Factors Influencing the Success of Rural Cataract Surgery Programs in China: The Study of Hospital Administration and Relative Productivity (SHARP)

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Purpose. To explore factors potentially influencing the success or failure of rural Chinese hospitals in increasing cataract surgical output and quality.

Methods. Focus groups (FGs, $n = 10$) were conducted with hospital administrators, doctors, and nurses at 28 county hospitals in Guangdong Province. Discussions explored respondents' views on increasing surgical volume and quality and improving patient satisfaction. Respondents numerically ranked possible strategies to increase surgical volume and quality and patient satisfaction. FG transcripts were independently coded by two reviewers utilizing the constant comparative method following the grounded theory approach, and numerical responses were scored and ranked.

Results. Ten FGs and 77 ranking questionnaires were completed by 33 administrators, 23 doctors, and 21 nurses. Kappa values for the two coders were greater than 0.7 for all three groups. All groups identified a critical need for enhanced management training for hospital directors. Doctors and nurses suggested reducing surgical fees to enhance uptake, although administrators were resistant to this. Although doctors saw the need to improve equipment, administrators felt current material conditions were adequate. Respondents agreed that patient satisfaction was generally high, and did not view increasing patient satisfaction as a priority.

Conclusions. Our findings highlight agreements and disagreements among the three stakeholder groups about improving surgical output and quality, which can inform strategies to improve cataract programs in rural China. Respondents' beliefs about high patient satisfaction are not in accord with other studies in the area, highlighting a potential area for intervention. (*Invest Ophthalmol Vis Sci.* 2013;54:266–273) DOI: 10.1167/iovs.12-10906

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Cataract remains the leading cause of blindness in China today, with 4.5 million people blind from the disease.[1–7] China's cataract surgical rate was approximately 680 per million per year in 2008, a third of the rate needed to eliminate the surgical backlog.[8] Due to unequal urban-rural distribution of health care resources, the surgical shortfall is more pronounced in rural areas, where coverage among patients bilaterally blind due to cataract is only 35.7%.[9] With 400,000 new cases of cataract every year,[10] there is an urgent need for programs to increase the delivery of high-quality cataract surgery in rural China.

In 2003, in collaboration with Helen Keller International,[11] the Zhongshan Ophthalmic Center (ZOC) launched the Starr Eye Care rural cataract surgery training program to build capacity to perform independent manual small incision cataract surgery at 27 county hospitals in Guangdong Province. The training model consisted of four components:

1. Assessment of hospitals in terms of equipment, facilities, staff, surgeon experience, and administrative support;
2. Education of trainees regarding screening for cataract, preoperative assessment, cataract surgery, and postoperative management;
3. Two-month didactic and wet lab training on the principles of cataract surgery at ZOC;
4. Hands-on training by ZOC trainers during supervised surgeries at the county hospitals.

Doctors selected for training could not previously independently conduct cataract surgery, but had basic surgical experience (e.g., pterygium surgery). Similar rural cataract surgery programs have been implemented elsewhere in China by other nongovernmental organizations (NGOs), including Project Vision,[12] Lions Club International,[12] ORBIS International,[13] and the Fred Hollows Foundation,[14] and have in some cases achieved excellent results.[15] Despite the existence of these programs and related government support, very little information exists on the factors influencing the success or failure of rural Chinese hospitals in increasing their cataract surgical output or departmental revenue.

In 2010, we initiated the Study of Hospital Administration and Relative Productivity (SHARP), a quantitative and qualitative study of predictors of 3-year increase in annual cataract surgical volume in more than 50 rural county hospitals in several provinces of China. The goal of this study is to enable governments and NGOs to better predict which rural hospitals are most likely to benefit from interventions to develop surgical capacity, and potentially to develop more effective capacity-building strategies. The qualitative portion of the study, whose results we describe here, consists of focus group (FG) discussions with three key stakeholder groups at each of

several hospitals on ways to increase surgical volume, revenue from surgery, surgical quality, and patient satisfaction. FGs can provide insight into complex phenomena, such as health service utilization and delivery, which complement quantitative data, and are especially appropriate when the goal is to understand differences in perspectives between groups of people.[16] While prior FG studies in the area have focused on patients and providers,[17–19] few have explored the views of hospital staff, especially nurses and administrators. We report here the results of the FG discussions and ranked responses from the different groups to key questions about improving cataract surgical output and quality.

Methods

The present study was carried out during a training conference held at the ZOC in June of 2010 for hospital administrators, doctors, and nurses taking part in a cataract surgery program sponsored by the Chinese government and an international nongovernmental development organization. Study personnel obtained written informed consent from all participants. The study was approved by the Ethics Committee at ZOC, and the tenets of the Declaration of Helsinki were followed throughout.

Selection of Participants

Three or four FG discussions were carried out for each of three key constituencies: hospital administrators (hospital directors and Ophthalmology Department directors), doctors, and nurses. Of the 41 county hospitals that were part of the Starr Eye Care network at the time, 28 had personnel attending the conference, and all attending administrators, doctors, and nurses were approached and invited to participate in the FG discussions. All personnel who were approached agreed to participate, forming a convenience sample from the 28 hospitals. In 2009 (the most recent year with complete official data), the counties serving as catchment areas for participating hospitals had a median population of 542,750 (interquartile range [IQR] 379,075–1,086,575) and a median rural per capita annual income of RMB 5638 (IQR 5286–5944), compared with a rural per capita annual income of RMB 6907 for all of Guangdong Province, RMB 5153 for rural China and RMB 17,175 for urban China.[20] The hospitals had a median annual cataract surgery volume of 200 (IQR 119–397) and a median total hospital revenue of RMB 70 million (IQR 55.6–125.0 million), compared with surgery volume of 225 and hospital revenue of RMB 53.6 million for the 13 nonparticipating hospitals ($P > 0.05$ for both, Wilcoxon rank-sum). Participants were randomly assigned to groups, with the goal of including 6 to 10 subjects in each FG to maximize potential for interaction. Subjects were offered bottled water during the interview, but received no other inducements or remuneration to participate.

Implementation of FGs

Eight program personnel, all of whom were either doctors or program administrators, were selected to be FG facilitators and underwent three sessions of training by an experienced FG researcher (NC). Facilitators were matched so that there was at least one native Cantonese speaker for each FG discussion. Study authors prepared a brief general introduction on the FG process and drafted separate semistructured scripts for each of the three constituent groups to assist in guiding discussions. The scripts included open-ended questions concerning potential factors influencing the success of a rural hospital in carrying out a cataract surgical program, including equipment, hospital staff, patient characteristics, outreach screening, and local competition (see below), and were based on a review of the literature[11,21–27] as well as prior program experience.

Questions Asked of Hospital Administration, Doctors, and Nurses in the FG Discussions

A. Hospital Administration
   1. Equipment and Consumables
      a. Is the equipment at your hospital sufficient?
      b. What equipment needs to be added or replaced?
      c. Through what ways could you procure new equipment?
   2. Outpatient
      a. How would you evaluate waiting times at your hospital? How could they be shortened?
      b. How would you evaluate the patient record management system at your hospital? How would you improve it?
   3. Training
      a. How would you evaluate the training you have received?
      b. What additional training is needed?
   4. Patients
      a. What catchment area and outpatient load is needed for a county hospital to successfully carry out a cataract program?
      b. What barriers do rural patients face in coming to the hospital? How could these barriers be overcome?
      c. How is patients' satisfaction with surgery and outpatient services at your hospital?
      d. How are attitudes of hospital personnel toward patients at your hospital?
      e. How much can patients afford to pay for surgery at your hospital? What proportion of patients has trouble affording cataract surgery fees? How could this problem be overcome?
   5. Outreach Screening
      a. Is outreach screening important?
      b. How often should screening take place?
      c. How would you evaluate the screening activities taking place at your hospital?
   6. Local Competition
      a. Do you face competition in providing cataract surgery? How much impact does this have on your hospital?
      b. In what ways could you overcome this competition?
      c. Are free cataract surgery programs offered in your area? What is the effect of free cataract surgery programs on your hospital?
   7. Role of Ophthalmic Department
      a. What impact does the attitude of the hospital director have on the success of the ophthalmic department?
   8. Hospital Personnel
      a. In what ways can surgeons and nurses impact the implementation of a rural cataract surgery program?
      b. How could you motivate surgeons and nurses to improve their attitude and quality of service?
   9. Collaborative Partners

B. Doctors
   1. Equipment and Consumables
      a. Is the equipment at your hospital sufficient?
      b. What equipment needs to be added or replaced?
   2. Operating Room
      a. In what ways should nurses assist you in the operating room (OR)?
      b. If you had sufficient number of patients, in what ways could the OR be improved to increase your surgical volume?
      c. How would you evaluate the sterilization procedures at your hospital?
   3. Training
      a. What kinds of training do you feel doctors need?
      b. What are the strong and weak aspects of training you've received so far?
      c. What training would you like to receive in the future?

4. Other Hospital Personnel
   a. What are the strengths and weaknesses of current administrative methods at your hospital? How could it be improved?
   b. How is the attitude of the hospital administration toward the ophthalmic department? How could it be improved?
   c. How much assistance do you receive from nurses in the OR? How could they be of more help?
5. Patients
   a. What catchment area and outpatient load is needed for a county hospital to successfully carry out a cataract program?
   b. What barriers do rural patients face in coming to the hospital? How could these barriers be overcome?
   c. How would you evaluate waiting times at your hospital? How could they be shortened?
   d. How is patients' satisfaction with surgery and outpatient services at your hospital?
   e. How are attitudes of hospital personnel toward patients at your hospital?
   f. How much can patients afford to pay for surgery at your hospital? What proportion of patients has trouble affording cataract surgery fees? How could this problem be overcome?
6. Outreach Screening
   a. Is outreach screening important?
   b. How often should screening take place?
   c. How would you evaluate the screening activities taking place at your hospital?
7. Local Competition
   a. Do you face competition in providing cataract surgery? How much impact does this have on your hospital?
   b. In what ways could you overcome this competition?
   c. Are free cataract surgery programs offered in your area? What is the effect of free cataract surgery programs on your hospital?
8. Job Satisfaction
   a. How could your satisfaction be improved?
9. Definition of a "successful rural cataract program"
   a. What are the most important factors for successfully carrying out a rural cataract program?

C. Nurses
1. Training
   a. What kinds of training do you feel nurses need?
   b. What are the strong and weak aspects of training you've received so far?
   c. How confident are you in your skills in the OR?
   d. What training would you like to receive in the future?
2. Outpatient
   a. How would you evaluate the quality of outpatient services offered at your hospital?
   b. How could you improve the quality of outpatient services?
3. Attitudes on Other Hospital Personnel
   a. What are the strengths and weaknesses of current administrative methods at your hospital? How could it be improved?
   b. How is the attitude of the hospital administration toward the ophthalmic department? How could it be improved?
   c. How is the skill of surgeons at your hospital? In what ways could it be improved?
   d. How are the attitudes of doctors toward patients at your hospital? How could they be improved?
4. Patients
   a. What barriers do rural patients face in coming to the hospital? How could these barriers be overcome?
   b. How is the satisfaction of patients toward outpatient and inpatient services at your hospital?
   c. Do you think doctors are in a good position to explain illnesses and treatments to patients?
   d. How would you evaluate waiting times at your hospital? How could they be shortened?
   e. What proportion of patients has trouble affording cataract surgery fees? How could this problem be overcome?
5. Satisfaction with Work
6. Definition of a "Successful Rural Cataract Program"
   a. What are the most important factors for successfully carrying out a rural cataract program?

A total of 10 FGs were carried out, 4 for administrators and 3 each for doctors and nurses. Nine FGs were carried out on June 26, 2010, with the final nursing FG completed on July 16, 2010, due to technical problems with recording equipment at the time of the originally scheduled gathering. The mean length of FGs for administrators and doctors was approximately 90 minutes, while those for nurses had a mean length of 55 minutes. All FGs were carried out in Cantonese and/or Mandarin, recorded digitally, and subsequently transcribed into written Chinese by a trained team of three transcriptionists. Translations into English in the current article were carried out by coauthors fluent in both English and Chinese (NC, TL).

After completion of the FGs, participants were asked to anonymously rank a number of potential responses to the following questions:

1. "What are the best ways to increase surgical volume"? (Administrators and doctors)
2. "What are the best ways to increase revenue from surgery"? (Administrators and doctors)
3. "What are the best ways to increase quality of surgical outcomes"? (Administrators, doctors, and nurses)
4. "What are the best ways to improve patient satisfaction"? (Nurses)

These ranking exercises provide insight on the relative importance that participants attribute to various strategies and complement the themes explored in the FG discussions.

Analysis of Data

FG data were analyzed following a grounded theory approach, using the constant comparative method to code participant responses into distinct concepts and subconcepts that were eventually grouped into themes.[28,29] Two trained study personnel (XG, XY) independently reviewed all 10 transcripts, agreed on a coding scheme, and then coded each FG transcript independently using NVivo 8.0 (QSR, Inc., Melbourne, Australia). Coding was accomplished by categorizing respondents' comments into "Tree Nodes," which were identical for both coders. The interrater coding reliability (Cohen's kappa) was calculated for each set of participants using the "Coding Comparison" query provided by NVivo, as an indicator of agreement between coders in assigning passages to nodes. By convention, a Kappa greater than 0.7 is considered acceptable interrater reliability.[30] Thematic saturation was evaluated in a manner modified from that adopted by Guest et al.,[31] in which the number of FGs needed to identify at least 80% of the total codes was determined for each constituent group.

For ranking questions such as "What are the best ways to increase revenue from surgery?" (Table 1), respondents selected and ranked their top six answers from a number of choices. Participants' rankings were analyzed using SPSS 17.0 (SPSS Corp., Chicago, IL) as follows: each response received 6 points for every participant who ranked it the highest, 5 points for every participant who gave it a second-place ranking, and so forth, with the response receiving 0 points if a participant did not include it in his/her top six answers. A total score for each response was calculated as the sum of points awarded across all participants, which was then divided by the maximum possible score (i.e., number of respondents times 6) to calculate a "proportion

Table 1. Illustration of Ranking and Scoring Methodology, Using Responses of Administrators to the Question: "What are the best ways to increase revenue from surgery?"

Responses	Ranking (A Ranks Highest, G Lowest)							Total Respondents	Total Score*	Proportion of Maximum Possible Score (216)
	A (6 Pts)	B (5 Pts)	C (4 Pts)	D (3 Pts)	E (2 Pts)	F (1 Pt)	G (0 Pts)			
Do more cataract cases	28	2	3	0	0	0	0	33	190	0.960
Do more of other types of surgery	3	15	4	5	4	2	0	33	134	0.677
Offer phacoemulsification surgery	1	8	10	11	3	0	0	33	125	0.631
Harder work from doctors and nurses	1	2	10	8	4	8	0	33	96	0.485
Charge more for surgeries	0	4	4	2	11	12	0	33	76	0.384
Offer imported IOLs	0	2	2	7	11	11	0	33	72	0.364

* Scoring is explained in the Methods section.

of max possible score" value in order to facilitate comparison across groups of different sizes considering different numbers of possible responses. Thus, the potential proportional score for each response in each group ranged from 0 to 1.0.

Results

Subject Demographics

A total of 10 FGs including ranking questionnaires were conducted with 33 administrators, 23 doctors, and 21 nurses. Demographic information is given in Table 2. Of the 33 hospital administrators, 15 (45.5%) were ophthalmologists serving as ophthalmology department heads. Of the 23 doctors, 20 (87.0%) had active medical licenses, 17 (73.9%) had received training from the ZOC and 13 (56.5%) were capable of independently performing cataract surgery. Those performing independent surgery reported completing a mean (± SD) of 155 ± 81 cases in the previous year (2009). Of the 21 nurses, 3 (15%) had received training from ZOC, and 7 (35%) had had experience working in the operating room.

Results of FGs: Intergrader Agreement and Thematic Saturation

The kappa values for the two coders were 0.81 for the administrators' focus group, 0.74 for doctors, and 0.78 for nurses. For each constituent group, the first two FGs captured 80% to 88% of the total number of codes identified (80% for administrators, 80% for doctors, and 88% for nurses). Results of the FG discussions are summarized below; longer contextual quotes for each of the prominent themes can be found in Table 3.

Increasing Surgical Volume and Hospital Revenue

In FG responses and quantitative rankings, respondents of all three stakeholder groups suggested that hospital revenue could be enhanced by increasing cataract surgical volume through various means (administrator rank #1 [score 0.960]; doctor rank #1 [score 0.877]). Suggested improvement in operating room efficiency from doctors included increasing the OR size, establishing a separate ophthalmic OR and "improving doctor-nurse collaboration to improve work flow." Both doctors and nurses suggested financial incentives were needed to improve surgical output: "no matter how much work we do, our income is the same"; "profits from surgery go to the general surgery department instead of ophthalmology." Administrators agreed that improvements in hospital management could increase efficiency and surgical output, noting that their training had been focused on medical knowledge and skills, rather than on management. Administrators' support for the ophthalmology department was identified as "poor" or "just okay" by doctors, although all three stakeholder groups agreed that hospital directors with a background in ophthalmology were far more supportive.

Increased outreach screening was ranked highly by both administrators (rank #1 [score 0.788]) and doctors (rank #2 [score 0.630]) as a means to increase surgical volume. Although estimates for the best frequency with which to carry out screenings varied greatly from "every day" to "once a year," many doctors and administrators suggested that screening be done when "patients run out." However, respondents cited potential barriers to surgery acceptance during screening including "cost," "distrust of surgical quality," "fear that surgery will hurt," "no one to accompany them to the hospital," "children don't provide money [for surgery]," and "belief that blindness is natural."

Reduction of surgical fees was suggested as a means to increase surgical volume. Although hospital administrators generally believed that the poorest patients could find a way to obtain free surgery, one admitted, "We really don't know the payment ability of patients." Doctors and nurses suggested lowering the surgery price or offering free surgery (for which the hospital could still be reimbursed through government insurance), and doctors ranked this as the most effective way to increase surgical volume (score 0.906).

Table 2. Demographic Information on Focus Group Participants

Stakeholder Group	*n*	Age, mean ± SD, y	Age Range, y	% Male	Years of Professional Experience, mean ± SD	Years of Experience at Present Hospital, mean ± SD
Administrators	33	44.7 ± 4.8	37–55	84.8	23.1 ± 6.0	19.2 ± 7.3
Doctors	23	33.0 ± 5.5	25–50	65.2	8.6 ± 5.4	7.6 ± 5.2
Nurses	21	35.1 ± 4.8	21–46	0.0	6.9 ± 7.5*	14.7 ± 5.5

* This figure refers to years of experience as ophthalmic nurses. Nurses may have had more years of general nursing experience.

Table 3. Contextual Quotes Illustrating Prominent Themes of the Focus Group Discussions

Theme	Constituent Group	Quote
Reducing surgical fees to increase surgical volume; Lack of support from hospital administrators	Doctors	"We've actually thought of many strategies to increase our surgical volume, but the hospital [administration] just isn't very supportive. [. . .] We've raised the idea of lowering the surgical fee for patients, or even offering it for free. We can still make RMB 4000 profit through the New Rural Cooperative Medical Scheme's reimbursement. [. . .] Even if you don't make it completely free, you can charge the patient RMB 1000, and the hospital can earn RMB 5000. I feel like this would be very affordable for the patient, and also very good revenue for the hospital, but when we raise the idea with the administration they won't approve it."
Need for improved equipment; Lack of support from hospital administrators	Doctors	"When our equipment breaks and we request new ones, they won't approve it. When our phacoemulsification equipment broke and we requested a new one, it took forever, and in the end they kept delaying the payment [to the vendor]. I don't know how long it will take before we actually get it."
Need for more basic surgical skill training	Doctors	"Trying to teach those with no experience at all can be very difficult—they'll have lots of questions from the very beginning. You need those with some basic skills, who can bring [specific] questions to the training. The problem is that at the rural level, doctors mostly haven't received much standardized training. They'll learn a little here, learn a little there, maybe when an instructor shows up; most of it is not standardized at all. Now when they try to do surgery [according to your protocol], they'll have to learn step by step; they can't learn all at once."
Nurses' desire for chances to practice their skill	Nurses	"What we lack now are chances to practice our skills. You can read some materials and learn the content, but to be able to do it, you need to repeatedly practice. More practice is always better. We can read the material once but without practice, we'll forget it."
Lack of prioritizing increasing patient satisfaction	Administrators	"When we were studying at the Ministry of Health, they touched upon these 2 questions [concerning patient satisfaction] as well. They said, hospitals should know their role, they shouldn't try to be like five-star hotels—bowing here, smiling there [. . .] it's a societal abnormality. Hospitals are trying to do their jobs, but now apart from having to learn medicine, [the staff] have to learn to offer five-star service. What's the role of a hospital? It's to focus on treating patients and treat everyone equally. My second point is, even if patients are attracted to your hospital's brand, your value isn't the type of service offered by hotels. Your value is the quality of your care, your patient safety—that's sufficient, that's what's most important. [. . .] I feel like that's the reason doctors face so much pressure today—not only do they have to pay attention to improving their medical skills, ensuring their patients' safety, and improving the quality of care they provide, they also have to figure out how best to serve their patients?
Competition from local free cataract surgery programs	Doctors	"For example, in our area you've got [competition from] the Disabled People's Federation, "Mobile Eye Treatment Centers," and such. Their surgical quality is poor and requires local doctors to clean up the mess. Just in the last 2 weeks, we've encountered a few patients who received surgery from them and had really bad outcomes, corneal edema, even discharge from the pupils. The discharge was really severe, even now they haven't left the hospital yet. This was the result of the Disabled People's Federation—we have to clean up after them. There's been quite a few cases this year already."

Improving Surgical Quality

Improved equipment, training, and work-flow protocols were the principal suggestions to enhance quality. Most doctors indicated they had basic surgical equipment, such as operating microscopes, slit lamps, funduscopes, keratometers, and A-scan devices. Although most administrators believed that existing equipment was sufficient, doctors indicated that some necessary equipment was not available ("noncontact tonometer," "more surgical microscopes") or needed to be upgraded ("keratometer," "tonometer," "surgical microscope," "slit lamp"). In addition, doctors preferred imported intraocular lenses to domestic ones, which they claimed "are inaccurate," and "break easily." Nurses also indicated that the quality of outpatient service was negatively impacted by lack of equipment: "we are still checking intraocular pressure by palpation, which can easily hurt the cornea."

Both administrators (score 0.934) and doctors (score 0.855) ranked enhanced training for surgeons as the most effective way to improve surgical quality. Doctors praised the surgery training provided by visiting doctors from higher-level centers for the use of "standard protocols" but indicated they would have liked more hands-on opportunities, and that only those rural doctors with more experience could capitalize on these opportunities. Additional topics they wished to be trained in included "management of postoperative complications," and "glaucoma diagnosis and surgery."

Both administrators and doctors suggested that improved training for OR nurses could help improve surgical quality (administrator rank #3, score 0.616; doctor rank #3, score 0.478). Nurses themselves expressed satisfaction with their ability to carry out simple tasks, but less confidence in the OR due to spending most of their time in the patient wards. Many nurses indicated a desire for more standardized training materials and practical protocols. Some also expressed a desire for more training in "patient education" and "maintaining good eye health." However, nurses themselves ranked nurse training as a relatively ineffective way to improve surgical quality (rank #7, score 0.302), advocating instead written protocols for nursing OR tasks (rank #1, score 0.548).

Increasing Patient Satisfaction

Doctors, nurses, and administrators agreed that patient satisfaction was generally high, especially when surgery outcomes were good. Neither administrators nor doctors prioritized efforts to improve patient satisfaction as a way of increasing surgical volume or income (administrator rank #8, score 0.152; doctor rank #8, score 0.123). Suggestions for improving patient satisfaction centered on improving communication (particularly before surgery) and staff attitudes, with administrators noting that poor provider attitudes caused problems with patient satisfaction. Nurses ranked improving the friendliness and efficiency of staff and provision of good patient information as the most effective way to increase patient satisfaction (score 0.651).

Competition

Both doctors and administrators confirmed that local competition was a barrier to the successful implementation of a rural cataract surgery program. Administrators mentioned local Traditional Chinese Medicine hospitals ("have high reimbursement rates and lower start-up costs"), local private hospitals ("collaborate with the Professor's Association and charge lower prices"), and hospitals offering phacoemulsification as sources of competition. Doctors added that free surgery programs ("Mobile Eye Treatment Centers," "private donations by Chinese expatriates") draw patients away and create problems for their hospitals ("The surgery quality is poor and requires local doctors to clean up the mess."). Improving the quality of surgery, increased outreach and marketing, and a variety of price-related reforms were suggested as ways to overcome such competition.

Discussion

Our findings suggest several specific recommendations for the choice of hospitals to participate in rural cataract surgery programs in China. First, the administration of the hospital should be supportive of the ophthalmology department. Doctors and nurses both emphasized the strong influence that administrative support has on the success of a cataract surgery program, while highlighting the challenges associated with an unsupportive administration. Second, the hospital should ideally face relatively little competition from free surgery programs, which can undercut reasonable surgical fees and siphon off resources to provide postoperative care for "left behind" patients. Third, as doctors themselves commented, training programs may be more effective at hospitals where physicians already have some basic surgical skills.

Our findings also suggest some changes that can be made to increase the success of cataract surgery programs once partner hospitals have been chosen:

1. Provide management training for hospital administrators.

   Doctors and nurses expressed dissatisfaction stemming from factors such as lack of salary incentives and equipment and poor delineation of responsibilities. Meng et al.[32] found that health workers in rural hospitals cited low salaries and limited opportunities for professional development as primary reasons for moving to higher-level facilities. Such personnel losses create inefficiencies for hospitals. Those few studies of financial incentives in rural Chinese hospitals have generally suggested they can improve productivity and output.[33–35] While administrators agreed that financial incentives and training opportunities could motivate ophthalmic medical staff, it appears that they lack the management skills to implement them. Given that hospital administrators themselves recognized a need for more management training, cataract surgery programs may improve their effectiveness and sustainability by offering administrative training focused on topics, such as proper staffing and equipment, design and implementation of salary incentives, delineation of responsibilities, and creation of standardized protocols.

2. Reduce surgical fees.

   Although all three participant groups emphasized the importance of outreach screening to bring in new patients, currently only about one-third of patients identified through cataract screening in rural China ultimately accept surgery.[36] Participants in the present study suggested that reducing fees may promote surgical acceptance, a view supported by other studies in the area.[19,26] One such report found that lowering the cataract surgical fee by 30% resulted in a 61% increase in surgical uptake.[26] The problem of high surgical fees may be especially important in the 28 counties represented in the present study, which have a median per capita rural income lower than that of Guangdong Province. It is significant in this respect that hospital administrators expressed resistance to the idea of reducing surgical fees, suggesting that their views may be a significant barrier to this strategy for increasing surgical uptake. Quantitative studies on the elasticity of demand for cataract surgery in rural China could shed more light on the likely effectiveness of such strategies.

3. Provide OR and perioperative training for nurses.

   Our results suggest that nurses could benefit from additional training in three specific areas: OR tasks, basic clinical assessment (e.g., visual acuity measurement), and patient education. Both doctors and nurses themselves expressed doubts about nurses' current abilities in these key areas. It is also important to note that nurses themselves did not rate their training highly as a means to improve surgical outcomes, a potential barrier to their receiving these opportunities. Although few studies have investigated the role of ophthalmic OR nurses in developing countries, a study of scrub nurses in the United Kingdom found that for complicated cataract surgical cases, patients operated with more experienced scrub nurses in attendance were less likely to have secondary complications.[37] Providing nurses with training and hands-on experience in tasks, such as ensuring patient safety and indentifying and responding to intraoperative complications, may improve the outcomes of cataract surgery in rural Chinese hospitals.

4. Improve and expand training for surgeons.

   Although doctors generally praised the quality of current surgery training programs provided by ZOC, they highlighted weaknesses, such as a steep learning curve for doctors without basic surgery skills and lack of hands-on opportunities. We have reported relatively high rates of posterior capsular rupture during training of rural doctors,[38] and have found that some 50 independent cases during training may be necessary before trainees become comfortable with the most difficult steps of surgery.[39] Selective enrollment of doctors into training programs may be one way to overcome this challenge; however, given the fact that many rural Chinese hospitals have only one to two ophthalmologists, training programs suitable for ophthalmologists with

varying backgrounds will need to be developed, or the choice of partner hospitals conditioned on availability of surgeons with acceptable basic skills. As doctors themselves highlighted, training will need to include management of surgical complications and recognition and management of ocular comorbidities. One report in this region identified glaucoma or suspicion of glaucoma in nearly 20% of cataract-operated eyes.[24] Expanding current training curricula for surgeons to include more complex diseases, such as glaucoma and diabetic retinopathy, can increase the efficiency of current case finding efforts and improve cataract surgical outcomes.

5. Attend to patient satisfaction.

Despite agreement among respondent groups that patient satisfaction was generally high, evidence suggests otherwise. A large-scale survey of hospital patient satisfaction across China found results significantly worse than for European hospitals: fewer than half of patients believed that nurses and doctors always communicated well, and fewer than a third believed that staff always explained medications.[40] Very few studies have examined the extent to which providers can accurately predict patient satisfaction; although two studies from the United States found that emergency department providers either accurately predict[41] or underestimate[42] patient satisfaction, the same may not be true in rural China, where patient-provider relationships may be different in nature. Low patient satisfaction with the perceived quality of care has been shown to be a key factor preventing uptake of cataract services in this and other parts of rural China,[27] whereas increased patient satisfaction has been associated with increased patient compliance, reduced complaints against the institution, and improved provider morale.[43] That administrators and doctors did not prioritize enhancing patient satisfaction or reducing wait times as a way to increase surgical volume highlights this as an important area in which a rural cataract program can be improved.

The results and implications of this study must be understood within the context of its limitations. The sample size of the present study was based on a convenience sample from hospitals in Guangdong Province, and therefore generalization of these findings to other areas in rural China must only be done with care. However, the purpose of FG research is not to draw conclusions representative of the entire population, but rather to explore complex issues in greater depth with small groups of participants. Our findings from the present study will supplement a quantitative, 3-year survey of more than 50 rural county hospitals in two provinces. A second limitation of the current report is the fact that no patients participated as respondents in the FGs. Previous FG studies in the areas have focused on the patient's perspective in rural eye care,[18,19] and thus we sought to focus on stakeholders within the hospital system. Finally, although the FG facilitators underwent several rounds of training, they were not professional FG researchers and therefore may have faced challenges in fully engaging with respondents.

The strengths of the present study include the involvement of three key stakeholder groups in the implementation of an ongoing rural cataract surgical program, as well as the fact that data were collected and analyzed according to a predetermined protocol that has been used by the senior author (NC) in previous studies in the area.[17–19] Our results suggest that reducing surgical fees, improving patient satisfaction, and providing additional training for hospital administrators, doctors, and nurses, may potentially increase the success of rural cataract surgery programs in China. These qualitative findings will supplement the quantitative component of the SHARP study by highlighting potential stakeholder obstacles to implementing change. China's low cataract surgical rate highlights the continued need for more effective rural cataract surgery programs, and both the Chinese government and various NGOs have demonstrated a willingness to support such work. The present study is among the first in the region to provide guidance on increasing the likelihood that such programs will be both effective and sustainable.

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