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QUALITY AND UTILISATION OF ANTENATAL CARE SERVICES IN RURAL LAO PDR

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ABSTRACT

Background

Antenatal care (ANC) plays an important role in reducing maternal mortality and morbidity by detecting early risk factors in order to have an effective intervention in time and by linking the pregnant women to a planned delivery with a skilled birth attendant. However, the utilisation of ANC services of pregnant women is problematic in many low-income countries, and in Laos only 39% used the services in 2005.

Aims

To assess the quality and utilisation of ANC services in rural areas of the Lao PDR (Lao People's Democratic Republic), to explore the care providers' views on their antenatal services, to explore the women's experiences of pregnancy complications and their opinions regarding ANC services, and to measure the impact of a community-based intervention combined with strengthening of the ANC service.

Methods

The studies were conducted in rural areas of Laos between 2008 and 2011. We interviewed recently or currently pregnant women about factors related to their ANC utilisation, using structured interviews (n= 460, Study I). Fifty-nine ANC provider-client sessions were observed and semi-structured interviews were carried out with 26 health care providers (Study II). Eight focus group discussions were performed among women who had been or were pregnant (Study III). A low-cost ANC up-grading community-based intervention was assessed using structured interviews [n= 460 before (Study I) and n= 317 after the intervention (Study IV)].

Results

About 50% of the women had had at least one ANC visit; 63% of them had three or more. The factors associated with ANC use were women whose husbands were salaried employees (OR 2.66, CI: 1.45–4.88); women perceiving ANC as somewhat useful (OR 2.88, CI: 1.26–6.61); or very useful (OR 7.45, CI: 3.59–15.46) (Study I). Women younger than 18 years old when having their first pregnancy were less likely to use the services (OR 0.56, CI: 0.28–0.97). Some participants considered ANC a curative rather than a preventive service, seeking care only for pregnancy complications. Sparse or non-utilisation of services was also due to limited access to health facilities, negative attitudes towards health care providers, sub-quality of the services and lack of information about ANC (Study III). Traditional beliefs influenced the behaviour of pregnant rural Lao women. The prohibition of particular food items and restriction of certain behaviours were related to a fear of obstructed labour. Some of the practices indicated a lack of modern medical knowledge about what causes pregnancy-related problems. Perceived problems were dealt with by using modern health care or traditional medicine or a combination of both, but many of the problems were neglected (Study III). Overall, the quality and performance of ANC services in rural health facilities were poor due to lack of routines, scarce or insufficient equipment and limited skills among providers. The average consultation time for each woman was five minutes. The health care providers expressed having little competence and motivation to work with ANC. Compared to district hospitals, health centres had less equipment

and supplies, and their care providers had less ANC training and a heavier work load (Study II). After the intervention, overall ANC use increased from 49% to 78% for the women in the intervention arm and from 54% to 64% in the control arm, displaying a significant intervention effect of 19 percentage units. Similarly, there were positive intervention effects of 26 and 24 percentage units, respectively, for making the recommended number of ANC visits and for making the visits at health centres (Study IV).

Conclusions

Several factors related to ANC utilisation. Besides limited access to the services and lack of awareness among the women regarding ANC, sub-quality of the services also inhibited pregnant women from seeking care. The low-cost intervention proved to greatly increase the proportion of ANC utilisation in a short period of time. This type of intervention can be recommended for implementation at a larger scale with an assessment of the quality of services.

ບົດຄັດຫຍໍ້

ບົດນຳ

ການຝາກທ້ອງແມ່ຍິງຖືພາ ແມ່ນມີບົດບາດສຳຄັນຕໍ່ການລຸດຜ່ອນ ອັດຕາການຕາຍ ແລະ ອາການເຈັບເປັນຂອງແມ່ ໂດຍການຊອກຫາປັດໄຈສ່ຽງແຕ່ຫຳອິດ ເພື່ອສາມາດປິ່ນປົວໄດ້ຢ່າງທັນການ ແລະ ນອກຈາກນັ້ນ ການຝາກທ້ອງຂອງແມ່ຍິງຖືພາຍັງຊ່ວຍໃຫ້ມີການວາງແຜນການເກີດລູກ ກັບຜູ້ຊຳນານ ໃນການຊ່ວຍເກີດລູກໄດ້. ເຖິງຢ່າງໃດກໍຕາມ, ການນຳໃຊ້ບໍລິການຝາກທ້ອງ ຂອງ ແມ່ຍິງຖືພາຍັງເປັນບັນຫາ ໂດຍສະເພາະໃນບັນດາປະເທດທີ່ມີເສດຖະກິດຕ່ຳ, ຢູ່ ສປປ ລາວ ກໍເຊັ່ນກັນ ໃນປີ 2005 ມີພຽງແຕ່ 39% ຂອງແມ່ຍິງຖືພາເທົ່ານັ້ນທີ່ໄປນຳໃຊ້ບໍລິການ ການຝາກທ້ອງ.

ຈຸດປະສົງ

ເພື່ອປະເມີນຄຸນນະພາບ ແລະ ການນຳໃຊ້ບໍລິການ ການຝາກທ້ອງຂອງແມ່ຍິງຖືພາ ຢູ່ຊົນນະບົດຂອງ ສປປ ລາວ, ເພື່ອສຳຫລວດຄວາມຄິດເຫັນຂອງພະນັກງານແພດກ່ຽວກັບການໃຫ້ບໍລິການຝາກທ້ອງ, ເພື່ອສຳຫລວດປະສົບການຂອງແມ່ຍິງກ່ຽວກັບບັນຫາທີ່ກ່ຽວຂ້ອງກັບການຖືພາ ແລະ ຄວາມຄິດເຫັນກ່ຽວກັບການໃຫ້ບໍລິການຝາກທ້ອງ, ແລະ ເພື່ອປະເມີນປະສິດທິພາບໃນການທົດລອງໃຫ້ ຊຸມຊົນມີສ່ວນຮ່ວມ ໃນການປຸກລະດົມໃຫ້ແມ່ຍິງຖືພາໄປຝາກທ້ອງ ສົມທົບກັບການສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແກ່ການບໍລິການ ຝາກທ້ອງ.

ວິທີວິທະຍາ

ການສຶກສາແມ່ນໄດ້ດຳເນີນຢູ່ເຂດຊົນນະບົດຂອງ ສປປ ລາວໃນປີ 2008 ເຖິງ 2011, ໂດຍໄດ້ ສຳພາດ ແມ່ຍິງທີ່ເຄີຍຖືພາ ແລະ ກຳລັງຖືພາ ກ່ຽວກັບບັນດາປັດໄຈທີ່ພົວພັນເຖິງ ການນຳໃຊ້ການບໍລິການຝາກທ້ອງ ຈຳນວນ 460 ຄົນ (ການສຶກສາ I). ສັງເກດການໃຫ້ບໍລິການຝາກທ້ອງຂອງພະນັກງານແພດ ແກ່ແມ່ຍິງຖືພາຈຳນວນ 59 ຄັ້ງ ແລະ ສຳພາດແບບລົງເລິກພະນັກງານທີ່ໃຫ້ບໍລິການຝາກທ້ອງ 26 ຄົນ (ການສຶກສາ II). ການສົນທະນາກຸ່ມຂອງແມ່ຍິງທີ່ເຄີຍຖືພາໄດ້ຈັດຂຶ້ນຈຳນວນ 8 ຄັ້ງ (ການສຶກສາ III). ການທົດລອງແບບຕົ້ນທຶນຕ່ຳ ໂດຍການໃຫ້ຂອງຊຸມຊົນມີສ່ວນຮ່ວມໃນການປຸກລະດົມໃຫ້ແມ່ຍິງຖື ພາໄປ ຝາກທ້ອງໄດ້ປະເມີນໂດຍການສຳພາດ ແມ່ຍິງທີ່ເຄີຍຖືພາ ແລະ ກຳລັງຖືພາ ກ່ອນການທົດລອງ ຈຳນວນ 460 ຄົນ (ການສຶກສາ I) ແລະ ຫລັງການທົດລອງ ຈຳນວນ 317 ຄົນ (ການສຶກສາ IV).

ຜົນໄດ້ຮັບ

ປະຊາກອນທີ່ສຶກສາ ປະມານ 50% ເຄີຍໄປຝາກທ້ອງຢ່າງໜ້ອຍນຶ່ງຄັ້ງ; ໃນຈຳນວນຜູ້ທີ່ໄປຝາກທ້ອງນັ້ນ 63% ແມ່ນໄດ້ໄປຝາກທ້ອງ 3 ຄັ້ງ ຫລື ຫລາຍກ່ວາ. ບັນດາປັດໄຈທີ່ພົວພັນເຖິງການໄປຝາກທ້ອງມີ ອາຊີບຂອງສາມີ (OR 2.66, CI = 1.45–4.88); ຄວາມຮັບຮູ້ວ່າການໄປຝາກທ້ອງແມ່ນມີປະໂຫຍດສ່ວນໃດນຶ່ງ (OR 2.88, CI = 1.26–6.61); ຫລື ມີປະໂຫຍດຫລາຍ (OR 7.45, CI = 3.59–15.46) (ການສຶກສາ I). ແມ່ຍິງທີ່ຖືພາລູກຜູ້ທຳອິດກ່ອນອາຍຸ 18 ປີ ແມ່ນມີແນວໂນ້ມບໍ່ມັກໄປຝາກທ້ອງ (OR 0.56, CI = 0.28–0.97). ປະຊາກອນທີ່ສຶກສາຈຳນວນນຶ່ງ ມີແນວຄິດວ່າ ການໄປຝາກທ້ອງ ແມ່ນເພື່ອການປິ່ນປົວ ຫລາຍກ່ວາການປ້ອງກັນ, ພວກເຂົາຈະໄປຝາກທ້ອງກໍຕໍ່ເມື່ອພວກເຂົາຮູ້ສຶກຜິດປົກກະຕິ.

ເຫດຜົນທີ່ບໍ່ຕ້ອງການໄປຝາກທ້ອງແມ່ນມີຂໍ້ຈຳກັດໃນການເຂົ້າເຖິງສະຖານທີ່ບໍລິການ, ມີທັດສະ ນະຄະ ຕິໃນທາງລົບ ຕໍ່ພະນັກງານແພດ, ຄຸນນະພາບຂອງການບໍລິການບໍ່ໄດ້ມາດຕະຖານ ແລະ ຂາດຂໍ້ ມູນຂ່າວ ສານກ່ຽວກັບ ຄວາມສຳຄັນຂອງການໄປຝາກທ້ອງ (ການສຶກສາ III).

ການເຊື່ອຖືທາງດ້ານປະເພນີຫລາຍຢ່າງ ແມ່ນມີອິດທິພົນຕໍ່ພຶດຕິກຳໃນໄລຍະຖືພາຂອງແມ່ຍິງໃນຊົນນະ ບົດ. ການຄະລຳອາຫານ ແລະ ການເຂັ້ມງວດຕໍ່ພຶດຕິກຳບາງຢ່າງ ແມ່ນຍ້ອນຢ້ານວ່າ ມັນຈະມີຜົນເຮັດໃຫ້ ເກີດລູກຍາກ. ການປະຕິບັດບາງຢ່າງແມ່ນສະແດງໃຫ້ເຫັນເຖິງການຂາດຄວາມຮູ້ທາງດ້ານການແພດ ແຜນໃໝ່ກ່ຽວກັບສາເຫດຂອງການເກີດບັນຫາກ່ຽວກັບການຖືພາ. ການແກ້ບັນຫາທີ່ເກີດຂຶ້ນບາງຄົນ ແມ່ນປິ່ນປົວໂດຍການນຳໃຊ້ການບໍລິການສຸຂະພາບແບບການແພດແຜນໃໝ່, ບາງຄົນແມ່ນນຳໃຊ້ຢາພື້ນ ເມືອງ, ບາງຄົນແມ່ນນຳໃຊ້ແບບປະສົມປະສານ ແລະ ບາງຄົນແມ່ນບໍ່ເຮັດຫຍັງເລີຍ (ການສຶກສາ III).

ໂດຍທົ່ວໄປແລ້ວ, ຄຸນນະພາບ ແລະ ການໃຫ້ບໍລິການກ່ຽວກັບການຝາກທ້ອງຢູ່ສະຖານບໍລິການການປິ່ນ ປົວແມ່ນຍັງບໍ່ໄດ້ມາດຕະຖານ ຍ້ອນ ຂາດການໃຫ້ບໍລິການເປັນປົກະຕິ, ອຸປະກອນບໍ່ຄົບຖ້ວນພຽງພໍ, ແລະ ທັກສະຂອງພະນັກງານແພດຍັງຈຳກັດ. ການໃຫ້ບໍລິການຝາກທ້ອງແກ່ແມ່ຍິງຖືພາ ແມ່ນໃຊ້ເວລາ ປະມານ 5 ນາທີຕໍ່ຄົນ. ພະນັກງານແພດສ່ວນຫລາຍມີແນວຄິດອະຄະຕິຕໍ່ຄວາມສາມາດ ແລະ ຂາດ ແຮງຈູງໃຈໃນການເຮັດວຽກກ່ຽວກັບການບໍລິການຝາກທ້ອງ. ເມື່ອສົມທຽບກັບໂຮງໝໍເມືອງ, ພົບວ່າສຸກ ສາລາ ແມ່ນຂາດເຂີນອຸປະກອນໃນການໃຫ້ບໍລິການຫລາຍກ່ວາ, ການອົບຮົມກ່ຽວກັບກວດທ້ອງແມ່ນມ ກໍມີໜ້ອຍ, ແຕ່ພາລະໜ້າທີ່ແມ່ນມີຫລາຍ ເພາະວ່າຕ້ອງໄດ້ເຮັດທຸກກິດຈະກຳຂອງສຸກສາລາ (ການສຶກ ສາ II).

ຫລັງຈາກການທົດລອງ, ການນຳໃຊ້ການບໍລິການຝາກທ້ອງໂດຍລວມແລ້ວແມ່ນເພີ້ມຂຶ້ນ ຈາກ 49% ເຖິງ 78% ໃນເຂດທົດລອງ ແລະ ຈາກ 54% ເຖິງ 64% ໃນເຂດຄວບຄຸມ, ຊຶ່ງສະແດງເຖິງປະສິດທິພາບຂອງ ການທົດລອງແມ່ນມີເຖິງ 19%. ສຳຫລັບຕົວຊີ້ວັດອື່ນກໍເຊັ່ນດຽວກັນ, ການທົດລອງແມ່ນມີປະສິດທິພົນ ໃນທາງບວກ 26% ສຳຫລັບຈຳນວນຄັ້ງຂອງການໄປຝາກທ້ອງ ແລະ 24% ສຳຫລັບການໄປຝາກທ້ອງຢູ່ ສຸກສາລາ (ການສຶກສາ IV).

ສະຫລຸບ

ການສຶກສາຄັ້ງນີ້ສະແດງໃຫ້ເຫັນວ່າມີຫລາຍປັດໄຈທີ່ພົວພັນເຖິງ ການໄປຝາກທ້ອງຂອງແມ່ຍິງຖືພາ. ນອກຈາກຂໍ້ຈຳກັດໃນການເຂົ້າເຖິງບໍລິການ ແລະ ການຂາດຈິດສຳນຶກຕໍ່ການໄປຝາກທ້ອງຂອງແມ່ຍິງ ຖືພາແລ້ວ, ຍັງພົບວ່າ ຄຸນນະພາບທີ່ບໍ່ໄດ້ມາດຕະຖານຂອງການໃຫ້ບໍລິການ ກໍແມ່ນອີກປັດໄຈນຶ່ງທີ່ ເຮັດໃຫ້ແມ່ຍິງຖືພາບໍ່ໄປຝາກທ້ອງ. ການທົດລອງແບບຕົ້ນທຶນຕ່ຳ ໃນໄລຍະສັ້ນໄດ້ພິສູດໃຫ້ເຫັນວ່າການ ນຳໃຊ້ບໍລິການຝາກທ້ອງແມ່ນເພີ້ມຂຶ້ນ. ເຖິງຢ່າງໃດກໍຕາມ, ການທົດລອງນີ້ ຄວນນຳໄປທົດລອງ ໃນຂອບ ເຂດທີ່ກ້ວາງຂວາງກ່ວານີ້ ພ້ອມທັງປະເມີນຄຸນນະພາບຂອງການໃຫ້ບໍລິການໄປພ້ອມກັນ.

LIST OF PUBLICATIONS

This thesis is based on the following papers, which in the text will be referred to by their Roman numerals I–IV:

I. Chanthanom Manithip, Amphoy Sihavong, Kerstin Edin, Rolf Wahlström and HansWessel. Factors associated with antenatal care utilisation among rural women in Lao PDR. *Maternal and Child Health Journal* 2011; 15: 1356–1362.

II. Chanthanom Manithip, Kerstin Edin, Amphoy Sihavong, Rolf Wahlström and Hans Wessel. Poor quality of antenatal care services – is lack of competence and support the reason? An observational and interview study in rural areas of Lao PDR. *Midwifery*. doi:10.1016/j.midw.2011.12.010. (Accepted)

III. Chanthanom Manithip, Kerstin Edin, Amphoy Sihavong, Rolf Wahlström and Hans Wessel. Antenatal care in Lao PDR: beliefs and perceptions among rural women (Manuscript).

IV. Chanthanom Manithip, Amphoy Sihavong, Kerstin Edin, Rolf Wahlström and Hans Wessel. Improved antenatal care utilisation after a low-cost community intervention – a pragmatic randomised trial in rural Lao PDR. (Submitted for publication.)

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
ANC	Antenatal care
AIDS	Acquired immunodeficiency syndrome
EmONC	Emergency obstetric and neonatal care
EPI	Expanded Program on Immunisation
FGD	Focus group discussion
FP	Family planning
GDP	Gross domestic product
GOL	Government of Laos
HCP	Health care provider
HIV	Human immunodeficiency virus
MCH	Mother and child health
MDG	Millennium development goal
MPI	Ministry of Planning and Investment
MMR	Maternal mortality ratio
MNCH	Maternal neonatal and child health
MOH	Ministry of Health
NGPES	National growth and poverty eradication strategy
NHC	National Health Conference
NSC	National Statistics Centre
NSEDP	National socio economic development plan
PCA	Principle component analysis
PHC	Primary health care
SBA	Skilled birth attendance
STD	Sexually transmitted diseases
STI	Sexually transmitted infections
TB	Tuberculosis
TBA	Traditional birth attendant
TT	Tetanus toxoid
UN	United Nations
UNDP	United Nations Development Program
WHO	World Health Organization

1. BACKGROUND

1.1. Significance of antenatal care

Antenatal care (ANC) is the care that a woman receives throughout her pregnancy and some week post-partum. The rationale for providing ANC is to screen predominantly healthy pregnant women to detect early signs of, or risk factors for, abnormal conditions or disease and to follow this detection with effective and timely intervention (Lumbiganon et al., 2004). Good ANC does more than just deal with the complications of pregnancy. It provides an opportunity to establish a birth plan (WHO, 2002), promotes a healthy lifestyle that improves long-term health outcomes for the woman, her unborn child and possibly her family (Glasier et al., 1996). Good ANC also informs women and their families about the possibility of unexpected events, how to deal with them and seek help when appropriate (Whitford & Hillan, 1998; Pasinlioglu, 2004). Women and their families can also learn how to improve their health, and equally importantly, how to take care of the new-born child (Pasinlioglu, 2004). In that way, ANC also contributes to improving the care and health of new-borns and children in the future (Zuniga de Nuncio et al., 2003). In short, ANC helps to build a healthy family environment that is responsive to the mother's and the child's needs.

ANC, in theory, should reduce maternal and perinatal morbidity and mortality directly through the detection and treatment of pregnancy-related illness or indirectly through the detection of women at increased risk of complications of delivery (Carroli et al., 2001). Effective and appropriate antenatal care should be offered to all pregnant women. However, what is considered "routine ANC" varies from country to country. Some interventions still provided to women with normal pregnancies have not been proved effective, and many of them have not been evaluated (HEN, 2006). The traditional approach to ANC, which was based on European models developed in the early 1900s, assumed that frequent visits were important when caring for pregnant women. Many low-income countries have adopted the traditional approach without adjusting the intervention to meet the particular needs of their population, without taking into account their country's available resources, and without evaluating the scientific basis for specific practices (Villar et al., 1997). In 1996, the World Health Organisation (WHO) launched a randomised trial in Argentina, Cuba, Saudi Arabia and Thailand on ANC, focusing on providing effective care through fewer but goal-oriented visits. The new focussed antenatal care had no negative effects on the maternal and perinatal outcomes and it could be implemented without major resistance from women

and providers and could reduce cost (Villar et al., 2001). The new model has come to be known as the "four-visit or focussed ANC model", ideally having the first visit when the pregnancy is less than 16 weeks, then at 26 weeks, 32 weeks and 36 weeks. The major goal is to help women maintain normal pregnancy through the following practices: identification of pre-existing health conditions, early detection of complications arising during the pregnancy, health promotion and disease prevention and birth preparedness and complication readiness planning (WHO, 2002). ANC is also a platform for other programs that improve public health, such as prevention and intervention of HIV/AIDS, sexually transmitted infections (STI) and tuberculosis (TB). This approach will strengthen the link between women and health services during and after childbirth and may promote breastfeeding and a healthy lifestyle (WHO, 2005). The proportion of women visiting a health facility at least four times during pregnancy is used as an indicator to monitor progress towards achievement of the Millennium Development Goal (MDG) number five, see 1.3 below (Matai, 2011).

1.2. Pregnancy-related maternal mortality

While maternal mortality has reached an almost irreducible minimum in the high-income countries, it remains alarmingly high in low-income countries. An estimated 358,000 maternal deaths occurred worldwide in 2008, a 34% decline from the levels of 1990. Despite this decline, low-income countries continue to account for 99% (355,000) of the deaths, of which about half (180,000) occur in Southeast Asia, the region where Lao PDR, the target for our study, is situated (WHO, 2010a). The adult lifetime risk of maternal death (the probability that a 15-year-old female will during her life-time die from a maternity-related cause), measured in 2008, was highest in sub-Saharan Africa (1 in 31), followed by Oceania (1 in 110), South Asia (1 in 120) and Southeast Asia (1 in 260), while high income regions had the smallest lifetime risk (1 in 4300) (WHO, 2010a).

About 80% of maternal deaths result from direct complications of pregnancy and childbirth. The five major direct causes are unsafe abortions, haemorrhage, sepsis, hypertensive disorders and prolonged or obstructed labour. Most of these conditions can be prevented with proper medical monitoring, information and services. The rest arise from pre-existing conditions that are aggravated by pregnancy such as malaria, anaemia and HIV (WHO, 2010b). In Southeast Asia, haemorrhage is the leading cause of maternal deaths and accounts for 32%, followed by hypertensive disorders (17%),

abortion (9%), sepsis (8%), embolism (2%), other direct causes (10%) and other indirect causes such as malaria and HIV (22%) (Acuin et al., 2011).

1.3. Millennium Development Goals

In September 2000, the largest-ever gathering of Heads of State and Government ushered in the new millennium by adopting the United Nations Millennium Declaration. The Declaration was endorsed by 189 countries and was translated into eight Millennium Development Goals (MDGs) to be achieved by 2015. The Goals include eradicating extreme poverty and hunger, improving education, promoting gender equality, improving health and combating disease, ensuring environmental sustainability and building a global partnership for development (UN, 2000). Progress towards achieving the MDGs is monitored with a framework of measurable targets and indicators for each MDG were defined in 2001. The fifth MDG aims to improve maternal health with a target of reducing the maternal mortality ratio (MMR) by 75% between 1990 and 2015 (UN, 2001). Globally, the number of women dying as a result of complications during pregnancy and childbirth has decreased by 34% – from 546,000 in 1990 to 358,000 in 2008, with the annual percentage decline of 2.3%. Among countries with an MMR $\geq$ 100 in 1990, 30 countries have made insufficient or no progress towards achieving the goal, including 23 from sub-Saharan Africa; 147 other countries have experienced a decline, 90 of which showed a decline of 40% or more (WHO, 2010a). The monitoring framework for MDG 5 was revised following the review of progress at the 2005 World Summit, with one new target (universal access to reproductive health) and four new indicators – the MDG 5B (contraceptive prevalence rate, adolescent fertility rate, antenatal care coverage, unmet need for family planning) (UN, 2005). Latest estimates suggest that 63% of women in low-income countries aged 15–49 years who were married used some form of contraception. Although 80% of pregnant women received ANC at least once during the period 2000–2010, only 53% received the WHO-recommended minimum of four antenatal visits. The proportion of deliveries attended by skilled health personnel rose from 58% in 1990 to 68% in 2008, but remained low in the WHO African Region and the WHO South-East Asia Region where only around 50% of deliveries were attended by skilled birth attendances (SBA) (WHO, 2011). Table 1 shows the average proportion of the MDGs achieved in each of the WHO regions based on the latest data available.

Table 1. Average proportion of MDGs in each WHO regions

Indicators / Regions	MMR (per 100,00 live births)*	Birth attended by skilled personnel (%)**	Contraceptive coverage (%)**	Adolescent birth rate (per 1000 girls aged 15-19)**	ANC coverage (%)**	Unmet needs for FP (%)**
Africa	620	47	24.4	117	74	24.8
America	66	92	74.5	63	95	8.9
Europe	21	96	70.7	24	97	9.7
Eastern Mediterranean	320	59	42.7	41	68	20.3
South-East Asia	240	49	57.5	54	76	12.7
Western Pacific	51	92	80.2	11	91	3.7

Sources: World Health Statistics, WHO 2011 (* data in 2008, ** data in 2000).

1.4. Lao People's Democratic Republic

1.4.1. General information

Lao People's Democratic Republic (Lao PDR or Laos), is located at the heart of the Indochinese peninsula and shares borders with China to the north, Cambodia to the south, Vietnam to the east, Thailand to the west and Myanmar (formerly Burma) to the northwest. The country stretches 1,700 km from north to south, with an east-west width of over 500 km at its widest and only 140 km at its narrowest point. Laos covers a total of 236,800 square kilometres, of which three-quarters comprise mountains and forest.

The total population was about 5.6 million in 2005, of which half (2.8 million) were females. The average population density is 24 per square kilometre, giving Laos the lowest population density in South-East Asia. About 85% of the population are rural dwellers engaged in subsistence farming. There are 49 distinct ethnic groups, many with their own language, culture and traditional practices. Based on ethno-linguistic characteristics, the Lao population is usually counted as being composed of four major ethnic groups. The majority (67%) of the population is Lao-Tai, 22% Mon-Khmer, 8% Hmong-Lu Mien and 3% Chinese-Tibetan (King, 2010). The official language is Lao. Sixty-seven percent of the population are Buddhist, and 33% are "others" (e.g. Animist, Christian and Muslim). Administratively, Laos has 16 provinces and one capital city, 141 districts, 10,552 villages and about 1,000,000 households. The average household

size is 5.9 persons. Twenty-seven percent of the population lives in urban areas and 73% in rural areas (NSC, 2005a).

Figure 1. Map of Lao PDR
(Source: United Nations, 2003)

Lao PDR has progressed significantly in the past two decades thanks to economic reforms, with improvements in health and primary education outcomes. Despite this, it remains one of the least-developed countries in East Asia and the Pacific region, and ranked 122nd out of 169 nations on the Human Development Index in 2010 (UNDP, 2011a). The literacy rate was 73% in the population above 15 years of age in 2005 (NSC, 2005a). More than 50% of GDP is derived from agriculture, about 80% of the population rely on the natural resource base for their livelihoods and almost 60% of Foreign Direct Investment is related to the country's environment and natural resources (Emerton, 2005). In 2008, about 34% of the population lived on less than $1.25 per day (ADB, 2010). The per capita gross income was US$1,000 in 2010, with an 8.4% economic growth rate (World Bank, 2011a). Table 2 shows some health and demographic indicators for Laos.

Table 2. Selected health and demographic indicators of Laos in 2005

Health and demographic indicators	
Population	5,621,982
Sex ratio (males per 100 females)	99.3
Population density (persons per km^2)	23.7
Women aged 15–49 years (%)	25
Infant mortality rate (per 1,000 live births)	70
Under 5-mortality rate (per 1,000 live births)	90
Maternal mortality ratio (per 100,000 live births)	405
Life expectancy at birth (years)	
Total (male/female)	61(59/63)
Population growth rate (%)	2.1
Total fertility rate (per woman)	4.5
Adult literacy rate (%)	
Total (male/female)	73(85/64)

Source: National Statistics Centre, 2005

1.4.2. National Health Policies

The health priorities of the Lao PDR are articulated in three main policy documents as follows (MOH, 2006a):

1. The health strategy towards the year 2020 was promulgated by the VIIth Party Congress in 2001 and has four basic concepts: full health care service coverage and health care service equity; development of early integrated health care services; demand-based health care services; and self-reliant health services.
2. The Lao Health Master Planning study (2002) identified seven precedent programs to be implemented and 31 priority programs in the fields of planning and management, human resources development, health financing, health education, infectious disease control, primary health care, maternal and child health, nutrition, hospital services, medical laboratory technology and the availability of essential drugs.
3. The national growth and poverty eradication strategy (NGPES) is based on some major documents developed since 2001 by the Lao government.

In August 2007, the 6th National Health Conference (NHC) reviewed the achievements and implementation of the 2001–2005 National Health Plan and provided

recommendations for the 2006–2010 five-year national plan (MPI, 2006). The actual strategy of the Ministry of Health is based on a "healthy village model" that included eight components of primary health care (PHC), as expressed in the national PHC policy, and will provide health for all. It is aimed at enabling development from the grassroots-upwards (WHO, 2010c).

The health of mothers and children in Laos is the responsibility of the Department of Hygiene and Disease Prevention, Ministry of Health. The Mother and Child Health Centre is responsible for implementing programs and coordinating the nationwide provision of mother and child health services. To accelerate progress toward the achievement of MDG 1, 4 and 5, and in support of NSEDP 2006–2010, the following policy and strategy documents have recently been developed and endorsed by government authorities in Laos (WHO, 2010c):

- National Nutrition Policy (2008)
- National Food Safety Policy (2009)
- Skilled Birth Attendance Development Plan 2008–2015 (2008)
- Strategy for an Integrated Package of Maternal Neonatal and Child Health Services 2009–2015 (2009)
- Health Information Systems Strategic Plan 2009–2015
- Human Resources of Health Master Plan 2009–2020
- Draft Health Financing Strategic Plan 2011–2015

In order to achieve the goal on the reduction rates of infant mortality and maternal mortality, the mother and child health (MCH) policy was developed in 2006. Table 3 shows the indicators that need to be achieved (MOH, 2006b):

Table 3. The indicators have to be achieved the goal

Indicators	1995	2000	2005	2010 (target)	2015 (target)	2020 (target)
Infant mortality rate	104	82	70	55	45	30
Under-5 mortality rate	170	106.9	98	75	55	40
Maternal mortality rate (/100,000)	656	530	405	300	185	100
Fertility rate	6.7	4.9	4.5	3.9	3.4	3.0

1.4.3. Health delivery systems

The Lao health system is divided into three branches: health care; prevention, promotion and disease control; and health management and administration. It is organised at four levels: central, provincial, district and village (Figure 2).

At the *central level*, the Minister of Health is responsible for the management of health services throughout the country. This Ministry consists of various departments each with specific tasks and responsibilities, including human resource development, prevention and hygiene, curative care, the council of medical sciences, food and drugs and the cabinet of health. Under the current structure, health services are mostly provided through vertical, centrally planned programmes.

At the *provincial level*, the health department has administrative responsibility for the health services within their provinces. This includes the provincial hospital, but also the planning, implementation supervision and monitoring of the Primary Health Care (PHC) programs; furthermore, implementation of vertical programs (e.g. malaria); regulation and inspection of private sector facilities (e.g. private clinics).

At the *district level*, a committee supervises the provision of health services within the district and oversees village health programs. At the *village level* and where they have health centres, the functions range from disease prevention, health promotion, diagnosis and treatment of basic diseases, implementation of the PHC activities, promotion of community participation and training and supervision of village health volunteers. These volunteers are trained for different kinds of activities to promote PHC activities such as implementing health education and promotion of clean water, sanitation, malaria control and assisting with immunisation, ANC and family planning programs (FPs), and introducing drug kits and the revolving drug fund to people in remote villages.

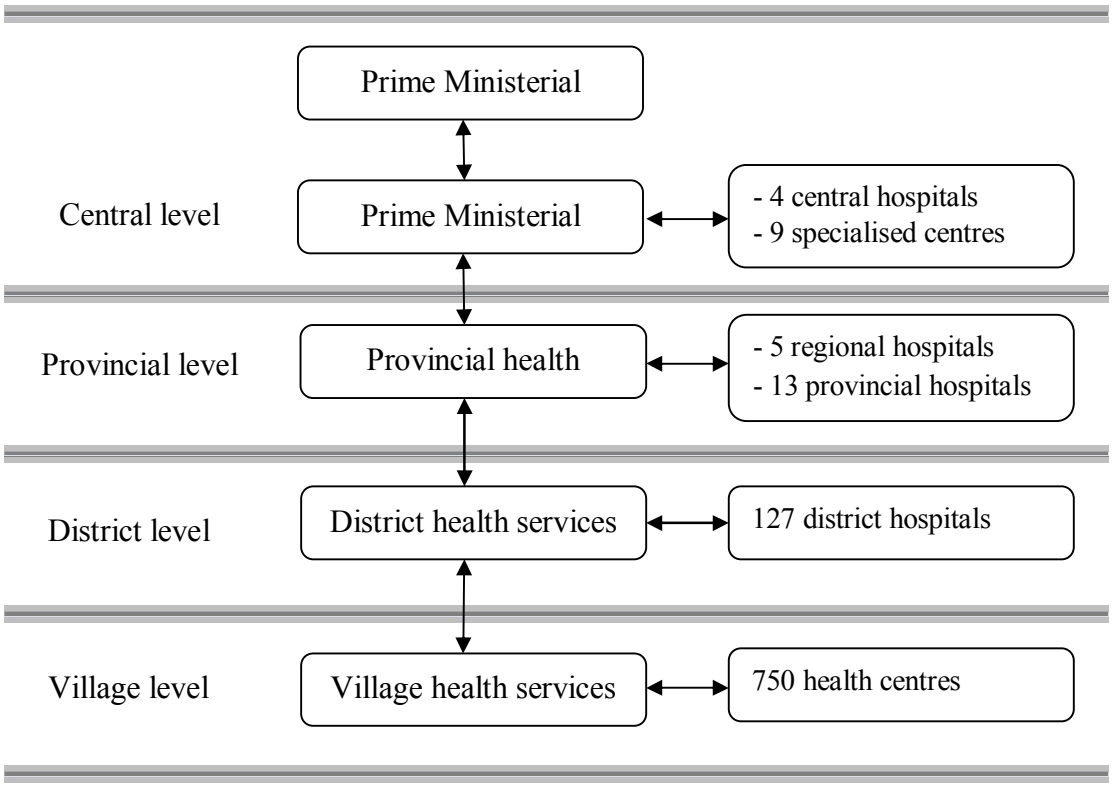


Figure 2. The structure of the health organisation and the health management in the Lao PDR (Adopted from Phomtavong et al, 2005)

A total of 5,081 hospital beds were available in 2005, giving a ratio of 0.9 beds per 1,000 inhabitants (MOH, 2007a). There are no private hospitals but there are 308 private clinics, 2,132 private pharmacies and 6 pharmaceutical factories (Phomtavong, 2008).

In Lao PDR, there are two categories of health care provision: formal health care and non-formal health care. The system of formal health care provision has three types of services: 1) services provided by hospitals (hospital system); 2) services provided by the primary health care facilities; and 3) services provided by vertical programs. The system of non-formal health care provision includes traditional healers, traditional herbalists, traditional birth attendants (TBAs), private clinics, registered pharmacists, drug sellers, village's health providers and village health volunteers (Boupha, 2005).

TBAs in Laos are usually older women respected in their community. In general, they do not receive any formal training in health care provision. They are self-taught or learn their trade through apprenticeship or from parents/relatives, and experience as a

mother. Sometime, those TBAs receive short training for a few days to one week on how to assist deliveries with aseptic method and about health education promotion.

TBAs provide assistance, not only in birthing and maternal care, but also in basic health care and hygiene promotion. These latter tasks are shared with village health providers and village health volunteers (MOH, 2000).

1.4.4. Health care financing

The Lao health care spending in 2005 was about US$11.5 per person per year, with 60% coming from households, 30% from foreign donors and 10% from government tax revenue (Boupha, 2005). The total health expenditure made up 4% of GDP in 2008 (Thome & Pholsena, 2009). Of the government health budget, the major spending was on staff salaries while about 35% was devoted to hospitals, which covered only 17–25% of recurrent costs of the central hospitals and 32–85% of the district hospitals (WHO, 2010c). To bridge the gap, public health facilities relied on a revolving drug fund mechanism. Social health protection mechanisms in Laos include: 1) social health insurance for public sector employees and their families; 2) health equity fund – third party mechanisms that pay for health services used by poor people; and 3) community-based health insurance for non-poor informal sector households. These mechanisms cover less than 1% of the population (Boupha, 2005). Accordingly, out-of-pocket expenditure by patients for care and treatment is a major cause of impoverishment and a deterrent to health care (MOH, 2009a).

1.4.5. Human resources for health

In 2005, the total health workforce numbered 18,017, a ratio of 3.21 per 1000 people. That included regular staff (civil servants) and contracted staff under the Ministry of Health, as well as the Ministry of Defence and the Ministry of Public Security. Around 70% of all health workers including medical staff, paramedical staff and non-medical staff are under the auspices of the Ministry of Health. Medical staff are divided into high-level (medical doctor-university graduates), mid-level (assistant medical doctor: 4 years training and nurse-midwife: 2–3 years training) and low-level (auxiliary nurse: ≤ 2 years training). According to a WHO report in 2006, Laos was one of 57 countries in the world with a critical shortage of health personnel (MOH, 2007a). Existing staff were poorly distributed, 39% of new recruitments were placed at the central level (2005) and with overall staff allocation highly concentrated in urban rather than in rural

health facilities. Most of the medical staff at district hospitals are mid- and low-level personnel, and only 10% of them are medical doctors. Health centres are almost totally served by low-level (81%) and mid-level (18%) staff and only 8 medical doctors in the entire country work at health centres (MOH, 2007a). In the villages, in 2005 there were 13, 970 village health volunteers, 5,241 TBAs and 569 village health providers working (NSC, 2005a). In the past few years, the net increase of the workforce was below 2%, which was below the population growth rate. There is an increase in student enrolment in health care education but very few jobs are created for them. The capacity of existing health workers to provide skilled care during pregnancy, birth and the postnatal period was low (MOH, 2008). Mid-level midwifery (three-year courses) was carried out from 1987–1989. During 1993–2002, low-level nurse-midwife (also called auxiliary nurse) and mid-level nurse-midwife courses were implemented. Then these programs were phased out since it was doubtful that these curricula conformed, in terms of theoretical contents and practices, to what would be necessary to graduate as a professional midwife according to international standards (MOH, 2008). In 2007, the Minister of Health, Laos endorsed the decree on Nursing and Midwifery in order to develop once again a midwifery profession (MOH, 2007b). In 2009, the SBA development plan was established. The general objective of the plan is to further develop the health sector's capacity to deliver culturally appropriate and accessible health services for pregnancy, childbirth and postnatal care of mothers and babies (MOH, 2009b).

1.4.6. The impact of the Lao Women's Union on women's health

The Lao Women's Union is a mass and social organisation of women founded in 1955. The organisational system of the Lao Women's Union operates throughout the country at four levels, namely: central, provincial, district and village with a total membership of 1,015,506 women. The roles of the Lao Women's Union are to educate women of all ethnic groups on the Constitution, Laws, Legislations and International Conventions related to the rights and benefits of women and children; to protect the rights and benefits of Lao women and children; to mobilise and advocate women to actively participate in the socio-economic development; to take part in protection of fine culture and traditions of Lao women of all ethnic groups (LWU, 2009).

However, women in Laos experience a lower standard of living than men and suffer from gender disparities, particularly in rural areas (GRID, 2005). Women and girls continue to be disadvantaged in terms of access to educational opportunities. In 2006,

the number of girls enrolled per 100 boys in primary education was 86, in secondary school the level was 78, in high school the level was 74 and in university the level was 62. About 80% of adult women participate in the labour force, which mostly involves work in agriculture (GOL, 2008). Gender inequalities are reflected in the country's human development ranking. In 2011, Laos ranked 107 of 173 countries in the Gender-related Development Index (UNDP, 2011b). In order to achieve MDG 3 and 5, under the NGPES, special efforts were made to increase the number of female and ethnic minority health workers, to ensure gender balance in training programs for village health workers and to increase women's representation on village health committees. The NGPES also proposed a greater role for the LWU in community mobilisation on nutrition, birth spacing and other reproductive health issues (ADB, 2004). The Lao Women's Union also support women and girls' empowerment by educating and raising awareness on the impact of early marriage, child-bearing and the family planning services and advocates for community participation by involving men in supporting women's health and well-being as well as working with both men and the village elders to ensure local engagement and commitments (World Bank, 2011b).

In cooperation with the Ministry of Health, the Lao Women's Union has organised training workshops, campaigns on mother safety projects, vaccination for mother and child project, breast feeding from birth to 6 months old, H1N1 prevention and HIV/AIDS awareness among couples in Lao PDR. In this way, the Ministry provides opportunities for all, especially mothers and children, poor people and people living in the rural and remote areas to have access to health care services (LWU, 2009).

1.4.7. Accessibility and quality of mother and child health services

At present, women's access to reproductive health services – especially family planning, skilled birth attendants, antenatal and emergency obstetric care services – is significantly lower in rural and remote areas than in urban areas, and also lower among some ethnic groups, the poor and those with lower education (GOL, 2008). Over 70% of the Lao population live in rural areas, of whom 27% live in areas inaccessible by road, and about 54% cannot reach the district hospital in less than one hour (NSC, 2005b), while about 16% of the population are not able to reach a health centre within one hour (Messerly et al., 2008). Mother and child health services are available in most health facilities throughout the country. However, even women who live close to health

facilities may not have access to the Emergency Obstetric and Neonatal Care (EmONC) because many hospitals at present cannot provide a full range of those services. An assessment of Skilled Birth Attendance (SBA) in Laos in 2008 pointed out that only 27 of the 41 comprehensive EmONC facilities and 5 of the 107 basic EmONC facilities (district hospitals) were able to provide all the required EmONC functions (MOH, 2008). All provincial hospitals can provide complete services for MCH on a regular basis but the SBA assessment in 2008 revealed that the skill competency score (using case scenarios and practical skills testing) of providers ranged from 51–84%, but the score for management of the third stage of labour was only 22% (MOH, 2008).

1.4.8. Health care-seeking behaviour

Health-seeking behaviour is defined as the action taken to prevent or deal with health problems. A report at the National Health Conference in August 2007 revealed that the first health-seeking behaviour for most common health problems is the purchase of drugs in official or unofficial pharmacies. Public facilities, especially district hospitals and health centres, are poorly utilised, with only 0.2 curative contacts per capita per year (Thome & Pholsena, 2009). The national health survey 2000 showed that only about half (47%) of those falling ill sought care. Of those, 29% used medical care while 71% used self-medication, including a pharmacy consultancy (mostly a non-government facility), 5% visited a private clinic or got a home visit by HCP, 3% visited a village health volunteer or TBA and 1% visited a spiritualist (MOH, 2001).

Regarding pregnancy-related health-seeking behaviours, it has been reported that 39% of women sought care during their pregnancy. The percentage of women who received ANC ranged from 25% among those with no education to 37% among women with primary education, to 85% among women with higher education (MOH, 2006c). Most of the births (85%) took place at home assisted by friends and relatives (65%) or by TBAs (12%) while 3.4% did not receive any assistance at all. In rural areas, friends and relatives assisted 79% of the deliveries (NSC, 2005b). Thirty-nine percent of women with higher education were assisted by doctors during delivery compared to 8% of those with lower education (MOH, 2006c).

1.4.9. Traditional beliefs regarding pregnancy

All societies have their own distinct cultural attitudes and practices related to pregnancy and childbirth. Childbearing practices in every society occur in accordance with the

cultural norms of that society. In most societies, however, childbearing practices share a common value: the preservation of life and maintenance of the health and well-being of the newborn infant (Daviau, 2003). According to traditional Lao culture, child bearing before the age of 35 is one of the natural means of preventing maternal mortality. Child-bearing periods are seen as a threat to women's health, and the risk as increasing with the woman's age. On the other hand, some ethnic groups consider pregnancy as just a normal event and not a cause of concern despite such factors as the age of the mother (Daviau, 2003).

Dietary restrictions during pregnancy vary between ethnic groups (see also 1.4.1). In the case of the Hmong, there is no restriction unless the woman is sick, though they would not eat tiger meat or animals killed by a tiger. Any dietetic restrictions are subject to the advice of elders. There is a general tendency to eat less for the fear of a big baby, which might be hard to deliver (AusAID, 2002). Lao Loum and Khmu proscribe few items that seem not to have much impact on nutritional status except potentially taro and sweet potatoes; both groups believe these foods make women fatter and would cause a difficult delivery. Akha have clear taboos during pregnancy, such as the interdiction of eating wild food from five months of pregnancy to five months after delivery (AusAID, 2002).

Besides diet, there are also other traditional beliefs and taboos that are thought to influence the pregnancy and delivery. Ethnic Lao women and Tai Deng do not allow pregnant women to sit in front of a door; Khmu women are not allowed to thresh rice for others, to go to the temple or participate in festivals and to go to dark places. Ngkriang women are prohibited to patch clothes or to put a lid on a pot and are also forbidden to sit on the doorway of a house with the belief that failure to respect these taboos will result in a difficult delivery. Men also face taboos in the pregnancy period; they can dig but they are forbidden to put something in the ground and the father-to-be must not bend a garden spade crooked because it will cause the legs of the child to be crooked as well. It is also prohibited for men to block the natural course of a river (Daviau, 2003).

1.4.10. Maternal health situation in Lao PDR

The MMR in Laos remains among the highest in Southeast Asia at 405 per 100,000 live births in 2005 (see also 1.2), although reduced from 650 in 1995 (GOL, 2008). The

adult lifetime risk of maternal death had decreased from 1 in 33 in 2005 (WHO, 2007) to 1 in 49 in 2008 (WHO, 2010a). The major causes of maternal mortality in Laos are haemorrhage, obstructed labour, pregnancy-induced hypertension and sepsis. A woman's risk of pregnancy-related death is dependent upon the availability and quality of health care, level of education, geographic accessibility of services and economic status (GOL, 2008). Even though the maternal mortality has been somewhat reduced, it is doubtful that Laos can reach the MDG 5 target given the current low levels of investment for maternal health (GOL, 2008). Reduction in maternal mortality depends upon a number of complex factors such as 1) access to comprehensive reproductive health services, especially family planning; 2) skilled care during and immediately after pregnancy and childbirth; and 3) emergency obstetric and neonatal care when life-threatening complications develop, and assessing progress in maternal mortality reduction requires a review of these factors (WHO, 2010c). Table 4 shows the progress in Laos of the five MDGs from 2000 to 2005.

Table 4. Lao PDR MDG 5 status

MDG 5A indicators	2000	2005	2015 (Target)
Maternal mortality ratio* (maternal death per 100,000 live births)	580	405	185
Birth attended by skilled health personnel (percent)	17	23	80
MDG 5B indicators			
Antenatal care at least one visit (percent)	35	39	60
Contraceptive prevalence rate (percent)	32	38	55
Adolescent birth rate (birth per 1,000 women ages 15–19)	96	76	No target
Unmet need for family planning (percent)	40	27	No target

Sources: MOH, 2006b; MOH, 2009a; NSC, 2005b

Priority interventions include access to family planning to reduce unwanted pregnancies, presence of skilled birth attendants at deliveries and access to emergency obstetric and neonatal care. These interventions will only be effective, however, if they encompass the entire country including women in rural and remote communities. In order to increase the use of health services and provide the reproductive health care

needed to improve maternal and neonatal health, investment in training and capacity strengthening for health personnel – especially skilled birth attendants (SBAs) – is required. Health systems must meet minimum standards in terms of human resources, infrastructure, supplies and management (GOL, 2008).

According to WHO (2004), SBAs comprise accredited health professional – such as a midwife, doctor or nurse who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of women and new-borns with complications.

1.4.11. Antenatal care in Lao PDR

The ANC coverage (at least one visit) was 35% in 2000 (MOH, 2001). As a response to this, in 2004, the Lao Ministry of Health endorsed the decree on Maternal and Child health care, which emphasised that all pregnant women should have ANC regularly at health facilities. The schedule was set as follows: 1) first trimester – one time (as early as possible); 2) second trimester – two times (month 5 and month 6); 3) third trimester – 7 times (month 7 – 1 time, month 8 – 2 times, month 9 – 4 times or once a week) (MOH, 2004). In 2009, based on the WHO recommendations, the Lao Ministry of Health instead adopted a four-visit model for ANC, with emphasis on health education and provision of quality care. Pregnant women were advised to visit health facilities at least once in the first and second trimesters, and twice in the third trimester. The HCPs are expected to be capable of early recognition of pregnancy complications and to take appropriate actions on such problems as anaemia, oedema, hypertension, vaginal bleeding and abdominal pain. In addition, the ANC should give appropriate advice to pregnant women about the planning needed for transport to health facilities and safe deliveries with skilled birth attendants (MOH, 2009c). In 2005, the proportion of women who had ANC in urban areas was more than twice that of those in rural areas (71% and 29% respectively). Among women who had ANC for the entire country, 50% of them received ANC from doctors, 42% from nurse-midwives, 6% from village health workers and 2% from TBAs, and about 66% of them had their first ANC at 3–5 months of pregnancy (NSC, 2005b). Of those women who received ANC, 82% had their blood pressure measured, 36% had a blood sample taken, 50% were told about the signs of complications of pregnancy, 13% received information about HIV/AIDS infections, 3% were tested for HIV and 2% received results of HIV testing (MOH,

2006b). According to government policy, the ANC service is free. However, the woman has to pay for other costs in connection to the visits such as transport, blood test, ultrasound (where available) and medicines.

Table 5. The guidelines for ANC services for pregnant women at each level of the health care facilities (adopted from MNCH integrated package 2009–2015)

Item of services	Community	Outreach services	Health centre	District hospital	Central & provincial hospital
Monitoring progress of pregnancy and assessment of maternal and foetal well-being		+	+	+	+
Detection & management of pregnancy problems (e.g., anaemia, hypertensive disorders, bleeding, mal-presentation, multiple pregnancies)			+	+	+
Iron & folate supplementation	+	+	+	+	+
Two doses of TT immunisation or at least three in the past		+	+	+	+
Use of insecticide-treated bed nets from prenatal to postnatal	+	+	+	+	+
De-worming	+	+	+	+	+
STI/HIV risk assessment, counselling and referral			+	+	+
Syphilis testing*			+	+	+
Information and counselling on self-care at home, nutrition, sexual activities, breastfeeding, family planning, healthy lifestyle	+	+	+	+	+
Mobilisation for choosing health facility as preferred place of birth, birth to be attended by SBA even for out-of-facility births, birth and emergency preparedness planning including advice on danger signs	+	+	+	+	+
Back up ANC if complications				+	+
Post-abortion care and treatment of abortion complications				+	+

* when rapid test available

Information on factors related to the underutilisation of ANC services among pregnant women is limited. The quality of ANC services is also in question, and according to our knowledge, no studies of these issues have taken place in Laos. Assessment of the quality of ANC as well as the underlying factors that determine whether pregnant women will seek ANC is needed. Attending ANC services is an essential component in the effort to reduce maternal morbidity and mortality and perinatal mortality and it is the entry point for women to have essential obstetric care and planning for delivery. Improving ANC would increase the utilisation of institutional delivery or delivery with a skilled birth attendant and, consequently, the MMR would be minimised and the MDG 5 goal would be achieved. In order to identify specific problems and to develop strategies to improve the utilisation rate of ANC, several questions need to be answered:

- Which factors contribute to the use of ANC among pregnant women?
- What is the quality of ANC services in the health centres?
- What are the pregnancy-related problems of the women and how do they solve these problems?
- Are the pregnant women willing to utilise the ANC services if they are informed and if the quality of services improves?

Based on the research questions, the thesis was designed as shown in the following figure.

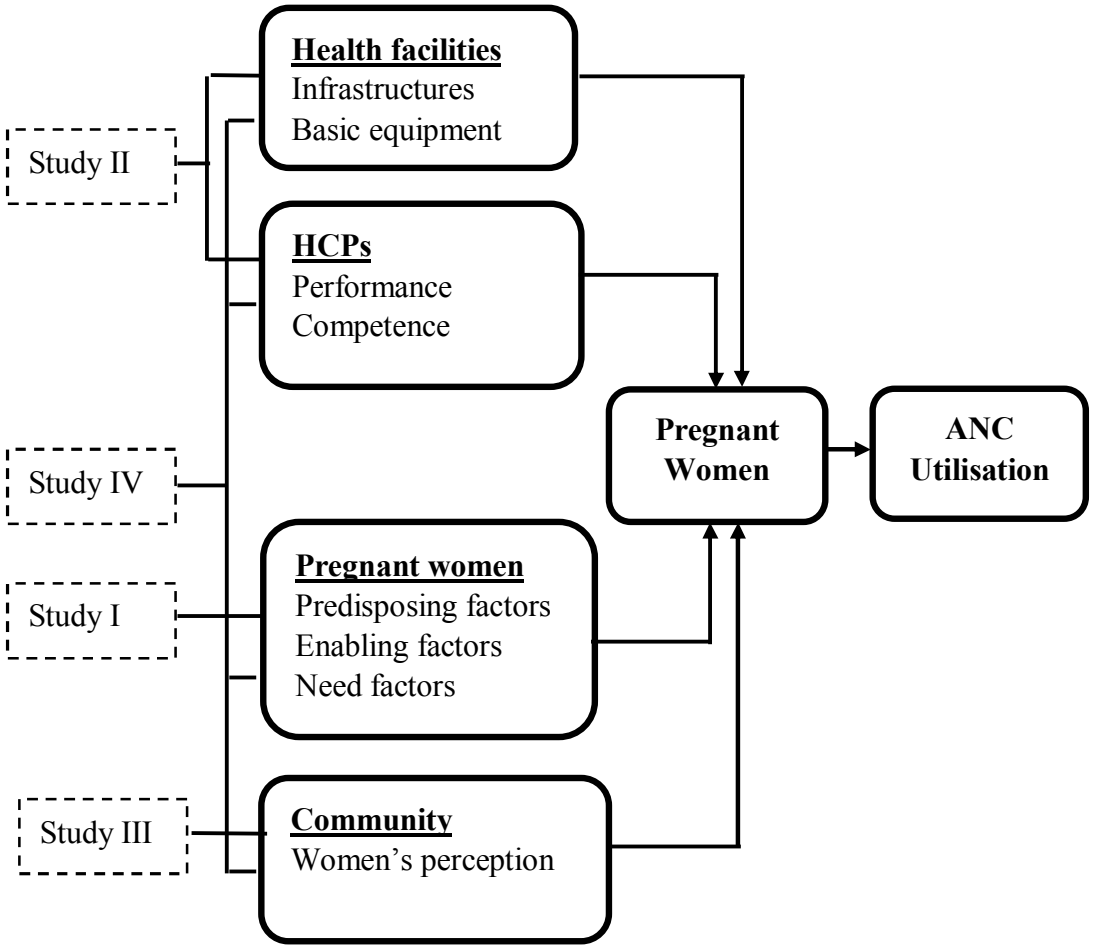


Figure 3. Overview of the different studies and how they relate

2. OBJECTIVES

2.1. General objective

The main aim of the study was to assess the quality and utilisation of ANC services in rural areas of the Lao PDR, to explore the care providers' views on their antenatal services, to explore women's experiences of pregnancy complications and their opinions regarding ANC services and to measure the impact of a community-based intervention combined with strengthening of the ANC service.

2.2. Specific objectives:

1. To explore factors related to ANC utilisation in rural areas of Laos (Study I).
2. To describe the available equipment for ANC, HCPs' performance in ANC services and their own opinions about the work situation at rural health facilities in Laos (Study II).
3. To explore women's beliefs regarding pregnancy, their perceptions towards ANC utilisation as well as the care-seeking behaviour for pregnancy-related problems in Laos (Study III).
4. To test the effectiveness of a participatory community-based intervention combined with strengthened ANC services, aimed at increasing ANC utilisation patterns among rural pregnant women in two provinces of Laos (Study IV).

3. METHODS

3.1. Study design

This research utilised a quantitative cross-sectional design to identify factors related to the utilisation of the ANC services, as reported by the pregnant women (Study I), to quantify the basic ANC equipment and the performance of HCPs providing ANC services at the health centres (Study II). A qualitative study design helped to get an understanding of the opinion and motivation towards ANC services among the HCPs (Study II), as well as pregnant women's perceptions and beliefs concerning pregnancy and ANC utilisation as well as about their care-seeking behaviour (Study III). The results from both the quantitative and the qualitative studies were used as information to set up Study IV. Study IV employed a pragmatic randomised controlled trial design to assess the impact of interventions aimed at increasing the ANC utilisation among pregnant women in rural areas. The pragmatic randomised controlled trials reflect the heterogeneity of participants and emphasised the functional outcomes (Hotopf, 2002). The trials also aimed at informing clinical health services or policy decision-makers for the choice of intervention (Treweek & Zwarenstein, 2009).

Table 6. Summary of study design and methods

Study	Setting	Design/data collection method	Subject and sample size	Data collection period
I	Rural villages in Khammouane and Champasack provinces	*Quantitative* Cross-sectional - Structured interviews using questionnaires	460 women: - 60 currently pregnant women (beyond 32 weeks of pregnancy), age 15 to 45 - 400 women who had given birth during the last 12 months	June 2008
II	District hospitals and health centres in Khammouane and Champasack provinces	*Quantitative and qualitative* Cross-sectional exploratory - Observation - Semi-structured & open-ended interviews	- 59 observations of ANC sessions - 26 healthcare providers engaged in ANC services	July 2009
III	Rural villages in Khammouane and Champasack provinces	*Qualitative* - Focus group discussions	- 8 FGDs among women who had been or were pregnant	July 2009
IV	Rural villages in Khammouane and Champasack provinces	*Quantitative* Pragmatic randomised trial - Structured interviews using questionnaires Intervention components : - Supplied basic ANC equipment - Refresher course for HCPs - Community participants	Intervention arm: 212 women before and 127 women after intervention In the control arm: 248 women before and 190 women after intervention	March 2011

Intervention

The main goal of the intervention was to promote awareness among pregnant women about the usefulness of utilising ANC services, such as consulting the HCPs in the first trimester of pregnancy, or as soon as they believed they were pregnant. Moreover, to attend ANC at least four times during a normal pregnancy, to recognise pregnancy-related problems and to attend ANC at the health centre instead of waiting for HCPs' out-reach activities in the villages. The intervention consisted of three parts: 1) community participation in promoting ANC use; 2) provision of basic ANC equipment to intervention health centres; and 3) refresher courses for HCPs at these health centres.

Community participation

During the intervention period, collaboration between community members was facilitated by village representatives, such as the head of the village, the head of the Lao Women's Union and the village health volunteers. After consulting the director of the district hospital, HCPs at health centres and heads of villages, one of the leading representatives in each village was recruited as facilitator of a series of meetings. During the six months (June–November, 2010) of the intervention period, meetings were held ten times (Table 7). There were on average 15 participants in the meetings, including men and women with different characteristics, married, unmarried, young and old. The time and place of the meetings were set up based on the convenience of the facilitators and the participants. In some villages, the meetings were conducted in the early morning before people went to work in the field. In each meeting, the facilitators and HCPs from the health centres would present and explain a poster to the participants followed by open discussions. The posters were designed by the research team, and presented the reasons why pregnant women needed ANC, daily activities which promote healthy pregnancy and what complications could occur. The aim of these meetings was to increase the knowledge and awareness of pregnancy-related problems and to give advice on how to seek assistance when problems occur. In some villages, there were several facilitators in the meetings. The facilitators from each district had been trained together at the district hospital for a week by a member of the research team. The intervention was monitored three times during the implementation period.

Provision of basic ANC equipment

In order to help the HCPs to perform basic ANC examinations, each health centre in the intervention site was supplied with a sphygmomanometer, a stethoscope, a foetoscope, urine test kits, a tape measurement, a weighing scale, a cloth to cover the abdomen, an ANC manual including a procedure checklist, a poster showing the usefulness of attending ANC and pregnancy record booklets for women.

Refresher courses for health care providers

The HCPs at the intervention health centres had refresher courses on focused ANC provision. The aims of the course were to review the importance of ANC provision, focused ANC, basic prevention and simple treatment for certain pregnancy complications (including the provision of iron tablets, tetanus vaccine, anti-parasite treatment and HIV information), how to record the status at each visit, how to use the ANC record booklet for pregnant women and how to explain the ANC posters to them. The contents of the courses were based on clinical standards of midwifery practice in Lao PDR (MOH, 2009c) and the manual for the ANC and postnatal care for training (MOH, 2009d). The course was carried out over a week by the members of the research team. Besides learning the theories, the HCPs also practiced how to perform ANC services. These HCPs were also responsible to give advice to the facilitators and joined them in the village-meetings.

Table 7: Objectives and contents of the intervention-meetings in the villages

Meeting	Objectives	Contents
1	To seek the cooperation of the villagers	- The facilitator introduces the project - Discuss why pregnant women should have ANC, what is useful, what are the advantages and disadvantages of having ANC, what problems can be discovered during ANC consultations - The facilitator shows and explains the poster
2	To identify problems about pregnancy in the community, and how to solve those problems	- Ask the participants about problems related to pregnancy, the cause of the problems and what they should do when they occur - The facilitator shows and explains the poster
3	To discuss the self-care of pregnant women and dietary intake	- What self-care should pregnant women do in order not to risk mother and unborn babies - The importance of healthy dietary intake - The facilitator shows and explains the poster
4	To discuss the signs and symptoms of pregnancy problems	- How do pregnant women notice if they have pregnancy problems, whom should they consult - When should they see the HCPs - The facilitator shows and explains the poster
5	To discuss if the baby is normal, and how one knows when to give birth	- How to notice if the baby is normal, the signs of being in labour - Where they should give birth, with whom and where - The facilitator shows and explains the poster
6	To prioritise pregnancy-related problems	- Review the pregnancy-related problems often occurring in the community, how they happen - What problems are the most important - The facilitator shows and explains the poster
7	To discuss how to prevent these problems	- The participants discuss how the problems can be prevented, what should they do if problems occur. - The facilitator shows and explains the poster
8	To discuss how to solve the priority	- The participants discuss what they should do if problems occur - The facilitator shows and explains the poster
9	To discuss how the community can participate in solving the problems	- The participants discuss what the community should do to help when the pregnant women have problems
10	To disseminate the results of the meeting	- The facilitator reports the results to the entire villages

In each meeting, the facilitators started by summarising what had been discussed in the previous meeting and at the end of each meeting, made an appointment for the next meeting.

3.2. Study settings

The study was conducted in the two provinces of Khammouane and Champasack. Khammouane is located in central Laos and had 337,390 inhabitants in 2005, of whom 82,313 were females of reproductive age (15–49 years) and was in 2008 estimated to have about 11,000 pregnant women (MOH, 2005). ANC was provided to 33% of pregnant women in 2005 – 27% by HCPs, 4% by village health workers, 1% by TBAs and 1% by others (MPI, 2009). Champasack is situated in the southern part of the country, had a population of 603,880 inhabitants in 2005, of whom 147,528 were females in the age group 15–49 years old and was in 2008 estimated to have about 20,600 pregnant women (MOH, 2005). In 2005, about 35% of pregnant women had ANC – 30% by HCPs, 3% by village health workers, 1% by TBAs and 1% by others (MPI, 2009). For both provinces, the number of pregnancies was calculated from the projections based on the national censuses from 1995 and 2005 (MOH, 2005).

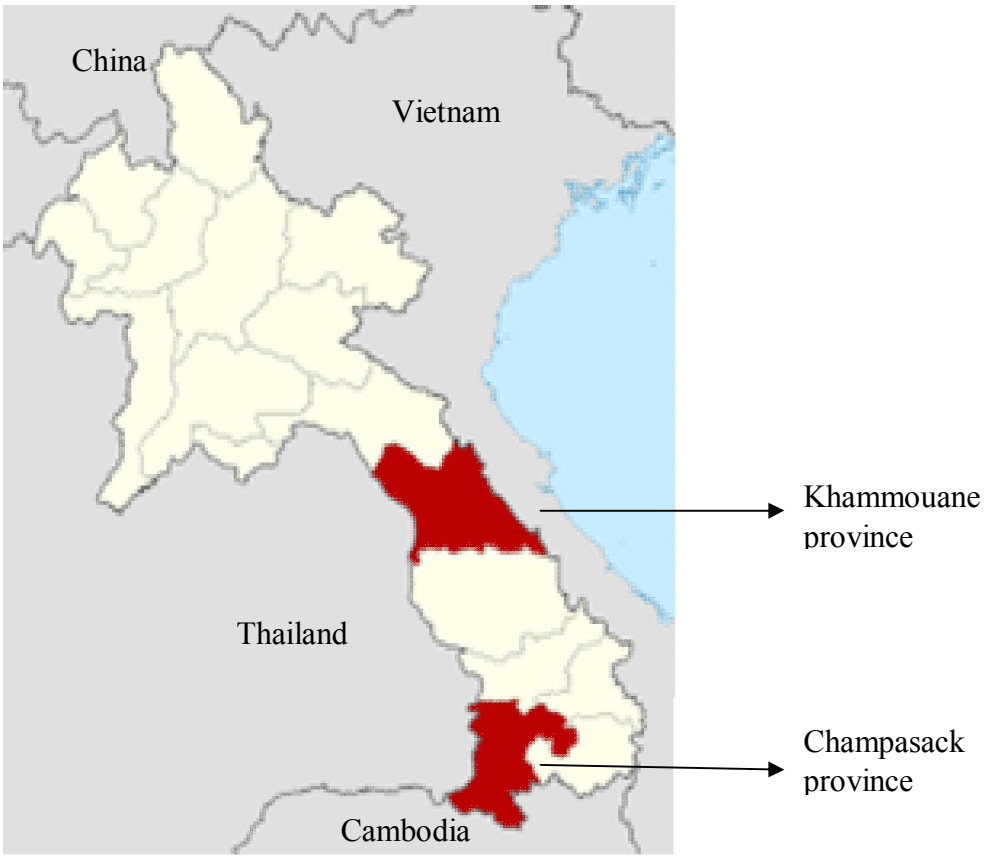


Figure 4. Location of the Lao-study sites

In each province, two districts were selected based on information from provincial health directors according to the study group's criteria: geographically separate populations with different economic standards. In the poorer districts more than half (51%) of the citizens were regarded as poor, over 40% of the villages had no school or dispensary, over 60% had no road access and less than 40% had access to clean water (Messerly et al., 2008). The number of villages with road access in each district ranged from 53 to 99. Five villages with health centres and five villages without health centres but within their respective catchments area were randomly selected from each district. All study area villages were accessible by road.

For the intervention, by tossing a coin, the better-off district in Champasack Province was chosen to be the intervention site and hence the poor district served as a control site. Conversely, in Khammouane Province the poor district became an intervention site and the better-off district became the control site (see also Figures 3 and 4).

3.3. Study subjects and sample selection

Study I

The subjects were currently pregnant women with a gestation ≥ 32 weeks or women who had given birth during the last year. A sample size of 317 was determined based on a requirement of a proportion of 29% (previously reported ANC coverage in rural areas), a 95% confidence interval limit and with an estimated 5% maximum error. Because of a big variation in the numbers (3–15) of eligible women in each village during the time of data collection, all were included in the study (apart from four who were working at paddy fields very far from home during the time of data collection) (Figure 5). The women were either identified by the head of the village, the Lao Women's Union representatives, village health workers or by their neighbours. With their informed consent, 460 women (60 of them were pregnant) were included in the study.

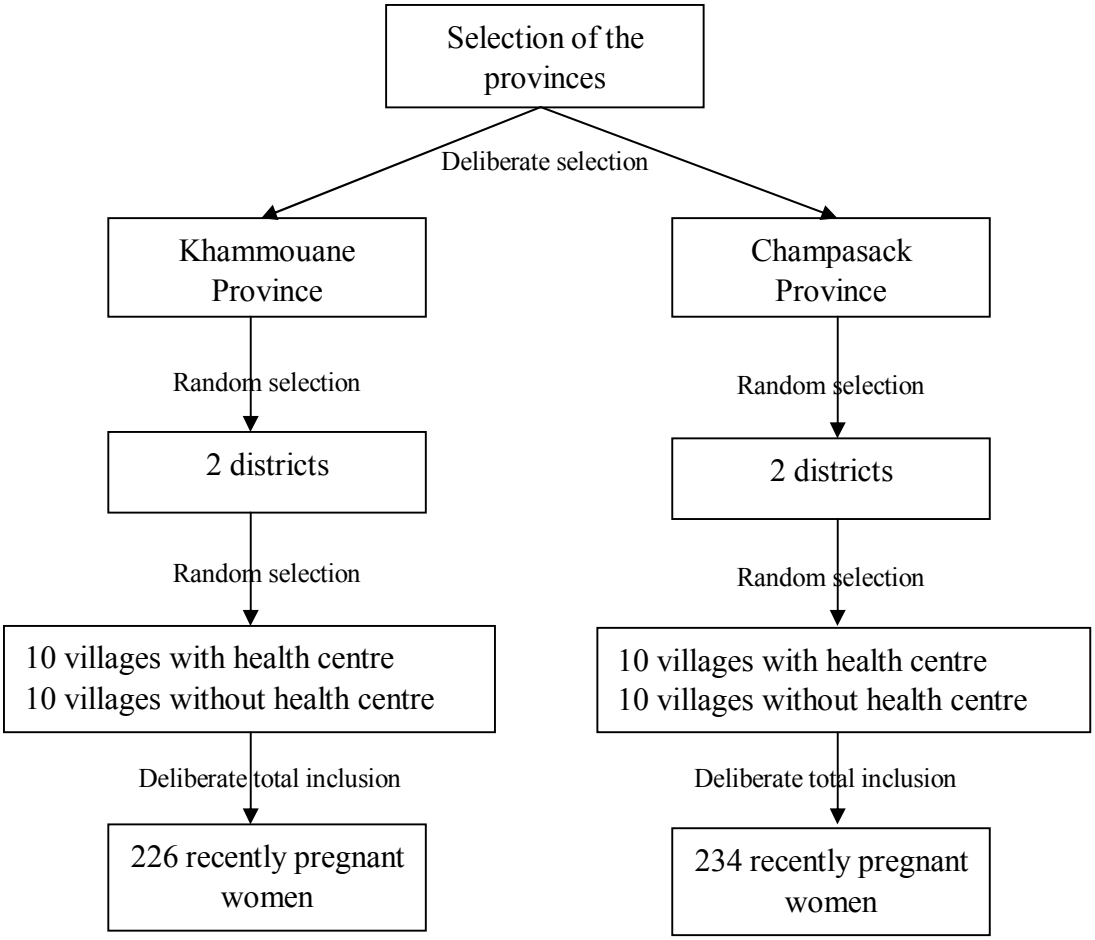


Figure 5. Flow-chart for recruitment of study sample

Study II

HCPs from the district hospitals and from each of the five selected health centres were purposively selected based on their engagement in ANC services. Two health centres were excluded due to not providing ANC services. Finally, 26 HCPs were included in the study (seven from four district hospitals and nineteen from eighteen health centres).

Fifty-nine encounters between HCPs and pregnant women were observed. Thirteen of them took place during regular ANC visits at the district hospitals. For the remaining 46 observations, because of the unpredictability of voluntary visits to the health centre, pregnant women were asked to come to the health centres for an ANC appointment during the data collection period.

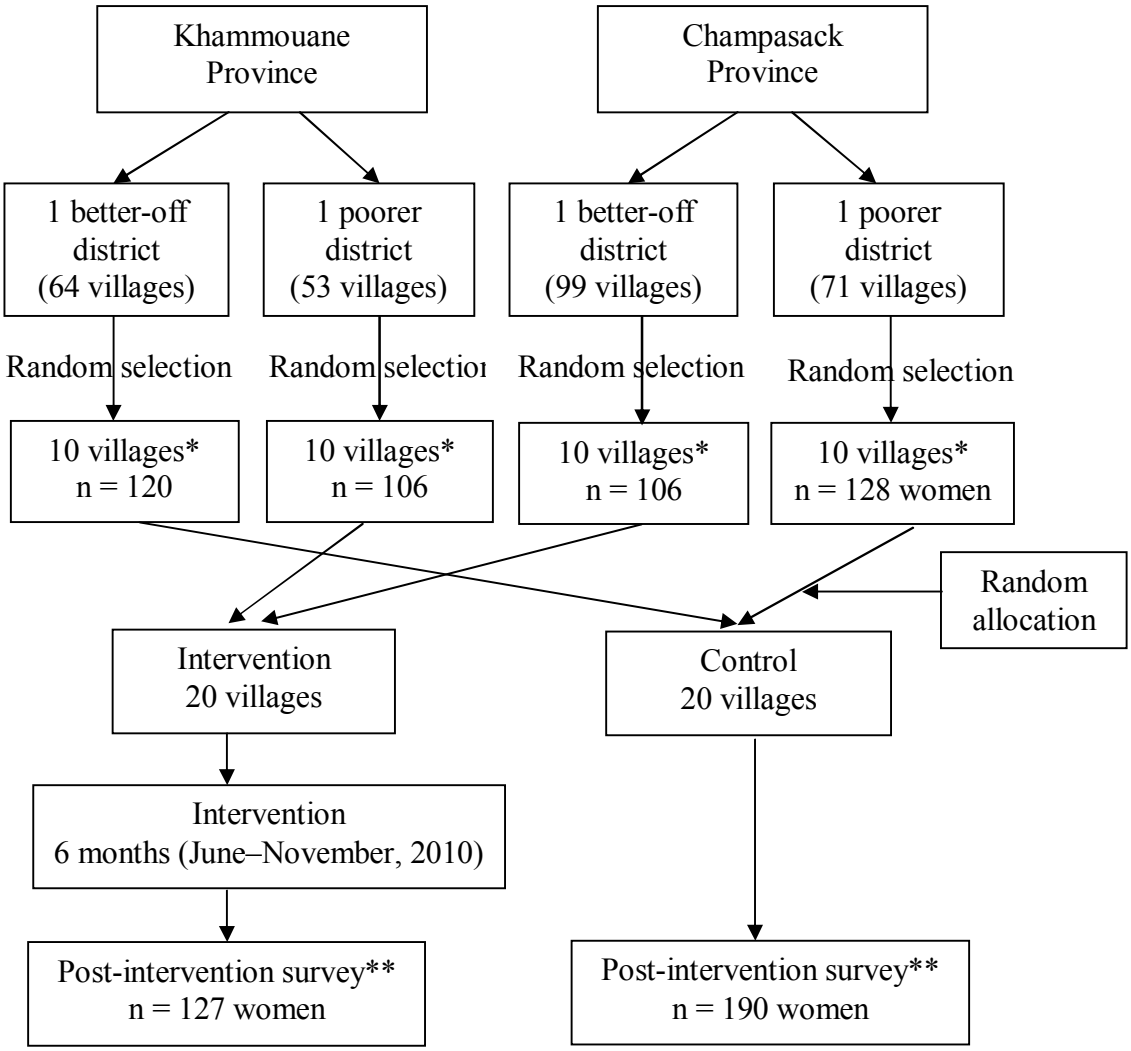
Study III

Eight focus groups comprising a total of 64 women who had been or were pregnant were invited to participate in the study. Informants were identified by the head of the village and by the head of the Lao Women Union. Since we failed to specify the age of the eligible respondents, some participants were older than 49 years. Each focus group comprised eight informants. There was a mix of young and older women (range 18–59 years) and a mix of ethnic origins: in some groups all participants were Lao Lum, in others there was a mix of two other ethnic groups (Laven and Makong) and in two groups the participants were all of either Laven or Makong origin.

Study IV

The study population, at the time of data collection, consisted of women aged 15–49 years and currently pregnant with a reported gestational age of 32 weeks or more, or who had recently given birth (during the last year for the pre-intervention survey, and during the last six months for the post-intervention survey). Eligible women were identified by the heads of the villages, representatives of the Lao Women's Union, village health workers or their neighbours. All eligible women were included in the study; only one woman was absent (Figure 6).

In order to have a sufficient number of respondents, the sample size was calculated using a 95% confidence interval limit, 80% power of the test with an absolute 15% difference in proportion of ANC use before and after intervention. This was based on the target in a strategic planning developed by the Ministry of Health in Laos to increase ANC coverage from that targeted in 2010, which is 45% to 60% in 2015 (MOH, 2009a). The calculated sample size was thus 181 eligible women for each arm.



* pre-intervention survey June 2008, ** March 2011

Figure 6. Flow-chart of the selection and implementation process for the intervention (paper IV)

3.4. Data collection

Research team

The research team comprised myself, a Lao pharmacist specialised in public health (team leader), a Lao medical doctor specialised in obstetrics, gynaecology and public health, three Swedish public health scientists (one also an obstetrician, and one a RN midwife), and three research assistants from the University of Health Sciences. Being Lao, I have both social and cultural knowledge and speak the language. With permission from the directors of the provincial health departments, our team was led to the district health departments. From there the HCPs led us to health centres. We were

introduced to the communities by the HCPs from the health centres. They worked closely with the heads of the villages, the Lao Women's Unions, village health volunteers and TBAs. The head of the village assembled the head of the Lao Women's Union and the village health volunteers to help in identifying the eligible women to be interviewed. With the direction given, we found our way to the respondents' houses. After interviewing one respondent, we asked for the next eligible woman (so-called "snow ball sampling").

Data collection methods

The data collection methods in this thesis included structured interviews using questionnaires (Studies I and IV), semi-structured open-ended interviews (Study II), observation (Study II) and focus group discussions (Study III).

Structured interview

The structured interview is a method used to gather the personal information in order to develop an understanding of key issues and refine the phrasing of specific questions (Barbour & Kitzinger, 2001). The interviews may be done on a large number of people to yield standardised answers that are later analysed with the help of statistics (Dahlgren et al., 2004). In order to determine the proportion of ANC use and the factors related to ANC use by the women, Study I used the structured interview method. Study IV also used the same method to find out if the proportion of ANC use increased after the intervention.

Study I: The data were collected in June 2008. Structured questionnaires in Lao were pre-tested with 30 respondents outside the study provinces and they were revised according to analysis of flaws and consistency. The questionnaires were used to gather information on socio-economic characteristics, pregnancy history, aspects of ANC utilisation, accessibility to health facilities and perceptions of ANC service quality. The assessment of the families' economic status was based on asset ownership information. The interviews took place either at the respondents' houses or out in the paddy field. Even though some of the respondents belonged to different ethnic groups, for example Laven, Makong, Kateng and Sooy, all of them understood and spoke the national language, Lao.

Study IV: The data were collected in March 2011, three months after concluding the intervention period. The structured questionnaires were the same as in Study I. However, some of the questions were omitted such as items concerning economic conditions, as we assumed that there would not be much change during this period. Even though the respondents might not be identical to the women of the pre-intervention survey, the geographical setting was still the same. The main outcome variable, overall ANC use, was explored through the question: "Have you attended ANC during the time you were pregnant with your present/last baby?" and the response was categorised as "ANC use" or "non-ANC use". The two secondary outcome variables related only to those women who attended ANC. The first question was "How many times did you visit ANC?" and the answers were grouped into "1–3 visits" and "4 or more visits" in line with the recommendation by the Ministry of Health of the Lao PDR. The second question was "Where did you go for ANC service?" and was classified into "health centre" and "other places".

Direct observation

The observation method entails a systematic noting and recording of events, behaviours and artefacts in the social setting chosen to study (Marshall & Rossman, 2006). Observation is particularly well suited to study organisations and how people within them perform. In addition, observation may uncover behaviours and routines of which the participants themselves may be unaware (Mays & Pope, 1995). For this thesis the observational method was used to collect data on the performance of HCPs while providing ANC services (Study II).

Study II: The data were collected in July 2009. The infrastructure and ANC equipment at the health facility as well as the HCPs' interactions with clients and performance of ANC activities were observed. The observations followed a strategy described by Abdulhadi et al. (2006) whereby the two observers sat in the examination room and followed the procedure of ANC services performed by the HCPs. The two observers had been trained and had conducted the pre-test at a central hospital. These two observers were female research assistants who assisted in data collection from the start of the project (Study I). All observations were made by them. The notes taken by the two observers were compared. Any differences were discussed and resolved with the principle investigator (CM).

Semi-structured interview

Semi-structured open-ended interviews can be used to gather qualitative information. Interviews of this type are suited to work with small samples and are useful for studying specific situations or for supplementing and validating information derived from other sources. In addition, since they provide access to perceptions and opinions, they are effective for gaining insight into problems that are not immediately perceptible but that nonetheless cause concern in certain areas or segments of the population (Laforest, 2009). This method was used to explore the opinions of HCPs about their working situation (Study II).

Study II: For the qualitative part of the study, the 26 semi-structured interviews took place in the HCP's office, in an examination room or outside under a tree. Two research assistants conducted each interview, one asking questions while the other observed the dialogue. The questions were listed in an interview guide and started by using a broad open question, for example "What is your experience in the care of pregnant women?", followed by questions such as "What are the problems you encounter during consultations?" and "What kind of training in caring for pregnant women do you have?" In order to extend the information, follow-up questions were asked such as "What do you mean?" or "Can you explain this further?" The interviews lasted between 38 and 90 minutes, were conducted in Lao and audio recorded.

Focus group discussions

In focus groups, the discussions aim at exploring a specific set of issues among a group of people. The focus group discussions (FGDs) are distinguished from group interviews by explicit use of group interaction to generate data. This method is open and flexible. Hence, it is ideal for exploring people's general attitudes, but also their experience, opinions, wishes and concerns about a specific selected topic (Barbour & Kitzinger, 2001). The FGD method requires people to listen to others' opinions to form their own. Often, the questions are deceptively simple; the trick is to promote the participants' expression of their views through the creation of a supportive environment; the format allows the facilitator the flexibility to explore unanticipated issues as they arise in the discussion (Marshall & Rossman, 2006). In order to obtain the women's general opinions and attitudes about ANC and their perceptions relating to pregnancy, we decided that FGDs were a relevant method for Study III.

Study III: The data were collected in July 2009. Eight FGDs were held with a total of 64 women who had been or were pregnant. Two FGDs were carried out in each district, one at a village with a health centre and another at a village without a health centre. Each FGD comprised eight informants. To ensure privacy, most of the discussions took place at the temple in the village. One discussion took place at the house of a villager because there was no temple in the village. A semi-structured guide included areas of interest such as attitudes regarding ANC, health-seeking because of pregnancy complications and experiences of ANC services. The FGDs were recorded and each lasted between 70 and 90 minutes.

3.5. Data analysis

3.5.1. Statistical analysis

Data analysis was performed with Stata/IC 10.0 software (StataCorp LP, College Station, Texas, USA) for the quantitative studies (I, II, IV). The mean, standard deviation and proportion were calculated. The frequency distributions were computed for the observed items on the ANC equipment, the health facilities' infrastructure and the ANC performances of HCPs (Study II). The 95% confidence interval, crude odds ratio, multiple logistic regressions and their p-value were used to identify the factors related to ANC utilisation by the study subjects (Study I).

The principal component analysis (PCA) was performed and based on the national income quintiles (Q 1–5) from the Lao National Health Survey with Q1 for the poorest and Q5 for the richest (MOH, 2006). In our sample, the proportion of Q1 was 1%, of Q2 was 52%, of Q3 was 30%, while Q4 was 10% and Q5 was 7%. For the purposes of our study we decided on three groupings: poor (Q1–2), middle (Q3) and high economic status (Q4–5) (Study I).

Chi-square tests were used to compare the characteristics of women in the intervention and control areas. Z-tests of proportion were used to compare data before and after in the intervention and control areas, and to compare the total proportional difference between the two study areas. Possible confounding factors related to socio-demographic differences between women in the intervention and control arms were assessed through a stratified analysis for each of the outcome variables. For all calculations, a p-value less than 0.05 was considered statistically significant (Study IV).

3.5.2. Qualitative data analysis

The semi-structured open-ended interviews (Study II) and FGDs (Study III) were analysed using content analysis and the main focus was to grasp the manifest meaning (Graneheim & Lundman, 2004). The first author (CM) read through the Lao transcriptions several times in order to get an overall picture of the content before starting the coding where the text was condensed into meaning units, sorted into codes, organised into categories and later grouped into themes. The main steps of the coding were translated into English and discussed together with the second author (KE). Disagreements about how to grasp the meaning were further discussed with the whole group of authors.

3.6. Ethical issues

The studies were carried out after receiving approval from the National Ethics Committee for Health Research, Ministry of Health of Laos, No. 174/NECHR, dated 30/4/08. Official and open information was presented to local authorities before conducting the study. Information about the voluntary and confidential nature of the project was given verbally to the participating women and to the HCPs prior to the interviews and they all agreed to participate. However, during the intervention implementation (Study IV) the participants in the group meeting were not asked for consent individually. They were informed in group and they participated voluntarily in the meetings and they could opt-out of the next meeting as they preferred.

Study IV was designed to test the effectiveness of community participation and the upgraded quality of ANC services at the health centre and initiatives to increase ANC use pattern in rural Laos. The study team considers it unethical to strengthen services only in the intervention and not the control arm. However, due to budget constraints, we have not been able to provide the basic equipment for ANC and to train HCPs in the control areas after we finished the study.

4. RESULTS

4.1. Characteristics of the study population

Study I: Most of the respondents were between 18 and 35 years old (89%), had primary school level or higher (69%), were housewife-farmers (78%), of Lao Lum ethnicity (75%) and Buddhist (77%). Their husbands were mainly farmers (80%), had primary school level or higher (81%) and belonged to the lower level of economic status (53%).

Study II: The study sample was composed of 25 female and 1 male HCPs aged between 24 and 50 years old. On average, they had 11 years experience of ANC provision (range 1–24 years) and 15 years of general health care work (range 1–30 years). The number of ANC appointments provided by respondents to pregnant women ranged from three per month to three per day. Nine of the HCPs could not report the number of pregnant women visiting the health centre for ANC due to the fact that very few women attended; instead, they usually provided ANC service while visiting the villages.

Study III: The average age of the 64 participants was 35 years (range 18–59 years). Sixteen participants were illiterate, 61 were farmers and 35 were of Lao Lum origin. The average number of pregnancies was 5, with a range from 1 to 17. Twenty participants had experienced at least one miscarriage, and 10 had at least once had a stillborn baby.

Study IV: The socio-demographic characteristics of the respondents were similar before and after the intervention in the intervention arm and in the control arm, except that in the control arm, the percentage of respondents who had two parities was higher after the intervention. When comparing the socio-demographic characteristics of the intervention and control respondents, they were also similar, except for ethnicity and educational attainment among the respondents and their husbands.

4.2. Antenatal care utilisation

Study I: About half (49%) of the respondents had never received antenatal care for their last pregnancy while the other half (51%) had made at least one ANC visit. Among the users, 63% had visited ANC three times or more but only 28% had their first ANC during the first trimester. The ANC clients said that they had been examined by

medical assistants (40%), nurses (48%), midwives (4%), TBAs (5%) and village health workers (3%).

4.3. Factors associated with ANC utilisation

Study I:

The respondents reported that the reasons for not using ANC services were the following: normal progress of pregnancy and/or feeling normal (49%); difficult access to the clinic (48%); critical of ANC (21%); time restraints or being busy (14%); no declared reason (16%) and relatives were HCP (1%). However, 65% of all 460 respondents said that ANC was very useful. The reasons stated were as follows: to have an abdominal palpation to make women feel "comfortable" (42%); to receive delivery assistance in order to stay healthy and confident (29%); to have a doctor to examine (24%); to confirm foetal well-being (16%); and to know if they would deliver easily and when (1%).

A multiple logistic regression analysis was performed in order to identify factors associated with ANC utilisation of the pregnant women. After adjusting for other factors, pregnant women whose husbands were government officers or employees were more likely to visit ANC compared to those whose husbands were farmers (OR = 2.66, 95% CI = 1.45–4.88). Women who knew that the health centre provided ANC services (OR = 3.30, 95% CI = 2.08–5.25), women who perceived ANC as somewhat useful (OR = 2.88, 95% CI = 1.26–6.61) or very useful (OR = 7.45, 95% CI = 3.59–15.46) were more likely to seek antenatal care. Women younger than 18 years when bearing their first child were less inclined to seek antenatal care (OR = 0.54, 95% CI = 0.29–0.79) compared to older mothers (Table 8).

Study III:

The women reported that some reasons for not seeking ANC service were that they did not perceive ANC to be beneficial to their health or the health of their unborn child, and that their pregnancies were normal so there was no need to seek care, or they thought that the ANC was not useful. However, some of them said that they sought ANC when they felt uncomfortable, felt no foetal movement, had contractions, had vaginal bleeding or wanted to be safe for delivery.

Limited access to health facilities was another factor, mentioned by FGD participants, which discouraged them from seeking ANC services during the pregnancies. The elderly participants said that in their child-bearing days the health facilities were situated very far, there was no available car and the road conditions were bad. However, at the present time it was convenient to go to health facilities but often the women did not have money for the transportation or had no time.

The shyness and fear of pain during ANC services made some pregnant women refrain from using ANC services. The participants said that they felt shy to show their abdomen to a male HCP, and some of them mentioned that whenever the HCPs palpated the abdomen they felt pain. Hence they stopped seeking ANC.

Another factor that discouraged the pregnant women from using the ANC services was insufficient service and information. The participants said that now and then they saw no HCPs at the health centres, and sometimes they did not meet the same HCP, especially at the district or provincial hospital where there were many different HCPs on duty. At the health centres, the HCPs did no better than TBAs, only palpated the abdomen and sometimes provided medicines. There was no advice, no mentioning about where they should give birth. Even though the HCPs visited the villages regularly, they did not give any information that the pregnant women should have ANC and where to seek care if pregnancy-related problems occurred.

4.4. Husband's support (Study III)

The participants from the FGDs said that they decided themselves whether to seek ANC or not during their pregnancies. Their husbands had no objections to their wives seeking ANC; they mostly said nothing or gave no advice regarding the ANC consultations. Some participants said that their husbands wanted them to see the HCPs but they themselves did not want to. Some other women said that their husbands brought them to health facilities for ANC and if they felt unwell during the pregnancy the husband would call for the HCPs or brought the women to health facilities.

4.5. Traditional practices to avoid pregnancy problems (Study III)

The findings from the FGDs pointed out that women during pregnancy should take precautions for their dietary intake. Some foods were prohibited due to the beliefs that they caused problems such as swelling, prolonged labour and excess foetal growth,

which would make the delivery difficult. However, some women did not have any food restrictions during pregnancy but did not eat certain kinds of food because they could not stand the smell of it.

Some activities such as taking a nap during the day, killing a snake, sitting on the top of the ladder or sitting between the door-ways were also prohibited during pregnancy due to the beliefs that this would lead to obstructed delivery. Some problems during pregnancy were even believed to be caused by the unborn baby such as swelling, stomach ache and leg pain.

4.6. Management of illness during pregnancy (Study III)

The most common pregnancy complications mentioned in all groups were tiredness, dizziness, fever, headache, swollen legs and unspecified illness (felt pain, uncomfortable inside the body, back pain, stomach ache and rash). Except for swollen legs, the symptom occurred mostly during the first 2–3 months of pregnancy, and then it disappeared. The swollen legs occurred during the last trimester, especially during the 8^{th} and 9^{th} month and the problems disappeared after delivery. Some women had experience of two or more miscarriages, which mostly happened when they were two to seven months pregnant. Some women mentioned vaginal discharge, which irritated them throughout their pregnancies. However, one woman said that she had no problem whatsoever during her pregnancies.

According to the report of the FGDs' participants, there were different ways to deal with pregnancy complications. Some participants said that they did not seek any medical care when problems occurred during pregnancy since they considered the problems as a normal situation for pregnant women. There were some participants who consulted elderly people who also viewed the problems as normal events during pregnancy.

Use of modern health care was the option for some participants. When they encountered pregnancy-related problems they bought drugs to relieve the symptoms. Some consulted the village health provider, and some went to a health facility.

Some participants used traditional practices such as herbal medicines or having a steam sauna to lessen the pregnancy problems. Participants from the Makong ethnic group

reported on inhaling the odour of squeezed red ants to relieve dizziness. Respondents from the Laven ethnic group mentioned painting the body with fresh chicken blood when they felt tired.

Some of the participants said that they took modern medicines when they felt unwell but at the same time they also used traditional medicines. Some respondents talked about switching from one method to another in order to solve the problem. One FGD participant mentioned about going to the hospital when she had a miscarriage but when the bleeding did not stop, she used boiled herbs.

4.7. Observation of infrastructure, basic equipment and ANC performances (Study II)

Among the 18 health centres observed, 17 had examination beds, 17 had pillows, 15 had a waiting area, 12 had toilets, 5 had tap water, 4 had private rooms for examination, and 1 had sheets to cover patients during examination. Regarding basic equipment, 15 had weighing scales, 15 had a height measure, 12 had a stethoscope, 12 had a sphygmomanometer, 11 had tape measures, 10 had a foetoscope and 5 had a supply of iron sulphate pills. Compared to the health centres, the four district hospitals generally had better infrastructure and basic equipment, except one that had no private room for examination, two that had no sheets for the patients and one that could not provide iron supplementation.

Regarding the interaction between HCPs and pregnant women, most of the HCPs welcomed patients in a friendly way (58/59 encounters), but none of them introduced themselves, used any ANC guidelines or recorded the examination results on any ANC form. The average times for the visits were five minutes (range 2-18 minutes). During the history-taking, HCPs asked about number of previous pregnancies (22/59 encounters), age of the client (16/59 encounters), gestational age (15/59 encounters), problems with current pregnancy and history of miscarriages or abortions (9/59 encounters). Some items were not asked at all by any of the HCPs such as case history regarding twins and previous delivery mode including complications such as large loss of blood.

During ANC services to 59 women, only 23 were weighed, in 21 the abdomen was assessed for size of pregnancy and foetus position, in 14 the foetal heart rate was

registered, 14 had the fundal height measured and 11 had their blood pressure measured. Some of the activities were not performed at all by any HCP, e.g. they did not wash their hands before examining the client, and neither did they perform nor refer for urine or haemoglobin tests.

The information or health education provided by HCPs to pregnant women varied considerably. Some of them advised the women on diet and nutrition (28 encounters), advised about women's personal hygiene (24 encounters), told about family planning (16 encounters), discussed about returning for the services (16 encounters), informed about gestational age (13 encounters), provided information about the health status during pregnancy (11 encounters), informed about position of the foetus (10 encounters) and birth preparedness (1 encounter). None of the HCPs informed women about warning signs of complications during pregnancy or labour.

4.8. The health care providers' opinions about their work situation at health centres (Study II)

The HCPs at health centres expressed their opinions about daily activities: they had to perform all kinds of health care such as curative work, vertical program (such as EPI and TB) and MCH activities. Compared to the HCPs from the MCH sections at district hospitals, they thought their work schedule was overloaded.

The knowledge of HCPs on ANC was limited due to a lack of formal additional training after graduation. Their experiences were gained by working at a district hospital before taking up the position at the health centres and some HCPs returned occasionally. The knowledge of risk assessment of pregnant women varied among the interviewed HCPs. The identification of pregnancy-related complications was mostly based on the external examination. They referred the women, e.g. those with uncertain foetal position, to the higher-level hospitals where there was more efficient equipment.

The motivation to work at health centres, for some HCPs, was to get a promotion or to become a permanent government officer. Working at the district or provincial hospital where the work was not overloaded was preferable for some HCPs. Some other HCPs preferred to work at a health centre because it was located at their home village. It was their responsibility to take care of the patients, and they could get the cooperation with

their colleagues. Moreover, there was a good chance to exchange the knowledge with the colleagues because the staff had the same duty and were working more closely.

Concerning the provided ANC services, some HCPs were admired by the women for their performance. However, some clients complained about waiting time, weekend appointments (did not consult calendar when making appointment), HCPs' behaviour, absence of staff, same services every time and erratic prescriptions (the patient felt no better after taking medicines).

The HCPs proposed that, in order to improve the ANC services, there was a need to increase the number of HCPs with greater knowledge, to supply the requisite equipment and to renovate the health centres. Support from superiors, colleagues and TBAs as well as refresher courses were also requested.

4.9. Impact of a low-cost community intervention on antenatal care utilisation (Study IV)

After the intervention, there were highly significant absolute increases in the intervention arm for overall ANC use (29%), visits four times or more (32%) and health centre-based ANC services (40%). In the control arm, there were significant increases for overall ANC use (10%) and for having ANC at the health centre (16%). When comparing the proportional changes in the intervention and control arm, there were significant differences between the two arms for all three outcome variables with intervention effects of 19, 26 and 24 percentage units respectively (Table 9).

Since the respondents in the intervention and control arms differed regarding their own educational level and that of their husbands, plus regarding ethnicity, stratified analyses were performed in order to identify confounding issues. The results showed that educational level was the only factor that might have confounded the results for the primary outcome and for one of the secondary outcome variables (Table 10).

Table 8 Crude ORs and adjusted ORs of the associations between predisposing, enabling and need-factors and the respondents' ANC utilisation.

Factors	Total Number	Ever use Number	Crude OR	p-value	Adjusted OR	95% CI	p-value
Educational attainment							
Illiterate	141	57	1.00				
Primary school	171	81	1.33	0.220			
Secondary school or higher	148	98	2.89	0.000			
Husband's occupation							
Government officer/employee	84	61	3.19	0.000	2.66	1.45–4.88	0.002
Farmer	366	166	1.00		1.00		
Vendor/merchant	10	9	10.84	0.024	5.82	0.66-51.00	0.112
Economic status of household							
Lower	243	110	1.00				
Middle	137	81	1.75	0.010			
Higher	80	45	1.55	0.089			
Distance from own house to health centre♣			0.90	0.011			
Know if HC provides ANC services							
Yes	265	166	2.99	0.000	3.30	2.08–5.23	0.000
No/ Don't know	195	70	1.00		1.00		
Means of transportation to ANC services							
On foot/ Bicycle	205	119	1.41	0.079			
Motorcycle/car	222	110	1.00				
Public transport	33	7	0.27	0.004			
The usefulness of using services							
Very useful	297	193	11.98	0.000	7.45	3.59–15.46	0.000
Somewhat useful	81	32	4.21	0.012	2.88	1.26–6.61	0.012
Not at all	82	11	1.00		1.00		
Age when first pregnant							
< 18 yrs	78	30	0.51	0.009	0.54	0.29–0.97	0.041
≥ 18 yrs	375	206	1.00		1.00		
Previous stillbirth							
No	405	217	1.00				
Yes	55	19	0.46	0.009			
No. of pregnancies♣			0.85	0.001			
No. of deliveries♣			0.84	0.002			

Note: ♣ : continuous variables

Table 9 Comparison of outcome variables before and after the intervention and the total proportional difference between intervention and control arms

ANC use pattern	Intervention			Control			Proportional change difference	95% CI**
	% Before n = 212	% after n = 127	p-value*	% before n = 248	% After n = 190	p-value*		
Overall ANC use	49	78	< 0.001	54	64	0.035	0.19	0.13–0.24
ANC visits ≥4 visits	17	49	< 0.001	22	28	0.148	0.26	0.21–0.31
Visit at health centre at least once	21	61	< 0.001	12	28	< 0.001	0.24	0.17–0.30

* p-value from Z-test

** CI: confidence interval

Table 10 Proportional ANC use patterns stratified with probable confounding factors

ANC use		Overall ANC use			ANC visits ≥ 4 times			ANC visits at health centre		
Pattern stratified variables	N	Before	After	Pre-post diff.	Before	After	Pre-post diff.	Before	After	Pre-post diff.
Educational level										
Illiterate										
Intervention	162	0.40	0.73	0.33	0.15	0.53	0.38	0.19	0.55	0.36
Control	92	0.42	0.41	-0.01	0.16	0.18	0.02	0.14	0.14	0
P-value				< 0.001			< 0.001			< 0.001
Primary										
Intervention	115	0.51	0.85	0.34	0.12	0.56	0.44	0.14	0.67	0.53
Control	162	0.44	0.67	0.23	0.18	0.31	0.13	0.09	0.30	0.21
P-value				0.044			< 0.001			< 0.001
Secondary or higher										
Intervention	62	0.66	0.79	0.13	0.34	0.63	0.29	0.37	0.67	0.30
Control	184	0.66	0.76	0.10	0.28	0.32	0.04	0.14	0.35	0.21
P-value				0.510			< 0.001			0.147
Ethnic groups										
Lao Lum										
Intervention	191	0.50	0.78	0.28	0.22	0.50	0.28	0.21	0.60	0.39
Control	395	0.53	0.65	0.12	0.23	0.29	0.06	0.08	0.27	0.19
P-value				< 0.001			< 0.001			< 0.001
Other ethnic groups										
Intervention	148	0.46	0.78	0.32	0.11	0.47	0.36	0.20	0.61	0.41
Control	43	0.59	0.50	-0.09	0.18	0.25	0.07	0.55	0.31	-0.24
P-value				0.003			< 0.001			0.042
Husband's education level										
Illiterate										
Intervention	88	0.51	0.73	0.22	0.20	0.43	0.23	0.18	0.59	0.41
Control	71	0.53	0.43	-0.10	0.24	0.16	-0.08	0.15	0.19	0.04
P-value				0.043			0.011			< 0.001
Primary										
Intervention	115	0.36	0.74	0.38	0.08	0.34	0.26	0.14	0.53	0.39
Control	116	0.45	0.61	0.16	0.19	0.22	0.03	0.09	0.24	0.15
P-value				< 0.001			< 0.001			< 0.001
Secondary or higher										
Intervention	136	0.58	0.85	0.27	0.25	0.63	0.38	0.29	0.67	0.38
Control	251	0.58	0.72	0.14	0.23	0.36	0.13	0.13	0.33	0.20
P-value				0.002			< 0.001			< 0.001

5. DISCUSSION

The main findings of these four studies can be summarises as follows. Only half of the respondents had attended ANC during a recent pregnancy. The women were more likely to use the health services when they thought that it was useful. The awareness of where to obtain service was also an important factor for the utilisation of the services (Study I). The main reason for not utilising ANC was the inaccessibility to the health facility (Study III). Women perceived the pregnancy as a normal event that did not need medical care. Some women were not satisfied with the ANC services provided (Study I, III). The quality of the ANC was poor in terms of lack of basic equipment and the performance of the HCPs (Study II). After the implementation of the intervention, the ANC use in the intervention arm was greatly increased compared to the control arm, plus the frequency was improved by having ANC four and more times and also more commonly having ANC at the health centre (Study IV).

5.1. Perception on usefulness of ANC (Study I, III)

In order for an individual to utilise a service they must first believe that the service will benefit their and their unborn child's health (Thaddeus & Maine, 1994; Griffiths & Stephenson, 2001). A study in Thailand showed that the positive perception of ANC was associated with high knowledge about ANC services such as when they should have the first ANC, how many times, etc. (Iino et al., 2011). Therefore, the pregnant women's knowledge plays a very important role in the utilisation of ANC, as it encourages them to seek and accept ANC services. Our study found that women who perceived the usefulness of having ANC were more likely to seek that service. However, only 51% of the respondents utilised the ANC even though 65% of them reported that it was very useful. This implied that some women were not exactly aware of how the ANC might help to improve their health, as cited by some respondents: they did not made use of ANC because their pregnancy was normal. Previous studies have also revealed that lack of appropriate knowledge about the benefit of ANC and absence of health problems during pregnancy were the main reasons mentioned for not using ANC services (Tura, 2009; Harris et al., 2010; Ye et al., 2010). A study of Lubbock and Stephenson (2008) indicated that women's utilisation of the services was affected by the varying degree to which they received information such as from other women in the community, from health workers and partners. This implies that the appropriate knowledge of the women depended on the information accessed. However, the improvement of the knowledge is significantly influenced by the women's educational

background (Nuraini & Parker, 2005). Contrarily, the women who perceived ANC as useful still did not want to use the service if it had little to offer. As shown in our study, the quality of ANC services was sub-standard with inadequate essential basic equipment, and limited knowledge of HCPs.

5.2. Limited access to ANC and lack of awareness of existing services (Study I, III).

According to Gabrysch and Campbell (2009), accessibility is categorised into an economic accessibility and a physical accessibility. The economic accessibility refers to the relation between financial capability and costs of a facility delivery including transport costs. While directly affecting whether a woman can actually reach a facility, the anticipation of high costs will affect whether the decision is made in the first place. The role of household economic status on health services utilisation, an increased likelihood to underutilise ANC services along with the reduction of household wealth index, has been reported in various studies (Simkhada et al., 2007; Titaley et al., 2010; Ye et al., 2010). In our study, the economic status of the family significantly correlated with ANC utilisation only in the crude analysis but the correlation disappeared when controlled for other factors. However, the husband's occupation as salaried employee may be considered as a substantial financial supply for the family and it appeared to be one of the most significant determinants of ANC use. The effect of economy on ANC use was also expressed in the FGD study. The women mentioned that they did not go to the hospital because they were poor and had no money for transportation. Even though the women did not mention about the cost of receiving care, since the ANC services in Laos are free of charge, they might have to take into consideration the other costs such as the cost of medication and other supplies that they might have to buy before deciding to seek for ANC. Nevertheless, Griffiths and Stephenson (2001) pointed out that the socioeconomic status was not a barrier to the service use when women perceived the benefits of the service to outweigh the cost, and when the service was within the reasonable distance of their place of residence.

Physical accessibility such as place of residence, distance and transport has been shown to also affect the decision of the women to use the health care service (Gabrysch & Campbell, 2009). In our study, there was a slight difference in proportion of ANC use between women living in villages with a health centre (54%) and women in non-health centre villages (48%). For every extra kilometre of distance to a health centre, 10% of

the pregnant women abstained from visiting ANC and 73% of women who used public transport were less likely to use the services than those living within walking distance or those who arranged their own transportation (car or motorcycle). Our finding was similar to previous studies, which noted that a greater distance to health centres (Alexandre et al., 2005; Nielsen et al., 2001; van Eijk et al., 2006), and place of residence such as rural setting (Furuta & Salway, 2006; Tura, 2009; Titaley et al., 2010) significantly reduced the number of ANC visits among mothers who decided to seek care.

The information on where to access the services is important for their utilisation. A study in Bangladesh (Islam et al., 2009) pointed out that the availability of services in a community did not necessarily reflect the care-seeking behaviour unless the awareness about the available services among potential clients was increased, and in order to enhance the use, the available service option should be publicised among people in the community. Our study identified that the women were more likely to use the ANC service if they knew that the health centre provided the service. This lack of knowledge presents a fundamental barrier to increasing the ANC utilisation and can be linked in part to HCPs who failed to provide any appreciable information for women. As pointed out in the FGDs, the HCPs did not inform women that they should have ANC when they got pregnant or where to get consultation if any pregnancy complication occurred. In such cases, women were often left to draw upon their own beliefs rather than understand the biomedical reasons of the complication and the importance of seeking medical care.

5.3. Limited knowledge on pregnancy complications among women (Study III)

As indicated in other studies, apart from economic issues, transportation and quality of care, lack of awareness of the danger signs of complications during pregnancy contributed to harmful delays of women and families in the decision to seek care (Thaddeus, & Maine, 1994; Kyomuhendo, 2003). Killewo et al. (2006) also cited that the reason for delay was due to the inability to judge the gravity of the situation. In our study, the women were not aware of the pregnancy-related complications and most of these were interpreted as normal when expecting a baby. Symptoms such as oedema were a natural phenomenon for pregnant women and it would disappear after delivery. The lack of awareness of risks during pregnancy might be due to underutilisation of ANC services. Pembe et al. (2009) noted that besides age and multiparity, visiting

ANC more than four times increased the awareness of danger signs of complication during pregnancy. However, this may not be true for ANC visit in Laos, based on the finding from our study, because the HCPs spent very little or no time to educate women.

5.4. Social status of the Lao women (Study III)

In Laos, men and women work side by side, equally sharing the responsibilities. Men and women spend similar amounts of time on agricultural work, but men spend more hours on income-generating activities. Women play a critical role in agriculture and the use of natural resources, and are primarily responsible for maintaining their families' food security such as planting the seeds and collecting non-tradable food products. In addition to their work in farms and within the household, women are involved in informal small-scale income-earning activities and handicrafts production to supplement their family incomes. Men are described as the heads of the households representing their families at all official meetings to discuss village development activities. About 80% of the labour forces are women. Unfortunately, due to the low level of gender awareness in society, women's position is often neither visible nor valued (GRID, 2005). However, more than half of our respondents (52%) were members of the Lao Women's Union, which has the role of promoting and protecting women's rights. Moreover, in Laos, traditional gender norms give women the responsibility for the children and the household, including health care and ensuring the immunisation of the children (GRID, 2005). Hence, there is no wonder that, from our finding, women made the decision by themselves regarding the choice of care, with either support from their husbands or not at all. This was contradictory to a study in India, which indicated that the husbands in most cases decided about where to have care (Singh & Arora, 2008). Similarly, a study in Ethiopia found that the husband's approval had a major effect on prenatal care utilisation (Biratu & Lindstrom, 2000).

5.5. Lack of ANC equipment at health facilities (Study II)

Our findings indicated that the studied health centres lacked basic equipment for providing ANC services. As mentioned before, this might contribute to the underutilisation of the services. This was demonstrated by Fort and Voltero (2004) who noted that lack of equipment contributed to the low utilisation of ANC services among women. A study in Vietnam mentioned that although clients may not be able to evaluate whether a specific technical procedure is appropriate, they can, however,

assess quality according to the availability of medical equipment and behaviour of the health staff dealing with it (Duong et al., 2004). Other studies have noted that lack of equipment also has a negative impact on the HCPs' performances since the providers had to struggle with this deficiency on a daily basis (Rowe et al., 2005; Gross et al., 2011) and this might have a negative impact on their work motivation (Mathauer & Imhoff, 2006; Willis-Shattuck et al., 2008; Manongi et al., 2006). The impact of lacking equipment on HCPs' performances and their motivation to work was also found in our study. The ANC services of HCPs were poorly performed and some of them were dissatisfied with their current work. According to the observation, the HCPs did not perform all the imposed duties of ANC services. This can be interpreted as either that they had limited skills or they were not able to give the service due to lack of equipment.

5.6. Limited knowledge among health care providers (Study II)

The results from our exploratory study indicated that the knowledge of ANC among HCPs was limited. They had no additional training after graduation. They lacked adequate knowledge on how to report the risks of pregnant women. This finding was confirmed by the observation of ANC consultations, which revealed that the provision of ANC services was not fully performed, and there was no supervision from skilful staff or superiors. Our study provided the evidence that unskilled HCPs were left without support of their colleagues, not only to deal with a high workload but also to handle cases for which they were not trained. This raises questions about the ability of HCPs to carry out the quality services for the women. Other studies have indicated that education and training opportunities have a strong motivating effect (Dieleman et al., 2003; Manongi et al., 2006), which enables HCPs to take on more demanding duties and to achieve personal goals of professional advancement (Mathauer & Imhoff, 2006). Providing HCPs with prospects for training and career development not only has the potential to improve their skills but might additionally result in a positive spill-over effect of increased motivation to work in rural settings (Manzi et al., 2004). It is hopeful that if the knowledge of HCPs at health centres was improved, it would eventually benefit women in rural Laos.

Our study also found that, besides a lack of training, the HCPs had no way to maintain their ANC skills due to excess workload of other activities and due to the limited number of pregnant women to whom to provide their services. Previous studies had

shown that excess workload among ANC providers led to poor quality of services (Shelton, 2001; Shahidzadeh-Mahani et al., 2008) and sparsely visited services mean a lack of everyday practice making it unlikely to maintain the skills and to improve the performance (Fort & Voltero, 2004).

5.7. Lack of support from superiors (Study II)

Our exploratory study indicated that in order to improve the ANC services the HCPs need more support from the senior staff from a higher-level health department, colleagues and the community. The attention from superiors could result in the improvement of ANC services in terms of providing more knowledgeable staff, sufficient supply of equipment and a chance to improve the knowledge. Dieleman et al. (2003) pointed out that to achieve better staff motivation, besides financial incentives, attention should be paid to incentives that show appreciation and respect from superiors and colleagues and which could be achieved through performance management (supervision, training, performance management and career development) and feedback from the community. A study in Armenia emphasised that receiving recognition from the employer, client or community was the factor most strongly associated with the prenatal care performance of HCPs (Fort & Voltero, 2004). In a context of economic hardship affecting fair and prompt payment of salaries to HCPs or some HCPs working voluntarily without payment such as in Laos, non-monetary incentives in the form of recognition, in-kind contributions, community respect and assistance with the services can become powerful motivations to enhance the performance of HCPs.

5.8. Impacts of intervention on antenatal care use pattern (Study IV)

The results after intervention showed that the primary outcome (overall ANC use) had an absolute increase of 19%, and the two secondary outcomes of 1) four or more visits increased by 26% and 2) at least one visit to a health centre increased by 24%. Our intervention strategy was the combination of improving the quality of ANC services by supplying basic ANC equipment and by a refresher course to HCPs and by increasing awareness in the community by regular meetings among villagers. Even though we could not prove that the improved ANC use pattern among “exposed” villagers was due to our strategy, to our knowledge, there were no major national campaigns or other major interventions by NGOs or donors during this period in any of the participating districts. However, a systematic review of maternal health interventions in resource-limited countries indicates that no single “magic bullet” intervention exists for

reduction of maternal mortality. Integrating multiple interventions is more likely to have significant impact on maternal outcome (Nyamtema et al., 2011). The advantage of our strategy consisted of the facilitators, the head of the villages or the head of Lao Women's Union (see also 1.4.6), who led all activities in the villages and who most of the villagers trusted. To involve community leaders and decision makers was also successful in decreasing maternal mortality in Nepal (Manandhar et al., 2004), and in increasing ANC use and birth in health facility in Eritrea (Turan et al., 2011). In our study, with the support of HCPs from the health centres, the facilitators led the group of villagers and discussed pregnancy-related problems in the meeting. This community-centred process might also be one of the factors that made women confident in the message received from the facilitators, leading to the ANC utilisation pattern in the intervention arm in our study. Involving men in the group meeting might also have contributed to the effectiveness of the intervention since husbands might encourage women to seek care during their pregnancies. A study in Nepal also showed that including husbands in antenatal health education enhanced women to use the services and to prepare for birth (Mullany et al., 2007).

5.9. Methodological consideration

In this thesis, both quantitative and qualitative methods were adopted. Such a design was chosen as it was considered that the key issues could be satisfactorily addressed only by means of using mixed methods. This approach was considered to be advantageous as it incorporated different paradigms. The quantitative method helps us to count and analyse the data statistically while the qualitative method discovers, categorises, defines and interprets differences between objects (Dahlgren et al., 2004). Therefore, mixing quantitative and qualitative methods brought different kinds of knowledge to the area of ANC utilisation among pregnant women. Thus, quantitative analysis of questionnaire data was used whenever a large sample of the group was studied, whereas the qualitative approach was used whenever an in-depth elucidation was the aim.

5.9.1. Quantitative methods

In quantitative research, terms such as internal validity, reliability and external validity (generalisability) are mostly used to judge if the findings are worth believing.

Internal validity

Internal validity implies the validity of the inference for the study population. Three main types of bias may threaten validity in a study: selection bias, information bias and confounding (Gordis, 2000). We believe that the selection bias should not be a serious problem in our studies, because we recruited the sample from different economic settings, and all eligible studied samples were included in the study, except four women who were not available (Study I).

Two sources of information bias should be considered: interviewer bias and reporting bias. We used interviewer-administered questionnaires in Studies I and IV. The interviewers might influence the respondents to answer in the way they think supports the purpose of the study. However, we tried to minimise this bias by training the interviewers thoroughly and by supervising the field work. After the end of every interview day, all questionnaires were checked by the field research team to make sure that they were fully completed and correctly filled in. In addition, questionnaires were tested and revised before collecting data to make sure that all questions were clear to the respondents. Reporting bias cannot be excluded. Women may either forget or report behaviours that would please the interviewer. Some women had obtained ANC eight to twenty months (Study I), and some had ANC more than twelve months (Study IV) prior to the interview, and consequently recall bias could occur. However, to minimise the recall bias in Study IV, the verbal responses were validated from the pregnant women's own record books from two-thirds of the women in the intervention arm and from every fourth women in the control arm, through information from the pregnant women's own ANC record books. Among the record holders, 9% in the intervention area and 3% in the control area under-reported the actual number of visits by one or two, while 13% in the intervention area and 24% in the control area exaggerated their utilisation by one or two visits.

Identification and measurable confounding factors were controlled by using stratified analysis (Study IV) and logistic regression analysis (Study I).

Reliability

Reliability is concerned with whether the results are replicable. It is the consistency of the measurement or the degree to which the instrument measures the same thing each time it is used under the same condition with the same subjects (Rothman, 2002). In

Studies I and IV, we used a questionnaire specifically designed to meet our study requirement. We pretested our interview-administered questionnaire and it was established that each time it was administered, it was understood the way we expected. Thus, the results can be reproduced using a similar tool and methodology.

External validity

External validity or generalisability refers to the degree to which results of the study or systematic review can be applied in other settings or contexts (Rothman, 2002). Another term, which has been used, is applicability. We believe that our findings provide useful information to support planning of future interventions to improve ANC use in rural Laos and also for rural settings in other low-income countries.

5.9.2. Qualitative methods

Trustworthiness

The different aspects of trustworthiness in qualitative research include credibility, dependability and transferability (Graneheim & Lundman, 2004).

Credibility

Credibility (internal validity) deals with the focus of research and refers to how well aim, data and analysis fit together. The credibility of our results was enhanced through a thorough analysis and through verification of the transcripts with a co-author to ensure the consistency of the transcribed content. Then one author coded the interviews and the others took part in discussions on the emerging codes, categories and themes until consensus was reached.

Dependability

Dependability has to do with whether the process of research is logical, traceable and clearly documented. This was achieved through clear documentation of all steps and extensive deliberations of the research team throughout the research period. The dependability was assured by CM carefully taking the steps of research while having an on-going dialogue with the co-authors, by including trained research-assistants and by using a well-prepared inquiry-guide.

Transferability

There is a substantial difference between transferability in qualitative inquiry and the concept of generalisability. Since individual subjective meaning is central for qualitative inquiry, findings are not seen as facts that are applicable to a population at large, but rather as analytical descriptions or theories that can be applied within a specified setting and can enhance our understanding of a certain phenomenon (Tobin & Begley, 2004). From this perspective, the opinions of the HCPs in Study II need to be understood against the background of the study setting. The results are strengthened by a clear description of the data collection procedures, the setting and process of analysis; we believe that the findings can also be applicable in other rural low-income settings.

Reflexivity

Reflexivity refers to how knowledge is shaped by the researcher and how this is accounted for in the research process (Angen, 2000). Reflexivity starts by identifying the preconceptions brought into the project by the researchers, representing previous personal and professional experiences, pre-study beliefs about how things are and what is to be investigated, and the motivation and qualifications for exploration in the field (Stige et al., 2009). If reflexivity is thoroughly maintained, personal issues can be valuable sources for relevant and specific research. However, the investigator should take care not to confuse knowledge intuitively present in advance, embedded in preconceptions, with knowledge emerging from inquiry of systematically obtained material. This situation can be avoided by a declaration of beliefs before the start of the study. Being Lao, I understood the culture and had notions about how things should be. In many ways, there are similarities in the nurture we had and the study population had. However, my research team included the lecturer at the university and belonged to a different social class where education is of utmost importance. Probably, our backgrounds did not influence the research process but being outsiders may somehow have some influences. By including the government officer who holds a prestigious status in Laos, my team was welcomed and well accepted. During data collection, the participants referred to me and the members of my team as “Than Mor” (doctor). According to our status, I feared that the participants would not be transparent about their concerns or might refuse to discuss anything negative in relation to ANC services at the health facilities, , which might lead to biasing the results. However, I gained the trust from the participants by informing them about confidentiality and started the discussion on general issues such as their lives, their families, their children or their

work. Once they engaged in discussion, they became focused on the questions and reacted positively to our teams. Moreover, my team was introduced to the communities through HCPs from the district hospitals and health centres, who were working closely with the communities. Some were even residents of the villages. This facilitated our entry into the communities and helped to build a trusting relationship with the respondents. However, my team visited the same villages several times after we started the project. Therefore, we were no strangers to them. The trust was reflected in the eagerness to share the experiences even with a male assistant.

5.10. Implications for future research

Based on the research findings presented in this thesis, the following topics are recommended for future research:

1. Investigate the prevalence and determinants for pregnancy-related problems in rural Laos.
2. Explore barriers in communication between women and HCPs in ANC services.
3. Investigate factors influencing ANC use in different ethnicities in Laos.
4. Explore men's perceptions regarding ANC services in rural Laos.
5. Investigate TBAs' performance and their perceptions about ANC services.
6. Compare pregnant women's satisfaction with the HCP services and those of the TBAs.
7. Implement and assess the intervention strategy developed in this thesis on a larger scale.
8. Run a longitudinal study to monitor the sustainability of the intervention.

6. CONCLUSIONS AND RECOMMENDATIONS

- The main factors influencing ANC utilisation in rural Laos were information on ANC services, perceived usefulness of attending ANC, accessibility to health facility, positive attitude towards the HCPs' performance and husbands' occupation. The findings indicate that there is a need to increase the awareness of the women on the usefulness of having ANC during child bearing as well as a campaign to inform women where the ANC services are available.
- Husbands did not take an active part in the decision-making regarding ANC use of the women. Therefore, men should be included in the ANC campaign or be encouraged to attend the ANC services with their wives in order that they will understand more about potential risks for pregnant women.
- Traditional beliefs and customs were applied to prevent pregnancy-related problems from occurring. Hence, the HCPs should be informed about the beliefs regarding pregnancy of different ethnicities in order to promote them to use the ANC services and provide the services efficiently.
- The pregnant women applied various methods (a combination of traditional and Western medicine) to deal with pregnancy-related problems depending on their and other people's experiences. The health education and promotion campaign should emphasise the useful methods and identify those that may be harmful.
- The health centres' infrastructure and basic equipment for ANC services were sub-standard. In order to improve the quality of ANC services at the health centres, it is necessary to supply basic ANC equipment as well as essential drugs for pregnant women to all health centres in Laos.
- Health care providers at health centres had limited knowledge and skills. For a successful project to improve the quality of ANC services, in-services training should be organised for HCPs to upgrade their knowledge.
- A low-cost community-based intervention with support and reinforcement of antenatal care utilisation increased the ANC utilisation concerning coverage, having at least four visits per pregnancy, and having health centre-based ANC in the piloted area. This kind of intervention should be implemented on a larger scale to test its effectiveness and its sustainability.

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