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'That is because we are alone': A relational qualitative study of socio-spatial inequities in maternal and newborn health programme coverage in rural Uttar Pradesh, India

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ABSTRACT

This qualitative study was conducted in Uttar Pradesh state, India to explore how interrelated socio-economic position and spatial characteristics of four diverse villages may have influenced equity in coverage of community-based maternal and newborn health (MNH) services. We conducted social mapping and three focus group discussions in each village, among women of lower and higher socio-economic position who recently gave birth, and with community health workers ($n = 134$). Data were analysed in NVivo 11.0 using thematic framework analysis. The extent of socio-economic hierarchies and spatial disparateness within the village, combined with distance to larger centers, together shaped villages' level of socio-spatial remoteness. Disadvantaged socio-economic groups expressed being more often spatially isolated, with less access to infrastructure, resources or services, which was heightened if the village was physically distant from larger centers. In more socio-spatially remote villages, inequities in coverage of MNH services that disadvantaged lower socio-economic position groups were compounded as these groups more often experienced ASHA vacancies, as well as greater distance to and poorer perceived quality of health services nearest the village. The results inform a conceptual framework of 'socio-spatial remoteness' that can guide public health research and programmes to more comprehensively address health inequities within India and beyond.

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Health equity; maternal and newborn health; qualitative research; social space; India

Background

Maternal and newborn health (MNH) has greatly improved in India in the last two decades, both overall and in large, high burden states such as Uttar Pradesh (UP) in north India. As mortality rates have reduced, worse maternal and newborn health outcomes have become increasingly concentrated among families who are poorer, less educated or from more disadvantaged caste and tribal groups (Busch et al., 2022; International Institute for Population Sciences and ICF, 2022). The Government of India has promoted wider access to MNH care through the National Rural Health

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Mission (NRHM) since 2005, renamed the National Health Mission since 2013. One of its main strategies is the Accredited Social Health Activist (ASHA) programme, training incentivised community health volunteers to support women in their own villages (Ministry of Health and Family Welfare, 2014). ASHAs' home visits include counselling and support for attendance at antenatal care (ANC) check-ups at weekly Village Health and Nutrition Days (VHNDs, now including sanitation), as well as at government health facilities at the sub-district (or block) level. In UP, VHNDs previously focused on immunising pregnant women and children (Ministry of Health and Family Welfare, 2007), but were expanded in 2015 to provide comprehensive antenatal care at the village-level nearer families.

Health inequities have been defined as systematic and unjust disparities in health between socio-economic position (SEP) groups, based on unequal access to power, resources and prestige or status (Braveman & Gruskin, 2003; Marmot, 2009). They have predominantly been examined using a distributional approach, or in terms of differences in health outcomes between pre-defined socio-economic or geographic population groups (Keats et al., 2018; O'Campo & Dunn, 2012; Ruktanonchai et al., 2016; World Health Organization, 2013). A relational approach to health equity provides another lens to explore socio-economic inequities in health and health care that goes beyond assuming objective, fixed or abstract measures of difference. It interrogates how health inequities are influenced by hierarchies of power and related control over resources, through explicit or implicit injustice, oppression, or exclusion within social, political, economic and cultural processes (Gaventa, 2006; Mathieson et al., 2008). This lens derives from the critical realist assumptions of 'practice theory', which views individual human practices as processes produced dynamically and collectively through social relations over time and space (Cohn, 2014; Nicolini, 2012; Schatzki, 2002). A relational framing also assumes that geographical 'space' is not solely physical distance, but intertwined with social relations and subjective meanings in terms of 'social space' (Cummins et al., 2007).

Most research to date has applied a relational lens to understand social exclusion and poverty (Cohn, 2014; Elwood et al., 2016; Emirbayer, 1997), and socio-economic health disparities in high-income countries or urban settings of lower-income countries to date (Blue et al., 2016; Bourke et al., 2012; Corburn, 2017; Cummins et al., 2007; Veenstra & Burnett, 2014). Few studies have qualitatively explored health inequities in coverage of community-based MNH services or programmes, and fewer on the interrelatedness of socio-economic with spatial inequities (Aziz et al., 2015; Duong et al., 2015; Gupta et al., 2017; Morrison et al., 2010; Mumtaz et al., 2015; Nair et al., 2010). We conducted qualitative research in four diverse rural villages of Uttar Pradesh state, India to explore how people's understandings of higher and lower 'socio-economic position' were informed by social relations in the spaces where they live, interact, and access resources, and the ways in which these socio-spatial processes influenced equity in coverage of community-based maternal and newborn health programmes there.

Methods

Study design

This qualitative study was part of a mixed-methods doctoral study led by the first author with the Uttar Pradesh Technical Support Unit (UP TSU). The UP TSU has worked with the state of Uttar Pradesh's branch of the National Health Mission since 2012. The UP TSU is implemented through a partnership between the India Health Action Trust, the University of Manitoba, and other national and international organisations, funded by the Bill & Melinda Gates Foundation. They provide technical support to strengthen the availability, utilisation and quality of reproductive, maternal, newborn, child and adolescent health services at the community, facility and health system levels across UP. The broader study sought to understand the extent to which, how and in what contexts ASHA workers contributed to reducing inequities in maternal and newborn health outcomes in UP (Blanchard, 2019). The qualitative methodology and tools here were particularly informed by Aziz

et al.'s operationalisation of the relational concept of 'social space' in research to understand social exclusion and maternal health services in villages of Pakistan (Aziz et al., 2015). Though in the broader study we did not undertake a formal case study, the assumptions and approaches here also resonate with case study methodology by integrating differing perspectives and data sources to understand the influence of socio-economic position and spatial characteristics on health service coverage within the real-world contexts of the study villages (Yin, 2018).

Study context

To select study sites, we identified two districts as reflecting the geographic and socio-cultural diversity of UP (e.g. in terms of land ownership patterns, caste or tribal groups, and religion): Prayagraj (formerly called Allahabad) district in eastern UP, and Rampur district in western UP (more detail previously described (Blanchard, 2019)). Within each district, we selected one village that was near the block (sub-district) or district headquarters (the nearest urban centers), and another village farther.

In the study of socio-economic position, it is relevant to note that understandings of 'caste' in India (originally Portuguese *casta*, meaning breed, community, or birth-group), and the original *Sanskrit* words *varna* and *jati*, have had complex and shifting meanings. Important Hindu texts describe that the creator gave four *varnas* or human archetypes distinct moral qualities and callings (*dharma*) in an order of precedence to preserve creation (Bayly, 1999). Some groups were also considered *avarna,* and 'untouchable' or ritually polluted. The term *harijan,* meaning 'children of God', was popularised by Mahatma Gandhi to redeem formerly 'untouchable' groups; the term *dalit,* or 'oppressed', is also commonly used by the community (Bayly, 1999). Additionally, indigenous tribes are known as *adivasi* groups, meaning 'original inhabitants', and have been historically self-governing (Valvi, 2015). The *Sanskrit* term *jati* is now widely used to describe sub-caste groups, in terms of kinship or lineage in the, '"concrete and factual" domain of everyday social life' (Bayly, 1999, p. 9). Muslim kinship groups or *zaats* (often used interchangeably with *jatis* in UP) also position groups within a socio-economic hierarchy (Khanam, 2013).

Socio-economically disadvantaged kinship or *jati* groups have been designated as 'Scheduled Castes', 'Scheduled Tribes', and 'Other Backward Classes' in India's constitution (Bayly, 1999; Mandal, 1980). In the 2019–2021 National Family Health Survey in UP, 25% identified as part of a 'Scheduled Caste', 52% as 'Other Background Class', and 2% as 'Scheduled Tribe', while 82% of the population were Hindu and 18% Muslim, consistent with earlier censuses (Department of Rural Development, 2011; International Institute for Population Sciences and ICF, 2022; Office of the Registrar General & Census Commissioner, 2011). This study considered how institutionalised categories of Scheduled Castes (including but not solely *harijan* groups), Scheduled Tribes (*adivasi*), Other Backward Classes (including most Muslim kinship groups), and other or General Castes mapped onto the lived experiences and social relations among kinship or *jati* groups as variously described by participants, rather than assuming fixed hierarchies between them.

Data collection and analysis

Data collection and analysis was conducted by a team of one lead qualitative researcher (AKB) and two research investigators (SA and RR), each with graduate training in public health and social sciences, and long-term experience working in rural contexts of India. The research partnership between the first author and the UP TSU was developed through several years of collaboration. To initiate field work, the research team worked with the programme's state and district community teams to identify pertinent questions and study sites, and undertook in-depth training and preparations for data collection. We met with stakeholders in each study village to develop rapport and gain permission to conduct the study there. Then we conducted social mapping in each village in February 2017. We discussed the village context with CHWs, the *pradhan* (village chief), and

visited each section or hamlet to observe living conditions and speak to pregnant women or new mothers and family members that agreed. Our discussions were recorded as field notes by each researcher, then typed, combined and imported into Dedoose and NVivo 11.0 for analysis.

Using the social mapping results, we developed a screening tool based on characteristics in each village that community members considered to distinguish families with relatively lower and higher socio-economic positions: types of household assets, occupations or livelihoods, literacy or education, caste status, hamlets of residence, and village *panchayat* or leadership roles. This tool was used as purposive sampling criteria for focus group discussions (FGDs). In May 2017, we conducted 12 FGDs with three groups in each of the four villages: one with women who recently gave birth of lower SEP, one with women who recently gave birth of higher SEP, and one with ASHAs, who were invited to participate by the UP TSU community team. They were held at schools or *panchayat* buildings for women, and at community health centres for ASHAs, with the three researchers and participants present. Each FGD started with obtaining individual written informed consent (using signature or thumb print) for participation and audio-recording, and then asking anonymous socio-demographic information of each participant.

FGDs were conducted in Hindi using a semi-structured topic guide that included questions on the socio-economic position and spatial characteristics in their areas, followed by their experiences and perspectives on ASHAs' activities, their influence on maternal and newborn health service access and outcomes, and the contextual factors shaping their influence (Supplementary Table 1). The discussions lasted between 50 to 70 minutes. The questions had been finalised through translating and back-translating between English and Hindi, and pilot-testing in a village similar to the study villages. One researcher took notes indicating when each participant spoke using numbers. During data collection and analysis, we found patterns in the experiences and views emerging across FGDs, indicating data saturation was being reached (Hennink, 2014). Ethics approval was obtained from the Sigma Institutional Review Board, New Delhi [#10040/IRB/D/16-17], and the University College London Research Ethics Committee [#9909/001].

The FGD recordings were translated and transcribed from Hindi into English by a professional translator, and coded in NVivo 11.0 and Dedoose. We created codes to number which participant had spoken wherever possible, using the note-taker's numbering on the transcripts (also presented in results). Transcripts were coded line-by-line with the same codes as for the social mapping notes on socio-economic position and village features, and additional codes on community-based MNH programme coverage, health outcomes, and socio-economic, cultural, political and geographic contextual factors, adding sub-codes where needed. The researchers coded the first three transcripts separately and agreed on consistent code meanings to develop a coding tree, which we used to code the rest (Supplementary Table 2). We used thematic framework analysis (Gale et al., 2013). We ran matrix queries in NVivo and developed charts to identify and organise coded information on socio-economic position characteristics and spatial dynamics, and where these overlapped with coverage of MNH services and contextual processes, for each village comparing within and across FGDs using the socio-demographic information. Then we developed themes based on how codes interrelated through discussion with the state and district programme teams.

Results

Socio-spatial dynamics in four villages of Uttar Pradesh

In total, 134 women participated in the FGDs: 46 ASHAs, 53 women who recently gave birth of lower socio-economic position, and 35 women who recently gave birth of higher socio-economic position. Participant socio-demographic characteristics for groups of women and ASHAs are provided in Supplementary Tables 3 and 4 respectively. Key characteristics of each study village are summarised in Table 1, then we describe each villages' socio-economic position characteristics and spatial dynamics in turn.

Table 1. Socio-spatial and community-based programme characteristics of the four study villages.

	Prayagraj district (East UP)		Rampur district (West UP)	
	Village 1 (proximate to headquarters, HQ)	Village 2 (distant to HQ)	Village 3 (proximate to HQ)	Village 4 (distant to HQ)
Population	5000 + people	3500 people	2300 people	2200 people
Number of community health workers and their supervisors	• 6 ASHAs • 2 ASHA *sanginis** • 2 Auxiliary Nurse Midwives (ANMs)** • 5 *anganwadi* workers (AWWs)***	• 2 ASHAs • 1 ASHA *sangini* • 1 ANM • 2 AWWs	• 2 ASHAs • 1 ASHA *sangini* • 1 ANM • 3 AWWs	• 2 ASHAs • 1 ASHA *sangini* • 1 ANM • 3 AWWs
Characteristics of ASHA workers	• ASHAs working since 2008 • One ASHA vacancy in Hamlet B that took months to fill • SC or OBC Hindu *jatis* • Education from 6–9 standards to secondary	• ASHAs working since 2008 • One ASHA recently recruited to replace ASHA *sangini* • OBC Hindu *jatis*, one related to *gram panchayat*+ members (and nominated by them) • Mid-level education (8–12 standards education)	• ASHAs working since 2008 • OBC Hindu *jatis* • 8–12 standards or college education	• One ASHA started in 2008, another recently recruited in second hamlet • One Hindu (SC *jati*) and one Muslim (OBC) • Lower to higher secondary education
Status of Village Health and Nutrition Day (VHND) in the village	• VHND occurred in *anganwadi* center in hamlet A • Not as accessible to women in farther hamlets who were of OBC and SC *jatis* due to large distances	• VHND functioning at local school in hamlet A, known widely as 'immunisation day' where they give oral rehydration solution and vaccinations • Women of lower SEPs attended more often, richer women sought ANC outside the village	• VHND occurred multiple times per month at the school or in one of the two ASHAs' homes • Women of all SEPs said they attended	• VHND occurred every two weeks at primary schools in each hamlet, known for giving immunisations and iron tablets • Some OBC Muslim and Hindu women attended less because they lived farther or feared the services, and the ANM sometimes did not come
Health facilities available outside the village	• CHC at block HQ around two kilometers away • District and private hospitals in district HQ around 20 kilometers away	• CHC at block HQ around 15 kilometers away • District hospital at HQ 60 kilometers away • Private hospitals 16 kilometers away	• CHC at block HQ around two kilometers away across a major railway line • District and private hospitals in the district HQ 45–50 kilometers away	• CHC at block HQ 13 kilometers away • District hospital at district HQ 25 kilometers away • Private hospitals five to 25 kilometers away

Acronyms: ASHA, Accredited Social Health Activist; ANM, Auxiliary Nurse Midwife; AWW, *Anganwadi* Worker; CHC, Community Health Centre; HQ, headquarters; PHC, Primary Health Centre; SC, Sub-Centre.

+*Gram panchayat* is the village-governing institute or village council.

*ASHA *sanginis* or supervisors*:* One ASHA *sangini* is trained to supervise 20 ASHAs at a block level; ASHA *sanginis* are selected among ASHAs and must volunteer for this role, be active, and have worked for at least three years as ASHAs.

**Auxiliary Nurse Midwives (ANMs): ANMs are hired to provide ANC services at the community-level, mainly at VHNDs.

***Anganwadi Workers (AWWs): AWWs conduct nutrition activities for pregnant women, newborn infants and children.

Village 1 in Prayagraj district (proximate to HQ): Peri-urban with hierarchies yet opportunities

Village 1 in Prayagraj was large in size and population, spreading from a river up to the main highway that led to a city only a couple of kilometres away (Figure 1). People of different caste groups, all Hindu, lived among their own sub-castes (*jatis*) spread across the many hamlets. There were distinct socio-economic position hierarchies in terms of the interplay of wealth and caste characteristics. The predominant OBC group was relatively well-off, as they made good wages selling milk from the cows they owned. They were also a majority in the village, mainly living in the main hamlet and occupying leadership roles. People from the smaller GC groups mostly worked in private businesses like shops in the main hamlet, or owned the agricultural land.

In contrast, participants said that those who were 'poor' or 'deprived' (*garib* in Hindi) were primarily those who had insufficient means to earn money and feed their families, and were most often classified as SC or OBC sub-castes, though more variation among the latter. Most SC *jatis* here worked in seasonal and daily wage labour such as sand work, fishing, brick kilns or construction: 'In my area, if work shuts down even for one day, then people have to face the challenge of feeding their family. If they earn for ten days and are unemployed for five days, then it gets very difficult for them to survive.' (Lower SEP Village 1) They also lived more often in village hamlets or areas with more limited resources. Negative views on the lack of provision of resources were widespread, as these women of lower SEP shared:

> Respondent, R(5): [To] those who have brick [*pucca*] houses they give facilities, but [to] those who have mud or non-cemented [*kuccha*] houses or huts they do not provide anything. R(6 + 3 + 5): Everyone's getting [ration] cards but we are not getting … R(3): We do not even get to know about anything. The *pradhan* is not accessible to everyone. He works with some people but not us poor people. Some people have their paperwork, ration cards etc. made but we don't. We do not even get rations [*galla*], wheat and rice to which people with below poverty line cards are entitled. R(6): The toilets have been made in some places, but in our area, where we are all poor, nothing like that has been done. (Lower SEP Village 1)

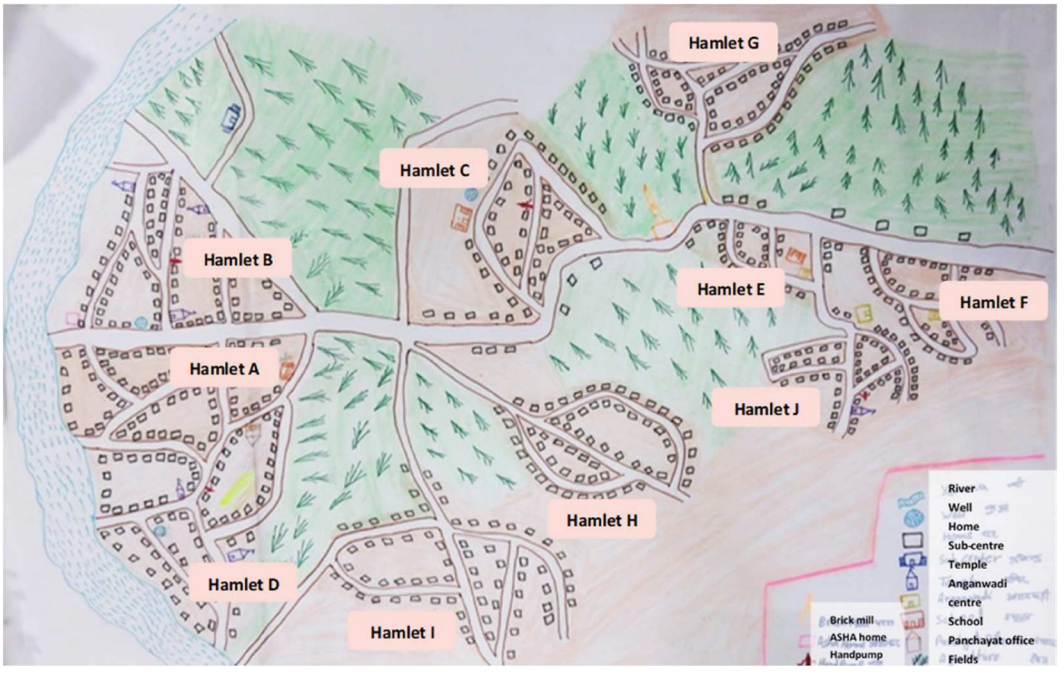

Figure 1. Social map of village 1, Prayagraj district [Caste groups by hamlet: A (OBC, GC), B (OBC, SC), C (SC), D (OBC), E (SC), F (SC), G-I not included.]

Still, being close to the large district headquarters afforded more job and educational opportunities across caste groups than in other study villages. Education levels generally overlapped with people's wealth and job security, but some women of poorer families said they were able to go to secondary public schools because they were nearby.

Village 2 in Prayagraj district (distant to HQ): Sprawling with distinct leadership and labour divisions

Village 2 had the widest socio-economic hierarchy and spatial spread, as well as being far from the block and district headquarters (Figure 2). There were distinct caste groups, related political roles, and economic resources or opportunities, accompanied by lower access to and quality of health and other services within and near the village. Village 2 had two main hamlets, A and B, interspersed by large swathes of agricultural land. Most GC and OBC families lived in the main hamlets, while some SC and ST households lived there as well as in more peripheral hamlets. A few households of one particularly marginalised *harijan* SC group lived alone in hamlet F, ST groups lived alone or among other castes in a few hamlets, and one Muslim family lived on an inherited agricultural homestead in hamlet E.

During social mapping, it was apparent that higher caste families in hamlet A had brick houses and owned water wells and electricity. ASHAs also said that their prosperity was evidenced by owning land on which others worked, and especially having 'stable' government or business jobs outside: 'Those working outside, they are prosperous and happy […] Those who earn through agriculture, they are at the medium grade while those who are daily wage earners-like the *adivasis* or the *harijans*- they only make ends meet on a daily basis.' (ASHAs Village 2) The predominant GC and OBC group also had a major role in village leadership. In fact, the OBC group was said to now be more involved in the leadership of the *gram panchayat* than in the past, owned more of the land, as well as having their traditional means of income by owning cows and selling milk.

Figure 2. Social map of village 2, Prayagraj district. [Caste groups by hamlet: A (SC non-*harijan* and *harijan*, ST, OBC, GC), B (OBC, ST), C (ST), D (SC *harijan*, ST), E (SC non-*harijan*, ST, OBC Muslim), F (SC *harijan*), G-H not included.]

Comparatively, the GC families were seen as having the enduringly highest status, yet there were relatively fewer households of those *jatis*, and they now often lived and worked in the cities.

Women of untouchable or *harijan* SC and *adivasi* (ST) groups said they were considered to have the lowest status, and least access to resources. A*divasi* women told us that their families worked on others' land, and they lived in *kuccha* houses with hand pumps but no toilets, usually in the peripheral hamlets. A *harijan* woman described the inequitable treatment that they experienced:

> R(9): If we as *harijans* go to get the water with the other communities, they do not allow us. The *pradhan* doesn't tell us anything, or give us any provision [*pravidhan*] that comes for the village […] M: What facilities are not available to you? R(9): There is no water supply. I mean there is a water pipe [hand pump], but water supply is a problem. Even when the government supply comes to our area, it is never installed in our area. The other communities get it installed in their area. M: Why do you think they do that? R(unrecognised): I have no idea. R(9) That is because we are alone [*akela parivaar* – lone or only one family] so they do not care about what we want. (Lower SEP Village 2)

Other women of SC and ST castes (*jatis)* also noted the lack of resources and infrastructure provided to them:

> R(10): Also, even when there is a [government] provision for electric poles, they do not give us any power [electricity] supply. Basically, nobody cares about what the poor families need […] It doesn't matter if there are roads in front of our houses but the [highest GC castes (*jati*)] will always have good roads constructed for them. (Lower SEP Village 2)

Though there were schools, education levels were also inequitable in this village due to the costs for books and uniforms at public schools, and high fees at private schools.

Village 3 in Rampur district (proximate to HQ): Social diversity yet shared resources

In Rampur, village 3 was relatively smaller with one hamlet, and less apparent socio-economic hierarchies or spatial disparateness (Figure 3). The village was not very far from the district headquarters, and could be reached directly by a rough brick road from the block headquarters two kilometres away. The majority of families were Hindu, with a small group of Muslim families, interspersed but clustered by *jati* group. The predominant *jatis* were OBC, with fewer GC families. There were around 50 households of one of the same large *harijan* SC groups as in Prayagraj.

People were said to be prosperous if they had facilities and *pucca* brick houses, owned land, or had jobs in shops or government. They were unanimously said to be the OBC and GC castes (*jatis)*, though some OBC Muslim families had fewer facilities in their homes. The GC families usually held leadership positions. SC Hindu and OBC Muslim families were considered poorer because they had *kuccha* houses, had little or no electricity or toilets, and worked as local or migrant labourers. Yet electricity, televisions and water were available more widely across caste groups than in Prayagraj. For example, some SC *harijan* families owned televisions, land and agricultural equipment, though their homes were at the periphery. In the higher SEP FGD, women explained without probing that some people practised untouchability, which limited their integration with other groups:

> R(1): Yes, it happens sometimes, say, if the people belong to different castes like [SC *harijan jati* name] […] then there is the issue of untouchability [using the term *bhangi*] […] M: Where do they live? Do they live away from the main village population? R(unrecognised): They live at the end of the village. (Higher SEP Village 3)

People gave more weight to education than caste or religion group in distinguishing SEP in Rampur than in Prayagraj. The lower SEP group said that the preference for government or private schools was directly related to one's level of wealth as well: 'The poor can only send their children to government schools.' (Lower SEP Village 3) Meanwhile, most women in the higher SEP group preferred private schools, which related to the expectations of higher social status attained through private, often English medium, education.

Figure 3. Social map of village 3, Rampur district. [Caste groups by hamlet: A (all groups – GC, OBC Muslim and Hindu, and SC *harijan*)].

Village 4 in Rampur district (distant to HQ): Parity amid scarcity of seasonal, agrarian livelihoods

Village 4 also had less distinct socio-economic position hierarchies or spatial disparateness, but was distant with fewer accessible resources for the whole village (Figure 4). It had one larger and one smaller hamlet, separated by an unpaved road across agricultural fields. The village was seasonally isolated by a large river that flooded annually. Women there expressed how the flooded river affected them, and reduced the provision of public health and social services:

> R(3 + 2): If it rains too much, the area gets flooded, making commuting difficult. [The village and its hamlet] have no relief from the river. Nobody comes to look after us. Even the government officials just come to gaze at the riverside and leave without doing anything real […] R(8): The pregnant women have to be taken across on boats. If the boats are not available, it gets extremely difficult; people have to use makeshift boats with their beds. (Higher SEP Village 4)

The majority of the village population was Muslim, of various OBC groups in hamlet A, and one GC group in hamlet B. There were also around 50 SC Hindu households in hamlet A of the same large *harijan jati* group as in villages 2 and 3.

People said that there were not strong socio-economic hierarchies, as most were not well-off:

> M: Who has all facilities like electricity and water, etc.? R(8): Nobody has anything. There's nothing in my locality and absolutely no source of light. We have mud houses with polythene sheets in the name of roofs. Nobody has a mobile phone or even a bicycle. (Lower SEP Village 4)

ASHAs reiterated how poverty was mostly economic here: 'M: And who are affluent? R(3): See, there are affluent and poor in all castes. Nobody's needs can ever be completely met.' (ASHAs

Figure 4. Social map of village 4, Rampur district. [Caste groups by hamlet: A (GC and OBC Muslim, SC *harijan*), B (GC Muslim).]

Village 4) The Muslim GC group often owned some land to farm, or ran shops or businesses outside. Many but not all had brick houses, electricity and toilets, though with open sewers and fewer handpumps. Unlike in Prayagraj, some SC Hindu families here also owned small amounts of land, tractors, electricity and televisions as in village 3. The *pradhan* told us that education was a widespread issue, and was lowest among Muslim women and girls. Children left school by adolescence when they were needed to help with agricultural work. Most people had difficulty sending their children for secondary or higher education, which was located outside the village.

The influence of socio-spatial dynamics on equity in coverage of community-based MNH services

We next present themes exploring how the socio-spatial dynamics of each village influenced equity in coverage of community MNH services between pregnant women of higher and lower SEP groups.

First, women in all FGDs responded that ASHAs did not noticeably differentiate who they visited based on socio-economic position. Moreover, ASHAs were found to have visited women of differing caste, wealth or educational status than themselves. Some ASHAs reflected on the challenges they had initially faced to gain trust with families, but how this had improved over their time as an ASHA, many for ten years:

> M: Is there a specific caste of people who do not listen to you? R(all): Now everybody listens to us. R(9): Things have improved a lot now, people have started listening to us […] R(3): The mothers-in-law sometimes taunt us for coming and giving them new advice every time […] R(13): But things have changed a lot now. (ASHAs Village 4)

ASHAs in that village further reflected that pregnant women themselves had come to see them as a sister or friend with whom they can share anything. Still, a couple participants noted that ASHAs

spent less time visiting families of SC or OBC *jatis* that they knew remained resistant to their counselling. Conversely, women from higher caste or wealth families were more often secluded at home, living within cities, or accessing private MNH services, and so relied relatively less on ASHAs than women of lower SEP groups.

ASHAs' relative socio-economic positions also influenced their relationships with women whom they visited in different ways. Many said they had worked to overcome any social distance between them. ASHAs in three of the four study villages were from OBC *jati*s, which was an intermediate socio-economic position, and were thus more able to visit both poorer or SC/ST groups and wealthier or higher caste households in their villages. For example, most *adivasi* women in the second village, who were relatively disadvantaged, said they received home visits from the ASHA who was of an OBC *jati*: 'R(16): She meets us on a regular basis […] R(11): I think very highly of her.' (Lower SEP Village 2) Still, there was one account by a higher educated OBC woman of caste-based discrimination towards 'untouchable' groups by ASHAs in another village, though women made clear that this was not the case in their own. With respect to religion, in the fourth block we found that there were more Hindu ASHAs despite being a majority Muslim area, because they could more often meet the educational requirement of completing eight standards. Yet the Hindu ASHAs said they had developed good relationships with Muslim women and their families; this was reflected by an OBC Muslim woman there who said, 'R(8): In my village, everybody shares everything with the ASHA worker […] She visits everyone and encourages us to share with her if we have any problems.' (Lower SEP Village 4)

Rather than being overtly discriminating along socio-economic lines, coverage of ASHAs' home visits was more indirectly differential in villages with combined socio-economic and spatial disparities. This was evident in villages with disparate hamlets (village 1 though not distant from the headquarters, and village 4 that was distant), and especially the more distant village 2 with large socio-economic position hierarchies that were spatially patterned across disparate hamlets. More disparate hamlets were hard for ASHAs to reach regularly. This was compounded when there were ASHA vacancies, as the present ASHAs had insufficient time to visit women in distant hamlets beyond their catchment areas and particularly as their workloads increased over time. This was evident in hamlet B in the first village of Prayagraj, as women in the lower SEP group explained:

> R(2): Since our region is in the corner of the village, the visits don't happen. If we ask her to come, she visits us, but not on her own […] R(6): My house is a little far off. She has come only once or twice but she doesn't come often. M: What area do you belong to? [Hamlet B name - referring to socio-demographic sheet]? So, the problem in [hamlet B] is that the ASHA worker doesn't come to your area […] What is the reason for this? R(2): It is because it is really far away for them. R(unrecognised): There must be a dearth of ASHA workers. R(unrecognised): Only if you tell her that there is a baby in the area does she go to visit, otherwise, she wouldn't even do that. M: Why do you think the ASHA does not come in your area? R(2): Because of the distance. R(2): But if it is her job, she should go irrespective of how far the place is, isn't it? (Lower SEP Village 1)

During social mapping in village 4, women in hamlet B said that the ASHA had not visited them much. However, the situation improved after the second ASHA of a Muslim OBC *jati* (in the village majority) had been recruited by the time of the FGD. Women said that the ASHA made a concerted effort to reach them despite the flooding there:

> M: In extreme summers or when it floods in the monsoon, how does she reach you? R(12): She reaches us by all means. M: How does she commute then? R(12): She walks all the way. R(12): Irrespective of whether it is muddy or filled with water, she comes nonetheless. (Higher SEP Village 4)

In turn, socio-spatial inequities influenced ASHAs' ability to ensure timely birth registration and preparedness for all. Where there were ASHA vacancies, ASHAs used reactive strategies or self-identification to support pregnant women, rather than proactive methods as trained. This was explained by women in village 1: 'M: What kind of information did she give you? R(4): Nothing really in the way of information, but she told me to contact her if there was any problem.' (Lower SEP Village 1) ASHAs' reliance on reactive identification posed particular challenges for

ensuring timely birth registration and preparedness for women who were not literate. This made it harder to know the date when they conceived, and to plan timely prenatal visits and birth preparedness:

> R(4): There are very few educated women in the villages. Only they are able to accurately tell when they last got their periods. So they say, for instance, that from that last cycle, it has been two or three months since. (ASHAs Village 1)

Finally, the extent of socio-spatial divisions in the village also affected women's attendance at ANC at VHNDs within the village, as well as at CHCs for ANC and childbirth care outside the village. The VHNDs were predominantly held within the main hamlet, which tended to be more difficult for women of lower SEP to reach as they more often lived in remote hamlets or areas within the village. Many said they were even less able to make the journey if no one could accompany them, as women of OBC *jatis* living in more distant hamlets of village 1 commented:

> M: So when it [VHND] happens in [hamlet A], do you go there? R(unrecognised): It is so far away, how will anyone go there? M: Why do you not go there? R(4): Because it is very far away. It is far and there is no means of transportation to go there. It will be difficult to walk for that long a distance. (Higher SEP Village 1)

Yet the VHND was said to fill a gap in the public sector, particularly for villages 2 and 4 where the CHC was farther, and often perceived as not having sufficient quality to warrant the journey. These inequities were generally amplified for childbirth care services, which were provided most proximately at CHCs within the block, or district hospitals at the district headquarters (discussed more elsewhere (Blanchard, Ansari, et al., 2021)). Particularly in the most remote villages, the CHC was reportedly least well-equipped with supplies or staffing to provide MNH care. Hence, many women of lower socio-economic position hesitated to travel there, while higher socio-economic position women and families preferred private MNH care because they could afford the higher costs of transport and services to access them.

Discussion

This qualitative study used a relational lens to understand local socio-spatial dynamics and their influence on equity in coverage of community-based MNH services in four distinct villages of Uttar Pradesh, India. Participants across villages described lower and higher socio-economic positions in terms of consistent characteristics, including facilities or assets in the home (such as cement houses, toilets, electricity or water), wealth or land ownership, occupation, education, caste, and religion. Yet these interplayed somewhat differently in each village to shape the extent of socio-economic position hierarchies. These SEP hierarchies were further exacerbated if the village was spatially disparate, as lower SEP groups usually lived in more distant or less resourced hamlets. This was intensified if the village was more distant from block or district headquarters, likely related to an unequal distribution of more limited resources, infrastructure or services available there. Relatedly, villages with more inequitable socio-spatial dynamics exhibited more inequities in community-level ASHA home visits and MNH service coverage, as they more often also experienced ASHA vacancies, gaps in provision of VHND services, or poorer perceived quality of public MNH services at CHCs.

This study corroborates quantitative analyses showing that coverage of ASHAs' home visits were not noticeably different between socio-economic position groups in UP (Blanchard, Colbourn, et al., 2021; Seth et al., 2017; Smittenaar et al., 2020). Moreover, ASHA home visits were more strongly associated with ANC or childbirth care coverage among SC or ST caste and less educated or illiterate women than higher caste or more educated women, though less strongly associated among Muslim compared to Hindu women (Blanchard, Colbourn, et al., 2021; Seth et al., 2017). Compared to another study of the *anganwadi* worker program in Bihar, we found that ASHAs' and community members' relative caste, economic or religion status was less of an intractable barrier to improving coverage of home visits or access to services (Blanchard, Ansari, et al.,

2021; John et al., 2020). This was in part because of their concerted efforts to develop trusting relationships with families over time, though the impact of their efforts were likewise affected by broader factors beyond their control.

Our study also revealed that in villages with larger socio-economic hierarchies combined with spatial disparateness, the most disadvantaged SEP groups expressed being more often isolated or 'alone', and thus without infrastructure, resources or services provided in their areas even when allocated. Another study in India found that higher stunting among SC and OBC children compared to General or other castes was not fully explained by a lower economic status, but also the extent of relative social hierarchies between groups within the same village (Coffey et al., 2019). In the study villages, we further found that inequities in coverage of MNH services were not glaring when compared between socio-economic groups alone, but were most influenced by the compounding of socio-economic and spatial disparities. Similarly in neighboring states, lower coverage of home visits was related to ASHAs being less willing to visit physically remote hamlets due to lower remuneration relative to the added effort and time, or to more ASHA vacancies in a disadvantaged village as too few women there had sufficient education to fulfill the requirements (Gupta et al., 2017; Scott & Shanker, 2010).

The finding that socio-spatial inequities within villages were exacerbated if also more physically distant from larger urban centers was likely due to less overall investment in infrastructure or services inside or nearby, but also more inaccessible services outside, as observed in other 'remote' contexts (Bourke et al., 2012). Kabeer has also described how socio-economic inequities in other parts of India were compounded by a village's 'remoteness', and their related lack of integration into the broader economy and lower quality services (Kabeer, 2006). The more distinct hierarchies in eastern compared to western UP may also be influenced by historical processes (Desai & Dubey, 2012; Lerche, 1999). For example, in western UP where Rampur is located, landholding was democratised earlier, leading to more land ownership across caste and religion groups than in eastern UP where Prayagraj district lies (Lerche, 1999; Stokes, 1978). It was also found that OBC groups obtained growing political roles relative to historically higher caste groups, particularly in the Prayagraj villages where caste distinctions were greater. Others have found that rural political positions were sometimes consolidated over time by denying access to government services or entitlements to more disadvantaged caste groups with less influence (Himanshu et al., 2016; Shah et al., 2018).

Prevailing global frameworks to guide health equity research, even those drawing on the social determinants of health, still operationally treat socio-economic position characteristics as individual and group-level attributes forming fixed hierarchies that can become depoliticised, decontexualised and ahistorical (Hamal et al., 2020; Kim et al., 2019). Our findings highlight the need to consider socio-economic and spatial inequities as interrelated, and both crucial to our understandings of health equity (Elwood et al., 2016; O'Reilly et al., 2017). They also suggest that the condition of 'remote' places having limited infrastructure and services should no longer be treated as an inevitable consequence of immutable structural conditions or physical distance (Anand et al., 2018; Bourke et al., 2012). Rather, there is a need to consider how the spatial concept of 'remoteness' is also socio-economically and politically constructed, being influenced by observable decisions and power relations among an array of government, private sector, civil society and community actors (Anand et al., 2018; Ferguson, 2012; Winterton et al., 2014). Local social spaces in villages or communities can thus be understood as connected yet unique nodes in a wider set of relations, or 'power geometry,' that are influenced by the political, health system and societal contexts beyond those spaces (Bourke et al., 2012; Elwood et al., 2016).

The absence of frameworks to integrate socio-economic and spatial dynamics influencing health inequities provides an opportunity to reconceptualise remoteness based on our study's findings. It draws on a relational view of 'remote' social spaces as not only physically determined but socially constructed and infused with local meaning, as well as connected to and impacted by broader socio-political processes, decisions, and actions over time (Elwood et al., 2016; Statz & Evers, 2020; Winterton et al., 2014). Our proposed framework (Figure 5) captures micro-level dimensions of 'socio-

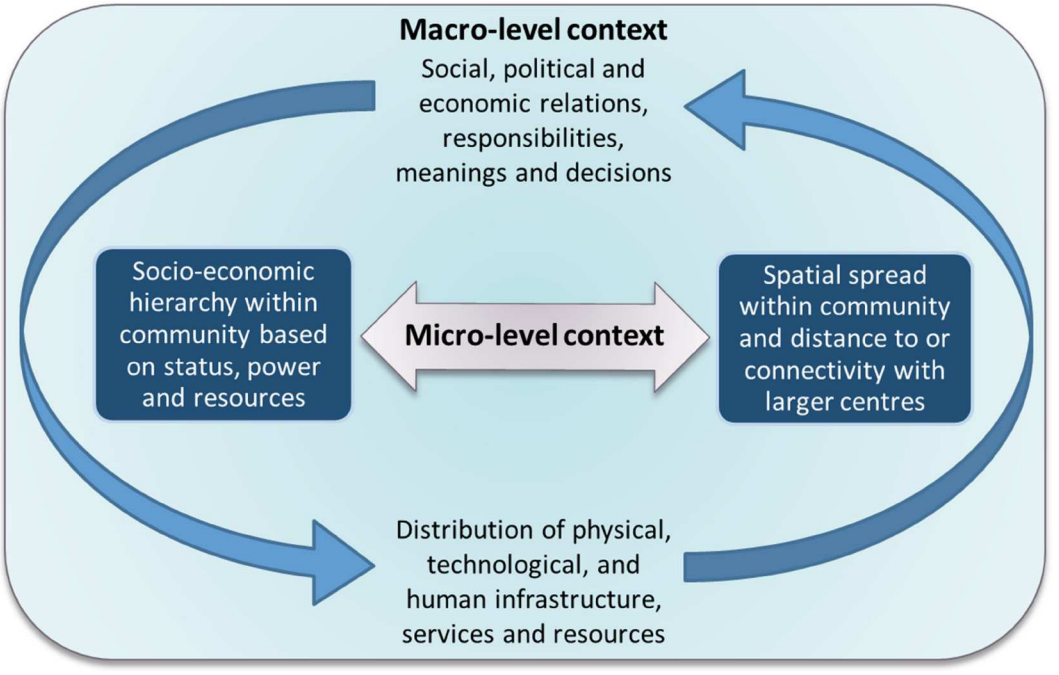

Figure 5. Conceptual framework of socio-spatial remoteness influencing equity in health programme coverage.

spatial remoteness' that we found to be jointly affecting inequitable health service coverage within communities: (i) the extent of socio-economic position hierarchy based on relative status, power and resources over time, and (ii) the spatial spread or disparateness within communities, combined with overall distance and connectivity to large centers or headquarters outside. The framework also helps to recognise that these micro-level dimensions are shaped by interrelated macro-level factors, which often get overlooked even in place-based framings of remoteness: (i) the role of social, political and economic relations, responsibilities and decisions by actors in public, private or civil society sectors, and (ii) related distributions of physical, technological and human infrastructure, services and resources within and outside the community (Anand et al., 2018; Bourke et al., 2012; Elwood et al., 2016; Winterton et al., 2014).

This framework can aid in characterising the micro- and macro- level dimensions of socio-spatial remoteness experienced by different types of communities, and the interrelated influence these may have on inequities in coverage of health services. This could in turn guide public health strategies to tailor their responses to local socio-spatial inequities at the community-level and beyond with more contextual nuance. In line with our proposed framework, the study's results have spurred ongoing gap analysis by the UP TSU to map ASHA catchment areas and fill vacancies more efficiently, and to identify and shift VHND locations to be accessible to previously missed groups and areas. Community-based participatory action research tools and vulnerability mapping have also been integrated within ASHAs' training modules, which aim to guide participatory processes by communities to uncover and address socio-spatial issues that perpetuate health inequities (Ministry of Health and Family Welfare, 2016). Continuous micro-planning will help understand and address broader socio-spatial inequities in MNH service availability, accessibility, and quality. This should be combined with coordination among responsible health and non-health actors to address underlying systems-level issues like human resource, supply chain or transportation gaps.

To apply this framework in future health equity research, we propose a 'bifocal' lens that uses mixed-methods to integrate both distributional and relational approaches (Peters, 1997). The

predominant distributional quantitative analyses can measure socio-economic or geographical disparities in health outcomes at a population level, while relational qualitative analyses can add depth and nuance to these population patterns by uncovering local perspectives on the socio-economic and spatial processes that influence these disparities over time (Peters, 1997; Weis & Fine, 2012). This approach could be applied for understanding other pressing public health issues such as environmental exposures or migration patterns that are particularly marked by socio-spatial patterning (Cummins et al., 2007). It also holds potential to advance multisectoral efforts related to 'Health in All Policies' or even One Health by centrally considering the spatial contours of socio-economic position inequities (Biermann & Kalfagianni, 2020; Ramirez-Rubio et al., 2019). A bifocal lens would be apt for guiding more transdisciplinary approaches in which practitioners, academics, and community members partner to integrate multiple knowledge forms and contextualised understandings, in future efforts to better uncover and overcome socio-spatial inequities in health (Cohn, 2014; Elwood et al., 2016; Stock & Burton, 2011).

There were some limitations to the present study. It was sometimes difficult to recruit participants from all hamlets or socio-economic groups in large villages, though we talked to a wide set of people during the social mapping and FGDs. The study used discussion-based methods, which are better able to capture what people said they did than what they actually did due to any social desirability or recall bias. While the UP TSU team viewed East and West UP as good representations of socio-cultural and geographical diversity in the state, we could have included other areas to enhance transferability.

Conclusions

Our study applied a relational lens to explore local socio-spatial dynamics and how these influenced equity in coverage of community-based maternal and newborn health programmes in four rural villages of Uttar Pradesh state, India. The study villages displayed varying degrees of remoteness based on the extent to which socio-economic hierarchies interplayed with spatial disparateness within the village, and overall distance of the village to larger urban headquarters. Inequities in coverage of community-based MNH programmes that disadvantaged lower socio-economic position groups were exacerbated in villages with greater socio-spatial remoteness, as they also more often experienced ASHA vacancies as well as distance to and poorer perceived quality of health services nearest the village. The results inform a new conceptual framework of 'socio-spatial remoteness' that could aid future public health programmes and research to more comprehensively characterise and address health inequities. To apply this framework, taking a bifocal lens to blend distributional analyses at a population level with relational qualitative insights from people's lived experiences would help to better understand socio-spatial inequities in health collectively and contextually, and thereby provide actionable insights for public health programmes. Future applications could advance the push for a more transdisciplinary, multisectoral pursuit of the Sustainable Development Goals on universal health coverage and leaving no one behind by 2030.

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Data availability statement

The data are not publicly available to prevent the potential to breach confidentiality, but anonymised, aggregated results are available from the corresponding author upon reasonable request.

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