

Do Waiting Times in Dental Offices Affect Patient Satisfaction and Evaluations of Patient-Provider Relationships? A Quasi-experimental Study

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Abstract

Purpose: Spending time in waiting rooms prior to dental visits is not uncommon for dental hygiene patients. The objectives were to determine if the length of a patients' waiting time affected their satisfaction with the appointment and their evaluation of their provider. In addition, the patient's level of education and whether the dental visit is a first visit will be examined to determine if these affected the outcome.

Methods: Survey data were collected from 399 adult patients who came for regularly scheduled visits to a dental school clinic. The patients ranged in age from 19 to 93 years (mean=52 years; SD=16.9). For 29% of the patients, this visit was the first visit with this provider.

Results: The patients whose providers were early (n=65) were more satisfied, more likely to plan to follow their provider's recommendation and evaluated their relationship with their provider more positively than patients whose providers were on time (n=283), while the patients in the "late" group (n=32) showed the most negative responses to all questions. Patients from higher educational backgrounds were most negative in their responses when their providers were late. Patients with a first visit whose providers were late had the most negative evaluations of the patient-provider relationship.

Conclusion: Long waiting times prior to a scheduled dental appointment have a negative effect on patients' satisfaction with their visit, the evaluations of the patient-provider relationship and the patients' intentions to return.

Keywords: dental hygienists, dentists, patients, dentist-patient relationships, patient appointment, patient satisfaction, patient schedule, patient compliance, patient cooperation

This study supports the NDHRA priority area, **Health Promotion/Disease Prevention:** Assess strategies for effective communication between the dental hygienist and client.

INTRODUCTION

Research in medical settings reports that patients' satisfaction with their provider is an important predictor of their willingness to return for follow-up visits, their cooperation with treatment recommendations and the likelihood that they recommend their provider to other patients.¹⁻³ Several studies in dentistry have shown similar findings. For example, Patel et al concluded that the relationship with a periodontist was related to patients' decision to accept a recommendation to have surgical treatment.⁴ Inglehart et al documented that the level of satisfaction with their dentist affected whether and how long patients had used a bite splint they had received because they suffered from bruxism.⁵ Numerous other studies provided additional support for the importance of dental patients' satisfaction with their provider, for reducing patients' dental fear and anxiety, for increasing their confidence in their dentist, and for achieving more positive treatment outcomes.⁶⁻¹⁴

as having a negative effect on patients' satisfaction with their provider was the length of time the patients spent in a waiting room. This relationship was documented for patients in many different medical settings, such as when seeking care in emergency rooms, receiving chemotherapy treatment, visiting a primary care provider, or a gynecologist, obstetrician or other medical specialists.¹⁵⁻²⁰ In dental offices, patients' dissatisfaction with long waiting times have been documented as well.²¹⁻²³ However, no study so far explored how the exact length of the patient's time in the waiting room would affect their satisfaction with their provider, their intentions to cooperate with treatment recommendations and their intentions to return for future dental visits. The first objective of this study is to explore if having a long waiting time versus not having to wait or having a dentist who is early affects a patient's response to their providers and their intended treatment cooperation.

eral, it is also interesting to reflect whether certain groups of patients will respond to longer waiting times more negatively than other groups of patients. One potential moderating factor could be the patient's level of education. Research found that there is a general relationship between patient satisfaction and level of education. Patients with lower levels of education were on average more satisfied with their medical care and providers than patients with higher levels of education.²⁴⁻²⁶ In the context of exploring the effects of length of waiting time on dental patients' satisfaction, these earlier findings might not only result in the prediction that less educated patients would be more satisfied than better educated patients, but there might be a differential effect of waiting time length in these groups. The second objective is to explore whether a patient's level of formal education (more precisely, the years of schooling they had received) will differentially affect their satisfaction as a function of the length of their waiting time. It is hypothesized that patients with more formal education will be less satisfied than patients with less formal education, and that this effect would be especially large when patients had a long waiting time.

A second moderating factor might be whether a dental visit is a patient's first encounter with a provider or whether a patient has an already established relationship. At a new patient visit, dental care providers do not only need to assure that they collect all the necessary medical and dental information to provide safe and the best possible care for a patient, but they also have to develop good rapport with a patient. The question is how the length of waiting time affects a new patient versus an established patient's response to their providers.

METHODS AND MATERIALS

This research was determined to be exempt from oversight by the Institutional Review Board for the Health and Behavioral Sciences at the University of Michigan in Ann Arbor.

Respondents: An a priori power analysis with the program package G*Power 3.1.2 was conducted to compute the needed sample size given $\alpha=0.05$, the power=0.95 and a medium effect size of 0.20 when using a univariate of analysis to test for significant differences in the average responses of respondents whose provider was early, late or on time. The result showed that a sample size of 390 patients was needed. Data were collected from 399 regularly scheduled adult dental/dental hygiene patients. Table I shows that the sample was quite heterogeneous in regard to gender, age and years of education. There were approximately equal numbers of male ($n=196$) and female ($n=203$) patients. The patients ranged in age from 19 to 93 years (mean=52 years) and

Table I: Background Characteristics of Study Participants

Background characteristics	Frequencies or Mean	Percent or SD to Range
Gender		
Male	196	49%
Female	203	51%
Age	Mean: 52 years	16.87 19 to 93 years
Years of education	Mean: 14 years	2.76 6 to 30 years
Dental visit information		
First visit to dental school		
Yes	36	9%
No	363	91%
First visit with this student		
Yes	117	29%
No	282	71%
Length of waiting time in minutes	Mean: 9	10.91 0 to 75 minutes
Waiting time - Provider was:		
Early	66	17%*
On time	298	75%
Late	34	9%

*Percentages might not add up to 100% due to rounding

their years of education ranged from 6 to 30 years (mean=14 years).

Procedure: The patients were informed about the study when they arrived for a regularly scheduled appointment in the waiting room area of a Midwestern dental school. If they agreed to respond to a self-administered survey after their appointment, they received the survey and a voucher for free parking during the visit from the research assistant. They responded to the anonymous survey after their appointment and returned it in a sealed envelope to the research assistant. The return of the survey was seen as giving implicit consent. No written consent was required because the survey was anonymous.

Materials: A survey instrument was developed by the research team and then pilot tested with a group of 10 patients. The pilot data showed that the questions were easy to understand and that only formatting changes were needed. The final survey consisted of 4 sets of questions. The first set asked the patients about some background characteristics such as their gender, age, years of education and whether this dental visit was their first visit with this provider. Part 2 consisted of 2 questions related to the length of their waiting time. Question 1 inquired about the length of the waiting time in minutes and Question 2 asked the patients to indicate categorically if their

Table II: Patients' Satisfaction and Relationship-Related Responses

Satisfaction with appointment	1 and 2	3	4	5	Mean SD
Satisfaction with dental visit today*	2%	2%	13%	83%	4.77 0.60
I enjoyed the visit today**	3%	11%	23%	64%	4.46 0.84
I felt comfortable today**	2%	3%	20%	75%	4.68 0.65
I learned more about how to keep my teeth healthy**	3%	5%	15%	77%	4.66 0.77
Index "Satisfaction with appointment" (alpha=0.763)					4.64 0.55
Evaluations of relationship					
My provider was well prepared	1%	3%	11%	85%	4.79 0.57
My provider welcomed me in a friendly manner**	1%	1%	9%	90%	4.87 0.44
My provider explained what would be done today**	1%	1%	10%	88%	4.85 0.47
My provider took time to listen to me**	1%	1%	11%	88%	4.85 0.47
I trust my provider to give good treatment	1%	2%	11%	87%	4.84 0.48
I plan to follow my provider's recommendations**	1%	3%	13%	84%	4.78 0.58
I plan on returning to this provider**	1%	1%	10%	88%	4.85 0.46
I feel my provider values my time**	1%	3%	10%	87%	4.81 0.54
Index "Evaluation of relationship" (alpha=0.962)					4.83 0.45

*Answers ranged from 1=not at all to 5=very satisfied

**Answers ranged from 1=strongly disagree to 5=strongly agree

student provider was early, on time or late for their appointment.

The third set of questions was concerned with the patients' satisfaction with the appointment. The first of these 4 satisfaction questions asked about the patient's "Satisfaction with the dental visit today," with answers ranging from 1=Not at all to 5=Very satisfied. Three additional questions had a Likert-style answer format. They consisted of the statements "I enjoyed the visit today," "I felt comfortable today" and "I learned more about how to keep my teeth healthy." Answers ranged from 1=Strongly disagree to 5=Strongly agree. The Cronbach alpha inter-item consistency reliability coefficient for these four items was 0.763.

The final set of questions consisted of 8 Likert-type questions concerning the patients' evaluations

of their relationship with their provider and their responses related to cooperating with their provider's recommendations ("I plan to follow my provider's recommendations") and their likelihood to return to the provider ("I plan to return to this provider"). These answers also ranged from 1=Strongly disagree to 5=Strongly agree. Table II provides an overview of the wording of these statements. The Cronbach alpha inter-item consistency reliability index for these 8 items was 0.962.

Statistical analyses: The data were entered into SPSS (Version 21). Descriptive statistics such as percentages, means, standard deviations and ranges were provided to give an overview of the responses. Inferential statistics were used to compare the responses of subgroups of patients. Multivariate analyses of variance (MANOVA) with the 3 independent variables "Length of waiting time" (with the 3 lev-

Table III: Average Responses of Patients whose Providers Were Early, On Time or Late

Satisfaction with appointment	Waiting time - Provider was:		
	Early	On time	Late
Satisfaction with dental visit today?#	4.96	4.80	4.21***
I enjoyed the visit today.##	4.70	4.44	4.06**
I felt comfortable today.##	4.82	4.68	4.39**
I learned more about how to keep my teeth healthy.##	4.79	4.66	4.33*
Index "Satisfaction with appointment"	4.81	4.64	4.25***
Evaluations of relationship			
My provider was well prepared for my visit.	4.89	4.81	4.47**
My provider welcomed me in a friendly manner.##	4.89	4.89	4.69*
My provider explained what would be done today.##	4.89	4.87	4.56**
My provider took time to listen to me.##	4.91	4.87	4.53***
I trust my provider to give good treatment.	4.86	4.86	4.63*
I plan to follow my provider's recommendations.##	4.88	4.81	4.50**
I plan on returning to this provider.##	4.89	4.87	4.63*
I feel my provider values my time.##	4.89	4.85	4.34***
Index "Evaluation of relationship with provider"	4.89	4.85	4.54***

*p≤0.05; **p≤0.01; *** p≤0.001

#Answers ranged from 1 = not at all to 5 = very satisfied

##Answers ranged from 1 = strongly disagree to 5 = strongly agree

els: Provider was late, on time or early), "Education" (≤12 years of education vs. >12 years of education), and "Type of visit" (first vs. repeat visit) and the dependent variables satisfaction with appointment (4 items) and evaluations or relationship with provider (8 items) were computed. An index "Satisfaction with the appointment" and an index "Evaluation of the patient-provider relationship" were calculated by averaging the responses to the single items in these 2 item sets. The inter-item consistency of these 2 scales was determined with Cronbach alpha coefficients. Univariate analyses of variance with the independent variable "Waiting time," "Level of education" and "First vs. not first visit" and the 2 indices as the dependent variables were conducted. A level of p<0.05 was accepted as significant.

RESULTS

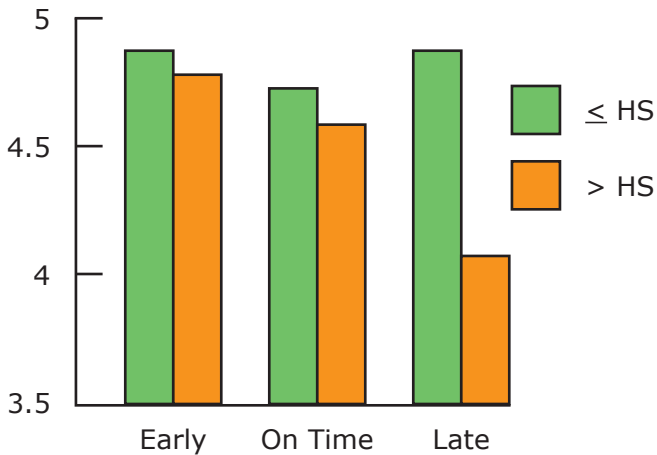
Table I shows that 196 male and 203 female patients participated in this study. The patients were on average 52 years old (range 19 to 93 years) and had an average of 14 years of education (range 6 to 30 years), with 151 patients having a high school diploma or fewer years of education and 221 having more years of education than a high school diploma. Nine percent of the patients reported that this was their first visit to the dental school, and 29% indicated that it was the first visit with this particular student provider. When the patients were asked how long they had to wait in the waiting room area, the average answer was 8.59 minutes (range 0 to 75

minutes). In response to the question whether their provider had been early, on time, or late, 17% reported that their provider was early, 75% that their provider was on time, and 9% that their provider was late (Table I).

The vast majority of patients was very satisfied with their dental visit (83%), agreed strongly that they enjoyed their visit (64%), had felt comfortable (75%), and had learned more about how to keep their teeth healthy (77%) (Table II). When a satisfaction index was constructed by averaging the responses to these 4 items, the average response was 4.64 on a 5-point scale with 5 being the most satisfied response. The responses to the 8 items that measured the patients' evaluations of their relationship with their provider and their intentions to follow treatment recommendations and return for a follow-up visit were also very positive. Again, over 80% of the respondents strongly agreed that their provider was well prepared; welcomed them in a friendly manner, explained what would be done, and took time to listen to them. Over 80% also trusted their provider, planned on following the provider's recommendations and on returning to the provider, and felt their provider valued their time. When an index was constructed based on the average of the responses to these 8 items, the average response was 4.83.

The first objective was to compare the responses of patients who had reported that their provider had been early, on time or late. Table III shows that the

Figure 1: Average Satisfaction with the Appointment of Patients whose Provider was Early, On Time or Late by Level of Education

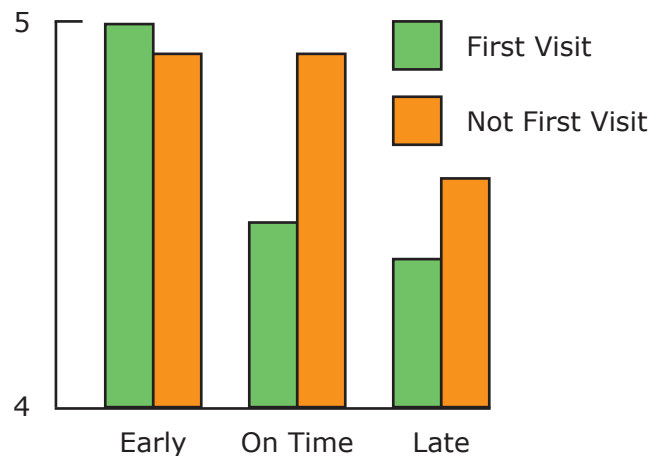


patients whose provider was early were significantly more satisfied with their dental visit than the patients whose provider were on time, and that the least satisfied patients were those whose provider was late for the appointment (4.96 vs. 4.80 vs. 4.21; $p < 0.001$). The same pattern of responses was also found in the answers to the statements "I enjoyed the visit today," "I felt comfortable today" and "I learned more about how to keep my teeth healthy." In each instance, patients whose provider was late were least positive in their responses, and the patients whose provider were early were most positive (MANOVA: $F(4/754) = 5.15$; $p < 0.001$). A univariate analysis of variance with the dependent variable "Satisfaction with appointment" index showed the same overall pattern of responses.

Table III also shows that the 3 groups of respondents whose providers were early, on time or late differed in the same way in their evaluations of their relationship with their provider. For each of the 8 statements, patients whose provider had been late were significantly less positive about their relationship than patients whose providers were early or on time (MANOVA $F(16/742) = 2.51$; $p = 0.001$).

In addition to comparing the responses of patients whose providers were early, on time or late, it was also explored how the patients' level of education affected the responses of these 3 groups. Figure 1 shows the average level of satisfaction of patients with lower (12 years or less) vs. higher (more than 12 years) levels of education in each of the 3 waiting time groups. This figure shows that patients with a lower level of education were more satisfied in each of the 3 groups than patients with higher levels of education (4.82 vs. 4.48; $p < 0.001$). In addition, patients with a higher level of education whose provider was late were on average least satisfied with their appointment (mean: 4.07) compared to

Figure 2: Average Evaluation of the Patient-Provider Relationship of Patients whose Provider Was Early, On Time or Late by First vs. Not First Visit with This Provider



all other groups ($p < 0.01$). Table IV provides the detailed information concerning the effects of level of education on satisfaction and provider evaluations of patients in the 3 groups. Patients with lower levels of education had more positive average overall evaluations of their relationship with their provider than patients with higher levels of education (4.91 vs. 4.71; $p < 0.01$). While the interaction effects between the factors "Waiting time" and "Level of education" were not significant for most of the evaluation items, the average responses to the item "I feel that my provider values my time" showed again that patients with higher levels of education were least positive in response to this item compared to all other groups.

The final question was whether the fact that a patient had a first visit with a provider affected their responses to whether their provider was early, on time or late. Figure 2 shows that the average overall evaluations of patients whose provider had been late and for whom this visit was a first visit were least positive (Mean: 4.40), while the responses of patients with a first visit whose provider were early were most positive (Mean: 5.00) compared to the evaluations of all other respondents. Table V shows that the fact that a patient had a first vs. not a first visit with a provider did not affect how satisfied they were, how much they enjoyed the visit and how comfortable they felt. However, patients with a first visit agreed less strongly that they had learned more about how to keep their teeth healthy than patients for whom this visit was a repeat visit. In addition, patients who saw providers for the first time agreed less strongly that their provider was well prepared for their visit, welcomed them in a friendly manner, explained what would be done during the visit, took time to listen and valued their time than patients for whom this visit was not a first visit with this provider. Patients with a first visit whose provider was late had the least positive response to the statements

Table IV: Average Responses of Patients with High School or Fewer Years of Education vs. With More Years than High School Education whose Providers Were Early, On Time or Late

Satisfaction with appointment	≤HS vs. >HS	Waiting time			Total
		Early	On time	Late	
Satisfaction with dental visit today?#	≤HS	5.00	4.78	5.00***	4.83***
	>HS	4.91	4.80	3.95	4.74
I enjoyed the visit today.##	≤HS	4.77	4.58	4.78	4.63***
	>HS	4.63	4.35	3.86	4.34
I felt comfortable today.##	≤HS	4.80	4.78	4.78	4.78
	>HS	4.83	4.62	4.32	4.62
I learned more about how to keep my teeth healthy.##	≤HS	4.90	4.73	4.89	4.77**
	>HS	4.69	4.60	4.14	4.57
Index "Satisfaction with appointment"	≤HS	4.87	4.72	4.86**	4.82***
	>HS	4.76	4.59	4.07	4.48
Evaluations of relationship					
My provider was well prepared for my visit.	≤HS	4.93	4.82	4.88	4.85*
	>HS	4.85	4.79	4.41	4.76
My provider welcomed me in a friendly manner.##	≤HS	4.93	4.89	4.88	4.90
	>HS	4.85	4.88	4.68	4.86
My provider explained what would be done today.##	≤HS	4.93	4.90	4.88	4.91*
	>HS	4.85	4.85	4.50	4.82
My provider took time to listen to me.##	≤HS	4.97	4.89	4.88	4.91*
	>HS	4.85	4.85	4.45	4.81
I trust my provider to give good treatment.	≤HS	4.93	4.87	5.00	4.89**
	>HS	4.79	4.84	4.55	4.81
I plan to follow my provider's recommendations.##	≤HS	4.97	4.86	4.75	4.87*
	>HS	4.79	4.76	4.45	4.74
I plan on returning to this provider.##	≤HS	4.97	4.87	5.00	4.90**
	>HS	4.82	4.87	4.55	4.83
I feel my provider values my time.##	≤HS	4.97	4.90	5.00***	4.92***
	>HS	4.82	4.81	4.18	4.75
Index "Evaluation of relationship with provider"	≤HS	4.95	4.88	4.91	4.91**
	>HS	4.83	4.83	4.47	4.71

*p≤0.05; **p≤0.01; ***p≤0.001

#Answers ranged from 1=not at all to 5=very satisfied

##Answers ranged from 1=strongly disagree to 5=strongly agree

"My provider explained what would be done today" and "My provider took time to listen" compared to all other respondent groups.

DISCUSSION

Patients' satisfaction with their medical and dental visits and their provider is crucial for their willingness to cooperate with treatment recommendations, their willingness to return for a follow-up visit and to recommend a provider to other patients.¹⁻⁵ While a lack of treatment cooperation ultimately might affect

patients' health, not returning for follow-up appointments and not recommending a provider to other patients can clearly affect the success of a dental practice.⁵ Avoiding situations that negatively affect patients' satisfaction is therefore crucial. The results of this study showed that letting patients wait for their appointments and not being on time affects their satisfaction negatively. Managing appointment times carefully is therefore important. However, there are times when patients might have to wait due to unforeseen events. The way these situations are being managed seem to determine ultimately how much

Table V: Average Responses of Patients with a First vs. Not a First Visit to the Dental School Clinics whose Providers Were Early, On time or Late

Satisfaction with appointment	First vs. Not First	Waiting time - Provider was:			Total
		Early	On time	Late	
Satisfaction with dental visit today?#	First	4.88	4.79	4.08	4.73
	Not First	5.00	4.80	4.37	4.80
I enjoyed the visit today.##	First	4.42	4.47	4.00	4.40
	Not First	4.86	4.43	4.21	4.48
I felt comfortable today.##	First	4.63	4.67	4.31	4.62
	Not First	4.93	4.68	4.53	4.70
I learned more about how to keep my teeth healthy.##	First	4.46	4.63	4.15	4.54*
	Not First	4.98	4.68	4.47	4.71
Index "Satisfaction with appointment"	First	4.59	4.64	4.13	4.52
	Not First	4.94	4.65	4.39	4.65
Evaluations of Relationship#					
My provider was well prepared for my visit.	First	4.70	4.77	4.38	4.71*
	Not First	5.00	4.18	4.56	4.83
My provider welcomed me in a friendly manner.	First	4.70	4.89	4.62	4.81*
	Not First	5.00	4.89	4.78	4.90
My provider explained what would be done today.	First	4.70	4.86	4.31*	4.76***
	Not First	5.00	4.88	4.78	4.89
My provider took time to listen to me.	First	4.74	4.86	4.31*	4.77**
	Not First	5.00	4.87	4.72	4.88
I trust my provider to give good treatment.	First	4.74	4.85	4.54	4.79
	Not First	4.93	4.86	4.72	4.86
I plan to follow my provider's recommendations.	First	4.74	4.77	4.46	4.73
	Not First	4.95	4.82	4.56	4.82
I plan on returning to this provider.	First	4.74	4.85	4.54	4.79*
	Not First	4.98	4.88	4.72	4.88
I feel my provider values my time.	First	4.74	4.80	4.15	4.71**
	Not First	4.98	4.86	4.56	4.86
Index "Evaluation of relationship with provider"	First	5.00	4.49	4.40*	4.61
	Not First	4.87	4.88	4.57	4.85

*p≤0.05; **p≤0.01; ***p≤0.001

#Answers ranged from 1=not at all to 5=very satisfied

##Answers ranged from 1=strongly disagree to 5=strongly agree

the length of waiting affects patients' satisfaction, at least in the short term. Research in medical settings found that when medical care providers were late for their appointment with a patient, spending more time with the patient during the appointment could moderate the negative effects of a long waiting time.^{19,27,28}

The results of this study showed that patient characteristics might also affect the degree to which longer waiting times affect patients' satisfaction. While previous research clearly documented that patients'

level of education was related to their treatment satisfaction,²⁴⁻²⁶ this is the first study that documents that patients' level of education might moderate their responses to longer waiting times. In addition, there is some evidence that whether a dental visit is a new patient visit could further moderate patients' responses. Future studies could explore whether other patient characteristics such as patients' age might also affect responses to longer waiting times.²⁹

In addition to considering how longer waiting times affect patients' responses, it is also noteworthy to

consider that research showed that providers' satisfaction with an appointment was also lower when they could not provide on-time care for their patients and the patients had to wait.¹⁸ Running late for appointments might induce stress that affects patient-provider interactions and providers' professional quality of life. In summary, longer waiting times for patients are not only likely to result in reduced patient and provider satisfaction in a given situation, but might affect the success of a practice in the long run.

This study had several limitations. First, the data were collected in a dental school setting where dental care is relatively less expensive, but takes longer than in a private office. Answers to the question concerning the patients' intent to return might be affected by the fact that they were seeking dental treatment for a reduced price. In private practice settings, patients' intentions to return to a provider, especially if a dental visit is their first visit, might therefore be more affected by their level of satisfaction with an appointment. Second, given that these data were collected in a dental school, the patients might be more likely to come from a lower socio-economic background. Future research might therefore consider patients' economic situation in connection with their level of education as a factor that might determine the patients' responses to long waiting times. Third, no data were collected concerning whether these patients were treated by dental or dental hygiene students. It is therefore not possible to answer the question whether a longer waiting time for an appointment with a dental hygienist vs. a dentist would affect patients' responses differentially. Finally, all dependent variables were assessed with patients' responses to a survey. In future studies, it would be interesting to collect objective data such as whether patients actually return to a provider after having had to wait for a long time. In addition, several possible variables that might have affected the outcomes such as the procedure performed and the amount of experience of the provider were not

included and should be considered in future studies. Assessing patients' responses at later points in time could also be helpful because it would clarify if the findings in this study hold up over time.

CONCLUSION

Based on these findings, it can be concluded that the length of time patients have to wait in a waiting room area for their dental care provider negatively affects their level of satisfaction with the appointment, their evaluations of the patient-provider relationship as well as their intentions to cooperate with the providers' recommendations. These negative effects on patients' level of appointment satisfaction are especially severe for patients with higher levels of education. In addition, if a provider is late for a first visit with a new patient, it can be expected that the patients' overall evaluations of the patient-provider relationships will be least positive compared to the evaluations of all other patient groups.

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