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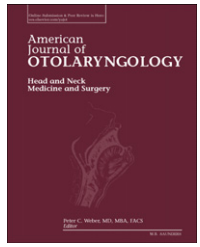

Predictors of repeated "no-showing" to clinic appointments☆

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ABSTRACT

Objective: To determine the variables that contribute to repeated patient non-compliance with showing up to clinic appointments.
Study design: Retrospective chart review.
Setting: Single tertiary care academic institution.
Subjects and Methods: Patients who did not show up to 3 or more clinic appointments in the otolaryngology department in the Henry Ford Health System in metro Detroit, Michigan between July 1, 2011 to June 30, 2012 area were compared to control patients randomly chosen from those who had appointments on the same day with the same provider as the no-show patients.
Results: 105 patients were identified who no-showed to 3 or more clinic appointments. Younger age, black race, and lower income were all found to be significant factors for patients missing appointments in a multiple variate model. On logistic regression, Medicaid insurance, closer distance from home to appointment, less bus transfers, and less time by bus travel were also found to correlate with no-showing.
Conclusion: Age, race, and income are significantly related to patient non-compliance with clinic appointments. Paradoxically, proximity to the clinical appointment location is also significantly related – we hypothesize this may be the result of significant income inequality in the metro Detroit population distribution. Follow up studies include analyzing factors that precluded patient access and interventions to improve compliance and decrease cost.

1. Introduction

The "no-show" patient is well known to every healthcare provider. They decrease healthcare delivery efficiency by limiting access to care for other patients and lowering provider productivity. With each no-show patient, not only is a clinic slot lost that could have been filled with a "showing" patient, but also potential operative procedures for the otolaryngologist may be missed.

Previous authors have analyzed factors that contribute to patients no-showing by looking at both patient factors as well as provider factors in otolaryngology clinics [1,2]. However, past studies have focused on non-attendance as a whole and have not stratified these patients into one-time offenders versus repeat offenders. These studies also focused primarily on scheduling factors rather than patient factors.

This is the first study to look specifically at patients who serially fail to attend clinic appointments with an emphasis

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Table 1 – Variable description for no-show and control patients.

Variable	Controls		No-shows		p-value
Female gender	48.1%		59.6%		0.047
Black race	34.2%		73.1%		0.001
Medicaid insurance	31.8%		45.2%		0.016
	mean	SD	mean	SD	
Age	54.6	21.9	43.6	20.5	0.001
Miles to appointment	16.6	27.0	13.3	11.6	0.612
Minutes by car	21.0	26.2	18.2	12.3	0.491
Minutes by bus	87.5	50.5	73.0	40.0	0.030
Number of bus transfers	1.2	0.9	0.9	0.7	0.002
Income level	50853	22771	29588	16510	0.001

on identifying patient-specific factors that might help predict those at higher risk for missing appointments. By being able to predict patients who are at risk, measures can be taken to better help these patients obtain the medical care they need, maximize access to care across the board, as well as increase provider productivity.

2. Methods

Patients who missed three or more clinic appointments in the otolaryngology department in the Henry Ford Health System in metro Detroit, Michigan, between July 1, 2011, to June 30, 2012, area were analyzed. Only patients scheduled for a physician or mid level provider (nurse practitioner or physician assistant) appointment were included. Audiologic appointments were excluded.

No-showing was defined as missing a scheduled appointment that was not cancelled ahead of time. All appointments were scheduled by patients and missed appointments were not automatically rescheduled. All four otolaryngology clinic sites were included in the analysis: Detroit, Dearborn, Sterling Heights, and West Bloomfield.

To generate a control cohort of "showing" patients, three days missed by each no-show patient were selected. A patient with the closest appointment time to the no-show patient for the same provider who showed up to their clinic appointment was selected to the control group for each of the days missed.

Parameters analyzed included: age, sex, race, median income of zip code, miles from appointment (from patient's address), minutes by car, minutes by bus, number of bus transfers, and insurance type (Medicare, Medicaid, or other). Uninsured patients were not accounted for in the analysis as uninsured patients are unable to be seen in the outpatient clinics. Google maps (http://maps.google.com) was used to map each patient's address to their clinic appointment location. The number of minutes by car was estimated with Google maps, selecting the route offering the shortest travel time to the appointment location. Current traffic conditions for that particular time of day were not adjusted for, as it was Henry Ford's policy at that time to see patients even if they were late.

Minutes by bus and number of bus transfers were also determined with Google maps. Because of the variability in bus schedules depending on the time of day, the bus route was determined assuming patients would take bus routes aiming to arrive at their appointment on time. If multiple bus options were available, the bus offering the shortest time to appointment location was selected. For some patients living very far away from their appointment location, bus service was sometimes not available.

Median income of the patient's zip code was determined through the United States Census American Community Survey data compiled by the University of Michigan for census data between 2006 and 2010 (http://www.psc.isr.umich.edu/dis/census/Features/tract2zip/index.html). This is a well-established method for approximating income level of patients [3,4].

The two groups, no-show and control patients are described in Table 1. The categorical variables are compared between the two groups using a Chi-squared test while the continuous variables are analyzed using a Wilcoxon two-sample test. The nonparametric method was used as the normality of the variables was in question.

A logistic regression was used on each variable individually to estimate an odds ratio of no-showing for the appointment. For minutes to the appointment location by bus, the odds ratio is a change for 10 minutes and for income, it is for a change of $10,000. A multivariable model was then implemented using a stepwise routine to find the most parsimonious model where each variable was significant. All analyses were performed using SAS 9.2 and a p-value less than 0.05 was considered significant.

This study was approved by Henry Ford's Institutional Review Board.

3. Results

Out of 6311 total appointments that were no-shows between July 1, 2011, to June 30, 2012, 105 patients were identified who missed 3 or more clinic appointments within that year. Sixty-three appointments were located in Detroit, 19 in Dearborn, 15 in Sterling Heights, and 8 in West Bloomfield clinic locations. The Detroit and West Bloomfield clinics are located within a larger hospital. The Dearborn and Sterling Heights clinics both have ambulatory surgery centers but no in-patient services connected (the Dearborn facility also has an emergency department).

The two groups are described and compared in Table 1. The no-show group had a higher proportion of female, black, and patients with Medicaid insurance and the difference is statistically significant. The no-show group also had a statistically lower mean age,

Table 2 – Univariate logistic regression results for control patients compared to no-show patients.

Variable	Odds ratio (95% confidence interval)	p-value
Age	0.80 (0.72, 0.84)	0.001
Female gender	1.60 (1.01, 2.53)	0.047
Black race	5.21 (3.15, 8.63)	0.001
Medicaid insurance	1.77 (1.11, 2.82)	0.017
Miles to appointment	0.91 (0.78, 1.07)	0.245
Minutes by car	0.92 (0.79, 1.08)	0.305
Minutes by bus	0.93 (0.88, 0.99)	0.013
Number of bus transfers	0.60 (0.44, 0.82)	0.001
Income level	0.75 (0.66, 0.85)	0.001

less minutes to the hospital by bus, less bus transfers, and lower income than the control group. Miles to the appointment location and travel time by car were not significantly different.

The logistic regression in Table 2 confirms these results. The odds ratio (OR), with its 95% confidence interval (CI), was greater than 1 indicating a risk factor for females 1.6 (1.0, 2.5), blacks 5.2 (3.2, 8.6), and patients with Medicaid 1.8 (1.1, 2.8). Age 0.8 (0.7, 0.9), minutes to the appointment site 0.9 (0.9, 1.0), bus transfers 0.6 (0.4, 0.8) and income 0.8 (0.7, 0.9) all had odds ratios below 1 indicating a protective factor.

The stepwise multivariable model (Table 3) selected age (OR 0.76, 95% CI 0.68–0.86), black race (4.51, 2.58–7.88) and income (0.83, 0.72–0.96) as the three jointly significant variables for repeatedly no-showing to clinic appointments.

4. Discussion

By focusing on patients who repeatedly no-show for clinic appointments, this study was able to identify patient factors that might be barriers to patient access to care, specifically younger age, black race, and lower income. Similar to the results of this study, Hamilton found in a cohort study in as general practitioner practice in the UK that patients of younger age and lower socieoeconomic status were more likely not to attend clinic appointments [5]. Other studies have found younger age to be a significant characteristic of no-show patients as well [6,7]. The results of Cohen and Zirkle in otolaryngologic practices in Israel and Canada also found female sex and younger age to be significant factors for non-attendance [2,8]. While useful in gathering a gestalt about a likely no-show patient, these past studies did not separate out patients who failed to show in a single versus multiple instances.

We hypothesize that younger patients not attending clinic appointment could be linked to a higher likelihood of employment status versus retirement, difficulty getting time off work, or family duties. If this is the case, clinics held in the evenings or on the weekends may provide these patients with greater access to care. Gender differences are variable among studies [2,5–8] but we hypothesize that while women tend to utilize health care serves more than men [9,10], there may be a difference when specialty services are utilized.

Contrary to our initial hypothesis that further distance would be a barrier to access, a patient's proximity to the appointment location based on bus time and transfers was found to be significant for no-showing. One explanation could

Table 3 – Multivariable logistic regression results for control patients compared to no-show patients.

Variable	Odds ratio (95% confidence interval)	p-value
Age	0.76 (0.68, 0.86)	0.001
Black race	4.51 (2.58, 7.88)	0.001
Income level	0.83 (0.72, 0.96)	0.010

be that the mean income around the appointment locations is lower. The median income around Henry Ford's Detroit location is $23,146 and Dearborn location is $31,505. Together, 80/105 (75%) of no-show patients had appointments at these locations. If these patients lived in proximity to these sites, their median income was likely similar (mean from Table 1 $29,588) which could account for this paradoxical result.

Interestingly, having Medicaid insurance was found to be significant but having any government issued insurance was not. This may correlate with the finding that lower income and younger age were significant factors for no-showing. Additionally, patients with other government insurance such as Medicare may not necessarily have a lower income and tend to be older which could account for the lack of significance.

A natural follow-up to this study would be the use of reminder interventions assuming that a portion of missed appointments are due to forgetting about the appointment. The Henry Ford Health System routinely sends out appointment reminders through the mail approximately one week prior to clinic appointments. While interventions like this have been shown to help improve patient no-show rates [11], any intervention incurs a cost. Some data suggests that telephone reminders may be the most effective method of reducing no-show rates and allowing cancellations to be filled by same day patients [12]. The otolaryngology department does not currently augment the mail reminders with telephone reminders.

There may also be some patients whose circumstances are not augmentable. In those cases, Daggy proposed a model of scheduling patients according to their no-show probability [13]. By changing scheduling patterns, practitioners may be able to maximize use of their clinical time. Izard proposed a similar schedule change in a family practice setting where habitual no-showers were placed on virtual doctor's schedule [14]. If the patient showed up, they were seen behind regularly scheduled patients and if they did not, they were terminated from the system with a prior warning. This decreased no-show rates by 20% and increased physician visits by 30%.

Another follow-up study could be performed where patients are contacted to determine their mode of transportation. Patients who live in lower income neighborhoods might not own a car or might not feel safe riding the bus. Other methods that were not factored in which could have been utilized are carpool/vanpools, ambulance, or family members residing at a different residence. Determining the primary mode of transportation and providing vanpools or bus passes could encourage lower income patients to attend their clinic appointments.

One limitation is the location in which this study was performed. The Detroit metro area is a highly segregated region in which race and income level differ starkly from one region to the next. For example, Detroit's population is 83%

black with a median household income of $26,955 [15] while West Bloomfield's population is 80% white with a median household income of $93,790 [16]. While other metropolitan areas in the US may have similar distributions, it is difficult to predict if our results will translate to the majority of otolaryngologic practices in the US.

Another limitation of this study is the general parameters analyzed. A follow-up to this study would be to analyze more specific patient characteristics such as medical comorbidities, history of mental illness, independence status, main mode of transportation, having a valid driver's license, employment status, highest completed education, and household income. These parameters may shed more light on how mobile theses patients are and where a doctor's appointment might lie in their priorities among other life duties. Additionally, examination of external factors such as weather could be analyzed as well. We did include this variable in compiling our study database. However, our design compares patients from the same day so weather did not vary between the no-show and control groups and thus could not be compared.

Since the time of this analysis, the Henry Ford Health System has instituted a new medical record system that allows patients to interact more with healthcare professionals via an online portal. With the increased convenience of scheduling appointments via this online portal, the demographic of patients who repeatedly no-show might be altered over time.

5. Conclusion

Younger age, black race, and lower income are significant contributors to patient non-compliance with clinic appointments. Identification of these predictors is the first step towards directing interventions in the future to improve patient access to care. Follow-up studies include implementing interventions such as educational tools, transportations services, or patient navigators to improve compliance and decrease overall healthcare cost.

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