

## Original Article



# Overt versus covert observations on health care providers' care and communication during antenatal care visits in Lao PDR

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## ABSTRACT

**Background:** Antenatal care contributes to health delivery for mother and child by identifying potential problems early and providing advice to mothers. The quality of antenatal care in Laos remains inadequate. This study aims to assess the quality of the public antenatal care service in a real life setting and to investigate differences in results between overt and covert observation as ways to identify where interventions are most needed.

**Methods:** This health-facility based, cross-sectional observation study compared overt and covert observation to identify strong and weak points during antenatal visits. Four trained nurses and midwives assessed performance using a World Health Organization checklist. For covert observation, research assistants posed as relatives of pregnant women attending an antenatal care session.

**Results:** One hundred and fifty-four pregnant women were analyzed. Overall performance was poor for both overt and covert observation, but the scores for most items were lower when observation was covert. Provision of health promotion was insufficient. Less than one quarter of cases were advised to eat a variety of food during pregnancy, and none of the health providers provided counseling. Communication skills, behavior and attitude of health providers were highly inadequate. Less than a quarter of pregnant women were treated with kindness and respect. Less than 10% of available information materials were used during ANC session. Overall mean (standard deviation) time-spent for each ANC session was 15.3 (4.4) minutes.

**Conclusion:** Using covert rather than only overt observation to identify where the antenatal care needs to be improved added detailed information on where improvement is needed. The level of performance was already inadequate when health workers knew they were being observed but it declined even further on most items when they were unaware of the observation. These findings can guide efforts to improve the quality of ANC services in Laos.

**Keywords:** Covert observation; Overt observation; Health care providers; Antenatal care; Laos

### Conflict of Interest

No potential conflict of interest relevant to this article was reported.

### Author Contributions

Conceptualization: Phommachanh S, Essink DR, Wright PE, Broerse JEW, Mayxay M; Data curation: Phommachanh S; Formal analysis: Phommachanh S; Investigation: Phommachanh S; Methodology: Phommachanh S, Essink DR, Wright PE, Broerse JEW, Mayxay M; Project administration: Phommachanh S; Supervision: Essink DR, Wright PE, Broerse JEW, Mayxay M; Validation: Essink DR, Wright PE, Broerse JEW, Mayxay M; Writing - original draft: Phommachanh S; Writing - review & editing: Essink DR, Wright PE, Broerse JEW, Mayxay M.

## INTRODUCTION

The quality of antenatal care (ANC) services is often poor in low-and middle-income countries.<sup>1</sup> Improving the quality of health care service, particularly nutrition education and counseling, is an important task in improving maternal and child health outcomes.<sup>2-4</sup> However, the poor performance of health workers is an ongoing challenge to attaining the targets for the Sustainable Development Goals (SDGs) in developing countries.<sup>5</sup>

In Laos, the quality of ANC service remains quite poor.<sup>6,7</sup> This poor quality is mainly related to the lack of effective information, education, and communication (IEC) materials for counseling, the lack of ANC standard guidelines, training, and essential physical resources, as well as issues in medical ethics when providing routine care. Two recent studies using in-depth interviews and direct observation indicated that the quality of ANC service was inadequate in all level of the public health settings in Laos, particularly with respect to providing health education and counseling to pregnant women and their family members by health providers (submitted for publication).

Although direct observation is an effective method compared to exit interviews for assessing the quality of care and can provide accuracy and validity of the results,<sup>8,12</sup> conducting direct observation has limitations because the observation itself might influence actual practice. In addition, some important information during the observation might be missed and not all behaviors of the health providers may be visible during direct observation. Therefore, for greater accuracy and validity of results, which is very important to plan improvements in quality of ANC services, the covert study may be a more appropriate method. It is often the only possible method when studying deviant behaviors and secretive organizations.<sup>13</sup> A previous study conducted in National Taiwan University Hospital on compliance of health care workers with hand hygiene practices, using a comparative analysis of overt and covert observers, demonstrated that the compliance rate for hand hygiene practices was significantly lower when observation was covert than when the health workers were aware that they were observed.<sup>14</sup>

To our knowledge, there are few reports on studies in health care using covert observations, in spite of the advantages.<sup>13</sup> They are especially rare in the field of maternal health and in low-resource settings. We conducted both overt and covert observation of the actual practice of health care providers during ANC sessions with their clients, with the aims: 1) to assess the quality of the public ANC service in a real-life setting; and 2) to compare the results of overt and covert observation. The results of this research will provide information that health policy makers and planners can use to improve the quality of ANC services at public health facilities in Laos. In addition, it provides additional insights into the appropriateness of overt versus covert observation to assess health care providers' practices.

## METHODS

### Study design and sites

We conducted a health facility based, comparative cross-sectional study, using covert and overt observations in 4 central-level public hospitals that routinely provide ANC services in Vientiane, the capital city of Laos. These health facilities were purposively selected using the following criteria: the facilities have similar characteristics of health providers and similar

standard of ANC services, appropriate for the design using a comparative cross-sectional study for the study objectives described above.

### Study participants

For the overt observation, both pregnant women who attended ANC and health providers at the ANC were invited to participate in the study. The health care workers providing ANC at the central level were all female, and could be general doctors, nurses, and midwives, who play the same role for routine care at ANC visits in Laos. For the covert part of the study, the pregnant women were invited to join, and agreed to accept a health researcher as a supposed family member. The health workers were not informed, to keep the observation covert; their hospital directors were informed and agreed to this approach.

The sample size was determined by the number of health providers who were working at the public ANC each day; at the central level, 4 to 6 health workers provided ANC service during the study period. Each data collector observed one provider per day. For the covert observation, we spent five days and we could work with 4 pregnant women per day in each of the 4 hospitals, because each ‘role play’ as a family member took a certain amount of time to prepare. Of the 80 pregnant women invited, 73 agreed to participate; the other seven said they did not have enough time. For overt observation, 120 pregnant women were invited (see **Table 1**) of whom 39 women declined to participate.

### Research instruments

A checklist was applied for both overt and covert observations, which was developed using “The World Health Organization (WHO) recommendation on ANC services for positive pregnancy experience” in 2016 and a WHO counseling handbook,<sup>15,16</sup> both of which are used to train Lao ANC providers. The checklist included the following sections: 1) medical history taking; 2) physical examination; 3) providing health promotion during pregnancy, for childbirth and postpartum care; 4) health education materials to be used during ANC provision; and 5) effective communication skills, behavior and attitude of health providers. Firstly, the checklist was developed in English; thereafter back and forth translation was made between English and Lao languages to ensure accuracy. Before using the checklist in the Lao language, pretesting was conducted at different health facilities in the study areas and edited where needed. The checklist will be provided on request.

**Table 1.** Number of observations at ANC clinics

Variables	Working days	Invited women	No. of observations
<b>Overt observations</b>			
Hospital 1: 6	5	30	20
Hospital 2: 6	5	30	21
Hospital 3: 6	5	30	20
Hospital 4: 6	5	30	20
No. of overt observations		120	81
<b>Covert observations</b>			
Hospital 1: 4	5	20	18
Hospital 2: 4	5	20	19
Hospital 3: 4	5	20	18
Hospital 4: 4	5	20	18
No. of covert observations		80	73

ANC = antenatal care.

### Data collection

Data collection was carried out from June to August 2017. Two Lao nurses and 2 midwives with 2 to 4 years' working experience in ANC from Vientiane and 4 midwife students were recruited and trained for data collection; they were all female. Authors SP and MM trained them for 5 days, using role-play to demonstrate how to use both covert and overt methods to observe the performance of the health providers and fill in the observation checklist. During the training, the 8 data collectors practiced data collection at the ANC of health facilities not included in the study. They were closely monitored and supervised in the field by the 2 trainers. We finally selected 4 of the 8 trainees who were able to do the role-play convincingly.

Prior to data collection for the overt observation, the health providers and pregnant women were fully informed about the study objectives and observation procedure. In contrast, for the covert observation method, only the pregnant women were fully informed and asked for consent before attending each ANC session. If they agreed, an observer accompanied the pregnant woman, playing a role as her family member or relative. Information on the mothers' current pregnancies was obtained through observation and their ANC card; information on previous visits and their last children were collected from ANC cards for both methods. During the study, almost all of the women (99%) brought their ANC cards when visiting the ANC; women who did not bring their cards were excluded from the study. The time spent for each ANC session, excluding waiting time and registration, was recorded.

Each overt observer noted the health provider's performance using the checklist during the ANC session. For covert observation, a voice record using a mobile phone was made, which was immediately checked afterwards using the same checklist. Additional information was obtained from the woman's ANC cards and the time spent on the ANC consultation was recorded. At the end of each day, characteristics of the health providers (age, sex, profession, and working experience) were collected in a brief interview, but this was not applied for the covert observation. The overt observers sat approximately 2 meters away from the health providers and pregnant women to observe the consultation session. The covert observers sat beside the pregnant women during consultations. We began conducting covert observation 2 weeks before conducting overt observation, using the same data collectors who could play different roles for overt and covert observations. For the covert observers they wore a wig to play their role as family member of pregnant women to reduce chances of recognition by health providers.

### Data analysis

Data were entered into Microsoft Excel (2011) for Mac then transferred to 'IBM SPSS 25' for analysis (IBM Corp., Armonk, NY). Descriptive statistics, such as percentage, mean (standard deviation; SD) and median (range), were applied to describe pregnant women's personal information. The performance scores of health providers on history taking, physical examination, health promotion during pregnancy, for childbirth and postpartum care, including communication skills, were calculated as well as the time spent for each ANC session. When any performance item was conducted by the health provider regardless of whether it was right or wrong, a score of 1 was given; if the item was not done the score was 0.

Comparison of proportion between two groups was made using  $\chi^2$  or Fisher's exact tests as appropriate. Mann Whitney U test or Student's t tests were applied to compare medians or means between groups.

### Ethical approval and participants' consent

This study was part of a research project on the situation analysis of maternal and child health care in Laos, which received ethical approval from the Ethics Committee of the University of Health Sciences, Ministry of Health, Laos. We obtained verbal consent from eligible pregnant women before beginning each covert and overt observation. Health care providers gave written informed consent for overt observation, but of course were not informed when observation was covert. The directors of the hospitals where observation was carried out were informed and gave their consent for the study. They were also provided with the overall results of the study during a national meeting.

## RESULTS

A total of 16 ANC providers of central hospitals were enrolled in the study. During the study period, 154 observation sessions with 154 pregnant women (81 in overt and 73 in covert observations) were conducted. The overall mean age of health providers was 36 years old; all of them were female and trained as general doctors, nurses or midwives. Their median years of working experience were 11, with a range of 1–33 years.

The characteristics of pregnant women who visited ANC are presented in **Table 2**. These women had a median age of 26 (range, 14–44) years. At the time of observation, more than half of the pregnant women were visiting the ANC in their third trimester; the overall median and range of gestational age was similar between covert and overt observation groups.

Overall, the medical history taking and physical examination performance by the health providers were relatively poor, as shown in **Table 3**. Among 6 questions related to 'medical history taking,' during overt observation only 59.3% of the mothers were asked about current pregnancy problems and about any medicines taken by the mothers during their pregnancies, while during covert observation only 25% asked these questions.

Observation of performance of the 6 items of physical examination also resulted in very low scores on several items, which were significantly lower for the covert observation than the overt observation ( $P \leq 0.001$ ; **Table 3**). It appears that only listening to the heartbeat of the fetus was high during both overt and covert observation (67.9% and 80.8% respectively), while the percentage of the other 5 items of physical examination (measuring weight and

**Table 2.** Characteristics of pregnant women who visited ANC

Variables	Overt observation (n = 81)	Covert observation (n = 73)	P-value
Age of pregnant woman (yr)			
14–24	42 (51.9)	27 (37.0)	
25–35	37 (45.7)	40 (54.8)	
36–44	2 (2.5)	6 (8.2)	
Median (range)	24 (14–43)	27 (16–44)	0.022
No. of pregnancies			
Median (range)	2 (1–7)	2 (1–7)	0.836
Gestational age (weeks)			
First trimester (9–12)	6 (7.4)	4 (5.5)	
Second trimester (13–26)	36 (44.4)	31 (42.5)	
Third trimester (27–41)	39 (48.1)	38 (52.1)	
Median (range)	25 (11–41)	27 (11–41)	0.317

Data shown as number (%) unless indicated.  
ANC = antenatal care.

**Table 3.** Mothers' medical history taking and physical examination by health providers

Variables	Overt observation (n = 81)	Covert observation (n = 73)	P-value
Age of clients (yes)	19 (23.5)	18 (24.7)	0.862
Medication (yes)	42 (51.9)	36 (49.3)	0.753
Last menstruation (yes)	30 (37.0)	19 (26.0)	0.143
Prior pregnancy (yes)	36 (44.4)	7 (9.6)	0.001
Previous pregnancy problem (yes)	30 (37.0)	7 (9.6)	0.001
Current pregnancy problem (yes)	48 (59.3)	18 (24.7)	0.001
Score of history taking (max = 6)	2 (0-6)	1 (0-6)	0.007
Measuring weight and height (yes)	57 (70.4)	0 (0.0)	< 0.001
Recording weight and fetus growth in the follow up book (yes)	61 (39.6)	0 (0.0)	< 0.001
Taking blood pressure (yes)	62 (76.5)	0 (0.0)	< 0.001
Examining edema (yes)	66 (81.5)	0 (0.0)	< 0.001
Examining abdomen (yes)	58 (71.6)	0 (0.0)	< 0.001
Listening to heartbeat of fetus (yes)	55 (67.9)	59 (80.8)	0.680
Score of physical examination (max = 6)	5 (0-6)	1 (0-1)	< 0.001
Washing hands before examination (yes)	1 (1.2)	0 (0.0)	0.341
Asking permission any time before performing examination (yes)	-	15 (20.5)	< 0.001
Giving feedback on the results of examination to the mothers (yes)	59 (72.8)	35 (47.9)	0.002
Considering privacy during examination (yes)	10 (12.3)	10 (13.7)	0.803
Score of additional procedures (max = 4)	2 (0-3)	1 (0-2)	< 0.001
Grand total score of all physical examination performances (max = 10)	6 (1-9)	2 (0-3)	< 0.001

Data shown as number (%) or median (range).

height, recording weight and fetal growth in the follow-up book, taking blood pressure, checking for edema, and examining abdomen) ranged between 39.6 and 81.5% during overt observation, going down to 0% during covert observation ( $P \leq 0.001$ ).

The overall providers' performance on other procedures was also poor. For example, washing hands before examination was only 6.7% and privacy during examination was ensured in only 4.0% of cases. The grand total score on the physical examination process was significantly higher for overt observation than for covert observation ( $P \leq 0.001$ ).

Although the health providers who were overtly observed provided more health promotion messages to the mothers than did those observed covertly, the overall performance for this service remained unsatisfactory (Table 4). For example, 5 out of 8 items separately were performed in less than 50% of the observation sessions, and less than one quarter of cases were advised to eat a variety of food during pregnancy. The overall median score was significantly lower for covert observation (only 2 compared to 5 during overt observation;  $P \leq 0.001$ ).

Health promotion practices were poor overall. The difference between the overt and covert observations was significant, as illustrated by the data in Table 4. For example, one third of the mothers were advised on a safe place for childbirth, signs of labor, and preparedness for childbirth, while advice was given on 6 out of 8 items. None of the health providers provided counseling on child vaccination, breastfeeding or nutrition. The overall median score for health promotion on childbirth and the postpartum period was only 3 out of a possible 12 during overt observation, but the score during covert observation was as low as 0 ( $P \leq 0.001$ ).

The availability of health education materials for each ANC session observed by overt and covert observations, and their use during health education by health providers at the public health facilities was extremely poor as shown in Table 5. Overall health education materials were used to provide health information in fewer than 10% of the sessions, although more than 50% of required health education materials were available at each health facility at

**Overt-covert observation in providing ANC session in Laos**

**Table 4.** Provision of health promotion during pregnancy, and on childbirth and postpartum care to mothers by health providers

Variables	Overt observation (n = 81)	Covert observation (n = 73)	P-value
Explaining disease prevention (yes)	46 (56.8)	7 (9.6)	< 0.001
Providing information on how to seek care if danger sign is observed (yes)	54 (66.7)	35 (47.9)	0.019
Explaining on physical activities to be done during pregnancy (yes)	47 (58.0)	15 (20.5)	< 0.001
Advising pregnant women to take more rest than usual (yes)	53 (65.4)	36 (49.3)	0.043
Advising mothers not to restrict food (yes)	55 (67.9)	29 (39.7)	< 0.001
Advising mothers not to drink nor smoke (yes)	34 (42.0)	9 (12.3)	< 0.001
Advising mothers to eat variety of food (yes)	45 (55.6)	9 (12.3)	< 0.001
Giving iron/folate/vitamin to mothers (yes)	45 (55.6)	10 (13.7)	< 0.001
Total score of health promotion during pregnancy (max = 8)	5 (0–8)	2 (0–6)	< 0.001
Advising a safe place for childbirth (yes)	44 (54.3)	15 (20.5)	< 0.001
Providing information on signs of labor (yes)	46 (56.8)	14 (19.2)	< 0.001
Providing childbirth preparedness (yes)	38 (46.9)	8 (11.0)	< 0.001
Advising for postpartum care at health facilities (yes)	17 (21.0)	2 (2.7)	< 0.001
Advising to bring the child to get vaccination (yes)	17 (21.0)	3 (4.1)	0.001
Providing child vaccination counseling (yes)	0	0	
Providing breastfeeding counseling (yes)	0	0	
Providing nutrition counseling (yes)	0	0	
Advising postpartum mother to eat variety of food (yes)	30 (37.0)	4 (5.5)	< 0.001
Informing diet habit to improve malnutrition (yes)	14 (17.3)	6 (8.2)	0.095
Informing complement food for child at 6 to 23 months (yes)	21 (25.9)	0 (0.0)	< 0.001
Suggesting one/two options to improve nutrition status (yes)	26 (32.1)	0 (0.0)	< 0.001
Total scores of health promotion for childbirth and postpartum (max = 12)	3 (0–8)	0 (0–6)	< 0.001

Data shown as number (%) or median (range).

**Table 5.** Health education materials used by health providers at health facilities

Variables	Overt observation (n = 81)	Covert observation (n = 73)	P-value
Using any health education material to explain food diet during pregnancy (yes)	3 (3.7)	2 (3.7)	0.549
Using any health education material to explain food diet after childbirth (yes)	1 (1.2)	1 (1.4)	0.725
Using any health education material to explain for vaccination (yes)	3 (3.7)	2 (2.7)	0.549
Availability of materials for each ANC session at clinics (yes)	43 (53.1)	29 (39.7)	0.097

Data shown as number (%) unless indicated.

the time. The very low frequency of using materials to explain about diet during pregnancy (3.2%), after childbirth (1.3%), and for child vaccination (3.2%) was not significantly different between the covert and overt observations.

The results of assessing the performance of health providers' communication with the mothers are presented in **Table 6**. Generally, there were many weaknesses in the communication between health providers and their clients. Except for: sitting at the same level, giving relevant information, and using simple language with the mothers, other communication items expressed or performed by the health providers were scored as inadequate. For example, the items: self-introduction with title, helping brainstorming, asking if there are more questions and encouraging asking questions, and agreeing on an appointment for the next visit were almost never performed. Although the overall median score out of 24 on communication was only 6 for overt observation, this was significantly higher than the median of 3 during covert observation.

The overall mean time spent for ANC per visitor during overt observation, 15.5 (SD = 3.6) minutes, was not significantly different from time spent when observation was covert 14.6 (SD = 3.5) minutes ( $P = 0.104$ ).

**Table 6.** Communication, behavior and attitude of health providers

Variables	Overt observation (n = 81)	Covert observation (n = 73)	P-value
Warmly greeting (yes)	42 (51.9)	4 (5.5)	< 0.001
Self-introduction with title (yes)	4 (4.9)	0 (0.0)	0.074
Sitting at the same level as mothers (yes)	80 (98.8)	66 (90.4)	0.022
Paying attention to mothers (yes)	21 (25.9)	8 (11.1)	0.020
Listening carefully to mothers (yes)	27 (33.3)	11 (15.1)	0.009
Kindness (yes)	15 (18.5)	6 (8.2)	0.063
Confidentiality with conversation (yes)	16 (19.8)	8 (11.0)	0.133
Considering privacy (yes)	18 (22.2)	3 (4.1)	0.001
Asking open questions (yes)	28 (34.6)	6 (8.2)	< 0.001
Giving practical messages (yes)	20 (24.7)	10 (13.7)	0.085
Giving brief and relevant information (yes)	61 (75.3)	46 (63.0)	0.098
Using body language (yes)	38 (46.9)	18 (24.7)	0.004
Using simple language (yes)	56 (69.1)	31 (42.5)	0.001
Avoiding judging words (yes)	24 (29.6)	6 (8.2)	0.001
Giving mother time to think (yes)	25 (30.9)	6 (8.2)	< 0.001
Helping with brainstorming (yes)	0 (0.0)	0 (0.0)	0
Encouraging to ask questions (yes)	6 (7.4)	2 (2.7)	0.175
Recognizing good practice (yes)	16 (19.8)	5 (6.8)	0.020
Reflecting/repeating the words of women (yes)	8 (9.9)	3 (4.1)	0.141
Compassion listening to issues (yes)	13 (16.0)	3 (4.1)	0.013
Asking for more questions (yes)	4 (4.9)	1 (1.4)	0.218
Agreeing on appointment for the next visit (yes)	2 (2.5)	1 (1.4)	0.539
Practicing two-way communication (yes)	4 (4.9)	2 (2.7)	0.391
Thanking, respecting, and showing good manners at the end of session (yes)	15 (18.5)	6 (8.2)	0.063
Total scores of communication scores (max = 24)	6 (1-18)	3 (1-9)	< 0.001

Data shown as number (%) or median (range).

## DISCUSSION

The findings illustrate that the overall performance of ANC providers was very poor when observed either overtly or covertly, but the performance of most items of ANC provision was even lower when scored through covert observation. In general, the health providers performed fewer than 50% of the items in the categories of medical history taking, physical examination, providing information for health promotion, and communication skills between health providers and pregnant women. An exception was 'listening to the heartbeat of the fetus' which was high during both overt and covert observation (67.9% and 80.8%, respectively).

A similar study using a comparative analysis of overt and covert observers on compliance of health care workers with hand hygiene practices also demonstrated that the compliance rate was significantly lower when measured covertly.<sup>14</sup>

An observational study can provide accurate and valid results, perhaps better than an exit interview which is also frequently used to rate performance of health care workers.<sup>10,17</sup> A study on the receiver operating curves (ROCs) for counseling in the management of common childhood diseases, which compared direct observations with exit interviews, demonstrated that exit interviews did not provide as reliable a measurement of providers' performance, compared to direct observation.<sup>10</sup> However, direct observation also has its limitations.<sup>10,18</sup> For example, when health care providers know they are being observed they are likely to perform better than they would if they were not being observed.<sup>19</sup> That is why covert observation is preferred when health worker behavior and actual practice is at the core of the research question.



Our findings revealed 3 distinctive patterns in performance for the different items on the checklist: 1) for some items, overt observation yielded better performance than covert; 2) for other items, both overt and covert yielded relatively high performance; and 3) for still other items, both covert and overt observation yielded relatively low performance. The first pattern was most frequently found; as might be expected, overt observation often yielded better performance compared to covert observation. People often try to do better when they are being assessed or observed, a well-known bias limiting the accuracy of overt observation. For example, the proportion of health workers measuring weight, taking blood pressure, or checking for edema was found to be quite high during overt observation but went down to zero in covert observation. In these cases, the knowledge of the need and the capacity to execute the behaviour is present, but there are apparently other reasons why the action is generally not performed. The health workers may not want to do it, not like to do it, or feel they do not have time to do it. These reasons need to be explored further and actions need to be undertaken to make these behaviours part of their routines; for example, by awareness raising on the need for these behaviours (for staff and clients), better supervision or allocating more time to perform behaviours. In the case of the second pattern, when the actions were usually performed during both overt and covert observation, such as listening to the fetal heartbeat, we assume that the action is felt to be an important part of the health workers' routines. It is commendable that there were items on the checklist that all care providers performed. The third pattern, of low performance during both overt and covert observation, was seen most notably in relation to health promotion and communication, which scored low whether health workers knew they were being observed or not. This included providing counselling, encouraging the woman to ask questions, and agreeing on an appointment for the next visit. These behaviours were not part of the health providers' routines; they may lack capacity to perform these actions, or may feel they are not important, otherwise they might have been expected to perform them when observed overtly. More training and awareness raising around these behaviours is clearly required.

In brief, the low proportion of health workers performing most of the actions listed for ANC sessions when covertly observed strengthens the evidence for the need to improve delivery of ANC services in the public health facilities in Laos. The observation identified behaviors that need to be addressed through better training, supervision and disclosure of health worker performance.

Covert observation is high in value if it is very carefully prepared and implemented.<sup>13</sup> In our study, we trained the researchers intensively and had them practice and pre-test, before conducting the covert observations. For example, we selected only 4 of the 8 trainees who were able to do the role-play convincingly. Using role-play for the training was very useful to demonstrate how to approach and recruit each pregnant woman to get consent before attending each ANC session together, how to act as a relative, and how to observe the performance of the health providers and record information. During the training, the four observers practiced several times with 2 trainers in the field to ensure that the necessary skills were developed. Therefore, the Ethical Committee of the University of Health Sciences in Laos considered that the high value of the covert study and the low risk and high benefits to participants and policy makers-planners made it acceptable in this instance.

However, a number of ethical concerns arise in covert research.<sup>13,20</sup> Standard practice includes the principle of voluntariness and the question as to whether those being studied are able to give informed consent.<sup>21</sup> Potential research participants should be given all relevant information about the plan of the study, which they should be able to understand and agree to.<sup>22-24</sup>

Conducting covert observation unavoidably involves having a cover story and collecting data without the subject's knowledge and consent. It is therefore an obligation of the researchers to share the information collected during covert observation with the health workers and their employers at a later time, so that all may learn and benefit from that information.

Another limitation of the study is that it was only done at central level hospitals. It might be expected that the quality would be better at this level, and that covert observation at lower level facilities might reveal additional weaknesses. However, considering the many weak points observed in this study, we expect that almost all health facilities would have similar needs for improvement. The last limitation is that we did not design the study to compare the performance between health providers with different types/amounts of experience or between the clients with different gestational age groups possibly requiring different actions during ANC, both of which are additional factors that could influence health providers' performance.

In summary, the data reported here show both that ANC sessions as performed in 4 public hospitals in Vientiane need to be improved, and that covert observation may give a more realistic picture of the weak points that need attention than does overt observation or other data collection methods such as exit interviews.

In conclusion, these findings revealed that covert observation of health workers' giving ANC provided a more realistic measurement of the quality of ANC services than did overt observation. Applying appropriate measures of health workers' performance was essential to identify points for improvement in Laos, where the poor quality of ANC services is recognized. Considering the poor performance of ANC health providers, it is strongly recommended that training with specific guidelines, supervision, and providing sufficient and effective materials and specific room arrangements for counseling should be given high priority in public health facilities in Laos.

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