Spatial Examination of Family Planning Provider Networks in Urban Nigeria

Introduction

The Nigerian Urban Reproductive Health Program (NURHI) aims to increase contraceptive use in four urban areas of Nigeria. While the program has a large demand generation component, other aspects of increasing family planning use are not ignored – such as improving contraceptive service delivery. Under the task of improving service delivery, NURHI has spearheaded the formation of a Family Planning Provider Network (FPPN) in each intervention city. The FPPN is an essential component of the NURHI program – as it allows the project direct access to family planning providers as a unit for training, training updates, exposure to other program areas as well as promoting the demand generation activities. The main goal of the FPPN is to improve referral patterns from non-clinical providers to clinical providers – to increase access to long acting and permanent methods of family planning. Approximately one quarter of all women using family planning currently access family planning from non-clinical providers, patent medical vendors (PMVs), in urban Nigeria.

The FPPN is a new entity in Nigeria. In order to understand the baseline FPPN members' service delivery biases and network structure – a baseline study was conducted. Studying the FPPN network structure is of interest as it sheds light on the opportunities and challenges associated with increasing referrals from non-clinical to clinical providers. In addition, studying provider bias along with the network structure is important as social networks are strong conduits of attitudes and beliefs. Studying both the network structure and level of bias affords us the ability to understand the role of these networks as conveyors of attitudes associated with provider bias.

Methods

Data on all registered FPPN members in Abuja, Ibadan, Ilorin, and Kaduna were collected in November and December of 2011. Consent was obtained from each study participant prior to data collection. Data were collected from study participants via a self-administered survey. The survey included questions on demographics, professional work history, personal family planning use, questions on biases towards provision of each type of contraceptive method, and identification of personal and professional network members within each city using a pre-populated census list of network members.

Responses to service provision biases questions for each contraceptive method, on age, parity, marital status, and partner's consent restriction, were summed to create an overall aggregate bias measure.

Network data were analyzed using Ucinet 6 software – attributes examined included sex, religion, workplace, profession, personal family planning use, and level of bias in service provision.

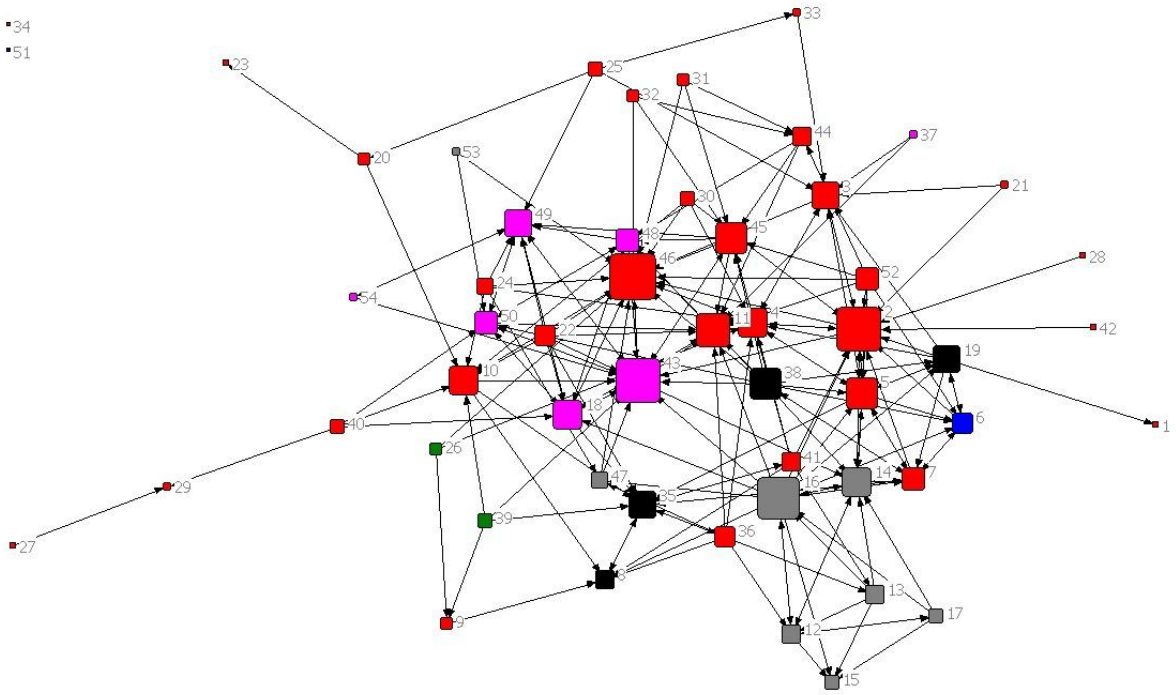
Results

Workplace

At baseline, there were a total of 294 FPPN members. Network members work at public hospitals, private hospitals, clinics, primary health centers, pharmacies, or patent medical vendors (PMVs). One quarter of the sample works at a public hospital, primary health center, or PMV. The remaining are at pharmacies (9%), other (8%), private hospitals (6%), or clinics (4%). Some patterns emerged across the four cities – private hospitals and clinics were often isolated in the network. PMVs and pharmacies were often well connected within facility type but poorly connected to other aspects of the network. Public hospitals, primary health centers, and others were often well connected in the network among all types of facilities. The Abuja FPPN network is displayed below as an example of these patterns. The only unique aspect in Abuja is the absence of PMVs; there are no PMVs in the Abuja network unlike the other three cities (see Figure 1).

Figure 1. Abuja FPPN Workplace

Public Hospital = Red
Private Hospital = Blue
Primary Health Center = Pink
Clinic = Green
Pharmacy = Grey
Other = Black



Profession

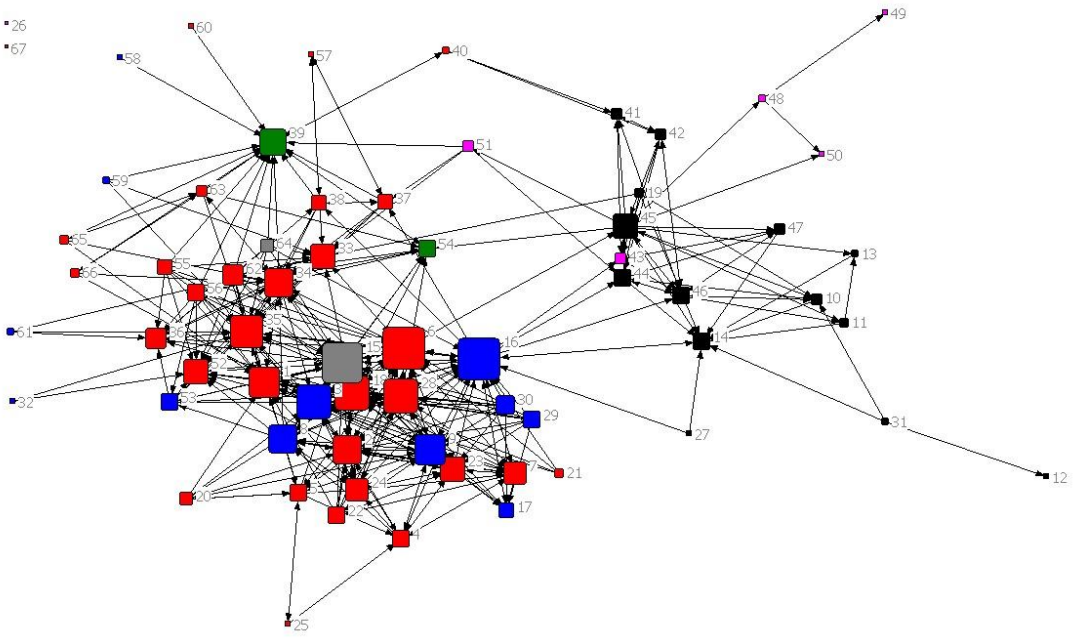
The majority professional in the FPPNs across all four cities is nurse-midwives, 45%, while doctors make up just 3% of the FPPN. The remaining network members are PMVs (24%), community health workers (CHW) (14%), pharmacists (9%), and others (5%). When examining the family planning networks in the four cities some patterns emerged: pharmacists are often well connected with each other but isolated

from other professional types. Doctors are often isolated and not well connected with each other. The two majority professional types in the networks, nurse-midwives and PMVs, are often well connected within but not across the networks. The connections between the PMV network and nurse-midwife network usually flows through one or two connecting individuals – the professional type of this flow differs by city – in Abuja, Ilorin, and Ibadan it is a nurse-midwife and a PMV or a CHW. In Kaduna, a male CHW is a key node (16) connecting the PMV network to the others – while another connecting node or is a doctor (54).

The separation of the PMV network from the nurse-midwife network is most pronounced in Kaduna. Also of note in Kaduna, the nurse-midwife network is connected to other professional types (CHWs, other), while the PMV network is not (see Figure 2).

Figure 2. Kaduna FPPN Professional Attribute

Green = Doctor
Red = Nurse-Midwife
Pink = Pharmacist
Black = PMV
Blue = Community Health Worker
Grey = Other

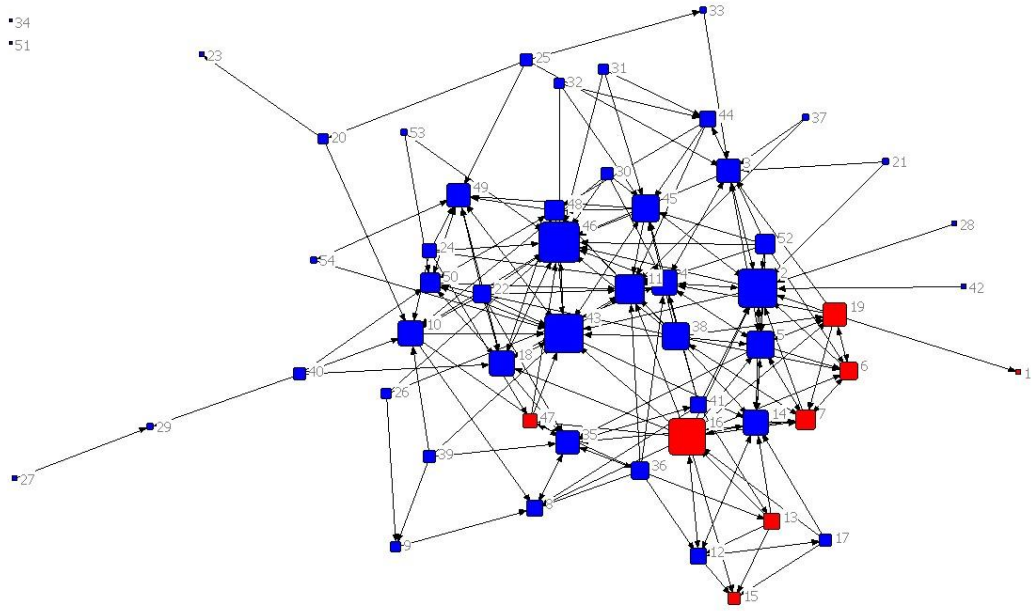


Sex

The majority sex of network members in all cities is female (71%). The minority members, males, are on the fringe of the network in Abuja (see Figure 3).

Figure 3. Abuja FPPN Sex

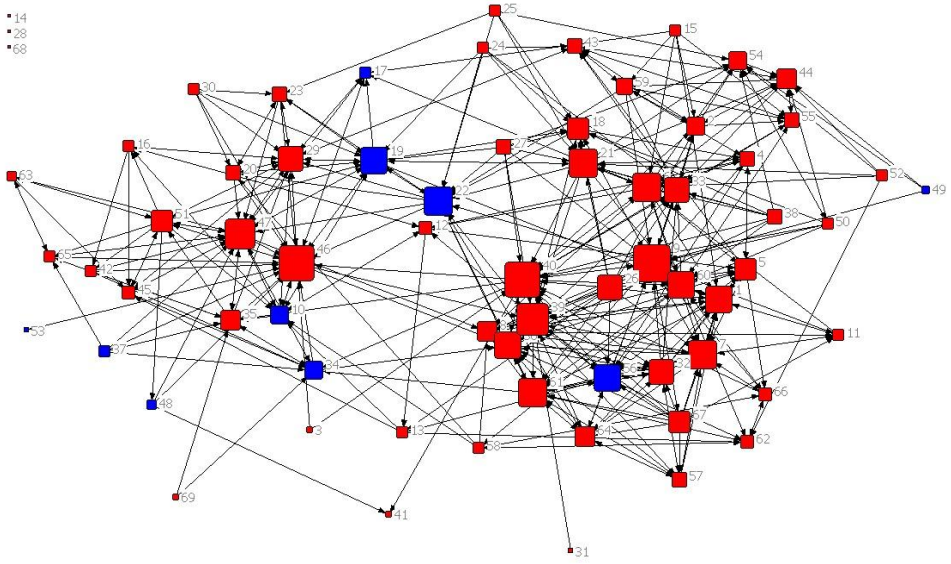
Red = Male
Blue = Female



While in Ibadan, two of the male members serve as connectors between the two main networks, PMVs and nurse-midwives (see Figure 4).

Figure 4. Ibadan FPPN Sex

Blue = Male
Red = Female

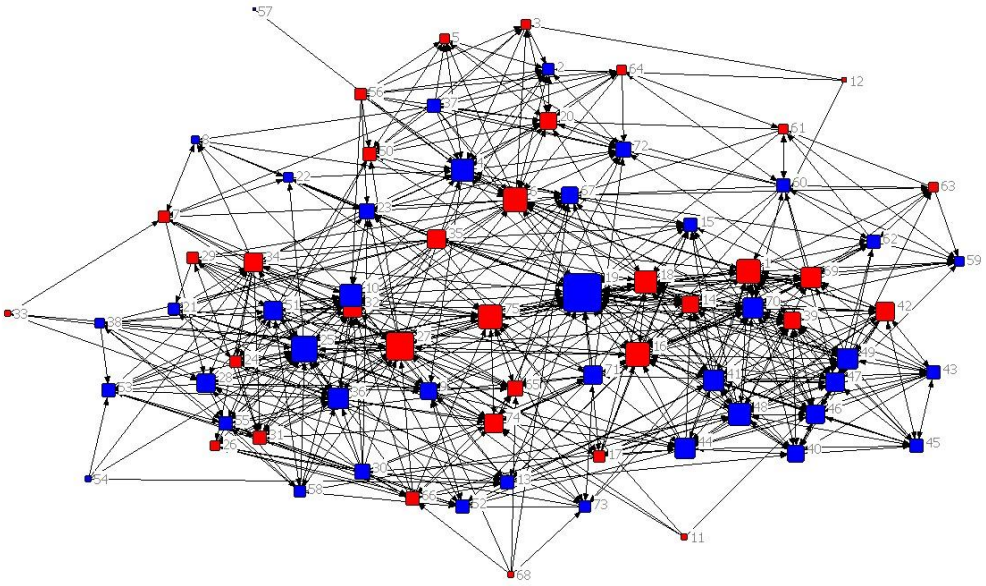


Religion

The distribution of religion differs by city – from 91% Christian and 9% Muslim in Abuja to 45% Christian and 55% Muslim in Ilorin. When examining the Ilorin network by the religion attribute – one can see that religious affiliation is distributed quite evenly in Ilorin (see Figure 5).

Figure 5. Ilorin FPPN by Religion

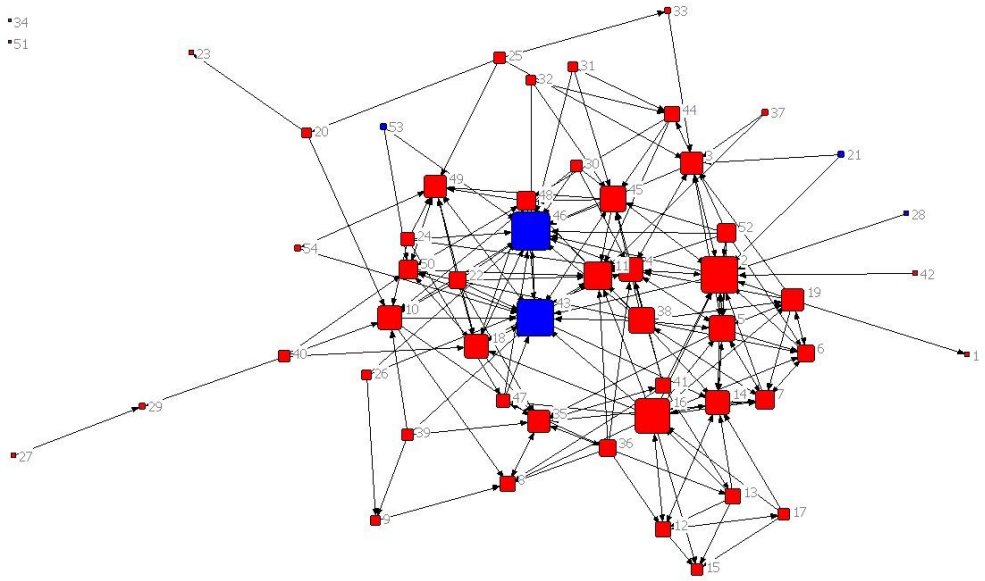
Red = Christian
Blue = Muslim



Despite the uneven distribution of religious affiliation among family planning providers in Abuja, minority religious affiliation does not appear to hamper network centrality (see Figure 6).

Figure 6. Abuja FPPN by Religion

Red = Christian
Blue = Muslim



Family Planning Use

The vast majority of the FPPN members have used a modern method of family planning (91%) but this indicator drops to less than half (41%) when restricted to use of long-acting and permanent methods (LAPM) of family planning. In Ibadan, LAPM use is associated with network majority. The PMV operators clustered on the left are less likely to have used LAPMs than the nurse-midwives clustered on the right. The CHWs, clustered in the upper right corner are less likely to have used LAPMs as well. It is noteworthy that the nurse-midwife connecting the two networks is less likely to have used LAPMs (see Figures 7 and 8).

Figure 7. Ibadan FPPN and Personal LAPM Use

Blue = no
Red = yes

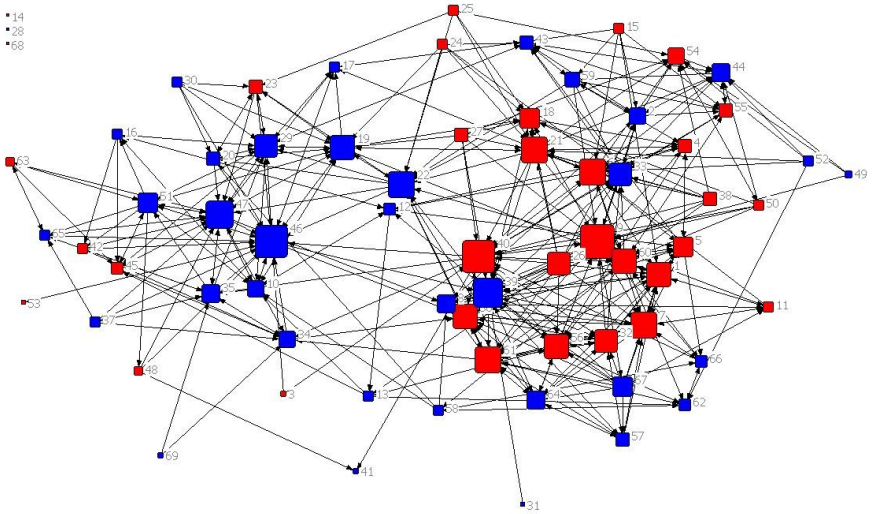
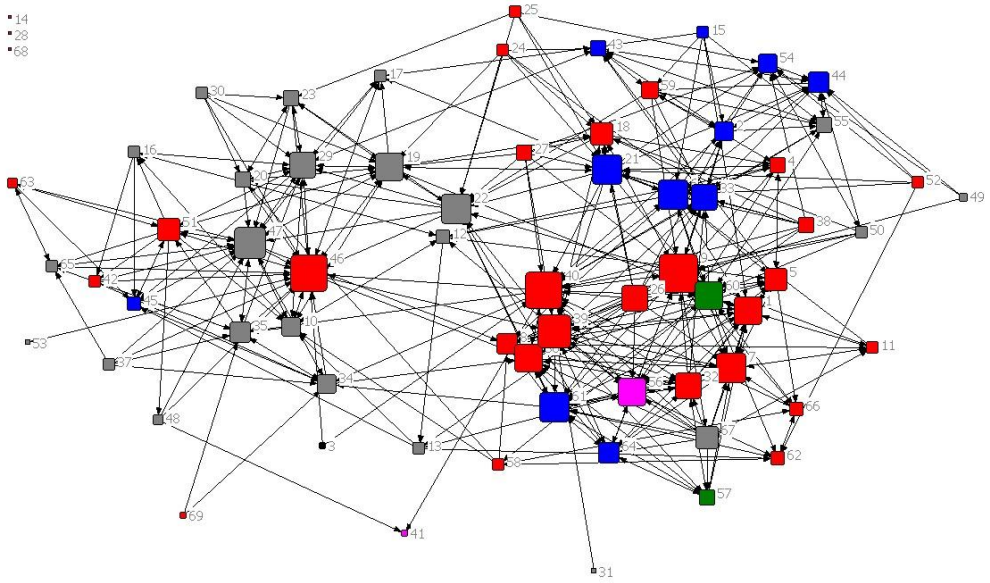


Figure 8. Ibadan FPPN Profession

Pink = Doctor
Red = Nurse-Midwife
Black = Pharmacist
Grey = PMV
Blue = Community Health Worker
Green = Other

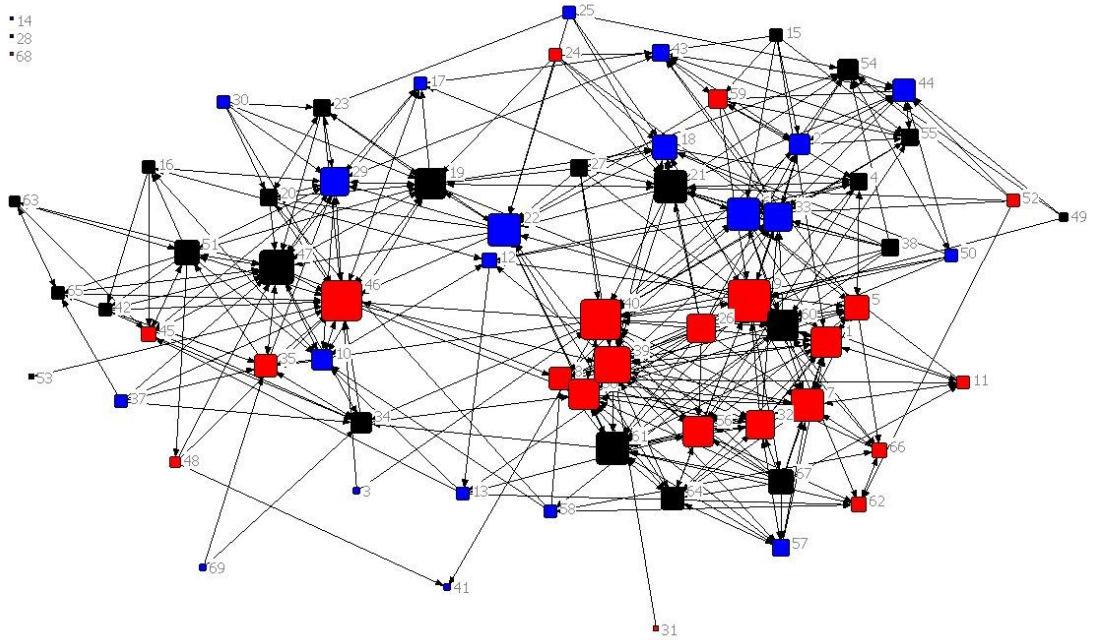


Bias

The summed bias score was categorized into low, middle, and high bias to assess the distribution of bias across network members. In Ibadan, the nurse-midwife cluster has the lowest bias scores while those in the PMV and CHW sections of the network tend to have higher bias scores. It is interesting to note that network members that are less connected tend to have higher bias. The nurse-midwife who is a strong connector between the two main networks has low bias – a potential focal person for the FPPN (see Figure 9).

Figure 9. Ibadan FPPN Service Provision Bias

Red = low bias
Blue = mid bias
Black = high bias



Discussion

Examining the distribution of network attributes using sociograms assists the NURHI team in meeting the goal of the FPPN, which is to improve referral patterns from non-clinical providers to clinical providers with the long term goal of increasing access to long acting and permanent methods of family planning.

Network members who work at private hospitals and clinics were often isolated in the network. Individuals who work at PMVs and pharmacies were often well connected within facility type but poorly connected to other aspects of the network. Those working at public hospitals, primary health centers, and others were often well connected in the network among all types of facilities. These findings are useful for targeting individuals and facility types for increased networking within the FPPN.

The majority of nurse-midwives and PMVs interact well within profession but not across profession. Nurse-midwives are more likely to interact with other professional types than are PMVs. Given this, and the importance of PMVs in referring their family planning clientele to higher tier providers for more effective methods, those individuals in the PMV network and nurse-midwife network who bridge the networks are key individuals to target in increasing the connections between non-clinical and clinical providers. In addition, a few CHWs appeared to be well connected in the networks, at times as bridge nodes, who could potentially act as vehicles to increase the communication and relationships between the PMV and nurse-midwife networks.

Religion, in a country often described as divided along religious preference, doesn't seem to impact network membership or connectedness. In some cities the networks are divided by gender – in others, the minority males are important bridge network members who might be able to foster increased communication between provider types.

Network members who were less central in the networks were less likely to have used LAPMs and to have higher biases. The general location of those with less personal use of LAPMs and higher biases affords us the ability to recognize the best use of resources to target those family planning providers with the highest need for intervention.

Efforts to increase use of LAPMs through referral patterns from lower tier providers to higher tier providers are unlikely to be successful as long as lower tier providers and higher tier providers do not communicate and network with each other. NURHI can target bridge network members to increase the networking across provider type – and increase the odds of LAPM referral from lower tier to higher tier providers.

The FPPN is a unique context in which it is possible to create an environment for clinicians and non-clinicians to mingle and learn from each other. It is possible that PMV operators, through targeted interactions with clinical network members during FPPN events, could then refer clients to those service providers for more effective family planning methods. The FPPN is a great environment to test the effect of professional and personal networking among family planning providers on referral patterns and LAPM use.