

## **Synopsis**

### **Research Project: Development of Laparoscopy in Rural India**

Since the early 1970's pioneers in India have set mile stones in laparoscopy and later in laparoscopic surgery (LS)<sup>[3]</sup>. In time many of these hospitals became specialised high volume centres based in major cities. With two thirds of India's population living in rural areas and one third of the population living below the poverty line, access to sophisticated surgery is limited. However these patients benefit most from the early return to work after minimal access surgery<sup>[4,5]</sup>. The scope of operations in the rural setting is considerable and often cost-cutting, ranging from diagnostic laparoscopy saving CT or MRI scanning or laparoscopic vagotomy saving a life long medication on proton pump inhibitors with cholecystectomy, appendectomy and sterilisation making up the most of operations<sup>[6,7,8,9,10]</sup>. There is concern whether LS is to be promoted in rural hospitals due to concerns of a greater consumption of resources<sup>[11]</sup>. Cost effectiveness is a key issue, thus forcing the rural surgeon to improvise<sup>[12,13,14]</sup>. One of the main cost factors is the investment in surgical instruments and equipment (camera, light, monitor, CO<sub>2</sub>-insufflator, etc.).

This study is to determine the availability of LS in rural India with present investments and the projected development of LS, the need for facilities and financial resources. Special emphasis is placed on the surgeon's needs. For this a questionnaire [Appendix I] will be circulated to the Members of the Association of Surgeons of India (ASI), the Indian Association of Gastrointestinal Endosurgeons (IAGES) and the Association of Rural Surgeons of India (ARSI).

Approximately 12800 ASI<sup>[15]</sup>, 1800 IAGES<sup>[16]</sup> and 400 ARSI<sup>[17]</sup> Members add up to a total of 15000 potential recipients of the questionnaire. A survey among ASI members in the year 1986<sup>[13]</sup> judging the activity in rural areas had a feedback of 1,7%. By adding a prepaid return envelope this rate can surely be improved to at least 5%, giving a projected return of 750 questionnaires thus providing adequate data to be able to determine significant results.

Relying purely on a printed questionnaire and postal services creates costs per recipient of approximately 50 INR adding up to a total of 7.5 lakhs (11000 Euro). This may be restricted due to limited financial resources available from industry sponsoring the research. So a two-staged procedure is advocated: Primarily there will be a telephone survey with known better return rates<sup>[18]</sup>. Lack of telephone connections in rural areas calls for a second step circulating the questionnaire via postal services reducing the number by step one.

Projected results are that there is a desire to facilitate LS in rural hospitals but that there is a need of sturdy reusable equipment at drastically reduced cost. The goal is to demonstrate to industry that the developing world has a huge potential for LS equipment which needs to meet specific demands different to the increasingly sophisticated equipment in Europe or the US.

# Appendix I

## Questionnaire: Development of Laparoscopic Surgery in India

☎ = Interviewer

☺ = Doctor

### Starting the interview

When reaching the desired Doctor please confirm identity of Doctor for example:

☎ "Hello. Am I speaking with Doctor .....? " or "Hello. Can I please speak to Doctor .....?"

☺ Yes.

☎ "My name is Mrs. ...."

I am calling on behalf of the International Leadership and Business Society, Germany. We are conducting a survey to determine what rural surgeon's needs. Please give me just 10 minutes of your valuable time for some questions."

☺ Yes. If answer is NO → give reason: \_\_\_\_\_ 0a

☎ "Thank you Sir. Are the contact details I have here correct?"

▪ Your Name is (Surgeon's Name) \_\_\_\_\_ 1a

▪ The Hospital Name / Institution \_\_\_\_\_ 1b

▪ Your Address \_\_\_\_\_ 1c

\_\_\_\_\_ 1d

▪ Telephone number \_\_\_\_\_ 1e

▪ Email to forward the results of the survey \_\_\_\_\_ 1f

\_\_\_\_\_ 1f

▪ Your year of birth 19\_\_\_\_ 1g

☎ "Are you MBBS or MS?"

<sup>2a</sup> MBBS <sup>2b</sup> MS

☎ "Do you have a specialisation?"

Specialisation \_\_\_\_\_ 2c

☎ "I believe your are a member of ARSI?"

<sup>3a</sup> ARSI (Association of Rural Surgeons of India)

☎ "Are you a member of ASI?"

<sup>3b</sup> ASI (Association of Surgeons of India)

☎ "Are you a member of IAGES?"

<sup>3c</sup> IAGES (Ind. Ass. of Gastrointestinal Endosurgeons)

<sup>3d</sup> Other \_\_\_\_\_

### Part I: Specifications of hospital

☎ "What is the total number of beds in your hospital (incl. medicine and other specialities)"

☺ Number of beds \_\_\_\_\_<sup>4a</sup>

☎ "How many operating doctors (surgeons, gynaecologists, orthopaedists, etc.) are posted in your institution?"

☺ Number of operating doctors \_\_\_\_\_<sup>4b</sup>

☎ “In what environment in the hospital located?  
 In a <sup>5a</sup> city with more than 1 million population  
<sup>5b</sup> city less than 1 million population  
<sup>5c</sup> rural town  
<sup>5d</sup> completely rural?”

☎ “How far away is the next referral hospital?”  
 ☺ In \_\_\_\_\_ km<sup>6a</sup>.

☎ “What is the main funding?”  
 ☺ <sup>7a</sup> Government  
<sup>7b</sup> Private  
<sup>7c</sup> NGO/Missionary etc

☎ “What percentage of patients are below the poverty line?”  
 ☺ Patients below poverty \_\_\_\_\_ %<sup>8a</sup> of total patients.

☎ “How many operations were performed in the last year? Please give approximate number for the following procedures and state if open or laparoscopic surgery:”

☺ Approximate number of surgical procedures for the last year:

	<i>open surgery</i>	<i>laparoscopic surgery</i>
<i>Diagnostic laparotomy/laparoscopy</i>	_____ <sup>9a</sup>	_____ <sup>9b</sup>
<i>Appendectomy</i>	_____ <sup>10a</sup>	_____ <sup>10b</sup>
<i>Cholecystectomy</i>	_____ <sup>11a</sup>	_____ <sup>11b</sup>
<i>Hernia repair</i>	_____ <sup>12a</sup>	_____ <sup>12b</sup>
<i>Colon resection</i>	_____ <sup>13a</sup>	_____ <sup>13a</sup>
<i>Vagotomy</i>	_____ <sup>14a</sup>	_____ <sup>14b</sup>
<i>Sterilisation</i>	_____ <sup>15a</sup>	_____ <sup>15b</sup>
<i>Hysterectomy</i>	_____ <sup>16a</sup>	_____ <sup>16b</sup>
<i>Ovarial cyst</i>	_____ <sup>17a</sup>	_____ <sup>17b</sup>
<i>Ectopic rupture</i>	_____ <sup>18a</sup>	_____ <sup>18b</sup>

☎ “What is the all over cost for a cholecystectomy including charges for surgeon, anaesthetist, medication and hospital stay? Please give cost both for open procedure and as laparoscopic procedure.”

☺ Approximate cost for cholecystectomy as open procedure \_\_\_\_\_ INR<sup>19a</sup>  
 ☺ and as laparoscopic cholecystectomy \_\_\_\_\_ INR<sup>19b</sup>.


\*!\*\*\*! If the hospital has not done any laparoscopic surgery up to date → ask this question:

☎ “What are the main reasons that your hospital has not done any laparoscopic surgery to date? ☺

- <sup>20a</sup> high cost
- <sup>20b</sup> lack of training
- <sup>20c</sup> no benefit
- <sup>20d</sup> complication rate
- <sup>20e</sup> or other reasons: \_\_\_\_\_ (please specify)


→ !\*!\*\*\*! in this case (no laparoscopic surgery) please continue with part III

## Part II: Laparoscopic surgery at present in your hospital

 “What is the main factor making the laparoscopic procedure more expensive?”



- 21a *invested equipment*
- 21b *operating time*
- 21c *more resources needed*
- 21d *disposable products*
- 21e *or other reasons:* \_\_\_\_\_ (please specify)


 “How much has been investment in laparoscopic surgery equipment and instruments in your hospital to date?”

☺ Approximate investment in laparoscopic surgery equipment and instruments in total to date \_\_\_\_\_ INR<sup>22a</sup>.

 “What is used to create pneumo-peritoneum?”




- 23a *CO<sub>2</sub>*
- 23b *air*
- 23c *abdominal wall lift*
- 23d *or other:* \_\_\_\_\_ (please specify)

 “What is used as a light source?”



- 24a *conventional halogen*
- 24b *cold light source*
- 24c *or other:* \_\_\_\_\_ (please specify)

 “Do you regularly use disposable products like:



- 25a *harmonic scalpel*
- 25b *linear endostaplers*
- 25c *circular endostaplers*
- 25d *endo-bags*
- 25e *or other:* \_\_\_\_\_ (please specify)

 “What kind of 'self made' instruments and materials do you use?”

- 26a *endo-loops*
- 26b *self made sutures*
- 26c *condoms as endo-bags*
- 26d *or others:(please specify!!!)*


---



---



---

 “What kind of anaesthesia is used for laparoscopic surgery?”



- |   | <i>all</i>                   | <i>mainly</i>                | <i>some</i>                  | <i>never</i>                 |
|---|------------------------------|------------------------------|------------------------------|------------------------------|
| <i>general anaesthesia with ether</i>       | <input type="checkbox"/> 27a | <input type="checkbox"/> 27b | <input type="checkbox"/> 27c | <input type="checkbox"/> 27d |
| <i>general anaesthesia with other</i> _____ | <input type="checkbox"/> 28a | <input type="checkbox"/> 28b | <input type="checkbox"/> 28c | <input type="checkbox"/> 28d |
| <i>spinal anaesthesia</i>                   | <input type="checkbox"/> 29a | <input type="checkbox"/> 29b | <input type="checkbox"/> 29c | <input type="checkbox"/> 29d |
| <i>local anaesthesia</i>                    | <input type="checkbox"/> 30a | <input type="checkbox"/> 30b | <input type="checkbox"/> 30c | <input type="checkbox"/> 30d |

☎ “What kind of difficulties do you encounter practising laparoscopic surgery? Please state if none, some, often or major difficulties”

	none	some	often	major difficulties
☺				
finding adequate equipment	<input type="checkbox"/> <sup>31a</sup>	<input type="checkbox"/> <sup>31b</sup>	<input type="checkbox"/> <sup>31c</sup>	<input type="checkbox"/> <sup>31d</sup>
financing equipment	<input type="checkbox"/> <sup>32a</sup>	<input type="checkbox"/> <sup>32b</sup>	<input type="checkbox"/> <sup>32c</sup>	<input type="checkbox"/> <sup>32d</sup>
repair of equipment	<input type="checkbox"/> <sup>33a</sup>	<input type="checkbox"/> <sup>33b</sup>	<input type="checkbox"/> <sup>33c</sup>	<input type="checkbox"/> <sup>33d</sup>
adequate power supply	<input type="checkbox"/> <sup>34a</sup>	<input type="checkbox"/> <sup>34b</sup>	<input type="checkbox"/> <sup>34c</sup>	<input type="checkbox"/> <sup>34d</sup>
training	<input type="checkbox"/> <sup>35a</sup>	<input type="checkbox"/> <sup>35b</sup>	<input type="checkbox"/> <sup>35c</sup>	<input type="checkbox"/> <sup>35d</sup>
time consuming	<input type="checkbox"/> <sup>36a</sup>	<input type="checkbox"/> <sup>36b</sup>	<input type="checkbox"/> <sup>36c</sup>	<input type="checkbox"/> <sup>36d</sup>
complications	<input type="checkbox"/> <sup>37a</sup>	<input type="checkbox"/> <sup>37b</sup>	<input type="checkbox"/> <sup>37c</sup>	<input type="checkbox"/> <sup>37d</sup>
conversion rate	<input type="checkbox"/> <sup>38a</sup>	<input type="checkbox"/> <sup>38b</sup>	<input type="checkbox"/> <sup>38c</sup>	<input type="checkbox"/> <sup>38d</sup>
acceptance by patients	<input type="checkbox"/> <sup>39a</sup>	<input type="checkbox"/> <sup>39b</sup>	<input type="checkbox"/> <sup>39c</sup>	<input type="checkbox"/> <sup>39d</sup>
unqualified paramedical staff	<input type="checkbox"/> <sup>40a</sup>	<input type="checkbox"/> <sup>40b</sup>	<input type="checkbox"/> <sup>40c</sup>	<input type="checkbox"/> <sup>40d</sup>
lack of diagnostic facilities	<input type="checkbox"/> <sup>41a</sup>	<input type="checkbox"/> <sup>41b</sup>	<input type="checkbox"/> <sup>41c</sup>	<input type="checkbox"/> <sup>41d</sup>
legal problems	<input type="checkbox"/> <sup>42a</sup>	<input type="checkbox"/> <sup>42b</sup>	<input type="checkbox"/> <sup>42c</sup>	<input type="checkbox"/> <sup>42d</sup>
other; (please specify) <sup>43a</sup>	_____			

☎ “Has your hospital trained any surgeons in laparoscopic surgery in the last year?”

- ☺ <sup>44a</sup> no.  
<sup>44b</sup> yes. → ☎ “How many?” ☺ Number surgeons trained \_\_\_\_\_<sup>44c</sup>.

### III Prospected development in the next 5 years in your Hospital

☎ “Please judge the development of laparoscopic procedures in your hospital in the next 5 years: Will appendectomies be open surgery (all or mainly) or laparoscopic surgery (all or mainly)? How is this with cholecystectomies? With hernia repairs? With colon resections?”

	open surgery		laparoscopic surgery	
☺	all	mainly	mainly	all
Appendectomy	<input type="checkbox"/> <sup>45a</sup>	<input type="checkbox"/> <sup>45b</sup>	<input type="checkbox"/> <sup>45c</sup>	<input type="checkbox"/> <sup>45d</sup>
Cholecystectomy	<input type="checkbox"/> <sup>46a</sup>	<input type="checkbox"/> <sup>46b</sup>	<input type="checkbox"/> <sup>46c</sup>	<input type="checkbox"/> <sup>46d</sup>
Hernia repair	<input type="checkbox"/> <sup>47a</sup>	<input type="checkbox"/> <sup>47b</sup>	<input type="checkbox"/> <sup>47c</sup>	<input type="checkbox"/> <sup>47d</sup>
Colon resection	<input type="checkbox"/> <sup>48a</sup>	<input type="checkbox"/> <sup>48b</sup>	<input type="checkbox"/> <sup>48c</sup>	<input type="checkbox"/> <sup>48d</sup>

☎ “What is the planned investment in laparoscopic equipment and instruments in the next 5 years?”

☺ Planned investment \_\_\_\_\_ INR<sup>49a</sup>

\*\*\*! If planned investment is none, ask this question:

☎ “Why is there no intention to expand laparoscopic surgery? What are the main reasons?”

- ☺
- <sup>50a</sup> high cost
  - <sup>50b</sup> lack of training
  - <sup>50c</sup> no benefit
  - <sup>50d</sup> complication rate
  - <sup>50e</sup> other reasons, (please specify) \_\_\_\_\_

☎ *“Do you see a positive cost-benefit ratio for laparoscopic surgery for “under privileged” patients (rural, below poverty line, low caste, etc.)?”*

😊

- <sup>51a</sup> none
- <sup>51b</sup> to some extent
- <sup>51c</sup> definitively

\*!\*\*\*! If “to some extent” or “definitely”, ask this question:

☎ *“What is the main benefit?”*

😊

- <sup>52a</sup> short hospital stay
- <sup>52b</sup> early onset of work
- <sup>52c</sup> aesthetic
- <sup>52d</sup> reduced pain
- <sup>52e</sup> less wound infections
- <sup>52f</sup> other, (please specify) \_\_\_\_\_

☎ *“What aspects do you consider important when installing laparoscopic equipment? What is difficult to obtain?”*

😊

	important	difficult to obtain
low cost	<input type="checkbox"/> <sup>53a</sup>	<input type="checkbox"/> <sup>53b</sup>
durability	<input type="checkbox"/> <sup>54a</sup>	<input type="checkbox"/> <sup>54b</sup>
easy maintenance	<input type="checkbox"/> <sup>55a</sup>	<input type="checkbox"/> <sup>55b</sup>
compatibility	<input type="checkbox"/> <sup>56a</sup>	<input type="checkbox"/> <sup>56b</sup>
reusable	<input type="checkbox"/> <sup>57a</sup>	<input type="checkbox"/> <sup>57b</sup>
high definition camera and monitor	<input type="checkbox"/> <sup>58a</sup>	<input type="checkbox"/> <sup>58b</sup>
high quality optics	<input type="checkbox"/> <sup>59a</sup>	<input type="checkbox"/> <sup>59b</sup>
CO <sub>2</sub> -insufflator rather than air	<input type="checkbox"/> <sup>60a</sup>	<input type="checkbox"/> <sup>60b</sup>
cold light source rather than halogen	<input type="checkbox"/> <sup>61a</sup>	<input type="checkbox"/> <sup>61b</sup>
video documentation system	<input type="checkbox"/> <sup>62a</sup>	<input type="checkbox"/> <sup>62b</sup>
other _____	<input type="checkbox"/> <sup>63a</sup>	<input type="checkbox"/> <sup>63b</sup> SPECIFY!

☎ *“What have you always wanted to tell designers and industry about their products, what do they need to change, what is great?”*

😊<sup>64a</sup>

☎ *“Have we missed anything important in this questionnaire?”*

😊<sup>65a</sup>

☎ *“Sir, thank you very much for your patience and your detailed answers!”*

Date<sup>66a</sup> \_\_\_\_\_ Interviewer Name<sup>66b</sup> \_\_\_\_\_

Comments from interviewer:

<sup>66c</sup>

Further Information can be found at [www.ilbs.org](http://www.ilbs.org) → follow medical research.

## References

- 1 The International Leadership and Business Society e.V., Johannesstrasse 14, 78609 Tuningen, Germany, at [www.ilbs.org](http://www.ilbs.org)
- 2 Dr. med. Elias Engelking, Hugstetter Str. 19, 79106 Freiburg, [eliasengelking@yahoo.com](mailto:eliasengelking@yahoo.com). Surgeon in training at Diakoniekranenhaus Freiburg (Teaching Hospital of the University of Freiburg).
- 3 Udwardia TE: Diagnostic laparoscopy. *Surg Endosc* 2004, 18 (6-10).
- 4 Cadière GB: Laparoscopic surgery and the third world. *Surg Endosc* 1996, 10 (957-958).
- 5 Udwardia TH: Laparoscopy in India - A personal perspective. *J Min Access Surg* 2005, 1 (51-52).
- 6 De U : Laparoscopic versus open appendicectomy: An Indian perspective. *J Min Access Surg* 2005, 1 (15-20).
- 7 Gnanaraj J: Laparoscopic surgery in rural areas. *ANZ Journal of Surgery* 2007, 77 (799-800).
- 8 Manning RG, Aziz AQ: Should Laparoscopic Cholecystectomy be Practised in the Developing World? The Experience of First Training Program in Afganistan. *Ann Surg* 2009, 5 (794-798).
- 9 Mir IS et al.: Laparoscopic cholecystectomy in a small rural hospital in Kashmir Valley, India. *Trop Doctor* 2008, 38 (213-216).
- 10 Ramakrishna HK: Experiences at a M.A.S. unit in a rural area. *Rural Surgery* 2004, 4 (4-7).
- 11 Anita NH: ARSI, Its origin, Present status and Future. *Rural Surgery* 2006, 1 (2-3).
- 12 Jesudian G: Laparoscopic surgery in rural areas. *ANZ Journal of Surgery* 2007, 77(9) (799-800).
- 13 Banerjee JK: Caring for Developing Communities. *Eur J Surg* 1999, 165 (69-71).
- 14 Arun SK, Cost-efficient laparoscopy in India, 125th Congress of the German Association of Surgeons, Berlin 2008,
- 15 ASI Members Directory, July 2009 at [www.asiindia.org](http://www.asiindia.org)
- 16 IAGES Members Directory, July 2009 at [www.iages.org.in](http://www.iages.org.in)
- 17 ARSI Members Directory, July 2009 at [www.arsi-india.org](http://www.arsi-india.org)
- 18 Statistical Survey, 26.7.2009 at [www.en.wikipedia.org/wiki/Statistical\\_survey](http://www.en.wikipedia.org/wiki/Statistical_survey)