Exploring Male Participation in Maternal Healthcare in a Patriarchal Population: An Agent-Based Model

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Abstract

Evidence shows that male participation is an important factor in enhancing maternal healthcare utilisation and good maternal health outcomes. However, in sub-Saharan Africa and other patriarchal societies, pregnancy and childbirth are still seen as a feminine matter and male participation is subject to social stigma and sanctions. Recognising the global health promotion of male involvement in maternal health as a strategy to ensure safer pregnancy and childbirth, this paper seeks to understand the process of attitude change from patriarchal attitudes which characterises male involvement in maternal healthcare as a feminine matter because of traditional gender division of labour to more egalitarian ones which support participation. Male involvement in maternal healthcare being a macro phenomena is embedded within the social and cultural fabric of society. Understanding micro-level actions which brings it about is important because it helps us identify conditions under which men are enabled to participate in maternal healthcare which subsequently has the potential of enhancing policy strategies in the positive direction. The paper operationalises the social influence theory and applies it to patriarchal societies of sub-Saharan Africa. I use agent-based modelling to simulate an artificial society and the idea of the model is to simulate the decision-making process of agents living in a social environment which is predominated by patriarchal and masculinity ideologies and experiencing some change due to persuasive communications from social networks, interest organisations, opinion leaders and significant others to change traditional attitudes and behaviours towards egalitarianism and participate in maternal healthcare. The results show that attitudinal ahnage was a function of the number of people propagating a particular attitudinal change, the extent of their influence and their closeness to the individual with opposing attitudes. The results also show a familiar trend in attitudinal change research and the complex phenomena of polarisation in society–that if in general, social interaction resulted into the attitude of the majority becoming dominant, complete uniformity of attitudes was never attained and clustering along like-minded attitudes was observed. The study illuminates the need for advocates of male involvement in maternal healthcare in patriarchal societies to maximize their outreach and target opinion leaders who are likely to have a big impact in changing attitudes from patriarchal to egalitarian ones.

1 Introduction

In patriarchal societies, pregnancy and child birth have always been constructed as omen's domain and maternal healthcare services have been feminine matters with little involvement of men. Although male participation is maternal healthcare is low, they play an important role in insuring the safety of female partners and childbirth. This is because men are the major primary decision-makers within households and communities, determining healthcare-seeking practices of women during pregnancy and delivery periods (Comrie-Thomson et al., 2015; Mullany et al., 2005; Story et al., 2016; Kululanga et al., 2011). Indeed, evidence shows that male participation is associated with women's access and utilisation of maternal healthcare services (Mangeni et al., 2012; Dudgeon and Inhorn, 2004). In most patriarchal societies, men are empowered economically and are heads of households. They thus, occupy an integral position to ensuring better access to maternal healthcare services which may result in positive reproductive health outcomes such as increased use of contraception, skilled delivery care and improved uptake of interventions to combat HIV transmission (Kululanga et al., 2011; Mangeni et al., 2012). Other beneficial effects of prenatal male involvement include higher first trimester ANC visits, abstinence from smoking and alcohol consumption (Alio et al., 2010; Martin et al., 2007), and reduction in low birth-weight in infants (Alio et al., 2010; Tweheyo et al., 2010).

Also, given the fact that men dominate most governance, social and religious institutions, their involvement can potentially signal a significant challenge to broader patriarchal structures which reproduce gender inequities (Barker et al., 2007). It is for this reason that maternal health interventions that target both men and women have proved successful not only in increasing knowledge levels about maternal health issues among men but also improved use of maternal healthcare including antenatal care attendance, skilled birth attendance, facility delivery, postpartum care, birth and complication preparedness and maternal nutrition (Tokhi et al., 2018).

The perception of gender division of labour is the main challenge to male involvement in maternal healthcare highlighted in recent research, where men regard maternal health care issues as being outside their domain (Lowe, 2017; Aborigo et al., 2018; Singh et al., 2014). Evidence does indicate that men are not necessarily indifferent towards maternal healthcare (Bougangue and Ling, 2017). They are aware that women posses special rights relative to pregnancy and childbirth and the dangers associated with them. Their actions however, are determined by social and cultural norms and values as they are socialised to be resource and not care providers for their wives and children. Women on the other hand desire full

support from their husbands throughout the maternal healthcare continuum, from antenatal attendance to delivery and postpartum periods (Rahman et al., 2018) In this sense, social and cultural traditions clash with public health recommendations and also has the potential to create conflict within families.

What is lacking in extant literature on male involvement in maternal healthcare is the micro-level factors underlying male-involvement. Indeed recent policy strategies adopted in most countries especially in sub-Saharan Africa encouraging men to be fully involved in maternal healthcare have shown enormous success and than men are able to circumvent stereotypical gender roles and take part in maternal healthcare. The question is what conditions make it convenient for men to participate in maternal healthcare and how do they decide when and when not to participate? Answering these questions is important because it gives us an understanding of how "problematic" sociocultural norms are formed, the extent of their influence on individual decision-making processes and how agency is exercised to resist this influence.

In this paper, I dynamically model micro-level male participation in maternal healthcare bottom-up to assess emergent macro-level properties through agent-based modelling. The professed goal is to ascertain the micro-level conditions that would make a man to decide to participate in maternal healthcare against the social structure that encourages non-participation.

The the paper is structured as follows. First, it gives a historical narrative of male involvement in maternal healthcare rooting on the Cairo conference on population development as an important turning point in maternal health strategy. I then discuss the theory of social influence and how it can be applied in order to understand attitudinal change in male involvement in maternal healthcare. I then briefly discuss agent-based models and their relevance and uniqueness in studying attitudinal change emphasising on their ability to link micro-level actions to their macro-level emergent phenomena. After that, the modelling procedure is discussed followed by the presentation of results, discussions and conclusion.

1.1 Historical perspectives and male involvement strategies

Policy initiatives to involve men in reproductive , maternal, newborn and child health (RMNCH) were uncommon until the 1994 Cairo international conference on population development (ICPD) when the international community recognised the importance of shared responsibility of men in RMNCH. The programme of action of the ICPD called for the

engagement of men in maternal health activities and promotion of their active participation in family planning and parenthood in general (Platiner, 1995). The world health organisation later also recognised the importance of male involvement and made recommendations for interventions to promote the involvement of men during pregnancy, childbirth and after birth. There are different models and rationales that have been proposed and adopted over the years for seeking to involve men in pregnancy and childbirth-related issues including a view of men as gatekeepers for access to maternal and newborn health (MNH) services, men as responsible partners of women and important sub-population within the community and men's preference to be included as fathers/partners (Organization et al., 2015).

In recognition of the important role men play in maternal healthcare, many sub-Saharan African governments have incorporated male involvement in the strategic plans aimed at promoting maternal health at the household and community levels (Bougangue and Ling, 2017).These strategies are also health facility-based and they encourage men to attend ante-natal and postnatal consultation through mass media campaigns, community and workplace-based outreach and education, home visits and facility-based counselling for couples, groups or men only.

1.2 Theory of Social Influence

Social and cultural norms and values are identified in literature as the main drivers of male involvement of maternal healthcare. Norms and values are cultural traits which are learned from others through the concept of social influence. Social psychologists and sociologists have studied the topic of social influence for many decades now. Social influence is defined as the tendency to alter one's opinions, beliefs, attitudes, customs or other cultural traits in order to conform with the cultural majority, a high status minority or as well as a network neighbour with whom one interacts regularly (Axelrod, 1997). The 1958 work of Herbert Kelman has been influential in shaping social influence theory as he focusing on the three processes that make up influence and they include compliance, identification and internalisation. According to him, compliance occurs when an individual accepts to be influenced by others and adopts the induced behaviour not because they agree with its content but because they are interested in the rewards that come with the adoption of the new behaviour. The satisfaction that actors get in this process is approval and avoidance of disapproval and punishment (Kelman, 1958).

Identification occurs when an individual is influenced or accepts to be influenced because she wants to maintain a self-defining relationship with another person or group. Again in this

process, the specific content doesn't matter but the induced behaviour is adopted because of the need for a desired relationship. Internalisation on the other hand, is based on the content of the induced behaviour. This is where an individual adopts the new behaviour because it is in congruent with her individual value systems (Kelman, 1958). Taking Kolman's three processes into consideration, the determination of whether or not an individual will be influenced to change attitudes and a set of long-held belief systems depends on a) the relative importance of anticipated effect, b) the relative power of the influencing agent and c) the prepotency of induced response.

Nowak et al. (1990) in their later work on social influence re-shaped Kelman's 1958 formulation by iluminating the role played by the source(s) of social influence and came up with different drivers of social influence relative to the source. Borrowing from Latańe's 1981 work on social impact theory, they held that the moderating factor of social influence are strength, immediacy and number of other people in the social invironment who hold a divegent view point. According to them, strength is represented by the source's credibility and attractiveness, immediacy is represented by physical closeness and the number of people is basically how many people hold opposing views in the social environment. They also acknolwdged that the source may not only persuade the actor to change their behaviour but also support their current set of beliefs and this makes change not obvious. In this regard, they distinguished between persuasiveness and supportiveness and they define as the earlier as ability to induce someone with an opposing position to change and supportiveness as the ability to help those who agree with one's own point of vioew to resist influence from others. This entails that a given person's likelihood to change their attitudes, behaviours and beliefs are a direct function of strength, immediacy and number of those sharing her own points of view (either persuasive or supportive) (Nowak et al., 1990)

The fulcrum of the social influence theory seems to be that people modify their stated behaviour, attitudes and beliefs in response to persuarsive arguments from those they interact with or even the mere knowledge that others may have a different opinion (Nowak et al., 1990; Flache et al., 2017). The changes are always in the direction of greater conformity with the sources of influence. The reasons why people yield fo social influence include the need to conform with others (Akers et al., 1979), because their are persuaded to change their position (Nowak et al., 1990), they feel social pressure and opt to follow the prevailing social norms and because they are unsure of a certain decision and want to follow the lead of others (Wood, 2000). The question that has dominated much scholarship in this area is why, despite the willingness of people to change positions, don't differences eventually disappear and uniformity the norm?. Robert Axelrod's 1997 work on *dissemination culture* dealt with

this question and he showed how diversity can be preserved despite the convergent tendencies created by cultural influence (Axelrod, 1997). A preference for interaction among people with similar traits preclude influence once the differences between cultural groups become too large. This is what makes social influence an interesting phenonemena because on one hand it has been found to decrease differences between people, on the other hand, people may not influence each other to become alike but actually reject the behaviour, attitudes and beliefs of those they interact with.

1.3 Social Influence theory and Male involvemnt in Maternal Healthcare

Social influence can be described as a metatheory that broadily describes how certain variables affect the operations of specific social processes but may not in itself describe the nature of those specific processes. Theory application to specific social phenomena becomes necessary and an ideal way of establishing the relevance of social influence theory. There are many social scientists who have implimented computational models to study how social influence works within a particular society across a wide specrum of subjects including sociology, psychology, political science and organisational theory amoung others. Theories about changes in beliefs, attitudes, and behaviour are also well-developed and implemented such as the spread of social norms (Axelrod, 1986), spread of knowledge (Carley, 1991), the diffusion of innovations (Rogers and Shoemaker, 1971), the establishment of technical standards (Axelrod et al., 1995), cultural polarisation (Axelrod, 1997; Flache and Macy, 2011) and online networks (Bond et al., 2012). These studies have contributed to our understanding of social influence as a micro-level process and its resultant emergent macro-level properties.

Male involvement in maternal healthcare is a macro-level phenomena which is embedded in social and cultural fundamentals of patriarchal societies. It is mostly as a result of gender division of labour where men and women are postulated to play distinct roles that are crucial to the well-being of families and society at large (Kendall, 2012). Gender systems are social insititutions and they describe basic characteristics of men and women and how they are supposed to live with respect to their roles, rights and obligations. Maternal healthcare is one such role that is perceived to be associated with women and the involvement of men is seen not only as a demonstration of wealness on their part but also as an intrution in the constituency and therefore a loss of women's rights to make decisions regarding pregnancy and other maternal issues (Blanc, 2001). Traditional approaches to maternal health in African societies have for a long time reflected this formulation, which did not encourage male paricipation

because the services were female-oriented (Kululanga et al., 2012). Social influence theory is in resonance with gender systems which prescribe 'appropriate behaviour' for men and women because it suggests that people's behaviour, attitudes and beliefs are directed by their social environment. Human beings are not born with particular attitudes and bevioural characters, they tend to adopt the social norms, values and beliefs of a society they are born in through imitation, modelling and applications of rewards and punishments (Kendall, 2012). Hoewever, social infuence theory has also postulated that these characteristics are not permanent, they can change in response to persuasive messages from social interaction. In this regard, gender role behaviour and attitudes imposed by a particular society with respect to male involvement in maternal healthcare can be altered with persuasive communication.

Accordingly, as in the social influence theory, male involvement in maternal healthcare in a function of the credibility of the persuasive source, physical closeness of tha source and the number of people with changing attitudes in the individual's social environment. Indeed there are no shartages of credible advocates of male involvement in maternal healthcare. The World Health Organisation offers that credibility as it has prioritised male involvement in maternal healthcare and made it an essential element in the initiative for making pregnancies safer (Kululanga et al., 2012). Many international organisations and governments have also been credible sources of persuasive health promotion information that encourages men to recognise the importance of their involvement in maternal healthcare. Physical closeness of the persuasive sources is applied in terms of the presence of local opinion leaders. Research shows that the involvement of local opinion leaders such as chiefs, elders, assemblymen and leaders of women groups among others can be very effective in enhancing behavioural change in maternal healthcare (Aborigo et al, 2018). The number of men who are involved in maternal healthcare in an individual's social network are also expected to determine one's willingness to participate in maternal healthcare. Given that social influence never results in uniformity of views or the disapperance of diversity in the social system, it is expected that regardless of relentless advocacy from credible organisations, opinion leaders and close friends, endorsement of traditional gender roles which resist perticipation in maternal healthcare will still be prevalent, at least to a certain extent.

2 Methods

2.1 Agent-based modelling

The main idea behind agent-based modelling is that most phenomena is the world can be modelled with agents, an environment, and a description of agent-agent and agent-environment interactions (Wilensky and Rand, 2015). Agent-based models can be defined as computer programmes in which artificial agents interact based on a set of rules within an environment specified by the researcher (Miller and Page, 2009). These models follow a 'generative paradigm' as they seek to model agent's individual behaviour at a micro-level in a bottom-up approach and then offer to evaluate the macro structures that result from it against empirical observations or theoretical expectations of the macro strcuture (Epstein, 2006). While the modelling process takes place at the individual micro-level, the interactions between agents and their environment often aggregates to create emergent patterns observable at the micro-level. The ability of agent-based models to explicitely link individual characteristics and behaviour to their collective consensequences makes them invaluable in exploring the social consequences of individual behaviour (Bruch and Atwell, 2015). Male involvement in maternal healthcare is part of the sociocultural emergent phenomena that is created by micro-level decision-making processes of individual men. The resultant emergent phenomena has characteristics that are distinct from the individual actions that created it and also may determine the subsequent behaviour of the individuals. This is what makes an agent-based model appropriate for this analysis.

Agent-based models typically do not enlist central authorities as the emergent phenomena is said be randomly created without any coordination (Wilensky and Rand, 2015). The same phenomena can be modelled in many different ways dependending on what aspect of the phenomena one wants to illuminate. The individual agents are assumed to follow simple rules and the rules are not necessarily derived from any principles of rational calculation, rather the agents simply adapt to their environment (Axelrod, 1997).

2.2 The model

With this model, I add a unique contribution to literature bacause I try to operationalise the social influence theory and Latané's 1981 theory of social impact which specifies principles underlying how individuals are affected by their social environment into a schocastic model. Individuals have the capacity to act independently and make their own choice about whether

or not to modify their attitudes and behaviour. It conforms with the principles of agent-based models in that makes an agent based model is that social norms and support emerge as outcomes of interactions between agents. Parameters in the model are driven from the literature on male involvement in sub-saharan Africa mostly on qualitative research in line with the recommendations of Ghorbani et al. (2015) who argued for the inclusion of qualitative research in agent-based models. Some parameters are derived from plausible guesstimates as they are not from data because it is scarce or doesn't exist at all. The model is inspired and it is an extention of Nowak et al. (1990)'s *From Private to Pulic Opinion model* and the simulation is implemented in `NetLogo`.

The idea of the model is to simulate the decision-making process of agents living in a social environment which is predominated by patriarchal and masculiniy ideologies and experiencing some change due to persuasive communications from social networks, interest organisations, opinion leaders and significant others to change traditional attitudes and behaviours towards egalitarianism and participate in maternal healthcare. The agents represent men of the reproductive age group between the ages of 15 and 59[1]. I define a few other *turtle's own* variables such as wealth, marriage and employment. These variables were selected because literature shows that socioeconomic status and marital status are some of the factors influencing both male participation in maternal health and women utilisation of maternal healthcare services (Simona et al., 2018; Tweheyo et al., 2010). Wealth was assigned boolean values with a larger percentage belonging to those without wealth reflecting the wealth distibution of sub-Saharan African countries. Each agent is assigned a value showing their marital status (whether or not they are married) and again with a distribution of more married men than unmarried ones according to true reflection of sub-Saharan African male population demographics. Employment also has a boolean expression where agents are either be employed or not employed.

The population of agents is divided into two groups of those with patriarchal attitudes and those with egalitarian attitudes. The size of each group (N) equals the number of people sharing the same attitude. Each individual agent has four attributes affecting the degree to which they will influence or be influenced by others to change their attitude. First is the individual's attitude, which is defined to be either patriarchal or egalitarian and this attribute is randomly assigned to each agent. The second attribute is their persuasiveness, which is their ability to persuade others with opposing attitudes and behaviour to change them. The third is supportiveness which is the ability to provide social support to people

[1]The figures are derived from the international demographic and health (DHS) surveys which is conducted in more than 90 countries defining male reproductive age group to be between 15 and 59

with similer views. Supportiveness and persuasiveness attributes are assigned in recognition of the fact influence in real life situations is often receprocal in nature. In the sence that one can be a receipient of social influence and at the same time be a source of innfluence for other people in a social setting. Men with patriarchal attitudes for example, could be influenced by those with egalitarian attitudes to change and become involved maternal healthcare and at the same time have the portential to support others to mantain patriarchal attitudes. The fourth attribute is neighbourhood, which is the distance between agents with specific spatial location and it is the quantity that is given between two individuals. To determine whether someone maintained the patriarchal attitude or changed to a more egalitarian one, I used the rule that is decribed in Nowak et al. (1990), that whenever the influence on an individual from the group with a different opinion was greater than the influence of her own group, the attitude of that individual changed. Influence is computed by dividing the supportiveness or persuasiveness of each source by the square of their distance to the receipient to determine their contribution to the net impact.

Although agents have no central authority and uncoordinated, it import to recognise that social influence is not uniform among agents. There are some agents that are more influencial than others. It has already been stated that there are credible local and international organisations that are involved in the promotion of male involvement and individuals associated with these organisations are naturally more influencial that ordinary male associates. Qualitative research literature shows that local opinion leaders such as chiefs, villages headmen, community leaders are important in the promotion of male involvemnt in maternal healthcare and these are expected to have disproptionate influence compared to ordinary people. It is also important to note that ordinary people and significant others such as friends and relatives in the social environment. These are expected to have more influence on an individual whether it is in support or against male involvement in maternal healthcare. I included this dynamic in the model whereby agents were further delineated into two types of influencial and ordinary agents with influencial agents being assigned more influence on an agent than non-influencial ones. Table one beloew reports the parameters included in the model

2.3 The procedure

At setup, the frequency of each position in the distribution of attitudes is controlled by the attitude slide while the starting configeration of attitudes is random. The values of persuasiveness and supportiveness are random values between 0 and 100. Each color represents

Table 1: Agent-based model attributes

Attribute	**Distription**
Attitude	Whether patriarchal or egalitarian. Patriarchal attitudes are associated with obedience to traditional norms and against male involvement in maternal healthcare
Persuasiveness	Ability to influence people who are initially disagreeable
Supportiveness	Ability to offer support to others in the resistance to attitude change
Neighbourhood	Distance between agents. Those who are close to the agent are expected to have more influence compared to those who are far away
Influential	Important agents who are expected to be more influential compared to others (these are opinion leaders in the community and they include chiefs, elders, assemblymen, leaders of organisations, etc)
Ordinary	Regular agents whose influence is less that the influential ones

an attitude type: either patriarchy or egalitarianism and at each run, the agents change their attitudes depending on which has a greater impact on them. After changing their attitudes parameters of persuasiveness and supportiveness are re-assigned at random. This means that a given initial configuration could lead to different types of equilibria. The `NetLogo` interface showed the percentage of attitude and it can be varied according to the preference of the user. The monitors show the number of patches, number of turtles and the percentage of red turtles and green ones representing the two attitude types.

The simulation was on a 20 x 20 matrix where individuals are represented by 1681 turtles sitting on the same number of patches. I used Lanaté's theory to define the interactions of agents with their environment whereby neighbors are represented by two immediate turtles and these are expected to have more influence on the immediate agent and this power decreases with distance. I borrowed Nowak et al. (1990)'s formular by calculating the neighbourhood of two turtles as a Euclidean physical distance between the patches holding the two turtles in the matrix.

I also created two types of breeds to represent influential and ordinary individuals and the influence of influential turtles was calculated as twice the ordinary ones but this was also determined by the distance to the individual turtles. Those influential turtles most closest are the ones with double influence while influential turtles a distance way have the same influence as the ordinary ones

3 Results

The results show a trend that is familiar in that, after equilibrium is reached, the distribution of attitudes was in favour of the majority position and sub-groups of similar neighbourhoods were clustered together. Whichever type of attitude (patriarchal vs. egalitarian) was in the majority in the begining of the simulation encreased their membership during the simulation process and ended up being the majority. In other words, the attitudinal choice with the majority of the population gained more members while the minority lost more. This was a constant phenomena in several simulations inspite of varying the number of minority and majority attitudinal groups.

It is important to note that influential members of either type of attitudes were an important dynamic in the simulation process. When the number of influential members were increased, it had a significant effect on the distribution of attitudes. Influential members in both sides had the power to tilt the distribution configuration for up to 30%. Meaning that the minority

attitude type with a less than 30% defit could increase more members and become the majority when equlibrium was attained. However, when the number of influential members is equalised with ordinary members across the attitudinal groups, the typical distribution at the end of the simulation perion was observed.

In line with other social influence models (Nowak et al., 1990; Axelrod, 1997), individuals surrounded by groups of differing attitudes have a higher probability of changing themselves leading to uniformity among members of of local subgroups with similar attitudes to emerge from the initial random configuration. As the simulation proceded, subgroups became more coherent as smaller sub-groups were absorbed by larger ones. Figure 1 reports this dynamic where by the initial and the final distribution of sub-group sizes have many fewer smaller groups at the end than begining. Also, demonstrating one of the prominent features of social influence theory, that diversity never completely disappears as there will always be small minority groups on the social margins. When egalitarian attitudes supporting male invlovement has engulfed society, there will always be some disenting patriarchal attitudes among certain groups and this is hardly eliminated. However, the figure also indicates that as simulation went on, the frequency of attitude change reduced and even disappered because individuals in larger groups were less likely to change their attitudes. Equilibrium was reached after a series of simulation steps

Time before equilibrium was reached is reported in figure 2 and except for a spike at 40% minority, it shows that the time is a function of the starting proportion. When the two attitude types have an equal percentage of membership, time to equilibrium takes longer compared to a skewed distribution where one attitude type dominates the other.

At the end of the simulation process, the distribution of attitudes was a function of the initial distribution. Figure 2. reports the results of the final proportion of people holding a given attitude as a function of the starting proportion based on 10 simulations runs for each point. The results indicate that if a group dominates in the beginning of the simulation, it will dominate even more in the end and the dominance depends on the nature of the initial state of the group. When the proportion of the egalitarian population at the beginning of the simulation was 10% of the artificial population, it disappeared by the time of equilibrium in some simulations while the maximum value was a reduction to about 3%. There are also cases where 20% of the egalitarian attitudes at the beginning were equally erased by the end of the simulation, with a maximum value of around 5%. When egalitarian and patriarchal attitudes are the same, the mean final attitude was at 50% with a range of between 38% and 58%. The overall configuration of the simulation shows an S shaped distribution were by after the initial drop in the number of egalitarian minority members, the remaining ones seemed to

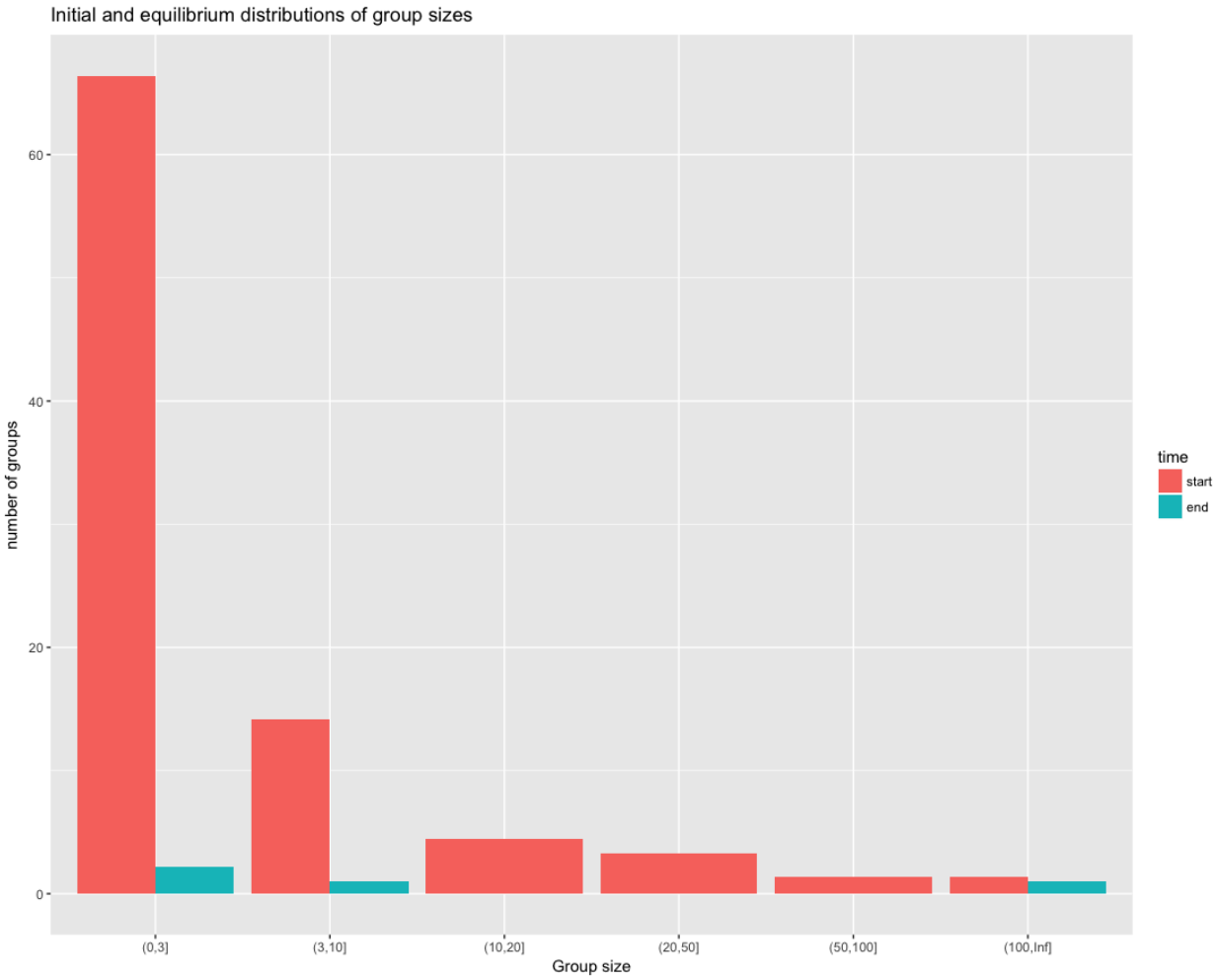

Figure 1: Initial and equilibrium distributions.

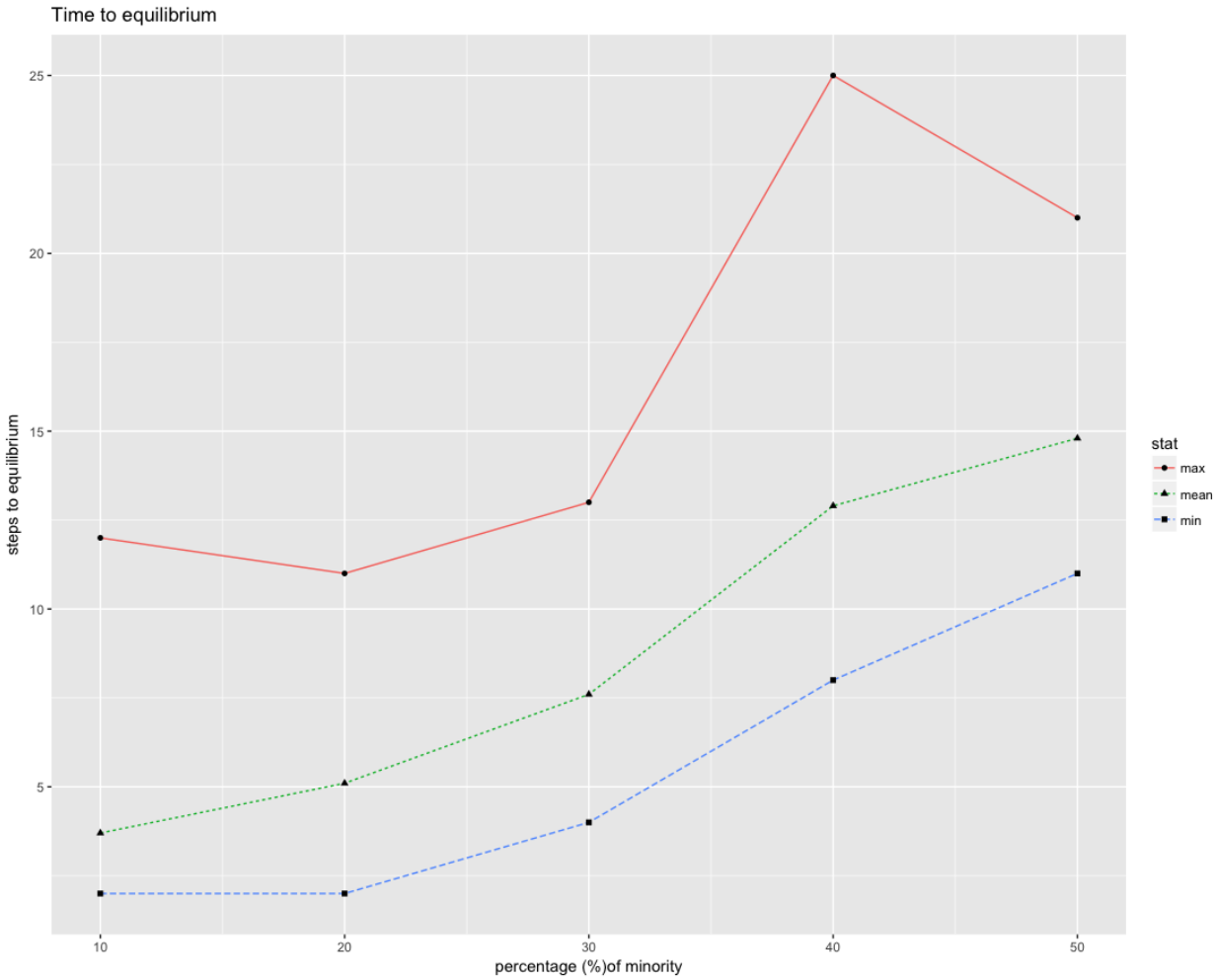

Figure 2: Time to equilibrium.

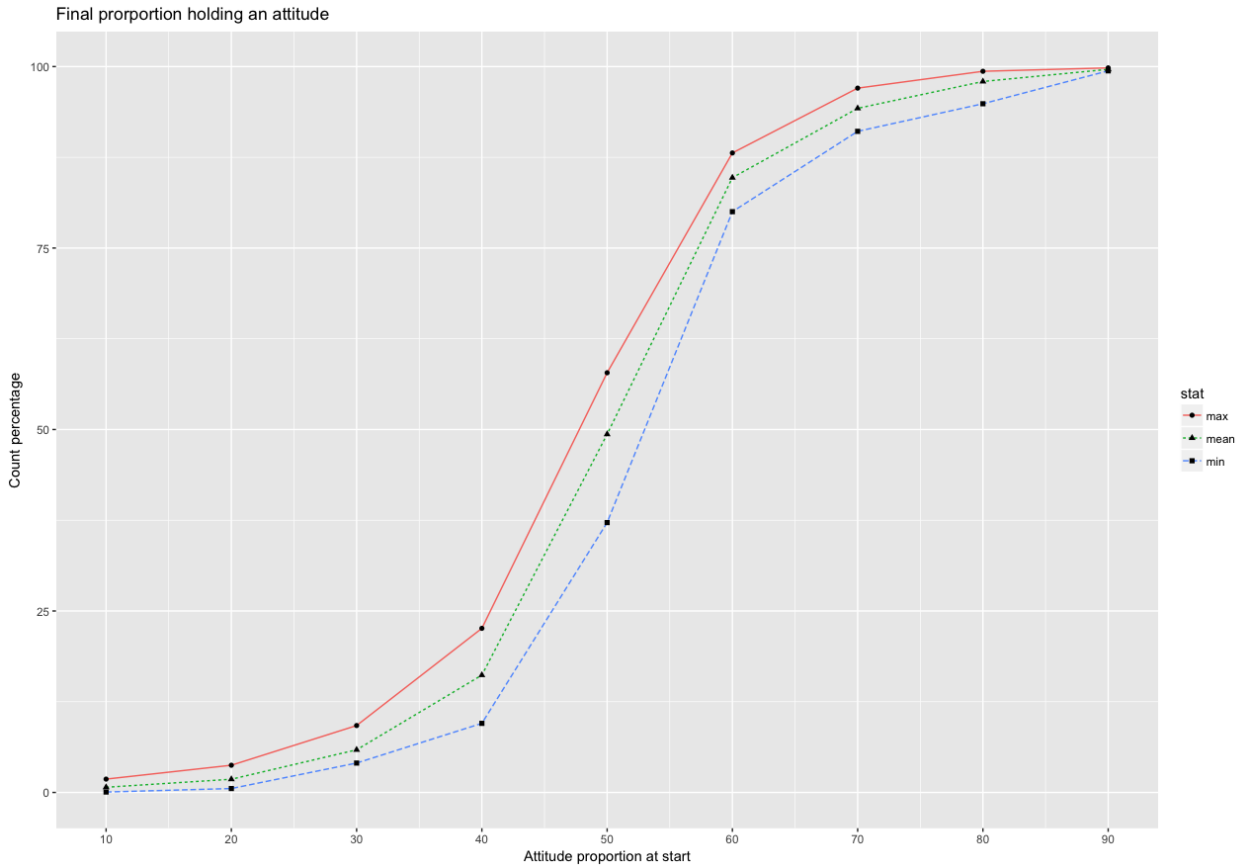

Figure 3: Final proportion holding an attitude.

spread their egalitarian attitudes quite effectively and showed a surge in membership. With time, all members of the original egalitarian group show a change of attitude to conform with patriarchal attitudes which was the majority, leaving only newly recruited members who manage to resist change and later converting some of the majority members. This also happens when the starting minority are the patriarchal groups. However, uniformity is never attained as there are always resisting members of the opposing group in the margins.

4 Discussion and Conclusion

The aim of this paper was to understand the micro-level mechanisms that determine the decision making proceses among men with repect to participation in maternal healthcare in patriarchal societies. Male involvement in maternal healthcare being a macro phenomena is embedded within the social and cultural fabric of society. Understanding micro-level actions which brings it about is important because it helps us identify conditions under which men

are enabled to participate in maternal healthcare which subsequently, has the potential of shaping policy strategies in the positive direction.

Social influence theory was found to be useful in understanding the circumstances through which individuals change their attitudes from patriarchal to egalitarian ones. The simulation indicates that the change of attitude in men depends on the number of people propagating a particular attitudinal change, the extent of their influence and their closeness to the individual with opposing attitudes. This study aligns very well with qualitative research in maternal healthcare which have determined the importance of opinion leaders in aiding the change of attiudes among men (Aborigo et al., 2018). Also, the fact that people have a propensity to conform with the majority and persuasive messages within their social environment due to the need for belonging, acceptence and social pressure (Flache et al., 2017; Wood, 2000).

The study illuminates the complex phenomena of polarisation in society. Even if in general, social interaction resulted into the attitude of the majority becoming dominant, complete uniformity of attitudes was never attained and clustering along like-mided attitudes was observed. Axelrod (1997) provides important reasons that could be explored here as to why polarisation is always the norm. His concepts of specialisation and changing environment are especially important in male participation in maternal healthcare in sub-Saharan Africa. By specialisation, Axelrod argues that people have interest that are at least partialy resistant to social influence in the environment. This could be an important point is sub-Saharan Africa where male involvement has been characterised as a faminine matter (Story et al., 2016; **?**) and thus contradict with masculinity ideologies. For men who subscribe to masculinity ideologies, they would see male involvement in maternal healthcare as a threat to their interests and may resist despite the majority of people being in support of it. The effects of a changing envronment or technology is another aspect described by Axelrol. This idea mirrors what is called cultural lag in sociology (Kendall, 2012), meaning that the envoronment may be changing faster than people are able to respond to it. In a social evironment enmeshed by traditional norms and values, this is a plausible formulation. The wheel of cultural change moves slow and therefore men may feel unprepared to engage in what they have always considered as the female sphere and this can cause resistence to participation.

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