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Research article:

Knowledge, attitude and practice among Health Visitors in the United Kingdom towards children's oral health.

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Abstract:

Objectives:

The purpose of this study was to determine knowledge, attitude and practical behaviour of health visitors regarding children's oral health in the United Kingdom (UK).

Methods:

A web-based self-administered survey with 18 closed and 2 open ended questions was distributed to a convenience sample of approximately 9,000 health visitors who were currently employed in the UK and a member of the Institute of Health Visiting.

Results:

A total of 1088 health visitors completed the survey, resulting in a response rate of 12%. One-third of the health visitors reported that they had not received oral health training previously. Almost all agreed that oral health advice/promotion should be included in their routine health visiting contacts. Previous oral health training/education was associated with an increase in oral health knowledge; confidence in entering a discussion with parents/caregivers and willingness to be involved in dental referral process.

Conclusions:

The results of our study support the need for health visitors to receive oral health training in oral health promotion including oral health risk assessment, guidance on evidence based up-to-date prevention measures, increasing the dental attendance prevalence at early stages and awareness of including specific oral health guidelines/fact sheets into their regular practice.

Keywords:

Health visitors, community health nursing, public health nursing education, oral health, child health

Introduction:

Oral health is an integral part of general health and cannot be isolated. Although there have been improvements in the oral health of children over the last 50 years due to widespread exposure to fluoride, dental caries remains as a serious public health problem disproportionately affecting individuals from low-income and minority status [Chou et al., 2014].

Chronic pain from decayed teeth can have significant impacts on a child's wellbeing and that of their family. It affects their ability to learn, thrive and develop can all be compromised due to interrupted sleep and difficulty in eating due to pain [Drummond, Meldrum and Boyd, 2013]. This will have an effect on the whole family; for example, parents or carers may have to take time off work to take their children to the dentist and children may miss school days due to toothache and dental treatment needs [Drummond, Meldrum and Boyd, 2013]. Dental caries may also be an initial sign of wider health and social care issues such as poor nutrition, obesity, and in some instances may indicate safeguarding and neglect of the child [Chou et al., 2014].

According to the Children's Dental Health Survey, 2013, nearly a third of 5 year old children in the United Kingdom (UK) had obvious dental caries experience in their primary teeth. Five year old children living in most deprived areas had severe dental decay compared to ones living in least deprived areas indicating that oral health inequalities still exist [Health and Social Care Information Centre, 2015]. Indeed, dental caries was the most common reason for hospital admissions for children aged 5 to 9 in 2012-2013 England [Health and Social Information Centre, 2013]. These treatments often require sedation or general anaesthesia, incurring heavy costs to family and healthcare system [Kalkani and Ashley, 2013]. The English National Health Service spends £3.4 billion per year on dental care with an estimated

additional £2.3 billion on private dental care [Public Health England [PHE], 2014a]. Dental caries is a preventable disease and early identification can reduce the impact dental caries has on children and families lives [Chou et al., 2014]. Therefore, primary prevention of dental caries is a priority for public health commissioners as caries remains the most prevalent oral health disease among children worldwide [Department of Health, 2009].

The first years of a child's development can have a profound impact on their future experience of health and wellbeing such as; Early Childhood Caries (ECC) is associated with caries in later life [Chou et al., 2014; Drummond, Meldrum and Boyd, 2013]. Hence, it is essential to focus efforts on effective early year's programmes [Roger, 2011]. It has been suggested that services delivered through health visiting services may be an important route to facilitate oral health benefits to both mother and young children [Rogers, 2011;Twetman, 2008; Cowley et al., 2015].

Health visitors is a term used in the United Kingdom, Denmark and Norway to denote professionals working within public health in community settings, primarily home environments where they engage with families. Across the world this terminology varies: child health nurse in Sweden, public health nurse in America, Canada and Ireland, child & family health nurse in Australia [Institute of Health Visiting, 2017].

Within the UK, early interventions for the family have been developed through the 'Healthy Child Programme' (HCP) [PHE, 2015]. This is an early intervention and prevention programme which is led by health professionals, primarily health visitors. Within this programme every ante-natal mother and every child is allocated to a health visitor to be supported at the early years of a child's development [PHE, 2015]. The health visiting service plays the vital role providing both universal services for children and their families including targeted services delivered through the

‘Universal Plus’ and ‘Universal Partnership Plus’ programmes [NHS England, 2016]. HCP’s universal programme provides development checks, information about parenting and immunisation at crucial stages of a child’s life which are also the first point of contact (one-to-one) for new born children with the health system in the UK (antenatal, new baby, 6-8 weeks old, 9-12 months old and 2 - 2½ years old) [NHS England, 2013].

Health visitors are more likely to see new parents and children than dentists. This has been borne out by the Faculty of Dental Surgery who reported 70% of children under two years of age in England did not visit an NHS dentist in 2013 [Health and Social Care Information Centre, 2015]. Health visits therefore have ideal contact points with families for oral health advice to be given which could reduce dental caries [Ballantyne-MacRitchie, 2000]. The challenge for the health visitor is to ensure that their knowledge is sufficient, evidence based and up-to-date in all areas of health promotion, including oral health promotion. Therefore, the aim of this study was to assess health visitors’ oral health knowledge, attitudes and practices related to oral health advice for families to support the development of a healthy child.

Methods:

Survey development

The questionnaire (Table 1), was developed using existing questions from validated survey tools [Quinn and Freeman, 1991; Ballantyne-MacRitchie, 2000; Gold and Tomar, 2015; Prakash et al., 2006]. Questions were also developed by dental public health experts (from Leeds University and PHE) based on the evidence within 'Delivering Better Oral Health' which is a toolkit for dental advice and care [PHE, 2014b]. The questionnaire then was piloted with four health visitors to check its relevance, time taken to complete, clarity and ambiguity in questions. The survey was designed and disseminated using the 'Bristol Online Survey (BOS)' a web based survey tool [Bristol Online Survey, 2016] and consisted of 18 closed and 2 open ended questions.

Participant selection and procedure

The questionnaire was distributed to all health visitors who were currently employed in the UK and member of the 'Institute of Health Visiting (iHV)' (n=9000) between May 2016 and June 2016. The iHV has membership representing over 90% of UK registered health visitors and have their contact details within a database accessible by authorised members of the iHV. The iHV invited their members to take part in this survey outlining the purpose of the study and details of anonymization. The email also contained a link to the survey which directed them to the BOS website which contained the consent and participation information with the questionnaire. Two email reminders were sent by the iHV to non-responders at two week intervals.

Data Analysis:

Data was analysed using statistical package for social sciences (SPSS) for descriptive and multivariate analysis. All statistical tests were performed at 0.05 significance level. Data obtained from free text boxes was analysed to identify any themes and to add context to the data gathered. Logistic regression models were used to identify characteristics that predicted the outcomes of interest. Multivariate logistic regression was used to determine which factors were independently associated with 3 dependent variables; oral health knowledge as answering all knowledge related questions correctly versus others (Model 1), confidence of discussing oral health with parents/caregivers versus not feeling confident (Model 2) and referral of a child if aware the child is experiencing dental decay versus not referring (Model 3). Main effect categorical variables included in each model were; years of experience after qualification (≤9 years of experience or ≥10 years of experience) and previous oral health training background (yes or no). Oral health knowledge (answering all oral health knowledge related questions correctly versus answering at least one incorrect answer) was also included as a main effect categorical variable for model 2 and model 3.

Results:

Participant demographics

After 3 mailings, 1088 health visitors completed the questionnaire with the response rate of 12.1% (99.1% female). Of the total respondents, half of them reported 10 or more years of experience after qualification (Table 2, section 1). Among all respondents, 66.7% health visitors reported that they had received oral health training for young children previously while 44.7% had received this training as a student and 50.4% as part of on-going training for their role (e.g. CPD) (Table 2, section 1).

Oral health knowledge

Health visitors were asked about their oral health knowledge in the second section (Table 2, section 2); the vast majority correctly identified that ‘not only bottle fed children get tooth decay’, ‘parents/caregivers should start clean their child’s teeth with fluoridated toothpaste and toothbrush when the first teeth erupt’ and ‘supervision of tooth-brushing should be maintained until their child reaches at least 7 years old’ (98.9%, 97.5% and 97.0% respectively).

Just under half of participants (48.0%) did not correctly answer that the first dental visit for a child should be under 1 year of age. Additionally, 22.1% reported that they either do not believe or do not know that fluoride prevents tooth decay. The identification of the correct amount and appropriate fluoride concentration of toothpaste for children under 3 years of age was obtained from less than half (44.8%) of the respondents. Overall, less than quarter (22.4%) of the total respondents answered all oral health knowledge related questions correctly.

A multivariate logistic regression analysis was conducted for oral health knowledge. Several variables such as years of experience after qualification and training background were associated with a significant increase in oral health knowledge. Indeed, health visitors with 9 or less years of experience (OR= 1.3; 95% CI =1.01-1.83, p= 0.042) and those who had received oral health training previously (OR= 1.8; 95% CI = 1.30-2.54, p< 0.0001) had higher level of oral health knowledge (Table 3, model 1).

Health visitors' beliefs

Nearly all health visitors (99.8%) agreed that oral health advice/promotion should be included in their routine home visit contacts with parents and carers. Additionally, 97.3% of the respondents agreed that dental decay in baby teeth was important and 99.5% agreed that tooth decay affects general health (Table 2, Section 4).

Confidence

Ninety-six percent of the health visitors reported that they feel confident to discuss oral health with parents/caregivers during regular home visit contacts (Table 2, Section 5). 'No previous training provided', 'need for more up-to-date evidence based data', and 'in need of more oral health knowledge' were the potential barriers reported through free text options within questionnaire. Multiple logistic regression was used to assess the independent association with health visitors' confidence with several variables and the results showed that health visitors who had received oral health training (OR= 6.68; 95% CI= 3.17-14.07; p =<0.0001) reported feeling more confident to have oral health discussions with parents or caregivers (Table 3, Model 2).

Self-report of current engagement in oral health promotion

The majority of the health visitors reported that they advise parents and carers of the importance of regular tooth-brushing (95.5%), regular dental visits (93.5%), and the role of sugary foods and drinks with parents/caregivers at these contact points (96.6%).

Eighty-percent of the respondents reported referring a child to a dentist if they were aware the child was experiencing a dental problem. Those who reported that they do not refer did report that they either 'advise parents to take their child to a dentist' or 'complained about not having an official referral system within their local settings' (Table 2, section 6). A logistic regression analysis showed that health visitors who had ≥10 years of experience (OR = 0.63; 95% CI= 0.45-0.87; p =0.006) and those who had received oral health training previously (OR =1.51; 95% CI= 1.09-2.09; p =0.013) are more likely to refer children to dentists (Table 3, model 3).

Awareness of supporting materials

Among all respondents, 90% of the respondents were aware of the 'Institute of Health Visiting' official website, 29.8% are using the 'good practice points-oral health fact sheet' which is held on this website to support health visitor contacts and 18.4% reported that they are signposting parents to the 'iHV oral health parenting tips fact sheet' during their family contacts (Table 2, section 7).

Discussion:

This is the first study that has analysed data from a large national sample of health visitors from around the UK for the purpose of evaluating their knowledge, attitudes and practical behaviours regarding children's oral health. Unfortunately, at present, there are very few studies which have assessed the dental health knowledge, perspectives and working behaviours of health visitors, particularly in the UK [Quinn and Freeman, 1991]. The results of the present study provide valuable insight into and perspective toward the design of relevant oral health education and training for health visitors.

In interpreting the findings of the present study, it is important to acknowledge limitations as well. Firstly, despite there being a large number of respondents, they represent only 12% of those eligible to take part. It is likely that those most interested in oral health are over-represented in the findings of this survey and non-respondents might have different experiences and opinions regarding oral health in home visiting contacts. Secondly, potential social desirability may mean that respondents' over/under report their attitudes and practices.

From a public health perspective, the prevention of oral diseases is largely dependent upon patients changing their behaviours in line with professional guidance. Parents need to be equipped with the appropriate health knowledge, which in turn may affect their motivation and skills to sustain good oral health for themselves and their children. In the UK, HCP is the leading programme for this purpose which is primarily led by health visitors. Therefore, understanding the knowledge level of the health visitors is very important as it drives training availability to be able to give consistent, up-to-date oral health messages to families.

One very important and promising finding of the present study is that, 99.8% of the respondents stated that oral health should be discussed within the regular health visiting contact points with parents and carers which also reflects findings from a similar study conducted previously by Quinn and Freeman (96%) [Quinn and Freeman, 1991]. These results support that health visitors in common are familiar and aware with the idea of integration of oral health into regular targeted home visits and not separate oral health advice/promotion from general health.

Oral health during the childhood is the main indicator of oral health in the adulthood [Chou et al., 2014; Drummond, Meldrum and Boyd, 2013]. Health visitors' responses with regard to the importance of baby teeth and its importance to general health, 97.3% and 99.5% respectively, suggest that health visitors have a good understanding of the importance of children's oral health which is similar to the results that were obtained from studies done with other primary health care groups [Quinn and Freeman, 1991; Sezer et al., 2013; Lewis et al., 2000].

Survey results also highlight that health visitors are knowledgeable about when tooth-brushing should be initiated (as the first teeth erupt) and that parents should supervise and assist tooth-brushing of their child until seven years old as recommended by 'Delivering Better Oral Health' [PHE, 2014b]. Added to this, almost all of the health visitors reported that they routinely advise the importance of tooth-brushing, regular dental visits and discuss the role of sugary foods and drinks with parents/caregivers which are mandatory advices to achieve or maintain good oral health.

However, knowledge varied with regard to the effectiveness of fluoride on preventing dental caries, the correct amount and concentration of toothpaste for children under 3 years of age, and appropriate timing of the first dental visit.

The use of fluoride, both at home and professionally, is the most recommended, most feasible and economical way to prevent dental caries [Marinho et al., 2003]. Surprisingly, there seems to be a knowledge gap regarding fluoride effectiveness and toothpaste usage among health visitors. Around quarter of the health visitors reported that they either do not believe or are not aware that fluoride prevents tooth decay. The result is similar to the findings of a study done with primary health care workers in the United States which found that 35% are not aware that fluoride prevents tooth decay when applied topically [Gold and Tomar, 2015]. There are on-going inaccurate arguments about the negative health impacts from fluoride use within the media which may affect opinions and reduce fluoride use being promoted. Evidence based up-to-date information for health workers should be provided and delivered to clear this suspiciousness regarding fluoride use.

Awareness regarding the amount and concentration of fluoridated toothpaste for children under 3 years of age varied within this study. It is recommended by ‘Delivering Better Oral Health’ that a smear of toothpaste including no less than 1,000 ppm fluoride should be used for children under 3 years old to be effective and considering the development risk of fluorosis [PHE, 2014b]. Less than half of the health visitors are knowledgeable about correct amount and concentration of fluoridated toothpaste which was a similar finding with the results that were obtained from other studies’ done in the UK (55% and 20% respectively) [Kalkani and Ashley, 2013; Quinn and Freeman, 1991]. Giving incorrect advice to parents may unintentionally contribute to poor oral health of young children and may even increase the oral health inequalities conflicting information may lead to advice not being trusted. Therefore, any health visitor and/or primary health care worker who are aware of the fluoride effectiveness and correct usage information of the

fluoridated toothpaste will be more likely to play positive role in children's oral health than any other who is unaware.

Children who have access to dental services are more likely to receive appropriate preventive and routine oral health care. First examination and/or establishment of a dental home is recommended at the time of the eruption of first primary tooth or no later than the child reaches 12 months old [American Academy of Pediatric Dentistry, 2013]. Health care (mainly preventative measures) provided to patients in a medical/dental home environment is more beneficial, cost effective and less traumatic in comparison to emergency care facilities or hospitals [American Academy of Pediatric Dentistry, 2013]. However, according to the Child Dental Health Survey (2013), only 30% of children visited a dentist before two years of age in the UK. Considering our results, half of the health visitors recommend the first dental visit before 12 months old; this proportion is higher than reported in other studies of other primary health care workers [Prakash et al., 2006; Sezer et al., 2013] but still indicated that there is further room for improvement.

Oral health training for the wider professional workforce other than dentists is a recommended intervention by local authorities due to its positive implication such as costing less rather than creating new services to deliver oral health education and oral health promotion to wider population [PHE, 2015]. Therefore health visitors are readily available, accessible and acceptable for both mother and child for the purpose of giving oral health advice and education [Quinn and Freeman, 1991].

Knowledge is associated with training/education and according to the results presented within this study shows that those who had received oral health training are better at oral health knowledge related questions (Table 2: Model1) and many other studies have documented a similar training-knowledge association [Kalkani and

Ashley, 2013; Gold and Tomar, 2015; Sezer et al., 2013; Guisseppe et al., 2006]. Two thirds of the health visitors had received oral health training previously and only 22.4% answered all oral health knowledge related questions correctly, indicating that more effort is perhaps required (training and education) to support these key health care workers in relation to oral health advice.

The majority of the respondents reported feeling confident of entering an oral health discussion with parents/caregivers (96%) and results suggest that those who had received training were more likely to enter discussion. Reasons given for not being confident were similar to those from other studies [Gold and Tomar, 2015; Prakash et al., 2006]; ‘no oral health training provided’, ‘need for more up-to-date evidence based data’ and ‘in need of more oral health knowledge’ were the barriers mentioned which clearly highlights areas to work on in order to support health visitors to play a greater role in oral health promotion beside overall health.

Referral by the primary care physician or health provider has been recommended, based on risk assessment, as early as six months of age and no later than 12 months of age [American Academy of Pediatric Dentistry, 2013]. This provides time-critical opportunities to implement preventive health practices and reduce the child’s risk of preventable dental/oral disease. A study undertaken by Bentley and Holloway, showed that health visitors can play an important role in encouraging the dental attendance for infants [Bentley and Holloway, 1993]. ‘Not having an official referral system within their local settings’ and ‘only advising instead of formal referral’ were the barriers mentioned in the present study for not referring the patients and should be considered while implementing new interventions.

Finally, guidelines are crucial documents for improving knowledge in specific areas and to support the practice of best guidance. However, according to our results very

few, less than we were expecting, health visitors are aware of the specifically designed ‘Good Practice Points-Oral Health Fact Sheet’ and even fewer are signposting parents to ‘iHV Oral Health Parenting Fact Sheet’; similar to the finding of Kalkani and Ashley (2015) where 95.8% of the paediatric trainees in the UK were unaware of an evidence-based toolkit for prevention ‘Delivering Better Oral Health’ [Kalkani and Ashley, 2013]. Both studies may raise the issue that guidelines are being neglected by primary health care workers in the UK and may not be considered as the best way to provide evidence based up-to-date information.

Conclusion:

The present study has found that training in oral health is associated with an increase in knowledge of appropriate and correct information about oral health with confidence in entering a discussion with parents/caregivers and dental referral incidence. The results supports the need for health visitors to receive oral health training in oral health promotion including oral health risk assessment, guidance on evidence based up-to-date prevention measures such as fluoride effectiveness and usage information of fluoridated toothpaste, increasing the attendance prevalence at early stages and awareness of including specific oral health guidelines and fact sheets into their regular practice.

List of abbreviations:

UK: United Kingdom, HCP: Healthy Child Programme, iHV: Institute of Health Visiting

Declarations:

Ethics approval

Ethical approval for this research is obtained from University of Leeds Research Ethics Committee with a DREC ref: 110416/OO/201.

Competing interests

The author(s) declare that they have no competing interests.

Authors' contributions

OAO is responsible for reported research, participated in the design of the study, data collection, statistical analysis, interpretation of data and prepared the manuscript. JC and GD have made substantial contributions to conception and design, and revising critically the manuscript. DS involved in design and established link with the Institute of Health Visiting. CA ensured the dissemination of the survey. All authors read and approved the final manuscript.

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Table 1: Description of Questionnaire Contents

Section of Questionnaire	
1. Participant demographics	gender, years of experience after qualification and previous oral

	health training
2. Oral health knowledge	bottle feeding, first dental visit, initiation and supervision of tooth-brushing and fluoride effectiveness including toothpaste usage information for children under 3 years old
3. Health visitors' beliefs	importance of dental caries to general health and oral health promotion as part of routine home visits
4. Confidence	engaging in oral health discussions with parents/caregivers
5. Self- report of current engagement in oral health promotion	discussing the role of sugary foods and drinks with parents, advising the importance of regular tooth brushing and regular dental visits, and referral process of a child to dentist
6. Awareness of supporting materials	Institute of Health Visiting (iHV) official website, good practice points-oral health fact sheet and oral health parenting tips fact sheet

Table 2. Questionnaire results

	N	%
Participants demographics (Section 1)		
Gender		
Male	10	0.9
Female	1078	99.1

Experience after qualification		
≤9 years	550	50.6
≥10 years	538	49.4
Have you ever received any training on oral health for young children?		
Yes	726	66.7
No	362	33.3
If yes when? (more than one box can be ticked)		
As a student	325	44.7
After qualification	426	58.6
As part of induction training for health visiting role	50	6.8
As part of on-going training for role (e.g. CPD)	366	50.4
Oral health knowledge (Section 2)		
Only bottle fed children get tooth decay		
Agree	7	0.6
Disagree	1076	98.9
Don't know	5	0.5
Age recommendation for first dental visit		
<1 year old	566	52.0
1 to 2 years old	471	43.3
After the eruption of all primary teeth	44	4.0
Do not recommend	7	0.4
Fluoride prevents tooth decay when applied topically		
Yes	848	77.9
No	101	9.3
Don't know	139	12.8
Initiation of brushing child's teeth with fluoridated toothpaste and toothbrush		
When the first teeth erupt	1061	97.5
After all primary teeth erupt	5	0.5
When a child can hold a tooth brush	17	1.6
After 5 years of age	2	0.2
Don't know	3	0.3
Amount and concentration of toothpaste that should be used under 3 years of age		
None	5	0.5
A smear less than 1000ppm	198	18.1
A smear of no less than 1000ppm	491	44.8
A pea-sized amount of less than 1000ppm	402	36.7
Supervision of tooth-brushing until the child is at least 7 years old		
Agree	1055	97.0
Disagree	13	1.2
Don't know	20	1.8

Health visitors' beliefs (Section 3)

Dental decay in baby teeth is not important		
Agree	26	2.4
Disagree	1059	97.3
Don't know	3	0.3
Dental decay could affect general health		
Agree	1083	99.5
Disagree	4	0.4
Don't know	1	0.1
Oral health advice/promotion should be a part of routine health visitors contact		
Yes	1086	99.8
No	2	0.2

Confidence (Section 4)

Do you feel confident to talk to parents/caregivers about child's oral health?		
Yes	1044	96.0
No (why?)	44	4.0

Self-report of current engagement in oral health promotion (Section 5)

Advising importance of regular tooth-brushing		
Yes, routinely	1043	95.5
Yes, occasionally	40	3.7
Yes, rarely	4	0.4
Never	1	0.1
Advising importance of regular dental visits		
Yes, routinely	1017	93.5
Yes, occasionally	66	6.1
Yes, rarely	5	0.5
Never	0	0.0
Discuss the role of sugary foods and drinks with parents/caregivers		
Yes	1044	96.0
No	44	4.0
Referral of a child to dentist if aware of dental problem		
Yes	886	81.4
No (please state)	202	18.6

Awareness of supporting materials (Section 6)

Used/seen the 'Institute of Health Visiting' website		
Yes	979	90.0
No	109	10.0
Using health visiting fact sheet 'good practice points-oral health'		
Yes	313	29.8

No	775	71.2
Signposting parents to the 'iHV oral health parenting tips' fact sheet		
Yes	200	18.4
No	888	81.6

Table 3. Logistic regression models results

Predictor Variable	OR	B	95% CI	p-value
Model 1. Oral health knowledge				
Years of experience after qualification				

≤9 years	1.36	0.31	1.01-1.83	0.042
≥10 years†				
Training Background				
Yes	1.82	0.6	1.30-2.54	<0.0001
No†				
Model 2. Confidence				
Oral health knowledge				
Answering all knowledge questions correct	1.52	0.42	0.63-3.71	0.35
Answering at least one incorrect answer†				
Years of experience after qualification				
≤9 years	0.77	-0.3	0.39-1.51	0.45
≥10 years†				
Previous oral health training				
Yes	6.68	1.9	3.17-14.06	<0.0001
No†				
Model 3. Referral				
Oral health knowledge				
Answering all knowledge questions correct	1.05	0.53	0.72-1.53	0.78
Answering at least one incorrect answer†				
Years of experience after qualification				
≤9 years	0.63	-0.5	0.45-0.87	0.006
≥10 years†				
Previous oral health training				
Yes	1.51	0.41	1.09-2.09	0.013
No†				

Reference Category †