

Formal and informal maternal health care: comparing the service provision of health facilities and village health volunteers in East Sepik Province

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SUMMARY

Maternal health across Papua New Guinea (PNG) is of extreme public health concern. In response, the National Department of Health explicitly prioritized improving maternal, neonatal and child health services, envisaging increased collaboration between the formal health system and community-based initiatives as one method for achieving this. This study examined the patterns of formal and non-formal service utilization during pregnancy and childbirth in one province. We analysed the activity database of the East Sepik Women and Children's Health Project's Village Health Volunteer (VHV) program, an informal health service in East Sepik Province of PNG, estimating VHV activity and coverage for two maternal health care services (first antenatal care visit and VHV-attended deliveries) and comparing these to the volume and estimated coverage of these services delivered by the formal health system in East Sepik over the years 2007 to 2010. We found a significant increase in women's utilization of VHVs for first antenatal care and for an attended delivery. Reported coverage of these services delivered by the formal health service declined or at best remained static over the same time period. Our data cannot illuminate the causes of an apparent and highly concerning decline in health facility usage for assisted delivery, nor the reasons for increased usage of VHVs. The factors contributing to these trends in service provision require urgent study, to improve our understanding of the drivers of utilization of critical maternal health services. Our study demonstrates that VHVs deliver a substantial proportion of maternal health services in East Sepik. This finding alone highlights the importance of considering this cadre when planning health service improvements and suggests that a national VHV policy that builds on the work of the National Health Plan in defining the most appropriate role for VHVs in maternal health care is long overdue.

Introduction

Maternal health indicators across Papua New Guinea (PNG) are of extreme public health concern. National maternal mortality rates in PNG are the highest in the Pacific region at 733 per 100,000 (1) (as reported by the government's most recent survey) compared to other Pacific Island countries

(eg, Fiji 210 per 100,000) (1). In the National Health Plan for 2011-2020 (1), the National Department of Health (NDoH) explicitly prioritized improving maternal, neonatal and child health, recognizing poor coverage and quality of existing rural health services. The Plan envisages increased collaboration between the formal health system and community-based initiatives, with community

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partners seen as having a prime role in encouraging families to use formal health services.

PNG has an informal, unpaid, cadre of trained lay health workers known as village health volunteers (VHVs) scattered across the country in extremely varied programs, usually run by non-government organizations (NGOs), each with their own unique history and objectives (2). The first attempt to standardize VHV functions was undertaken by the NDoH in 2002, but was not fully adopted into national health policy. The generic term 'village health volunteer' is an umbrella term for a variety of lay health workers, including village birth attendants who provide antenatal care and attend women during and after delivery, community-based distributors who mostly distribute family planning supplies, and 'marasin meri' and 'marasin man' who provide treatment for a range of common illnesses.

In East Sepik Province, the East Sepik Women and Children's Health Project (ESWCHP) was established by the NGO Save the Children in 1998. There has been a steady increase in the numbers of VHVs trained, and East Sepik Province now has more than 1200 VHVs. The aim of the ESWCHP is to improve basic health services in isolated locations where the permanent health system is unable to reach people. For care during pregnancy and childbirth, some VHVs are trained as 'village birth attendants'. Internationally, controversy remains regarding the role of VHVs in care during pregnancy and childbirth (3). Evidence indicates that skilled birth attendance in a health facility is safest for mothers and newborns. However, an estimated 60 million women per year worldwide, and some 60% of women in PNG, give birth at home or in the village (4,5). For these women, international evidence suggests that training VHVs can improve utilization of prenatal services and, when the VHV is linked to a health facility, improve skilled birth attendance and referrals for obstetric emergencies (3,6-8). In East Sepik, VHVs are trained to provide basic antenatal care, to encourage women to attend the health facility for subsequent antenatal care and childbirth, to identify and refer women who experience health concerns in the antenatal period, and to attend deliveries for those women who continue to deliver in the village. This last service is with the intention of earlier recognition and referral of women with

complications, although it is well recognized that referral is often extremely difficult and that VHVs have very few medical resources with which to manage complications themselves. VHVs trained as birth attendants receive an initial training period of four weeks using an adaptation of the 2002 NDoH training materials, followed by two weeks of practical placement at the provincial hospital, under supervision in the labour ward and the family planning/antenatal clinic. However, in cases of deliveries with complications, the ability of VHVs to provide adequate assistance is negligible.

Rarely are VHVs included in descriptions of health service coverage; however, a recently available database from ESWCHP makes this possible for East Sepik Province. This study examines the maternal health care provision by VHVs in East Sepik Province for two services: attendance of first antenatal care (ANC) visit and attended deliveries, defined as attendance during childbirth by a trained lay health worker (noting that this is not equivalent to the term 'skilled birth attendance'). We then compared these to health facility data. We aimed to describe the relative contribution over time by the VHV program to province-wide maternal health services.

Methods

Source of data – VHV database

The VHV activity database collating reports by ESWCHP VHVs provided VHV activity data. This database compiles VHV tally sheet reports, submitted on a monthly basis by each operating VHV. Tally sheet reports are similar in structure to those used by first-line health facilities. At the time of analysis, there were over 33,000 monthly reports submitted between 1998 and 2010, allowing for a detailed picture of VHV services and trends over time. Tally sheets are entered into a computer database maintained by Save the Children.

Data cleaning and analysis

VHV data were transferred from the Microsoft Access database to STATA version 10 for analysis. Data cleaning removed duplicate entries and those considered invalid (for example if date of data entry preceded date of collection) and standardized variable names. Summary indicators condensed

records to one summary line per year, district and catchment. This study provides analysis of only ANC visits and attended deliveries data, focusing on trends from 2007 to 2010. ANC and attended deliveries were then estimated as proportions of all pregnant women and all live births in the province respectively, using population estimates described below.

Estimation of population-based service delivery measurements

The estimated population sizes of each district for the years 2007 to 2009 were extrapolated from data included in the 2000 Census data, whilst population estimates for 2010 were sourced from the Monitoring and Research Branch of the NDoH. Total provincial population numbers were used to calculate estimated numbers of pregnant women and births across the whole province, using proportions derived from figures provided by the NDoH in the National Health Plan demographic annexes (estimated number of births = 3.9% of the total population; estimated number of pregnant women = 16% of the number of women of child-bearing age). These figures were used as denominators in the calculation of total provincial population-based service delivery for VHVs.

Source of data – health facility

Formal health facility data were derived from the coverage reports in the Annual Sector Review for East Sepik Province (Momase Region report) for 2006 to 2010, produced by the NDoH with data sourced from the National Health Information System (5). The report presents proportions as measures of coverage and does not include raw measures of activity nor information on how denominators were calculated.

Statistical analysis

Royston's test for trend in proportions was used to determine if there was a difference in the number of maternal health services provided over time by VHVs. Tests for significance were not performed on reported health facility proportions due to uncertainty regarding denominators utilized in their calculation by the NDoH. All reported p values are exact and for all analyses $p < 0.05$ was considered significant. All analyses were performed using STATA version 10 (StataCorp, College Station, Texas).

Results

Over the study period, the total number of VHVs reporting provision of care increased from 951 in 2007 to 1215 in 2010. In population terms, this represents one VHV per 429 people in 2007 and one VHV per 364 people in 2010. The total number of health facilities reporting to the National Health Information System remained constant.

Antenatal care visits (Figure 1)

The recorded number of women receiving their first ANC visit from a VHV increased from 898 in 2007 to 2407 in 2010. This represented an increase in coverage from 6% of the estimated pregnant women in 2007 to 15% in 2010. This trend was significant ($p < 0.001$). The reported coverage for health facilities decreased from 71% in 2007 to 55% in 2010. Figure 1 displays these services as a proportion of estimates of the total number of pregnant women in the province.

Attended deliveries (Figure 2)

The recorded number of women whose childbirth was attended by a VHV increased from 1207 in 2007, equivalent to 8.0% of estimated births, to 2272 in 2010, equivalent to 13.2% of estimated births. This trend was significant ($p < 0.001$). Reported health facility coverage of women attending a health facility for childbirth decreased from 28% in 2007 to 22% in 2010. Figure 2 displays these services as a proportion of estimates of the total number of births in the province.

Discussion

When our estimates of VHV services are examined in conjunction with coverage by formal health services, it is clear that the majority of women, approximately 65%, are missing out on attendance at childbirth, and a significant proportion, approximately 30%, are going without any antenatal care. These deficiencies in access to care are acknowledged as a major contributor to continuing high maternal mortality rates in rural PNG (1). The first conclusion to be drawn from our work is that increasing access to good-quality antenatal and childbirth care, including emergency obstetric care, must remain a national priority (9).

We found a significant increase in the

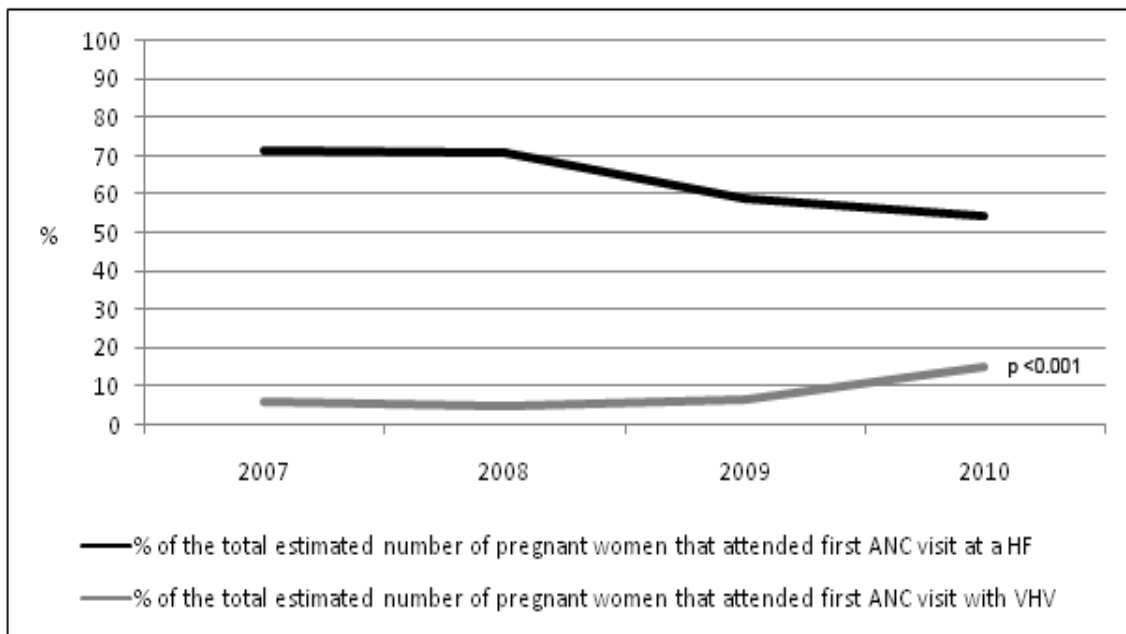


Figure 1. Proportion of the total estimated number of pregnant women in East Sepik Province attending first antenatal care (ANC) visit at a health facility (HF) or with a village health volunteer (VHV), 2007-2010.

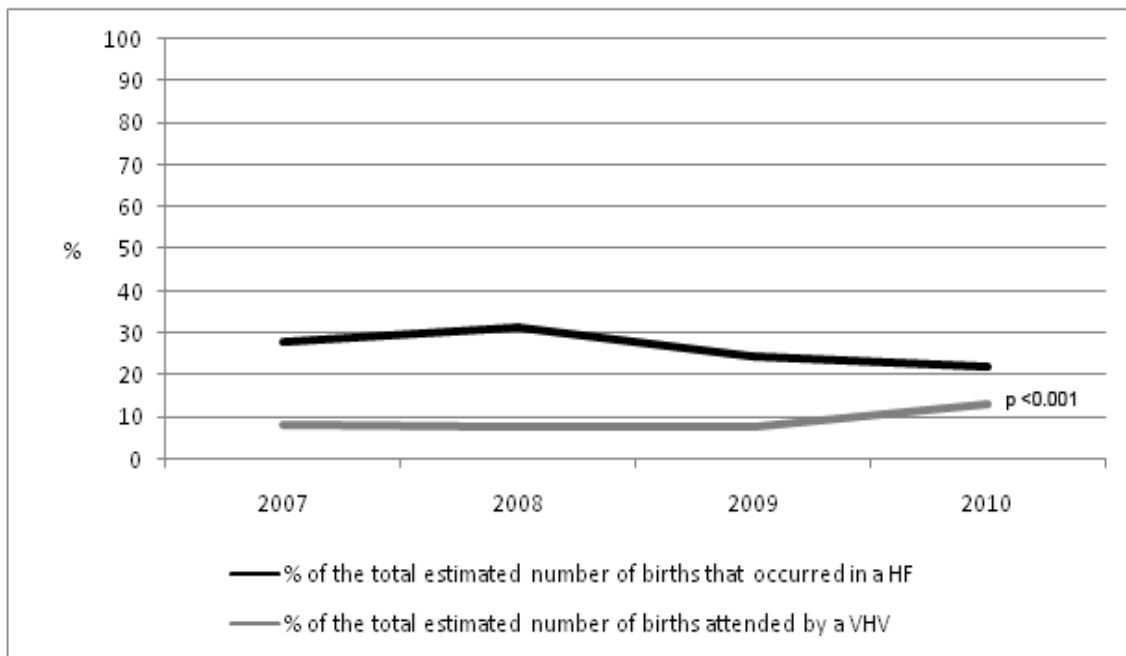


Figure 2. Proportion of the total estimated number of births in East Sepik Province attended in a health facility (HF) or by a village health volunteer (VHV), 2007-2010.

maternal health services that are being provided by VHVs in East Sepik Province: in the period 2007 to 2010 the proportion of all pregnant women receiving their first antenatal visit from VHVs has more than doubled and the proportion of all births assisted by VHVs has increased by more than half. This is likely to be at least partly attributable to the rapid increase in the number of trained VHVs in East Sepik over this time-frame. If VHVs are delivering services in accordance with their training and as intended by ESWCHP, the increase in volume of services delivered by VHVs should increase families' access to better information on pregnancy and childbirth and be accompanied by an increase in health facility usage. It is highly concerning, then, that health facility utilization over the same period declined, albeit by a small percentage and from an already low starting point. Our study cannot provide evidence, one way or another, to determine whether there is a direct causal link between these two changes. Also, because our estimates are for coverage across the whole province, while the VHV program focuses on specific areas within districts, it would be incorrect to deduce from our data that the increase in VHV activity has actually caused the decline in health facility usage.

Our findings contradict several international experiences where increased community-based care is accompanied by increased usage of health facilities for childbirth (10-12). East Sepik is a difficult environment, with dispersed communities and very limited transport infrastructure. It may be that women simply cannot reach formal health services and VHVs are perceived to be filling a gap in service provision. It is possible that both the NGO and communities feel that some degree of trained birth attendance is better than none at all, a perspective that is understandable even when this does not match with national maternal health policy. There may also be social or cultural barriers to childbirth in health facilities, possibly including a preference for VHVs over formal service providers. There is potential for VHVs to help overcome cultural and social barriers in support of facility-based childbirth, a role envisaged for them in national health strategies. Our study cannot illuminate these factors and there is an urgent need to pursue our findings further, perhaps through rigorous qualitative research in East Sepik Province, to better understand why families are not using health facilities. Finding

ways to redress this is of highest importance to reducing maternal mortality (9,13).

The ESWCHP has been able to generate a sizeable cadre of VHVs, with the potential to improve maternal health through provision of basic health promotion messages, identification of pregnancy complications and referral to a health facility for antenatal and intrapartum care. This success represents the mobilization of considerable community desire for better maternal outcomes. Through this, VHVs have increasing access to a significant proportion of women during pregnancy and childbirth. It is important that this cadre provide those evidence-based services proven to be the most effective in mortality reduction (2), and the best match for their training, mandate and supervisory support. The National Health Plan proposes that their major role is in education and health promotion (1); however, this study reveals that VHVs conduct roughly as many attended deliveries as they do first antenatal care visits. This suggests that greater provincial attention is needed to enable women to receive skilled birth attendance at health facilities and to reinforce the role of VHVs as promoters of health facility usage (both routinely and in referral). Where facility-based care is not feasible VHVs should be enabled to support families (such as by distribution of clean birth kits) and their potential role re-examined. For example, East Sepik may benefit from community distribution of other medicines, such as uterotonics for prevention of postpartum haemorrhage (14,15), under carefully monitored pilot activities.

This study makes use of an unusual NGO database collected at the grass-roots level. These datasets are important in PNG and rarely reported, but require significant time for data cleaning. These initial findings demonstrate the potential of further analysis of this dataset, and of others that may exist in VHV programs in PNG.

Lastly, this study demonstrates the importance of including the VHV cadre in health planning, and the urgent need to update national policy to standardize the roles and training of VHVs in relation to pregnancy and childbirth. Where VHV programs are active, district health planners will benefit from integrating them into health information, supervision and other systems. VHV program managers will also benefit from monitoring

trends, not only in VHV activities, but also in associated health facility usage. If such usage is static or declining, as is the case here, then broader health system strengthening is imperative. An extension to ESWCHP is taking up this challenge, investing simultaneously in both VHVs and first-level health facilities.

Limitations

The process used to collect ANC data in East Sepik Province is likely to result in some women being recorded as having received a first ANC visit from both a VHV and a health facility. Health facility staff are likely to record a pregnant woman as receiving first ANC even if that woman has previously received ANC from a VHV (which is why we did not sum these figures). More generally, there is the potential for inconsistent recording by VHVs on data entry sheets; some errors were excluded by our validity tests, but some may be impossible to eliminate. Lastly, accurate province-wide population denominators for all years under investigation were unavailable. Therefore, population projections based on Census data were used.

Conclusions

This study shows that, between 2007 and 2010, VHVs mobilized by ESWCHP delivered an increasing proportion of antenatal care and attended births in East Sepik Province, while health facility usage declined. A large proportion of women continue to miss out on any care, especially during childbirth. It is important that VHV services are considered during health service planning, that there is simultaneous investment in first-level health facilities, and that both health facility and VHV service activity are monitored and evaluated closely to make sure that their programs are in keeping with national health policy.

COMPETING INTERESTS

The authors declare that they have no competing interests. Initial analyses of the dataset were funded by Save the Children Australia; however, the organization had no role in the conduct or conclusions of this study.

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