

Research Article

Assessing the Knowledge, Attitude, and Practices of Cigarette Smokers and Use of Alternative Nicotine Delivery Systems in Pakistan: A Cross-Sectional Study

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Background. This research has been conducted to assess smokers' knowledge and behavior vis-à-vis combustible smoking cessation, prevalence, and risk, and the use of alternative nicotine delivery systems to quit smoking. **Methods.** A mixed-method approach utilizing cross section primary survey data and comprising descriptive and s-KAP index analysis has been adopted to ascertain the relationship between dependent and independent s-KAP variables; the principal component analysis methodology has been used to determine the use of alternative nicotine delivery systems. **Results.** Most of the smokers were aged between 15 and 35 years. A predominant 69.8% of the smokers came from middle-class background. Moreover, 71.3% were unaware of any alternative Tobacco Harm Reduction product. A majority of the respondents (68.2%) were keen to quit smoking. However, when asked why they had not succeeded, 52.9% reported addiction to nicotine as the main impediment. In Pakistan, lack of smoking cessation services is the weak link in the fight against the tobacco epidemic. Smokers are generally unaware of the Tobacco Harm Reduction products available in Pakistan; moreover, only 10.9% of the respondents were willing to spend more than Rs. 4000 per month on Tobacco Harm Reduction products. The average s-KAP score for young adults below the age of 20 was much lower than the national average but improved with the level of education. Interestingly, the score of smokers who had ever tried to quit smoking was slightly higher than that of those who had never tried to quit. **Conclusion.** There is intent to quit combustible smoking but the policy and infrastructure necessary for successful quitting are missing. Pakistan needs to concentrate on two fronts: a large scale awareness campaign against the use and harms of combustible smoking and simultaneously providing affordable and accessible smoking services across the country. Pakistan should look at the use and regulation of safer nicotine products in the UK. The country should carefully weigh the options of ensuring how to incorporate the use of safer nicotine delivery systems in its tobacco control efforts.

1. Introduction

Tobacco consumption is a predominant cause of preventable deaths worldwide. There are 1.3 billion tobacco smokers living in low- and middle-income countries. Every year, more than 8 million people die from tobacco use; of these, more than 7 million die directly from tobacco while 1.2 million die from Secondhand Smoke (SHS). Even though all forms of tobacco are life-threatening, smoking cigarettes is the most prevalent in the world [1]. According to the World Health Organization (WHO), the consumption of cigarettes

has declined in the Americas (AMRO), the European Region (EURO), and the Western Pacific Region (WPRO). However, between 1999 and 2016, cigarette consumption increased in countries such as China (0.71 trillion), as well as the African Region (AFRO, 0.03 trillion), the Eastern Mediterranean Region (EMRO, 0.09 trillion), and the South-East Asia Region (SEARO, 0.23 trillion). According to age-standardized methods, the prevalence of daily smoking in males (25%) and females (42%) declined between 1980 and 2012, but the total number of daily smokers grew by 41% in males and 7% in females due to a rise in population growth [2, 3].

The important question is how have these countries been able to minimize smoking prevalence? They have done so primarily due to public recognition of the value of health and wellbeing, and implementation of prevention initiatives including price, regulation, and taxation [4]. The burden of tobacco use has risen the most in China and Southeast Asia [5]. Pakistan, India, Bangladesh, and Sri Lanka are among vulnerable countries in Asia, with a substantial number of people consuming tobacco and cigarettes [6]. Compared to India and Sri Lanka, Pakistan and Bangladesh are among countries where a significant number of adults aged 15–65+ years use tobacco smoking [7].

In Pakistan, one in every five adults uses some form of tobacco (Global Adult Tobacco Survey [8]). This translates into nearly 25 million consumers of tobacco with 160,189 deaths, more in males (120,240) than in females (39,949) [9]. Several tobaccos, waterpipes, “shisha,” “pan,” “gutka,” and “niswar” are consumed [10]. The annual consumption of combustible cigarettes is around 86 billion sticks [11]. This includes both locally produced registered and illicit brands. Although Pakistan has been taking measures to contain the use of tobacco ever since 2004 when it ratified the WHO Framework Convention on Tobacco Control (FCTC), the country is yet to formulate a national policy on tobacco controls.

Smoking cessation is one of the weakest links in the fight against tobacco use in Pakistan, where the success rate of quitting is less than 3% [12]. According to the WHO cessation index, Pakistan offers Nicotine Replacement Therapy (NRT) and/or some cessation services with at least one cost covered (<https://tobaccoatlas.org/topic/quitting/>). As information about smoking cessation services is not widely disseminated, even the young, educated well-to-do smokers who want to quit do not know about such services [12]. Almost half of the quit attempts are unaided in Pakistan due to lack of knowledge about smoking cessation services [8]. Pakistan, after India, is one of the top tobacco producing countries in South Asia. However, the share of tobacco farming in the overall irrigated land of Pakistan is 0.25%, with 75,000 growers, most of them in Khyber Pakhtunkhwa. The overall tobacco produce is 0.42% of the total farming produce in Pakistan [9].

Even though a nascent phenomenon, Pakistan has witnessed a steady increase in the use of Tobacco Harm Reduction (THR) products such as e-cigarettes and nicotine pouches over the last five years [13]. Various called Electronic Nicotine Delivery Systems (ENDS) or Safer Nicotine Delivery Systems (SNDS), these HRP are used in regulatory vacuum. However, e-cigarettes and other HRP are legally imported as consumer goods, with tax duties imposed on them. Currently, the data on tobacco use in Pakistan are old, if not outdated. Since GATS [8], no new nationwide research has been conducted vis-à-vis tobacco use.

There is an urgent need to gauge the exact situation of tobacco use in Pakistan, ranging from the total number of smokers and young smokers, to SHS and illicit trade, etc.

Although a number of small studies have been conducted on these topics, the need for a fresh perspective can hardly be overemphasized. A review and reevaluation of tobacco-related issues can help determine the kind of interventions that can be made to affect a decline in smoking prevalence by 2030 and meet the target of strengthening “the implementation of the WHO’s FCTC in all countries, as appropriate” under the Sustainable Development Goal (SDG) 3. In view of the abovementioned, this research seeks to fill the gap by offering an assessment of the knowledge and behavior of smokers in relation to combustible smoking cessation, prevalence, and risk, and the use of ANDS to quit smoking.

Section 2 of the study addresses the analytical context for s-KAP calculation and data used in the empirical study of s-KAP and its source. The findings of the empirical analysis are discussed in Section 3, while Section 4 focuses on policy implications and conclusion.

2. Methodological Framework of s-KAP

Multiple approaches and procedures are available in literature to ascertain cigarette smokers’ knowledge, attitude, and practice (s-KAP). Most research studies [14–19] offer a basic descriptive analysis and apply chi-square and *t*-test to assess the relationship between dependent and independent variables. A few studies have used KAP index and logistic regression, while others have employed multivariate analysis [20–22]. For this research, a mixed-method approach comprising descriptive analysis and s-KAP index analysis was adopted to evaluate the relationship between dependent and independent s-KAP variables and the use of ANDS, using STATA (version 15.1). A simple frequency and percentage of data were used for descriptive analyses and the principal component analysis (PCA) methodology was used to construct the s-KAP index by means of KAP indicators, which are a proxy for smokers’ behavior. It is commonly used in social science to build scores and reduce the number of variables into simple index scores [23–25]. This approach is used in two distinct ways of covariance and correlation matrix. However, this research employed correlation matrix technique because of different units of variables [26]. The mathematical shape of the PCA is

$$\begin{aligned}
 PC_1 &= \alpha_{11}Y_1 + \alpha_{12}Y_2 + \dots + \alpha_{1n}Y_n, \\
 PC_1 &= \alpha_{21}Y_1 + \alpha_{22}Y_2 + \dots + \alpha_{2n}Y_n, \\
 &\dots \\
 &\dots \\
 PC_m &= \alpha_{m1}Y_1 + \alpha_{m2}Y_2 + \dots + \alpha_{mn}Y_n,
 \end{aligned}
 \tag{1}$$

where

PC_1 , PC_2 and PC_m are principal component equations with Y_n different variables and mn equation weights. Formally, the linear combination of the index for *smokeri* is calculated, based on the following equation:

$$Y_i = \alpha_1 \left(\frac{X_1 - \bar{X}_1}{S_1} \right) + \alpha_2 \left(\frac{X_2 + \bar{X}_2}{S_2} \right) + \dots + \alpha_K \left(\frac{X_K + \bar{X}_K}{S_K} \right), \tag{2}$$

where Y_i is the index, X_k is the mean, S_k is the standard deviation, and α_k are the weights. Based on the PCA calculation, the first principal component (PC1) yields the highest weights between positive and negative values. For translation to a normalized value, the mean value of the score is subtracted from the real value of the respective indicator and divided by the standard deviation. In addition, these uniform scores are multiplied by PC1 in order to achieve scores of each dimension. The sum of each dimension of the score results from the final index at the respondent level. Finally, the respondent level index contrasts with cross-reference categories of variables.

2.1. Description of s-KAP Variables. The selection of s-KAP variables (see Table 1) was based on literature review conducted in line with WHO-recommended core questions for assessing smoking status, and GATS. These s-KAP variables reflect respondent characteristics such as gender, age, education, classification of residential area, knowledge related to use of cigarettes and safer ANDS, attitude regarding social acceptance and SHS, and practice.

2.2. Data and Sources. The study used cross-sectional survey data from 13 large district cities of all provinces and territories of Pakistan. According to the study objectives and budget constraints, three districts each of Punjab and Sindh, two districts each of Khyber Pakhtunkhwa (KP) and Balochistan, one district each of Azad Jammu and Kashmir (AJK) and Gilgit-Baltistan, and Islamabad Capital Territory were selected for this study. A semi-structural questionnaire was developed from a rigorous literature review. The questionnaire focused on the characteristics, knowledge, attitude, and practice of smokers and the use of ANDS and was exercised via telephonic interviews. A sample of 650 cigarette smokers was randomly chosen at the study representation level, based on Cochran’s sample size formula, using 95% confidence level, a 5% margin of error, and a 7% adjustment for nonresponse. The following sample size calculation was used for accuracy:

$$ss = \frac{Z^2 * (p) * (1 - p)}{c^2}, \tag{3}$$

where Z value is e.g., 1.96 for 95% confidence level, p is the percentage picking a choice, expressed as decimal (0.5 used for sample size needed), and c is the confidence interval, expressed as decimal (e.g., $0.07 = \pm 7$).

An accurate, robust, and statistically representative sample requires a complete and updated sampling frame. Keeping the objectives of the survey in view, a sample of 650 respondents was randomly selected, using preexisting cigarette smoker listing data. Moreover, the distribution of the

same sample was carried out at the district level as reflected in Table 2.

2.3. Selection Procedure. This study has used simple random sampling for the selection of respondents from the preexisting cigarette smokers’ listing data. The preexisting cigarette smoker listing was prepared by Pakistan Alliance for Nicotine and Tobacco Harm Reduction (PANTHR). One of its objectives was to talk with and listen to smokers in terms of their efforts/struggles to quit smoking and what kind of help they need to give up this habit. Currently, PANTHR has more than 12000 potential smokers’ members from the randomly selected clusters in 27 large district cities across Pakistan. For this particular study, we selected required number of smokers from the 13 selected districts. Because of Covid-19 pandemic and budget constraints, we opted for 50 random smokers per district sample for the telephonic survey.

The following criteria were adopted for listing:

- (i) 18 years of age and above
- (ii) Adult smoker residing in the respective area
- (iii) Willingness to share smoking experience

2.4. Ethical Consideration. The study was approved by the ARI internal Ethics and Technical Committee to ensure research quality and ethics. A verbal consent of the participants was obtained before starting the interview. Furthermore, confidentiality and anonymity of the respondents were ensured.

3. Empirical Results

3.1. Characteristics of Smokers. As many as 648 of 650 respondents across various provinces and regions of Pakistan, as reflected in Table 2, were interviewed for the study. As seen in Table 3, all smokers were males. According to the study findings, most of the respondents were aged between 15 and 35 years with an average age of 28.5 ± 8.2 years. Most of the respondents were educated; one-fifth had done their matriculation (10th grade) while one-fourth had passed the intermediate level (12th grade). Similarly, one-fifth of the respondents were graduates and 12% had completed their master’s and MPhil/Ph.D. education. A predominant 69.8% of the smokers came from middle-class background, while 19.8% were poor.

3.2. Smokers’ Knowledge. Smokers’ knowledge about smoking-related diseases, cessation, and THR products was significantly linked to the government’s tobacco control strategy. Health is a major component of human capital, and health spending is closely linked with economic growth [27, 28]. As reflected in Table 4, a majority of the respondents (72.2%) knew that smoking causes cancer. When asked which cancers, 37.8% of the respondents said lung cancer, 35.9% referred to mouth cancer, and 17.3% said it causes cancer of the throat. While it is encouraging to know that a

TABLE 1: s-KAP domains and indicators.

Domains	Indicators
Characteristics	Gender
	Age
	Education
	Residential area classification
Knowledge	Smoking-related illnesses
	Smoking cessation services
	Banning of cigarette smoking in Pakistan
	THR products
Attitude	Social acceptance of smokers
	Smoking ban at work and in public places
	Young people and smoking
	SHS smoking
Practice	Permission to smoke in home/car
	Use of cigarettes
	Illnesses faced
	Quit smoking attempt(s) made
	Reasons for failed quit attempt(s)
	Use of THR products
	Willingness to use safer ANDS

TABLE 2: Study sample size.

Province/region	District	Required sample size	Covered sample
ICT	Islamabad	50	47
Punjab	Lahore	50	49
	Multan	50	50
	Muzaffargarh	50	50
Sindh	Hyderabad	50	50
	Karachi	50	50
	Nawabshah	50	50
KP	Peshawar	50	50
	Swabi	50	50
Balochistan	Quetta	50	54
	Qila Abdullah	50	50
AJK	Bagh	50	50
GB	Ghanche	50	48
Total		650	648

TABLE 3: Characteristics of smokers.

	Percentage	N = 648
Gender		
Male	100.0	648
Age (years)		
16 to 20	5.6	36
20 to 25	28.9	187
25 to 30	32.6	211
30 to 35	14.2	92
35 to 40	7.4	48
40 to 45	5.4	35
45 to 50	3.1	20
50 and above	2.9	19
Education		
Illiterate	6.0	39
Primary	4.0	26
Middle	8.3	54
Matriculation	20.7	134
Intermediate	24.2	157
Graduation	24.9	161
MA/MPhil/Ph.D.	11.9	77
Residential area classification		
Rich	2.3	15
Upper-middle class	8.2	53
Middle class	69.8	452
Poor	19.8	128

majority of the respondents were aware of the carcinogenic properties of tobacco smoking, 85% had no idea about the availability of cessation services in Pakistan; the lack of these services is the weakest link in the fight against the tobacco epidemic. Smokers were also aware of places where smoking is banned. Most of them (29.2%) said smoking is banned in public places, followed by hospitals (24.3%), public transport (18.2%), and educational institutions (16.1%).

A majority of the respondents confirmed not getting verified information about the dangers of smoking. Only 28.7% said they had come across some information about the dangers of smoking in the last 30 days; social media was the primary source of information for 41.4% of the respondents. Another important source identified by smokers was representatives of a newly launched ANDS product in Pakistan; 27.4% of the respondents said representatives of the product informed them about the

dangers of smoking. Only 3.8% and 13.4% of the respondents saw information about the ill-effects of smoking in the print and electronic media, respectively, in the last 30 days. A majority of the smokers (71.3%) did not know about the presence of alternative THR products, which are variously called Safer Nicotine Delivery Systems, Electronic Nicotine Delivery Systems, or alternative nicotine delivery systems, commonly referred to as electronic cigarettes (e-cigarettes).

TABLE 4: Smokers' knowledge.

	%	N = 648
Do you think cigarette smoking can cause cancer(s)?		
Yes	72.2	468
No	27.8	180
If yes, what kind of cancers?		
Lungs	37.8	177
Throat	17.3	81
Mouth	35.9	168
Kidney	1.9	9
Stomach	0.9	4
Liver	4.9	23
Blood	0.9	4
Skin	0.4	2
Where do you think are smoking cessation services available in Pakistan?		
Tobacco cessation centres	1.2	8
Hospitals	4.6	30
Private doctors	1.4	9
Drug control centres	6.5	42
Private organizations	1.2	8
Do not know	85	551
Where do you think is cigarette smoking banned in Pakistan?		
Public places	29.2	329
Hospitals	24.3	273
Educational institutions	16.1	181
Public transport	18.2	205
Others	12.3	138
Do you know or have you ever heard about THR products such as e-cigarettes?		
Yes	25.3	164
No	74.7	484
If yes, how did you come to know about these products?		
Friends	51.6	96
Vendors	13.4	25
Newspapers	4.3	8
Internet	18.8	35
Saw others vaping and inquired	7.5	14
Others	4.3	8
In the last 30 days, did you come across any information about the dangers of smoking?		
Yes	28.7	186
No	71.3	462
If yes, what was the source?		
Print media	3.8	7
Electronic media	13.4	25
Social media	41.4	77
Billboards	1.1	2
Articles	0.5	1
Research papers	7.0	13
ANDS representatives	27.4	51
Family/friends	5.4	10

3.3. Smokers' Attitude. As reflected in Tables 5 and 6, young smokers often associate smoking with glamor. However, 28.6% of the smokers disagreed with the notion that smoking makes young people feel fit in and cool. As many as 35.2% of the respondents agreed and 55.3% strongly agreed for ban on combustible smoking at work and in

public places. Although they are themselves currently smoking, 62.7% of the respondents strongly believed that young people should stay away from the addictive habit, meaning that they understand that combustible smoking is harmful and dangerous and hence do not want young people to become smokers.

Smokers are also aware of the harmful effects of SHS on children and other people around them. A predominant 74.1% of the respondents said they would not allow anyone to smoke in their car; 70.2% termed cigarette smoke harmful for others. A majority of the respondents (68.2%) claimed wanting to quit smoking. However, when asked why they have not been able to quit, 52.9% reported addiction to nicotine as the key impediment.

3.4. Smokers' Practices. Most of the respondents (60.6%) said they had been smoking cigarettes for more than three years, followed by 14.5% and 13% who had been smoking for the last three and two years, respectively. Similarly, most of them (75.8%) smoke daily. A little more than 30% of the respondents smoke 16–20 and more than 20 cigarettes per day. However, one-fourth (23.6%) smoke 6–10 cigarettes a day (Table 7).

As far as smoking cessation is concerned, 48% of the respondents had made at least one attempt to quit smoking while 34.1% had made more than three attempts. Dependence on nicotine (48.3%) is the major reason for failure to quit smoking, followed by living or working with smokers (15.7%), and stress and anxiety (13.7%).

3.5. Use of Alternative Nicotine Delivery System. Generally, smokers are unaware about THR products used in Pakistan. Firstly, these products are not advertised in the mainstream media, and secondly, they are too expensive and unaffordable for a majority of the smokers. Only 8.6% respondents claimed having used a THR product in the near past. Of those who had used a THR product, 44.6% had used it out of curiosity. Since THR products are used in a regulatory vacuum with no medical consultation or assistance, their use remains an individual decision, so much so that 91% of the vapers did not consult a doctor when they decided to shift to vaping from smoking [13]. Most of the respondents (73.2%) did not use a THR product after the first use; of these, 26.8% never planned to use the THR product permanently and 24.4% said it did not satisfy their need for nicotine. However, 60% of the respondents said they were willing to use a THR product with the intention of quitting smoking, if it is easily available. The prices of these products nonetheless remain a barrier to wider use. Only 10.9% of the respondents said they were ready to spend more than Rs. 4000 per month on a THR product (see Table 8). Since almost all vaping products are imported, they are far more expensive than cigarettes. The most expensive duty paid cigarette packet in Pakistan costs a little more than a dollar, while the price of a vaping kit starts from \$24 and goes up to \$162. Vaping kits are imported from China and their flavors from the US, UK, and Malaysia [13].

TABLE 5: Smokers' attitude.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	N
Do you think cigarette smoking makes young people feel fit in, cool, etc.?	9.0	28.6	13.1	27.6	21.8	648
Do you think cigarettes should be banned at work and in public places?	1.1	5.3	3.2	35.2	55.3	648
Do you think young people should stay away from smoking?	0.5	2.3	4.6	29.9	62.7	648
Do you think SHS smoking is harmful for children and other people?	0.2	2.5	5.3	27.8	64.4	648

TABLE 6: Smokers' attitude.

	%	N = 648
Do you allow people to smoke in your home/car?		
Yes	25.9	168
No	74.1	480
If not, what is the reason for disallowing?		
Cigarette smoke is harmful to others	70.2	409
I am allergic to cigarette smoke	3.4	20
My children/family use my car	10.5	61
Smoking in the car is forbidden	9.3	54
Others	6.7	39
Do you want to quit smoking?		
Yes	68.2	442
No	31.8	206
If not, why have you not quit?		
I am addicted to smoking	52.9	109
Tried but failed to quit	5.8	12
Did quit but relapsed	1.9	4
Most of my friends are smokers	8.3	17
Did not want to as I enjoy smoking	19.4	40
Others	11.7	24

TABLE 7: Smokers' practices.

	%	N = 648
How many years have you been smoking cigarettes?		
Less than a year	3.2	21
One year	8.6	56
Two years	13.0	84
Three years	14.5	94
More than three years	60.6	393
Do you currently smoke cigarettes daily or less than daily?		
Daily	75.8	491
Less than daily	24.2	157
How many cigarettes do you smoke daily?		
1 to 5	32.3	209
6 to 10	23.6	153
11 to 15	13.1	85
16 to 20	15.7	102
More than 20	15.3	99
Have you ever tried to quit smoking?		
Yes	48.0	311
No	52.0	337
How many times have you attempted to quit?		
Once	20.3	63
Twice	23.8	74
Thrice	21.9	68
More than thrice	34.1	106
What is the reason behind your failed quit attempt(s)?		
Nicotine dependence	48.3	313
Withdrawal symptoms	7.9	51
Living or working with smokers	15.7	102
Stress, depression, anxiety, psychiatric issues	13.7	89
Inability to afford medications or treatment	1.7	11
Others	12.7	82

3.6. *Smokers' KAP Index.* To ascertain the association of smokers' knowledge, attitude, and practices with characteristics, the s-KAP index has been constructed from a factorial analysis using the PCA with selected variables (see Table 9) along with the correlation matrix. In all selected variables, the first factor component is greater than 0.1, except for the two questions getting information about dangers of smoking in the last 30 days and allowing others to smoke in your car. The largest eigenvalues have been used to create an aggregate index score [25]. However, the PCA gives k-main components against k-dimensional data and tries to put as much information in the first components without losing information. The distribution of s-KAP index scores has been presented in Figure 1. The average s-KAP index score was calculated at a median (0.05), with a minimum of -4.02 and a maximum of 5.8.

A detailed description of the selected s-KAP index variables with the PC1 of the PCA and the mean and standard deviation of each variable is presented in Table 9.

3.7. *Association of s-KAP Index.* The s-KAP index for age, education, residential area, and quitting of the smokers, as presented in Figures 2(a)–2(d), indicates that smokers' age is the most critical factor for the initiation of combustible smoking. In Pakistan, young children become victims of

early smoking without any realization of its side effects and health risks. The comparison of s-KAP index scores between age groups illustrates that the average score for young adults below the age of 20 years was much lower than the national average and the other age groups. The average score for adults aged above 20 years and less than 40 years was significantly higher compared to the above age groups and higher than the national average score, with the exception of the age group of 25 to 30 years. These findings suggest most of the respondents between 15 and 30 years of age have less information regarding combustible smoking, quitting, protecting themselves and children from smoking, smoking-related diseases, and the use of the ANDS/SNDS. A comparison of education and s-KAP index score showed an improvement in the score with level of education and was slightly higher than the

TABLE 8: Use of alternative nicotine delivery system.

	%	N = 648
Have you used any THR product in the near past?		
Yes	8.6	56
No	91.4	592
If yes, what was the purpose of using the product?		
Out of curiosity	44.6	25
Intentionally	25.0	14
To quit smoking	30.4	17
Did you continue to use the product after the first use?		
Yes	26.8	15
No	73.2	41
If not, what was the reason for discontinuing?		
Never planned to use it permanently	26.8	11
Vaping never satisfied my nicotine requirement	24.4	10
Too expensive to afford	7.3	3
Not easily available	9.8	4
It is a hassle to use e-cigarettes	14.6	6
More dangerous than cigarettes	17.1	7
Are you willing to use safer ANDS to quit smoking, if easily available?		
Yes	60.8	394
No	39.2	254
If yes, how much would you be able to spend on ANDS?		
<Rs.1000	27.7	109
Rs.1000 up to Rs. 2000	24.9	98
Rs. 2000 up to Rs. 3000	22.1	87
Rs. 3000 up to Rs. 4000	14.5	57
Rs. 4000 and above	10.9	43

TABLE 9: Description of selected s-KAP index variables and factorial analysis.

KAP index variables	Comp1	Mean	Std. Dev.
Do you think cigarette smoking can cause cancer(s)?	0.15	0.72	0.45
In the last 30 days, did you get any information about the dangers of smoking?	0.05	0.29	0.45
Do you think cigarettes should be banned at work and in public places?	0.27	4.38	0.86
Do you think young people should stay away from smoking?	0.22	4.52	0.73
Do you think SHS smoking is harmful for children and other people?	0.24	4.54	0.72
Do you allow people to smoke in your home/car?	-0.21	0.26	0.44
Do you want to quit smoking?	0.4	0.68	0.47
Have you faced any illness/disease because of smoking?	0.35	0.23	0.42
Have you ever tried to quit smoking?	0.38	0.48	0.5
Did you seek any medical help to quit smoking?	0.23	0.05	0.22
Do you know or have you ever heard about THR products?	0.22	0.25	0.44
Have you used any THR product in the near past?	0.28	0.09	0.28
Did you continue to use the THR product after the first use?	0.18	0.02	0.15
Are you willing to use safer ANDS to quit smoking?	0.34	0.61	0.49

national average after the intermediate or 12th year of education. This shows education or knowledge related to smoking illness, quitting, and protecting is significantly associated and could be a game changer for controlling the combustible smoking in line with the FCTC guidelines.

Similarly, the s-KAP index association with smokers' residential area showed that upper-middle- and middle-class residential smokers had a higher score relative to rich and poor smokers and a slightly higher score for upper-middle-class smokers than the national average.

In Pakistan, most of the combustible smokers belong to the middle and upper-middle class and use low-cost cigarettes under the family budget constraints. Most of them are

willing to quit but are unable to find the supervision or direction for availing the clinical help in this regard. This clearly shows that the government and the tobacco control organizations need to reach out to these smokers who are willing to give up with awareness and necessary clinical help.

Interestingly, the scores of smokers who had ever tried to quit smoking were slightly higher than those of smokers who had never tried to quit. The average score of these smokers was higher than the national average score. Similarly, the score of smokers who smoked on a regular basis was better than that of those who did not smoke on a daily basis. The overall daily smokers' score was higher than the national average. The average score of smokers who used HRP's

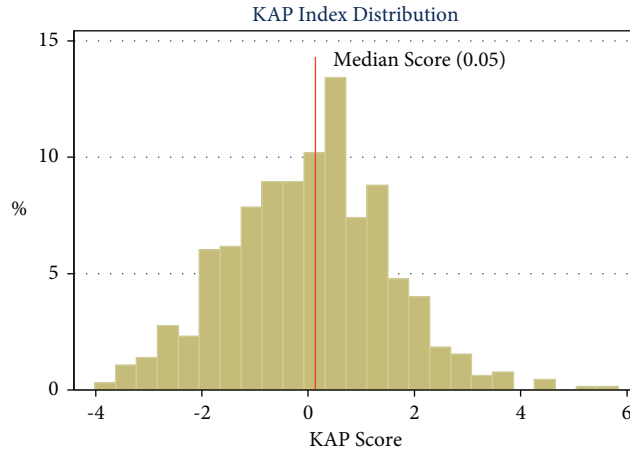
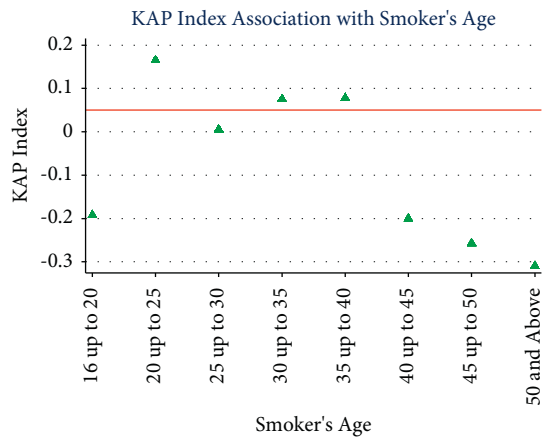
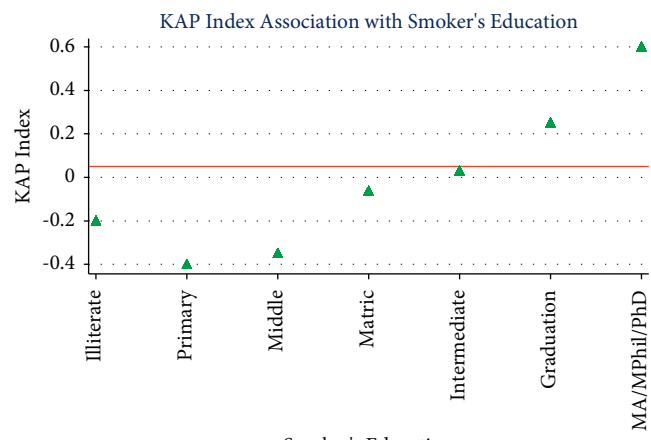


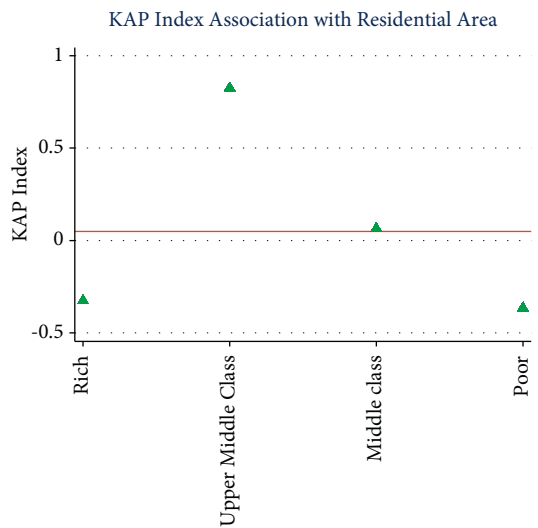
FIGURE 1: s-KAP index distribution.



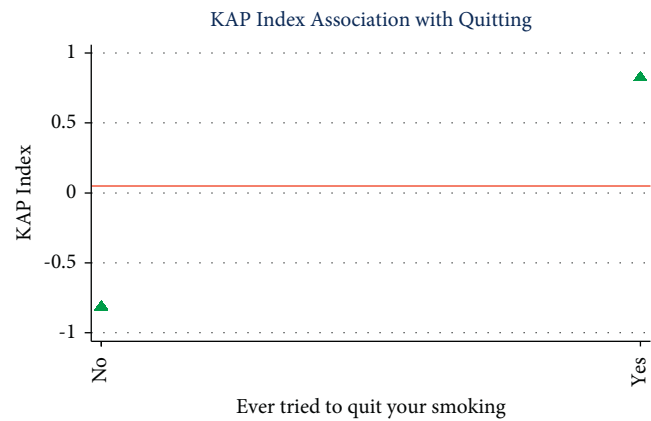
(a)



(b)



(c)



(d)

FIGURE 2: KAP index association with age, education, residential area, and attempts to quit smoking.

stop smoking was higher than that of smokers who did not use HRP to quit smoking. The average score of HRP users was slightly higher than the national average (see Figures 3(a) and 3(b)). These behaviors show that smokers who have attempted to quit smoking or used HRP to quit smoking are better placed than those who have not tried to quit smoking or have not used HRP.

4. Discussion

Using cross-sectional survey data, this study has ascertained the knowledge, attitude, and practice of combustible smokers in 13 districts of Pakistan, and the use of ANDS. Most of the respondents were young and aged between 15 and 30 years. The average age was 28.5 ± 8.2 years. Pakistan is the 6th most populated country in the world with a population of 207 million. Almost 64% of the country's population is under the age of 29 [29]. The prevalence of any form of tobacco use among males and females is 31.8% and 5.8%, respectively [8], in Pakistan. Smoking among youth is a serious issue in Pakistan. Almost 11% young people (aged 13–15 years; 13.3% boys and 6.6% girls) have used some tobacco product. Young people mostly initiate smoking at an early age; among youth who have ever smoked, 40% tried their first cigarette smoking before the age of 10 [30].

A predominant 69.8% of the smokers came from middle-class background, followed by 19.8% who reported they were poor. These figures contrast with previous studies conducted at the regional level (GATS [8] and Saqib et al. [7]).

After ratifying FCTC, Pakistan has been taking various measures to stem the rising tide of tobacco use. These measures include bans on tobacco advertisements and smoking in public and private places, as well as printing of graphical warnings on cigarette packs, among others [1]. A number of taxes have been imposed on cigarettes and tobacco products [9]. However, smoking cessation seems to be the weakest link in the fight against the tobacco epidemic in Pakistan. The success rate of smoking cessation is less than 3% [11]. According to the WHO Global Cancer Observatory, in the year 2020, breast, lip oral cavity, lung, esophagus, and colorectum were the top five cancers in Pakistan [31]. In the financial year 2018–19, the federal government withdrew Rs. 28.7 million allocated for the Tobacco Control Cell under the Public Sector Development Program (Dawn, October 6, 2018. Funds for Tobacco Control Cell withdrawn, [available at <https://www.dawn.com/news/1437093>]). This budgetary cut can be said to have proved detrimental to the cause of public awareness.

According to this study, most of the smokers in Pakistan are keen to quit smoking, know that combustible cigarette smoking is carcinogenic, and even recognize that SHS is harmful for the health of people around them, and their families. These findings are the same as those indicated by Irfan et al. [32] and Shaheen, Oyeboode, and Masud [12]. Yet, despite being alive to the dangers of smoking, they are unable to quit. In Pakistan, 72.5% adults (16.8 million) working indoors are exposed to tobacco smoke at the workplace. Similarly, 86% adults (49.2 million) are exposed

to SHS in restaurants, and 76.2% in public transport [8]. This shows weak implementation of the smoking ban at the workplace and in public transport. Young people (aged 13–15 years) are also exposed to SHS, 37.8% in public places and 21% in their homes [30]. On the average, a smoker in Pakistan consumes 13.6 cigarettes daily [30]. Similarly, every month on average, around 20–25 billion cigarette sticks are legally produced in Pakistan (<http://www.pbs.gov.pk/qim>).

In Pakistan, peer pressure, anxiety, tobacco dependence, stress, and mood swings have been the most widely observed reasons for not giving up smoking [32]. Additionally, the provision of smoking cessation services is yet to become a priority intervention in the government's tobacco control efforts. The lack of smoking cessation services, which are available to only a few hundred out of the 25 million tobacco users in the country, is a key impediment. Between January 1, 2015, and September 1, 2020, only 2371 smokers had registered with the quit line, and of these, 1439 were referred to the National Institute of Rehabilitation Medicine, which has a smoking cessation clinic. Only 73 smokers succeeded in quitting smoking in the last five years (Maqbool, Shahina. *The News*, 11 October, 2020. Tobacco control efforts eclipsed by lack of policy [available at <https://www.thenews.com.pk/print/727686-tobacco-control-efforts-eclipsed-by-lack-of-policy>]). Although Pakistan included NRTs in the Essential Drugs List in 2017, they are expensive and not easily available. It is clear from the study that the intent to quit combustible smoking is present, but the policy and infrastructure necessary for successful quitting is missing. Pakistan needs to concentrate on two fronts: a large-scale awareness campaign against the use and harms of combustible smoking and simultaneously providing affordable and accessible smoking services across the country.

Over the last five years, Pakistan has witnessed a steady increase in the number of people using THR products, mainly e-cigarettes [13]. However, their number still remains miniscule compared to the number of tobacco users. Expensive and limited to upscale localities, THR products are being used in a regulatory vacuum. Being legally imported, individuals use them without any medical consultation or advice. Therefore, the shift to THR products from combustible smoking remains an individual decision. Most of the smokers do not know about the availability of THR products. Their main sources of information about these products are friends, and they largely use them out of curiosity.

The high prices of THR products are a major barrier for combustible smokers interested in switching over. This study has found that only 10.9% of the respondents were ready to spend more than Rs. 4000 per month on a THR product. In Pakistan, the price of a vaping kit starts from \$24 and goes up to \$162, primarily because vaping products are imported. The kits are imported from China and their flavors from the US, UK, and Malaysia [13]. Pakistan should look at the use and regulation of safer nicotine products in the UK. Instead of rejecting the SNDS, the country should carefully weigh the options of ensuring how to incorporate the use of SNDS in its

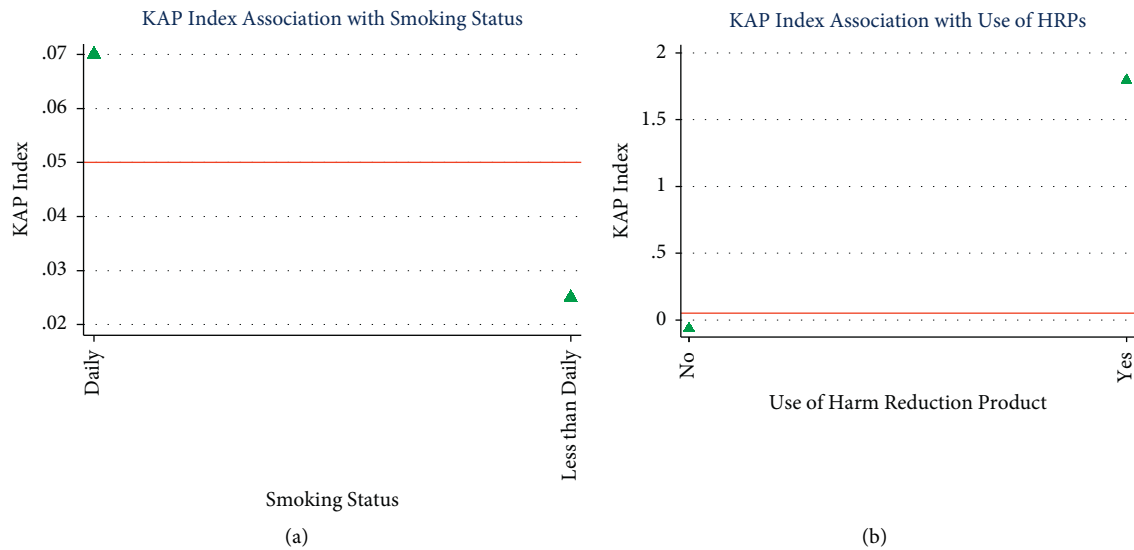


FIGURE 3: KAP association with smoking status and HRP.

tobacco control efforts. A sensible approach to regulating SNDS should be adopted. This would mean taking differential approach to taxation vis-à-vis SNDS.

The almost two decades of tobacco control efforts in Pakistan face a critical review. In a country where nearly two-thirds of the population are below 30 years of age, the need to assist adult smokers to quit combustible smoking or switch to THR products can hardly be overemphasized. Simultaneously, efforts should be made to keep the young away from initiating smoking or vaping. For achieving this objective, the government should widen the circle of engagement with stakeholders. The most important stakeholder should be the smokers, who have remained invisible in the efforts for tobacco control. Along with smokers, the government should also engage with the proponents of SNDS and HRP vendors to sensibly regulate their use and ensure that they become affordable for adult smokers who want to give up combustible smoking.

5. Conclusion

The component of smoking cessation is almost missing in Pakistan's existing tobacco control efforts and policies. There is a need to establish smoking cessation clinics in hospitals and create buy-in through mass awareness. This assistance should be backed with public advocacy on the negative effects of combustible smoking. Pakistan also needs to develop durable mechanisms to control illicit trade of cigarettes in order to restrict available options of buying cheap, illicit, or smuggled cigarettes. Tobacco law enforcement on smoking at public and private places should be more stringently pursued. There is a need to create an understanding about HRP, backed by sensible regulation. Currently, the use of HRP, mainly e-cigarettes, is unregulated and limited to the upper and middle classes. The unregulated use of HRP in a regulatory vacuum may create space for abuse of HRP in the form of fake products.

5.1. Limitations and Further Research. This research has been conducted to assess smokers' knowledge and behavior about combustible smoking cessation, prevalence, and risk, and the use of alternative nicotine delivery systems to quit smoking. However, the study was limited by several research constraints during the Covid-19 pandemic. It used 648 respondents' data at the study level representation to assess statistically accurate sample size, using Cochran's sample size formula. Therefore, the sample population is not fully representative at the national level. Interviewing women in Pakistan is difficult due to cultural constraints, especially among tobacco users. Women do smoke in Pakistan but avoid smoking in the public and additionally they would avoid discussing their smoking habit. There, we were unable to find an adult female smoker ready for the interview. The two females in the survey have been included due to incorrect gender code. However, the female sample was calibrated with the male sample. It is a limitation in the study. The study results, based on the data, have been modified. There is a need for national and provincial level research to assess smokers' knowledge and behavior vis-à-vis combustible smoking cessation.

Data Availability

The data can be obtained from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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