

Master Thesis

Awareness, Use, and Perceptions of Heated Tobacco Products among young adults in Germany - a cross-sectional online survey

Submitted by
Laxminarayan Sonde

Master of Public Health

1st Advisor: Prof. Dr. Ralf Reintjes

2nd Advisor : MSc-Psch. Frederike Bokemeyer

in association with

UKE, Hamburg

HAMBURG UNIVERSITY OF HEALTH SCIENCES

Faculty of Life Science

CONTENTS

ABSTRACT.....	1
Keywords	2
1. INTRODUCTION	3
1.1 Heated tobacco products (HTPs)	3
2 BACKGROUND	5
2.1 Awareness and use of HTPs	5
2.2 Factors associated with HTP awareness and usage.....	6
2.3 Perceptions about HTPs.....	7
2.4 Relationship of HTP usage with Cigarette smoking abstinence.....	7
2.5 Research problem statement.....	9
2.6 Research question	10
2.7 Research Objectives	10
3. METHODOLOGY	11
3.1 Study design	11
3.2 Inclusion criteria-	11
3.3 Sample Size	11
3.4 Sampling.....	11
3.5 Study tool	12
3.6 Statistical analysis.....	13
3.7 Time line	14
4. RESULTS	15
4.1 Demographic characteristics of participants	15
4.2 Awareness of study participants regarding HTPs	17

4.3 Perceptions of the study participants (absolute values) regarding the CCs, ECs and HTPs	18
4.4 HTP Smoking practices among study participants.....	22
4.5 Association of Awareness with demographic variables	24
4.6 Association between awareness and age, personality scores and addiction scores	26
4.7 Association of Perception with demographic variables and substance use	27
4.8 Association of Perception with personality scores and knowledge scores.....	29
4.9 Relationship of ever HTP use with demographic characteristics.....	31
4.9.1 Association of HTP usage with age, personality, awareness, and addiction	33
5. DISCUSSION.....	35
5.1 Methodology	35
5.2 Strengths of the study.....	35
5.3 Important results and comparison with previous studies	36
5.3.1 Sample.....	36
5.3.2 Awareness of HTPs.....	36
5.3.3 Using HTPs.....	37
5.3.4 Relationship of HTP use with quitting CCs.....	39
5.3.5 Perceptions about HTPs	40
5.4 Limitations.....	42
5.5 Recommendations.....	43
6.CONCLUSIONS.....	44

7. REFERENCES.....	45
8. APPENDICES	48
8.1 Ethics committee approval	48
8.2 Informed consent Sheet (German)	49
8.3 Questionnaire (German)-	52
9. DECLARATION.....	65

LIST OF TABLES

Table 1 Demographic characteristics of participants	15
Table 2 Awareness of study participants regarding HTPs.....	17
Table 3 Perceptions about various smoking products (absolute values) .	20
Table 4 Perceptions about HTPs in relation to other smoking products .	21
Table 5 HTPs Smoking practices among participants.....	22
Table 6 Addiction among current smokers	24
Table 7 Awareness by demographic characteristics.....	25
Table 8 Correlation of Awareness with age and personality	26
Table 9 Binomial regression analysis to perceptions about HTPs in relation to other smoking products with demographic characteristics and substance use as covariates.....	28
Table 10 Binomial regression analysis to perceptions about HTPs in relation to other smoking products with personality and awareness as covariates.....	30
Table 11 Use of HTPs by demographic variables.....	31
Table 12 Use of HTPs by age, awareness, personality and addiction among CC and EC users.....	344

LIST OF FIGURES

Figure 1 Perceptions about addiction potential of various smoking products (absolute values) -----	18
Figure 2 Perceptions about harm to health due to various smoking products (absolute values) -----	19
Figure 3 Perceptions about harm from passive smoking due to various smoking products (absolute values) -----	19
Figure 4 Perceptions about social acceptability of various smoking products (absolute values) -----	20

ABBREVIATIONS

HTP- Heated Tobacco product

USA- United States of America

EC- e-cigarettes or Electronic cigarettes

TSNAs- tobacco-specific Nnitrosamines

CC- Conventional cigarettes

aOR- adjusted Odds Ratio

OR- Odds Ratio

ANDS- Alternative Nicotine Delivery Systems

DEFF- Design effect

FTND- Fagerström Test for Nicotine Dependence

SD- Standard deviation

ANOVA- Analysis of Variance

RANOVA- Repeated measures ANOVA

ABSTRACT

Introduction

Aim- To assess the awareness, perception, about HTPs and prevalence of HTP usage among young adults of age 18-40 years in Germany and relationship of HTP usage with conventional tobacco usage.

Methods

A cross sectional and observational Study among 246 young adults of age 18-40 years living in Germany was conducted. The tool was the questionnaire developed for the purpose of this study, collected information on demographic factors, substance use, addiction with Fagerstrom scale, Personality with big 5 inventory, perceptions and knowledge about the HTPs. Data was analysed using SPSS. Awareness, Use and Perceptions were analysed and relationship with demographic characteristics, substance use and personality were assessed.

Results

About 45.9% of the participants had above or equal to average knowledge score. Men, married, people with college level education, EC and CC users showed significantly high awareness. More than one-fourth of the study participants used HTPs at least once in their life. Awareness, CC smoking use, EC use and alcohol consumption were significantly associated with ever HTP use. HTPs were perceived as less addictive, less harmful to health, less harmful for passive smokers and more socially acceptable compared to CCs

Conclusion

Awareness of HTPs was quite high among study participants compared to that of previous studies. A quarter of them used HTPs at least once in their

lifetime. Perceptions were associated with gender, age, employment status, substance use and certain personality types.

Keywords

Heated tobacco products (HTPs), heat-not-burn tobacco products, smoking cessation, prevalence of tobacco use, E-cigarettes,

1. INTRODUCTION

1.1 Heated tobacco products (HTPs)

Heated tobacco products (HTPs) are tobacco products that produce aerosols containing nicotine and other chemicals, which are inhaled by users, through the mouth. They differ from e-cigarettes (ECs) in that, e-cigarettes heat liquids containing nicotine, flavourings, and other ingredients in contrast to tobacco itself. There are several products available in markets. Examples include IQOS from Philip Morris International, Ploom TECH from Japan Tobacco International, Glo from British American Tobacco, and PAX from PAX Labs. Cigarette smoking is harmful and causes death, is a known fact all over the world since more than 50 years. HTPs claim to have reduced toxicant levels compared to conventional smoking tobacco products. According to WHO, HTPs are sold in more than 40 countries now, sometimes even in the markets where they are banned by law (*Heated Tobacco Products, WHO*).

Heated Tobacco products (HTPs) come in many forms and sometimes are also marketed as “heat-not-burn” products. Some have electronic heating elements and others have a carbon tip wrapped in glass fibres which is heated by a lighter or match with former being the commonest. They heat sticks or plugs of tobacco which are available in the markets for the consumer. Some are flavoured also. Regardless of heating mechanism, whether with a flame or without, any tobacco product is harmful (CDCTobaccoFree, 2022).

Based on variety of toxicological studies that have also been published its assumed that vapours from the HTPs contains significantly less (i.e. 80 to 99%) toxicants, such as aldehydes and volatile organic compounds, tobacco-specific Nitrosamines (TSNAs) (Leigh et al., 2018; Mallock et al.,

2019). However, the nicotine levels are still almost as much as in the conventional cigarettes. A 90 days investigation of biomarkers even demonstrated that 51-90% reduction in the Harmful and Potentially Harmful Constituents related biomarkers(Mallock et al., 2019). According to Deutsches Krebsforschungsinstitut Heidelberg, toxicant exposure from HTPs is lower than cigarettes but higher than ECs. Since health risks and addiction potential of HTPs are unclear, non-smokers should not use these and protect non-smokers by using them where smoking is permitted(Scherer et al., 2022). People are made to believe by the manufacturers of HTPs, that completely switching to HTPs can reduce the toxicant exposure and that it is harmless compared to smoking conventional cigarettes (M. Kim et al., 2020). However, this does not mean reduction of health risks for HTP users as toxicant reduction may not necessarily mean decreased health risk, as these studies were either laboratory studies or done on animals or were of short duration. Biological relevance is not yet established with longer exposure epidemiological studies(Mallock et al., 2019).

A study to assess the effect of Second-hand HTP Aerosol using a self-reported questionnaire survey showed that incidence of asthma attacks or chest pain was more, when exposed to Second-hand HTP smoke compared to second-hand cigarette smoke exposure(Imura & Tabuchi, 2021). Hence, they should not be used as first option to decrease smoking associated harm. In USA and Europe HTPs are authorised for sale without modified risk status i.e. they cannot imply on product/package, that it is less hazardous compared to other tobacco products(Mallock et al., 2019).

2 BACKGROUND

2.1 Awareness and use of HTPs

A 2019 data of a longitudinal study among young adults of age 18-34 in USA showed that 9.7% of study participants had heard of HTPs, 3.5% ever used them and 2.4% purchased them in the past year. Majority of them were bought in the shops or with retailers, however substantial numbers were purchased online (39.3%)(Berg et al., 2021). In another study in USA, 8.6% of U.S. adults were aware of heated tobacco products. Ever use of heated tobacco products was common among E-cigarette users and cigarette smokers(Azagba & Shan, 2021).

According to a cross-sectional questionnaire survey among 4154 participants aged at least 20 years in Japan, HTPs were used by 5% of participants. About 16% of them used these products exclusively and 11% of respondents were dual users of Combustible Tobacco products and HTPs(Adamson et al., 2020).

In a study among Korean adults, the prevalence of HTP use was 10.2%. 13.4% of current HTP users were exclusive users of HTP and more than 80% were using HTP with either Conventional cigarettes(CC) or EC or all forms (J. Kim et al., 2021).

In a European study, awareness among the study participants was 27.8%, and prevalence of ever HTP use was 1.8% and current use was 0.1%. In Germany awareness among population was 34.3%(Gallus et al., 2022). Another European study showed that awareness about HTPs increased from 8% in 2016 to 17% in 2018. Ever use of HTPs increased from 1.1% to 1.9% (Maria Lotrean et al., 2020).

2.2 Factors associated with HTP awareness and usage

In USA, having heard of HTPs was significantly associated with older age, male gender and with current smoking status. Among people who heard of HTPs, Using HTPs was associated significantly with non-Hispanic race and current smoking status. Being older, male, sexual minority, non-Hispanic and current smokers had significantly more likelihood of future use (Berg et al., 2021). Another study in USA revealed by Multivariable logistic regression, that E-cigarette smokers, cigarette smokers and other tobacco product users had higher odds (OR- 2.7, 2.19 and 1.69 respectively) of ever use of HTPs compared to non-users of Tobacco (Azagba & Shan, 2021). In a study conducted in Hongkong, Younger age and higher education were significant predictors of initiation (Luk et al., 2021).

In Korea Youth Risk Behaviour Survey, it was observed that “combined ever use of smoking forms” was associated with high perceived stress, high frequency of physical activity and low use of internet. However, “HTP ever only” use was not associated with high perceived stress. According to authors, these findings suggested experimental use of tobacco products, weight-control strategy, Peer influence in adolescents for social inclusion among sportspersons, social isolation among people who are less active on internet or social media (Lee et al., 2019). Another study in Korea on 7,000 adults assessed the factors associated with, HTP use. The prevalence among males was 3 to 5 times higher than females (J. Kim et al., 2021).

The European study showed that, odds of ever HTP use was significantly higher among men, 15–25-year-olds compared to older, ex-smokers (both CC and EC compared to non-smokers), current smokers/users (both CC

and EC compared to non-smokers/users). No associations were seen with education and economic status (Gallus et al., 2022).

In another European study HTP usage was more among daily cigarette smokers and ever electronic cigarette users. Germans had higher odds of HTP use compared to all other 5 countries in the study in 2016 and compared to 4 countries in 2018. Again males, young people of age 18-24 years and urban residents had higher odds of HTP use overall. HTP use in 2018 was significantly associated with attempts to quit cigarette smoking and perception that HTPs are less harmful than cigarettes (Maria Lotrean et al., 2020).

2.3 Perceptions about HTPs

In one of both European and American studies, the HTP users perceived them as less harmful than cigarettes. Additionally, in the USA study, participants perceived HTPs less addictive and more socially acceptable than cigarettes and smokeless tobacco (Berg et al., 2021; Maria Lotrean et al., 2020)

A qualitative study in which 33 young adult tobacco users in California “unboxed” an HTP device and narrated their impressions and opinions, showed that attributes, sleek electronic design, novel technology, perceived harmfulness, complexity, and high cost influenced appeal for participants. Participants were suggested that it is safer than smoking cigarettes by “no smoke” claim and heating technology of the manufacturer (Luk et al., 2021).

2.4 Relationship of HTP usage with Cigarette smoking abstinence

Many studies assessed the relationship of HTP usage with abstinence from or reduction of traditional smoking or any other use of tobacco.

A community-based prospective cohort study of smokers in Hong Kong assessed the predictors of HTP initiation and the prospective association of HTP use with cigarette abstinence. Smokers with intention to quit or reduce smoking were recruited and divided into current HTP users and never users of HTP at Baseline. 7-day point-prevalence of cigarette abstinence was outcome variable at 6 months. During the follow-up period, 10.9% never users at baseline initiated HTPs. Study showed that current HTP use at baseline and persistent use of HTP from baseline to 1-month/3-month follow-up were not associated with cigarette abstinence at 6 months (Luk et al., 2021).

In the Japanese study by Adamson et al, a very low proportion (12%) of sole combustible tobacco products users had switched back from HTP use in the past 12 months, compared to 94% who remained as sole HTP users. Amongst dual users 14% had switched to sole use of HTPs. This study showed that HTPs could be recognized as a substitute tobacco product amongst combustible tobacco users. Quitting rate ranged from 4 to 6% (Adamson et al., 2020).

The Korean study analysed the association between HTP use and quitting combustible cigarettes (CCs). Electronic cigarette (ECs) users and dual users of HTPs and ECs had significantly higher adjusted odds of having attempted to quit CCs in the past year compared to non HTP and non-EC users (aOR 2.92 and 8.42 respectively). However, when assessed among ever CC smokers, odds of having quit CCs was low for either ECs only and HTPs only users or HTPs+ECs users. Thus study concluded that even though HTP and EC use is associated with increased attempts to quit, association with successful quitting is very low (J. Kim et al., 2021).

2.5 Research problem statement

Only a few studies, have investigated factors associated with HTP use in detail and analysed the association between HTP use and quitting combustible cigarettes in Europe. In fact, German study on factors associated with HTP use is not conducted. The study by Gallus et al focussed mainly on the prevalence of HTP use and association of demographic factors like age, sex and smoking history with HTP use in many European countries including Germany (Gallus et al., 2022). The study by Lotrean et al has only identified factors related to HTP use from 6 European countries (Maria Lotrean et al., 2020). None of these studies in Germany or Europe has explored the relationship between personality traits and use of HTPs. Also, to date no study in Europe has assessed the relationship between HTP usage and abstinence from traditional use of tobacco.

The European study also revealed that 10% of ever users of HTPs had never smoked CCs or any other form in the past (Gallus et al., 2022). This suggests attraction trend towards HTP usage in European countries. Regarding "Public support for a comprehensive advertising ban on alternative nicotine delivery systems (ANDS) that includes HTPs", the ongoing German Study on Tobacco Use showed that 57% of general population, 46% of current tobacco smokers, 42.7% ANDS users, 64.8% of ex-smokers support a comprehensive ban on advertising. However, considerable part of the population was still not in favour of total ban on tobacco advertisements (Kastaun & Kotz, 2019).

Considering the increase in popularity of HTPs in the European countries and in Germany, because of vigorous marketing by the manufacturers to increase the sale by creating an image that HTP use is safer method of

smoking, it is imperative to understand, what factors are associated with HTP use among young adults and whether this leads to change in smoking behaviour of the HTP consumers. This information will be vital to identify the risk groups and risk factors for adopting this habit, thereby helpful in creating public health strategies to support, plan, implement and monitor prevention and control programs.

2.6 Research question

What is the awareness, perception, about HTPs and prevalence of HTP usage among young adults of age 18-40 years in Germany and relationship of HTP usage with conventional tobacco usage?

2.7 Research Objectives

- To assess the awareness, perception about HTPs and prevalence of HTP usage among young adults in Germany
- To assess the factors associated with awareness, perception, and usage of HTP among young adults in Germany
- To assess the relationship between HTP usage and conventional tobacco usage among young adults in Germany

3. METHODOLOGY

3.1 Study design

It was a cross sectional and observational study. Study was conducted using an online social media survey. Sample included the young adults of age 18-40 years living in Germany.

3.2 Inclusion criteria

- Age 18-40 years
- Must speak and understand German
- Lives in Germany since at least 1 year

3.3 Sample Size

Sample Size of 246 was calculated based on the Population size of Germany according to census data of 2021 as 21.08 million (18–40-year-olds), Hypothesized % frequency of outcome factor in the population (p) as 20%, Confidence limits (d) as 5%, Design effect (DEFF) as 1, with the formula $n = [DEFF * Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2} * (N-1) + p*(1-p)]$

3.4 Sampling

Study was approved by the Ethics committee of the HAW Hamburg. The study was conducted complying with the Declaration of Helsinki guidelines. The data was completely anonymised as the participants names were not collected. Also, all the necessary precautions were taken to ensure data safety.

University students were approached through university mailing lists. After obtaining informed consent the online questionnaire link (google forms) was sent to the study participants. The other study participants were recruited using social media channels. The study was advertised on the various groups on Facebook which have members of target

population. Those who showed interest in participating were led to the consent form with a link and then to the questionnaire. Informed consents were digitally recorded, as the recruitment process and survey were entirely online. Those who agreed to participate in the survey clicked on the button “I have understood the information presented above and give my consent to participate in this survey” which then led to the opening of the questionnaire form.

3.5 Study tool

The questionnaire was developed for the purpose of this study and tested for validity and reliability. The questionnaire was translated to German language by bilingual translators and checked for reliability by back translation. The questionnaire included questions on personal details (age, sex, country of origin, education and occupation, relationship status), personality traits (short 15-item Big Five Inventory (BFI-S) of personality dimensions by Lang et al (Lang et al., 2011), smoking history (conventional, electronic, HTPs), Nicotine dependence using Fagerström Test for Nicotine Dependence (FTND), alcohol consumption, awareness and perceptions of study population regarding HTP usage in comparison with other forms of smoking.

Awareness was assessed by asking the participants four knowledge questions regarding HTPs. Total of knowledge score was considered as awareness. Perception was recorded by asking the participants about addiction potential, harmfulness to health by primary and passive smoking and social acceptability in comparison to CCs and ECs, which was recorded on a 7-point scale ranging from not at all to absolutely. Information on Nicotine dependence was collected only from current smokers of any form. FTND was used after modification for EC smokers and HTP users. (Heatherton et al., 1991; Rahman et al., 2020)

HTP use was assessed by asking if they ever used HTP. Those who selected “yes” were considered as “ever users”. Out of them, those who used daily and sometimes were considered as current HTP users. Current users were also asked about the product brand, duration, if they use HTPs exclusively and its effect on other forms smoking if any. This way, the Questionnaire assessed if the regular smoking pattern has changed after they started using the HTPs. CC smoking was assessed by asking “do you smoke cigarettes?” with possible responses as present smoker, previously smoker and never smoker (less than 100 cigarettes in lifetime). EC smoking was assessed by asking about the use of ECs (daily, occasionally, or never).

3.6 Statistical analysis

Data was exported from google forms in the Microsoft excel format and then analysed using SPSS Version: 29.0.0.0 (241). Nominal (demographic and alcohol use) data was expressed as percentages and Numerical data (including scores on Fagerstrom scale and big 5 personality inventory) and ordinal data (perceptions measured on scale of 1 to 7) were expressed as means and standard deviation, while assessing Knowledge, perceptions, and Usage of HTPs.

Demographic variables, use of alcohol, use of CCs, use of ECs, personality (big five inventory), addiction (assessed by Fagerstrom method) was considered as independent variables. Awareness (Knowledge score), Perceptions regarding HTPs and ever use of HTPs were considered dependent variables. Demographic variables, Education and Occupation were later recoded to form 2 and 3 categories respectively due to a smaller number of participants in certain categories in each of them. Perceptions regarding HTPs were later recoded to convert them to dichotomous

variables (“Lower than” and “equal to or higher than” compared to CCs and ECs).

Comparison of Awareness (knowledge score) between categorical variables (demographic variables and Alcohol use) was assessed using t test or one way Analysis of Variance (ANOVA) with post hoc Tukey test. Correlation between Numerical variables (age, personality) and Awareness (knowledge score) was assessed using Pearson bivariate correlation. Repeated measures ANOVA was used for comparing the perception scores between the CCs, ECs and HTPs. Association of Perceptions regarding HTPs with demographic variables, substance use, personality scores and awareness were assessed using Binomial regression analysis with outcome variable as perception being “equal to or higher than HTPs” and “lower than HTPs”. Association of ever use of HTPs with categorical variables was assessed by chi-square test and Fischer exact test and association with numerical variables by t test between the groups who used and did not ever use HTPs. Statistical significance was set at 0.05 level.

3.7 Time line

- Protocol writing- March to April 2023
- Ethics committee approval- May 2023
- Data collection – June 2023 to January 2024
- Thesis Registration- February 2024
- Data analysis and report writing- March to July 2024
- Submission of Thesis- July 2024

4. RESULTS

In total 246 people participated in the survey. Because of the incompletely filled questionnaires certain number of participants were excluded for some analysis.

4.1 Demographic characteristics of participants

Table 1 depicts demographic characteristics and alcohol consumption behaviour of study participants. Mean age of the participants was 26.03 with Standard deviation (S.D) of 5.6. Majority of the participants were women (67.4%), had Germany as the country of origin (85.2%), living in Germany since birth (81.1%). About half of the participants were single and approximately half of the participants had minimum college level education. Students and working students formed the majority occupational group. Because of the low number of participants in certain categories educational level and occupation were later recoded to form a smaller number of the categories. College and above education were recoded as academic degree and compared with the rest of the people. Working people, students and unemployed people formed 3 occupational categories. Majority of the participants (66.1%) claimed to be occasional consumers of alcohol and only 13.2% of the participants claimed to be regular consumers of alcohol.

Table 1 Demographic characteristics of participants

	N	Minimum	Maximum	Mean	Std. Deviation
Age	239	18	40	26.03	5.648
			Frequency	Percent	
Gender	Men		77	31.8	
	Women		163	67.4	

	Diverse	2	0.8
	Total	242	100.0
Origin	Deutschland	208	85.2
	Others	36	14.8
	Total	244	100.0
Living in Germany since	More than 1 year	46	18.9
	Since birth	198	81.1
	Total	244	100.0
Marital status	Married	33	13.6
	Living with partner	85	35.0
	Single	125	51.4
	Total	243	100.0
Educational level	Phd	2	0.8
	Master	29	11.9
	Graduate	92	37.7
	Apprenticeship	22	9.0
	Abitur	85	34.8
	Gymnasium	7	2.9
	Realschule	5	2.0
	Hauptschule	2	0.8
	Total	244	100.0
Occupation	Main caregiver of the child at home, not employed	1	0.4
	Employed, full-time	48	19.8
	Employed, part-time	20	8.2
	Unemployed	5	2.1

	Disabled; unable to work	1	0.4
	Student	138	56.8
	Self-employed	6	2.5
	Student jobs	19	7.8
	Apprentice	5	2.1
	Total	243	100.0
Alcohol use	No	50	20.7
	Regular	32	13.2
	Occasional	160	66.1
	Total	242	100.0

4.2 Awareness of study participants regarding HTPs

Total knowledge scores were used to evaluate the awareness of study participants regarding the HTPs. Mean score was 1.41 (range 0-4). Mean score was considered as minimum score for considering being aware of HTPs. About 45.9% of the participants had above or equal to average score (Table 2).

Table 2 Awareness of study participants regarding HTPs

		Mean	Std. Error	Std. Deviation	Variance
Total knowledge score		1.41	0.084	1.313	1.725
		Frequency		Percent	
Total knowledge score	Lower than average	132		54.1	
	Higher than or equal to average	112		45.9	
	Total	244		100.0	

4.3 Perceptions of the study participants (absolute values) regarding the CCs, ECs and HTPs

Perceptions of the study participants regarding the CCs, ECs and HTPs are represented by table 3 and Figures 1 to 4.

Addiction potential of HTPs was perceived as significantly lesser compared to that of CCs but not significantly lower than ECs (figure 1 , Table 3).

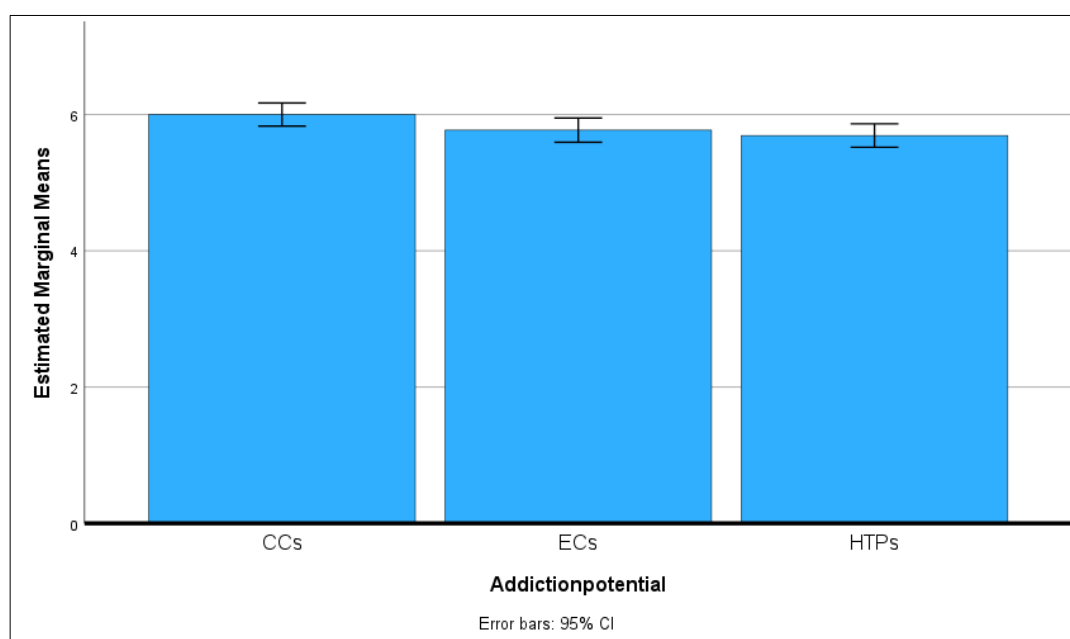


Figure 1 Perceptions about addiction potential of various smoking products (absolute values)

Harm to health from HTPs was perceived as lower than that of CCs and this difference was statistically significant. Harm to health from HTPs was perceived equal to that of ECs (figure 2, Table 3). Harm from passive smoking from HTPs was considered to be significantly lower than that of the CCs but higher than ECS (Figure 3, Table 3). Social acceptability of HTPs was perceived as significantly better than that of CCs but significantly lower than that of ECs (Figure 4, Table 3).

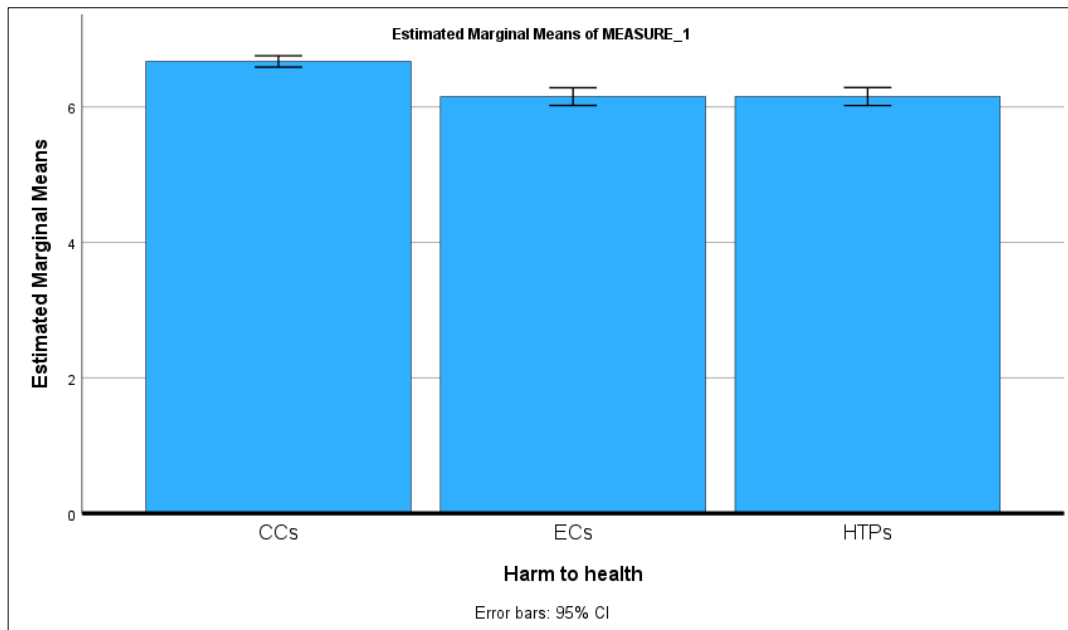


Figure 2 Perceptions about harm to health due to various smoking products (absolute values)

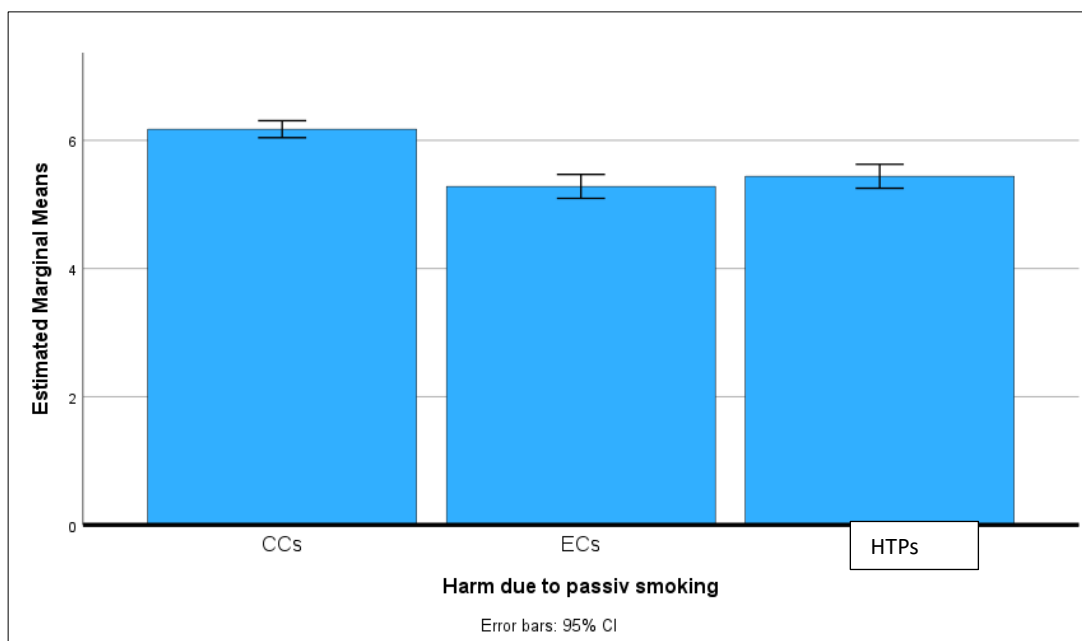


Figure 3 Perceptions about harm from passive smoking due to various smoking products (absolute values)

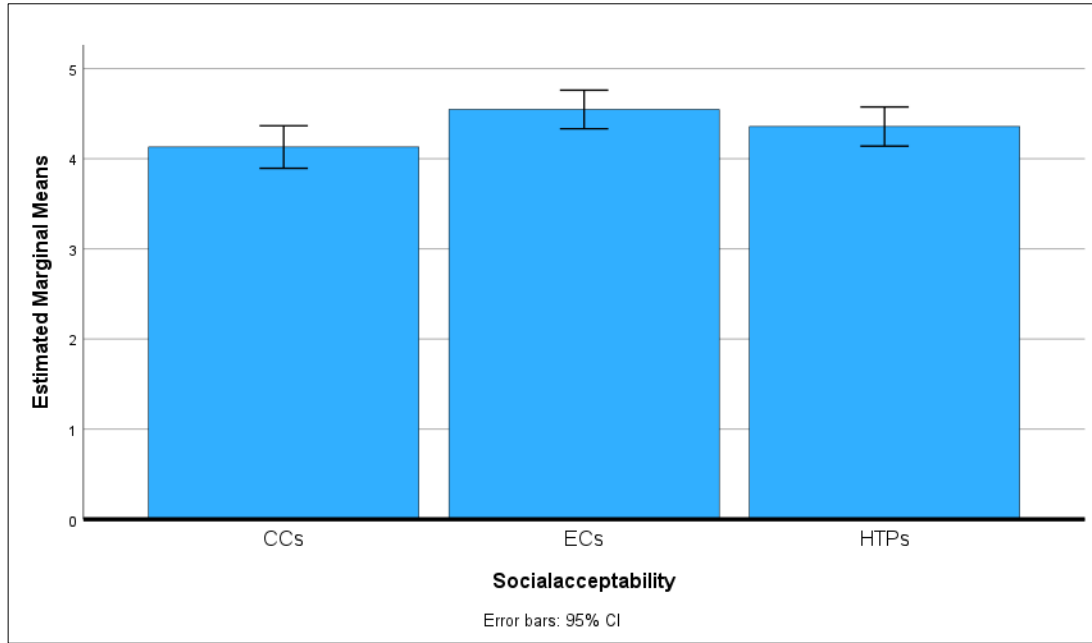


Figure 4 Perceptions about social acceptability of various smoking products (absolute values)

Table 3 Perceptions about various smoking products (absolute values)

	Mean	Std. Error	Std. Deviation	Variance	P value (Repeated measures ANOVA)
Addiction potential					
Cigarettes ^{*\$}	5.96	0.090	1.408	1.982	<0.001
E-Cigarettes [*]	5.76	0.092	1.433	2.052	
HTPs ^{\$}	5.69	0.087	1.352	1.829	
Harm to health					
Cigarettes ^{*\$}	6.67	0.043	0.662	0.438	<0.001
E-Cigarettes [*]	6.16	0.066	1.031	1.062	
HTPs ^{\$}	6.16	0.067	1.047	1.096	
Harm due to passive smoking					
Cigarettes ^{*\$}	6.17	0.067	1.047	1.096	<0.001
E-Cigarettes ^{*†}	5.29	0.095	1.474	2.171	
HTPs ^{\$†}	5.44	0.095	1.471	2.164	
Social acceptability					
Cigarettes ^{*\$}	4.14	0.118	1.836	3.371	<0.001
E-Cigarettes ^{*†}	4.54	0.107	1.668	2.783	
HTPs ^{\$†}	4.36	0.110	1.699	2.888	

Foot note- Same superscript in front of the category means that values are significantly different from each other (post hoc test)

When the responses were dichotomised as lower than and equal to or higher than cigarettes, 33.6% of the participants perceived HTPs less addictive, 36.9% of the participants perceived HTPs less Harmful, 43.9% of the participants perceived passive smoke from HTPs less harmful and 20.9% of the participants perceived HTPs less socially acceptable compared to CCs. When the responses were dichotomised as lower than and equal to or higher than E-cigarettes 20.5% of the participants perceived HTPs less addictive, 10.7% of the participants perceived HTPs less Harmful, 9.8% of the participants perceived passive smoke from HTPs less harmful and 29.1% of the participants perceived HTPs less socially acceptable compared to ECs (table 4).

Table 4 Perceptions about HTPs in relation to other smoking products

		Frequency	Percent
Addiction potential compared to Cigarettes	Lower	82	33.6
	Equal to or higher	162	66.4
Addiction potential compared to E-Cigarettes	Lower	50	20.5
	Equal to or higher	194	79.5
Harm to health compared to cigarettes	Lower	90	36.9
	Equal to or higher	154	63.1
Harm to health compared to E-cigarettes	Lower	26	10.7
	Equal to or higher	218	89.3
Harm due to passive smoking compared to cigarettes	Lower	107	43.9
	Equal to or higher	137	56.1
Harm due to passive smoking compared to E-cigarettes	Lower	24	9.8
	Equal to or higher	220	90.2

Social acceptability compared to cigarettes	Lower	51	20.9
	Equal to or higher	193	79.1
Social acceptability compared to E- cigarettes	Lower	71	29.1
	Equal to or higher	173	70.9

4.4 HTP Smoking practices among study participants.

Table 5 depicts HTP smoking practices among study participants. About one quarter of the participants (26.6%) had ever used HTPs. IQOS was the most common brand used among the ever users. Among ever users of HTPs 9.2% use daily, 15.4% use occasionally and remaining 75.4% do not currently use HTPs. Among daily and occasional HTP users, majority (43.75%) use them since past 1-3 years and 18.75% of them use since more than 3 years. Among current users of HTPs (daily and occasional) 37.5% use exclusively HTPs, another 37.5% use CCs also with HTPs and 12.5% use E-cigarettes and remaining 12.5% use all the 3 forms of smoking. Out of the 65 ever users of HTPs 35.4% and 33.8% reported themselves as current users of CCs and ECs respectively. Out of exclusive users of HTPs four i.e. 66.7% claim to have quit CCs and 16.7% reported to have quit ECs because of HTPs. Mean addiction score calculated with Fagerstrom method for regular users of HTPs, CCs and ECs is depicted in the Table 6.

Table 5 HTPs Smoking practices among participants

		Frequency	Percent
Ever use of	No	179	73.4
	Yes	65	26.6
	Total	244	100.0
Brand	No answer	2	3.1
	Others	17	26.2

	Glo	1	1.5
	IQOS	44	67.7
	IQOS, Glo	1	1.5
	Total	65	100.0
Current CC smoking status	Current smoker	23	35.4
	Former smoker	16	24.6
	Never smoker	26	40.0
	Total	65	100.0
Current use of vaping/e-cigarettes	Not at all	43	66.2
	Daily	8	12.3
	Occasionally	14	21.5
	Total	65	100.0
Current use of HTPs	Daily	6	9.2
	Occasionally	10	15.4
	No	49	75.4
	Total	65	100.0
Daily and occasional smoking of HTPs since	0-1 years	6	37.5
	1-3 years	7	43.75
	More than 3 years	3	18.75
	Total	16	100
Exclusive use among daily and occasional users of HTPs	Yes	6	37.5
	No. I use Conventional cigarettes too	6	37.5
	No. I use E- cigarettes	2	12.5
	No. I use all 3 forms	2	12.5
	Total	16	100.0

Use HTPs exclusively since	1 - 3 Months	1	16.7
	3- 6 Months	2	33.3
	More than 6 Months	3	50.0
	Total	6	100.0
Stopped smoking conventional cigarettes because of HTPs	Yes	4	66.7
	Not applicable	2	33.3
	Total	6	100.0
Stopped smoking e-cigarettes due to HTPs	Yes	1	16.7
	Not applicable	5	83.3
	Total	6	100.0

Table 6 Addiction among current smokers

Addiction assessed by Fagerstrom scale	N	Mean	Std. Error	Std. Deviation
among exclusive HTP smokers	6	3	1.54	3.795
among current cc smokers	40	4.72	0.320	2.025
among current EC smokers	44	2.16	0.425	2.820

4.5 Association of Awareness with demographic variables

Table 7 represents association of Awareness (assessed by knowledge score) with demographic variables. Men had significantly higher awareness of HTPs compared to Women. People with other countries as origin and who were living in Germany since more than 1 year had slightly higher scores compared to people of German origin. However, this

difference was not statistically significant. Marital status showed significant association with awareness. Married people showed significantly higher awareness compared to single/people living alone. There was no significant difference in awareness between people who are living with partner and people living alone . People with academic degree showed significantly higher awareness compared to others. Difference in awareness between occupational groups was not significant. Although users of alcohol showed higher scores compared to non-users, the difference was not statistically significant. CC users and EC users had significantly higher awareness compared to non-users.

Table 7 Awareness by demographic characteristics

		N	Mean	Std. Deviation	Std. Error Mean	P Value	Effect size
Gender	Men	77	1.84	1.368	.156	<0.001	0.482
	Women	163	1.23	1.239	.097		
Origin	Germany	208	1.39	1.340	.093	0.441	0.126
	Others	36	1.56	1.157	.193		
Living in Germany since	More than1 year	46	1.67	1.194	.176	0.113	0.245
	Since birth	198	1.35	1.335	.095		
Marital status	Married ^{\$}	33	2.00	1.250	.218	0.003	0.046
	Living with Partner	85	1.54	1.368	.148		
	Single ^{\$}	125	1.18	1.240	.111		
Educational level	Academic degree	123	1.67	1.233	.111	0.002	0.395
	Others	121	1.16	1.348	.123		

Occupation	Gainfully employed	74	1.54	1.377	.160	0.496	0.006
	Unemployed	7	1.71	1.380	.522		
	Student jobs	162	1.35	1.283	.101		
Alcohol consumption	No	50	1.26	1.352	.191	0.613	0.004
	Regular	32	1.53	1.319	.233		
	Occasional	160	1.44	1.311	.104		
CC use	No	164	1.07	1.196	.093	<0.001	0.851
	Yes	80	2.11	1.273	.142		
EC use	No	200	1.28	1.273	.09	<0.001	0.578
	Yes	44	2.02	1.338	.202		

Foot note- Same superscript in front of the category means that values are significantly different from each other (post hoc test)

4.6 Association between awareness and age, personality scores and addiction scores

Table 8 depicts correlation between Awareness and Numerical variables like age, personality scores and addiction scores. Significant positive correlation of awareness was observed with age, and extraversion. Non-significant very weak correlations were observed with Neurotiscm, openness, agreeableness, Conscientiousness and addiction scores among current CC and EC smokers.

Table 8 Correlation of Awareness with age and personality

		Total score knowledge
Age	Pearson Correlation	0.139*
	Sig. (2-tailed)	0.032
	Pearson Correlation	0.645

Addiction assessed by Fagerstrom scale	Sig. (2-tailed)	0.167
Neurotiscm	Pearson Correlation	-0.075
	Sig. (2-tailed)	0.244
Extraversion	Pearson Correlation	0.167**
	Sig. (2-tailed)	0.009
Openess	Pearson Correlation	0.064
	Sig. (2-tailed)	0.324
Agreeableness	Pearson Correlation	-0.084
	Sig. (2-tailed)	0.192
Conscientiousness	Pearson Correlation	-0.058
	Sig. (2-tailed)	0.367
Addiction among CC users assessed by Fagerstrom scale	Pearson Correlation	-0.016
	Sig. (2-tailed)	0.921
Addiction among EC users assessed by Fagerstrom scale	Pearson Correlation	0.236
	Sig. (2-tailed)	0.256

4.7 Association of Perception with demographic variables and substance use

Table 9 shows results of binomial regression analysis with perception about HTPs as a dependent variable and demographic characteristics and substance use as covariates. Among demographic variables Age, Gender, Occupation, substance use showed significant association with perceptions. Origin, time since living in Germany, education and marital status did not show association with perceptions. Being older showed lower odds (0.924) of perceiving that harm due to passive smoking from HTPs was higher than or equal to CCs. Women had significantly lower odds (0.166) of perceiving that social acceptance of HTPs are higher than or

equal to ECs. Unemployed had lower odds of perceiving that Harm from HTPs (0.454) and passive smoking from HTPs (0.308) are equal to or higher than CCs. Alcohol consumption was associated with lower odds (0.381) of perceiving that harm from passive smoking of HTPs was higher than or equal to that of CCs. Current CC smokers had lower odds (0.230) of perceiving that social acceptability of HTPs was higher than or equal to CCs. Current EC users had lower odds of perceiving that Addiction potential of HTPs was higher than or equal to CCs (0.382), and lower odds of perceiving that social acceptability of HTPs was higher than or equal to ECs (0.272). Ever users of HTPs had higher odds of perceiving that social acceptability of HTPs was higher than or equal to CCs (3.267) as well as ECs (5.77)

Table 9 Binomial regression analysis to perceptions about HTPs in relation to other smoking products with demographic characteristics and substance use as covariates.

		Addiction potential higher than or equal to		Harm to health higher than or equal to		Harm due to passive smoking higher than or equal to		Social acceptability higher than or equal to	
		Cigarettes	E-Cigarettes	Cigarettes	E-cigarettes	Cigarettes	E-cigarettes	Cigarettes	E-cigarettes
		OR (95% C.I)	OR (95% C.I)	OR (95% C.I)	OR (95% C.I)	OR (95% C.I)	OR (95% C.I)	OR (95% C.I)	OR (95% C.I)
Age		1.014 (.944, 1.089)	1.039 (.952, 1.135)	.940(.875,1.010)	1.043(.928, 1.172)	.924*(.856, .997)	.978(.871, 1.099)	1.058(.969, 1.156)	1.025(.943, 1.115)
Gender	Men	1	1	1	1	1	1	1	1
	Women	1.297 (.705, 2.387)	1.140 (.544, 2.390)	1.407(.767, 2.584)	1.123(.421, 2.997)	1.211(.648, 2.265)	1.950(.725, 5.245)	.452(.200, 1.022)	.166**(.068, .407)
Origin	Germany	1	1	1	1	1	1	1	1
	Others	2.608 (.776, 8.761)	1.782 (.421, 7.538)	.706(.216,2.303)	1.085(.167, 7.036)	.520(.147, 1.842)	1.279(.170, 9.607)	.362(.086, 1.513)	1.251(.296, 5.286)
Living in Germa	More than a year	1	1	1	1	1	1	1	1

ny since	Since birth	1.944 (.657, 5.751)	1.412 (.384, 5.196)	.602(.195,1.861)	1.198(.205, 6.992)	.310(.090, 1.061)	.939(.145, 6.063)	.506(.122, 2.101)	.666(.175,2.528)
Marital status	Married	1	1	1	1	1	1	1	1
	Living with a partner	1.077 (.418, 2.773)	1.370 (.455, 4.129)	1.381(.548, 3.479)	.752(.164,3.447)	1.563(.593, 4.121)	1.107(.227, 5.404)	.747(.233, 2.398)	1.026(.350, 3.007)
	Living alone	1.031 (.397, 2.675)	2.413 (.762, 7.639)	1.839(.713, 4.742)	1.108(.225, 5.455)	2.661(.977, 7.247)	1.282(.254, 6.472)	.496(.153, 1.614)	.813(.273,2.425)
Education	Academic degree	1	1	1	1	1	1	1	1
	Others	1.174 (.636, 2.168)	.786 (.373, 1.659)	.728(.397,1.338)	1.246(.470, 3.301)	.646(.345, 1.212)	.751(.272, 2.077)	1.737(.821, 3.676)	1.505(.748, 3.029)
Occupation	Gainfully employed	1	1	1	1	1	1	1	1
	Unemployed	.834(.394, 1.764)	.523 (.201, 1.360)	.454*(.209, .984)	.562(.163,1.942)	.308*(.138, .686)	.563(.154, 2.054)	1.495(.611, 3.656)	.734(.302,1.784)
Alcohol status	No	1	1	1	1	1	1	1	1
	Yes	.930 (.452, 1.914)	1.343 (.561, 3.213)	.690(.331,1.440)	1.464(.098,2.207)	.381*(.174, .835)	.433(.091, 2.060)	1.468(.643, 3.350)	.898(.397,2.030)
CC smoking status	No	1	1	1	1	1	1	1	1
	Yes	.784 (.392, 1.566)	.892(.393, 2.023)	.784(.398,1.545)	.368(.133,1.018)	.626(.314, 1.249)	.826(.278, 2.457)	.230**(.098, .537)	.470(.209,1.054)
Current vaping status	No	1	1	1	1	1	1	1	1
	Yes	1.052 (.478, 2.314)	.382*(.165, .880)	.874(.405,1.885)	.512(.185,1.414)	.493(.222, 1.096)	.383(.131, 1.119)	1.039(.405, 2.666)	.272*(.110, .673)
ever use of HTP	No	1	1	1	1	1	1	1	1
	Yes	.987 (.494, 1.973)	.626(.287, 1.366)	.722(.365,1.427)	.639(.244,1.675)	.926(.458, 1.870)	.646(.232, 1.794)	3.267*(1.248, 8.556)	5.770**(.2199,15.139)

*, ** Statistically significant at 0.05 and 0.01 level respectively

4.8 Association of Perception with personality scores and knowledge scores

Table 10 depicts results of binomial regression analysis with perception about HTPs as a dependent variable and personality scores and knowledge score as covariates. Higher extraversion scores predict the

lower odds of perceiving that social acceptability of HTPs are equal to or higher than that of ECs. Higher agreeableness scores predict the lower odds (0.750) of perceiving that harm due to passive smoking of HTPs is equal to or higher than that of CCs. Higher openness scores predict higher odds (1.296) of perceiving that harm due to passive smoking of HTPs is equal to or higher than that of CCs. Higher Conscientiousness scores predict higher odds (1.727) of perceiving that harm due to passive smoking of HTPs is equal to or higher than that of ECs. Higher awareness was associated with lower odds of perceiving that harm from HTPs is higher than or equal to that of CCs (0.703) or ECs (0.594) and with lower of perceiving that harm from passive smoking of HTPs was higher than or equal to that of CCs (0.720)

Table 10 Binomial regression analysis to perceptions about HTPs in relation to other smoking products with personality and awareness as covariates.

	Addiction potential higher than or equal to		Harm to health higher than or equal to		Harm due to passive smoking higher than or equal to		Social acceptability higher than or equal to	
	Cigarettes OR (95% C.I)	E-Cigarettes OR (95% C.I)	cigarettes OR (95% C.I)	E-cigarettes OR (95% C.I)	Cigarettes OR (95% C.I)	E-cigarettes OR (95% C.I)	Cigarettes OR (95% C.I)	E-cigarettes OR (95% C.I)
Neuroticism	1.071 (.864, 1.327)	1.134(.879, 1.462)	1.020(.823, 1.265)	.936(.673, 1.303)	.991(.801, 1.224)	1.301(.910, 1.859)	1.006(.786, 1.289)	.761(.604,.958)
Extraversion	1.104 (.902, 1.352)	.897(.702, 1.146)	1.135(.926, 1.392)	.870(.622, 1.216)	1.141(.934, 1.392)	1.006(.725, 1.396)	.873(.686, 1.110)	.669**(.530,.846)
Openness	1.172 (.940, 1.462)	1.058(.816, 1.373)	1.177(.943, 1.469)	.960(.674, 1.368)	1.296*(1.037, 1.619)	1.137(.804, 1.607)	.955(.735, 1.242)	1.120(.879, 1.425)
Agreeableness	.952 (.722, 1.256)	.935(.675, 1.295)	.905(.686, 1.194)	.883(.573, 1.359)	.750*(.568, .991)	.986(.638, 1.522)	.983(.712, 1.356)	1.012(.754, 1.357)
Conscientiousness	1.022(.772, 1.352)	1.329(.950, 1.860)	1.066(.807, 1.408)	1.478(.957, 2.285)	1.049(.797, 1.380)	1.727*(1.071, 2.784)	.943(.681, 1.307)	1.001(.748, 1.340)

Total knowledge score	1.019(.825, 1.258)	.958(.748, 1.228)	.703*(.568, .870)	.594*(.420, .840)	.720*(.583, .889)	1.019(.726, 1.430)	1.126(.877, 1.444)	1.096(.874, 1.373)
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*, ** Statistically significant at 0.05 and 0.01 level respectively

4.9 Relationship of ever HTP use with demographic characteristics

Table 11 shows relationship of ever HTP use with demographic characteristics. There was no significant association with gender, origin, time since living in Germany, marital status, education, and occupation. CC smoking use, EC use and alcohol consumption were significantly associated with ever HTP use. Present smokers (57.5%) and former smokers (40%) of CCs were more consumers of HTPs than non-CC smokers (15.9%). Similarly daily EC users (61.5%) and occasional users (45.2%) were more likely consumers of HTPs compared to non-consumers of ECs (21.5%). Also, regular alcohol users were significantly more likely to have HTP use (40.6%) compared to occasional (26.9%) and non-users (14%).

Table 11 Use of HTPs by demographic variables

		Ever use of HTPs		P value
		No	Yes	
Gender	Men	51	26	0.177
		66.2%	33.8%	
	Women	125	38	
		76.7%	23.3%	
	Others	1	1	
		50.0%	50.0%	
Origin	Germany	156	52	0.219
		75.0%	25.0%	
	Others	23	13	
		63.9%	36.1%	

Living in Germany since	More than 1 year	30	16	0.195
		65.2%	34.8%	
	Since birth	149	49	
		75.3%	24.7%	
Marital status	Married	24	9	0.758
		72.7%	27.3%	
	Living with intimate partner	60	25	
		70.6%	29.4%	
	Single	94	31	
		75.2%	24.8%	
Education level	Academic degree	89	34	0.773
		72.4%	27.6%	
	Others	90	31	
		74.4%	25.6%	
Occupation	Gainfully employed	51	23	0.521
		68.9%	31.1%	
	Unemployed	5	2	
		71.4%	28.6%	
	Student jobs	123	39	
		75.9%	24.1%	
CC smoking status	Present smoker	17	23	<0.001
		42.5%	57.5%	
	Former smoker	24	16	
		60.0%	40.0%	
	Never smoker	138	26	
		84.1%	15.9%	

Current vaping status	Never	157	43	<0.001
		78.5%	21.5%	
	Daily	5	8	
		38.5%	61.5%	
	Occasionally	17	14	
		54.8%	45.2%	
Alcohol use	Never	43	7	0.025
		86.0%	14.0%	
	Regularly	19	13	
		59.4%	40.6%	
	Occasionally	117	43	
		73.1%	26.9%	

4.9.1 Association of HTP usage with age, personality, awareness, and addiction

Table 12 represents association of HTP usage with age, personality, awareness and addiction among CC and EC users. Age, personality scores calculated under Neuroticism, extraversion, openness, agreeableness and Conscientiousness, and addiction score calculated among CC and EC users were not significantly different between participants who ever used or not used HTPs. Mean knowledge score among people who ever used HTPs was significantly higher than who did not use HTPs ($p= 0.008$).

Table 12 Use of HTPs by age, awareness, personality and addiction among CC and EC users

		Ever use of HTPs		P value t test	Effect size (cohen's d)
		No	Yes		
Age	Mean	26.06	25.94	0.885	0.021
	Std. Deviation	5.78	5.29		
	Std. Error Mean	0.44	0.67		
total score knowledge	Mean	1.28	1.78	.008	0.39
	Std. Deviation	1.31	1.27		
	Std. Error Mean	0.10	0.16		
Neurotiscm	Mean	4.12	4.21	0.654	0.065
	Std. Deviation	1.28	1.52		
	Std. Error Mean	0.10	0.19		
Extraversion	Mean	4.52	4.82	0.153	0.208
	Std. Deviation	1.48	1.37		
	Std. Error Mean	0.11	0.17		
Openess	Mean	5.01	5.10	0.617	0.073
	Std. Deviation	1.31	1.12		
	Std. Error Mean	0.10	0.14		
Agreeableness	Mean	5.18	5.01	0.258	0.164
	Std. Deviation	1.02	1.07		
	Std. Error Mean	0.08	0.13		
Conscientiousness	Mean	5.11	4.82	0.061	0.274
	Std. Deviation	1.02	1.11		
	Std. Error Mean	0.08	0.14		
Addiction score (Fagerstrom scale) among current CC smokers	Mean	4.76	4.70	0.917	0.034
	Std. Deviation	1.821	2.204		
	Std. Error Mean	0.442	0.46		
Addiction score (Fagerstrom scale) among Exclusive EC smokers	Mean	3.85	3.75	0.993	0.034
	Std. Deviation	2.51	3.16		
	Std. Error Mean	0.697	0.914		

5. DISCUSSION

The study was conducted with the broad aim of assessing awareness, perceptions, and use of HTPs in young adults among Germany. In fact, this is the first study to assess the prevalence, awareness, and perceptions about HTPs and to investigate the possible association with demographic factors, habits, and personality in Germany. We also tried to explore if the use of HTPs has any influence on traditional form of Cigarette smoking.

This information would be essential for identifying risk groups and risk factors for the adoption of this habit. This would enable public health strategies to be developed to support, plan, implement and monitor prevention and control programmes.

5.1 Methodology

The study used cross sectional observational study design with online questionnaire survey. The study used social media to recruit samples, which is the best method to reach the target population of young adults across Germany. The study considered this to be the target population as adults aged 18-40 are the potential target group for the marketing of various HTP products and prevention strategies, if any, need to be implemented for this target group. Inclusion criteria, such as a minimum stay of one year in Germany and the ability to speak and understand German, ensured that the participants really belonged to the target population.

5.2 Strengths of the study

Online questionnaire recorded several details about demographic characteristics and substance use, perceptions about HTPs, CCs and ECS, Personality and Nicotine addiction. Methods used to assess Personality and Nicotine addiction were validated tools. To date, the Big Five

personality constructs are a recognised, comprehensive, and rich framework that can be used to describe the structure of key personality traits among adults. It promotes a strong and perceptive interdisciplinary transfer and exchange between the behavioural, economic, and social disciplines. This method is reliable and robust even when self-administered as much as Face-to-face surveys (Lang et al. 2011).

5.3 Important results and comparison with previous studies

5.3.1 Sample

The study population was consisting of mostly student population (bachelor and masters), women, and people of German origin. The population may not be exactly confirming to the demographic characteristics of German young adults of 18-40 years due to online nature of the survey. For example, Women, people with college level education (bachelor and masters) participated largely in this study. Previous online surveys also showed similar participant composition.

5.3.2 Awareness of HTPs

The study participants had fair knowledge of HTPs. Almost half of the study participants had above average knowledge score of HTPs. This indicates that awareness of HTPs was quite high among study participants compared to that of other studies. The studies in USA showed that, prevalence of awareness was less than 10% of the participants. (Azagba and Shan 2021; Berg et al. 2021). Even previous European studies showed that awareness among Europeans and Germans was significantly lower (27.8% and 34.3% respectively) than that found in present study (Maria Lotrean et al. 2020). These studies are only 2 years old. This implies that awareness about the HTPs has been steadily increasing in Germany. Another testament to this trend has already been described by Lotrean et

al. where awareness nearly doubled between 2016 and 2018 (Maria Lotrean et al. 2020).

The association of awareness with demographic characteristics was assessed by within group comparison of knowledge scores and association with numerical variables like age, personality scores and addictions scores were assessed by bivariate correlations. Men, married, people with college level education, EC and CC users showed significantly high awareness compared to women, unmarried, people with lesser than college education and non-users of EC and CC respectively. Origin and number of years living in Germany and alcohol use did not show significant association with awareness of HTP. Older age and Extraversion showed positive correlations with awareness. Similar findings were noted in the study by Berg et al. and Lotrean et al. In the former study awareness was associated with being older, male gender, CC use and EC use. In the latter study it was associated with younger compared to older than 40, male gender and EC usage. (Berg et al. 2021; Maria Lotrean et al. 2020). Another study by Azagba et al. younger age, male gender, CC use and EC use were significantly associated with Awareness but education and employment status did not show any association. (Azagba and Shan 2021)

5.3.3 Use of HTPs

More than one-fourth of the study participants used HTPs at least once in their life. The proportion of the participants who ever used HTPs was higher than the studies by Berg et al. (3.5%) and Azagba et al. (below 9%) which were conducted between 2020 and 2021 (Azagba and Shan 2021; Berg et al. 2021). The 2019 study by Adamson et al. in Japan and 2020 study by Kim et al. in Korea also reported low prevalence of HTP usage which was only 5% and 10% of the participants respectively (Adamson et al. 2020;

Kim et al. 2021). Even the European study of 2018 showed a very low prevalence of Ever HTP use in Germany (1.4%). (Gallus et al. 2022). IQOS was the most common brand used among the present study participants. This finding is also in line with all the studies which assessed the HTP usage.

One-fourth of ever HTP users still use them either daily or occasionally. Majority of them started more than 1-3 years back and about one third of them acquired this new habit quite recently. One third of the current users smoke exclusively HTPs. Almost one third of the current as well as ever HTP users also smoke CCs. About one third of ever HTP users also smoke ECs whereas only 12.5% of current users additionally smoke ECs. Nevertheless another 12.5% current HTP smokers use all 3 forms of smoking. These findings are considerably higher than the previous studies conducted by Adamson et al. where only 16% of ever users claimed to be exclusive HTP users and 11% smoked both HTPs and CCs (Adamson et al. 2020). Even in the Korean study, the findings were considerably lower with respect to being exclusive users but considerable higher for Combined HTP and CC usage (Kim et al. 2021).

Association of ever HTP use with demographic characteristics using chi-square test revealed that, there was no significant association with gender, origin, time since living in Germany, marital status, education, and occupation. CC smoking use, EC use and alcohol consumption were significantly associated with ever HTP use. Users of CC, EC and alcohol had more likelihood of using HTPs than non-users. Among continuous variables age, personality, and addiction score among CC and EC users did not show significant association with use of HTPs. Only awareness of HTPs was significantly higher among those who used compared to who did not use HTPs ($p= 0.008$). Causal relationship however cannot be ascertained

owing to the cross-sectional nature of the study. This finding could not be compared with other studies as majority of the studies did not assess this association and some of them studied use of HTPs only among participants who claimed to be aware of HTPs. Association with EC, CC usage has been corroborated with studies by Azagba et al., Berg et al., Gallus et al., Lotrean et al., Lee et al. However, study by Gallus et al. also showed association with gender and age. In Study by Luk et al. younger age and higher level of education predicted use of HTPs significantly.

None of the studies so far have assessed the association with personality although one study by Lee et al. found association between perceived stress and HTP use. (Azagba and Shan 2021; Berg et al. 2021; Gallus et al. 2022; Lee et al. 2019; Maria Lotrean et al. 2020). Perhaps further studies may be conducted with other tools of personality assessments or combined with big 5 inventory.

5.3.4 Relationship of HTP use with quitting CCs

Quitting of CCs and ECs after starting to use HTPs was also investigated in the present study. About two third of exclusive users claimed to have quit CCs and about 16% of them have claimed to have quit ECs after they started with HTP usage. This finding is also higher than found by Luk et al. in Hongkong, where 7 days self-reported CC smoking abstinence among HTP users was 24% (Luk et al. 2021). This difference may have been due to extremely low number of exclusive HTP users in our study compared to that of Luk et al. Another possible reason may be, the time since the study by Luk et al. was conducted, which was almost 4 years ago. This means a greater number of years have passed since which people know about use of HTPs. Unfortunately, we did not assess quit rates of CC smoking among non HTP users in the present study, which would have enabled us to

assess if there is any relationship between HTP smoking and quitting CC smoking. This can be considered as one of the limitations of the study. The Korean study and Hongkong studies corroborate our findings that CC and EC smokers have higher likelihood of being HTP users they also successfully proved by regression analysis that HTP use does not successfully lead to quitting CC smoking (Kim et al. 2021; Luk et al. 2021). Further studies in Germany need to be conducted with bigger sample of HTP users and compare their quit smoking attempts with that of non HTP users. Based on the present knowledge, conclusions cannot yet be drawn about their ability to help with quitting CCs. HTPs have the potential to attract youth causing a gateway effect. At present there is a lack of enough data to prove the interaction among dual users with other tobacco products and ECs.

5.3.5 Perceptions about HTPs

HTPs were perceived as less addictive, less harmful to health, less harmful for passive smokers and more socially acceptable compared to CCs and this difference was statistically significant. Compared to e-cigarettes however, they were considered equally harmful to health, more harmful to passive smokers and less socially acceptable. However, ECs compared to CCs were considered harmful, addictive and less socially acceptable than HTPs by a greater number of people. Similar results were observed in the study by Berg et al. However, they also reported that participants in that study also perceived HTPs to be less addictive and less harmful than even ECs. (Berg et al. 2021)

Age, Gender, Occupation, substance use showed significant association with perceptions. Older people, Unemployed and People who drink alcohol had higher chance of perceiving that Harm from HTPs is lower than

CCs. Smokers of EC perceived that HTPs have lower addiction potential compared to CC. Men perceived social acceptability of HTPs to be higher than ECs. Ever HTP users however perceived that HTPs are more socially acceptable than both CCs and ECs. EC smokers perceived that social acceptability of HTPs was lower than that of ECs. These results give us information on who can be considered as target group for future prevention programmes.

When personality scores and knowledge scores were examined for associations with perceptions, extraversion, agreeableness, openness, conscientiousness, and higher awareness were found to be significant predictors of some of the perceptions. People with low extraversion scores perceived that social acceptability of HTPs are higher than ECs. Whereas people with high agreeableness scores perceived that HTPs are less harmful for passive smokers compared to CCs, people with higher openness and higher conscientiousness scores perceived that HTPs are more harmful for passive smokers compared to CCs.

People with high awareness perceived that HTPs were less harmful than CCs and ECs and that passive smoking from HTPs was less harmful than CCs. Even though the preliminary studies have proved that HTP smoke has less potentially harmful constituents than CCs. The long-term human studies are lacking to conclusively prove that this translates to reduced risk among humans. Even though information leads to right perceptions and leading to proper judgements with respect to adopting the new habit, wrong information disseminated through industry advertisement propaganda can lead to overseeing harmful effects of the HTPs and wrong adoption of the habit, especially among non-smokers.

5.4 Limitations

Due to the online nature of the survey, certain limitations may have crept into the study, such as the inability to connect with people from remote areas or those without a social media presence, social desirability bias, and unanswered questions.

Due to online nature of the survey the inclusion of all the gender types in the study could not be controlled. Thus, we had more women participants compared to men and the participation of 3rd Gender was negligible. Thus, the conclusions of this study may not be generalisable to the entire population and thus may have to be taken with caution.

Again, due to online nature of the study participants cannot be considered as national representation, So the prevalence of HTP use should be interpreted with caution. A study with nationally representative samples is the need of the hour.

Although we provided pictures of HTP products during assessment of knowledge there might have been some confusion between the terms HTPs and ECs among some of the survey participants, because HTPs are basically E cigarettes, where tobacco is heated instead of liquid containing nicotine.

In this study the income status of the participants was not collected. Costs of HTPs was not considered in this study. While perceptions and awareness may not be strongly related to the cost of the product, use of the HTPs could be certainly related to it. CCs do not require but a lighter or a match stick to burn the CCs, HTPs are used by igniting the stick with the use of a battery-operated device which can costs anywhere around 30 to 50 Euros. The costs of sticks even though are equal to that of conventional cigarette sticks, initial cost in acquiring this habit could be

financially taxing. Therefore, the economic status of the person can be a strong predictor in the initiation of this habit.

5.5 Recommendations

Based on the results of this study following can be recommended from public health point of view;

1. A nationwide survey with a large sample is the need of the hour. Public health institutes like Deutsches Krebsforschungszentrum (German cancer research center) should consider this task on the priority basis considering the growing use of this new product in the market.
2. Further research also needs to be conducted among smokers especially among HTP users in order to successfully verify, if the use of HTPs is really associated with quitting conventional forms of smoking among German adult population.
3. Further research needed to also verify, if the economic factors like financial status of the person affects the choice of the smoking form.
4. Women, people with lower education levels and unmarried singles showed poor awareness with this product and are potential targets to acquire this new habit because of unharmed image created by the manufacturers. Thus, policies need to be directed towards these risk groups in order to create awareness about HTPs. In this regard, policies need to control and monitor marketing strategies by the manufacturers to prevent dissemination of false information.
5. Groups who are having good perceptions about HTPs, like Men, unemployed, or people who use alcohol and smoke CCs and ECs, personalities like Low extraversion, High agreeableness scores, need to be monitored over time and need to be included in preventive programs for risk minimisation.

6.CONCLUSIONS

Awareness of HTPs was quite high among study participants compared to that of previous studies. Men, married individuals, and those with a college-level education demonstrated significantly higher levels of awareness compared to women, unmarried individuals, and those with less than a college education, respectively. Furthermore, older age and extraversion were positively correlated with awareness.

A quarter of the study participants reported having used HTPs at least once in their lifetime. The use of HTPs was not associated with any of the demographic characteristics investigated, including gender, country of origin, length of residence in Germany, marital status, level of education, and occupation. Individuals who had previously used CC, EC, or alcohol were more likely to have used HTPs than those who had not. Awareness was found to be positively correlated with HTP use.

HTPs were perceived as less addictive, less harmful to health, less harmful for passive smokers and more socially acceptable compared to CCs and equally harmful to health, more harmful to passive smokers and less socially acceptable compared to ECs.

Being Men, older, unemployed, or having substance use habits like alcohol and smoking cigarettes were associated with having good perceptions about HTPs. Low extraversion, High agreeableness were associated with good perceptions about HTPs. Awareness showed to be very important factor in the development of right perceptions about HTPs.

One-fourth of ever HTP continue using them daily or occasionally and one third of the current users smoke exclusively HTPs. About two third of exclusive users self-reported to have quit CCs. Association between HTP usage and cessation of CC use was not conclusively established.

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8. APPENDICES

8.1 Ethics committee approval



Ethikkommission
Ethics Committee

10.05.2023

Ethikantrag / Ethics Application 2023-09

„Awareness, Use, and Perceptions of Heated Tobacco Products among young adults in Hamburg, Germany“

vom / of 27.03.2023

Antragsteller / Applicant: Laxminarayan Sonde
Betreuer / Supervisor: Prof. Ralf Reintjes

Sehr geehrter Herr Sonde,

das o.g. Vorhaben wurde nach Prüfung durch die Ethikkommission der HAW Hamburg als grundsätzlich „ethisch unbedenklich“ bewertet.

Dear Mr. Sonde,

the above-mentioned project was assessed by the Ethics Committee of the Hamburg University of Applied Sciences as "ethically acceptable".

Mit freundlichen Grüßen

Best regards



Dr. Christiane Stange
(Koordination Ethikkommission / Coordination Ethics Committee)

8.2 Informed consent Sheet (German)

TEILNEHMERINFORMATIONSBLATT UND EINVERSTÄNDNISERKLÄRUNG

Bekanntheit, Gebrauch und Wahrnehmung von erhitzten Tabakprodukten unter jungen Erwachsenen in Deutschland"

Ich, Laxminarayan Sonde, Student im Master of Public Health an der HAW Hamburg, führe eine Studie zum Thema "Bekanntheit, Gebrauch und Wahrnehmung von erhitzten Tabakprodukten unter jungen Erwachsenen in Hamburg, Deutschland" durch.

Ziel der Studie

Diese Studie wird durchgeführt, um das Bewusstsein, die Wahrnehmung und die Prävalenz des erhitzte Tabakprodukte-Konsums unter jungen Erwachsenen in Deutschland sowie die Beziehung zwischen dem Konsum erhitzter Tabakprodukte und Konsum der herkömmlichen Tabakprodukte zu ermitteln.

Warum werden Sie ausgewählt?

Weil diese Studie unter jungen Erwachsenen (18-40 Jahre) in Deutschland, durchgeführt.

Freiwilligkeit der Teilnehmer

Ihre Teilnahme an dieser Umfrage ist völlig freiwillig und würde mir sehr viel bedeuten. Sie können die Teilnahme ohne Angabe von Gründen verweigern.

Pflichten der Teilnehmer und erwartete Mitarbeit

Wenn Sie sich bereit erklären, an der Studie teilzunehmen, müssen Sie ein Online-Umfrageformular ausfüllen. Das Formular enthält mehrere Fragen

zu Ihrer Person, Ihrem Bewusstsein, Ihrer Wahrnehmung und Ihrem Konsum von erhitzten Tabakerzeugnissen und anderen Raucherzeugnissen beantwortet werden sollen. Da es sich um eine Online-Umfrage handelt, gibt es keine gedruckte Einverständniserklärung, die Sie unterschreiben müssen. Die Zustimmung wird von Ihnen eingeholt, wenn Sie auf das Feld „Ichstimme der Teilnahme zu“ klicken. Sie können jedoch jede Frage unbeantwortet lassen, wenn sie nicht auf Sie zutrifft oder wenn Sie nicht antworten möchten, oder Sie können die Teilnahme an der Studie ohne Angabe von Gründen abbrechen.

Risiken, Schäden und Entschädigungen

Es bestehen keinerlei Risiken für die Teilnehmer an dieser Studie.

Privatsphäre und Vertraulichkeit

Die Privatsphäre des Teilnehmers wird während der gesamten Studie gebührend geschützt. Alle Informationen, die den Teilnehmer betreffen, werden vertraulich behandelt. Die Ergebnisse werden in wissenschaftlichen Standardzeitschriften veröffentlicht. Bei der Veröffentlichung der Ergebnisse wird die Vertraulichkeit gewahrt. Ihre Antworten werden absolut vertraulich und anonymisiert behandelt.

Nutzen der Studie

Die Studie hat keinen direkten Nutzen für die Teilnehmer. Sie wird jedoch der Gesellschaft dabei helfen, das Verhalten beim Rauchen von erhitzten Tabakprodukten besser zu verstehen und somit Strategien zur Verhinderung dieser Gewohnheit zu finden.

Für weitere Informationen wenden Sie sich bitte an: Hauptforscher- Herr Laxminarayan Sonde, Masterstudent, Master of Public Health.



Ich, bin bereit, an der Forschungsstudie Bekanntheit, Gebrauch undWahrnehmung von erhitzten Tabakprodukten unter jungen Erwachsenen inHamburg, Deutschland teilzunehmen, die von Herrn Laxminarayan Sonde vonder HAW Hamburg durchgeführt wird. Ich wurde über diese Studie in einer fürmich verständlichen Sprache aufgeklärt. Ich habe meine Verantwortung indieser Studie verstanden. Ich bin über die Wahrung der Privatsphäre und derVertraulichkeit informiert worden. Ich bin darüber informiert worden, dasswährend der Studie keine Vergütung gezahlt wird. Ich bin darüber informiertworden, dass die Studie für wissenschaftliche Analysen und zur Veröffentlichungverwendet wird. Ich bin über die Freiwilligkeit der Studie aufgeklärt worden. Mirwurde das Recht eingeräumt, die Studie abzulehnen und von der Studiezurückzutreten. Mir wurde die Möglichkeit gegeben, Fragen zur Studie zu stellenund etwaige Zweifel zu klären

Nur ein Oval ankreuzen.

- Ja (Ich möchte in dieser Umfrage teilnehmen)
- Nein

8.3 Questionnaire (German)-

Bekanntheit, Gebrauch und Wahrnehmung von erhitzten Tabakprodukten unter jungen Erwachsenen in Deutschland"

1. **Alter**_____

2. **Geschlecht**

- Männlich
- Weiblich
- Diverse
- Keine Angabe

3. **Herkunft**

- Deutschland
- Andere

4. **Wie viele Jahre leben Sie schon in Deutschland? ***

- 0-1
- Mehr als 1 Jahr
- Seit der Geburt

5. **Familienstand**

- Verheiratet
- Leben mit einem Intimpartner
- Geschieden
- Getrennt
- Verwitwet
- Alleinstehend

6. **Höchster Bildungsgrad**

- Keine

- Hauptschule
- Realschule
- Gymnasium
- Abitur
- Ausbildung
- Universität/Fachhochschule
- Master-Abschluss
- Dokortitel

7. Beruf

- Hauptbetreuer des Kindes zu Hause, nicht außer Haus beschäftigt
- Angestellt, Vollzeit
- Angestellt, Teilzeit
- Arbeitslos
- Behinderung; arbeitsunfähig
- Student
- Selbstständig
- Sonstige (Student mit Teilzeit)
- Azubi

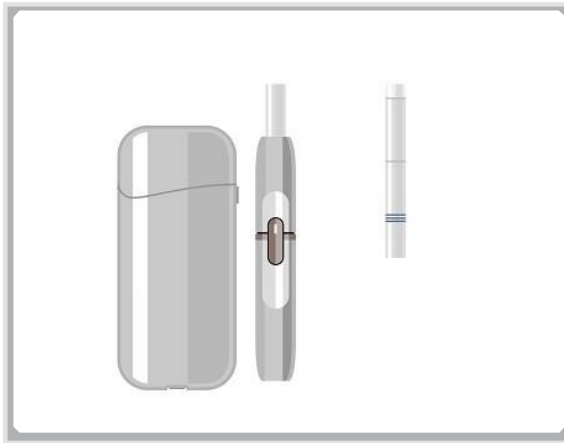
Kenntnisse über erhitzte Tabakprodukte

Raten Sie die Antworten in diesem Abschnitt nicht. Wenn Sie die Antwort nicht wissen, klicken Sie auf Ich weiß es nicht.

8. Sind erhitztes Tabakprodukt dasselbe wie elektronische Zigaretten?

- Ja
- Nein
- Ich weiß es nicht.

9. Welches ist ein erhitztes Tabakprodukt?



1

Option 1



Option 2



Option 3



Option 4

Ich weiß es nicht.

10. Wie funktionieren erhitzte Tabakprodukte?

- Erhitzen von Tabak mit batteriebetriebenen Heizsystemen.
- Erhitzen von E-Liquid, das Nikotin enthalten kann oder nicht und in den meisten Fällen keinen Tabak enthält
- Verbrennung des Tabaks wie bei einer normalen Zigarette.
- Ich weiß es nicht.

11. Bei einem erhitzten Tabakprodukt wird der Tabak auf welche Temperatur erhitzt, um Dampf zu erzeugen?

¹ Picture was downloaded from website of Centre for Disease control Link-
<https://www.cdc.gov/tobacco/other-tobacco-products/heated-tobacco-products.html>

- 700-900 °C
- 350°C
- 600°C
- Ich weiß es nicht.

Erhitzte Tabakprodukte Verwendung

12. Haben Sie jemals erhitzte Tabakprodukte verwendet? *

- Ja
- Nein *Skip to question 29*

13. Welche Marke von erhitzten Tabakprodukten haben Sie verwendet?

- IQOS
- Glo
- Ploom
- Lil
- Pulze
- Mok
- Andere_____

14. Derzeitige Verwendung von erhitzten Tabakprodukten *

- Täglich/Regelmäßig
- Gelegentlich
- Überhaupt nicht *Skip to question 29*

Wenn Sie bei der letzten Frage täglich oder gelegentlich geantwortet haben

15. Seit wie vielen Jahren verwenden Sie erhitzte Tabakprodukte ? _____

Ausschließliche Verwendung(exklusive Benutzer) von erhitzten Tabakprodukten

- Ich verwende ausschließlich erhitzte Tabakprodukte
- Ich benutze erhitzte Tabakprodukte und rauche auch Tabak *Skip to question 26*
- Ich benutze erhitzte Tabakprodukte und E-Zigaretten *Skip to question 27*
- Ich verwende alle 3 Formen *Skip to question 28*

Wenn Sie exklusiver Benutzer von erhitzten Tabakprodukten sind:

16. **Seit wie vielen Monaten verwenden Sie erhitzte Tabakprodukte ausschließlich?**

- Weniger als ein Monat
- 1 - 3 monaten
- 3- 6 monten
- Mehr als 6 Monate

17. **Haben Sie aufgrund von erhitzten Tabakprodukten mit dem Rauchen herkömmlicher Zigaretten aufgehört?**

- Ja
- Nein
- Nicht zutreffend (hat nie konventionelle Zigaretten geraucht)

Haben Sie aufgrund von erhitzten Tabakprodukten mit dem Rauchen von E-Zigaretten aufgehört?

- Ja
- Nein
- Nicht zutreffend (hat nie E Zigaretten geraucht)

18. Verhalten beim Rauchen

Wie schnell nach dem Aufwachen rauchen Sie Ihre erste Zigarette?

- Innerhalb von 5 Minuten
- 6-30 Minuten
- 31 bis 60 Minuten
- Nach 60 Minuten

19. Fällt es Ihnen schwer, an Orten, an denen das Rauchen verboten ist (z. B. in der Kirche, in der Bibliothek, im Kino usw.), auf das Rauchen zu verzichten?

- Ja
- Nein

20. Welche Zigarette würden Sie nur ungern aufgeben?

- Der erste am Morgen
- Alle anderen

21. Wie viele Zigaretten/Tag rauchen Sie?

- 10 oder weniger
- 11-20
- 21-30
- 31 oder mehr

22. Rauchen Sie in den ersten Stunden nach dem Aufwachen mehr als in den restlichen Stunden des Tages?

- Ja
- Nein

23. **Rauchen Sie, wenn Sie so krank sind, dass Sie die meiste Zeit des Tages im Bett liegen?**

Ja

Nein

Für nicht ausschließliche (exklusive Benutzer) Nutzer von erhitzte Tabakprodukte mit dem Rauchen herkömmlicher Zigaretten

24. **Mein Konsum von konventionellen Zigaretten hat sich geändert, seit ich mit erhitzte Tabakprodukte angefangen habe**

Nein

Ja - ich habe den konventionellen Zigarettenkonsum verringert

Ja- Ich habe den konventionellen Zigarettenkonsum erhöht

Ich habe seit 6 Monaten mit der herkömmlichen Zigarette aufgehört. *Skip to question 29*

Für nicht-exklusive Benutzer von erhitzte Tabakprodukte mit dem Rauchen von E-Zigaretten

25. **Mein Gebrauch von E-Zigaretten hat sich verändert, seit ich mit erhitzte Tabakprodukte angefangen habe.**

Nein

Ja - ich habe den Konsum von E-Zigaretten verringert

Ja- Ich habe den Gebrauch von E-Zigaretten erhöht

Ich habe mit der E-Zigarette aufgehört *Skip to question 29*

Ich verwende alle 3 Formen

26. **Mein Konsum von Zigaretten oder/und E-Zigaretten hat sich verändert, seit ich erhitzte Tabakprodukte benutze**

Nein

- Ja- Ich habe den Konsum von Zigaretten und/oder E-Zigaretten verringert
- Ja- Ich habe den Konsum von Zigaretten oder/und E-Zigaretten erhöht
- Ich habe den Konsum von Zigaretten und/oder E-Zigaretten aufgegeben

WAHRNEHMUNGEN IN BEZUG AUF DAS RAUCHEN

Bewerten Sie die einzelnen Punkte auf einer Skala von 1 bis 7, wobei 1 für "überhaupt nicht" und 7 für "sehr" steht.

Wie hoch schätzen Sie das Suchtpotenzial der folgenden Produkte ein?

27. Zigaretten 1 2 3 4 5 6 7
28. E-Zigarette 1 2 3 4 5 6 7
29. Erhitztes Tabakprodukt 1 2 3 4 5 6 7

Wie schädlich sind die folgenden Produkte Ihrer Meinung nach für Ihre Gesundheit?

Bewerten Sie die einzelnen Punkte auf einer Skala von 1 bis 7, wobei 1 für "überhaupt nicht" und 7 für "sehr" steht.

30. Zigaretten 1 2 3 4 5 6 7
31. E-Zigarette 1 2 3 4 5 6 7
32. Erhitztes Tabakprodukt 1 2 3 4 5 6 7

Wie schädlich ist es Ihrer Meinung nach für Ihre Gesundheit, den Rauch oder Dampf der folgenden Produkte einzusatmen? (passiv Rauchen)

Bewerten Sie die einzelnen Punkte auf einer Skala von 1 bis 7, wobei 1 für "überhaupt nicht" und 7 für "sehr" steht.

33. Zigaretten 1 2 3 4 5 6 7

34. E-Zigarette 1 2 3 4 5 6 7

35. Erhitztes Tabakprodukt 1 2 3 4 5 6 7

Wie gesellschaftsfähig (akzeptabel) sind Ihrer Meinung nach die folgenden Produkte unter Ihren Freunden und Bekannten?

Bewerten Sie die einzelnen Punkte auf einer Skala von 1 bis 7, wobei 1 für "überhaupt nicht" und 7 für "sehr" steht.

36. Zigaretten 1 2 3 4 5 6 7

37. E-Zigarette 1 2 3 4 5 6 7

38. Erhitztes Tabakprodukt 1 2 3 4 5 6 7

Fragen zur Persönlichkeit

Bewerten Sie auf einer Skala von 1-7 (1= stimme überhaupt nicht zu, 7= stimme voll und ganz zu)

39. **Ich sehe mich selbst als jemanden, der sich viele Sorgen macht**

1 2 3 4 5 6 7

40. **Ich sehe mich selbst als jemanden, der leicht nervös wird**

1 2 3 4 5 6 7

41. **Ich sehe mich selbst als jemanden, der in angespannten Situationen ruhig bleibt**

1 2 3 4 5 6 7

42. **Ich sehe mich selbst als jemanden, der geschwätzig ist**

1 2 3 4 5 6 7

43. **Ich sehe mich selbst als jemanden, der** aufgeschlossen und kontaktfreudig ist

1 2 3 4 5 6 7

44. **Ich sehe mich selbst als jemanden, der** zurückhaltend ist

1 2 3 4 5 6 7

45. **Ich sehe mich selbst als jemanden, der** originell ist, neue Ideen hat

1 2 3 4 5 6 7

46. **Ich sehe mich selbst als jemanden, der** künstlerische, ästhetische Erfahrungen schätzt

1 2 3 4 5 6 7

47. **Ich sehe mich selbst als jemanden, der** eine aktive Vorstellungskraft hat

1 2 3 4 5 6 7

48. **Ich sehe mich selbst als jemanden, der** manchmal unhöflich zu anderen ist

1 2 3 4 5 6 7

49. **Ich sehe mich selbst als jemanden, der** eine vergebende Natur hat

1 2 3 4 5 6 7

50. **Ich sehe mich selbst als jemanden, der** rücksichtsvoll und freundlich zu fast jedem ist

1 2 3 4 5 6 7

51. **Ich sehe mich selbst als jemanden, der** gründliche Arbeit leistet

1 2 3 4 5 6 7

52. **Ich sehe mich selbst als jemanden, der** zur Faulheit neigt

1 2 3 4 5 6 7

53. **Ich sehe mich selbst als jemanden, der** Dinge effizient erledigt

1 2 3 4 5 6 7

Konventionelles Zigarettenrauchen

54. **Welcher Status beschreibt Ihren derzeitigen Raucherstatus?**

*

Derzeitiger Raucher

Früherer Raucher *Skip to question 58*

Niemals Raucher (weniger als 100 Zigaretten im Leben) *Skip to question 58*

55. **Welche der folgenden nutzen Sie derzeit regelmäßig?**

(Wählen Sie alles, was zutrifft)

Zigarette

Zigarre

Gedrehte Tabakzigarette mit Filter

Gedrehte Tabakzigarette ohne Filter

Other:

Für Raucher von E-Zigaretten

56. **Aktueller Gebrauch von Vaping/ E-Zigaretten ***

Täglich/Regelmäßig

Gelegentlich

Überhaupt nicht *Skip to question 68*

57. **Seit wie vielen Jahren benutzen Sie E-Zigaretten/Vaporizer?**

58. **Wie hoch ist der Nikotingehalt in der Flüssigkeit?**

59. **Für derzeitige Nutzer von Vaping/e-Zigaretten**

Ich benutze ausschließlich(exklusiv) E-Zigaretten

Ich benutze E-Zigaretten und rauche auch Tabak *Skip to question*

68

Exklusiv benutzer von E-Zigarette

60. Verhalten beim Rauchen

Wie schnell nach dem Aufwachen dampfen Sie Ihre elektronische Zigarette?

Innerhalb von 5 Minuten

6-30 Minuten

31 bis 60 Minuten

Nach 60 Minuten

61. Fällt es Ihnen schwer, an Orten, an denen das Rauchen verboten ist (z. B. in der Kirche, in der Bibliothek, im Kino usw.), auf das Rauchen zu verzichten?

Ja

Nein

62. Auf welches Dampfen würdest du nur ungern verzichten?

Der erste am Morgen

Alle anderen

63. Wie oft/Tag dampfen Sie?

10 oder weniger

11-20

21-30

31 oder mehr

64. Dampfen Sie in den ersten Stunden nach dem Aufwachen mehr als in den restlichen Stunden des Tages?

Ja

Nein

65. Dampfen Sie, wenn Sie so krank sind, dass Sie die meiste Zeit des Tages im Bett liegen?

Ja

Nein

Alkoholkonsum

66. Trinken Sie Alkohol?

Ja, regelmäßig

Ja, gelegentlich

Nein

9. DECLARATION

I declare that this thesis is entirely my own work, that I wrote it myself without the assistance of others, and that I have used only the materials and sources declared as such within it. I declare that I have collected and processed the data, complying with the data protection law. I further declare that I have fully referenced all ideas and verbatim quotations taken from other works.

Laxminarayan Sonde



Date- 22.07.2024

Place- Hamburg