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Editorial Note:

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Assessing the Awareness, Perceptions, and Behaviors Regarding the Harmful Effects of Smoking Among Smokers - An Interventional Community-Based Study

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Abstract

Background: Tobacco use is the leading preventable cause of premature deaths. Tobacco control remains a top priority, and health warning labels (HWLs) are one of the recommended methods. The goal of health education is to influence their perception of tobacco use, thereby discouraging smokers and would-be-smokers from smoking. This study aimed to ascertain the level of awareness, perceptions, and behaviors regarding the harmful effects of smoking among male smokers in Farasan Island, Kingdom of Saudi Arabia.

Methods: A pre-experimental group with pre- and post-test design was conducted from January 2022 to March 2022. A total of 200 participants were selected using a purposive non-probability sampling technique. The questionnaire was prepared using the Global Youth Tobacco Survey (GYTS) and World Health Organization guidelines.

Results: Of the 199 participants, 91% had a family history of smoking, and 78.4% started smoking between the ages of 22–23. Most participants (48.2%) smoked 2–5 cigarettes per day. The mean knowledge score increased from the pre-test 4.49 (1.787) to post-test 17.5 (1.07), with a mean difference of 6.237. In perception, the maximum score was 55, while the mean score significantly increased from 21.65 (3.21) to 49.78 (2.69) in the post-test. Therefore, the educational intervention successfully improved both knowledge and perceptions of smoking.

Conclusion: Most participants had a family history of smoking and started smoking at a young age. This study highlights the need for increased awareness and education regarding the harmful effects of smoking and the development of strategies for smoking cessation.

Introduction

Smoking is a major global public health concern associated with significant negative health consequences for both smokers and non-smokers. Despite widespread awareness of the harmful effects of smoking, many individuals continue to smoke, and smoking rates remain high in many countries, including Saudi Arabia. Smoking is responsible for approximately 8 million deaths globally each year and is a leading cause of preventable deaths worldwide [1]. In Saudi Arabia, smoking is widespread, with prevalence on the rise, particularly among young people [2, 3].

According to the World Health Organization (WHO) [1], the prevalence of tobacco use in Saudi Arabia is estimated to be around 12.4%, with males being more likely to use tobacco than females. In addition to traditional tobacco products, the use of e-cigarettes is also on the rise in Saudi Arabia, particularly among young people [5]. Studies have investigated the effectiveness of tobacco control policies and interventions in reducing smoking rates. One study in Saudi Arabia evaluated the impact of a comprehensive tobacco control policy on cigarette smoking prevalence and found that it was associated with a significant reduction in smoking prevalence [6]. Another study found that the implementation of a comprehensive tobacco control policy, including taxation, smoke-free policies, and advertising restrictions, was associated with a significant reduction in smoking prevalence among adults in Saudi Arabia [7]. Similarly, a national anti-tobacco media campaign was shown to be effective in increasing awareness of the dangers of tobacco use among youth in Saudi Arabia [8].

This study aimed to measure knowledge levels regarding smoking-caused blindness among Saudi Arabian youth using a descriptive cross-sectional research design. A self-administered questionnaire that collected data on sociodemographic characteristics, education level, smoking status, and awareness of the adverse effects of smoking, such as lung and heart disorders and blindness, was provided via an online platform. The Statistical Packages for Social Sciences (SPSS) version 26 software was used for data analysis (IBM Corp., Armonk, NY) [9].

The study took place between January 2019 and January 2020 at smoking cessation clinics in healthcare facilities. In total, 103 participants were involved in this study. At three months, the success rate for smoking cessation was 36%, with a relapse rate of 13% at 6 months. Smoking cessation was shown to be significantly influenced by age ($p = 0.017$), profession ($p = 0.046$), daily cigarette consumption ($p = 0.015$), and number of visits ($p = 0.001$). However, only the number of visits enhanced the chance of quitting smoking in the multivariate analysis (adjusted odds ratio [AOR] = 0.31;

95% confidence interval [CI]: 0.15-0.63). Overall, 71% of participants indicated that self-efficiency was the key reason for ceasing smoking, whereas 18%, 10%, and 1% indicated that family support, smoking cessation treatments, and friends were the key reasons, respectively [4].

In summary, tobacco use is a major public health concern in Saudi Arabia, with high prevalence rates among adults and youth. Tobacco control policies and measures, such as smoking cessation programs and anti-tobacco media campaigns, have been used to address this issue. However, continuous efforts to limit tobacco use and raise awareness of the associated dangers are still required. This study aimed to determine smokers' knowledge, perceptions, and behaviors regarding the negative effects of smoking and to knowledge about these negative effects.

Methods

Research Design

A cross-sectional study was conducted in Farasan Island, Kingdom of Saudi Arabia from January 2022 to March 2022. This study involves a pre-experimental group with a pre- and post-test design.

Participants

Using non-probability purposive sampling, 200 participants were selected. One participant dropped out due to an unwillingness to participate. Participants had to engage in habitual smoking, be willing to complete the survey, and be aged between 18–65. Due to concerns regarding the willingness of participants living on Farasan Island, a smaller sample was considered.

Research Tools

The sample was selected using a non-probability sampling technique that was evaluated by experts and found to be reliable. The processes employed to measure key variables are referred to as data-gathering tools. The questionnaire was divided into five sections and adhered to WHO criteria for the Global Youth Tobacco Survey (GYTS).

1. Part 1 – A semi-structured interview that assessed participants' demographic variables, including age, educational level, family financial status, family history of smoking, age of first cigarette, type of smoking, number of cigarettes smoked per day, use of any smoked tobacco products other than cigarettes, frequency of smoking desire, whether smoking occurs in front of family, and whether they have undergone any formal training for smoking cessation.
2. Part II – This part involved 7 questions that assessed smoking knowledge, such as causes of smoking, effects of exposure to second-hand

smoking, and the frequency and harmful effects of smoking. participants answered 'yes' or 'no'; correct responses earned one point.

3. Part III – This part measured attitudes toward smoking using 11 questions and a 5-point response scale (strongly agree, agree, uncertain, disagree, and completely disagree). The maximum score for this part was 55.
4. Part IV – This part assessed behavior toward smoking habits using 7 questions and a 3-point response scale (never, sometimes, and often). Both positive and negative questions were used, and the maximum score was 27.
5. Part V – This part assessed knowledge levels following the education intervention using 4 “yes” or “no” questions. Correct responses were given one point.
6. For the educational intervention, participants were provided with smoking-related statistics, facts, reasons for smoking, smoking ingredients, health impacts, consequences, solutions, steps for quitting, and the benefits of quitting.

Data Collection

The web-based cross-sectional survey was distributed in Arabic via WhatsApp to participants. Participants received educational information about the causes, risk factors, complications, and preventive measures of smoking through web-based materials such as pamphlets. After 7 days of education, a post-test was conducted.

Statistical Analysis

Proportions and frequencies were assessed using descriptive statistics. Chi-square tests were used to assess the relationships between the research variables. Paired t-tests were used to determine differences in smoking behavior and pre- and post-test scores. Correlations between smoking-related knowledge, perceptions, and behaviors were assessed.

Ethical Consideration

Ethical approval for the study was obtained from Jazan University's Scientific Research Ethics Committee, as well as authorization from the Dean of Farasan University College. Each participant gave his agreement to contribute to the study. Ethics committee decision dated 17.11.2021. Decision number: Reference No.: REC-43/04/066.

Results

Of the 199 participants, 91% had a family history of smoking, and 78.4% smoked their first cigarette between the ages of 22–23. Cigarette smoking was the most commonly used form of tobacco (81.4%), and most participants smoked 2–5 cigarettes per day (48.2%). Approximately 44.7% of participants felt a strong desire

to smoke again 1–2 hours after smoking tobacco, and only 34.7% of participants had received formal training on smoking cessation strategies.

Table 1 shows the smoking knowledge levels from the pre- and post-test assessments. The post-test scores showed a significant improvement in knowledge compared to the pre-test, with a notable reduction in incorrect responses for the majority of questions.

S. No	Knowledge Items	Yes		No	
		Pre-test	Post-test	Pre-test	Post-test
1.	Smoking causes the following.	31 (15.7%)	196 (98.5%)	168 (84.3%)	5 (1.5%)
	a. Lung disease	18 (9%)	192 (96.5%)	181 (91%)	7 (3.5%)
	b. Oral cancer	15 (7.5%)	194 (97.5%)	184 (92.5%)	5 (2.5%)
	c. Heart disease	21 (10.6%)	197 (99%)	178 (89.4%)	2 (1%)
	d. Stroke	15 (7.5%)	195 (98%)	184 (92.5%)	4 (2%)
	e. Impotence	53 (26.6%)	199 (100%)	146 (73.4%)	0 (0%)
	f. Respiratory diseases	11 (5.5%)	176 (88.4%)	188 (94.5%)	23 (11.6%)
	g. Endocrine effects including diabetes	14 (7%)	168 (84.4%)	185 (93%)	31 (15.6%)
2.	Exposure to second-smoke origin in the subsequent	18 (9%)	190 (95.5%)	181 (91%)	9 (4.5%)
	a. Lung cancer (non-smokers)	25 (12.6%)	196 (98.5%)	174 (87.4%)	3 (1.5%)
	b. Lung disease in children	29 (14.6%)	198 (99.5%)	170 (85.4%)	1 (0.5%)
	c. Heart disease	13 (6.5%)	162 (81.4%)	186 (93.5%)	37 (18.6%)
	d. Birth of low-weight babies	19 (9.6%)	174 (87.4%)	180 (90.5%)	25 (12.6%)
	e. Affects the health of pregnant mothers has been exposed to cigarette smoking	46 (23.1%)	171 (86%)	153 (76.9%)	28 (14.1%)
3.	Smoking causes serious harm to one's health	37 (18.6%)	198 (99.5%)	162 (81.4%)	1 (0.5%)
4.	Tobacco consumption is an addiction	84 (42.2%)	4 (2%)	115 (57.8%)	195 (98%)
5.	Smoking on a non-daily basis is not harmful to health	31 (15.6%)	190 (95.5%)	168 (84.4%)	9 (4.5%)
6.	Tobacco smoke in the environment (passive smoking) is only harmful to young children.	57 (28.6%)	2 (1%)	142 (71.4%)	197 (99%)
7.	Very light smoking (1–5 cigarettes per day) is harmless to health.	73 (36.7%)	0 (0%)	126 (63.3%)	199 (100%)

Table 1: Frequency and Percentage wise distribution of Pre and Post-test Knowledge of Smoking.

Table 2 displays the pre- and post-test responses to the questions regarding smoking perception. After the post-test, most participants demonstrated a positive shift in their smoking perceptions, indicating strong agreement regarding the harmful health impacts of smoking and support for smoking bans.

Overall, the findings suggest that the education intervention had a favorable impact on participants'

S. No	Perception on Smoking	Strongly Agree (5)		Agree (4)		Uncertain (3)		Disagree (2)		Strongly Disagree (1)	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1.	I am concerned about my health when someone is smoking near me	41 (20.6%)	197 (99%)	28 (14.1%)	2 (1%)	38 (19.1%)	0	71 (35.7%)	0	21 (10.6%)	0
2.	Believing Exposure to smoke from another person's cigarette causes heart attack	37 (18.6%)	192 (96.5%)	31 (15.6%)	4 (2%)	81 (40.7%)	3 (1.5%)	27 (13.6%)	0	23 (11.6%)	0
3.	The people around me believe that I should not smoke	32 (16.1%)	186 (93.5%)	36 (18.1%)	7 (3.5%)	24 (12.1%)	6 (3%)	77 (38.7%)	0	30 (15.1%)	0
4.	Quitting smoking would improve my health	29 (14.6%)	188 (94.5%)	36 (18.1%)	7 (3.5%)	84 (42.2%)	4 (2%)	32 (16.1%)	0	18 (9%)	0
5.	Whether to support the provisions that establishment smoking bans in public /workplace	37 (18.6%)	194 (97.5%)	39 (19.6%)	5 (2.5%)	45 (22.6%)	0	62 (31.2%)	0	16 (8%)	0
6.	Smoking inhibits the student's concentration while studying	21 (10.6%)	180 (90.5%)	27 (13.6%)	11 (5.5%)	25 (12.6%)	6 (3%)	92 (46.2%)	2 (1%)	34 (17.1%)	0
7.	Taxes on cigarettes and tobacco products must be increased	14 (7%)	187 (94%)	13 (6.5%)	10 (5%)	26 (13.1%)	2 (1%)	88 (44.2%)	0	58 (29.1%)	0
8.	Advertising and promotion of cigarettes must be prohibited	22 (11.1%)	196 (98.5%)	26 (3%)	3 (1.5%)	21 (10.6%)	0	62 (31.2%)	0	68 (34.2%)	0
9.	Parents should not smoke in front of children	32 (16.1%)	186 (93.5%)	28 (14.1%)	10 (5%)	21 (10.6%)	3 (1.5%)	72 (36.2%)	0	46 (23.1%)	0
10.	Health precautions must be printed on the package	46 (23.1%)	195 (98%)	48 (24.1%)	4 (2%)	49 (24.6%)	0	34 (17.1%)	0	22 (11.1%)	0
11.	Health education increases the chances of quitting smoking	36 (18.1%)	189 (95%)	45 (22.6%)	6 (3%)	46 (23.1%)	4 (2%)	34 (17.1%)	0	38 (19.1%)	0

Table 2: Frequency and Percentage wise distribution of Pre and Post-test Level of Perception on Smoking.

S.No	Areas of Smoking	Max Score	Pre-Intervention		Post-intervention		Mean difference	t-test Value	P value
			Mean	SD	Mean	SD			
1	Knowledge Aspects of Smoking	19	4.49	1.787	17.5	1.07	13.01	6.237	0.05
2	Perception Aspects of Smoking	55	21.65	5.21	49.78	2.69	28.13	6.05	

Table 3: Distribution of Mean, SD, and Mean percentage of pre and post-test scores on smoking among smokers.

Demographic Variables	Frequency	Percentage	SD &Variance	Correlation Coefficient	T-test	P value	Chi-square- (knowledge)	Chi-square- (perception)
Age								
a. 18-25 years	26	13%	1.1864&1.40754	0.0758	6.28	0.005	0.0865	0.0752
b. 26-35 years	22	11%						
c. 36-45 years	78	39.2%						
d. 46-55 years	46	23.2%						
e. 56-65 years	27	13.6%						
Educational Level								
a. Primary Education	32	16%	0.9729&0.94653	0.0900	5.27	0.002	0.0061	0.0056
b. Secondary education	48	24.1%						
c. Higher secondary education	81	40.4%						
d. Degree	39	19.5%						
Family financial status								
a. Low Monthly Income	22	11%	0.7703&0.5933	0.1214	4.72	0.003	2.2575	2.1582
b. Moderate Monthly Income	98	49.3%						
c. High Monthly Income	66	33.2%						
d. Very high Monthly Income	13	6.5%						
Family history of smoking								
a. Yes	181	91%	0.2869&0.08231	0.0844	2.18	0.001	0.3895	0.3518
b. No	18	9%						
Age of the smoker who started the 1 st cigarette - 22-23yrs	156	78.4%	0.4153&0.1724	0.0777	2.44	< 0.001	0.9137	0.8571
Type of smoking								
a. Cigarette	162	81.4%	0.7571&0.5732	0.0781	2.72	0.003	0.3496	0.3180
b. E-cigarette	3	1.5%						
c. Shisha smoking	34	17.1%						
How many cigarettes did you usually smoke per day?								
a. 1 cigarette	18	9%	0.6531&0.42653	0.0913	4.75	0.004	0.0834	0.0689
b. 2-5 cigarettes	96	48.2%						
c. 6-10 cigarettes	85	41.5%						
d. 11-20 cigarettes	3	1.3%						
e. More than 20 cigarettes	0	0						
Did you use any form of smoked tobacco products other than cigarettes?								
a. Yes	4	2%	0.1565&0.02449	0.0692	3.95	< 0.001	0.0504	0.0487
b. No	195	98%						
How soon after you smoke tobacco do you start to feel a strong desire to smoke again that is hard to ignore?								
a. Within 60 minutes	7	3.6%	1.0692&1.14318	0.0919	5.70	0.002	0.2820	0.2502
b. 1-2 hours	89	44.7%						
c. Greater than 2-4 hours	46	23.1%						
d. Greater 4 hours but less than one full day	39	19.6%						
e. 1-3 days	18	9%						
f. 4 days or more	0	0						
Have you smoked in front of your family members?								
a. Yes	18	9%	0.2940&0.0864	0.0912	3.81	0.003	0.0038	0.0032
b. No	181	91%						
Have you ever received formal training on strategies for smoking cessation?								
a. Yes	69	34.7%	0.4782&0.22867	0.1087	3.30	< 0.001	2.2799	2.1058
b. No	130	65.3%						
c. If yes, how - friends and doctors								

Table 4: Statistical measures wise distribution of Demographic variables (n=199).

attitudes toward smoking. Only a small proportion of participants agreed or strongly agreed with each item in the pre-test. In the post-test, the number of individuals who agreed or strongly agreed with each statement increased dramatically. In the pre-test, only 20.6% of participants agreed or strongly agreed with question 1, which was about their health when somebody smoked near them. However, in the post-test, 99% of participants agreed or strongly agreed with this question. Similarly, only 18.6% of participants in the pre-test thought that exposure to second-hand smoke could cause a heart attack, whereas 96.5% agreed with this statement in the post-test. For most questions, the percentage of participants who were uncertain or disagreed with the statements decreased from the pre-test to the post-test. For example, in question 8, only 11.1% of participants in the pre-test strongly agreed that cigarette advertising and promotion must be prohibited, while 98.5% strongly agreed with this statement during the post-test.

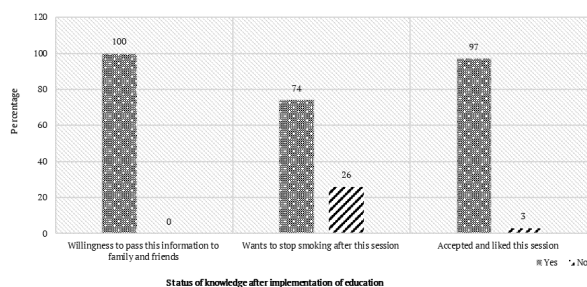


Figure 1: Frequency and Percentage-wise distribution of Status of knowledge after implementation of education.

Figure 1 shows the difference in knowledge levels following the educational intervention. All participants demonstrated a willingness to pass on the information they learned to their families and friends. Furthermore, 74% of participants expressed a desire to stop smoking after the session; 25.6% did not. Additionally, 97% of participants accepted and liked the session.

Table 3 depicts the statistical information for the pre- and post-test scores (distribution of mean, SD, and mean percentage). The knowledge section had a maximum score of 19. The mean score for this section increased in the pretest from 4.49 (1.787) to post-test 17.5 (1.07), with a mean difference of 6.237. This difference was statistically significant ($P = 0.05$). The perceptions section had a maximum score of 55. The pre-test mean score increased from 21.65 (3.21) to 49.78 (2.69) in the post-test, with a mean difference of 6.05. Therefore, the educational intervention successfully improved both knowledge and perceptions of smoking.

Table 4 provides a detailed analysis of the demographic variables and their correlations with smoking behavior. Age demonstrated a significant correlation with smoking behavior. The 18–25-year-old

age range had the highest correlation with smoking behavior (0.0758 , $P = 0.05$). Similarly, the educational level also demonstrated a significant correlation with smoking behavior, with participants who only completed primary education demonstrating the highest correlation (0.09 , $P = 0.002$). A family history of smoking also had a strong relationship with smoking behavior (0.0844 , $P = 0.001$), as did smoking cigarettes, as opposed to other forms of tobacco consumption (0.0781 , $P = 0.003$). The number of cigarettes smoked per day was also correlated with smoking behavior, with individuals who smoked one cigarette per day demonstrating the strongest correlation (0.0913 , $P = 0.004$).

The use of other smoked tobacco products besides cigarettes also demonstrated a strong link with smoking behavior (0.0692 , $P = 0.001$). Furthermore, participants who reported a desire to smoke again within 60 minutes of their last cigarette demonstrated the strongest correlation with smoking behavior (0.0919 , $P = 0.002$), as did smoking in front of family members (0.0912 , $P = 0.003$). Additionally, receiving formal smoking cessation training had a substantial link with smoking behavior (0.1087 , $P = 0.001$).

Overall, the analysis of demographic variables and their correlation with smoking behavior provided valuable insights into the factors that influence smoking behavior. The significant correlation coefficients suggest that all demographic factors should be considered when developing interventions to reduce smoking behavior.

Discussion

This study aimed to assess the smoking habits and behaviors of male smokers from Farasan Island. In terms of age, the results revealed that most participants were aged 36–45. This is consistent with the study by Lim et al., which indicated a greater prevalence of smoking among middle-aged individuals [10]. Regarding educational level, 40.4% of participants had had completed higher secondary education, which is consistent with other recent studies that have reported a strong association between higher education levels and smoking. Cheng et al. reported that individuals with college degrees demonstrated a greater frequency of smoking than people with a high school education or lower [11]. This implies that when establishing smoking cessation therapies, education level is a crucial aspect to consider, and interventions should be customized to the unique requirements of individuals with varying education levels.

Most participants had a family history of smoking. This is congruent with the findings of Zhang et al., who studied smoking behavior and its related variables [12]. According to their findings, 91% of the participants had

a family history of smoking, indicating that the majority of participants were exposed to smoking behavior in their families. This suggests that familial exposure to smoking behavior could be a significant factor that influences smoking behavior.

Most participants reported a strong urge to smoke again within 1–2 hours of their last cigarette. In a recent study, Quisenberry et al. reported that the majority of participants (56.3%) reported a strong urge to smoke again within 30 minutes to an hour following their last cigarette [13]. Furthermore, Lee et al. reported that cravings for cigarettes peaked during the first 30 minutes after smoking [14].

Many studies have investigated variations in smoking behavior among individuals. For example, Hamadeh et al. observed a considerable diversity in smoking behavior across people in an Indian sample, with a standard deviation of 6.09 and a variance of 37.13 [15]. This implies that smoking habits vary greatly among individuals. Researchers have established associations between smoking behavior and a variety of characteristics, such as age, gender, and education level. For example, in Pakistan, Ali et al. reported a strong negative correlation between smoking behavior and education level (-0.21 , $P = 0.05$) [16]. This implies that those with a greater degree of education are less prone to smoke. Furthermore, Hwang et al. demonstrated a significant difference in mean smoking behavior between male (16.1%) and female (1.5%) individuals in South Korea ($t = 15.30$, $P = 0.001$) [17].

The current study demonstrated that the age at which an individual started smoking and the type of smoking product used were significant factors that influenced smoking behavior. This is consistent with a study conducted in the United States by McKeganey et al [18]. This study reported a significant association between perceptions about the health hazards of smoking and smoking behavior ($\chi^2 = 45.20$, $P < 0.001$). Similarly, a study in Portugal by Alves et al. reported a significant association between knowledge regarding the health hazards associated with smoking and smoking behavior ($\chi^2 = 32.07$, $P < 0.001$) [19]. This suggests that individuals with more accurate perceptions regarding the health risks of smoking are less likely to smoke.

The current study emphasizes the necessity of developing and providing focused interventions to raise awareness and understanding about the detrimental effects of smoking, particularly among vulnerable groups, such as those with low educational levels and family income. These findings could aid in the development and implementation of successful smoking cessation programs and public health policies to lower smoking prevalence and its associated health concerns.

The present study investigated the factors that influenced smoking behavior among male adults in

Saudi Arabia. A significant proportion of the participants were smokers, with the majority smoking cigarettes. Having a family history of smoking was significantly associated with smoking behavior, suggesting a potential influence of social factors on smoking initiation and maintenance. Furthermore, a significant proportion of participants experienced strong desires to smoke again soon after finishing a cigarette, which indicates a potential challenge in smoking cessation efforts. Despite the significant findings, this study has some limitations, including its small sample size, limited generalizability to a broader population, and reliance on self-reported data. Further research involving bigger samples and more varied populations is required to validate and extend the current study's conclusions. Furthermore, future studies should investigate the effectiveness of smoking cessation therapies aimed at young adults in Saudi Arabia to help shape successful public health policies aimed at reducing smoking rates and related health concerns in this group.

Data availability

The statistical data that support the findings of this study are available from the corresponding authors upon reasonable request.

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Conflict of Interest

The authors declare that no conflicts of interest.

Author Contributions

Dr. Santhi Muttipoll Dharmarajlu, Ph.D. – Constructing concepts, Design, the definition of intellectual content, Literature search manuscript, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation, Guarantor.

Dr. Hamad Ghaleb Dailah, Ph.D. - Statistical analysis, Manuscript preparation, Manuscript editing, Manuscript review

Dr. Anuratha M D, Ph.D. - Constructing an idea or hypothesis for research, manuscript planning, Literature Review, and critical review.

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