

Predicting factors for the experience of HIV testing among women who have given birth in Cambodia

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SUMMARY

HIV testing and counselling is an entry point for the prevention of mother-to-child transmission of HIV (PMTCT) services, and it is important to determine predictors for HIV testing to improve the acceptance of HIV testing. The aim of this study was to assess predictive determinants for HIV testing asking mothers who had already given birth. Mothers who came to a childhood immunization in Phnom Penh, Cambodia with a child (children) aged 6-24 months were randomly selected in January and February 2006. A cross-sectional survey with a semi-structured questionnaire including a question about the experience of HIV testing was conducted to the mothers at the clinic by trained interviewers. Of the 315 respondents, 193 mothers (61.3%) had ever been tested for HIV and 265 mothers (84.1%) showed the necessity of permission by partners before HIV testing. In a multivariate logistic regression analysis, basic knowledge about HIV transmission [adjusted odd's ratio (aOR): 2.875, 95% CI: 1.668-4.956] as the best predictor, the number of children (aOR: 2.186, 95% CI: 1.241-3.852) and partner's education level (aOR: 1.950, 95% CI: 1.044-3.641) remained statistically significant, however the necessity of permission by partners did not (aOR: 1.691, 95% CI: 0.859-3.328). Since some mothers ever tested might have obtained the permission with the perception of their partners before tested, it should be still highlighted that involvement of partners is an important strategy. Education on HIV transmission to young women and men through communication and health education strategies involving partners seems to lead PMTCT services to be more acceptable.

Key Words: HIV test, PMTCT, Cambodia, predictors

Introduction

Knowing HIV status through voluntary counselling and testing (VCT) services is essential to preventing new HIV infections and accessing to care, support and treatment for people living with HIV/AIDS. However, the challenges toward the implementation of programmes for the prevention of mother-to-child transmission of HIV (PMTCT) include the low acceptance of HIV testing among pregnant women. The acceptance rates of VCT by pregnant women

in PMTCT services varied between 33 and 95% in developing countries (1). At antenatal care (ANC), PMTCT services such as counselling and testing are offered pregnant women as part of the services and uptakes of pre-test counselling, HIV testing and post-test counselling affect the efficiency of PMTCT programme implementation. Since the proportion of women living with HIV/AIDS globally continues to grow (2), it is important to assess the willingness and the barriers for women to be tested for HIV in order to increase the acceptability of PMTCT services.

Cambodia has the highest HIV prevalence rate in Asia, 1.6% in 2005 (3), and approximately 130,000 Cambodian people are estimated to be living with HIV/AIDS whereas fewer than 10,000 are aware of their status (4). Although the HIV incidence of sex

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workers and policemen successfully decreased from 1999 to 2002 in Cambodia, the incidence of HIV among pregnant women in ANC has not declined (5). Under the national policy of the Ministry of Health (6), a pilot of the National PMTCT programme using a single dose nevirapine regimen (7) commenced with technical and financial support by JICA and UNICEF (8,9) in 2001 and the programme has been being scaled up to rural areas by training health personnel such as midwives to be counsellors. The target population of the programme is not only pregnant women living with HIV/AIDS also those who are not infected for the primary prevention. Thus, pre-test counselling, HIV testing and consequent post-test counselling play important roles in the programme. Despite high initial willingness to be tested for HIV, the acceptance of HIV testing among pregnant women was not as high as expected at the beginning of the programme because many women wanted to talk with their partners to obtain the permission by them for being tested before accepting the test (10). However, the involvement of their partners in the PMTCT services by inviting them to group health education in ANC and using IEC materials to make them understand more about the services significantly increased the acceptance (11). Thus it is necessary to assess whether the permission by their partners was really a barrier and a predictor of decision making to be tested for those who experienced HIV testing and what else could be predictive factors after starting the involvement of their partners.

Most of studies determining barriers and predictors to participate in PMTCT services were conducted on pregnant women at ANC settings in many developing countries. However, no studies carried out on mothers who had already given birth have been reported to assess predictors to receive HIV testing. The aim of this study was to assess the association between the experience of HIV testing and social factors including the permission of their partners for HIV testing, and predictive determinants to be tested by asking mothers who had already given birth.

Materials and Methods

A cross-sectional survey with a semi-structured questionnaire was conducted at a childhood immunization clinic of the National Maternal and Child Health Center (NMCHC) in Phnom Penh, the capital of Cambodia in January and February 2006. Mothers who came to the clinic with a child (children) aged 6-24 months were randomly selected and received information of the study before starting the interview. Before taking part in the study, informed consent was obtained by the interviewers who were trained in the questionnaire and the objectives of the study, and face to face interviews were administered by the interviewers in Khmer language (the most common language in

Cambodia).

Items asked in the questionnaire were experience of HIV testing as a dependent variable, socio-demographic characteristics, necessity of the permission by their male partners for HIV testing and basic knowledge on the transmission of HIV as independent variables. All the items were verbally answered by the respondents. Place of ANC and delivery were asked about their last pregnancy. The knowledge was also measured by asking questions about the possibilities of "HIV transmission via mosquitoes", "mother-to-child transmission of HIV" and "transmission by kissing or hugging". The number of questions each mother answered correctly was totalled to score the knowledge of the mother and those mothers who scored full mark were regarded as having basic knowledge on transmission of HIV.

Data was processed and analyzed in SPSS 11.0 for Windows. Chi square tests were used to compare differences among various independent variables. The relative risks of possible risk factors were estimated by odds ratios (OR) and 95% confidence intervals (CI). Independent variables that had a significant relationship with dependent variables at the $p < 0.05$ level was selected and included in a multivariate logistic regression analysis.

Ethical clearance and approval of the study was obtained from the National Ethic Committee for Health Research in the Ministry of Health, Cambodia before starting the study.

Results

Three hundred and forty three mothers accompanied by their child aged 6-24 months were offered the study and 315 mothers (91.8%) who agreed to participate in it were interviewed. The mean age of the mothers and their youngest children were 27.5 years and 10.7 months, respectively (Table 1). Of the 315 mothers, 314 (99.7%) were married and 150 (47.6%) had one child only. Most of the respondents received ANC and were delivered at health facilities. One hundred and ninety three mothers (61.3%) had ever been tested for HIV and overall the majority of all the respondents thought it is necessary to obtain the permission by their partners for HIV testing.

In a univariate analysis, different variables were examined to determine significant association with the experience of HIV testing. The analysis shows that age of mothers ($p = 0.001$), the number of children ($p < 0.001$), place of ANC ($p = 0.007$), mother's education level ($p = 0.001$), partner's education level ($p < 0.001$), the necessity of partner's permission for HIV testing ($p = 0.016$) and basic knowledge on HIV transmission ($p < 0.001$) were significantly related between the mothers who had been tested and those who had never (Table 2). No statistically significant difference was found for the number of family members ($p = 0.148$) or occupation of

Table 1. Characteristics of the women in the study ($n = 315$)

Average Age (years) (SD)	27.5 (5.3)
Average Age of the youngest child (months) (SD)	10.7 (3.3)
Number of children	
One (%)	150 (47.6)
Two or more (%)	165 (52.4)
Marital status	
Married (%)	314 (99.7)
Single (%)	1 (0.3)
Average of family member (persons) (SD)	5.7 (2.1)
Occupation	
Housewife (%)	190 (60.3)
Government, private company or others (%)	125 (39.7)
Place of ANC	
Health facility (%)	302 (95.9)
Others (%)	13 (4.1)
Place of delivery	
NMCHC (%)	161 (51.1)
Other health facilities	123 (39.0)
Others (%)	31 (9.8)
History of HIV testing	
Ever been tested	193 (61.3)
Never	122 (38.7)
Need of permission by partner	
Yes (%)	265 (84.1)
No or I don't know (%)	50 (15.9)
Basic knowledge on HIV transmission	
Full mark (%)	206 (65.4)
Less (%)	109 (34.6)

mothers ($p = 0.738$).

In a multivariate logistic regression analysis, only the knowledge, the number of children and partner's education level remained statistically significant (Table 3). The knowledge was shown to be the best predictor of HIV testing [adjusted odd's ratio (aOR): 2.875, 95% CI: 1.668-4.956] and mothers who have only one child were more likely to have accepted HIV testing (aOR: 2.186, 95% CI: 1.241-3.852). Experience of HIV testing increased with high education of partners (aOR: 1.950, 95% CI: 1.044-3.641) as well while the necessity of the permission was not a significant predictor in the multivariate analysis. The odd's ratio of place of ANC in the last pregnancy was the highest but not statistically

Table 3. Multivariate logistic regression analysis of predictors to the experience of HIV testing

	Odd's ratio (95% CI)	p value
Age		
More than 27 years old (%)	0.633 (0.360-1.111)	0.111
27 years old and less (%)	1.000	
Number of children		
One (%)	2.186 (1.241-3.852)	0.007
Two or more (%)	1.000	
Place of ANC		
Health facility (%)	3.817 (0.903-16.129)	0.068
Others (%)	1.000	
Necessity of permission by partners		
Yes (%)	1.691 (0.859-3.328)	0.128
No and I don't know (%)	1.000	
Knowledge on HIV transmission		
Full mark (%)	2.875 (1.668-4.956)	< 0.001
Less (%)	1.000	
Education of mothers		
9 years and over (%)	1.367 (0.753-2.483)	0.304
Less than 9 years (%)	1.000	
Education of partners		
9 years and over (%)	1.950 (1.044-3.641)	0.036
Less than 9 years (%)	1.000	

significant.

Discussion

Our study targeting women who had given birth showed that the majority (84.1%) of the respondents thought the necessity of the permission by their partners and that age of mothers, the number of children, place of ANC, mother's education, partner's education, necessity of partner's permission for HIV testing and basic knowledge on HIV transmission were significantly associated with the history of HIV testing in the univariate analysis. Similar factors related to acceptance of VCT were previously reported such as education levels of pregnant women (12,13), knowledge (12-15), confidentiality (16), stigma (17,18), trust in the health care system (17), fear to the response of partners

Table 2. Comparison between mothers who have ever tested and never

	Ever tested ($n = 193$)	Never ($n = 122$)	Odd's ratio (95% CI)	p value
Age				
More than 27 years old (%)	60 (31.1%)	60 (49.2%)	0.466	0.001
27 years old and less (%)	133 (68.9%)	62 (50.8%)	(0.292-0.744)	
Number of children				
One (%)	108 (56.0%)	42 (34.4%)	2.420	< 0.001
Two or more (%)	85 (44.0%)	80 (65.6%)	(1.514-3.870)	
Occupation				
Housewife (%)	115 (59.6%)	75 (61.5%)	0.924	0.738
Others (%)	78 (40.4%)	47 (38.5%)	(0.581-1.471)	
Number of family members				
More than 5 (%)	82 (42.5%)	62 (50.8%)	0.715	0.148
5 and less (%)	111 (57.5%)	60 (49.2%)	(0.453-1.127)	
Place of ANC				
Health facility (%)	190 (98.4%)	112 (91.8%)	5.650	0.007*
Others (%)	3 (1.6%)	10 (8.2%)	(1.524-20.833)	
Necessity of permission by partners				
Yes (%)	170 (88.1%)	95 (77.9%)	2.101	0.016
No and I don't know (%)	23 (11.9%)	27 (22.1%)	(1.141-3.867)	
Knowledge on HIV transmission				
Full mark (%)	146 (75.6%)	60 (49.2%)	3.210	< 0.001
Less (%)	47 (24.4%)	62 (50.8%)	(1.979-5.207)	
Education of mothers				
9 years and over (%)	79 (40.9%)	27 (22.1%)	2.438	0.001
Less than 9 years (%)	114 (59.1%)	95 (77.9%)	(1.457-4.080)	
Education of partners				
9 years and over (%)	159 (82.4%)	75 (61.5%)	2.931	< 0.001
Less than 9 years (%)	34 (17.6%)	47 (38.5%)	(1.743-4.928)	

(19), and partner involvement such as the permission of partners (10,12) and the willingness to disclose test result to the partner (17). However, it should be highlighted that the rate of those mothers who showed the necessity of the partner's permission among the tested mothers was significantly higher compared to the rate among the not-tested while this was not anticipated before the study and that the necessity of the permission was not likely to be a determining factor in the multivariate logistic regression model. This result suggests that some mothers with experience of HIV testing in spite of the necessity of the permission probably might have obtained the permission with the perception of their partners about HIV testing and that the necessity of the permission cannot be a barrier to hamper the willingness to be tested in our setting. Accordingly, the finding that the education level of their partners was a predictor in the regression model is reasonable supposing that educated partners are more acceptable to HIV testing of their spouses. A study targeting primary school teachers in Tanzania (20) also found that the education level of their partners was significantly more likely to increase the history to be tested for HIV while one third of the samples included male respondents. In addition, the profession of male partners was indicated as the strongest predictor for the acceptability of HIV testing among pregnant women in a report from Rwanda (21). Thus, the importance of the partner's involvement in PMTCT services should be nevertheless stressed although the permission by partners was not likely to be a predictor for HIV testing. On the other hand, since the high prevalence of disclosure of HIV status to partners were reported in Cambodia (11), the issue of domestic violence by partners (22) after disclosure must be paid attention to (23) whereas most of the cases were reported in African countries (24-26).

In our study, the best independent predictor to the history of HIV testing was the basic knowledge on HIV transmission which was evaluated by asking only three simple questions while other knowledge such as one on HIV testing (12) or AIDS treatment was not included in our questions to minimize and simplify the questionnaire. This seems because the HIV testing policy for PMTCT in Cambodia adopts "opt-in" strategy. Mothers who have more knowledge could consider what benefit of HIV testing is and accept it. A study assessing the association between health literacy and HIV test acceptance in "opt-out" strategy found that low health literacy may not be a barrier to patients accepting HIV testing when recommended by a health care provider (27). Future studies evaluating determining factors of HIV testing experience should include more questions about HIV knowledge to investigate what message is needed and should be promoted through counsellors at health facilities and IEC strategies to increase the acceptability of HIV testing in PMTCT services.

The number of children was also an independent predictive factor of HIV testing in our mothers. The

finding that the mothers having one child only increased the uptake of HIV testing agrees with previous studies conducted for pregnant women in African countries (28,29). However, it was not clarified whether this was because mothers with two or more children were less likely to be informed on PMTCT or to be interested in HIV testing. PMTCT services in ANC should pay more attention to mothers who have ever given birth as well as primiparae of whom 79.2% want another child either soon or later (30).

To our knowledge, this was the first study to investigate predictors to the history of HIV testing among women who have given birth in Cambodia. It can be agreed that an ANC clinic is a good place to ask about willingness of HIV testing as an attitude but not suitable to ask the experience of HIV testing since some mothers might accept the test just before the delivery (31) or before the pregnancy. Therefore, the childhood vaccination clinic in Phnom Penh was selected as the study site. It was also considered easier to access women who have given birth, and the study in the childhood vaccination clinic in Phnom Penh could be more generalized to find the situation of the capital of Cambodia than studies conducted in ANC. The coverage of children who were vaccinated against any preventable childhood illnesses in Cambodia was estimated more than 90% (30,32), and this was higher than the coverage of ANC attendance in Phnom Penh that was 85% (30). Furthermore, Fujita *et al.* (33) estimated that approximately 30% of institutional deliveries in Phnom Penh were done in NMCHC while half of the mothers in the study had delivery in NMCHC.

This study, however, had certain limitations, since it was a cross-sectional health facility based study, so we cannot deny the possibility that the mothers interviewed originally had more interest in their own and families' health including HIV testing. In fact, the rate of deliveries at health facilities in our study was higher than other reports. The Cambodia Demographic and Health Survey report in 2005 (CDHS) (30) showed that it was 78.9% and Fujita *et al.* (33) estimated 84%. Thus, the application of the findings to other population in Phnom Penh still needs careful considerations. In addition, there is no doubt that studies targeting only mothers who came to a childhood vaccination clinic cannot include mothers who had abortion or still birth.

In conclusion, the results showed that the permission by male partners was not a predictor for HIV testing in our setting and that the best predictive factor for HIV testing among mothers who came to a childhood immunisation clinic with their children was basic knowledge on HIV transmission. Promotion of HIV knowledge to young women and men through communication strategies and health education by health care providers involving partners seems to lead HIV testing in PMTCT services to be more acceptable and involve more male partners in the services.

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References

- Cartoux M, Meda N, Van de Perre P, Newell ML, de Vincenzi I, Dabis F. Acceptability of voluntary HIV testing by pregnant women in developing countries: an international survey. *AIDS* 1998;12:2489-2493.
- UNAIDS/WHO. *AIDS Epidemic Update 2006*.
- UNAIDS. *Report on the global AIDS epidemic 2006*.
- Bith P. *AIDS in Cambodia*. *Lancet Infect Dis* 2004;4:482.
- Saphonn V, Parekh BS, Dobbs T, Mean C, Bun LH, Ly SP, Heng S, Detels R. Trends of HIV-1 seroincidence among HIV-1 sentinel surveillance groups in Cambodia, 1999-2002. *J Acquir Immune Defic Syndr* 2005;39:587-592.
- The ministry of health, the royal government of Cambodia. *National Policy on Prevention of Mother-to-Child Transmission of HIV 2000*.
- Guay L, Musoke P, Fleming T, *et al*. Intrapartum and neonatal single-dose nevirapine compared with zidovudine for prevention of mother-to-child transmission of HIV-1 in Kampala, Uganda: HIVNET 012 randomized trial. *Lancet* 1999;354:795-802.
- Kakimoto K, Fujita N. Technical assistance to the national programme for the prevention of mother-to-child transmission in Cambodia. *Technology and Development* 2004;17:32-39.
- UNICEF. *A UNICEF Fact Sheet 2002: Mother-to-Child Transmission of HIV*.
- Chheng TV, Kakimoto K, Fujita N, Chou TL, Poirot EP, Kanal K. Acceptance of Voluntary Counselling and Testing for Pregnant Women in New National Programme in Cambodia. 15th International AIDS Conference 2002, Barcelona, Spain, abstract D11227.
- Kakimoto K, Kanal K, Mukoyama Y, Chheng TV, Chou TL, Sedtha C. Influence of the involvement of husbands in the mother class with voluntary confidential counseling and testing acceptance for Prevention of Mother to Child Transmission of HIV Program (PMTCT Program) in Cambodia. *AIDS Care* 2007;19:381-384.
- Bajunirwe F, Muzoora M. Barriers to the implementation of programs for the prevention of mother-to-child transmission of HIV: A cross-sectional survey in rural and urban Uganda. *AIDS Res Ther* 2005;2:10.
- Lee K, Cheung WT, Kwong VS, Wan WY, Lee SS. Access to appropriate information on HIV is important in maximizing the acceptance of the antenatal HIV antibody test. *AIDS Care* 2005;17:141-152.
- Wu Z, Rou K, Xu C, Lou W, Detels R. Acceptability of HIV/AIDS counseling and testing among premarital couples in China. *AIDS Educ Prev* 2005;17:12-21.
- Hyodo C, Tanaka T, Kobayashi M, Shimizu M, Prueksunand P, Nitithamyong A, Jittawatanakorn J, Naka S. Factors affecting attitudes towards mother-to-child transmission of HIV among pregnant women in a maternal and child hospital in Thailand. *Int J STD AIDS* 2000;11:406-409.
- de Paoli MM, Manongi R, Klepp KI. Factors influencing acceptability of voluntary counselling and HIV-testing among pregnant women in Northern Tanzania. *AIDS Care* 2004;16:411-425.
- Castle S. Doubting the existence of AIDS: a barrier to voluntary HIV testing and counselling in urban Mali. *Health Policy Plan* 2003;18:146-155.
- Kalichman SC, Simbayi LC. HIV testing attitudes, AIDS stigma, and voluntary HIV counselling and testing in a black township in Cape Town, South Africa. *Sex Transm Infect* 2003;79:442-447.
- Maman S, Mbwambo J, Hogan NM, Kilonzo GP, Sweat M. Women's barriers to HIV-1 testing and disclosure: challenges for HIV-1 voluntary counselling and testing. *AIDS Care* 2001;13:595-603.
- Kakoko DC, Lugoe WL, Lie GT. Voluntary testing for HIV among a sample of Tanzanian teachers: a search for socio-demographic and socio-psychological correlates. *AIDS Care* 2006;18:554-560.
- Kowalczyk J, Jolly P, Karita E, Nibarere JA, Vyankandondera J, Salihu H. Voluntary counseling and testing for HIV among pregnant women presenting in labor in Kigali, Rwanda. *J Acquir Immune Defic Syndr* 2002;31:408-415.
- Garcia-Moreno C, Jansen HA, Ellsberg M, Heise L, Watts CH: WHO Multi-country Study on Women's Health and Domestic Violence against Women Study Team. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. *Lancet* 2006;368:1260-1269.
- Baiden F, Remes P, Baiden R, Williams J, Hodgson A, Boelaert M, Buve A. Voluntary counseling and HIV testing for pregnant women in the Kassena-Nankana district of northern Ghana: is couple counseling the way forward? *AIDS Care* 2005;17:648-657.
- Medley A, Garcia-Moreno C, McGill S, Maman S. Rates, barriers and outcomes of HIV serostatus disclosure among women in developing countries: implications for prevention of mother-to-child transmission program. *Bull World Health Organ* 2004;82:299-307.
- Maman S, Mbwambo JK, Hogan NM, Weiss E, Kilonzo GP, Sweat MD. High rates and positive outcomes of HIV-serostatus disclosure to sexual partners: reasons for cautious optimism from a voluntary counseling and testing clinic in Dar es Salaam, Tanzania. *AIDS Behavior* 2003;7:373-382.
- Temmerman M, Ndinya-Achola J, Ambani J, Piot P. The right not to know HIV-test results. *Lancet* 1995;345:969-970.
- Barragan M, Hicks G, Williams MV, Franco-Paredes C, Duffus W, del Ri C. Low health literacy is associated with HIV test acceptance. *J Gen Intern Med* 2005;20:422-425.
- Stringer JS, Sinkala M, Stout JP, Goldenberg RL, Acosta EP, Chapman V, Kumwenda-Phiri R, Vermund SH. Comparison of two strategies for administering nevirapine to prevent perinatal HIV transmission in high-prevalence, resource-poor settings. *J Acquir Immune Defic Syndr* 2003;32:506-513.
- Pignatelli S, Simpre J, Pietra V, Ouedraogo L, Conombo G, Saleri N, Pizzocolo C, De Iaco G, Tall F, Ouiminga A, Carosi G, Castelli F. Factors predicting uptake of voluntary counselling and testing in a real-life setting in a mother-and-child center in Ouagadougou, Burkina Faso. *Trop Med Int Health* 2006;11:350-357.
- National Institute of Public Health, the Ministry of Health Cambodia & National Institute of Statistics, the Ministry of Planning. *Cambodia Demographic Health Survey 2005 Preliminary Report 2006*.
- Samay M, Kruey LS, Glaziou P, Rekecawicz C, Leng C, Min DC, Delfraissy JF. Feasibility of antenatal and late HIV testing in pregnant women in Phnom Penh Cambodia: the PERIKAM/ANRS1205 study. *AIDS* 2002;16:950-951.
- WHO/UNICEF (2006). *Review of National Immunization Coverage 1980-2005*.
- Fujita N, Matsui M, Srey S, Po CS, Uong S, Koum K. Antenatal care in the capital city of Cambodia: Current situation and impact on obstetric outcome. *J Obstet Gynaecol Res* 2005;31:133-139.