

Surgical Training in Singapore: Will Patients Consent to Trainee Surgeons Performing Their Operations?

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Abstract

Introduction: Little is known about the attitudes of Singaporean patients towards the intraoperative involvement of trainee surgeons. We aimed to discover if patients would consent to having a trainee surgeon perform their surgery under the supervision of a consultant and if patients would agree to having their photographs or X-rays used for education or research. We sought to discover if patients' decisions were related to demographic factors such as ethnicity, gender, age, socioeconomic status and previous hospitalisation. **Materials and Methods:** A questionnaire was administered to 104 patients immediately after their consent was obtained at the Orthopaedic Surgery Clinic and Hand and Reconstructive Microsurgery Clinic at the National University Hospital, Singapore or after admission at the Day Surgery Centre. Only patients undergoing elective orthopaedic or hand surgery were recruited. **Results:** Sixty-eight per cent of the patients refused to have a trainee surgeon perform their surgery. However, 96% of the patients consented to the use of their photographs or X-rays for teaching. Demographic factors found to be statistically significant were education level and age of the patients. Patients with higher educational levels were more likely to refuse trainee surgeons compared to the group with little or no education [odds ratio (OR), 4.57] but they were more likely to consent to the use of their photographs or X-rays (OR, 0.13). **Conclusions:** Most patients are reluctant to have a trainee surgeon operate on them. This was strongly related to the level of education attained by the patient and the age of the patient.

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Key words: Attitudes, Informed consent, Patients, Surgery, Trainees

Introduction

Teaching, training, appraising and assessing doctors and students are important for the care of patients now and in the future.¹ In most hospitals, trainee surgeons play a substantial role in providing healthcare and surgical services, under the supervision of a consultant. The Departments of Hand Surgery and Orthopaedic Surgery of the National University Hospital (NUH) attract 6 to 10 Basic Surgery trainees, 4 to 5 Advanced Orthopaedic Surgery trainees² and 4 Advanced Hand Surgery trainees each year. Since 1993, a structured postgraduate training and assessment format has been put in place. Trainees have to undergo 3 years of basic surgical training, followed by another 3 years of advanced orthopaedic training before taking an exit assessment.^{3,4}

Little is known about the current views and attitudes of

patients in Singapore towards trainee surgeons. Whatever little information gleaned from newspaper forums and patient interaction seems to suggest a general aversion to being treated by trainee surgeons. A retrospective study of complaints received by the Family Health Services between January 1994 and December 1995 revealed a number of complaints regarding young or inexperienced doctors.⁵

There has been no previous local study assessing patients' attitudes towards trainee surgeons performing their operations. Hence, we used a questionnaire that had been used on preoperative patients in the United Kingdom⁶ to find out more about patients' attitudes.

The aims of our study were:

- o To discover if patients would agree to a trainee surgeon performing all or part of the surgery under the supervision of the consultant.

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- o To find out if patients would agree to let their photographs and records be used for educational and research purposes.
- o To find out if there were factors related to patients' decision such as age, race, gender, education level, type of procedure they are undergoing, previous hospitalisation or previous working experience in healthcare.

We hypothesised that patients would not agree to having trainee surgeons operate on them, but that they would consent to let their photographs or X-rays be used for educational or research purposes as it was less invasive.

Materials and Methods

NUH is a 928-bed, tertiary acute-care hospital.⁷ The hospital supports clinical teaching for undergraduate medical students and postgraduate training for specialist doctors. A prospective cohort study of all patients undergoing elective hand or orthopaedic surgery at NUH, Singapore, from 15 May 2006 to 9 June 2006, was undertaken.

The criteria for inclusion were:

1. Elective hand or orthopaedic surgical procedure
2. Age 21 years and above
3. Singapore citizens and permanent residents
4. Able to communicate coherently by themselves

In the outpatient clinics, patients who are listed for elective surgical procedures are seen in a preadmission counselling room where the nurse explains what happens on the day of surgery and provides financial counselling.

Patients who are listed for day surgery or same-day admission will register at the Day Surgery Centre and be admitted to the day surgery ward.

A questionnaire that covers a patient's attitudes toward trainee surgeons and having their photographs and X-rays being used for teaching or research purposes (Appendix A) was administered by the nursing staff at the pre-admission counselling room and Day Surgery Centre after registration. Patients were reassured that this was merely a survey to gauge their attitudes and would not affect the level of care they would receive later. Verbal consent was obtained from the patient and consenting patients completed the questionnaire.

The survey forms were collected at the end of the day.

Patients who were admitted on the eve of their surgery were interviewed by 1 of the authors (LWG) in the wards once they were settled in.

Survey Development

The questionnaire was adapted from a previous study conducted in the Department of Trauma and Orthopaedics

of a public hospital in the United Kingdom.

The questionnaire was designed to give insight to the following:

1. Operation details such as date of operation and type of procedure
2. Patients' attitudes towards trainee surgeons performing their surgery under the supervision of a consultant.
3. Patients' attitudes towards having their photographs or X-rays being used for research or teaching purposes.

Demographic information such as age, gender and ethnicity was obtained from the attached patient's label. There were additional questions after a literature review^{8,9} regarding the patient's level of education, previous hospitalisations, occupational history and the patient's paying status. The questionnaire was translated into Chinese and Malay for consistency of data capture.

A pilot study was carried out at the Hand and Reconstructive Microsurgery Clinic, NUH. This pilot study involved patients who were listed for elective hand surgery after their clinical consultation. Patients answered the survey questions and additional questions about whether they understood the terms used such as "trainee surgeons" and whether they felt the response options were appropriate.

The definition of trainee surgeon was added to the questionnaire for further clarification. Trainee surgeons referred to qualified doctors who have at least 3 years of postgraduate basic surgical training and have passed a basic qualifying surgical exam (MRCS) and are training to become specialists in hand/orthopaedic surgery. A sample photograph was incorporated into the questionnaire to provide responders with a clearer picture of how their photographs would appear.

Clearer definitions for some of the terms used in the questionnaire (Appendix A) were laid out to avoid confusion.

- o "Previous hospitalisation" would refer to previous stay in hospital for surgical or any other medical indications.
- o "Previous operations" would include any previous major/minor surgical procedures performed in the major operating theatres or day surgery.
- o "Family members" included only first-degree relatives such as parents, siblings and offspring.
- o "Working/worked in healthcare" referred to all workers in the healthcare setting such as doctors, nurses, laboratory and dental personnel, pre-hospital care providers, housekeeping, laundry, and maintenance workers, as well as traditional Chinese medicine practitioners, acupuncturists and therapists.
- o Patients were told to consider the questions in the context of their upcoming surgery.

Table 1. Demographics of Sample Population

Demographic variable	n	%
Total sample number	104	100
Gender		
Male	54	52
Female	50	48
Age (y)		
Range	21-91	
Mean	47.8	
Standard deviation	18.5	
Ethnic group		
Chinese	71	68
Malay	16	15
Indian	11	11
Others	6	6
Education level		
No formal schooling	12	12
Primary school/PSLE ¹	17	16
Secondary school/GCE N-Levels ² / O-Levels ³	34	33
Junior college/Pre-University/ GCE A-Levels ⁴	13	13
Polytechnic/Diploma	16	15
ITE ⁵ /Vocational institute	3	3
University graduate	7	7
Private or subsidised		
Subsidised	82	21
Private	22	79
Previously hospitalised		
Yes	74	71
No	30	29
Patient or family member working/ worked in healthcare		
Yes	87	84
No	17	16

¹ PSLE refers to Primary School Leaving Examination
² GCE N-level refers to Singapore-Cambridge General Certificate of Education Normal level
³ GCE O-level refers to Singapore-Cambridge General Certificate of Education Ordinary level
⁴ GCE A-level refers to Singapore-Cambridge General Certificate of Education Advanced level
⁵ ITE refers to Institute of Technical Education

All statistical analyses were carried out using the statistical software SPSS for Windows (version 14.0).

The associations between the outcome and demographic variables such as race and gender were assessed using chi-square or Fisher's exact test. Where the data is ordinal, chi-square trend test was used. Statistical significance was at $P < 0.05$.

The age groups were divided according to percentiles to decrease any bias during analysis.

Education level was analysed according to groups. Primary education included responders who had no formal schooling or attained PSLE standard and below. The secondary education group included responders who had

Table 2. List of Procedures Undergone by the Sample Population

Major procedures	No. of patients	%
ORIF of fractures	15	14
Joint replacement	11	11
Knee arthroscopy	9	9
ACL reconstruction	7	7
Spine surgery	7	7
Shoulder arthroscopy	7	7
Tibial osteotomy	2	2
Limb amputation	2	2
Bone grafting	2	2
Split thickness skin grafting	2	2
Skin flap	2	2
Tenolysis and arthrolysis of MCPJ	1	1
Reconstruction of left hand	1	1
Arthrodesis of thumb interphalangeal joint	1	1
Muscle biopsy	1	1
Minor procedures		
Carpal tunnel release, trigger finger release,	13	13
De Quervain tenosynovitis		
Ganglion/lump biopsy	9	9
Implant removal	8	8
Division of cross finger flap	1	1
Separation of groin flap	1	1
Excision of nail matrix	1	1
Bone marrow aspiration	1	1

ACL: anterior cruciate ligament; MCPJ: metacarpophalangeal joint; ORIF: open reduction and internal fixation

attained a GCE N-level, O-Level certificate or attended ITE or a vocational institute. The tertiary education group included responders who had at least attained a GCE A-Level certificate, diploma or university graduates. The groupings of the education level in the questionnaire was based on that used in the National Health Survey 2004.⁹

The procedures that patients underwent were divided into major and minor procedures based on the type of anaesthesia the patient underwent. Cases which used general or regional anaesthesia were defined as major procedures. Cases which used local anaesthesia were defined as minor procedures.

Of the 167 patients approached, a total of 114 patients responded, giving a response rate of 68.3%. However of the 114 responses, 10 were ineligible as 5 of the responders were below 21 years of age and the other 5 were foreigners.

Demographics of the patient population studied are shown in Table 1. Procedures that the sample population underwent are shown in Table 2. A total of 104 patients were enrolled in the study; 52% were men and 48% were women. The mean age was 47.8 years [standard deviation (SD), 18.5 years]. Less than 40% had education higher than secondary school level. Seventy-eight per cent of responders were subsidised patients. Seventy-one per cent of the responders had previously been hospitalised or undergone

Table 3. Distribution (%) of Survey Sample and the 2005 Singapore Resident Population Aged 20 to above 60 years by Gender, Age Group, Ethnic Group and Education Level

Demographic	Survey sample	Singapore resident population (at the end of June 2005)
Gender		
Male	51.9	49.6
Female	48.1	50.4
Age (y)*		
20-29	22.1	18.2
30-39	13.5	23.5
40-49	16.3	24.7
50-59	23.1	17.7
above 60	25.0	16.0
Ethnic group		
Chinese	68.2	75.6
Malay	15.4	13.6
Indian	10.6	8.7
Others	5.8	2.1
Education level*		
No formal education	11.5	16.4
Primary school/PSLE	16.3	22.0
GCE 'O'/'N' levels/ITE	32.7	21.4
Pre-university/GCE 'A' Levels	12.5	15.1
Polytechnic/Diploma	15.4	8.2
University degree	6.7	17.0

* Estimates derived from General Household Survey 2005, Statistical Release 1-Socio-Demographic and Economic Characteristics

surgery. Only 16% were healthcare workers or had family members who are healthcare workers.

The ethnic composition was 68% Chinese, 15% Malay, 11% Indian and 6% other ethnic groups. The ethnic group and gender distribution of the survey sample were similar to that of the general Singapore population estimates as at the end of June 2005, obtained from the Singapore Department of Statistics¹⁰ as shown in Table 3. However, our sample population was slightly older in terms of age and less well educated.

The responses to the questionnaire were collated and organised into Tables 4 and 5 according to the questions.

Results

Patients' Attitudes towards Trainee Surgeons

Patients were asked if they would agree to a trainee surgeon performing all or part of their surgery, under the close supervision of a consultant. A total of 66 patients (64%) would not agree to a trainee surgeon performing all or part of their surgery, under the close supervision of a consultant.

Out of the 54 men surveyed, 32 (59%) of them would not want a trainee surgeon operating on them. There were more female patients (34, 68%) who refused trainee surgeons.

Younger patients, aged less than 30 years, did not show obvious aversion to trainee surgeons operating on them, with 57% saying no. However, patients between 31 to 59 years of age (76%) were clearly not keen on having trainee surgeons operate on them. Patients above 60 years of age were the most agreeable, with less than half (42%) replying no. The differences between the age groups were significant (OR for ≤ 30 versus $\geq 60 = 0.56$; 95% CI, 0.18 to 1.75; OR for 31-59 versus $\geq 60 = 0.23$; 95% CI, 0.08 to 0.62).

There was a significant trend seen in the responses among the different education groups. Those with higher educational levels were less likely to agree to trainee surgeon involvement, with 59% of patients with primary education replying yes, while only 24% from the tertiary education group replied yes. Differences between the groups were significant (OR for primary education versus secondary education = 2.95; 95% CI, 1.08 to 8.10; OR for primary education vs tertiary education = 4.57; 95% CI, 0.01 to 1.18).

There were no obvious differences noted between ethnic groups. Similar responses were obtained from Chinese and Malay patients with 64.8% and 68.8%, replying no respectively.

Most private patients (72.7%) rejected the idea of a trainee surgeon operating on them. Patients with family members who were healthcare workers or previous healthcare workers themselves (70.6%) were less likely to agree to trainee surgeon involvement than non-healthcare workers (62.1%).

Previous hospitalisation or surgical experience did not change responder outcomes, with similar proportions of first-time patients (67.2%) and previous patients (66.7%) replying no. The magnitude of the procedures did not sway responders' preference either, with equal proportions of patients undergoing minor procedures (62.1%) and major procedures (64.0%) being unwilling to consent to trainee surgeons' participation.

Most of the differences between the various groups were not statistically significant, with the exception of education and age.

Patients' Attitudes Regarding X-ray Films and Photographs Being Used for Teaching or Research Purposes

Patients were asked if they would agree to having their photographs and/or X-rays used for teaching or research purposes. Ninety-six out of 104 patients (92%) replied yes, only 8 replied no.

There was a significant trend seen in the response from the different age groups. All the younger patients, aged less than 30 years (100%), were agreeable to having their X-rays and photographs used for educational purposes. The

Table 4. Results of the Question: “Would You Agree to a Trainee Surgeon Performing All or Part of your Surgery under the Close Supervision of a Consultant?”

	Total	Yes	No	Odds ratio	95% CI	P value
Gender						
Male	54	22 (41)	32 (59)	1.46	0.65-3.27	0.36
Female	50	16 (32)	34 (68)			
Age (y)						
≤30	23	10 (43)	13 (57)	0.56	0.18-1.75	0.009
31-59	55	13 (24)	42 (76)	0.23	0.08-0.62	
≥60	26	15 (58)	11 (42)	1.00		
Ethnic groups						
Chinese	71	25 (35)	46 (65)	1.00		
Malay	16	5 (31)	11 (69)	1.20	0.37-3.83	0.59
Indian and Others	17	8 (47)	9 (53)	0.61	0.21-1.78	
Education level						
Primary education	29	17 (59)	12 (41)	1.00		
Secondary education	37	12 (32)	25 (68)	2.95	1.08-8.10	0.004
Tertiary education	38	9 (24)	29 (76)	4.57	0.01-1.18	
Paying status						
Subsidised	82	32 (39)	50 (61)	1.00	0.61-4.82	0.31
Private	22	6 (27)	16 (73)	1.71		
Previously hospitalised						
Yes	74	28 (38)	46 (62)	1.00	0.50-3.00	0.82
No	30	10 (33)	20 (67)	1.22		
Patient/family member working/worked in healthcare						
Yes	17	5 (29)	12 (71)	1.00	0.22-2.11	0.51
No	87	33 (38)	54 (62)	0.68		
Type of procedure						
Minor	29	11 (38)	18 (62)	1.00	0.45-2.64	0.51
Major	75	27 (36)	48 (64)	1.09		

95% CI: 95% confidence interval

middle-aged group, between 30 to 59 years of age, had 4 out of 55 responders (7%) objecting to their photographs and X-rays being used. In the elderly group (above 60 years of age), 15% replied no to the question. Chi-square trend was statistically significant ($P = 0.05$).

Education level was another factor which showed a linear trend in response. The primary education group was the least likely to agree (83%) compared to the secondary education group (95%), with the tertiary education group (97%) being most supportive of the use of their radiographic images for research and education. The differences were not statistically significant ($P < 0.05$).

The rest of the demographic factors had similar proportions of responses, and hence were unlikely to be major factors in patients' decision-making.

Confounders

For both the survey questions, age and education level were found to be closely associated. The younger age groups were more highly educated while the older age group was found to be less educated. However, education level was found to be a more dominant factor related to

patients' decisions based on both the univariate analysis, and the logistic regression analysis including both age and education in an earlier model (results not shown). Simultaneously adjusting for age and education in the logistic regression model resulted in the problem of collinearity.

Discussion

Our study showed that most patients (64%) were unwilling to let a trainee surgeon perform all or part of the surgery under the supervision of a consultant. However, almost all of them (92%) were agreeable to having their X-rays or photographs used for teaching or research purposes. Factors related to their decisions were the patient's education level and age.

The results from our study differ greatly from the UK study⁶ on which it was based. The UK study found that 74% of the patients were agreeable to trainee surgeons performing all or part of their surgery. The estimated mean age of the study population in the UK study was 48 years, which is comparable to our study subjects' mean age of 47.8 years. Cowles et al⁸ found that in the United States only 32% of

Table 5. Results of the Question: “Would you Agree to Having Your Photographs/X-rays Being Used for Teaching/Research Purposes?”

	Total	Yes	No	Odds ratio	95% CI	P value
Gender						
Male	54	52 (96)	2 (4)	3.55	0.68-18.46	0.11
Female	50	44 (88)	6 (12)			
Age						
≤30	23	23 (100)	0 (0)	4.00	0.41-38.70	0.05
31-<60	55	51 (93)	4 (7)	2.32	0.53-10.12	
≥60	26	22 (85)	4 (15)	1.00		
Ethnic groups						
Chinese	71	66 (93)	5 (7)	0.88	0.10-8.10	0.78
Malay	16	15 (94)	1 (6)	1.76	0.31-9.96	
Indian and Others	17	15 (88)	2 (12)			
Education level						
Primary education	29	24 (83)	5 (17)	0.27	0.05-1.53	0.03
Secondary education	37	35 (95)	2 (5)	0.13	0.01-1.18	
Tertiary education	38	37 (97)	1 (3)			
Paying status						
Subsidised	82	75 (91)	7 (9)	0.51	0.06-4.38	0.46
Private	22	21 (95)	1 (5)			
Previously hospitalised						
Yes	74	68 (92)	6 (8)	0.81	0.15-4.26	0.58
No	30	28 (93)	2 (7)			
Patient/family member working/worked in healthcare						
Yes	17	14 (82)	3 (18)	0.29	0.06-13.3	0.12
No	87	82 (94)	5 (6)			
Type of procedure						
Minor	29	25 (86)	4 (14)	0.35	0.08-1.52	0.15
Major	75	71 (95)	4 (5)			

95% CI: 95% confidence interval

their patients would not want a trainee surgeon operating on them at all. This difference in findings could be attributed to the different cultures in the populations surveyed. Most Singaporeans would prefer a doctor they deem competent and knowledgeable.^{11,12} They may associate experience with competence and knowledge, thus explaining their preference for a consultant. The British and American patients did not mind trainee surgeons participating in their operations as long as they were supervised. Trainee surgeons are only allowed to shoulder the responsibility when they are deemed competent to perform a particular procedure. Numerous studies have shown that clinical outcomes do not differ between consultants and supervised trainees.

Differences in the healthcare systems could explain the difference in refusal rates between the two groups of patients. In the UK, healthcare is free under the National Health Service (NHS) while in the US, patients have health insurance to cover their healthcare costs.¹³ However, in Singapore, patients have to pay part or all of the healthcare cost themselves.¹³ Hence, they believe that they are entitled to choose their surgeons.

The reason behind the reluctance of most patients to consent to trainee surgeons could be linked to the lack of in-depth knowledge of the specialist training process. Previous studies in the United States have shown that patients were sometimes unable to differentiate between trainee surgeons and medical students.¹⁴ In one of the studies, 13% of the patients were not aware that the trainee surgeon had finished medical school and had already obtained an MD degree.³ Despite our attempts to clarify this misconception in our questionnaire, this belief may be too deeply ingrained in our population.

Among the different age groups surveyed, we found that the age group with the highest refusal rate was the 31 to 59 years age group, with 76% replying no. This finding corresponds to a local study by Lim et al⁵ regarding patient complaints. The study found that the adult patients from the 20 to 59 years age group had the highest rate of complaints. Lim et al inferred that being financially independent, this group of patients was more assertive and demanding. However, this needs further study and analysis.

We also found that the with higher educational levels, the

patients were less likely to consent to the intraoperative involvement of a trainee surgeon. This is consistent with other studies, which have found that patients of higher socioeconomic status are more likely to complain or file a malpractice claim.^{15,16}

However, the second question regarding the use of photographs and X-rays for education and research purposes saw an opposite trend, where the more educated patient was more likely to agree to the use of his or her radiographic images than the less educated one. The more educated patient would be aware of the benefits of research and be more likely to give their consent since the use of X-rays and photographs is minimally invasive and does not invade the patient's privacy.

Our study found that most patients are not willing to have trainee surgeons operate on them, which will impact greatly on surgical training. Trainee surgeons will have insufficient training and take a longer time to become competent in their skills. This will affect the level of healthcare received by the future generations of patients in the hands of these young surgeons.

The main limitation of our study is the small sample size which led to many of the results being statistically non-significant. The small sample size could be attributed to the limited time frame in which the study was conducted and the high refusal rate from patients.

For our study, only orthopaedic and hand surgery patients were recruited, hence the results may not be applicable to patients from other specialties.

Our survey only asked 2 questions on whether if patients would agree to a trainee surgeon operating on them and if they would agree to their photographs and X-rays being used for educational purposes. From these 2 questions alone, we were unable to discover the exact reasons behind their refusal to let trainee surgeons operate on them. The reasons in the discussion above are suggested based on findings from previous studies on patients' attitudes. A further study could be constructed to investigate the reasons behind patients' unwillingness to consent to trainee surgeons. If the reasons are non-justifiable or arise from pure misunderstanding of the system, we could seek ways to clarify and educate patients. This would result in a happier medical encounter for patients and doctors.

Conclusion

In conclusion, most patients are reluctant to have a trainee surgeon operate on them. This was strongly related to the level of education attained by the patient and the age of the patient. This large number of refusals would have a negative impact on surgical training. Further research is required to find out the reasons behind their reluctance. As we strive to be a hub of medical excellence, we should

create an environment where research, teaching and patient care can exist in harmony.

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Appendix A: Questionnaire

Please inform patients: This is merely a survey to gauge the attitudes of Singaporean patients and that it has no bearing on the procedure that the patient is undergoing.

Questionnaire

Patient's biodata:	Patient's label:
Date of operation :.....(DD / MM / YY)	
Type of procedure :.....	
1. Subsidised 2. Private	<input type="checkbox"/>
Previous hospitalization/ operation : 1. Yes 2. No	<input type="checkbox"/>
Patient or family member work/worked in health care : 1. Yes 2. No	<input type="checkbox"/>
Highest level of education attained :	
1. No formal schooling	
2. Primary school (Pri 1-6) / PSLE	
3. Secondary school (Sec 1 – Sec 4)/ N- levels/ O- Levels	
4. JC / Pre-university/ A-levels	
5. Polytechnic / Diploma	
6. ITE graduate / Vocational institute	<input type="checkbox"/>
7. University graduate and above	
1. Would you agree to a trainee surgeon performing all or part of your surgery, under the close supervision of the consultant ?	
[Trainee surgeons refer to qualified doctors who have at least 3 years of postgraduate basic surgical training and have passed a basic qualifying surgical exam (MRCS) and are training to become specialists in hand / orthopaedic surgery]	
您会同意让实习的外科医生在专科医生的监督之下，为您进行部分或全部的手术吗？	
Adakah anda bersetuju doctor bedah pelatih menjalankan sebahagian atau semua pembedahan anda dibawah arahan doctor pakar?	
1. Yes 同意 Ya	
2. No 不同意 Tidak	<input type="checkbox"/>
2. Would you agree to having your photographs / x-rays being used for teaching / research purposes?	
您会同意让您的照片或 x-光用于教育或研究用途吗？	
Adakah anda bersetuju bahawa gambar-gambar / x-rays anda boleh digunakan untuk pendidikan / kajian?	
1. Yes 同意 Ya	
2. No 不同意 Tidak	<input type="checkbox"/>

