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Do reasoned action approach variables mediate relationships between demographics and cervical cancer screening intentions or behaviour? An online study of women from the UK

Introduction

Cervical cancer is the fourth most common cancer in women worldwide (World Health Organisation, 2018). Survival is increased when the disease is caught at an early stage, and it is recommended that cancer screening should be offered on a population-level basis using organised screening programmes (European Council, 2003). However, at present, no countries report attendance at or above the 85% rate recommended by European guidelines (Gianino et al., 2018). In England, the National Health Service (NHS) offers routine screening for cervical cancer for women aged 25-64 years. Cervical cancer screening is estimated to prevent 70% of cervical cancer deaths, and if everyone attended could prevent 83% of cervical cancer deaths (Landy, Windridge, Gillman, & Sasieni, 2018). However, current rates of cervical screening in the UK are suboptimal, particularly in low socioeconomic status (SES) groups. In the most recently reported data split by deprivation which dates back to 2012, general uptake was 78.3%, but was 80.2% in individuals from the least deprived areas and 75% in individuals from the most deprived areas (Douglas et al., 2016).Uptake is also suggested to be associated with ethnicity. While national data does not report uptake statistics by ethnicity, it has been consistently reported that ethnic minority groups report additional barriers to screening (NHS Digital, 2019; Douglas et al., 2016). One study demonstrated that minority ethnic women were more than twice as likely to have never attended screening in the UK compared to white women (Moser, Patnick & Beral, 2009).

Screening uptake is also associated with age, where it is lowest in the youngest along with the oldest age groups of invitees (25-29 years: 63.3% uptake; Cancer Research UK, 2021) compared to the general population rate of 70.2% in 2021 (NHS Digital 2021). The basis of non-attendance for cervical screening is suggested to differ in younger versus older women, with younger women reporting practical barriers such as a lack of time or issues with childcare, while older women report attitudinal barriers to attendance (e.g., low worry or perceived risk to cervical cancer; Waller, Jackowska, Marlow, & Wardle 2012).

Despite these sociodemographic differences in screening uptake by SES, ethnicity and age group, studies in this area often tend to over-represent participants that are from higher SES backgrounds, who are white and older and under-represent participants from lower SES backgrounds, who are non-white and younger (Wilding et al., 2020). Studies that reverse this pattern and try to over-recruit or equally recruit participants from both lower and higher SES groups, white and non-white ethnicities and younger and older age groups could provide useful insights in this area but are generally missing from the literature. Therefore, the current study aimed to address this important shortcoming by recruiting a demographically broader sample of participants than most studies in this area.

Specifically, a stratified approach to sampling was used in this research to allow for a better assessment of the impact of these demographic factors on intentions to attend cervical screening and attendance behaviour. In addition, the focus was on the factors that might mediate the effects of these demographic variables on intentions and behaviour for cervical screening. The mediators examined were taken from the Reasoned Action Approach (RAA; Fishbein & Ajzen, 2010): an extended version of the Theory of Planned Behaviour (TPB, Ajzen, 1991). The RAA is a model of the predictors of behaviour that has been widely used in relation to understanding health behaviours (Conner & Sparks, 2015). A meta-analysis of published studies shows a good level of predictive power in relation to intentions and engagement with health behaviours (McEachan et al., 2016) explaining 59% of the variance in intention and 31% of the variance in behaviour. The RAA views behaviours like attending for cervical screening as principally based on an individual's intentions to engage in that behaviour (i.e., a decision to act). In turn, intention is based on a series of evidence and theory-based predictors that can be useful targets for interventions designed to change the behaviour. Importantly, the RAA explicitly includes normative influences that may be important determinants with behaviours like cervical screening. There are well-established associations between TPB variables (attitudes, norms, perceived behavioural control) to predict intention and screening behaviour (Sieverding, Matterne, &

Ciccarello, 2010). RAA is an extended version of the TPB (Ajzen, 1991) which separates attitudes into instrumental/cognitive attitudes (e.g., healthy–unhealthy) and experiential/affective (e.g., pleasant–unpleasant) and norms into injunctive norms (the belief others would approve of the individual engaging in the behaviour) and descriptive norms (the belief that others engage in the behaviour). Finally, perceived behavioural control is split into capability (confidence engaging in the behaviour) and autonomy (perceived control regarding engaging in the behaviour). A meta-analysis of RAA studies on health behaviours indicated affective attitude and capability as the strongest predictors of intention (McEachan et al., 2016). However, it is notable, that no studies in this review focused on cervical cancer screening.

Each of the RAA variables can be targeted in interventions in order to increase intentions to engage in the behaviour. For example, persuasive messages could be used to address the effectiveness of a behaviour like cervical screening (cognitive attitude) and the procedures to ensure it is not an unpleasant experience for women (affective attitude). Norms can be tackled by providing information on the numbers of women with positive views on screening (injunctive norms) or who engage in cervical screening (descriptive norms). While perceived behavioural control can be changed through messages emphasizing that cervical screening is an easy behaviour to engage in (capability) and a behaviour that women can choose to perform (autonomy).

In summary, the present study aimed to investigate the impact of sociodemographic factors (age, SES and ethnicity) on cervical cancer screening intention and past screening behaviour, along with the potentially mediating role of RAA variables in a sample of women recruited to provide equal representation of lower and higher SES groups, younger and older age groups and matched to the breakdown of ethnicity in the UK population. Our focus was on linear effects but given the evidence of lower screening in both older and younger women we also assessed quadratic relationships for age and socioeconomic status onto intentions and screening behaviour.

Materials and Methods

Sample

1074 participants were screened based on age, ethnicity and SES. We aimed to recruit 500 participants in total to the final survey with roughly equal numbers of younger (aged 25-49) and older (aged 50-64) participants split into equivalent numbers of high vs low levels of SES. In addition, 20% of the recruited sample was from a minority ethnic group. In order to match the breakdown of ethnic groups in the UK population (UK Government, 2011), again the participants from each ethnic grouping were stratified by age and SES. We aimed to recruit a minimum of 25 participants within each group (e.g., low deprivation, older women, minority ethnic group). In order to recruit the appropriate proportions of participants from each group, we initially screened participants based on their demographic characteristics and then invited a proportion of each to complete the main survey. For example, 120 individuals from minority ethnic groups completed the screening and subsequently were invited to take part in the main survey, where there were 100 spaces available.

A total of 500 respondents completed the final survey, of 508 that started the survey (98.4% response rate); all were women living in the United Kingdom. They were recruited in October 2021 via Prolific (https://prolific.ac/), an online research recruitment website. Participants were invited to take part in a study looking at their thoughts on cancer screening. All participants were living in the UK, and each of the four UK nations was represented. Based on self-reported postcode, an Index of Multiple Deprivation (IMD) decile was calculated using the postcode lookup provided by each of the UK nations (Ministry of Housing, Communities & Local Government, 2021; Scottish Government, 2021; Welsh Government, 2021; Northern Ireland Statistics and Research Agency, 2021).

407 participants (81.4%) reported they were currently up to date with their cervical cancer screening (i.e., had attended in the past 3 years if aged 25-49 or in the past 5 years if

aged 50-64). There were no missing data in the dataset. Due to the online survey design of the study, participants could only complete the survey if they had provided responses to every question.

Measures

Demographic data included age (years), ethnicity (white; minority ethnic group), and socioeconomic status (IMD decile).

Reasoned Action Approach (RAA) cognitions relating to the cervical cancer screening. All items were rated on seven-point Likert scales and coded so that high scores reflected high levels of the variable of interest. Participants completed measures to assess: attitudes (4 items: “For me, attending cervical cancer screening when I am next invited would be”: unpleasant-pleasant; disagreeable-agreeable; useless-useful; harmful-beneficial; first two used to assess affective attitude, last two to assess cognitive attitude; α = .695); injunctive norms (1 item: “Most people close to me would disapprove/approve of going for cervical cancer screening when I am next invited”: Would disapprove-Would approve); descriptive norms (1 item; “Of the people close to you, how many will attend cervical cancer screening when they are next invited?” None-All); capability (1 item; “How confident are you that you could go for cervical cancer screening when you are next invited?” Not all confident-Very confident); autonomy (1 item; “How much control do you have over whether or not you go for cervical cancer screening when you are next invited?” No control-Complete control); intention (3 items: “Do you intend to go for cervical cancer screening when you are next invited?”; “Do you plan to go for cervical cancer screening when you are next invited?” Definitely don’t-Definitely do; “Will you go for cervical cancer screening when you are next invited?” Definitely won’t-Definitely will; α = .995).

Behaviour (past) was assessed using four items: “Have you ever been invited for cervical cancer screening?” Yes/No; “If you have ever been invited, when was the last time you were invited for cervical cancer screening?” Within the last year; Within the last 1-3

years; Within the last 3-5 years; More than 5 years ago; Not applicable; I would rather not say; “Have you ever attended for cervical cancer screening?” Yes/No/I have never been invited; “If you have ever attended, when was the last time you went for cervical cancer screening?” Within the last year, Within the last 1-3 years; Within the last 3-5 years; More than 5 years ago; Not applicable; I would rather not say. Past behaviour was dichotomised using this final item. This was coded based on age where participants aged 25-49 who reported they had been screened in the past 3 years were classified as up-to-date with screening, as were participants aged 50-64 who reported they had been screened in the past 5 years. All other responses were classified as overdue/never screened.

Participants were also asked to complete a range of additional measures that are not further reported here, including COVID-19 vaccination uptake: (“Have you received a vaccination against COVID-19? Yes, first vaccination only; Yes, both vaccinations; No”); COVID-19 history (“Have you had COVID-19 (coronavirus)? Yes, diagnosed and recovered; Yes, diagnosed and still ill; Not formally diagnosed but suspected; Don't know; No”); Shielding status (“Are you regarded as a high-risk group (e.g., aged 70+, underlying health condition)? Yes/No”; Flu vaccination uptake: “Have you received a vaccination against flu in the past 12 months? Yes/ No”. Participants were also asked to complete the PHQ-9, GAD-7 and SWEMWBS as measures of depression, anxiety and wellbeing respectively(the full list of items is available in Supplementary materials).

Procedure

Respondents were recruited via Prolific (https://prolific.ac/) and after screening were invited to take part in a ‘cancer screening survey’. They gave informed consent and were then asked to complete the questionnaire via Qualtrics. On completion they were thanked and paid £1.25 for completing a 15-minute survey.

Ethical approval

Approval was granted by the University of XX, XX (Ref: PSYC-298, Date: 06.09.21). All participants provided informed consent prior to completing the online survey.

Data analysis

Data were analysed using SPSS (version 24, SPSS Inc). First, descriptive statistics were conducted for the study measures (i.e., demographics, RAA variables, intention, past behaviour) and bivariate correlations between demographic variables, RAA measures and intention and past behaviour were computed. Second, regression analyses were used to assess the combined effects of demographic variables (including quadratic effects) on screening intentions and behaviour. Third, regression analyses assessed the effects of demographic variables plus RAA variables on screening intentions and behaviour. Fourth, and finally, mediation analyses were conducted to assess any mediating effects of RAA variables on relationships between demographic variables and screening intentions or behaviour. Mediation analyses only examined demographic variables with significant zero-order effects on intention or behaviour. These analyses were carried out using the PROCESS Macro using a percentile bootstrap estimation approach with 5000 samples. All the above analyses are reported first for predictions of intentions (using linear regression) and then past behaviour (using logistic regression).

Results

254 (50.8%) respondents were coded into the most deprived five deciles, 246 (49.2%) were coded into the least deprived five deciles. Of the 498 participants self-reporting valid ethnicity, 397 participants (79.8%) were white, and 101 participants (20.2%) were from minority ethnic groups. Half of the participants were aged 25-49 and the remaining half were aged 50-65.

Table 1 provides details of the numbers, percentage screened and mean intention to screen in each of the 8 groups formed by splitting the sample by deprivation, ethnicity and

age group. In general we were successful in recruiting at least 25 to each of the 8 groups formed by differing levels of deprivation, ethnicity and age group (Table 1). Table 1 indicates that past screening was lowest in the most deprived, minority ethnic, 25-49 year old group and highest in the least deprived, white, 50-70 year old group. While intention to get screened was lowest in the most deprived, white, 50-70 year old group and highest in the least deprived, white, 25-49 year old group.

Table 2 reports the means and SDs for each measure across the full sample.

Predicting Intention to Screen

Table 2 also reports the correlations between study variables across the full sample. In relation to relationships between demographic variables and our outcome variables, intention was significantly negatively correlated with age and ethnicity, and significantly positively correlated with SES. Intention was also significantly positively correlated with all RAA variables.

Regression analyses demonstrated that when demographic variables were considered simultaneously (Table 3, step 1), age was a significant negative linear predictor of intention, and SES was a significant positive linear predictor of intention, while ethnicity was not significantly related to intention. There was no evidence of quadratic effects for either age or SES on intentions. The results indicated that younger women, along with those from less deprived areas were more likely to report higher intentions to attend cervical screening.

Regression analyses also indicated that when demographic plus RAA variables were considered simultaneously (Table 3, step 2), the effect for SES was no longer significant, although the effect of age remained as significant. Capability and cognitive attitude were the strongest significantly predictors of intention. Injunctive norm was also a significant predictor of intention. Finally, autonomy was demonstrated to be a significant negative predictor of intention.

In relation to age, the mediation analyses indicated that age was a significant predictor of capability (*B* = -.01, SE = .004, *p* = .006), affective attitude (*B* = -.03, SE = .003, *p* < .001), and cognitive attitude (*B* = -.009, SE = .003, *p* = .012). Capability (*B* = .77, SE = .03, *p* <.001), cognitive attitude (*B* = .11, SE = .03, *p* = .001), injunctive norm (*B* = .09, SE = .04, *p* = .012), and autonomy (*B* = -.06, SE = .02, *p* = .01) were significant predictors of intention. This supports the idea that capability, affective attitude, cognitive attitude, injunctive attitude, capability and autonomy were candidate mediators of the effects of age on intentions. Simultaneous mediation tests using bootstrap estimations of indirect effects indicated the indirect coefficient for capability (*B* = -.008, SE = .003, 95%CI = -.014, -.002), and cognitive attitude (*B* = -.001, SE = .0005, 95%CI = -.0022, -.0002) were significant. The direct effect for age remained as significant in these analyses (*B* = -.004, SE = .002, 95%CI = -.008, .0003), therefore, only partial mediation by capability and cognitive attitude was supported for the age-intention relationship.

In relation to SES, the mediation analyses indicated that SES was a significant predictor of capability (*B* = .06, SE = .02, *p* = .0006) only. Capability (*B* = .77, SE = .03, *p* <.001), cognitive attitude (*B* = .12, SE = .03, *p* = .0001), Injunctive norm (*B* = .09, SE = .04, *p* = .017), affective attitude (*B* = .06, SE = .03, *p* = .04) and autonomy (*B* = -.06, SE = .02, *p* = .01) were significant predictors of intention. Multiple mediation tests indicated the indirect coefficient for capability alone (*B* = .04, SE = .01, 95%CI = .02, .07) was significant. The direct effect for SES was no longer significant in these analyses (*B* = -.007, SE = .0085, 95%CI = -.024, .009) supporting full mediation via capability for the SES-intention relationship.

In relation to ethnicity, the mediation analyses indicated that ethnicity was a significant predictor of cognitive attitude (*B* = -.376, SE = .099, *p* = .0002), descriptive norms (*B* = -.257, SE = .110, *p* = .02), capability (*B* = -.224, SE = .111, *p* = .044), and injunctive norms (*B* = -.170, SE = .077, *p* = .023). Capability (*B* = .77, SE = .03, *p* <.001), cognitive

attitude (*B* = .11, SE = .03, *p* = .001), injunctive norm (*B* = .09, SE = .04, *p* = .012), and autonomy (*B* = -.06, SE = .02, *p* = .01) were significant predictors of intention. Multiple mediation tests indicated the indirect coefficient for cognitive attitude alone (B = -.044, SE = .02, 95%CI = -.089, -.011) was significant. The direct effect for ethnicity was no longer significant in these analyses (B = -.004, SE = .058, 95%CI = -.110, .120) supporting full mediation via capability for the ethnicity-intention relationship.

Predicting Past Screening Behaviour

Means, SDs and correlations between the study variables are reported in Table 2. Past behaviour was significantly negatively correlated with SES, but unrelated to age or ethnicity. Past behaviour was significantly positively correlated with all RAA variables.

Regression analyses demonstrated that when demographic variables were considered simultaneously (Table 4, step 1), SES was the only significant positive linear predictor of past behaviour, indicating that individuals from less deprived areas were more likely to be up to date with their screening. There was no evidence of quadratic effects for either age or SES on past behaviour.

Regression analyses also indicated that when demographic and RAA variables were considered simultaneously (Table 4, step 2), the effect for SES was no longer significant, age became significant, while capability, affective attitude and cognitive attitude were found to be significant predictors of past behaviour. However, when intention was entered into the model (Table 4, step 3), only age and capability remained as significant predictors of past behaviour. The effects for age at steps 2 and 3 are likely a statistical artefact given the simple correlation between age and past screening behaviour was not significant (Table 2).

In relation to SES, the mediation analyses indicated that SES was a significant predictor of capability (*B* = .06, SE = .02, *p* = .0006) and capability was the only variable that significantly predicted screening past behaviour (Log odds = -1.03, SE = .16, *p* < .001). Mediation tests indicated the indirect coefficient for capability only was significant, *B* =

.06, SE = .02, 95%CI = -.02, -.10). The direct effect for SES was no longer significant in these analyses (*B* = .05, SE = .05, 95%CI = -.049, .153) supporting full mediation via capability for the SES-past behaviour relationship.

Discussion

In this online study designed to recruit women from a range of sociodemographic backgrounds, cervical screening intentions were demonstrated to be lower in older, more deprived women and in women from minority ethnic backgrounds. Past behaviour was also found to be related to SES, where women from areas of greater deprivation were less likely to be up-to-date with their screening. Mediation analysis using variables from the reasoned action approach supported that capability (confidence engaging in the behaviour) was a key mediator of the effects of age, ethnicity and SES on screening intention and SES on past behaviour.

The findings of the current study are important as they provide further evidence that SES is a key predictor of both intention to attend screening and previous screening behaviour. This supports previous findings suggesting that individuals from areas of the greatest deprivation are not only less likely to attend cervical cancer screening but are also more likely to have human papillomavirus and are at greater risk of developing cervical cancer screening (Cancer Research UK, 2021). Capability was confirmed as a mediator of the relationship between deprivation and both outcome measures, suggesting that while deprivation is likely to influence screening intention and behaviour, this is likely to be heavily influenced by the level of confidence that individuals have regarding cervical cancer screening. The present study's finding that capability is a key mediator between sociodemographic variables, screening intention and behaviour, support this as a key variable to target in future public health interventions. Increasing capability could be an effective way to reduce socio-demographic differences in intentions to engage in cervical screening (e.g., through persuasive messages focusing on increasing confidence to engage in cervical screening).

The present study also suggests that individuals from minority ethnic backgrounds reported lower intentions to attend cervical cancer screening. The ethnicity-intention relationship was mediated by cognitive attitude, which suggests one potential variable that could be targeted in future interventions (e.g. through persuasive messages focusing on reinforcing how useful and beneficial engaging in cervical screening can be). However, despite previous research supporting individuals from minority ethnic backgrounds being less likely to engage in cervical cancer screening (e.g., Moser, Patnick, Beral, 2009; Bang, Yadegarfar, Soljak, Majeed, 2012; Marlow, Wardle, Waller, 2015), ethnicity was not supported as a significant predictor of past behaviour. This is despite the targeted recruitment of participants from a minority ethnic background in order to recruit an equivalent proportion as in the population of the UK along with the stratified sampling whereby equivalent numbers of participants from minority ethnic backgrounds were from areas of high and low deprivation. It is not clear why we did not find a relationship between ethnicity and past behaviour.

The effects of age on intention were found to be partially mediated by capability, along with cognitive attitude. This is an interesting finding and supports previous research suggesting that capability is the strongest RAA variable to predict intention (McEachen et al., 2016) along with findings reported by Waller, Jackowska, Marlow, and Wardle (2012) that showed that older women report greater attitudinal barriers to attendance. The present study therefore provides further evidence to support capability as a key factor influencing intentions. There are likely to be various factors that underly an individual's perceived capability to attend screening, including the confidence to make an appointment and attend, as well as more practical constraints as to whether the individual can make an appointment to attend screening. Our own research has suggested there being many potential barriers to screening attendance, with structural factors such as difficulty getting time off work or finding sufficient childcare being reported alongside more psychological barriers such as fear of pain or embarrassment (Wilding et al., 2020). Additionally, our previous work found that

individuals who thought of screening as potentially lifesaving were more likely to attend screening. This combined with the present study's findings support cognitive attitudes (how useful or beneficial screening is seen to be) as an additional key variable that could be targeted in future interventions aiming to increase screening uptake.

There are currently studies underway investigating the feasibility of self-sampling as a potential method of conducting cervical screening (Drysdale et al., 2022). Combined with the introduction of HPV primary sampling, where samples are tested initially for the presence of HPV and only if this is positive are then tested for abnormal cells, the way in which cervical screening is conducted is slowly changing. If it is found that self-sampling is a feasible method of screening, many of the issues relating to individuals experiencing low capability to attend screening, including the practical issues around making appointments, could potentially be reduced. Although recent research suggests that in individuals that had never attended screening previously, self-sampling was less supported by ethnic minority groups but was supported by older women (Drysdale et al., 2022).

The COVID-19 pandemic has caused significant disruption to the delivery of healthcare generally and to the programmes for routine screening of cancer run by the NHS in the UK (O'Connor et al., 2020). All screening programmes were paused between March and June-August 2020 in order to reduce the potential burden on the NHS caused by the screening itself as well as potential follow-up tests that are required. In Scotland, there is evidence that the disruption caused by COVID-19 to the bowel, breast and cervical cancer screening programmes has not significantly reduced the number of individuals engaging with the various screening programmes (Campbell et al., 2021). Although due to the programmes being required to 'catch-up' as a result of missed screening invitations, along with reduced capacity in primary care due to the pandemic, the impact of the pandemic on screening is not straightforward (Campbell et al., 2021). There is also research suggesting that the COVID-19 pandemic has more negatively affected these specific groups (Daly, Sutin &

Robinson, 2020; O'Connor et al., 2021), along with younger individuals compared to higher SES and white individuals.

Strengths and limitations

The present study had a number of strengths including the targeted recruitment of individuals from areas of greater deprivation, along with those from minority ethnic backgrounds. The study sampling aimed to be broadly representative of UK women (in terms of age, SES and ethnicity) in order to improve the generalisability of the study findings. There were also several weaknesses to the study. First, the outcome measures relied on self-reported intention rather than an objective measure of screening behaviour. Despite recruiting twenty percent of the sample from minority ethnic group backgrounds, it was not possible to conduct more analyses of specific ethnic groups, despite the lack of homogeneity and differing religious and cultural needs within different ethnic groups (Thomas, Saleem, Abraham, 2013). While analyses were not conducted in specific ethnic groups, due to the small numbers included, we did look in detail at the proportion of the sample reporting different ethnic groups. 8% of our sample reported their ethnicity as Black, Black British, Caribbean or African, 7% reported their ethnicity as Asian or Asian British, 4.6% were from Mixed or multiple ethnic groups and 1% reported their ethnicity as being from an Other ethnic group. According to the Institute of Race Relations, population estimates suggest that in 2019 3.5% of the UK population were Black, 8% were Asian, 1.8% were Mixed and 1.9% were Other. Therefore our sample may have over-recruited the proportion of Black participants, however we do not appear to have under-recruited any specific ethnic groups. It is not clear how this may have influenced the study results. In addition to this, participant ages were not normally distributed within each of the age groups recruited, with both groups skewing toward younger ages in each group (25-30 in younger women and 50-55 in older). Therefore, future research should attempt to replicate the current findings using a larger sample of participants and endeavour to include more objective measures of screening behaviour and extend similar approaches to other cancer screening behaviours (e.g., Tsipa

et al., 2021; Wilding et al., 2020). Further, we would note that the current approach could be usefully extended to exploring the factors determining other groups with lower cervical screening rates (e.g., LGBTQ+, women with disabilities).

Conclusions

In conclusion, the current study found that cervical screening intentions were related to age, ethnicity and level of deprivation, with older women, those from areas of greater deprivation and ethnic minority groups reporting lower intentions. Women from more deprived areas were also less likely to have attended screening before or be currently up-to-date. Capability (confidence engaging in cervical screening) was a key mediator, along with cognitive attitudes (perceiving screening as useful/beneficial), although this was to a lesser extent. Future public health interventions would benefit in targeting women's perceived confidence in attending screening along with their cognitive attitudes in order to promote cervical screening attendance and reduce potential inequalities associated with sociodemographic factors.

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Table 1. *Number of participants, percentage screened and mean intention to screen in each of the pre-defined subgroups*

		Age Group					
		25-49 years			50-70 years		
		N	Screened (%)	Intention (M)	N	Screened (%)	Intention (M)
White	Most deprived	101	90	6.59	99	91	5.75
	Least deprived	99	92	6.57	101	98	6.19
Minority ethnic	Most deprived	32	81	5.90	25	88	5.31
	Least deprived	18	89	6.11	25	96	6.48

Table 2. *Means, Standard Deviations and Intercorrelations between the demographics and RAA Variables*

	Age	SES	Ethnicity	Inj Norm	Desc Norm	Capability	Autonomy	Aff attitude	Cog attitude	Past behaviour	Intention	Mean/N	SD/%
Age	1	.099*	-0.014	0.058	0.024	-.124**	-0.031	-.348**	-.113*	0.005	-.167**	43.86	12.06
SES		1	-0.084	0.044	0.080	.153**	-0.015	-0.052	0.055	.113*	.104*	5.39	2.78
Ethnicity			1	-.102*	-.104*	-.090*	-0.077	-0.047	-.167**	-0.015	-.089*	397±	79.4
Inj Norm				1	.168**	.209**	0.066	.102*	.350**	.151**	.259**	6.62	1.17
Desc Norm					1	.326**	.123**	.185**	.176**	.177**	.272**	6.05	1.11
Capability						1	.229**	.497**	.467**	.563**	.845**	6.13	1.67
Autonomy							1	.172**	.209**	.132**	.152**	6.67	1.00
Aff attitude								1	.328**	.321**	.469**	3.82	1.67
Cog attitude									1	.331**	.494**	6.41	1.10
Past behaviour										1	.560**	407≠	81.4
Intention											1	6.21	1.53

*p<.05 **p<.01; ±N and % of white participants;≠ N and % of participants up-to-date with screening

Table 3. *Regression analyses predicting cervical screening intentions from demographic and RAA variables*

Step	Predictor	Beta	SE	Standardised β
1	Age	-0.015	0.004	-0.182***
	SES	0.041	0.016	0.115**
	Ethnicity	-0.211	0.109	-0.085*
	AgexAge	-0.048	0.062	-0.035
	SESxSES	-0.003	0.049	-0.003
2	Age	-0.004	0.002	-0.054**
	SES	-0.007	0.009	-0.018
	Ethnicity	-0.005	0.059	-0.002
	AgexAge	-0.007	0.033	-0.005
	SESxSES	0.030	0.026	0.028
	Inj Norm	0.090	0.036	0.063*
	Desc Norm	-0.008	0.025	-0.008
	Capability	0.774	0.030	0.778***
	Autonomy	-0.058	0.024	-0.058**
	Aff attitude	0.040	0.032	0.035
	Cog attitude	0.114	0.031	0.104**

Step 1 $F(5, 491) = 5.36$, $p < .001$, $R^2 = 0.05$; Step 2 $F(11, 485) = 123.50$, $p < .001$, $R^2 = 0.74$;

*p<.05 **p<.01 ***p<.001

Table 4. *Regression analyses predicting cervical screening past behaviour from demographic and RAA variables*

Step	Predictor	Beta	SE	*p*
1	Age	-0.004	0.010	0.684
	SES	0.103	0.041	0.013
	Ethnicity	-0.066	0.287	0.817
	AgexAge	-0.224	0.163	0.170
	SESxSES	-0.150	0.128	0.242
2	Age	0.032	0.013	0.018
	SES	0.053	0.052	0.305
	Ethnicity	0.686	0.408	0.093
	AgexAge	-0.283	0.199	0.155
	SESxSES	-0.114	0.157	0.469
	Inj Norm	0.097	0.198	0.624
	Desc Norm	-0.027	0.146	0.853
	Capability	1.034	0.164	0.000
	Autonomy	0.011	0.123	0.926
	Aff attitude	0.450	0.212	0.034
	Cog attitude	0.352	0.158	0.026
3	Age	0.038	0.014	0.006
	SES	0.062	0.052	0.238
	Ethnicity	0.719	0.417	0.085
	AgexAge	-0.288	0.205	0.159
	SESxSES	-0.161	0.159	0.313
	Inj Norm	0.036	0.210	0.866
	Desc Norm	-0.013	0.147	0.929
	Capability	0.498	0.218	0.022
	Autonomy	0.066	0.125	0.598
	Aff attitude	0.412	0.215	0.055
	Cog attitude	0.257	0.169	0.129
	Intention	0.767	0.212	0.000

Step 1 X^2 (df = 5) = 9.97, p =.08, Nagelkerk R^2 = 0.032; Step 2 X^2 (df = 6) = 139.18, p<.001, Nagelkerk R^2 = 0.42; Step 3 X^2 = 11.97, p=.001, Nagelkerk R^2 = 0.45.

Supplementary Tables.

Supplementary Table 1. Regression of intention on Age, IMD, Ethnicity and Interactions

Step	Predictor	Beta	SE	Standardised β
1	Age	-0.015	0.004	-0.182***
	SES	0.041	0.016	0.115**
	Ethnicity	-0.211	0.109	-0.085
2	Age	-0.0016	0.004	-0.19***
	SES	0.041	0.016	0.116**
	Ethnicity	-0.216	0.11	-0.087*
	Age x Age	-0.048	0.062	-0.035
	SES x SES	-0.003	0.049	-0.003

Step 1 $F(3, 493) = 8.29$, $p < .001$, $R^2 = 0.05$; Step 2 $F(9, 487) = 5.36$, $p < .001$, $R^2 = 0.23$;
*p<.05 **p<.01 ***p<.001

Supplementary Table 2. Regression of past behaviour on Age, IMD, Ethnicity and Interactions

Step	Predictor	Beta	SE	*p*
1	Age	-0.002	0.01	0.876
	SES	0.107	0.043	0.013
	Ethnicity	-0.044	0.284	0.876
2	Age	-0.004	0.01	0.684
	SES	0.103	0.041	0.013
	Ethnicity	-0.066	0.287	0.817
	Age x Age	-0.224	0.163	0.17
	SES x SES	-0.15	0.128	0.242

Step 1 X^2 (df = 3) = 6.49, *p* =.09, Nagelkerk R^2 = 0.021; Step 2 X^2 (df = 2) = 3.476, *p*=.176, Nagelkerk R^2 = 0.03;