Effect of Technical and Functional Quality on Patient Perceptions of Pharmaceutical Service Quality

David Holdford[1,3] and Richard Schulz[2]

Purpose. To evaluate the relative importance of functional quality (how services were provided) and technical quality (what was received for those services) on patient perceptions of pharmaceutical service quality. *Methods.* A scenario-based experimental design was chosen to manipulate functional (FQ) and technical quality (TQ). Subjects were asked to read one of four scenarios describing a pharmacy service experience and imagine that he or she were in the situation described. High and low TQ were manipulated by describing the presence or absence of a prescription medication dispensing error made by the pharmacist in the scenario. Each subject completed a survey about their evaluations of the service provided in the scenario. An ANOVA using a 2 × 2 completely randomized factorial design was conducted to compare the effects of TQ, FQ, and their interaction on perceptions of service quality and behavioral intention. Effect sizes were measured with the calculation of omega-square. *Results.* FQ had the greatest impact on patient perceptions of service quality and behavioral intentions. FQ explained 44% of the variance in service quality and 39% in intention to return. TQ and the interaction accounted for a significant but much lesser effect. The interaction showed that the effect of FQ was greatest under conditions of high TQ. There were no significant associations between any demographic characteristics and responses to service quality. *Conclusions.* The results suggest that FQ has the greatest impact on consumer perceptions of pharmaceutical service quality even under conditions of an obvious example of low TQ which respondents perceive as serious and possibly harmful. This study underscores the limitations of relying on patient perceptions in evaluating pharmaceutical services. Although patient evaluations are important, they can be inadequate for assessing the professional quality of services.

KEY WORDS: service quality; patient perceptions; technical quality; functional quality; pharmacist; medication error.

INTRODUCTION

Pharmacists complete years of training to enable them to provide higher levels of pharmaceutical services to consumers. However, some consumers do not seem to appreciate the professional activities of pharmacists, despite the fact that these activities can affect health and well-being. Although pharmacists are underutilized professionally and capable of providing much higher levels of care, consumers appear to be satisfied with current levels of pharmacist services (1–2).

Part of the problem lies in the challenge consumers face in evaluating any service. Services are intangible and therefore difficult to evaluate prior to sale. Service performances vary from person-to-person, transaction-to-transaction, and time-to-time resulting in no two service experiences being exactly alike. The quality of each service experience varies because services cannot be easily standardized due to variations in each buyer-seller interaction.

Typically, consumers rely on the visible actions of service providers and the physical surroundings of service locations when faced with service characteristics that are difficult to assess (3). One problem with consumers using this heuristic to evaluate services is that visible variables used to assess the technical competence of service providers may be unrelated to competence. For example, many professional services provided by pharmacists (e.g., checks of the patient profile for drug allergies and interactions) are provided behind the scenes, unseen by the consumer. Consequently, consumers may emphasize non-technical over technical characteristics of services when evaluating pharmaceutical services. If true, this can affect consumer acceptance of higher levels of pharmaceutical services. This paper discusses how patients evaluate the quality of pharmaceutical services and describes research which examines the relative importance of quality dimensions in overall evaluations of service quality.

Measures of service quality have been linked to outcomes of interest to pharmacists. For general services, service quality has been found to be a significant predictor of willingness-to-recommend, repeat purchase, switching behavior, complaining behavior, (4) and perceptions of service value (5). Businesses that provide superior service have demonstrated higher market share growth, (6) increased market share, and premium prices (7). For health care services, service quality has been associated with intentions-to-use, (8) repurchases, compliments, complaints, recommendations, switching behavior, and use of medical services (9). Perceptions of quality of care and profitability of hospitals has also been found to be related to service quality (10).

The marketing literature conceptualizes "service quality" as a post-consumption evaluation of services by consumers that compares expectations with perceptions of performance (3). Perceptions of service quality differ from consumer satisfaction because satisfaction is a transaction-specific measure, whereas, service quality is a long-run evaluation of multiple transactions (3). Additionally, satisfaction often examines non-quality dimensions such as cost, while service quality is limited only to quality evaluations.

Consumer evaluations of service quality are a function of how the service is perceived to be delivered (i.e., functional quality) and perceptions of what is received for that service (i.e., technical quality) (11). A model for pharmaceutical service quality is presented in Fig. 1. Technical quality (TQ) and functional quality (FQ) are interrelated and both are critical in assessing service quality. In other words, how the service is delivered can affect perceptions of outcome, and the outcome of service can influence perceptions of how the service is delivered.

One question of interest to researchers in professional services such as pharmacy is whether FQ has a greater role

[1] Assistant Professor of Pharmacy Administration, School of Pharmacy, Virginia Commonwealth University (MCV Campus), Richmond, Virginia.
[2] Professor of Pharmacy Administration, School of Pharmacy, University of South Carolina, Columbia, South Carolina.
[3] To whom correspondence should be addressed. (e-mail: dholdford@vcu.edu)

$$SQ = f(\ FQ,\ TQ\ )$$

SQ	= Service Quality -	Overall consumer perceptions of quality provided by pharmaceutical services
FQ	= Functional Quality -	Perceptions by the consumer about *how* the services were delivered (e.g., Were services fast and friendly?)
TQ	= Technical Quality -	Perceptions by the consumer about *what* was received from those services (e.g., Did the consumer get the drug? Did they get counseled?)

Fig. 1. Model of pharmaceutical service quality.

than TQ on consumer evaluations of overall service quality (12). When services have a clear and specific outcome (e.g., hair dressers and fast-food providers) consumers can base their evaluations of overall service quality using TQ as a primary determinant. However, many services are complex and do not have a clear outcome with which the consumer can make an objective judgement. These services are difficult to evaluate because consumers do not have sufficient information, expertise, and resources available to distinguish high from low TQ services. In these cases, consumer evaluations of TQ may bear little relationship with TQ as assessed by a service provider. For example, friendly, attentive pharmacists may be perceived by patients as technically knowledgeable when in reality, they may only be good at giving the impression of being knowledgeable.

Economists have addressed the difficulty of consumer evaluation by describing service attributes as having either *search* or *nonsearch* qualities (Fig. 2) (13). Search qualities are those that can be identified and evaluated prior to choice and/ or consumption. "Convenience" can be classified as a search attribute, because convenience can be determined through advertising or word-of-mouth before a purchase. Nonsearch qualities, in contrast, are those that cannot be evaluated prior to choice.

Nonsearch attributes are further classified into *experience* and *credence* sub-categories. Experience qualities are those that can only be evaluated during or after consumption. "Friendly" and "fast" services have experience qualities, because these attributes can only be assessed after consumption. Credence qualities, on the other hand, cannot be meaningfully evaluated even after experience (14). Most technical services provided by pharmacists, such as therapeutic monitoring, have credence
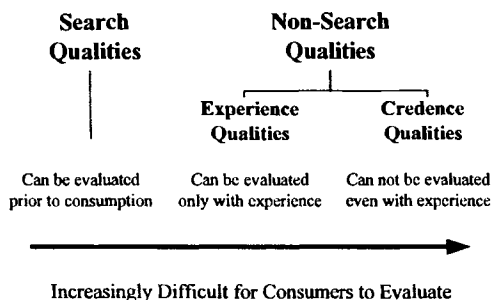
qualities because consumers do not have the knowledge or expertise to evaluate the services even after receiving them.

Medical services consist of many credence properties making them difficult to assess for consumers. Murray found that respiratory patients rely on search factors to evaluate the quality of respiratory services instead of perceptions of their own experience because of uncertainty in their own quality judgements (15). Studies in pharmacy show that consumers rely extensively on search characteristics (e.g., convenience) and experience characteristics (e.g., speedy and friendly service) in choosing pharmacies (16–17).

Nevertheless, there are times when the end result of health care can be easily and accurately evaluated such as with plastic surgery, obstetrics, and corrective orthopedics. Lytle and Mokwa found that health service outcomes (pregnancy or no pregnancy) significantly influence overall patient perceptions of service quality received in a fertility clinic (18). The process of care was a significant predictor of service satisfaction only when a negative outcome was received.

Therefore, the service quality literature suggests that the importance of TQ in overall service quality evaluations depends on the ability of the patient to evaluate the outcome. Powpaka offers the explanation that outcome (i.e., technical) quality is significant in determining consumer perceptions of overall service quality for services with search and experience attributes, but not for services with credence qualities (19). A service with a clear outcome can be judged after experience and therefore, TQ becomes a more important determinant in overall quality judgements. When the outcome is not so clear and easy to assess, FQ takes on greater consequence in overall evaluations.

Based on the previous literature review, five hypotheses can be proposed. Both TQ and FQ should be positively associated with overall perceptions of pharmaceutical service quality (H_1 and H_2). In a situation in which the outcome can be objectively judged by the consumer, TQ is hypothesized to have a greater impact than FQ on overall perceptions (H_3). Since evaluations of TQ depend on FQ and FQ on TQ, an interaction between the two is proposed (H_4). And finally, H_5 predicts that when there is an interaction, the impact of FQ on overall evaluations will be greatest under conditions of low TQ as suggested by Lytle and Mokwa (18).

```
          Search              Non-Search
        Qualities             Qualities
            |                     |
            |              ┌──────┴──────┐
            |          Experience     Credence
            |          Qualities      Qualities
       Can be evaluated  Can be evaluated  Can not be evaluated
       prior to consumption  only with experience  even with experience
    ──────────────────────────────────────────────►
```

Increasingly Difficult for Consumers to Evaluate

Fig. 2. Dimensions used by consumers evaluating service quality.

H_1 Functional quality of pharmaceutical services positively influences overall perceptions of service quality.

H₂ Technical quality of pharmaceutical services positively influences overall perceptions of service quality.

H₃ Technical quality has a greater effect than functional quality on overall perceptions of service quality when the outcome can objectively be judged after experience.

H₄ There is an interaction effect between functional and technical quality on perceptions of service quality.

H₅ When there is an interaction effect between functional and technical quality, the effect of functional quality on perceptions of overall quality will be greatest under conditions of low technical quality.

METHODS

A scenario-based experimental design was chosen to manipulate functional and technical quality. Scenario-based designs (also called role-playing designs) have been used extensively in the psychology and marketing literature (4,20–22). A scenario design was selected because of ethical and practical difficulties associated with manipulating the TQ of health care. Subjects were asked to read one of four scenarios describing a pharmacy service experience and imagine that he or she were in the situation described. A power calculation suggested that a sample cell size of 13 for each scenario would be sufficient to detect an effect size of .3 at an alpha of .05 and a power of .80 (23). Therefore, we attempted to design scenario manipulations that would provide sufficient power to detect differences.

Scenarios were designed to address elements of TQ and FQ. The scenarios were developed by carefully reviewing the constructs of TQ and FQ and then operationalizing them through examples that one might find in an actual pharmacy service experience. Since TQ is defined as the end result of a service experience, TQ was operationalized by whether or not the pharmacist dispensed the correct medication to the patient and the appropriate health outcome was achieved. Since the end result of high TQ pharmaceutical services are not just getting a drug but also achieving a positive health outcome, the resolution of the infection was also described. Operationalization of FQ was conducted by examining each element of quality evaluated by each of the 22 SERVPERF items, and describing an example of high or low quality for each element in the scenario. For example, tangibles were addressed by portraying the appearance of the pharmacy, employees, and its equipment. Pharmacy administration faculty and practicing pharmacists were asked to evaluate the scenarios for content validity, readability, and plausibility. Experts in consumer behavior research, pharmaceutical services research, and pharmacy practice approved the scenarios as appropriate manipulations of the constructs. The scenarios were then pretested on graduate students. Modifications were made based on the comments and the pretest.

Each scenario described a visit to an community pharmacy in which subjects were asked to evaluate a single randomly assigned scenario of either high TQ/high FQ, high TQ/low FQ, low TQ/high FQ, or low TQ/low FQ. The scenarios are described in Table I. High levels of FQ were manipulated by describing pharmacy services that positively demonstrated the characteristics of service quality described in Table II. Low levels of FQ negatively demonstrated those characteristics. High and low TQ were manipulated by describing the presence or absence of a prescription medication dispensing error made by the pharmacist in the scenario. A dispensing error was used as

a manipulation of TQ because it is a clear and specific outcome that can be evaluated by the subject and is reflective of a typical TQ problem seen in pharmacy practice.

Subjects were then asked to evaluate the quality of the services provided in the scenario and to provide demographic information about themselves (Table III). Service quality was measured using a 22-item instrument called SERVPERF which has been validated for a variety of health care and non-health care services (24–28). Although SERVPERF has been described primarily as a measure of FQ, a pretest on 63 pharmacy students found that it could also detect differences in TQ. In addition, TQ and FQ were measured using single item questions. Other measures included items asking about overall service quality and behavioral intentions. A seven-point rating scale ranging from "strongly disagree" to "strongly agree" was used. Demographic questions were collected to assess their relationship with service quality. Differences in perceptions of overall quality for categorical variables (i.e., gender, marital status, education, income, and race) were examined by chi-square calculations and quality evaluations associated with age were evaluated with a t-test.

The instrument was administered to a convenience sample of 67 current and potential customers of prescription drug services in a metropolitan area located in the southern United States. Subjects were asked to complete the survey and return it personally to one of several people recruited to administer the survey. Survey administrators were instructed to provide no information other than the instructions on the first page of the survey. Subjects were recruited from a variety of public places (primarily churches, workplaces, and the university) to obtain a wide cross-section of respondents. Respondents were required to be older than 18 years of age.

An analysis-of-variance using a General Linear Model GLM and a 2 × 2 completely randomized factorial design was conducted to compare the effects of the independent variables TQ, FQ, and their interaction on SERVPERF scores, overall service quality, and behavioral intention. The GLM was used to correct for the unbalanced design, i.e., unequal cell sizes (29). Effect sizes for the independent variables were measured with the calculation of omega-square.

RESULTS

Demographic characteristics of the subjects are listed in Table IV. The average subject was a highly educated, young, white, female who was likely to have visited a pharmacy in the last 12 months and received good to excellent service. There were no significant associations between any demographic characteristics and responses to overall service quality.

The means and standard deviations of several dependent variables for each scenario are shown in Table V, and the results of an analysis-of-variance of overall service quality scores are displayed in Table VI. The mean SERVPERF score was calculated by summing the means for all SERVPERF items and dividing by 22. As predicted for H₁ and H₂, those subjects exposed to higher FQ and TQ scenarios showed significantly higher service quality evaluations. However, there was no evidence to support H₃, that TQ had a greater effect than FQ on overall service quality.

The relative impact of FQ, TQ, and their interaction on SERVPERF, overall service quality perceptions, and intention

Table I. Scenario Manipulations

Scenario sections

INTRODUCTION *(used to introduce all scenarios)*

Please read the following description about an encounter between a pharmacist and customer in a community pharmacy. Imagine that you are the customer receiving the service described. Please answer the questions on the following page based on your reactions to that encounter.

A doctor has written you a drug prescription that you are taking into a pharmacy. You have seen television advertisements for the pharmacy that promote their convenient hours and excellent employees. Also, several friends have recommended the pharmacy.

Your prescription is for an antibiotic to treat an infection in your lungs. The infection is causing you to cough uncontrollably and feel achy and feverish.

SCENARIO MANIPULATIONS

HIGH FUNCTIONAL QUALITY

The pharmacy seems neat and organized, with nonprescription medicines carefully arranged on shelves in front of the prescription counter. The pharmacist, who is dressed in a short white lab jacket over a pressed white shirt, tie, and slacks, is working at a computer behind the counter. He glances at you and responds politely, "I'll be right with you." Shortly thereafter, he walks over to you, introduces himself, and asks in a pleasant voice, "How can I help you?"

He examines the prescription that you give him. He then asks if you would be willing to fill out a questionnaire for the pharmacy's records. He explains that the record will be used to monitor for potential problems such as adverse drug reactions and drug allergies. You agree, fill out the form, and return it to the pharmacist. He asks you to take a seat in the nearby waiting area and promises to fill the prescription in five minutes.

In well under five minutes, the pharmacist asks you to step over to a private counseling area, away from other customers and interruptions. After carefully examining your records, he asks a series of questions relating to your non-prescription drug use, allergies, and medical conditions. Satisfied that there are no problems with the therapy prescribed by the physician, he proceeds to describe to you how to take the medication. To ensure you understand how to correctly use the medication, he periodically asks you questions. You ask what side effects to watch for. He mentions that some people get upset stomachs, and if that happens, you should take the medicine with a meal or snack.

When the pharmacist is assured that you understand how to appropriately take the medicine, he hands you a pamphlet that contains the answers to commonly asked questions about the medication. The pamphlet looks neat and simply worded. The pharmacist asks you to call him if you have questions that are not answered in the pamphlet. He gives you the pamphlet with your prescription and asks if there is anything else he can help you with. After you respond "no," you pay him and leave the pharmacy.

LOW FUNCTIONAL QUALITY

The pharmacy seems somewhat messy and disorganized. Most of the items in front of the counter seem to be haphazardly placed and some have even been knocked onto the floor and left there. The pharmacist, who is dressed in an open-collared golf shirt and plaid slacks, is working at a typewriter behind the counter. He glances at you but does not acknowledge your presence. After waiting some time to get his attention, the pharmacist finally approaches you and asks in a flat, disinterested voice "Can I help you?"

He examines the prescription that you give him. He then tells you that you must fill out a questionnaire for the pharmacy's records before he can fill the prescription. You fill out the form which has a number of surprisingly personal questions on it. When you return the form, the pharmacist tells you to take a seat in the nearby waiting area and says he will try to fill the prescription in five minutes.

After waiting over ten minutes, the pharmacist tells you to step over to the counter and asks you if you wish to be counseled on your medication. When you say yes, he rushes through a description of how to take the medication. When finished, you ask if there are any side effects to watch for. He says "yes" and hands you a pamphlet that he says contains the answers to commonly asked questions about the medication. The pamphlet's information seems rather complicated and hard to follow. The pharmacist gives you the pamphlet with your prescription. You pay him and begin to leave the pharmacy.

HIGH TECHNICAL QUALITY (NO DISPENSING ERROR)

Three days later, after taking the medicine as directed, your symptoms stop and the infection clears up.

LOW TECHNICAL QUALITY (DISPENSING ERROR)

As you usually do, you check the prescription label. The doctor told you earlier that the prescription was for Ceclor, an antibiotic. However, you realize that the pharmacist has mistakenly given you Cecon, a vitamin which you have used in the past. You believe that the pharmacist has made an error and given you the wrong drug.

Table II. Ten Dimensions of Service Quality

Dimension descriptions

Tangibles—The appearance of physical facilities and personnel. The tools or equipment used to provide the service. Written information provided as part of the service.

Reliability—Performing the service correct the first time. Honoring promises through accurate billing, precise record keeping, and performance of the service when promised.

Responsiveness—Willingness and ability to provide prompt service. Involves timeliness of service.

Communication—Explaining service to customers in language they can understand. It involves explaining the service itself, describing how much it will cost, explaining the trade-offs between service and cost, and assuring the customer that the problem will be resolved.

Credibility—Trustworthiness, believability, and honesty of customer-contact personnel and company.

Security—Freedom from danger, risk, and doubt. It involves physical safety (will following the pharmacist directions hurt me?), financial security, and confidentiality of transactions (will the other customers hear about my physical ailments?.

Competence—Possession of the required skills and knowledge by customer-contact personnel to perform the service.

Understanding/knowing the customer—Involves learning a customer's specific requirements, providing individualized attention, and recognizing a regular customer.

Access—Involves approachability and ease of contact. Includes accessibility by telephone, convenient operating hours and location, and reasonable waiting time for service.

Courtesy—Politeness, respect, consideration, and friendliness of customer-contact personnel. Includes clean and neat appearance of customer contact-personnel.

Source: Parasuraman, Zeithaml, and Berry (3).

Table III. Survey Questions Administered After Scenarios

Questionnaire items		Item-to-total coefficient alpha
*SERVPERF items**	Q1-Q22	
The pharmacy has up-to-date equipment.		.75
The pharmacy is neat and orderly.		.92
The pharmacist presents a professional appearance.		.93
Materials associated with the service (such as pamphlets or statements) are easy to read and understand.		.88
When the pharmacist promises to do something by a certain time, he does so.		.92
When you have a problem, the pharmacist shows a sincere interest in solving it.		.80
The pharmacist performs the service right the first time.		.38
The pharmacist provides services at the time he promises to do so.		.93
The pharmacist insists on error-free records.		.63
The pharmacist tells you exactly when services will be performed.		.83
The pharmacist gives you prompt service.		.93
The pharmacist is willing to help you.		.92
The pharmacist is not too busy to respond to your requests.		.80
The pharmacist's behavior instills confidence in customers.		.90
You feel safe in your transactions with the pharmacy.		.79
The pharmacist is consistently courteous with you.		.89
The pharmacist has the knowledge to answer your questions.		.82
The pharmacist gives you individual attention.		.91
The pharmacy has operating hours convenient to all its customers.		.53
The pharmacist gives you personal attention.		.87
The pharmacist has your best interests at heart.		.83
The pharmacist understands your specific needs.		.88
Overall service quality.	Q23, Q24	
Overall functional quality.	Q25	
Overall technical quality.	Q26	
Intention to return.	Q27	
Intention to recommend.	Q28	

* SERVPERF scores were treated as an index although factor analysis found a two dimensional structure for the data.

Table IV. Demographic Information About Subjects (N = 67)

Variables	
Average Age (years)	29.5
Range (years)	18 to 55
Have visited a pharmacy in the last 12 months	90.5%
Rated previous pharmacy experiences as good or excellent	87%
Female respondents	76%
Male respondents	24%
African American	14.6%
White, Non-Hispanic	81.2%
Other	4.2%
Single, never married	52.8%
Married or previously married	47.3%
Some post-graduate or professional schooling	22%
Graduated college	23%
Attend/Attended College	50%
Graduated high school	3%
Did not graduate high school	2%
Household income (in dollars)	
29,999 or less	52%
30,000 to 59,999	31%
60,000 or greater	17%

Table V. Means (Standard Deviations) of Dependent Variables

		High TQ	Low TQ
		n = 15	n = 17
	SERVPERF/22	6.41 (.57)	5.24 (.77)
	Overall SQ	5.97 (1.5)	4.00 (.77)
High FQ[a]	Overall FQ	5.93 (1.5)	5.17 (1.6)
	Overall TQ	6.13 (1.5)	2.35 (1.6)
	Intention to return	6.06 (1.0)	3.12 (1.6)
		n = 16	n = 19
	SERVPERF/22	2.34 (.73)	2.28 (1.3)
Low FQ[a]	Overall SQ	1.78 (1.0)	2.00 (1.8)
	Overall FQ	1.69 (.87)	2.05 (1.8)
	Overall TQ	4.12 (2.3)	1.17 (.38)
	Intention to return	1.93 (1.6)	1.61 (1.46)

Note: Scores are based on a 7-point rating scale ranging from 1 "strongly disagree" to 7 "strongly agree."
[a] FQ = functional quality.
[b] TQ = technical quality.

Table VI. Effect of Quality Dimensions on Dependent Variables

Quality effect	SERVPERF		Service quality		Intention to return	
	(F-value)	ω^2	(F-value)	ω^2	(F-value)	ω^2
FQ	232.07[a]	.75	65.49[a]	.44	62.24[a]	.39
TQ	6.98[b]	.019	5.23[c]	.028	21.02[a]	.13
FQ × TQ	5.80[c]	.016	8.18[b]	.052	13.48[a]	.08

Note: ω^2 = Omega squared.
[a] p < .001.
[b] p < .01.
[c] p < .05.

to return was calculated with omega-square (Table VI). Seventy-five percent of the variation in SERVPERF scores between scenarios was explained by FQ while only 1.9% was explained by TQ and 1.6% by the interaction. Functional quality (FQ) explained 44% of the variance in overall service quality perceptions and 39% of intention to return. Technical quality (TQ) accounted for only 2.8% of overall service quality variance and 13% of intention to return. The interaction of TQ and FQ accounted for 5.2% of overall service quality perceptions and 8% of intention to return. This indicated that FQ substantially accounted for most variance in scores.

A pictorial representation of the interaction is shown in Fig. 3. A significant interaction between FQ and TQ was detected demonstrating support for H_4. However, the interaction shows that the effect of FQ is greatest under conditions of high TQ, a finding contrary to H_5. In fact, Fig. 3 shows that TQ has no effect on evaluations of overall quality under conditions of low FQ but is significant when FQ is high.

Checks of convergent, discriminant, and criterion validity of the adapted SERVPERF instrument were conducted. The convergent validity of the SERVPERF instrument as a measure of overall service quality was assessed by correlating SERVP-ERF scores with the two overall service quality questions. SERVPERF correlated highly with overall service quality (r =
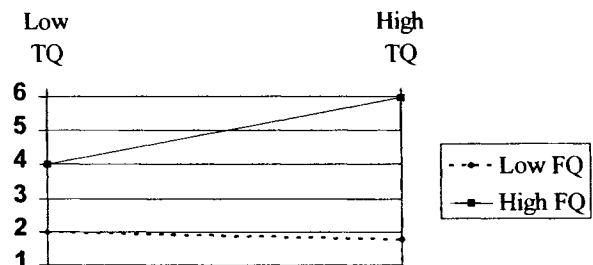

Fig. 3. Plot of mean overall SQ scores for each scenario.

.880) supporting an argument that it can be used as a measure of overall service quality. Since SERVPERF focuses on dimensions of FQ discriminant validity was tested by correlating SERVPERF scores with the single functional quality question and the single technical quality question. SERVPERF was more correlated with FQ (r = .913) than with TQ (r = .505) as expected. The discriminant validity of the single item FQ and TQ questions were also assessed through correlational analysis. Respondents were able to distinguish TQ from FQ (r = .510) indicating that the questions were measuring distinguishable, independent constructs. Criterion validity was tested by correlating TQ, FQ, overall service quality, and SERVPERF with behavioral intention. Behavioral intention is an estimate of attitude toward behavior and is widely used and supported as antecedent to actual behavior (30). All of these measures were associated with behavioral intentions toward pharmaceutical services (r = .635 to .745), and the results were consistent with the existing literature.

The overall internal reliability of the adapted SERVPERF scale was assessed with a calculation of coefficient alpha. Although exploratory factor analysis found a two dimensional structure for the SERVPERF responses, the scores were treated as an index (25,26) and item-to-total coefficient alphas were compared to total SERVPERF scores. SERVPERF was found to be internally reliable with a coefficient alpha of 0.980, above the target alpha of 0.85 for validated instruments (31).

Two additional questions were asked of subjects who received a low TQ scenario to verify if subjects actually understood the seriousness of the described dispensing error. Subjects responded that they perceived the dispensing error in the scenario to be serious (mean of 5.2 with a score of 7 indicating the greatest perceived risk) and the error was likely to cause harm if it was not corrected (mean of 4.8 with a score of 7 indicating the greatest perceived risk).

DISCUSSION

The experimental results suggest that FQ has the greatest impact on consumer perceptions of pharmaceutical service quality, while TQ has a significant but lesser effect. Even when offered an obvious example of low TQ which respondents perceived as serious and possibly harmful, subjects based their evaluations on how the services were provided rather than what was received from those services.

This surprising result may be explained in part by how TQ and FQ were operationalized in the study. In the low TQ scenario, subjects received the wrong medicine but did not actually take it. In fact, the scenario error was discovered and subjects might reasonably assume that the error would be corrected. Although the subjects rated the outcome of the service to be significantly less for the low TQ scenario, the subjects may have believed that they would eventually get the correct drug. Additionally, high and low FQ were operationalized as extreme cases. Consequently, subjects may have discounted the impact of a moderately negative outcome when compared to examples of extremes in FQ.

Another possible reason for the diminished impact TQ might be explained by attribution theory (i.e., perceived consequences behind events or behaviors). Bitner found that consumer evaluations of service quality were determined in part by the perceived likelihood of the event or behavior ever occurring

again (4). Medication errors may have been perceived by subjects as relatively rare and unlikely to reoccur. Therefore, subjects may have been forgiving about low TQ when evaluating overall service quality.

The interaction between FQ and TQ demonstrated that perceptions of TQ depend on the level of FQ provided. In other words, the way that services are provided has a significant impact on perceptions of the service outcome. However, the interaction between FQ and TQ limits the ability to draw broad inferences about their individual influences on overall service quality. One effect depends on the level of the other. Under different levels of TQ and FQ, the impact of each could be different.

The nature of the interaction between FQ and TQ was different than originally anticipated. It was hypothesized that FQ would have the greatest effect under conditions of low TQ instead of high TQ, because Lytle and Mokwa showed that patients pay closer attention to FQ if a negative outcome has been received. However, Lytle and Mokwa did not examine TQ under two levels of FQ. Subjects in their study probably received a more consistent level of FQ than the artificially manipulated FQ in this study.

One explanation for the nature of the interaction may come from disconfirmation theory (32). Evaluations of service quality result from a discrepancy between expectations of service quality and performance. At high levels of FQ, expectations of service are set at a high level. A service failure causes a significant disconfirmation. If low FQ is given, expectations are low. A service failure at this point does not cause disconfirmation because it is not a surprise. It therefore has little additional negative impact on perceptions.

Limitations

The generalizability of these results to other times, places, and populations is limited because this study is an artificial manipulation of services using a convenience sample of subjects from a restricted geographic area. The adaptation of the SERVPERF instrument (a measure of functional quality) may have introduced some measurement error into the study. However, all of the measures demonstrated consistent results and the findings of the study were consistent with other studies and theory. As expected, manipulations of TQ and FQ in the scenarios had significant effects on overall service quality, intentions to return, and their respective technical and functional quality scores. The perceived seriousness of the dispensing error described in the scenario was also tested and found to be perceived as very serious by subjects. In addition, the findings of the study were comparable with results of other service quality studies for other locations, populations, and times.

Any manipulation of an artificial scenario (as those in Table I) has potential to introduce bias to a study. For example, this study attempted to artificially raise expectations of the pharmacist by describing positive word-of-mouth experiences of friends and advertising promises by the pharmacy (33). Although the authors did not find any misinterpretations of the scenario in post-experimental discussions with subjects, the possibility of an unintended effect resulting from the scenario remains a possibility. In addition, the selection of an antibiotic instead of a drug from a different therapeutic class for the manipulation may reduce the generalizability of the results to

dispensing errors with other drugs. Future research may examine the issue of therapeutic class exclusively on perceptions of dispensing errors.

Implications

This research illustrates a potential reason why retail pharmacists may have been so slow in changing their method of practice over the years. Until recently, most prescriptions have been paid for by the patient. Because the patient is frequently unable to recognize higher levels of technical care, FQ improvements may generate greater consumer satisfaction on average than TQ improvements. As a result, faster, friendlier service along with lower prices and convenient locations may be the best strategy when the patient pays for pharmaceutical services.

However, as the percentage of prescriptions paid by insurance increases, pharmacists must satisfy third party payers, who have the sophistication to evaluate technical quality through outcomes research. In addition, consumers who become more actively involved in monitoring and managing their own pharmaceutical care will be more able to assess TQ attributes. To satisfy these new customers, pharmacists must not only maintain patient satisfaction through improvements in FQ, they need to monitor and improve the technical quality of their services in order to improve the impact on their patients' health outcomes. Systems that monitor the quality of pharmaceutical services should examine both types of quality.

This study underscores the limitations of relying on patient perceptions in evaluating pharmaceutical services. Although patient evaluations are important, they can be inadequate for assessing the professional quality of services.

REFERENCES

1. V. Meade. Patients satisfied with pharmacy service, survey shows. *Amer. Pharm.* 34:26–28 (1994).
2. B. Biesacher and R. Corey. Patient satisfaction with pharmaceutical services at independent and chain pharmacies. *Amer. J. Health-Systems Pharm.* 54:531–6 (1997).
3. A. Parasuraman, V. Zeithaml, and L. Berry. A conceptual model of service quality and its implications for future research. *J. Marketing* 49:41–50 (1985).
4. M. J. Bitner. Evaluating service encounters: the effects of physical surroundings and employee responses. *J. Marketing* 54:69–82 (1990).
5. R. N. Bolton and J. H. Drew. A multistage model of customers' assessments of service quality and value. *J. Consumer Res.* 17:375–84 (1991).
6. R. D. Buzzell and B. T. Gale. *The PIMS Principles.* New York: The Free Press; 1987.
7. L. D. Phillips, D. R. Chang, and R. D. Buzzell. Product quality, cost position and business performance: a test of some key hypotheses. *J. Marketing* 47:26–43 (1983).
8. A. G. Woodside, L. L. Frey, and R. T. Daly. Linking service quality, customer satisfaction, and behavioral intention. *J. Health Care Market.* 9:5–17 (1989).
9. D. E. Headley and S. J. Miller. Measuring service quality and its

10. M. T. Koska. High-quality care and hospital profits: is there a link? *Hospitals* 64:62–63 (1990).
11. C. Gronroos. Toward a third phase in service quality research: challenges and future directions. *Ad. Services Market. Management* 2:49–64 (1993).
12. S. W. Brown and T. Schwartz. A gap analysis of professional service quality. *J. Marketing* 53:92–98 (1989).
13. P. Nelson. Information and consumer behavior. *J. Polit. Econ.* 78: 311–329 (1970).
14. M. R. Darby and E. Karni. Free competition and the optimal amount of fraud. *J. Law Econ.* 16:67–86 (1973).
15. K. B. Murray. Health care service decision influences: an exploratory investigation of search and nonsearch criteria for professionals and patients. *J. Health Care Market.* 12:24–38 (1992).
16. J. P. Gagnon. Factors affecting pharmacy patronage motives-a literature review. *J. Amer. Pharm. Assoc.* ns17:556–59, 566 (1977).
17. J. B. Wiederholt. Development of an instrument to measure evaluative criteria that patients use in selecting a pharmacy for obtaining prescription drugs. *J. Pharm. Market. Management* 1:35–59 (1987).
18. R. S. Lytle and M. P. Mokwa. Evaluating health care quality: the moderating role of outcomes. *J. Health Care Market.* 12:4–14 (1992).
19. S. Powpaka. The role of outcome quality as a determinant of overall service quality in different categories of services industries: an empirical investigation. *J. Services Market.* 10:5–25 (1996).
20. V. S. Folkes. Consumer reactions to product failure: an attributional approach. *J. Consumer Res.* 10:398–409 (1984).
21. A. Dolinsky. A consumer complaint framework with resulting strategies: An application to higher education. *J. Services Marketing* 8:27–39 (1994).
22. C. F. Surprenant and M. R. Solomon. Predictability and personalization in the service encounter. *J. Marketing* 51:86–96 (1987).
23. J. Cohen. *Statistical Power Analysis for the Behavioral Sciences, Second Edition,* Lawrence Erlbaum Associates, New Jersey, 1988.
24. J. M. Carman. Consumer perceptions of service quality: an assessment of SERVQUAL dimensions. *J. Retailing* 66:33–55 (1990).
25. J. J. Cronin and S. A. Taylor. Measuring service quality: A reexamination and extension. *J. Marketing* 56:55–68 (1992).
26. J. J. Cronin and S. A. Taylor. SERVPERF versus SERVQUAL: Reconciling performance-based and perceptions-minus-expectations measurement of service quality. *J. Marketing* 58:125–131 (1994).
27. R. K. Teas. Expectations as a comparison standard in measuring service quality. *J. Marketing* 58:132–139 (1994).
28. R. K. Teas. Expectations, performance, evaluation, and consumers' perceptions of quality. *J. Marketing* 57:18–34 (1993).
29. Introduction to Analysis-of-Variance Procedures. *SAS/STAT User's Guide, Version 6, Fourth Edition, Volume 1.* SAS Institute Inc., Cary, NC, 1989.
30. Engel, R. D. Blackwell, and P. W. Miniard. *Consumer Behavior.* The Dryden Press: Orlando, Florida, 1993.
31. R. Rosenthal and R. L. Rosnow. *Essentials of Behavioral Research: Methods and Data Analysis.* McGraw Hill Co: New York, NY, 1991.
32. R. L. Oliver. A cognitive model of the antecedents and consequences of satisfaction decisions. *J. Marketing Res.* 17:460–69 (1980).
33. C. Webster. Influences upon consumer expectations of services. *J. Services Market.* 5:5–17 (1991).

relationship to future consumer behavior. *J. Health Care Market.* 13:32–41 (1993).