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Determinants of Nonattendance in a Urology Outpatient Clinic: A 5-Year Retrospective Study in a Tertiary Metropolitan Hospital

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ABSTRACT

Backgrounds: Nonattendance in outpatient healthcare contributes to patient morbidity and healthcare strain. Aboriginal and/or Torres Strait Islander peoples (hereafter, respectively referred to as Indigenous peoples) of Australia experience poorer health outcomes compared to non-Indigenous Australians, with higher rates of nonattendance in outpatient settings. Understanding factors associated with nonattendance is crucial for developing strategies to improve attendance and healthcare inequities. This study aimed to identify factors associated with nonattendance at a urology outpatient clinic and the difference in nonattendance rates between Indigenous and non-Indigenous peoples.

Methods: A secondary data analysis was conducted on urology outpatient clinic attendance at a Brisbane tertiary teaching hospital over 5 years (January 1, 2018 to December 31, 2022). Factors including age, gender, Indigenous status, review type, appointment modality, distance from the clinic, COVID-19 lockdowns, and socioeconomic status were analyzed using chi-square tests and multivariable logistic regression.

Results: Of the 11 683 scheduled appointments, the nonattendance rate was 4.9%. Indigenous patients had a higher nonattendance rate compared to non-Indigenous patients (13.6% vs. 4.6%, OR 2.8, CI 1.91–3.99, $p < 0.001$). Nonattendance was also associated with age groups less than 54 years of age ($p < 0.001$) and follow-up appointments (OR 1.73, CI 1.43–2.09, $p < 0.001$) across the patient population, particularly when the follow-up is scheduled in-person rather than via telehealth (OR 0.4, CI 0.23–0.67, $p < 0.001$).

Conclusion: Indigenous status, younger age, and follow-up appointment type were significant predictors of nonattendance. Offering follow-up appointments via telehealth may improve attendance. Addressing these disparities is vital for reducing healthcare inequalities and improving health outcomes for Indigenous peoples.

Dr. Collin and Dr. Cockburn contributed equally and are co-first authors.

1 | Introduction

Nonattendance to outpatient healthcare plays a well-established role in patient morbidity [1] and public healthcare strain [2]. Nonattendance is a known contributor to poorer outcomes in Australia [3]. Understanding the factors associated with nonattendance is a critical step toward developing strategies to improve access and reduce healthcare inequality [4]. Missed appointments within the first 12 months of outpatient attendance are shown to be associated with greater mortality [5], emphasizing the importance of addressing early nonattendance as a sign of future issues. Nonattendance rates are dependent on multiple factors, including age, gender, geographical factors, and ethnicity [6]. Factors contributing to nonattendance in urology practices specifically include lead time [7], socioeconomic status (SES) [8], and clinical factors [9].

The Aboriginal and/or Torres Strait Islander peoples of Australia have poorer health outcomes in comparison to non-Indigenous Australians [10]. Indigenous status has been associated with outpatient appointment nonattendance [11, 12]. While poorer health status among Indigenous Australian populations is recognized, there is limited data on urology-specific health inequalities in these populations [13, 14]. There is a lack of published data on Indigenous peoples' access to urology services, especially concerning nonattendance rates.

The primary objective of this study was to identify factors associated with appointment nonattendance in a urology outpatient clinic. Specifically, this study aimed to understand the impact of Indigenous status on nonattendance rates. Understanding differences in outpatient attendance rates is vital to addressing inequalities in urology healthcare outcomes, particularly for Indigenous peoples.

2 | Methods

The research proposal was acknowledged by the Human Research Ethics Committee (HREC) chair as meeting the requirements of the National Statement of Ethical Conduct in Human Research. An ethics exemption was obtained from Metro North Health HREC (EX/2023/MNHA/102684). All data was de-identified and analyzed in aggregate, in accordance with the National Statement 5.1.23.

2.1 | Participants, Setting, and Design

A secondary data analysis was performed on a metropolitan tertiary urology outpatient clinic attendance over a 5-year period from January 1, 2018 to December 31, 2022. This was a single-institution study performed at the Royal Brisbane and Women's Hospital (RBWH), the largest teaching and research hospital in South-East Queensland, Australia. The clinic schedules appointments for medical review as well as allied health services including continence assessments, prostate cancer consultations, and urodynamic evaluations. The dataset was obtained from the integrated Electronic Medical Record (iEMR) Enterprise Scheduling Management (ESM) system.

2.2 | Outcome Measurement

The measured outcome was appointment nonattendance, dichotomously coded: attended or failed to attend. Factors tested for association with nonattendance were age, gender, Aboriginal and/or Torres Strait Islander status, appointment modality (in-person or telehealth), review type (new patient or follow-up), distance from clinic, relativity to COVID-19 lockdowns, and SES.

Patient age was grouped into subcategories (10–17, 18–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, and 85 years and over). The 10–17 age group was excluded from analysis due to low sample size ($n = 58$). Age was categorized, like other variables in this study, to allow for nonlinear relationships between age and attendance, to align with comparable studies [11, 12], and to enable specific recommendations for different age groups. Additionally, Akaike information criterion (AIC) analysis showed similar fitness of models when comparing age as a categorical and continuous variable.

Gender was defined as male or female, with one indeterminate gender patient excluded due to low sample size ($n = 1$). Relativity to COVID-19 lockdowns was defined as whether the appointment was prior to March 26, 2020, when Queensland first declared local travel restrictions [15].

Indigenous status was defined as identifying as either or both Aboriginal or Torres Strait Islander. Patients were excluded if Indigenous status was not stated or unknown ($n = 67$).

Distance from the clinic was calculated using the latitude and longitude of the patient's postcode and the RBWH postcode, via the Matthew Proctor postcode database [16]. Patients with unknown postcodes were excluded from the analysis ($n = 75$). Four categories were defined with consideration to Queensland Health's travel subsidy scheme [17]: less than 50, 50–200, 201–600, and over 600 km. Travel subsidies are provided beyond 50 km, and overnight accommodation is subsidized for distances greater than 600 km. 200 km was considered a reasonable distance to travel in 1 day without need for overnight accommodation.

SES was estimated using median taxable income by postcode, obtained from the Australian Government National Map database [18]. Median income was grouped in $10 000 intervals for analysis.

2.3 | Statistical Analysis

A single encounter per patient was extracted from the dataset, being the earliest recorded for each patient within the 5-year period. Chi-square analysis determined whether an association existed between nonattendance and demographic variables. Generalized linear model univariate logistic regression was used to calculate the odds ratio (OR) and 95% confidence interval (CI) for each patient factor associated with appointment nonattendance at the univariate and multivariable levels. Factors significant at the 0.1 level in the chi-square analysis were carried into the univariate and multivariable analyses. The main effects

model was developed via backward stepwise regression using likelihood ratios.

From the final main effects model, interactions of interest were added to the model and assessed to determine if the interaction was significant in the model and should be included via a likelihood ratio test to create the final model. The interactions of interest were Indigenous Australian status crossed by all other factors to identify factors affecting Indigenous Australian nonattendance. Appointment modality and review type were assessed for interaction. Distance groups interacting with appointment modality and median income were also assessed for inclusion in the model to extract if telehealth appointments influenced nonattendance at greater distances.

Reference groups were chosen based on the lowest nonattendance rate or the largest sample size in the variable. Data was analyzed using R Studio version 4.3.1 [19]. Statistically significant results are noted with a $p \leq 0.05$.

3 | Results

A total of 11 683 patients had 45 915 appointments scheduled over the 5-year period (Table 1). 11 114 patients attended their first recorded appointment in the 5-year time period, with a nonattendance rate of 4.9%. Males accounted for the larger proportion of scheduled appointments (76%). The majority of the patient population were aged between 55 and 64 years and 65 and 74 years of age (20 and 27%, respectively). Patients identifying as Indigenous accounted for 2.3% of the study population. 85% of the appointments were delivered face-to-face. 86% of patients lived within 50 km of the hospital postcode. 59% of appointments were delivered prior to COVID-19 lockdowns. 46% of patients had a median income between $50 001 and $60 000.

Factors significant at chi-square level of 0.1 were carried forward into the univariate logistic regression assessing predictors of appointment nonattendance (Tables 1 and 2). Interaction factors of interest were assessed, and those that made it to the final model via stepwise regression are presented in Table 2.

3.1 | Gender

There was no association between gender and nonattendance, with both males and females having a nonattendance rate of 4.9% ($p = 0.90, \chi^2(1) = 0.015$).

3.2 | Indigenous Status

Indigenous Australian patients had a significantly higher nonattendance rate compared to non-Indigenous Australian patients (13.6% vs. 4.6%, $p < 0.001$, $\chi^2(1) = 47.42$). Multivariable analysis confirmed Indigenous Australian status was a significant predictor of nonattendance (OR 2.8, CI 1.91–3.99, $p < 0.001$). Interaction analysis showed that Indigenous Australian nonattendance was not moderated by any other patient factors included in this study.

3.3 | Age

Age group was significantly associated with nonattendance ($p < 0.001$, $\chi^2(8) = 117.1$). Younger age groups, with age groups 18–24 (OR 3.48, CI 2.33–5.1), 25–34 (OR 2.79, CI 2.04–3.79), 35–44 (OR 1.93, CI 1.37–2.68), and 45–54 years (OR 1.83, CI 1.37–2.44), were more likely to miss appointments compared to those aged 65–74 years.

3.4 | Review Type

Review type was associated with nonattendance ($p < 0.001$, $\chi^2(1) = 17.99$). In the final model, follow-up appointments had higher odds of nonattendance than new appointments (OR 1.73, CI 1.43–2.09, $p < 0.001$).

3.5 | Appointment Modality

While chi-square analysis did not show a significant association between appointment modality and nonattendance ($p = 0.4$, $\chi^2 = 0.702$, df = 1), the final model revealed patients were more likely to miss telehealth appointments at new appointments and when they lived within 50 km of the hospital (OR 1.47, CI 1.05–2.04, $p < 0.05$). Additionally, interaction analysis demonstrated patients were 2.5 times more likely to miss follow-up appointments if they were scheduled face-to-face rather than via telehealth (OR 0.399, CI 0.23–0.67, $p < 0.001$).

3.6 | Distance From Clinic

Distance from the hospital was not significantly associated with nonattendance in chi-square ($p = 0.5$, $\chi^2(3) = 2.36$) or univariate analysis. However, in the final model, those living 50–200 km from the hospital were 1.4 times more likely not to attend face-to-face appointments compared to those living closer (OR 1.4, CI 1.01–1.89, $p = 0.039$). Distances of 201–600 km (OR 1.24, CI 0.73–1.98, $p = 0.4$) and greater than 601 km (OR 1.1, CI 0.55–1.98, $p = 0.76$) did not show significant associations with nonattendance.

3.7 | COVID-19 Lockdowns

There was no significant difference in nonattendance rates before and during the COVID-19 lockdowns, with rates of 5% and 4.7% respectively ($p = 0.62, \chi^2(1) = 0.25$).

3.8 | Socioeconomic Status

There was no significant difference in nonattend rates among SES ($p = 0.26, \chi^2(5) = 6.47$).

3.9 | Interaction Factors

Interaction terms of appointment modality by review type and appointment modality by distance groups were included in the final model based on stepwise regression. The interaction between

TABLE 1 | Appointment and patient factors with chi-square (χ^2) analysis showing likelihood of nonattendance.

Factors	Overall $n = 11\,683$	Attended $n = 11\,114$	Failed to attend $n = 569$	p
Gender, $n = 11\,682$				
Male	8934 (76%)	8499 (95.1%)	435 (4.9%)	0.901 ($\chi^2 = 0.015$, df = 1)
Female	2748 (24%)	2614 (95.1%)	134 (4.9%)	
Indigenous status, $n = 11\,616$				
Not Aboriginal or Torres Strait Islander	11 344 (98%)	10 825 (95.4%)	519 (4.6%)	< 0.001 ($\chi^2 = 47.42$, df = 1)
Aboriginal and/or Torres Strait Islander	272 (2.3%)	235 (86.4%)	37 (13.6%)	
Age group, $n = 11\,683$				
18–24 years	331 (2.8%)	290 (87.6%)	41 (12.4%)	< 0.001 ($\chi^2 = 117.1$, df = 7)
25–34 years	769 (6.6%)	693 (90.1%)	76 (9.9%)	
35–44 years	830 (7.1%)	773 (93.1%)	57 (6.9%)	
45–54 years	1419 (12%)	1327 (93.5%)	92 (6.5%)	
55–64 years	2363 (20%)	2259 (95.6%)	104 (4.4%)	
65–74 years	3191 (27%)	3076 (96.4%)	115 (3.6%)	
75–84 years	2048 (18%)	1989 (97.1%)	59 (2.9%)	
85 years and over	674 (5.8%)	652 (96.7%)	22 (3.3%)	
Appointment modality, $n = 11\,683$				
Face-to-face appointment	9946 (85%)	9451 (95%)	495 (5%)	0.40 ($\chi^2 = 0.702$, df = 1)
Telehealth appointment	1737 (15%)	1663 (95.7%)	74 (4.3%)	
Review type, $n = 11\,683$				
New appointment	7068 (60%)	6769 (95.8%)	299 (4.2%)	< 0.001 ($\chi^2 = 17.99$, df = 1)
Follow-up appointment	4615 (40%)	4345 (94.1%)	270 (5.9%)	
Distance, $n = 11\,608$				
Less than 50 km	10 010 (86%)	9535 (95.3%)	475 (4.7%)	0.501 ($\chi^2 = 2.36$, df = 3)
Between 50 and 200 km	906 (7.8%)	854 (94.3%)	52 (5.7%)	
Between 201 and 600 km	422 (3.6%)	400 (94.8%)	22 (5.2%)	
Greater than 601 km	270 (2.3%)	258 (95.6%)	12 (4.4%)	
COVID status, $n = 11\,683$				
Pre-COVID (Pre 26/03/2020)	6889 (59%)	6569 (95%)	347 (5%)	0.617 ($\chi^2 = 0.249$, df = 1)
During COVID (Post 26/03/2020)	4794 (41%)	4545 (95.3%)	222 (4.7%)	
Median income, $n = 11\,624$				
Less than $40 000	203 (1.7%)	191 (94.1%)	12 (5.9%)	0.263 ($\chi^2 = 6.47$, df = 5)
Between $40 001 and $50 000	1841 (16%)	1743 (94.7%)	98 (5.3%)	
Between $50 001 and $60 000	5387 (46%)	5137 (95.4%)	250 (4.6%)	

(Continues)

TABLE 1 | (Continued)

Factors	Overall $n=11683$	Attended $n=11114$	Failed to attend $n=569$	p
Between \$60001 and \$70000	3824 (33%)	3648 (95.4%)	176 (4.6%)	
Between \$70001 and \$80000	359 (3.1%)	334 (93.0%)	25 (7.0%)	
Greater than \$80000	10 (<0.1%)	9 (90%)	1 (10%)	

appointment modality and review type revealed that patients were significantly less likely to attend follow-up appointments scheduled face-to-face compared to telehealth (OR 0.4, CI 0.23–0.67, $p<0.001$). Patient nonattendance was not impacted by telehealth appointment types at any distance group compared to those living less than 50 km from the hospital (50–200 km: OR 0.32, CI 0.07–0.92, $p=0.064$; 201–600 km: OR 0.58, CI 0.16–1.7; $p=0.36$; >601 km: OR 0.2, CI 0.01–1.1, $p=0.13$).

No interactions with Indigenous status were significant, indicating that nonattendance among Indigenous patients was not influenced by any other factors tested in this study, including gender, age group, distance, COVID, appointment modality, or review type.

4 | Discussion

To our best knowledge, this study is the largest and only analysis of urology outpatient nonattendance at a metropolitan tertiary outpatient urology clinic in Australia. Our results showed that the overall nonattendance rate was 4.9%, with Indigenous patients being 2.8 times more likely to nonattend (13.6%) than non-Indigenous Australians (4.6%).

The overall nonattendance rate of 4.9% was lower than similar studies in other clinics in Australia with 7.6% [11] and 5.4% [12] nonattendance, as well as international urology clinics with 14.3% [7] and 9% [9] nonattendance. This may be attributable to existing administrative strategies that facilitate attendance, including culturally sensitive practices, which can vary significantly across institutions [6].

Our findings that Indigenous patients are 2.8 times more likely to nonattend than non-Indigenous Australians align well with studies in nonurological settings, including in a medical imaging department (2.66 times) [12] and a regional clinic (three times) [11]. Nonattendance in this group was independent of all other factors tested. Distance has previously been highlighted as a barrier to healthcare access for Indigenous patients in qualitative studies [20–22]. It is possible that our study population differs from those in other research, or that there are unmeasured factors that could account for this variation. In our cohort, most Indigenous patients resided within 50 km of the clinic (218 patients vs. 54 patients >50 km), suggesting that our study may not be adequately powered to detect a significant difference based on distance. Moreover, the studies that report distance as a barrier are largely qualitative, potentially capturing aspects of the patient experience that our quantitative analysis does not reflect.

While Indigenous attendance was independent of gender in our study, higher rates of nonattendance for Indigenous women have been reported in general practice clinics in regional clinics [11]. The reasons for this are unclear, and further assessment of urban and regional specialist services may provide further insight.

Outpatient follow-up in this population is critical given that cancer [10] and chronic diseases [23, 24] are major contributors to Indigenous health inequities. Indigenous Australians have a higher prostate cancer [13] and penile cancer mortality compared with non-Indigenous Australians [14]. There are a number of reasons for outpatient nonattendance in this population, with previous studies identifying issues such as cultural awareness, communication, and competing responsibilities [25, 26]. While improving the cultural capability of clinical staff and nurturing attendance through patient-centered communication have been suggested as a means to improve attendance [10, 27], there is minimal data detailing the implementation and effectiveness of these interventions on attendance rates. One study performed at the same hospital as this study found a 45% decrease in surgery cancellations by Indigenous peoples after implementation of a culturally appropriate presurgery screening tool [28].

Follow-up appointments were significantly associated with nonattendance compared to new appointments. Furthermore, nonattendance for in-person follow-up appointments was 2.5 times more likely compared to telehealth, which is concordant with another study where telehealth appointments were almost twice as likely to be attended [29]. Early studies on the rapid shift toward telehealth outpatient reviews during the COVID-19 pandemic suggest attendance rates were preserved [30], which is supported by our study's finding that attendance rates were unaffected by both appointment modality and COVID-19 lockdowns. Where clinically appropriate, recommendations could be made to offer follow-up appointments as a telehealth modality to improve follow-up attendance.

SES showed no association with nonattendance. While some international studies correlate SES with nonattendance [6, 8, 31, 32], Australian studies remain limited [33] or exclude SES as a factor [11, 12]. In the Australian context, public outpatient services may under-represent higher SES groups who are more likely to access private healthcare [34], which is an important limitation of our study. Future research should assess contributors to SES beyond median income, including education, employment, and household stressors, which were not available in this dataset.

TABLE 2 | Univariate and multivariable logistic regression model of appointment and patient factors showing likelihood of nonattendance, including interactions selected using backward selection with likelihood ratios.

	Univariate logistic regression model			Multivariable logistic regression model		
Factors	**Odds ratio (OR)**	**95% confidence interval (CI)**	***p***	**Odds ratio (OR)**	**95% confidence interval (CI)**	***p***
Review type						
New appointment		Reference			Reference	
Follow-up appointment	1.455	1.224–1.729	< 0.001	1.729	1.433–2.086	< 0.001
Appointment modality						
Face-to-face appointment		Reference			Reference	
Telehealth appointment	0.891	0.687–1.138	0.368	1.474	1.045–2.037	0.022
Indigenous status						
Not Aboriginal and/or Torres Strait Islander		Reference			Reference	
Aboriginal and/or Torres Strait Islander	3.361	2.315–4.748	< 0.001	2.795	1.907–3.989	< 0.001
Age						
18–24 years	3.551	2.386–5.181	< 0.001	3.479	2.328–5.099	< 0.001
25–34 years	2.803	2.053–3.803	< 0.001	2.787	2.035–3.793	< 0.001
35–44 years	1.904	1.355–2.644	< 0.001	1.926	1.37–2.68	< 0.001
45–54 years	1.817	1.364–2.413	< 0.001	1.831	1.37–2.44	< 0.001
55–64 years	1.193	0.9062–1.569	0.2064	1.201	0.911–1.581	0.192
65–74 years		Reference			Reference	
75–84 years	0.773	0.556–1.062	0.117	0.781	0.561–1.075	0.135
85 years and over	0.907	0.556–1.41	0.682	0.943	0.577–1.474	0.806
Distance						
Less than 50 km		Reference			Reference	
50–200 km	1.244	0.913–1.658	0.151	1.393	1.01–1.887	0.039
201–600 km	1.144	0.716–1.732	0.55	1.24	0.729–1.978	0.397
Greater than 601 km	0.966	0.5086–1.661	0.909	1.103	0.554–1.977	0.76
Interactions						
Follow-up appointment × Telehealth appointment				0.399	0.231–0.674	< 0.001
Telehealth appointment × between 50 and 200 km distance				0.316	0.074–0.921	0.064
Telehealth appointment × between 201 and 600 km distance				0.583	0.159–1.698	0.359
Telehealth appointment × greater than 601 km distance				0.197	0.011–1.08	0.127

Younger age of under 55 is a predictor of appointment nonattendance. This is in keeping with general trends suggesting an inverse relationship between age and outpatient nonattendance [6, 35–37]. No association between gender and nonattendance was identified, with identical nonattendance rates (4.9% each) which is concordant with most studies, although it is important to acknowledge the significant variability and context-dependence of gender's association with nonattendance across the literature [6].

This study is limited to analyzing only the patient's earliest recorded appointment in the 5-year dataset, rather than including all of the patient's appointments during that time period. While this analysis facilitated a focused comparison in attendance between individual patients, it excludes analysis of individual patients' attendance at each of their appointments. Expanding the analysis to assess an individual patient's likelihood to attend multiple appointments may provide further insight, particularly given previous nonattendance is known to strongly correlate with future nonattendance [35]. Our dataset did not differentiate between telehealth modalities such as phone or video calls, which could be a worthwhile subanalysis given their association with better attendance for follow-up appointments. With ethical approval, identifying the impact of clinical factors on nonattendance could be explored in this dataset. Oncological diagnosis has previously been associated with lower rates of nonattendance [9] and poor adherence to active surveillance of prostate cancer can lead to poorer outcomes [38].

In conclusion, Aboriginal and/or Torres Strait Islander patients have higher nonattendance than non-Indigenous patients, which would contribute to the healthcare inequality among Indigenous Australians. This calls for a better understanding of barriers and enablers of Indigenous Australian attendance and integration of proactive engagement strategies among urologists and hospital services. Furthermore, this study supports recommendations of offering telehealth as follow-up appointments to improve appointment attendance. This is particularly important after the rapid shift to telehealth reviews experienced in the postpandemic era.

Author Contributions

Harry Collin: conceptualization, data curation, methodology, project administration, resources, supervision, visualization, writing – original draft, writing – review and editing. **Rachel Cockburn:** data curation, formal analysis, investigation, methodology, resources, validation, visualization, writing – original draft, writing – review and editing. **Xiang-Yu Hou:** conceptualization, methodology, project administration, supervision, writing – review and editing. **Susan Toolis:** conceptualization, resources, writing – review and editing. **Elisabeth Winslade:** conceptualization, writing – review and editing. **Kate Dickson:** conceptualization, writing – review and editing. **Rachel Esler:** conceptualization, project administration, supervision, writing – review and editing.

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Ethics Statement

An ethics exemption was obtained from Metro North Human Research Ethics Committee (EX/2023/MNHA/102684).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data will be kept for 5 years following publication of the project.

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