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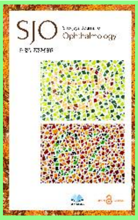

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Association between Gender and Utilization of Cataract Surgical Services: A Systematic Review and Meta-Analysis

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A B S T R A C T

Introduction: Cataract is the most prevalent cause of blindness worldwide, which can be effectively treated with surgery. The high incidence of blindness in women highlights the need to address gender inequality in the utilization of cataract surgery. This study aimed to assess the association between gender and the utilization of cataract surgical services. **Methods:** A systematic review and meta-analysis were conducted according to preferred reporting items for systematic review and meta-analysis (PRISMA) guidelines. A literature search was performed on PubMed and ProQuest in the last 10 years (2012 to 2022). The search strategy used the following terms: ("cataract surgical" or "cataract surgical coverage" or "cataract surgical uptake") and ("sex" or "gender"). Data were analyzed in RevMan 5.3, with pooled effect estimates reported as OR with a 95% confidence interval (CI). **Results:** A total of 13 articles were identified and included in the meta-analysis. The pooled results of these studies indicate a statistically significant association between gender and the utilization of cataract surgery, with a lower utilization probability, observed among women compared to men (OR 0.76, 95% CI 0.60-0.98, p=0.03). High heterogeneity was observed among studies (I^2 89%, p<0.0001). **Conclusion:** There is an association between gender and the utilization of cataract surgical services, with women being less likely than men to use cataract surgical services.

1. Introduction

A cataract is the most common cause of blindness in the world.[1] Blindness inherently results in a reduced quality of life, thereby causing a substantial economic burden on the global economy.[2] Surgery is currently the sole effective approach for treating cataracts. Cataract surgery enhances the vision-related quality of life by enabling increased social engagement and removing limitations on work-related tasks.

By 2030, all nations should aim to achieve equality in enhancing effective cataract surgery coverage across all populations.[3] Countries with a baseline effective cataract surgery coverage of 70% or more should strive to achieve universal coverage. The attainment of equality in all populations is associated with various factors that impact the utilization of cataract surgical services, including gender.

In many countries worldwide, there has been documented evidence of a gender disparity in access to cataract surgical services. The high incidence of blindness among women requires addressing gender inequality in the utilization of cataract surgery.[4] Previous studies have investigated this issue in specific countries or regions, but a systematic analysis evaluating this association on a global scale is currently lacking.[5-7] This study aimed to assess the association between gender and the utilization of cataract surgical services.

2. Methods

PubMed and ProQuest databases were used in this systematic review to identify articles published from January 2012 to December 2022, using specific search terms related to gender and cataract surgery. The keywords are ("Cataract surgical" OR "cataract surgical coverage" OR "cataract surgical uptake") AND ("sex" OR "gender"). This study followed the preferred reporting items for systematic review and meta-analysis (PRISMA) guidelines, which included conducting a search, identification, screening, and feasibility process.

Studies were included for analysis if they met the following criteria; the literature was published in English, performed from January 2012 to December 2022, conducted in a general adult population, and reported an odd ratio or the number of cataract surgery performed and the number requiring cataract surgery. Published studies in the form of letters, editorials, abstracts, or those with inadequate data, were excluded.

For each study, the following information was collected; first author's name, country, year of publication, study design, sample size, p-value, and odd ratio (females over males). The quality assessment of each article was conducted using the Joanna Briggs Institute (JBI) instrument, which includes eight items on a scale.[8] Articles with a low risk of bias were included in the meta-analysis.

After data extraction, the odd ratio (OR) values of each study were entered into the RevMan 5.3 software. The statistic for heterogeneity between studies was tested, and if the heterogeneity was significant and or high (p-value < 0.10 and/or $I2 \geq 50\%$), the random effects model was used. Otherwise, the fixed effect model was adopted (if the statistic for heterogeneity was not significant and/or low, meaning p-value > 0.10 and/or $I2 < 50\%$). A funnel plot was used to assess publication bias.

3. Results

The initial search yielded 141 articles from the PubMed database and 998 articles from the ProQuest database, resulting in a total of 1139 articles. After removing duplicates, a total of 1,071 articles were screened for the title and abstract review. From 277 screened articles, we had 113 potentially eligible studies that underwent full-text review. One hundred papers were excluded: 64 due to inadequate data or no odd ratio information, 16 published before 2012, and 20 with unsuitable research methodology. Finally, 13 articles were included in the meta-analysis.[9-21] The study selection process is depicted in figure 1 of the PRISMA flow diagram.

Table 1 presents the characteristics of the studies used in this systematic review, including the first author's name, country, published year, study design, sample size, p-value, and odd ratio. Among 13 articles, Syed et al reported three studies from three different countries and samples: Bangladesh, Kenya, and Philippines.[17] Therefore, a total of 15 studies from 13 articles were obtained, representing 9 countries, including Nigeria, Timor-Leste, India, Sri Lanka, China, Korea, Kenya, Bangladesh, and Philippines. All studies were categorized as having a low risk of bias, as shown in Table 2.

Meta-analysis was performed for 15 studies, with the pooled effect estimates reported as the odd ratio (OR) with a 95% confidence interval (CI). The meta-analysis of cataract surgery utilization by gender revealed a pooled OR of 0.76 (95% CI: 0.60–0.98) with a p-value of 0.03 for female use of cataract surgery compared with males (Figure 2). The heterogeneity was significant ($p<0.0001$ and I^2 89%), and a random effect model was used.

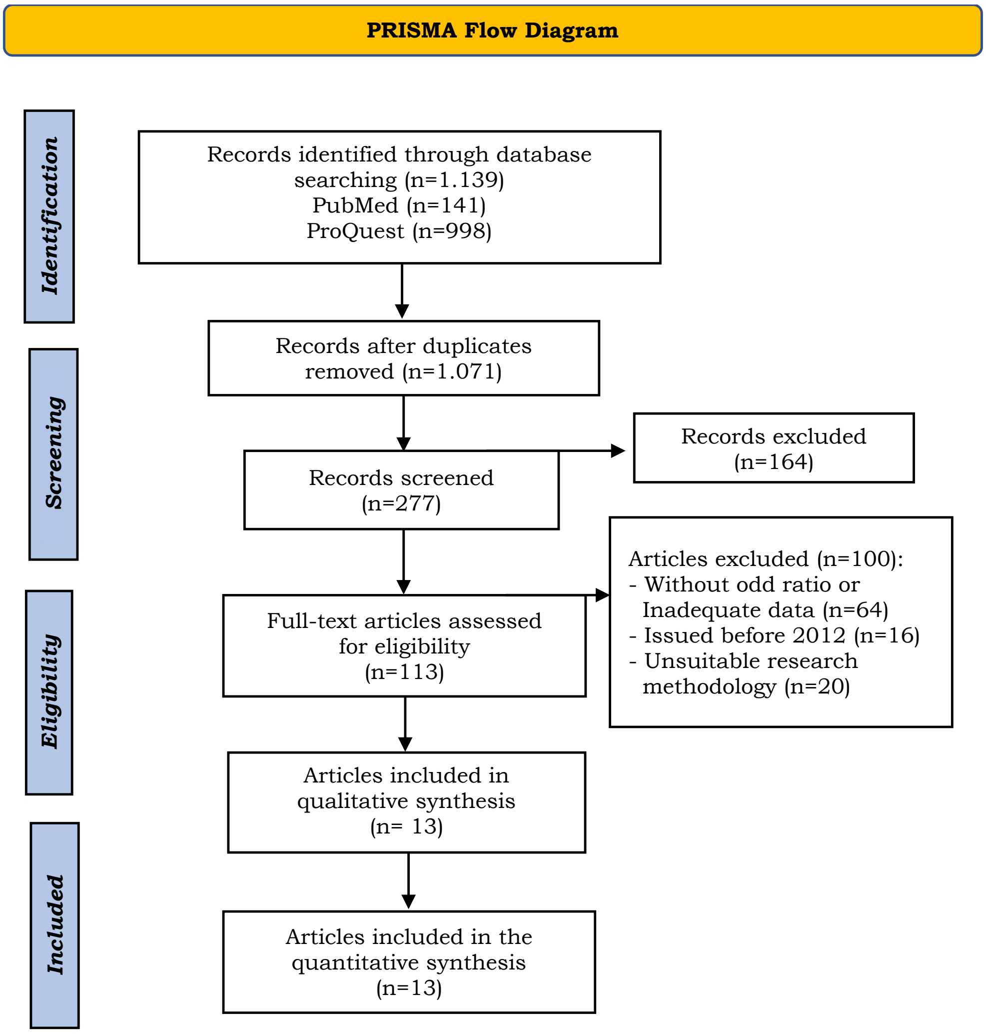

Figure 1. Diagram of study selection (PRISMA flow diagram).

Table 1. Characteristics of studies included in the meta-analysis.

First Author	Countries	Published year	Study design	Sample size	p-value	Odd ratio (95% CI)
Abubakar et al.[9]	Nigeria	2012	Cross-sectional	15,027	p=0.001	0.41 (0.26-0.66)
Correia et al.[10]	Timor Leste	2021	Cross sectional	3,253	p<0.01	0.65 (0.62-0.68)
Khan et al.[11]	India	2018	Cross-sectional	550	p=0.001	0.45 (0.28-0.73)
Murthy et al.[12]	Sri Lanka	2018	Cross-sectional	6,713	p=0.008	1.50 (1.19-1,87)
Park et al.[13]	Korea	2016	Cross-sectional	20.419	p=0.859	1.02 (0.79-1.30)
Ren et al.[14]	China	2015	Cross-sectional	116	p=0.67	1.24 (0.46-3.33)
Shen et al.[15]	China	2020	Cross-sectional	6546	p=0.355	1.14 (0.87-1.49)
Shen et al.[15]	China	2013	Cross-sectional	2133	p=0.677	1.20 (0.52-2.76)
Sun et al.[16]	China	2012	Cross-sectional	5592	p=0.09	0.44 (0.17-1.13)
Syed et al.[17]	Bangladesh	2013	Cross-sectional	217	p=0.0031	0.42 (0.24-0.75)
Syed et al.[17]	Kenya	2013	Cross-sectional	147	p=0.0055	0.36 (0.18-0.74)
Syed et al.[17]	Philippines	2013	Cross-sectional	238	p=0.41	0.80 (0.47-1.36)
Taryam et al.[18]	Nigeria	2019	Cross sectional	3120	p<0.005	0.55 (0.34-0.88)
Vimalraj et al.[19]	India	2022	Cross sectional	161	p=0.660	0.84 (0.38-1.81)
Xu et al.[20]	China	2018	Cross-sectional	2342	p=0.0127	1.32 (1.06-1.66)

Table 2. Risk of bias of individual studies.

First author (published year)	1	2	3	4	5	6	7	8	Summary item	Interpretation
Abubakar et al. (2012)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	87,50%	Low risk of bias
Correia et al. (2021)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Khan et al. (2017)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Murthy et al. (2018)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Park et al. (2016)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	87,50%	Low risk of bias
Ren et al. (2015)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Shen et al. (2013)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Shen et al. (2020)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Sun et al. (2012)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Syed et al. (2013)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Taryam et al. (2019)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Vimalraj et al. (2022)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias
Xu et al. (2018)	Yes	Yes	Yes	Yes	No	No	Yes	Yes	75%	Low risk of bias

Notes: Eight question scale items for risk of bias. (1) Were the criteria for inclusion in the sample clearly defined?; (2) Were the study subjects and the setting described in detail?; (3) Was the exposure measured in a valid and reliable way?; (4) Were objective, standard criteria used for measurement of the condition?; (5) Were confounding factors identified?; (6) Were strategies to deal with confounding factors stated?; (7) Were the outcomes measured in a valid and reliable way?; (8) Was appropriate statistical analysis used?.

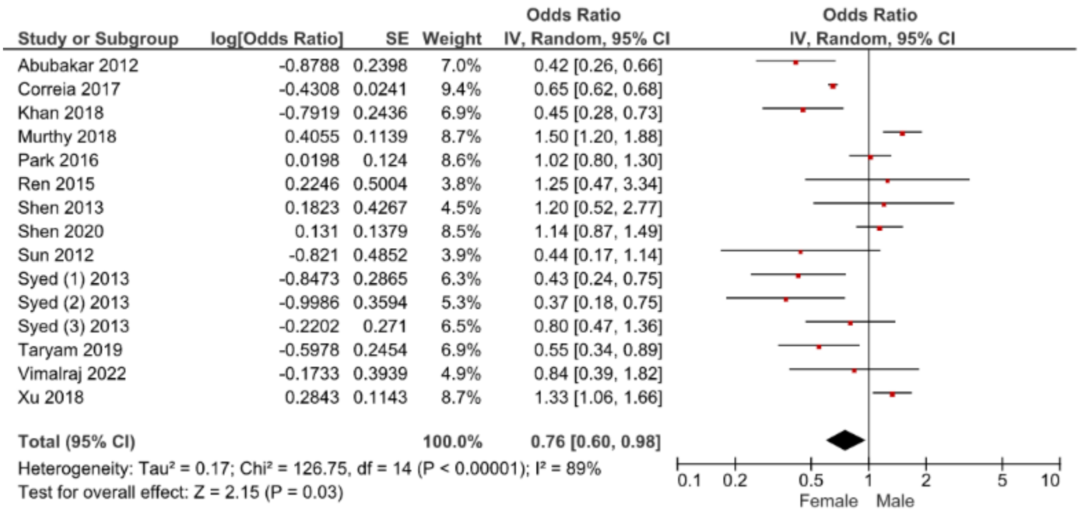

Figure 2. Forest plot of odd ratio for cataract surgery utilization by gender.

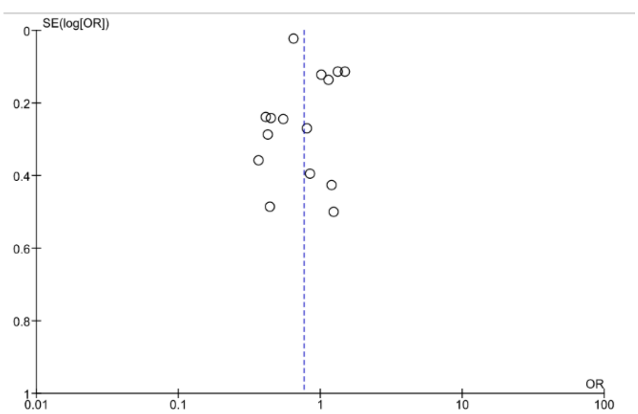

Figure 3. Funnel plot of odd ratio for cataract surgery utilization by gender.

4. Discussion

In this systematic review, we identified a total of 15 studies, of which 8 studies showed a significant association between gender and cataract surgery utilization. The meta-analysis indicated a pooled OR of 0.76 (95% CI: 0.60–0.98) with a p-value of 0.03. The study results suggest that females are 0.76 times less likely to utilize cataract surgery compared to males. This finding is supported by several studies which indicate that men tend to utilize cataract surgical services more often than women.[9,11,14,17,18]

Gender disparity in cataract surgical coverage persists, with females receiving fewer cataract surgery than males. Ye et al. conducted a study in South Asia which found that the gender of the patient remains a significant barrier to accessing cataract surgery, with men undergoing the procedure 1.46 times more often than women.[5] Similarly, Lewallen et al. reported that women were less likely than men to use cataract surgical services, and cataract surgical coverage was higher in men than in women (OR 1.71, 95% CI: 1.48-1.97).[6]

Gender inequality in the field of cataract surgery is linked to social, economic, and cultural disparities between men and women.[22] Sociocultural beliefs in several countries position men in a higher social standing than women.[23,24] Men's health is sometimes prioritized over women's health, leading to women being less concerned about their own health.[25] In addition, women's household responsibilities and roles as primary family caregivers can limit their ability to access health services due to time constraints and lack of mobility.[26] Potential causes of the lower coverage of women in accessing cataract surgery include male predominance, lack of financial resources, illiteracy, and lack of information.

Qualitative studies have also highlighted the role of gender in cataract surgical uptake.[24,25] These studies identified barriers that women face on both the demand and supply sides of the health system, including stereotypes and gender-biased sociocultural norms. Women's limited autonomy and control over financial resources can also make them dependent on their husbands and sons.[27]

Accessibility barriers, such as distance from surgical services and a lack of chaperones, pose significant obstacles for non-operative cataract blind individuals. These barriers also contribute to the pronounced gender differences and inequalities in the utilization of cataract services, with women being less likely to undergo surgery. In Bangladesh and Philippines, women frequently cite fear as a reason for refusing surgery, with no other socioeconomic or health factors associated with these gender differences. Gender plays a role in decision-making and the ability to seek assistance.[17] A strategic approach is necessary to reduce gender disparities in accessing cataract surgical services and improve access to reduce blindness. Cataract control programs should prioritize increasing coverage of cataract surgery among women who have a higher incidence of cataracts and longer life expectancy.

5. Conclusion

Gender is associated with the utilization of cataract surgical services, with women being less likely than men to utilize them. Thus, a planned approach aimed at improving access for women to cataract surgical services is necessary to reduce blindness globally.

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