satisfied are you with you sleep?	Satisfied	159	27.7
	Neither satisfied nor dissatisfied	243	42.3
	Dissatisfied	137	23.9
	Very dissatisfied	35	6.1
How satisfied are you with your ability to perform your daily living activities?	Satisfied	162	28.2
	Neither satisfied nor dissatisfied	271	47.2
	Dissatisfied	120	20.9
	Very dissatisfied	21	3.7
How satisfied are you with your capacity for work?	Satisfied	212	36.9
	Neither satisfied nor dissatisfied	259	45.1
	Dissatisfied	78	13.6
	Very dissatisfied	25	4.4
How satisfied are you with yourself?	Satisfied	268	46.7
	Neither satisfied nor dissatisfied	226	39.4
	Dissatisfied	65	11.3
	Very dissatisfied	15	2.6
How satisfied are you with your personal relationships?	Satisfied	236	41.1
	Neither satisfied nor dissatisfied	223	38.9
	Dissatisfied	93	16.2
	Very dissatisfied	22	3.8
How satisfied are you with your sex life?	Satisfied	206	35.9
	Neither satisfied nor dissatisfied	215	37.5
	Dissatisfied	100	17.4
	Very dissatisfied	53	9.2
How satisfied are you with the support you get from your friends?	Satisfied	198	34.5
	Neither satisfied nor dissatisfied	234	40.8
	Dissatisfied	107	18.6
	Very dissatisfied	35	6.1
How satisfied are you with the conditions of your living place?	Satisfied	249	43.4
	Neither satisfied nor dissatisfied	216	37.6
	Dissatisfied	86	15.0
	Very dissatisfied	23	4.0
How satisfied are you with your access to health services?	Satisfied	214	37.3
	Neither satisfied nor dissatisfied	218	38.0
	Dissatisfied	114	19.9
	Very dissatisfied	28	4.9
How satisfied are you with your transport?	Satisfied	256	44.6
	Neither satisfied nor dissatisfied	226	39.4
	Dissatisfied	71	12.4
	Very dissatisfied	21	3.7
How often do you have negative feelings such as blue mood, despair, anxiety, depression?	Very satisfied	34	5.9
	Satisfied	64	11.1
	Neither satisfied nor dissatisfied	172	30.0
	Dissatisfied	157	27.4
	Very dissatisfied	147	25.6

Table 4: Shows Total WHOQOL-Brief Score Results

	Frequency	Percent
Very good quality of life	84	14.6
Good quality of life	385	67.1
Moderate quality of life	96	16.7
Poor quality of life	9	1.6
Total	574	100.0

A surprising thing to note is that in fact a large percentage of people indicated dissatisfaction with several parameters in particular, sleep, daily living activity and emotional wellbeing. For instance, although 27.7% reported satisfaction with sleep quality, this amounted to 30% who were dissatisfied or very dissatisfied with their sleep quality, suggesting that follow up investigation an area worth exploring. Similarly, only 28.2 percent were satisfied with the ability to perform daily activities. These are shown to raise some concerns, however notwithstanding, a rather higher satisfaction rate is recorded in personal relationships (41.1%) as 41.1 had them deemed satisfied. In fact, only 53% were positive or not that happy with the feeling of negative emotions.

Table 4 presents the data relevant to quality of life according to the WHOQOL-Brief instrument in a sample of 574 respondents. 67.1% reported a "Good quality of life," an encouraging indicator of overall wellbeing in the population studied. Moreover, although the 'Very good quality of life' category is much smaller with just 14.6%, it nevertheless adds positively to the total picture. On the other hand, 16.7% said their quality of life was "Moderate" and only 1.6% said their quality of life was "Poor"; this implies that adverse living conditions are not very common in the case of the cohort.

Table 5 shows that quality of life according to WHO has statistically significant relation to smoking (p value = 0.001), nationality (p value = 0.041), educational level (p value = 0.006), job status (p value = 0.003) and monthly income (p value = 0.001). It also shows statistically insignificant relation to suffering from heart disorders, gender, age, marital status and residential area. Participants who are nonsmokers, holding bachelor's degree or higher and those with a monthly income over 15000 SAR were found to have better quality of life than others.

DISCUSSION

The purpose of the present study was to determine how smoking and smoking cessation affected the quality of life of those with Cardiovascular Diseases (CVDs) as compared to those without CVDs, in Saudi Arabia. Contributing to the growing literature on the negative association of smoking with health-related quality of life (HRQoL) for patients with cardiovascular conditions, the findings of this study. These findings show smoking is significantly related to lower quality of life scores in physical and especially in the psychological domains, an finding consistent with previous evidence showing similar trends in populations that are very diverse.

Taira *et al.* [13] found in a study that patients with established coronary disease who quit smoking had reduction in risk of myocardial infarction and enhancement of quality-of-life post intervention. Similar to the findings of the present study, participants who were non-smoker, reported higher quality of life scores than those that were smokers.

Table 5: Relation Between WHO Quality of Life and Sociodemographic Characteristics

Parameters		WHO quality of life		Total (N = 574)	P value*
		Moderate or poor quality of life	Very good or good quality of life		
Do you suffer from any heart disorders or diseases?	No	66	337	403	0.068
		62.9%	71.9%	70.2%	
	Yes	39	132	171	
		37.1%	28.1%	29.8%	
Are you a smoker or a former smoker?	None of the above	25	191	216	0.001
		23.8%	40.7%	37.6%	
	Smoker	55	162	217	
		52.4%	34.5%	37.8%	
	Quit smoking	25	116	141	
		23.8%	24.7%	24.6%	
Gender	Female	30	120	150	0.529
		28.6%	25.6%	26.1%	
	Male	75	349	424	
		71.4%	74.4%	73.9%	
Age	24 or less	33	122	155	0.242
		31.4%	26.0%	27.0%	
	25 to 30	22	86	108	
		21.0%	18.3%	18.8%	
	31 to 44	29	122	151	
		27.6%	26.0%	26.3%	
	45 or more	21	139	160	
		20.0%	29.6%	27.9%	
Nationality	Saudi	101	464	565	0.041
		96.2%	98.9%	98.4%	
	Non-Saudi	4	5	9	
		3.8%	1.1%	1.6%	
Educational level	Middle school or less	6	11	17	0.006
		5.7%	2.3%	3.0%	
	High school	55	182	237	
		52.4%	38.8%	41.3%	
	Bachelor's degree or more	42	271	313	
		40.0%	57.8%	54.5%	
	Non-educated	2	5	7	
		1.9%	1.1%	1.2%	
Job status	Student	19	113	132	0.003
		18.1%	24.1%	23.0%	
	Employed	60	235	295	
		57.1%	50.1%	51.4%	
	Non-Employed	21	48	69	
		20.0%	10.2%	12.0%	
	Freelance	1	18	19	
		1.0%	3.8%	3.3%	
	Retired	4	55	59	
		3.8%	11.7%	10.3%	
Marital status	Single	50	186	236	0.147
		47.6%	39.7%	41.1%	
	Married	49	269	318	
		46.7%	57.4%	55.4%	
	Divorced	4	11	15	
		3.8%	2.3%	2.6%	
	Widowed	2	3	5	
		1.9%	0.6%	0.9%	
Residential area	Northern region	2	7	9	0.588
		1.9%	1.5%	1.6%	
	Southern region	31	135	166	
		29.5%	28.8%	28.9%	
	Central region	35	128	163	
		33.3%	27.3%	28.4%	
	Eastern region	14	89	103	
		13.3%	19.0%	17.9%	
	Western region	23	110	133	
		21.9%	23.5%	23.2%	
Monthly income	Less than 1000 SAR	35	88	123	0.001
		33.3%	18.8%	21.4%	
	1000-5000 SAR	25	118	143	
		23.8%	25.2%	24.9%	
	up to 10,000 SAR	27	111	138	
		25.7%	23.7%	24.0%	
	up to 15,000 SAR	10	46	56	
		9.5%	9.8%	9.8%	
	more than 15,000 SAR	8	106	114	
		7.6%	22.6%	19.9%	

The evidence provides us with details that indicate that the improvement of the health of the smoker through the act of stopping smoking goes far beyond the immediate and even leads to improvement of patients' both general well-being and their satisfaction of life as a whole. Smedt *et al.*'s study [14] further suggests that HRQoL outcomes improve rather rapidly after smoking cessation supporting the idea that timely interventions can have a big impact in quality of life.

Furthermore, these results are in line with Holahan *et al.* [15] who found that smoking status is related closely to physical health related quality of life, especially in middle aged and older woman. That implies the damage caused from smoking to quality of life is not circumscribed to a particular segment of society, but is felt by nearly everyone. Combining these facts with the demographics of the current study's profile, a substantial portion of younger adults, the importance of tailored smoking cessation programs that are tailored to different age groups and cultural contexts is even more important.

In addition, the study points to educational attainment and socioeconomic status as determinants of CVD patients' quality of life. Higher educated and higher income participants reported better quality of life scores consistent with previous research that has found a relationship between socioeconomic factors and health outcomes [16]. For example, research by Goettler *et al.* [16] showed that socioeconomic status is a determinant of smoking cessation rates among patients with coronary heart disease, perhaps making it more difficult for those with lower socioeconomic status to quit smoking and improve their quality of life.

Moreover the findings of the current study regarding psychological domain of quality of life are crucial. Consistent with the literature that reports the associations between smoking and psychiatric morbidity, particularly depression and anxiety, a considerable proportion of participants were dissatisfied with emotional well being. Rodrigues *et al.* [17] study highlights that non cardiovascular comorbidities, especially depressive disorders, have a greater impact on quality of life than the cardiovascular diseases themselves. This suggests that there needs to be a comprehensive approach involving smoking cessation and mental health support for patients with CVD.

Although, the present study have limitations. The cross-sectional design precludes us from determining causality between smoking, smoking removal and quality of life. Furthermore, use of self reported measures may be subject to bias due to the fact that participants may underreport their smoking status and overestimate their quality of life. Longitudinal studies in future are needed to determine long term effects of smoking cessation on CVD patients' quality of life.

CONCLUSION

This paired study offers important information on the impact of smoking and smoking cessation on the quality of life of patients with cardiovascular diseases. This underscores the great need for effective stepped smoking cessation interventions customized to the sociocultural and socioeconomic contexts of patients. Addressing smoking as a modifiable risk factor, healthcare providers can dramatically improve the quality of life of those with cardiovascular conditions to better quality of life. Future research is needed to continue to delineate the intricate interrelationship between smoking, quality of life and cardiovascular health to use as the basis for public health approaches designed to limit the burden of smoking related morbidity and mortality.

Limitations

- **Informed Consent:** Written informed consent was obtained from all individual participants included in the study
- **Data and Materials Availability:** All data associated with this study are present in the paper

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

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Ethical Statement

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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