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Inequalities in NHS Health Check participation in a multiethnic city

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Abstract

Introduction The NHS Health Check programme targets adults aged 40–74 to reduce the risk of cardiovascular disease, diabetes, and stroke. Uptake is uneven, especially among minority ethnic and deprived communities. Birmingham, one of England's most diverse and disadvantaged cities, provides a key setting to examine participation. This study explored ethnic and gender differences in NHS Health Check uptake.

Methods A cross-sectional study design was used. Aggregated data were collected from ten ethnic groups: Arab, Bangladeshi, Black Caribbean, Chinese, Ghanaian, Indian, Nigerian, Pakistani, Somali, and White British. Variables included eligibility, actual uptake, and gender. Descriptive statistics, Pearson correlations, paired-samples t-tests, and a chi-square test of independence were conducted to explore patterns of uptake and the association between eligibility and attendance.

Results Of 153 eligible participants, 45 completed the Health Check. Uptake varied widely across ethnic groups, from 6.7% (Arab) to 87.5% (Ghanaian). Eligibility was not significantly related to uptake ($r = 0.33$, $p = 0.345$) and paired-samples t-tests confirmed large gaps between eligibility and attendance ($p < 0.001$). Gender differences were minimal, with both males and females showing low uptake relative to eligibility. A significant association between ethnicity and uptake was found ($\chi^2 = 26.26$, $p = 0.002$).

Conclusion NHS Health Check uptake was low and varied sharply across ethnic groups. Eligibility did not predict attendance, and gender had limited influence. Cultural and structural factors strongly shaped engagement. Targeted, community-focused, and culturally tailored strategies are needed to improve awareness, trust, and accessibility, especially for groups with the lowest uptake.

Keywords NHS health check, Ethnicity, Health check eligibility, Health check uptake

1 Introduction

The NHS Health Check programme was initiated in England in 2009 to identify adults at higher risk of non-communicable diseases (NCDs) and provide early advice, lifestyle support, and follow-up interventions to prevent or better manage conditions such as cardiovascular disease (CVD), type II diabetes, stroke, and kidney disease in individuals aged 40 to 74 years [16]. However, there is an increasing body of evidence indicating that the uptake of NHS Health Checks is low across diverse population groups, particularly

among racially marginalised communities, which contradicts the goal of reducing health inequities. Numerous studies have looked at differences in participation. For instance, more recent equity research in Walsall found that people from some minority ethnic groups had lower odds of invitation, uptake, and overall coverage of NHS Health Checks compared with White groups, highlighting ongoing ethnic inequalities in access to preventive health services [20]. Furthermore, Robson et al. [22] conducted a population-based cohort study across five London boroughs and found that engagement varied across ethnic groups, with improved uptake observed when outreach was culturally tailored. However, barriers related to socioeconomic disadvantage, language, and trust in health systems continue to limit participation [12].

1.1 Demographics and deprivation in Birmingham

According to the latest population estimates, Birmingham, UK, is home to approximately 1.144 million people [18], making it the largest local authority in England outside London. Birmingham is ethnically diverse, with more than 50% of residents identifying as belonging to global majority communities, including large South Asian, Black African and Black Caribbean populations. The city also accounts for approximately 8% of the total African and Caribbean population of England, highlighting the importance of addressing ethnic health inequalities locally. Birmingham is also widely recognised as one of the most deprived cities in the UK. Around 88% of wards are ranked below the national average for deprivation, and health inequalities are strongly shaped by socioeconomic conditions [14]. People living in the most deprived areas are up to three times more likely to develop cardiovascular disease than those in the least deprived areas [10, 23, 24].

1.2 NHS Health Check uptake in Birmingham

Despite Birmingham being one of the most diverse and populous cities in England, it faces significant health challenges and inequalities that make NHS Health Checks a crucial intervention for improving public health. Over half of Birmingham's residents identify with global majority backgrounds, and nearly nine out of ten wards fall below the national average for deprivation [3]. Birmingham's unique demographic and socioeconomic profile highlight the need for targeted, preventative healthcare interventions to reduce health inequalities and tackle the burden of preventable diseases [9]. The uptake of NHS Health Checks in Birmingham has fluctuated over recent years. For example, during 2018–2019, approximately 85,500 individuals were invited to attend an NHS Health Check, of whom around 33,300 completed the check [19]. More recently, in 2022–2023, around 90,000 individuals were invited, yet only approximately 31,000 attended [17]. This trend highlights a persistent challenge in engagement. Evidence suggests that uptake is generally lower among men and certain ethnic minority communities, which is particularly significant given Birmingham's diverse population and high levels of deprivation. Addressing these disparities remains a priority for public health initiatives aimed at reducing health inequalities and improving preventive care. Although the NHS Health Check programme has been in place since 2009 and earlier studies have examined uptake, important gaps remain in local, ethnicity-specific evidence, particularly within highly diverse urban settings. Socioeconomic, cultural, and gender factors continue to influence participation, meaning updated, context-specific

evidence is needed to inform targeted interventions. Therefore, the aim of this study was to investigate patterns of NHS Health Check uptake among ethnic minority groups in Birmingham.

2 Methodology

2.1 Study design

This study utilised a cross-sectional quantitative research design to investigate the uptake patterns of the NHS Health Check programme among various ethnic and gender groups. The main aim was to examine the relationship between the number of eligible participants and actual uptake, as well as to compare uptake rates between males and females within each ethnic group. The cross-sectional design was chosen for its ability to allow for statistical comparisons of data collected at a single time point. The study followed a quantitative research framework based on a positivist paradigm [4, 7], providing a structured approach to problem definition, data collection, analysis, and interpretation. This methodological consistency ensured the study's coherence and replicability, enhancing the reliability and validity of the findings and contributing to an evidence-based understanding of ethnic and gender disparities in NHS Health Check uptake. Although the total sample comprised 180 participants, inferential analyses were restricted to those eligible for the NHS Health Check (aged 40–74 years; n = 153), with ethnicity as the unit of analysis (n = 10 groups).

2.2 Ethical considerations

This study received ethical approval from the Birmingham City University Ethics Committee (Reference: Hossain/#13344/sub2/R(A)/2024/Sep/HELS FAEC). All procedures involving human participants were conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. As the study involved analysis of anonymised, routinely collected data, informed consent was not required.

2.3 Data source

The data used in this study were primary and aggregated, collected by the researchers as part a large NHS Health Check project. The dataset covered a single observation period in 2025 and comprised participants recruited via community-based Focus Group Providers (FGPs) serving ethnically diverse populations in Birmingham. Data were anonymised prior to analysis. The dataset comprised counts of individuals who were eligible for and those who participated in the NHS Health Check programme. While individual-level counts were collected (N = 153), all inferential statistical analyses were conducted at the ethnic group level (N = 10). This approach avoids small-sample issues in some categories and ensures meaningful group-level comparisons. Data were categorised by ethnic group and gender, representing ten distinct ethnic categories: Arabs, Bangladeshi, Black Caribbean, Chinese, Ghanaian, Indian, Nigerian, Pakistani, Somali, and White British. While individual-level counts were collected (N = 153), all inferential statistical analyses were conducted at the ethnic group level (N = 10). This approach avoids small-sample issues in some categories and ensures meaningful group-level comparisons.

For each ethnic group, information was recorded on:

- The number of eligible participants,

- The number of participants who attended the NHS Health Check (uptake),
- The number of males and females in each ethnic group, and.
- The number of males and females who completed the NHS Health Check.

All data were anonymised and aggregated, with no individual-level identifiers, ensuring confidentiality and compliance with data protection requirements. The dataset provided a robust basis for descriptive and inferential statistical analyses to explore patterns and associations in programme participation across different ethnic and gender groups.

2.4 Eligibility and uptake definitions

In this study, "eligible participants" were defined as individuals aged 40–74 years who met the NHS Health Check age criteria and were identified as eligible through community-based recruitment processes facilitated by Focus Group Providers (FGPs), rather than through routine primary care invitation records. Attendance ("uptake") was defined as completion of an NHS Health Check during the study period following recruitment, as recorded within the study dataset.

2.5 Variables

The variables included in this study were defined as follows:

- Eligible Participants: The total number of individuals from each ethnic group invited or eligible to attend the NHS Health Check.
- Actual Uptake: The number of individuals in each ethnic group who attended the NHS Health Check; analyses were conducted at the group level.
- Gender Distribution: The total number of males and females within each ethnic group.
- Gender Uptake: The number of males and females who attended the NHS Health Check; all gender comparisons are at the ethnic group level.
- The unit of analysis was the ethnic group, allowing comparisons between groups and between genders within each ethnic category. No individual-level inference is made.

The unit of analysis was the ethnic group, allowing comparisons between groups and between genders within each ethnic category (Table 1).

Table 1 Ethnic and gender distribution of NHS Health Check attendees

Ethnicity	Male	Female	Total participants
Arabs	7	10	17
Bangladeshi	9	12	21
Black Caribbean	9	9	18
Chinese	7	9	16
Ghanaian	8	6	14
Indian	8	12	20
Nigerian	7	13	20
Pakistani	12	12	24
Somali	10	10	20
White British	6	4	10

2.6 Data management

Data were organised and entered into IBM SPSS Statistics (Version 29) for analysis. Data cleaning and validation were conducted to ensure accuracy, consistency, and completeness prior to statistical testing. Each variable was coded appropriately to enable descriptive and inferential analysis.

2.7 Statistical analysis

2.7.1 Descriptive statistics

Descriptive statistics were used to summarise the characteristics of the dataset. Measures of central tendency (mean) and dispersion (standard deviation) were computed for both eligible participants and actual uptake across ethnic groups. Descriptive statistics were also calculated for the total number of males and females and for the number of males and females who attended the NHS Health Check.

2.7.2 Correlation analysis

A Pearson correlation was conducted to determine whether a linear relationship existed between ethnic group-level counts of eligible participants and group-level uptake of the NHS Health Check. Analyses were conducted at the ethnic group level ($N = 10$); no individual-level inference was made. Pearson's correlation was chosen because both variables are continuous and normally distributed at the aggregate level. A 95% confidence interval was calculated to estimate the precision of the correlation coefficient. Statistical significance was assessed using a two-tailed test with alpha = 0.05. This approach explores patterns and differences between groups rather than implying causation at the individual level.

2.8 Paired samples T-test (eligibility vs. uptake)

A paired samples t-test was performed to compare the mean number of eligible participants with the mean number of attendees across the ethnic groups. This compares group-level means, not individual participant data. The t-test assessed whether differences in group-level uptake were statistically significant. Effect sizes, including Cohen's d and Hedges' g, were calculated to quantify the magnitude of these differences. This method allows exploration of variations in uptake between ethnic groups, while avoiding assumptions about individual-level causation.

2.9 Gender-based analysis

Separate analyses were conducted for males and females to examine differences in uptake by gender.

- Descriptive statistics were calculated for the total number of males, total number of females, and numbers who attended within each ethnic group.
- Pearson correlation analyses assessed the relationships between the total number of males/females and the corresponding group-level uptake rates.
- Paired samples t-tests compared total males and females within each ethnic group with those who attended, at the group level only.
- Effect sizes were calculated to determine the magnitude of differences between groups, not individuals.

This approach ensures that findings reflect patterns of variation across ethnic and gender groups, without implying individual-level causation.

3 Results

3.1 Participants demographics

Table 2 presents the demographic and NHS Health Check characteristics of the 180 participants across ten ethnic groups. The sample included 83 males and 97 females, with a mean age of 52.11 years, reflecting the target eligibility range of 40–74 years. Most participants ($n = 153$) were eligible for the NHS Health Check, while 27 were approaching age 40. A small number of individuals recorded as "approaching age 40" were included in descriptive tables to reflect the broader population context. These individuals were not included in inferential analyses, as they were not age-eligible for the NHS Health Check during the study period. Uptake of the health check varied across groups, with 45 participants recorded as having attended, and higher attendance observed among Nigerian and Pakistani participants. A small number of participants ($n = 5$) reported a disability, primarily in the Pakistani and White British groups. Gender distribution was generally balanced, though females were slightly higher in several groups, supporting meaningful comparisons between males and females. Overall, the sample was ethnically and gender-diverse, providing a robust basis for analysing patterns of NHS Health Check uptake.

3.2 Eligibility versus NHS Health Check uptake

The mean number of eligible participants across the ten ethnic groups was 18.0 (SD +/-3.97), while the mean actual uptake of the NHS Health Check was 4.5 (SD +/-2.59) (see Appendix 1 for the full dataset). Pearson's correlation indicated a weak positive relationship between eligible participants and actual uptake ($r = 0.33$), which was not statistically significant ($p = 0.345$). The 95% confidence interval ranged from −0.37 to 0.80 (Table 3). A paired-samples t-test revealed a significant difference

Table 2 Participants demographic

Ethnic group	Male	Female	Mean age*	NHS Health Check Eligible (40–74)	Approaching Age 40	Had NHS Health Check	Disability count	Total participants
Arab	7	10	52.59	15	2	1	0	17
Bangladeshi	9	12	50.00	18	3	4	0	21
Black Caribbean	9	9	47.56	15	3	3	0	18
Chinese	7	9	58.44	15	1	6	0	16
Ghanaian	8	6	42.00	8	6	7	0	14
Indian	8	12	62.10	20	0	2	0	20
Nigerian	7	13	49.05	17	3	8	0	20
Pakistani	12	12	52.46	20	4	8	4	24
Somali	10	10	51.35	17	3	4	0	20
White British	6	4	55.60	8	2	2	1	10
Total / Mean	**83**	**97**	**52.11**	**153**	**27**	**45**	**5**	**180**

Mean age values represent aggregated averages for each ethnic group. Standard deviations (SDs) were not available due to the anonymised, group-level nature of the dataset. Total participants include individuals aged below 40 years ($n = 27$) who were not eligible for the NHS Health Check at the time of data collection. All inferential analyses were conducted using the eligible sample only ($n = 153$)

Table 3 Correlations between eligible participants and actual uptake

Statistic	Eligible participants	Actual uptake
Mean (+/-SD)	18.0 (3.97)	4.5 (2.59)
N	10	10
Correlation		
Pearson Correlation	1.00	0.334
Sig. (2-tailed)		0.345
N	10	10
Confidence intervals for Pearson correlation		
95% CI		(-0.374, 0.796)

N = 10 ethnic groups

Table 4 Descriptive statistics and paired samples test for eligible participants and actual uptake of the NHS Health Check

Measure	Mean (+/-SD)	Std. error mean	95% CI	t-value	df	*p*-value
Eligible participants (*N* = 10)	18.0 (3.9)	1.26	[15.5, 20.5]			
Actual uptake	4.5 (2.6)	0.82	[3.4, 5.5]			
Mean difference	13.5 (3.9)	1.25	[10.7, 16.3]	10.8	9	< 0.001

Table 5 Paired samples test for eligible participants and actual uptake of the NHS Health Check

Pair	Mean difference	Std. deviation	Std. error mean	95% CI	t	df	*p*-value
Male - Males Who Had NHS Health Check	6.4	1.90	0.60	5.04–7.76	10.7	9	< 0.001
Female - Females Who Had NHS Health Check	7.1	3.07	0.97	4.90–9.30	7.3	9	< 0.001

between the number of eligible participants (M = 18.0) and actual uptake (M = 4.5), t (9) = 10.8, $p < 0.001$, with a mean difference of 13.5 (Table 4). This indicates a substantial gap between eligibility and engagement at the ethnic group level. Together, the results suggest that the number of eligible participants does not strongly predict uptake.

3.3 Gender differences in NHS Health Check uptake

Descriptive statistics for males and females are presented in appendix 2. Across the ten ethnic groups, the mean number of males was 8.3 (+/-1.8), while the mean number of males who had an NHS Health Check was 1.9 (+/-1.4). For females, the mean number was 9.7 (+/-2.9), with 2.6 (+/-1.4) having completed the Health Check. Correlation analyses indicated a weak to moderate, non-significant relationship between the total number of individuals and those who had completed the Health Check for both males ($r = 0.3$, $p = 0.418$) and females ($r = 0.1$, $p = 0.825$), suggesting that larger ethnic group counts of eligible individuals did not necessarily correspond to higher uptake. Paired-samples t-tests (Table 5) revealed significant differences between the total number of eligible participants and actual uptake for both males (t(9) = 10.7, $p < 0.001$, mean difference = 6.4) and females (t(9) = 7.3, $p < 0.001$, mean difference = 7.1), indicating that, within ethnic groups, uptake was substantially lower than eligibility. Effect size calculations further demonstrated the practical

Table 6 Uptake by ethnicity

Ethnicity	Had check	Eligible	Uptake %
Arabs	1	15	6.7%
Bangladeshi	4	18	22.2%
Black Caribbean	3	15	20.0%
Chinese	6	9	40.0%
Ghanaian	7	8	87.5%
Indian	2	20	10.0%
Nigerian	8	17	47.1%
Pakistani	8	20	40.0%
Somali	4	17	23.5%
White British	2	8	25.0%

Table 7 Chi-square test of independence between ethnicity and NHS uptake status

Test	Value	df	*p*-value
Pearson Chi-square	26.26	9	0.002
Likelihood ratio	26.75	9	0.002
Number of valid cases	153		

5 cells (25%) had expected counts less than 5; minimum expected count = 2.35

significance of these differences, with large effects observed for both males (Cohen's d = 1.9; Hedges' g = 2.1) and females (Cohen's d = 3.1; Hedges' g = 3.4). Together, these results highlight a substantial gap between eligibility and uptake of NHS Health Checks across genders.

3.4 Uptake by ethnicity

Uptake of the health check varied substantially across ethnic groups (Table 6). The highest uptake was observed within the Ghanaian ethnic groups, with 7 of 8 eligible individuals completing the check (87.5%). Moderate levels of uptake were seen in the Nigerian and Chinese groups, where 47.1% (8/17) and 40.0% (6/15) participated, respectively. Pakistani participants also showed 40.0% uptake (8/20). Lower uptake rates were recorded among the Somali (23.5%, 4/17), Bangladeshi (22.2%, 4/18), and Black Caribbean groups (20.0%, 3/15). Uptake remained below 15% in the Indian and Arab groups, with 10.0% (2/20) and 6.7% (1/15), respectively. White British participants demonstrated an uptake of 25.0% (2/8). Overall, uptake across ethnic categories ranged from 6.7% to 87.5%.

3.5 Association between ethnicity and uptake

A chi-square test of independence was performed to examine the relationship between ethnicity and NHS uptake status (Table 7). The association was statistically significant, χ^2 (9, $N = 153$) = 26.26, $p = 0.002$, indicating that uptake at the group level varied by ethnic group. Five cells (25%) had expected counts less than five, with the minimum expected count being 2.35 (appendix 3).

All results are interpreted at the ethnic group level, and no individual-level inferences are made. This association should be interpreted cautiously, as several cells had small, expected counts and the analysis reflects group-level differences rather than individual-level effects.

4 Discussion

The aim of this study was to investigate the update patterns of the NHS health check programme among ethnic minority groups within Birmingham. The study found a clear gap between eligibility for the NHS Health Check and actual attendance. Although 153 participants were eligible, only 45 attended, showing that most people did not take up the offer. Uptake varied widely between ethnic groups, ranging from 6.7% in the Arab group to 87.5% among Ghanaian participants. Men and women showed the same pattern, with far fewer taking up the Health Check than were eligible. These key results indicate that eligibility alone does not lead to participation and that some communities may face greater barriers than others. This study describes variation in NHS Health Check uptake across ethnic groups but does not identify the underlying determinants of these differences. The NHS Health Check programme was created to identify adults aged 40–74 at increased risk of preventable conditions such as heart disease, stroke and type 2 diabetes. Although the programme has now been running for over a decade, national reports show that uptake remains uneven across communities, with some groups engaging readily and others attending far less frequently. Previous evaluations have highlighted gaps linked to ethnicity, health literacy, access to primary care and trust in health services [8, 21]. These inequalities matter because routine health checks are most valuable when they reach the groups who face the highest burden of disease. Despite this, relatively little work has examined how uptake patterns differ between minority ethnic groups at a local level, or how these patterns relate to gender and eligibility for the programme. This study set out to address this gap by examining NHS Health Check uptake across ten ethnic groups within a diverse community sample and by drawing on existing literature to explore factors that may help explain these differences, rather than directly measuring or testing these determinants within the dataset. The findings show clear and meaningful differences in NHS Health Check uptake across the ten ethnic groups included in the study. The chi-square analysis demonstrated that these differences were statistically significant, indicating that the observed variation in attendance across ethnic groups was unlikely to be due to chance alone. This pattern aligns with national evidence showing that uptake is not evenly distributed across the population and that some minority communities face persistent barriers to participation [25].

4.1 Uptake differences across ethnic groups

Ghanaian participants showed the highest engagement, with almost nine in ten eligible adults completing the check. Nigerian, Chinese and Pakistani groups also showed moderate levels of participation. These findings contrast with earlier national datasets, which often show lower NHS Health Check uptake among many Black and South Asian communities [6, 13]. One possible explanation is that community networks, local outreach or trust in local primary care services may differ from patterns observed nationally. Local studies have shown that some Black African communities respond particularly well to targeted, community-based health promotion, especially when information is delivered through trusted social

networks [1]. The high uptake among Ghanaian participants in this sample may reflect similar dynamics described in previous research, rather than factors directly measured in this study, and should therefore be interpreted cautiously. In contrast, uptake among Arab and Indian participants was noticeably low, with fewer than 10–15% attending. This mirrors findings from several studies reporting lower engagement among groups who may face language barriers, limited awareness of preventive programmes, or cultural differences in perceptions of risk and screening ([11]; Office for Health Improvement and Disparities, [17]). Qualitative accounts have also shown that some communities perceive NHS Health Checks as unnecessary unless symptoms are present, which can reduce participation in asymptomatic screening programmes [2]. Social and cultural factors, such as community and lay networks, may also affect NHS Health Check uptake. Trusted community groups, family, and local social connections can increase awareness, build trust, and encourage participation, especially in groups with lower attendance ([1, 25]; Office for Health Improvement and Disparities, [17]). Interventions that engage these networks could help improve participation and reduce inequalities across ethnic groups.

4.2 Relationship between eligibility and uptake

Across all groups, the number of eligible individuals did not strongly predict uptake. The weak, non-significant correlation in this study supports earlier work suggesting that eligibility alone is not enough to drive participation. Robson and colleagues [21] highlighted that simply offering the check does little unless there are communication strategies, culturally relevant materials and convenient appointment options. The large differences identified in the paired-samples t-tests further show that most eligible individuals did not attend, reinforcing the view that structural and social factors, rather than eligibility, shape engagement.

4.2.1 Gender patterns

Although females outnumbered males in the sample, but both groups showed a similar pattern: a large gap existed between the number who were eligible and the number who attended. This aligns with previous research showing mixed results regarding gender differences in NHS Health Check attendance. Some national analyses report higher uptake among women [5], while others show little consistent difference once ethnicity and deprivation are considered [15]. The current findings suggest that gender may be less influential than ethnicity or cultural context, particularly when invitations are delivered through standard GP systems.

4.2.2 Comparing findings with wider evidence

Our study suggests that uptake of NHS Health Checks varies across ethnic groups and may plausibly be influenced by cultural, social, and practical factors rather than eligibility alone, but it also provides new insights into ethnic-specific patterns within Birmingham. Uptake ranged from 6.7% in the Arab group to 87.5% among Ghanaian participants, showing wider variation than previously reported

nationally. These local differences suggest that national averages may mask substantial inequities. Tailored interventions such as translated materials, community outreach through trusted networks, flexible appointments, and culturally sensitive messaging are particularly critical for groups with the lowest engagement and should be informed by local community dynamics ([20]; Office for Health Improvement and Disparities, [17]).

4.2.3 Implications

The pronounced differences in NHS Health Check uptake across ethnic groups indicate that a "one-size-fits-all" approach is inadequate. Our Birmingham data show that some minority communities engage far more than others, highlighting the need for community-centred, culturally tailored strategies. These approaches could include outreach via trusted local networks, translated materials, and flexible appointments. Understanding local patterns is critical, as national averages may obscure substantial variations in attitudes, awareness, and trust in health services, particularly in diverse urban populations.

4.3 Future research

Building on these findings, future studies should explore longitudinal patterns of NHS Health Check engagement within diverse urban populations to understand how awareness, attitudes, and behaviours evolve over time. Research could evaluate whether repeated, culturally tailored invitations improve uptake and whether these approaches reduce long-term disparities in preventable diseases. Patient-centred qualitative work is also needed to examine experiences, expectations, and continuity of care after attendance. Finally, interventions co-designed with local community networks could test whether health-literacy-focused strategies enhance participation among underrepresented groups.

4.4 Limitations

This study has some limitations. Some ethnic groups had very few participants, which makes it harder to be sure about the results for those groups. The study only looked at people in Birmingham (UK), so the findings may not apply to other areas. We measured attendance at one point in time, so we cannot show how patterns change over time. We also did not collect detailed information about why people did or did not attend, and other factors like income or previous health experiences may have influenced results. Cultural, social, and structural determinants of engagement were not directly measured in this study; therefore, interpretations relating to these factors are based on existing literature and should be viewed as plausible explanations rather than causal mechanisms. The cross-sectional design limits the ability to determine why these ethnic differences in NHS Health Check uptake occur, as it captures patterns at a single point in time rather than changes or underlying causal factors.

5 Conclusion

This study demonstrates that NHS Health Check uptake among ethnic minority groups in Birmingham is highly uneven, with substantial differences between communities. Although many adults were eligible for the programme, only a small proportion attended, and eligibility alone did not predict participation. Uptake varied widely across the ten ethnic groups studied, and gender showed little influence compared with the strong role of ethnicity. These findings reinforce national evidence that cultural, social and practical barriers may continue to shape engagement with preventive health programmes. Addressing these inequalities will require community-centred, culturally tailored approaches that improve awareness, trust and accessibility, ensuring that the NHS Health Check reaches the groups who stand to benefit the most.

Appendix 1

See Table 8.

Table 8 Ethnicity-based descriptive data used for correlation analysis

Ethnicity	Male	Female	Mean age	NHS Health Check Eligible (Age 40–74)	Approaching age 40	Had NHS Health Check
Arabs	7	10	52.59	15	2	1
Bangladeshi	9	12	50	18	3	4
Black Caribbean	9	9	47.56	15	3	3
Chinese	7	9	58.44	15	1	6
Ghanaian	8	6	42	8	6	7
Indian	8	12	62.1	20	0	2
Nigerian	7	13	49.05	17	3	8
Pakistani	12	12	52.46	20	4	8
Somalian	10	10	51.35	17	3	4
White British	6	4	55.6	8	2	2
Grand Total = 10 Ethnic Groups	83	97	All Groups Mean Age: 52.11	153	27	45

Appendix 2

See Table 9.

Table 9 Descriptive statistics for each group

Group	Mean	*N*	Std. deviation	Std. error mean
Males	8.3	10	1.8	0.6
Males Who Had NHS Health Check	1.9	10	1.4	0.4
Females	9.7	10	2.9	0.9
Females Who Had NHS Health Check	2.6	10	1.3	0.4

Appendix 3

See Table 10.

Table 10 Uptake status by ethnicity

		Uptake status		Total
		Eligible	Uptake	
Ethnicity				
Arabs	Count	14	1	15
	Expected Count	10.6	4.4	15.0
	% within Ethnicity	93.3%	6.7%	100.0%
Bangladeshi	Count	14	4	18
	Expected Count	12.7	5.3	18.0
	% within Ethnicity	77.8%	22.2%	100.0%
Black Caribbean	Count	12	3	15
	Expected Count	10.6	4.4	15.0
	% within Ethnicity	80.0%	20.0%	100.0%
Chinese	Count	9	6	15
	Expected Count	10.6	4.4	15.0
	% within Ethnicity	60.0%	40.0%	100.0%
Ghanaian	Count	1	7	8
	Expected Count	5.6	2.4	8.0
	% within Ethnicity	12.5%	87.5%	100.0%
Indian	Count	18	2	20
	Expected Count	14.1	5.9	20.0
	% within Ethnicity	90.0%	10.0%	100.0%
Nigerian	Count	9	8	17
	Expected Count	12.0	5.0	17.0
	% within Ethnicity	52.9%	47.1%	100.0%
Pakistani	Count	12	8	20
	Expected Count	14.1	5.9	20.0
	% within Ethnicity	60.0%	40.0%	100.0%
Somalian	Count	13	4	17
	Expected Count	12.0	5.0	17.0
	% within Ethnicity	76.5%	23.5%	100.0%
White British	Count	6	2	8
	Expected Count	5.6	2.4	8.0
	% within Ethnicity	75.0%	25.0%	100.0%
Total	Count	108	45	153
	Expected Count	108.0	45.0	153.0
	% within Ethnicity	70.6%	29.4%	100.0%

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Author contributions
Muhammad Hossain is the project lead and conceived the study. Muhammad Hossain and Ayazuallh Safi conducted the research. Jadhakhan Ferozkhan performed the data analysis and contributed to drafting, reviewing, and revising the manuscript. All authors read and approved the final version of the manuscript.

Data availability
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interests

The authors declare no competing interests.

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