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RESEARCH ARTICLE

Participation in population-based eye health surveys is lower but more gender-balanced in high- compared to low- and middle-income countries

[version 1; peer review: 1 approved with reservations]

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Abstract

Background

Population-based eye health surveys are an important source of evidence describing the eye health needs of a population, although differences in participation rates between population groups may lead to response bias. In some high-income settings, participation in surveys has decreased over time, although whether this has occurred for eye health surveys is unclear. The aim of this study was to compare participation in population-based eye health surveys conducted over the previous ~20 years between country income levels and different population sub-groups.

Methods

Participation rates were extracted from an existing database of all population-based eye health surveys undertaken anywhere in the world between 2000–2023 that estimated the prevalence of vision impairment. Overall participation and participation rates disaggregated between population groups (identified using the PROGRESS+ framework) were extracted and compared between country income levels.

Results

Open Peer Review

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1. **Daniela Oehring**, University of Plymouth, Plymouth, UK

Any reports and responses or comments on the article can be found at the end of the article.

Participation was reported by 374 (86.6%) of the 432 included eye health surveys, was generally high (median=89.5%, interquartile range [IQR]: 81.1-94.6%) and did not change over the study period. Participation was lowest in high-income countries (79.2%, IQR 70.4-90.0%). Just over one-quarter of studies (n=125, 28.9%) disaggregated participation by gender/sex. In these studies, women were more likely to participate than men in low income (women: 90.5%, IQR 75.3-96.2 vs men: 86.8%, IQR 59.1-90.1%), lower-middle income (92.2%, IQR 86.1-95.5% vs 88.8%, IQR 80.1-93.4%), and upper-middle income (91.2%, IQR 85.8-94.6% vs 86.3%, IQR 77.4-90.1%) countries, but not in high-income countries where participation was similar (87.9%, IQR 80.8-95.4% vs 89.3%, IQR 79.1-92.9%). Participation rates disaggregated by age were reported by 68 surveys (15.7%) and participation was not significantly associated with age. Participation disaggregated between other population sub-groups was infrequently reported (<10% of surveys) and could not be meaningfully compared.

Conclusions

Researchers could consider alternative recruitment strategies that achieve better participation in high income countries and for men in low- and middle-income countries.

Plain language summary

Good eye health is essential for well-being and many countries are working to improve eye health services for everyone. To achieve this, policy makers often rely on information gathered from eye health surveys that estimate how many people need eye health services in their population. Ideally, these surveys would include people from all relevant population groups, and specific recruitment strategies may be required to achieve this.

We assessed the participation rates reported in eye health surveys that were conducted anywhere in the world and published between 2000-2023. Participation in eye health surveys did not change over this period but was lower in surveys conducted in high-income countries compared to those conducted in middle- or low-income countries. Women were more likely to participate in eye health surveys than men, although this difference was not observed in high-income countries. These differences in participation between men and women might be explained by women being more likely to be home when recruitment takes place, possibly due to men being away from the household involved in employment or education activities. Researchers could modify the way they invite participants into eye health surveys to achieve better participation.

Keywords

Eye health, population-based survey, participation, response rate, epidemiology

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Author roles: Goodman L: Formal Analysis, Investigation, Methodology, Project Administration, Visualization, Writing – Original Draft Preparation; **Turnbull P**: Formal Analysis, Visualization, Writing – Review & Editing; **McCormick I**: Methodology, Writing – Review & Editing; **Ewuru D**: Investigation, Writing – Review & Editing; **Evans JR**: Methodology, Writing – Review & Editing; **Burton MJ**: Methodology, Writing – Review & Editing; **Ramke J**: Conceptualization, Methodology, Supervision, Writing – Review & Editing

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Introduction

In recent years, the World Health Organization and the United Nations have placed increased emphasis on eye health in their efforts to reduce global health disparities[1,2]. Policymakers who are working to improve eye health in their country require evidence describing the eye health needs of the population[1,3]. One important source of evidence is from population-based health surveys[4], which are used to estimate the prevalence of vision impairment (from all causes or from specific conditions such as cataract) and to assess whether current services are providing effective coverage for that condition[5,6].

Population-based surveys employ specific methods to obtain a sample of participants who are (ideally) representative of the target population[4]. This is typically achieved using door-to-door enumeration to identify all eligible individuals and comparably high participation across all population groups is considered essential to reduce response bias[7]. To help avoid response bias, researchers could consider which population groups may be less likely to participate in a particular setting, so that enabling sampling and recruitment methods can be used[8].

In some high-income settings, participation in population-based health surveys has declined over time[9,10] although whether participation specifically in eye health surveys varies between country income level or between population groups is unclear. The recent Lancet Commission on Global Eye Health called for strengthening of survey methodology to provide robust evidence to inform planning[3]. To this end, we have used data from a recent systematic review of population-based eye health surveys[11], to summarize participation in population-based eye health surveys published since January 2000 across country income levels, and between different population groups.

Methods

This study was conducted using a database developed during a recently published systematic methodological review[11]. In brief, the database includes studies that used population-level sampling to estimate the prevalence of vision impairment and/or blindness at a national or sub-national level, published between 2000 and the search date (November 2023). To construct this database, we used the PROGRESS+ framework adopted by Cochrane Collaboration Equity Methods Group to identify and classify population groups[12] (P = Place of residence; R = race/ethnicity/culture/language; O = Occupation; G = gender/sex; R = Religion; E = Education; S = Socioeconomic status; S = Social Capital, "+" was limited to age ["+Age"] and disability ["+Disability]). These results describe additional data collected as part of a systematic methodological review[11]. As no official reporting guideline was available for methodological reviews, we based our review design on the limited guidance available[13,14].

Data extraction

Data describing the survey scope and the survey design were available from the existing database[11]. For this analysis we extracted overall participation (%), and disaggregated participation where the population group could be categorized within any of the PROGRESS+ domains. Where possible we calculated participation when this was not directly reported as a percentage value. We included all reported overall participation percentages regardless of the definition (e.g. number who agreed to participate, number who received an examination, or not clearly defined). Data extraction was performed independently by two reviewers using Covidence (Veritas Health Innovation, Melbourne, Australia. Available at www.covidence.org), and consensus, data cleaning, and synthesis was performed by one reviewer (LG) with discussion with another (JR) as required.

In reporting our results, we used the number of individual surveys conducted as the denominator. i.e. while one publication usually reported results from one survey, some surveys were reported across multiple publications, and in these instances only one overall participation value was included from the most complete dataset available. For reports describing more than one survey (e.g. surveys conducted separately in different countries or separate districts within a country; a baseline survey and a follow-up survey conducted at different times) the participation of each were included.

Analysis

We categorized each surveyed country by its income level (either low income, lower-middle income, upper-middle income, or high income), as defined by the 2024 World Bank Country and Lending Groups criteria)[15]. Participation in each study was reported as a percentage in each study and summarised across studies as the median and inter-quartile range. We compared participation between survey designs (rapid assessment of avoidable blindness (RAAB)[16] vs other design) and survey scope (multi-national or national vs sub-national) using the Wilcoxon rank-sum test.

Where sufficient data was available, we compared participation rates between the main population groups within each PROGRESS+ domain (e.g. men versus women: Gender/sex) using the Wilcoxon signed-rank test. For the surveys disaggregating participation within the Gender/sex domain, we calculated the participation difference between women and men (female – male). Ordinal regression was used to model the relationship between overall participation rates, or the difference in participation rates between women and men, with country income levels. A linear mixed effects model was created to estimate participation rate by age (using the mean of each age category), with random intercepts for each study. The relationship between participation over time was modelled using beta regression[17]. Statistical significance was defined as $p<0.05$. Statistical tests were performed in R (version 4.3.1, available from www.r-project.org/) using R Studio (2023.06.1, available from www.posit.co).

Results

Four hundred and thirty-two surveys were included in this analysis, and 26.2% (n=113) were rapid assessments (Table 1). Three hundred and seventy-four surveys (86.6%) reported overall participation, and the median participation reported by these surveys was 89.5% (interquartile range [IQR]: 81.1–94.6%). Participation was higher in rapid assessments (95.2%, IQR 92.5–97.0%) compared to other survey designs (86.1%, IQR 78.1–91.4%; $p<0.001$). There was no difference in participation between national (90.9%, IQR 82.0-95.4%) compared to sub-national surveys (89.1%, IQR 81.2-94.0%; p=0.23).

Overall participation was lower in high-income countries (79.2%, IQR 70.4–90.0%) compared to upper-middle (89.4%, IQR 80.8–93.7%), lower-middle (91.3%, IQR 86.7–95.4%), and low-income countries (93.5%, IQR 85.8–96.9%; Table 1; Figure 1A). Modelled overall participation decreased by 4.5% with each higher income level (t = 4.5, p<0.001; Figure 1A).

One hundred and forty-nine surveys (34.5%) disaggregated participation within PROGRESS+ domains (Table 2). Participation rates were most commonly disaggregated by

Table 1. Participation rates of included eye health surveys by survey characteristics.

Survey characteristic	Included surveys N=432		Participation		
	n	%	Median	IQR	p-value
Surveys reporting participation	**374**	**86.6**	**89.5**	**81.1–94.625**	
Country income level					p<0.001*[a]
High income	76	17.6	79.2	70.4–90.0	
Upper middle income	147	34.0	89.4	80.8–93.7	
Lower middle income	175	40.5	91.3	86.7–95.4	
Low income	34	7.9	93.5	85.8–96.9	
Survey design					<0.05*[b]
RAAB	113	26.2	95.2	92.5–97.0	
non-RAAB	319	73.8	86.1	78.1–91.4	
Scope					p=0.23[b]
National/multi-national	95	22.0	90.9	82–95.4	
Sub-national	337	78.0	89.1	81.2–94.0	

*The number of surveys is described as % of included surveys (N=432). *Indicates statistical significance between groups using the Kruskal-Wallis test[a], or Wilcoxon rank-sum test[b].*

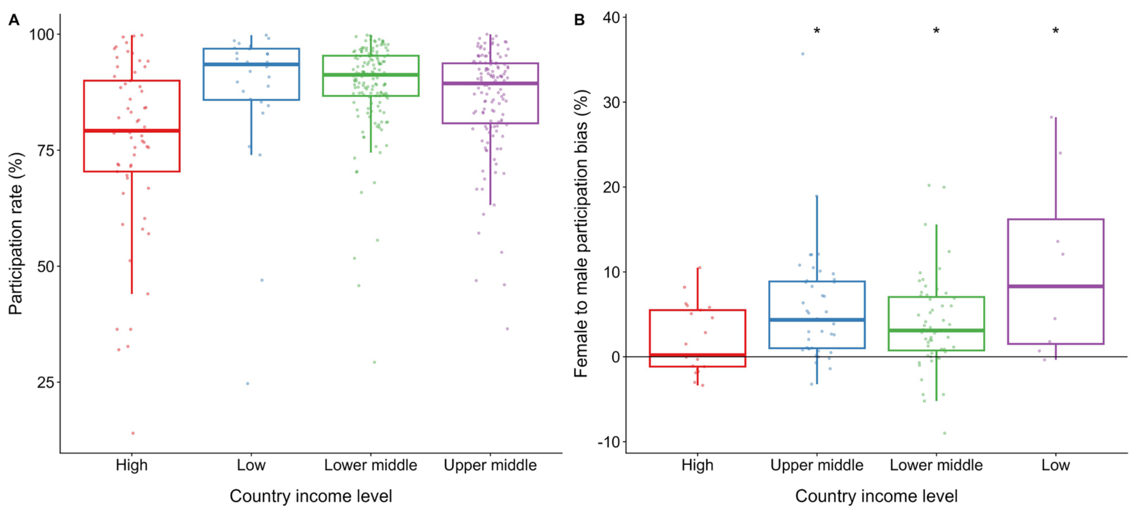

Figure 1. Participation rates reported by included eye health surveys grouped by World Bank country income levels. (**A**) Overall participation rates: Participation increased by 4.5% with each decreasing income level category (n=374 surveys, ordinal regression: t = 4.5, p<0.001). (**B**) Difference in participation between women and men, where values greater than zero indicate higher participation by women. Differences in participation between men and women increased by 4.4% with each decreasing income level category (n=125 surveys that disaggregated participation by Gender/sex, ordinal regression: t=1.55, p<0.001). Box plots indicate median, upper and lower quartiles, with whiskers extending to 1.5 times the interquartile range.

Table 2. Reporting of participation rates by each PROGRESS+ domain.

PROGRESS+ domain	Included surveys N=432	
	n	%
Surveys disaggregating participation by at least one domain	149	34.5
Place of residence	31	7.2
Race/ethnicity	13	3.0
Occupation	9	2.1
Gender/sex	125	28.9
Religion	0	0
Education	40	9.3
Socioeconomic status	13	3.0
Social capital	5	1.2
+Disability	0	0
+Age	68	15.7

The number of surveys is described as % of included surveys (N=432).

Gender/sex (n=125, 28.9%; Table 2) and were higher in women compared to men (women: 91.7% [IQR 85.2–95.4%]; men: 87.4% [IQR 77.6–92.5%]; p<0.001). The modelled difference in participation between men and women increased by 4.4% with decreasing country income levels (t=1.55, p<0.001; Figure 1B). The largest differences were observed in low-income countries (women: 90.5%, IQR 75.3–96.2 vs men: 86.8%, IQR 59.1–90.1%), followed by lower-middle (92.2%, IQR 86.1–95.5% vs 88.8%, IQR 80.1–93.4%) and upper-middle (91.2%, IQR 85.8–94.6% vs 86.3%, IQR 77.4–90.1%) income countries, whereas participation in high-income countries was more similar (87.9%, IQR 80.8-95.4% vs 89.3%, IQR 79.1–92.9%). Sixty-eight (15.7%) surveys disaggregated participation rates by +Age, but there was no effect of age on participation rate, t=-0.93 p=0.355).

Participation was less frequently disaggregated by Education (n=40, 9.3%) or Place of residence (n=31, 7.2%), and infrequently by the other PROGRESS+ domains (less than 3% of publications; Table 2). No further analysis was performed comparing participation within any of these PROGRESS+ domains. There was no change in participation between surveys published between the year 2000 to 2023 (p=0.42).

Discussion

We have used a database of national and sub-national population eye health surveys published globally since 2000[11], and observed no change in participation over this period. However, participation was lower in surveys conducted in high-income countries compared to those conducted in middle, lower-middle, and low-income countries. This could be explained by differences in the survey design[10] as rapid assessments are more commonly conducted in low- or middle-income countries and achieve higher participation than other survey designs (presumably by offering participants the convenience of data collection at the point of recruitment—usually within their own home)[16]. Furthermore, as vision impairment disproportionately affects people in underserved areas of low- and middle-income countries[18,19], people in these settings may perceive more benefits from participating in an eye health survey (e.g. access to an eye examination), compared to those in high-income countries who may be already be connected with eye care services[20].

Our analysis highlights how the social inequities experienced by women can be reflected by their participation within population-level eye health surveys. We observed a tendency for greater participation by females (as previously described)[21] in countries with lower levels of income which was not present in high-income countries. This may be explained by lower participation by women in paid employment in low- and middle- compared to high-income countries[22], meaning they are more likely to be at home during the door-to-door enumeration step of a population-based survey. For the same reason participation in eye health surveys could also be higher in rural areas—where self-employment and presumably working from home is more likely[23]—however there was insufficient data for us to explore participation by rurality here. To address this, strategies could be included in surveys to enable participation by employed people, such as offering appointments outside of work hours[24].

The main limitation of our study is that we included all reported participation rates, regardless of their definition, which may have increased variance within the data. We also compared participation between specific population groups but did not assess the representativeness of the final sample, and we acknowledge that recruitment efforts by the researchers may have reduced the potential for response bias. Finally, while we observed no effect of age on participation rate, increased reporting of disaggregated participation rates could reveal differences between age groups that were not detected within this sample. For example, older age groups may be more likely than younger age groups to be home during survey recruitment, and to see value in participating. Therefore, we recognise the importance of researchers conducting appropriate post-survey adjustments to the data, such as sex- and age-weighting to account for differential participation in the survey compared to the target population groups[18,19].

In conclusion, eye health surveys in high-income countries have achieved lower participation compared to other settings but experienced less disparity in participation between women and men, possibly due to less gender disparity in paid employment. While reduced participation does not necessarily lead to response bias[7,25], in settings where overall participation is low or is likely to differ between population groups, researchers could consider what strategies and resources would enable higher participation[26,27]. If researchers more often reported participation across priority population groups[28], recruitment strategies could be more often tailored to enable higher participation in routinely under-represented groups[11]. In high income countries, alternative methods of recruitment may need to be explored to achieve higher response rates.

Ethics and consent
This is an analysis of published studies, and no ethics approval or consent was required.

Data availability
Open Science Framework repository: Participation in population-based eye health surveys is lower but more gender-balanced in high- compared to low- and middle-income countries: https://doi.org/10.17605/OSF.IO/K68ME[29]

This project contains the following underlying data:

- Participation rate data_OSF.xlsx: a list of population-based eye health surveys included in this analysis, and the raw data extracted from each survey.

Author contributions
LG: investigation, methodology, project administration, formal analysis, visualization, writing – original draft preparation

PT: formal analysis, visualization, writing – review and editing

IM: methodology, writing – review and editing

DE: investigation, writing – review and editing

JRE: methodology, writing – review and editing

MJB: methodology, writing – review and editing

JR: conceptualization, methodology, supervision, writing – review and editing

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Supplementary material
None

References

1. World Health Organization: **World report on vision**. World Health Organization Geneva, 2019.
Reference Source
2. World Health Assembly: **Integrated people-centred eye care, including preventable vision impairment and blindness.** Global Targets for 2030. A74/9 Add.3. World Health Assembly, Geneva, 2021.
Reference Source
3. Burton MJ, Ramke J, Marques AP, *et al.*: **The *Lancet global health* commission**

on global eye health: vision beyond 2020. *Lancet Glob Health.* 2021; **9**(4): e489–e551.
PubMed Abstract | Publisher Full Text | Free Full Text

4. Margozzini P, Tolonen H, Bernabe-Ortiz A, *et al.*: **National health examination surveys; a source of critical data.** *Bull World Health Organ.* 2024; **102**(8): 588–599.
PubMed Abstract | Publisher Full Text | Free Full Text

5. Keel S, Müller A, Block S, *et al.*: **Keeping an eye on eye care: monitoring progress towards effective coverage.** *Lancet Glob Health.* 2021; **9**(10): e1460–e1464.
PubMed Abstract | Publisher Full Text | Free Full Text

6. World Health Organization: **Eye Care Indicator Menu (ECIM): a tool for monitoring strategies and actions for eye care provision.** Geneva, 2022.
Reference Source

7. Groves RM, Peytcheva E: **The impact of nonresponse rates on nonresponse bias: a meta-analysis.** *Public Opin Q.* 2008; **72**(2): 167–189.
Publisher Full Text

8. Tolonen H, Ahonen S, Jentoft S, *et al.*: **Differences in participation rates and lessons learned about recruitment of participants – the European Health Examination Survey Pilot Project.** *Scand J Public Health.* 2015; **43**(2): 212–219.
PubMed Abstract | Publisher Full Text

9. De Leeuw E, Hox J, Luiten A: **International nonresponse trends across countries and years: an analysis of 36 years of labour force survey data | Survey Methods: Insights from the Field (SMIF).** *Survey Insights: Methods from the Field.* 2018.
Publisher Full Text

10. Luiten A, Hox J, de Leeuw E: **Survey nonresponse trends and fieldwork effort in the 21st century: results of an international study across countries and surveys.** *J Off Stat.* 2020; **36**(3): 469–487.
Publisher Full Text

11. Goodman L, Reis T, Zhang JH, *et al.*: **Underserved groups could be better considered within population-based eye health surveys: a methodological study.** *J Clin Epidemiol.* 2024; **173**: 111444.
PubMed Abstract | Publisher Full Text

12. O'Neill J, Tabish H, Welch V, *et al.*: **Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health.** *J Clin Epidemiol.* 2014; **67**(1): 56–64.
PubMed Abstract | Publisher Full Text

13. Mbuagbaw L, Lawson DO, Puljak L, *et al.*: **A tutorial on methodological studies: the what, when, how and why.** *BMC Med Res Methodol.* 2020; **20**(1): 226.
PubMed Abstract | Publisher Full Text | Free Full Text

14. Lawson DO, Puljak L, Pieper D, *et al.*: **Reporting of methodological studies in health research: a protocol for the development of the MethodologIcal STudy reportIng Checklist (MISTIC).** *BMJ Open.* 2020; **10**(12): e040478.
PubMed Abstract | Publisher Full Text | Free Full Text

15. The World Bank: **World bank country and lending groups**. 2024.
Reference Source

16. McCormick I, Butcher R, Ramke J, *et al.*: **The Rapid Assessment of Avoidable Blindness survey: review of the methodology and protocol for the seventh version (RAAB7) [version 1; peer review: 2 approved].** *Wellcome Open Res.* 2024; **9**: 133.
PubMed Abstract | Publisher Full Text | Free Full Text

17. Ferrari S, Cribari-Neto F: **Beta regression for modelling rates and proportions.** *J Appl Stat.* 2004; **31**(7): 799–815.
Publisher Full Text

18. GBD 2019 Blindness and Vision Impairment Collaborators, Vision Loss Expert Group of the Global Burden of Disease Study: **Causes of blindness and vision impairment in 2020 and trends over 30 years, and prevalence of avoidable blindness in relation to VISION 2020: the Right to Sight: an analysis for the Global Burden of Disease Study.** *Lancet Glob Health.* 2021; **9**(2): e144–e160.
PubMed Abstract | Publisher Full Text | Free Full Text

19. GBD 2019 Blindness and Vision Impairment Collaborators, Vision Loss Expert Group of the Global Burden of Disease Study: **Trends in prevalence of blindness and distance and near vision impairment over 30 years: an analysis for the Global Burden of Disease Study.** *Lancet Glob Health.* 2021; **9**(2): e130–e143.
PubMed Abstract | Publisher Full Text | Free Full Text

20. AlThani M, Abdulmalik M, AlAbdulla S, *et al.*: **Prevalence and causes of blindness and vision impairment in the state of Qatar: results of a population-based cross-sectional study.** *Ophthalmic Res.* 2025; **68**(1): 137–145.
PubMed Abstract | Publisher Full Text | Free Full Text

21. Mindell JS, Giampaoli S, Goesswald A, *et al.*: **Sample selection, recruitment and participation rates in health examination surveys in Europe - experience from seven national surveys.** *BMC Med Res Methodol.* 2015; **15**: 78.
PubMed Abstract | Publisher Full Text | Free Full Text

22. International Labour Organization: **World employment and social outlook: trends for women**. 2017.
Reference Source

23. Ananian S, Dellaferrera G: **Employment and wage disparities between rural and urban areas.** ILO Working Paper 107. ILO Geneva, 2024.
Reference Source

24. Mindell J, Aresu M, Bécares L, *et al.*: **Representativeness of participants in a cross-sectional health survey by time of day and day of week of data collection.** *Eur J Public Health.* 2012; **22**(3): 364–369.
PubMed Abstract | Publisher Full Text

25. Kypri K, Stephenson S, Langley J: **Assessment of nonresponse bias in an internet survey of alcohol use.** *Alcohol Clin Exp Res.* 2004; **28**(4): 630–634.
PubMed Abstract | Publisher Full Text

26. Messiah A, Castro G, de la Vega PR, *et al.*: **Random sample community-based health surveys: does the effort to reach participants matter?** *BMJ Open.* 2014; **4**(12): e005791.
PubMed Abstract | Publisher Full Text | Free Full Text

27. Keeter S, Miller C, Kohut A, *et al.*: **Consequences of reducing nonresponse in a national telephone survey.** *Public Opin Q.* 2000; **64**(2): 125–148.
PubMed Abstract | Publisher Full Text

28. Ramke J, Palagyi A, Kuper H, *et al.*: **Assessment of response bias is neglected in cross-sectional blindness prevalence surveys: a review of recent surveys in Low- and Middle-Income Countries.** *Ophthalmic Epidemiol.* 2018; **25**(5–6): 379–385.
PubMed Abstract | Publisher Full Text

29. Goodman L, Turnbull P, McCormick I, *et al.*: **Participation in population-based eye health surveys is lower but more gender-balanced in High- compared to Low- and Middle-Income Countries**. 2025.
http://www.doi.org/10.17605/OSF.IO/K68ME

Open Peer Review

Current Peer Review Status: ?

Version 1

Reviewer Report 14 May 2025

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? **Daniela Oehring**
University of Plymouth, Plymouth, UK

In a nutshell: The authors compiled 432 population-based eye-health surveys (2000–2023) from a recently published methodological database and compared participation rates across World Bank income groups and PROGRESS+ sub-populations. Median participation was high overall (89.5 %), but markedly lower in high-income countries (79.2 %). Women participated more than men in low- and middle-income settings, whereas gender differences were minimal in high-income settings. Age, and other PROGRESS+ domains, were rarely reported. The authors recommend alternative recruitment strategies to raise participation in high-income countries and among men in lower-income settings.

Major comments:
Heterogeneous definitions of “participation”**.** Studies variously defined the numerator (e.g., “agreed”, “examined”, “completed”), yet all percentages were pooled without adjustment. This compromises comparability.
- Provide a clear operational definition and re-analyse using only comparable definitions, or perform sensitivity analyses stratified by definition. - Report the proportion of surveys in each definitional category

Potential selection bias from non-reporting surveys. Only 374/432 (86.6 %) surveys reported participation. If non-reporting is systematic, results may be biased.- Compare characteristics of reporting versus non-reporting surveys.
- Consider multiple-imputation or inverse-probability weighting to assess robustness.

Income classification fixed to 2024 status. Countries change income category over two decades. Applying 2024 categories retrospectively may misclassify surveys (e.g., China and India were lower-income in early 2000s).
- Re-classify each survey using the World Bank category current in the survey year, or present a sensitivity analysis showing the impact of re-classification.

Participation is a bounded proportion; median/IQR summarisation ignores study size, while

ordinal regression on medians assumes proportional odds.
- Use meta-analytic techniques with logit-transformed proportions, weighting by study size (random-effects).
- For gender differences, model paired differences with a mixed-effects meta-analysis.

Factors such as urban/rural setting, sampling strategy, contact modality, incentives, and survey length affect participation.
- Extract and tabulate these variables where available; include them in meta-regression.
- Discuss residual heterogeneity (I^2 or τ^2).

Age analysis under-powered and unclearly specified. Only 68 surveys provided age-specific participation; the mixed-effects model parameters are not reported.
- Present the fixed and random effects estimates with 95 % CIs, model fit statistics, and a figure depicting predicted participation by age.

A systematic methodological review should appraise the quality of reporting and risk of bias.
- Apply an established tool for prevalence studies (e.g., Hoy et al.) and include results in supplementary material.

The discussion would benefit from citing recent work highlighting declining survey response rates in high-income countries and under-representation of marginalised groups in eye-health surveys.
- Integrate these findings to contextualise the observed patterns and strengthen the rationale for targeted recruitment strategies.

Data are shared, but analytical code is not.
- Deposit the R scripts (including packages and sessionInfo) in the OSF repository and cite the DOI in the manuscript.

The authors attribute gender differences primarily to employment patterns, yet no employment data were analysed.
- Re-phrase speculative explanations, or support them with external evidence; clearly distinguish hypothesis from data-driven inference.

Minor comments

1. Although no guideline exists for methodological reviews, PRISMA-2020 items, STROBE, and the forthcoming PRISMA-ScR checklist contain relevant elements align formatting and flow accordingly.
2. The PROGRESS+ acronym repeats “R”; use the widely accepted “PaRticipation” instead of “Social capital” for the second “S”, and define “+” explicitly (age and disability).
3. Figure 1: Add 95 % confidence intervals around medians to convey uncertainty; consider a funnel plot to assess publication/reporting bias.
4. Table 2: Provide absolute numbers alongside percentages for clarity.
5. Editorial: Standardise “lower-middle-income” versus “lower middle income”; correct minor typographical errors (e.g., “RAAB16 vs other design” should include a space before “vs”).
6. Ethics statement: Include the OSF registration date and provide the systematic-review protocol URL (if registered).

The manuscript addresses an important question for global eye-health monitoring and provides the first global synthesis of participation rates in eye-health surveys. With the methodological clarifications and additional analyses outlined above, the study will make a valuable contribution to evidence-based survey design. At present, heterogeneity in the definition of participation, potential bias from non-reporting studies, and limitations of the statistical approach temper the strength of the conclusions. Addressing Major comments 1 to 4 is essential for scientific soundness; the remaining points will further enhance transparency and usefulness.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Eye and vision science, Visual systems and translational science, Medical Law and Ethics, Statistics.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.