

Knowledge of the health consequences of tobacco smoking among Nigerian smokers: A secondary analysis of the Global Tobacco Survey

B O Adeniyi,¹ MB ChB,FWACP; **O S Ilesanmi**,² MBBS, MBA, MSc, MPH, FWACP; **O M Babasola**,³ BSc, MSc (Epid); **B I Awokola**,⁴ MBBS, FMC FM, FWACP; **A O Kareem**,² MB ChB; **D Obaseki**,⁵ MBBS, MPH, FWACP; **G E Erhabor**,⁵ MBBS, FWACP, FCCP, FRCP (Edin), FRCP, (Lond)

¹ Department of Internal Medicine, Federal Medical Centre, Owo, Ondo State, Nigeria

² Department of Community Medicine, Federal Medical Centre, Owo, Ondo State, Nigeria

³ Department of Public Health, Africare Nigeria, Lagos, Nigeria

⁴ Medical Research Council (UK) Unit, Fajara Camp, The Gambia

⁵ Department of Internal Medicine, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria

Corresponding author: B O Adeniyi (bamidele.adeniyi@gmail.com)

Background. Tobacco smoking is a leading cause of preventable death in the world and a risk factor for several non-communicable diseases. Based on current trends, it is estimated that tobacco smoking will account for 8.4 million premature deaths each year by 2030. Knowledge of the consequences of smoking is necessary to initiate smoking cessation.

Objectives. This study aimed to identify the knowledge and perceived risks of the health consequences of smoking with regard to cancer among smokers in Nigeria.

Methods. This was a secondary data analysis of the Global Adult Tobacco Survey (GATS). The 2012 Nigerian GATS was a national representative household survey of 9 765 non-institutionalised men and women aged 15 years and older. Associations between sociodemographic variables, beliefs and attitude about smoking and its consequences were explored using the χ^2 test. The level of statistical significance was 5%.

Results. The records of all current smokers (4.4%; $N=429$) were extracted. The mean (standard deviation) age of smokers was 43.7 (14.6) years. Only 3.5% ($n=15$) were female, and 57.2% ($n=245$) were rural dwellers. Of the 9 765 that participated in the study, a total of 335 (3.4%) were daily tobacco smokers while 94 (1.0%) smoke less often than daily. Knowledge that smoking can cause various cancers was reported as follows: lung cancer 58.3% ($n=250$); bladder cancer 31.0% ($n=133$); mouth cancer 34.0% ($n=146$); and stomach cancer 31.5% ($n=135$). Overall, 67.8% ($n=291$) believed smoking tobacco caused serious illness. In the North Central region, 40.0% ($n=32$) knew that smoking could cause lung cancer compared with 75.0% ($n=51$) in the South East ($p<0.001$). Among rural dwellers, only 48.4% ($n=119$) knew that smoking could cause lung cancer compared with 71.6% ($n=131$) of urban dwellers ($p<0.001$).

Conclusion. The level of awareness of the adverse effects of tobacco smoking in Nigeria was low and varied by region and socioeconomic development. This presents a potential point of intervention through targeted health educational campaigns to change behaviour among smokers.

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Tobacco use is a leading cause of preventable death in the world and a risk factor for several non-communicable diseases including cancers, cardiovascular diseases, diabetes mellitus, and chronic respiratory diseases.^[1] About 6 million people die annually from tobacco use, and if nothing is done to reverse or halt the epidemic, tobacco-related deaths could rise to 8.4 million annually by 2030.^[2] Up to 80% of deaths related to tobacco use are projected to be in the developing countries, which are now the prime target for transnational tobacco companies' market expansion activities.^[3] In Nigeria, the prevalence of tobacco smoking has been reported to vary between 4.1% and 8.6%.^[4-6] This figure is expected to rise with increasing exposure of the younger population to tobacco smoking, coupled with the absence and weak enforcement of anti-smoking policies.

The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) was an international treaty negotiated under the auspices of the WHO.^[7] It was adopted by the World Health Assembly on 21 May 2003 and enforced on 27 February 2005.^[7] Under the FCTC treaty, member countries were expected to monitor tobacco use, conduct population-based surveys that would create an understanding of disease patterns, assess the effect of tobacco control measures, and assist tobacco control policy.^[7]

The Global Tobacco Surveillance System (GTSS) was implemented in 1988 by the WHO, the Centers for Disease Control and Prevention (CDC), and the Canadian Public Health Association (CPHA) as a programme to assist countries in conducting tobacco surveillance

and establishing a monitoring system for key articles of the WHO's FCTC.^[8,9]

The GTSS includes the collection of data through four surveys: the Global Youth Tobacco Survey (GYTS); the Global School Personnel Survey (GSPS); the Global Health Professional Student Survey (GHPSS); and the Global Adult Tobacco Survey (GATS). The GYTS focused on youth aged 13 - 15 years and collected information in schools. The GSPS surveyed teachers and administrators from the same schools that participated in the GYTS. The GHPSS focused on 3rd-year students pursuing degrees in dentistry, medicine, nursing and pharmacy. The GATS is a nationally representative household survey that monitors tobacco use among adults aged 15 years and older using a standard protocol. The use of a standardised protocol, is to enable cross-country comparisons and also comparisons in the changes in the prevalence of tobacco use that may occur over time for countries that repeat the survey.^[10]

The Nigerian GATS was conducted in 2012.^[11] The aim of this study was to assess the knowledge of adverse health consequences of tobacco smoking with particular reference to it as a risk factor for cancers among smokers documented in the survey.

Methods

The GATS 2012 data for Nigeria^[12] were analysed. The Nigerian GATS was conducted by the National Bureau of Statistics (NBS) under the coordination of the Federal Ministry of Health (FMOH). Technical assistance was provided by the WHO and the US CDC. It was funded by the Bloomberg Initiative to Reduce Tobacco Use. The Nigerian GATS data were released to the public domain in 2014.^[11]

A total of 11 107 households were sampled; 9 911 households completed screening and 9 765 individuals aged ≥ 15 years were successfully interviewed. One individual was randomly chosen from each selected household to participate in the survey. Data were collected using handheld electronic devices. The questionnaire included core questions about background characteristics of the respondents, tobacco smoking habits, smokeless tobacco products usage, smoking cessation, exposure to second-hand smoke, and knowledge, attitudes and perceptions regarding adverse effects of tobacco smoking.

The overall response rate for the GATS of Nigeria was 89.1%. The household response rate was 90.3% (86.8% urban, 94.1% rural), while the individual response rate was 98.6% (98.0% urban, 99.2% rural). Detailed information on the methodology has been published elsewhere.^[11]

For the purpose of our study, we extracted data for the smokers only. Selected sociodemographic variables were the independent variables while the dependent variable was the knowledge or belief that tobacco use causes cancer. All the independent variables were categorical. Smokers were defined as those who were using tobacco at the time of the survey as well as those who were using smokeless tobacco products, either daily or occasionally. Former tobacco users were not categorised as smokers. SPSS version 21 (IBM Corp., USA) was used to analyse the data.

The advantage of the GATS was that it was designed to produce nationally representative data, covering both rural and urban settings in all of the 6 geopolitical zones in Nigeria.

Results

The socioeconomic profile of the respondents and the distribution by region is shown in Table 1. The majority of the smokers were observed to be in the young and middle-aged group (25 - 44 years and 45 - 64 years). The South West and North Central regions had the highest number of smokers at 19.1% ($n=82$) and 18.6% ($n=80$), respectively.

Table 1 shows the sociodemographic characteristics of current cigarette smokers. The highest smoking prevalence was found in those between 25 and 44 years of age (61.8%; $n=265$) and the lowest prevalence was recorded among those > 65 years of age (4.9%; $n=21$). There were more male smokers (96.5%), mainly from rural regions (57.3%; $n=246$). In terms of regional variation, the South West had the highest number of smokers (19.1%, $n=82$), while the North East had the lowest (11.2%; $n=48$). Fig. 1 shows the knowledge or belief that tobacco smoking causes serious illness among smokers. As shown, 67.8% of current smokers answered 'yes' to the question on whether tobacco smoking causes serious illness.

Table 1. Sociodemographic characteristics of cigarette smokers and knowledge of tobacco smoking as a cause of lung cancer among smokers in Nigeria

Variables	<i>n</i> (%)
Age (years)	
15 - 24	37 (8.6)
25 - 44	265 (61.8)
45 - 64	106 (24.7)
65+	21 (4.9)
Sex	
Male	414 (96.5)
Female	15 (3.5)
Educational status	
No formal education	109 (25.4)
Primary school and below	120 (28.0)
Secondary	138 (32.2)
Post-secondary	62 (14.5)
Marital status ($n=428$)	
Single	105 (24.5)
Currently married	286 (66.8)
Ever married	37 (8.6)
Urban/rural status	
Urban	183 (42.7)
Rural	246 (57.3)
Region	
North Central	80 (18.6)
North East	48 (11.2)
North West	75 (17.5)
South East	68 (15.9)
South South	76 (17.7)
South West	82 (19.1)

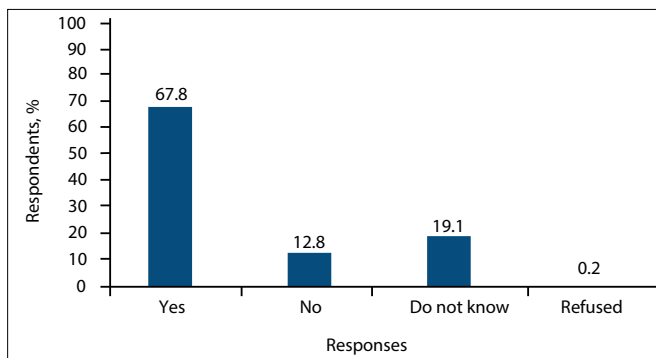


Fig. 1. Knowledge or belief that tobacco smoking causes serious illness among smokers.

Table 2. Knowledge of tobacco smoking as a cause of cancer among smokers

Cancer	Frequency, n (%)
Lung	
Yes	250 (58.3)
No	179 (41.7)
Bladder	
Yes	133 (31.0)
No	296 (69.0)
Mouth	
Yes	146 (34.0)
No	283 (66.0)
Stomach	
Yes	135 (31.5)
No	294 (68.5)

Among the smokers, 58.3% ($n=250$) believed that lung cancer could occur as a result of cigarette smoking. Knowledge of tobacco smoking as a possible cause of other cancers was as follows: bladder cancer 31.0% ($n=133$); mouth cancer 34.0% ($n=146$); and stomach cancer 31.5% ($n=135$).

Table 3 shows the association between sociodemographic characteristics and the knowledge that cigarette smoking causes cancer. In the North Central region, 40.0% ($n=32$) knew that smoking could cause lung cancer compared with 75.0% ($n=51$) in the South East ($p<0.001$). Among rural dwellers, only 48.4% ($n=119$) knew that smoking could cause lung cancer compared with 71.6% ($n=131$) of urban dwellers $p<0.001$.

The sociodemographic characteristics and knowledge of tobacco smoking as a cause of bladder cancer among smokers are displayed in Table 4. Only 16.3% ($n=13$) of smokers in the North Central region believed smoking cigarettes could cause bladder cancer, while higher numbers of participants from other regions believed this was possible.

Only 16.3% ($n=13$) of smokers in the North Central region believed smoking cigarettes could cause cancer of the mouth, while in the other regions, a significantly higher percentage believed that smoking could be a cause of cancer of the mouth. The association between other

sociodemographic characteristics and knowledge of tobacco smoking as a cause of mouth cancer among smokers is shown in Table 5.

Only 15.0% ($n=12$) of participants from the North Central region believed that smoking cigarettes could cause stomach cancer, as shown in Table 6.

Discussion

The prevalence of smoking according to the Nigerian GATS in 2012 was 4.4%.^[11] The findings of this study conform with other reports that place tobacco smoking prevalence in Nigeria between 4.1 and 8.6%.^[4-6] It was similar to the prevalence rates from Cameroon (6%), Ghana (4%) and Ethiopia (2.8%) previously reported in the WHO data on smoking in Africa.^[13] This prevalence was low compared with the reports of other studies, which reported a 19.7% prevalence in the USA,^[14] and as high as 34% in some European countries.^[15] Smoking is largely seen as a social stigma in Africa and most people who smoke tend to do so secretly. This may account for the differences between the smoking prevalence in Nigeria and other parts of the world. It is possible that this trend may however be changing as there is an increase in the social acceptance of smoking, particularly among young adults.^[16]

The majority of the smokers were male and relatively young with a mean (SD) age of 43.7 (14.6) years. In addition, most of them were married at the time of the survey and were living in rural areas. However, only ~14.5% of them had post-secondary level education. The findings revealed that the proportion of cigarette-smoking female respondents was low, which was similar to previous studies in Nigeria,^[17,18] and agreed with the low prevalence rate reported in a survey conducted in Osun State, Nigeria.^[19] Though this was a positive improvement, the higher prevalence of tobacco use among males increases the risks associated with passive smoke and continues to endanger the health of non-smokers. Passive smoking has also been documented to be an equally potent risk factor for chronic respiratory diseases and cancers.^[3,20,21] Previous studies showed that involuntary exposure to tobacco smoke puts non-smokers at a greater risk of diseases associated with smoking, including sudden infant death syndrome in infants.^[22]

The present analysis showed that knowledge about the health consequences of tobacco as it relates to cancers among respondents is sub-optimal and varies with location. Previous studies have explored the knowledge of the health consequences of tobacco smoking among the general population in Nigeria and most have reported varying levels of knowledge related to the health consequences of smoking;^[23-25] however, our study focused on tobacco smokers which is one of the few studies in that regard.

The generally low level of knowledge of the adverse effects of smoking can be extrapolated to other African countries. Countries with a similar socioeconomic and literacy status to Nigeria would probably demonstrate similar levels of knowledge; however, this remains to be validated through relevant research.

Regarding the implication of tobacco use on cancer causation, more than half of the respondents believed that tobacco use could cause lung cancer. This might be due to the fact that most anti-tobacco campaigns have focused mainly on its adverse effects on the lungs, thus increasing the level of knowledge in this regard. Although various issues come to mind when discussing tobacco use, the hazards of smoking in relation to

Table 3. Sociodemographic characteristics and knowledge of tobacco smoking as a cause of lung cancer among smokers

Sociodemographic characteristics	Yes, <i>n</i> (%)	No, <i>n</i> (%)	χ^2	<i>p</i> -value
Age (years)				
15 - 24	18 (48.6)	19 (51.4)	0.398	0.264
25 - 44	159 (60.0)	106 (40.0)		
45 - 64	64 (60.4)	42 (39.6)		
65+	9 (42.9)	12 (57.1)		
Sex				
Male	243 (58.7)	171 (41.3)	0.861	0.427
Female	7 (46.7)	8 (53.3)		
Educational status				
No formal education	52 (47.7)	57 (52.3)	0.739	0.060
Primary school and below	72 (60.0)	48 (40.0)		
Secondary	89 (64.5)	49 (35.5)		
Post-secondary	37 (59.7)	25 (40.3)		
Marital status				
Single	57 (54.3)	48 (45.7)	0.160	<0.001
Currently married	181 (63.3)	105 (36.7)		
Ever married	11 (29.7)	26 (70.3)		
Urban/rural status				
Urban	131 (71.6)	52 (28.4)	0.160	<0.001
Rural	119 (48.4)	127 (51.6)		
Region				
North Central	32 (40.0)	48 (60.0)	0.302	<0.001
North East	24 (50.0)	24 (50.0)		
North West	52 (69.3)	23 (30.7)		
South East	51 (75.0)	17 (25.0)		
South South	36 (47.4)	40 (52.6)		
South West	55 (67.1)	27 (32.9)		

lung cancer cannot be overemphasised. Despite being the second most common malignancy of the urogenital system after prostate cancer in Nigeria,^[26] the knowledge of tobacco use in relation to bladder cancer was low among the respondents (31%). Smoking is a major contributor to the global burden of dental diseases as it is associated with up to half of all periodontal disease conditions among adults.^[27] This association has been established in the literature.^[28] Unfortunately, only 34% of the respondents knew that tobacco use is a risk factor for developing mouth cancer. Interestingly, much higher levels of awareness (72%) were reported among dental patients in a South-Western tertiary hospital in Nigeria^[29] and a comparable level of awareness was noted in a population-based study in North Carolina^[30] in the USA, where 86% of the respondents had heard of oral cancer and 56% had knowledge of the risk factors. The knowledge regarding tobacco as a cause of stomach cancer was equally poor as only about a third of the smokers associated smoking with stomach cancer.

The majority of the respondents in our study agreed that smoking had adverse health effects, but the knowledge of smoking as a cause of specific cancers was rather low.

It is obvious from this study, that there is a slightly better level of awareness regarding the association between smoking and lung cancer compared with cancers of other parts of the body. This has been reported in various countries represented in the international tobacco control (ITC) and the global tobacco surveillance system (GTSS) data – both data sets showed that the lack of awareness that smoking caused heart disease, heart attacks, and strokes was highest in China. Among Chinese smokers, the awareness that smoking causes lung cancer was however over 80% in both data sets. Other countries with striking unawareness ($\geq 25\%$) of the effects of smoking on the heart were the Netherlands, Bangladesh, Thailand, India, Russia, and Vietnam. The lack of awareness of smoking as a cause of stroke was even higher.^[31]

Most of the previous efforts of anti-smoking campaigns in Nigeria have largely focused on the prevention of lung cancer. It is thus possible that most people do not readily link the adverse effects of smoking with other body organs that appear not to be directly exposed to smoke. Even in more economically advanced regions of the world, fewer people associated smoking with adverse effects other

Table 4. Sociodemographic characteristics and knowledge of tobacco smoking as a cause of bladder cancer among smokers

Sociodemographic characteristics	Yes, <i>n</i> (%)	No, <i>n</i> (%)	χ^2	<i>p</i> -value
Age (years)				
15 - 24	13 (35.1)	24 (64)	0.582	0.901
25 - 44	79 (29.8)	186 (70.2)		
45 - 64	34 (32.1)	72 (67.9)		
65+	7 (33.3)	14 (66.7)		
Sex				
Male	127 (30.7)	287 (69.3)	0.588	0.570
Female	6 (40.0)	9 (60.0)		
Educational status				
No formal education	30 (27.5)	79 (72.5)	0.102	0.796
Primary school and below	37 (30.8)	83 (69.2)		
Secondary	45 (32.6)	93 (67.4)		
Post-secondary	21 (33.9)	41 (66.1)		
Marital status				
Single	27 (25.7)	78 (74.3)	0.563	0.060
Currently married	99 (34.6)	187 (65.4)		
Ever married	7 (18.9)	30 (81.1)		
Urban/rural Status				
Urban	69 (37.7)	114 (62.3)	0.670	0.010
Rural	64 (26.0)	182 (74.0)		
Region				
North Central	13 (16.3)	67 (83.8)	0.175	0.004
North East	16 (33.3)	32 (66.7)		
North West	34 (45.3)	41 (54.7)		
South East	22 (32.4)	46 (67.6)		
South South	19 (25.0)	57 (75.0)		
South West	29 (35.4)	53 (64.6)		

than affecting the lungs.^[31] This is an important point to note and also a potential point of intervention.

Other findings from this study showed that smokers who were single were less knowledgeable about tobacco smoking as a cause of lung cancer. This was an interesting finding as it may highlight the role of marriage partners in the communication of the adverse effect of smoking to their spouse with a view to protecting both parties. This assertion needs to be validated.

A larger proportion of the smokers in rural areas did not know that smoking could lead to lung cancer. Smokers from the North Central region of Nigeria had poor knowledge of tobacco smoking as a risk factor for lung, bladder, mouth and stomach cancer. The regional variation in the level of knowledge regarding the adverse effects of tobacco smoking also appeared to parallel the level of socioeconomic development in northern Nigeria compared with the southern region. It is generally known that the northern part of Nigeria has a lower literacy level compared with the southern regions of the country.^[32] In a landmark study that investigated socioeconomic and country variations in smokers' knowledge that smoking causes heart disease,

stroke, impotence and lung cancer, and involving adult smokers from four countries (USA, Canada, the UK, and Australia) higher education and income were associated with higher awareness, while lower socioeconomic status was associated with lower awareness of the harms of smoking and misunderstandings about nicotine.^[33] This may account for the observed differences highlighted above. It is important to point out that <15% of participants in our study had at least post-secondary education and above, thus the low level of awareness may be related to the low literacy level.

Conclusion

We concluded that among smokers in Nigeria, there is a gross lack of knowledge of the health consequences of smoking, particularly of cancers other than that affecting the lungs.

This low level of knowledge varies according to region and possibly levels of socioeconomic development.

This is a potential point of intervention to change behaviour in regions most affected. Concerted efforts geared towards smoker-targeted cessation health education needs to be organised and

Table 5. Sociodemographic characteristics and knowledge of tobacco smoking as a cause of mouth cancer among smokers

Sociodemographic characteristics	Yes, n (%)	No, n (%)	χ^2	p-value
Age (years)				
15 - 24	14 (37.8)	23 (62.2)	0.129	0.730
25 - 44	86 (32.5)	179 (67.5)		
45 - 64	37 (34.9)	69 (65.1)		
65+	9 (42.9)	12 (57.1)		
Sex				
Male	141 (34.1)	273 (65.9)	0.003	0.100
Female	5 (33.3)	10 (66.7)		
Educational status				
No formal education	34 (31.2)	75 (68.8)	0.185	0.602
Primary school and below	45 (37.5)	75 (62.5)		
Secondary	49 (35.5)	89 (64.5)		
Post-secondary	18 (29.0)	44 (71.0)		
Marital status				
Single	28 (26.7)	77 (73.7)	0.757	0.023
Currently married	110 (38.7)	176 (61.5)		
Ever married	8 (21.6)	29 (78.4)		
Urban/rural status				
Urban	71 (38.8)	112 (61.2)	0.322	0.080
Rural	75(30.5)	171 (69.5)		
Region				
North Central	13 (16.3)	67 (83.8)	0.175	0.004
North East	21 (43.8)	27 (56.7)		
North West	30 (40.0)	45 (60.0)		
South East	21 (30.9)	47 (69.1)		
South South	26 (34.2)	50 (65.8)		
South West	35 (42.7)	47 (57.3)		

executed to promote better lung health and thus reduce diseases associated with cigarette smoking in Nigeria. It may be better to state the specific adverse effects that smoking can cause on cigarette packs rather than a blanket statement like 'smoking is injurious to your health'. Billboards and media messages depicting the adverse effects of smoking should also be optimised, particularly in strategic public places like airports, campuses, shopping malls and the local markets. More importantly, healthcare practitioners should create adequate time to educate smokers and encourage tobacco smoking cessation.

A strength of our study was that it targeted the smoking population; however its finding might not represent current realities as time-changing trends might have altered its findings. We recommend a possible repeat of the GATS in Nigeria in order to update our knowledge and also encourage workers from other countries with the GATS data to carry out similar secondary analysis.

Author contributions. AB conceptualised the study and wrote the manuscript. OI analysed the data. OB wrote an initial draft. AB edited the manuscript and wrote the discussion. AK captured and cleaned the data.

OD helped in the writing the manuscript and the abstract. EG provided mentorship throughout from conceptualisation to the writing up of the manuscript.

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Table 6. Sociodemographic characteristics and knowledge of tobacco smoking as a cause of stomach cancer among smokers

Sociodemographic characteristics	Yes, n (%)	No, n (%)	χ^2	p-value
Age (years)				
15 - 24	13 (35.1)	24 (69.4)	0.111	0.774
25 - 44	79 (29.8)	186 (70.2)		
45 - 64	35 (33.0)	71 (67.0)		
65+	8 (38.1)	13 (61.9)		
Sex				
Male	131 (31.6)	283 (68.4)	0.166	0.784
Female	4 (26.7)	11 (73.3)		
Educational status				
No formal education	32 (29.4)	77 (70.6)	0.152	0.677
Primary school and below	43 (35.8)	77 (64.2)		
Secondary	42 (30.4)	96 (69.6)		
Post-secondary	18 (29.0)	44 (71.0)		
Marital status				
Single	29 (27.6)	76 (72.4)	0.342	0.181
Currently married	98 (34.3)	188 (65.7)		
Ever married	8 (21.6)	2 (78.4)		
Urban/rural status				
Urban	65 (35.5)	118 (64.5)	0.242	0.119
Rural	70 (28.5)	176 (71.5)		
Region				
North Central	12 (15.0)	68 (85.0)	0.196	0.001
North East	16 (33.3)	32 (66.7)		
North West	32 (42.7)	43 (57.3)		
South East	17 (25.0)	51 (75.0)		
South South	24 (31.6)	52 (68.4)		
South West	34 (41.5)	48 (58.5)		

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