Childcare in transition: evidence that patterns of childcare differ by degree of market integration in north-western Tanzania.

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Abstract

Women around the world receive help with childrearing, much of which would have come from kin throughout most of human history. Market integration leads to less kin-dense social networks which may transform patterns of allomaternal care. Yet, few empirical studies have quantified the role of market integration in childcare patterns. We test the hypothesis that higher levels of market integration will be associated with (i) lower probability of receiving allomaternal support from kin; and (ii) higher probability of receiving support from non-kin. Using a survey of 808 children under 5 years from Mwanza, Tanzania, we test for differences in childcare arrangements between a less market integrated village and more market integrated town. We consider two types of allomaternal care, low-intensity and high-intensity, from seven sources: fathers, siblings, maternal grandparents, paternal grandparents, maternal aunts/uncles, paternal aunts/uncles and distant/non-kin. In the town, fathers, siblings, and paternal kin had lower odds and distant/non-kin had higher odds of providing care than in the village. Care from maternal kin was not associated with village/town residence. Market integration may disrupt paternal kin-orientated childcare arrangements, but not care from maternal kin, who may overcome greater physical distances to maintain contact. Distant/non-kin appear to substitute for the reduced support from kin in the town. We contribute data on an often assumed, but rarely tested, hypothesis: that market integration is associated with lower likelihood of help from kin, finding mixed support for this hypothesis.

1. Introduction

Increasing levels of market integration across the world are altering who people regularly interact with (Fischer 1982; Newson et al. 2005; Murphy 2008; Zelinsky 1971). It is commonly presumed that due to differences in physical proximity to kin, individuals living rurally rely more on kin for support (Nelson 2020), whereas individuals in urban communities are more likely to cooperate with non-kin (David-Barrett 2019; Murphy 2008, 2011; Sear and Coall 2011; Turke 1989). Dissolution of kin networks with market integration and urbanisation could result from declining dependence on agriculture leading to families living further apart in their search for work (Nelson 2020). In support of this idea, between 1790 and 1940 in the US, living close to patrilineal kin declined from nearly 50% of households to 17% - a decline that is partially attributed to urbanisation (Nelson 2020). Similarly, in Poland, rural economies are characterised by large kin-dense support networks (i.e., a high proportion of the support network is comprised of kin who are also connected to each other), while women living in households that are more market integrated tend to have less kin-dominated networks (Colleran 2020).

Declining kin availability, and this proposed erosion of kin networks in more market integrated communities, may well then have implications for who provides childcare support to mothers – or allomaternal support (Sear and Coall 2011; Bentley and Mace 2009; Sear and Mace 2008; Hrdy 2005b). Evolutionary anthropologists have demonstrated that humans have adopted a system of cooperative reproduction, in which women require help to raise children (Hrdy 2005b). This help with raising children has real implications for women's fertility and children's health and survival (Sear and Mace 2008; Sear and Coall 2011; Schaffnit and Sear 2017; Kramer 2005). While allomothering is documented in most societies around the world, there is diversity in who helps, and the types of help provided. Understanding how level of market integration correlates with types and sources of allomaternal support can elucidate how different patterns of support can drive real world differences in fertility and health between more and less market integrated populations. Here, we compare patterns of allomaternal care between a town and a village in north-western Tanzania that vary in their level of market integration but are culturally and historically similar in other ways.

We use the term market integration to refer to shifts in subsistence from economies largely reliant on farming and agriculture to those that are more dependent on wage-based labour and market work. The terms ‘market integrated’ and ‘urban’ are used interchangeably, with less market integrated communities referred to as ‘rural’ and more market integrated ones as ‘urban’. Rural and urban populations (i.e., less and more market integrated) differ considerably in their demographic make-up. Whereas extended family co-residence and high fertility are common in rural populations (Bentley, Goldberg, and Jasienska 1993; Walker et al. 2013; Walker 2014; Hedges et al. 2018), urbanised market economies tend to feature less complex family systems, lower fertility, and higher investment in human capital (due to a shift from agriculture-based to wage-based labour and an emphasis on formal education) (Hedges et al. 2018; Gurven et al. 2015; Kaplan 1996; Mattison and Neill 2013; Mattison and Sear 2016; Allendorf 2013; Adams 2010). Living in close proximity to family is correlated with more frequent and consistent childcare provision (Clark et al. 2017); perhaps increasing the availability and readiness of kin to provide help in rural areas. If urban households are smaller and more nuclear, and extended families do not reside nearby, seeking help from them may not be as easy as in rural areas. High fertility coupled with lower investment in formal education in less market integrated communities also enables older children to help mothers with domestic tasks including childcare. Contrastingly, lower fertility in urban communities can mean fewer siblings. Additionally, more investment in children’s education means that the relatively fewer older siblings who are present are less able to provide allomaternal support due to the demands of schooling. Children living rurally may therefore receive more care from their kin, especially siblings, compared to children living in more urban communities.

As higher levels of market integration predict less kin dense networks, it is often expected that allomaternal support will be more likely to come from non-kin in market integrated settings than in less market integrated ones. However, there are reasons why this may not be the case; while market integration may result in increased distances from kin and reduced number of kin in a woman’s social network, family members may still be motivated to overcome physical and social barriers to provide childcare support. In fact, a number of studies suggest the relationship between market integration and kin support is not straightforward. In Zambia, it has been argued that socioeconomic instabilities

resulting from urban living have led urban-dwellers to foster stronger connections with their village-based families (Cliggett 2003); kinship systems among an Igbo community in Nigeria have strengthened amidst contemporary political and economic instability as social ties are used to navigate structures of power (Smith 2001); and a historical Dutch cohort study spanning a 40-year life-cycle in an industrialising town, Tilburg, shows that rapid industrial and demographic change did not result in dissolution of extended family households (Janssens 1986). Urban settlements also have certain distinct features that distinguish them from rural ones, for example, being more densely populated and having better transport links, which may diminish geographical barriers between families and facilitate the provision of allocare from non-resident kin. Women may also prefer to receive support from their kin, regardless of where they reside, as it can be more dependable and of better quality compared to non-kin (Valeggia 2009). Some kin members, especially women's own mothers, may be willing or urged to bear the costs of travelling to provide help. This is seen in different contexts, for example, in rural Ethiopia, maternal grandmothers not residing with their married daughters continue to provide physical support regardless of the distance between their households (Gibson and Mace 2005); in Indonesia, grandparents provide more household help to daughters who are working outside the home (Snopkowski and Sear 2015); and in industrialising Tilburg, family support remained important for migrants (Janssens 1986). So, urban women may receive similar levels of care from their kin as rural women – highlighting the need for studies that explore rural-urban differences in support provision.

Regardless of availability of kin helpers, women living in urban communities may require more help with childcare if they participate in wage-labour outside the home, compared to rural women who engage primarily in domestic labour or farm work which is more compatible with childcare. In such contexts, while relatives might be accessible and willing to provide help in urban locales, women's interactions with non-kin may still be more frequent and regular simply because there are more of them around. Receiving allomaternal care from non-kin is not uncommon, even in the absence of market integration (Crittenden and Marlowe 2008; Hrdy 2011; Meehan 2008, 2009; Meehan and Crittenden 2016) and we expect social support to come from individuals who are around mothers more, such as friends and neighbours. An increased need for childcare together

with higher availability of non-kin may lead to women living in urban neighbourhoods receiving more help from non-kin than women in rural areas.

Researchers have demonstrated that kin density declines with market integration (Colleran 2020; Nelson 2020), and at least one study has shown that level of market integration is predictive of variation in allocare provision: Schacht and colleagues find that increased market access over a span of 20 years in a Mayan village co-occurred with changing forms of paternal investment (Schacht, Davis, and Kramer 2018). Contributing to this literature, and because patterns of allomaternal care matter considerably for women's fertility and children's health, here we explore how childcare support for mothers differs by degree of market integration. We provide a descriptive demographic perspective on childcare provision in two neighbouring communities in north-western Tanzania, a rural village and an urban town. While geographically close and culturally similar, previous research in the communities (see Hedges et al. 2018) and our observations during data collection suggest that the two vary in their levels of market integration. We first test this proposed variation in market integration between the two locations using our data, by identifying socio-economic and demographic markers of market integration and comparing these between the village and town. We then compare who provides childcare in each community, with the level of market integration operationalised by children's village or town residence. We make two predictions: (i) children in the village will have higher odds of receiving allomaternal care from kin than children in the town; and (ii) children in the town will have higher odds of receiving care from non-kin than children in the village. We utilise survey data on five measures of allomaternal care and seven categories of carers, from a relatively large sample compared to other anthropological studies on allomothering (n=808 children under 5-years).

2. Data and Methods

2.1 Data collection

We collected data from two neighbouring communities in north-western Tanzania, situated within the Magu Health and Demographic Surveillance System (HDSS). The Magu HDSS, 20km east of Mwanza city, is managed by the Tanzanian National Institute for Medical Research (NIMR), Mwanza Centre, and has a population of approximately 35,000 people (Kishamawe et al. 2015). Data were collected through cross-sectional surveys,

from July through October 2017, for the requirements of a larger project studying marriage and the wellbeing of women and their children (Lawson, Schaffnit, Hassan, & Urassa, 2020; Schaffnit, Hassan, Urassa, & Lawson, 2019).

Households were selected through simple random sampling using the 2016 HDSS census as a sampling frame and were eligible for inclusion in the study if they had resident at least one girl/woman aged 15 through 35-years. This age range was chosen for the requirements of the larger project; as was our sample goal of surveying 900 women (for details see Schaffnit et al. 2019b; Lawson et al. 2020). To reach our sample goal, we approached 1254 households; of these, 743 were surveyed leading to a total of 993 women. The gap between households approached and included was largely due to ineligibility of many of the households selected from the sampling frame (either because of the outmigration of the woman or of the entire household). Of the women who were successfully contacted, less than 1% refused participation. Once a household was included in the study based on the woman's participation, we asked if the household had a resident child under the age of 5 years. All children under 5-years of age were eligible for the child's survey. Data used in this paper come from surveys conducted in 506 of those households that had a resident child aged under 5 years (N=808).

Verbal consent for participation was obtained from all adults before the interviews, as well as consent from parents/guardians to measure their children. An information and consent form describing the study's goals and any risks/benefits of participation was read out to participants, who were then given time to ask questions and/or accept/decline to take part. Each participant was given a hard copy of the informed consent form as well as contact details for NIMR representatives in case they had any concerns or questions in the future.

At each household, we conducted a Household Survey with the head of the household or if they were not available, another resident adult (n=743). This recorded household membership, size and composition, the demographic characteristics of all household members, and household socio-economic status. Following this, a Women's Survey was conducted with all eligible resident women, and finally a Children's Survey was conducted with eligible children's biological mothers or primary guardians. The respondents to the Children's Survey sometimes, but not always, would be the same

women interviewed as part of the Women's Survey. These lasted up to 30 minutes. All indicators used in this paper that pertain to the child and the child's parents were measured through the Children's Surveys. Participating in the study was voluntary and survey respondents were not paid. All interviews were carried out in Swahili or Sukuma using Open Data Kit (ODK) Collect, an electronic data collection software (Brunette et al. 2013). Ethical approval was granted by the National Institute for Medical Research, Tanzania (MR/53/100/463), the Tanzanian National Ethical Review Committee (NIMR/HQ/R.8a/Vol.IX/3104), London School of Hygiene and Tropical Medicine (13809), and University of California Santa Barbara (1-17-0405).

2.2 Study population

The two communities selected for this project represent either extreme of a rural-urban gradient within the HDSS, and thus two levels of market integration. The village is less market integrated than the town. Previous work in these two communities shows that more village than town residents rely on farming as their primary livelihood (village: 38%, town: 10%); they farm and sell agricultural produce more (45% versus 4% in the town); and own and herd cattle more (44% versus 7% in the town) (Hedges et al. 2018). Children in the villages also regularly contribute to farm-work to a greater extent (Hedges et al. 2018). In contrast, the town has experienced recent increases in owning or working in small businesses or partaking in petty trading, labouring or skilled work; more households in the town have a business or shop (33% versus 10% in the village), and more have salaried (13% versus 2% in the village) and skilled members (20% versus 3% in the village) (Hedges et al. 2018). The town bestrides the main road linking Mwanza to Kenya. It is relatively densely populated, has regular public transport links to Mwanza city, and its own marketplace. Employment and business prospects in the town are more diverse and abundant than in the village. For example, large textile and Coca-Cola factories nearby are major sources of employment and can require secondary-level schooling for employment. The village is situated close to the town (about 10km away), yet it is more sparsely populated and is mostly removed from the main road. While the majority of children aged 7 to 19 years in both communities were enrolled in school in 2016 (75% in the village and 85% in the town), there is more investment in children's education in the town, with progression to secondary school much higher here (73% of 14-19 year olds) than in the village (31% of 14-19 year olds) (Hedges et al. 2018). Further

economic and demographic differences between the two sites are described below (Table 1). The population is primarily Sukuma, an ethnic group that comprises approximately 17% of the national population (Malipula 2016). Sukuma households tend to be larger than neighbouring ethnic groups (Lawson et al. 2015) and often contain affinal kin and/or fostered children (Hedges et al. 2019; Urassa et al. 1997). Almost all individuals get married during their lifetime, but both divorce and re-marriage are common (Boerma et al. 2002).

2.3 Variables used and data analysis

We measured seven sources of allomaternal care: the child's biological father, maternal grandparents, paternal grandparents, siblings, maternal aunts/uncles, paternal aunts/uncles, and distant/non-kin (usually comprising non-kin such as mother's friends or neighbours). Data were not collected separately for grandmothers and grandfathers, aunts and uncles, or brothers and sisters. For each category of allomother, the child's mother/guardian was asked if that allomother had provided different types of care to the child in the two weeks preceding the survey. This measure was irrespective of the allomother's presence/absence or residence in the household at the time.

Direct allomaternal care – activities that require physical contact or interaction with the child (Meehan 2008) – was measured through five binary variables. Each represented a different activity and indicated whether the child had received that particular care from each allomother in the two weeks preceding the survey. The five types of direct childcare were: supervising, playing with, washing, feeding or cooking for, and caring for the child if they had been sick in the two weeks preceding the survey (27% of children had been sick in this time period, $n=215$). The proportion of children who received each of these five types of care from each allomother, by village and town residence, is presented in Supplementary Materials Figure S1. We categorised the five measures of care into two variables, high-intensity and low-intensity care, as adapted by Meehan (2005, 2008) from Kleiman and Malcolm (1981) and Marlowe (1999, 2005). High-intensity care requires either intimate contact with the child, direct attention given to the child, or actions that can interrupt the carers other activities; whereas low-intensity care requires relatively low-levels of energy expenditure on the part of the carer, e.g., being in close proximity to or watching the infant (Meehan 2008, 2005). High-intensity care in our study comprised

of four variables: washing, feeding/cooking, playing, and caring when sick (n=808 for all allomothers, except n=807 for playing with maternal aunts/uncles and paternal aunts/uncles); and low-intensity care comprised of one variable: supervising (n=808 for all allomothers, except n=807 for paternal aunts/uncles). If, in the two weeks preceding the survey, children received any of the four care-types categorised as high-intensity, they were analysed as having received high-intensity care from that allomother; similarly, if children had received supervision from a particular allomother, they were included in the analysis as having received low-intensity care from that allomother.

Our primary independent variable was level of market integration, operationalized by whether the child lived in the village or the town. To assess whether the town and village were indeed different in their extent of market integration, we examined the following demographic and socio-economic characteristics: household size and number of 0-5 year olds in the household, assumed to be predictive of extended family co-residence and higher fertility; investment in human capital, measured by the household head's educational attainment; and reliance on agriculture versus wage-based labour or market work as a form of livelihood, measured by the household head's occupation. To explore variation in market integration between the village and the town, we ran bivariate associations between place of residence (village or town) and the socio-economic and demographic variables listed above, as well as several other child and household level characteristics, using Pearson chi-squared tests and t-tests.

We used logistic regression analyses to test our predictions that (i) children in the village will have higher odds of receiving allomaternal care from kin than children in the town; and (ii) children in the town will have higher odds of receiving care from non-kin than children in the village. Different regression models were run to analyse the association between village/town residence and each type of care from each category of allomother, for example, the effect of living in the town on receiving low-intensity care from fathers was one regression model. Thus, a total of 14 regression models were run: 12 models to test our first prediction (2 types of care and 6 categories of kin members); and 2 models to test our second prediction (2 types of care and 1 category of distant/non-kin allomother). The first stage of our analysis (bivariate associations between town and village) also allowed us to narrow down which variables may be important in explaining differences between the town and village, information which was used while building our

regression models. While we *a priori* retained child's age (measured continuously in years) as a potential confounder in all our models, child's sex and parity were not included based on results from bivariate analyses which indicated no difference in child's sex or parity between the village and town (Table 1). While a number of socio-demographic characteristics were strongly associated with village/town residence, including household size and household head's education level and primary occupation, these were not adjusted for in the regression models as we suspect these indicators to be on the causal pathway between residence and caregiving. Analyses were restricted to children who co-resided with their biological mothers (n=728) so that provision of care reflects allomaternal support (i.e., care provided to help mothers).

3. Results

3.1 Variation in market-integration and household demographics by village and town

Households in the town compared to the village were smaller (village: mean 8.5 people, SD 3.2; town: mean 7.1 people, SD 2.9; t-test=5.2; $p<0.001$) and had fewer resident children under the age of 5-years (village: mean 2 children, SD 1.1; town: mean 1.6 children, SD 0.9; t-test=4.9; $p<0.001$; see Table 1). The household head's educational attainment varied between the village and town ($\chi^2 (3)=52.6$; $p<0.001$). While most had achieved a primary school education in both the town (63%) and the village (68%), substantially fewer had progressed further than primary school in the village (2% versus 18% in the town); and more had no education in the village (34% versus 13% in the town). The household head's primary occupation also differed between the town and village with the starkest difference seen for farming ($\chi^2 (3)=130.5$; $p<0.001$): while the majority of households in the village farmed to earn their livelihoods (85%), only one-third of households in the town did so. In contrast many more households in the town relied on trading or market-based work to earn wages (30%) compared to the village (8%). Difference in level of market-integration between the village and town was also reflected in land and livestock ownership with substantially more households in the village owning both land (52% versus 31% in the town; $\chi^2 (3)=94.6$; $p<0.001$) and livestock (81% versus 39% in the town; $\chi^2 (1)=89.9$; $p<0.001$).

There were more female-headed households in the town (22% versus 14% in the village; $\chi^2 (1)=5.8$; $p=0.02$), possibly due to more household heads being widowed and/or

divorced than in the village. Almost all households in the village identified as Sukuma (99%); but there was more variation in ethnicity in the town where 84% identified as Sukuma ($\chi^2 (1)=32.7$; $p<0.001$). Almost half of the village-residents prescribed to traditional religious beliefs or 'no religion' and half to Christianity, whereas majority of the town residents identified as Christian (88%; $\chi^2 (2)=101.5$; $p<0.001$).

3.2 Variation in children's characteristics by village and town residence

There was no difference in the proportion of boys and girls, or children's mean age between the two sites (Table 1). Children's parental residence patterns varied in two main ways ($\chi^2 (3)=13.1$; $p<0.001$): more children in the village co-resided with both parents (71% versus 62% in the town), and fewer children in the village lived in father non-resident households (19% versus 29% in the town). There was a small number of foster children (i.e., residing without both alive biological parents) captured in our sample and this did not vary between the village and town (8% in both). Most children's parents were married to each other, i.e., married and either living together or apart, or living together as married. However, fewer parents were recorded as married to each other in the town (65%) than in the village (75%); and a higher percentage of parents in the town were either divorced (14% versus 10% in the village) or unmarried and living apart (19% versus 13% in the village; $\chi^2 (4)=10.5$; $p=0.03$). Fewer fathers were in a polygynous union in the town (8%) versus the village (18%; $\chi^2 (3)=11.3$; $p<0.001$).

These findings indicate that parental relationships differ between the town and village. Parental relationships are likely to influence patterns of allocare: substitution effects have been observed between fathers and maternal kin, with maternal kin more likely to provide more support when fathers provide less support (Meehan 2005), and children with less close relationships with fathers (e.g., after divorce) are likely to have less close relationships with their paternal kin too. Studies on kin support also highlight that it is common for kin, especially grandparents, to help mothers who are most in need (Brewster and Padavic 2002; Snopkowski and Sear 2015) and this may apply in circumstances where children do not co-reside with their fathers. Given the importance of parental relationships for allocare, we further explore if results vary between households where fathers co-reside with children and those where they are non-resident.

Table 1 Bivariate analyses showing correlation between child's residence (village or town) and selected child, parent and household-level socio-demographic characteristics (n=808 children for child-level variables and n=506 households for household-head variables).

	Village	Town	test-statistic	p-value
INDICATORS OF MARKET-INTEGRATION (HOUSEHOLD-LEVEL)				
Households with children 0-5 years	212	294		
Household size – mean (SD)	8.50 (3.24)	7.08 (2.86)	t-test=5.22	<0.001
Number of 0-5s in household – mean (SD)	1.99 (1.05)	1.57 (0.88)	t-test=4.90	<0.001
Primary occupation of head – n (%)			$\chi^2 (3) = 130.5$	<0.001
Farmer	180 (84.91)	100 (34.01)		
Trader	16 (7.55)	89 (30.27)		
Other	10 (4.72)	85 (28.91)		
None	6 (2.83)	20 (6.80)		
Education level of head – n (%)			$\chi^2 (3) = 52.63$	<0.001
Primary	134 (63.21)	201 (68.37)		
More than Primary	4 (1.89)	52 (17.69)		
None	71 (33.49)	38 (12.93)		
Don't Know	3 (1.42)	3 (1.02)		
Land ownership – n (%)			$\chi^2 (3) = 94.59$	<0.001
Owns land	111 (52.36)	90 (30.93)		
Owns and rents land	59 (27.83)	30 (10.31)		
Rents land	28 (13.21)	46 (15.81)		
Neither owns nor rents land	14 (6.60)	125 (42.96)		
Livestock ownership – n (%)			$\chi^2 (1) = 89.93$	<0.001
Yes	172 (81.13)	114 (38.78)		
No	40 (18.87)	180 (61.22)		

HOUSEHOLD HEAD CHARACTERISTICS				
Age – mean (min, max)	46.15 (13.35)	45.61 (12.65)	t-test=0.4635	0.64
Sex – n (%)			$\chi^2 (1) = 5.79$	0.016
Female	29 (13.68)	65 (22.11)		
Male	183 (86.32)	229 (77.89)		
Marital status – n (%)			$\chi^2 (4) = 9.48$	0.05
Married (monogamous)	153 (72.17)	204 (69.39)		
Married (polygynous)	32 (15.09)	28 (9.52)		
Divorced / separated	9 (4.25)	18 (6.12)		
Widowed	18 (8.49)	41 (13.95)		
Never married (Not engaged)	0 (0.00)	3 (1.02)		
Religion – n (%)			$\chi^2 (2) = 101.49$	<0.001
Roman Catholic	42 (19.81)	138 (46.94)		
Other established Christian	59 (27.83)	121 (41.16)		
Other	111 (52.36)	35 (11.90)		
Ethnicity – n (%)			$\chi^2 (1) = 32.73$	<0.001
Sukuma	210 (99.06)	246 (83.67)		
Other	2 (0.94)	48 (16.33)		
CHILD CHARACTERISTICS				
Total number of children 0-5 years	393	415		
Sex – n (%)			$\chi^2 (1) = 0.00$	0.99
Girl	193 (49.11)	204 (49.16)		
Boy	200 (50.89)	211 (50.84)		

Father's first child – n (%)*			$\chi^2 (1) = 3.78$	0.05
Yes	305 (81.33)	300 (75.57)		
No	70 (18.67)	97 (24.43)		
Age in years – mean (SD)	2.39 (1.36)	2.48 (1.42)	t-test=-1.01	0.31
Parental residence – n (%)			$\chi^2 (3) = 13.09$	<0.001
Lives with both parents	278 (70.74)	255 (61.74)		
Lives with mother, but not father	73 (18.58)	120 (29.06)		
Lives with father, but not mother	9 (2.29)	5 (1.21)		
Lives apart from both parents (fostered)	33 (8.4)	33 (7.99)		
Parents' marital status – n (%)			$\chi^2 (4) = 10.47$	0.03
Officially married	291 (74.05)	264 (63.61)		
Live together as married	4 (1.02)	7 (1.69)		
Divorced	41 (10.43)	57 (13.73)		
Mother and/or father dead	6 (1.53)	8 (1.93)		
Unmarried and live apart	51 (12.98)	79 (19.04)		
Father in polygynous union – n (%)**			$\chi^2 (1) = 11.33$	<0.001
Yes	53 (18.21)	22 (8.40)		
No	238 (81.79)	240 (91.60)		

* Excludes missing data (n=36).

** Restricted to children with married parents, excludes Don't Know/Refusal responses (n=533).

3.3 Variation in allomaternal care provision

Provision of allomaternal care varied by village/town residence, by who the allomother was, and by whether the care was low- or high-intensity. In both the village and the town, children received most low-intensity care from their fathers, followed by siblings; and most high-intensity care from siblings, followed by distant/non-kin (Figure 1). In the town, children had lower odds of receiving low- (OR: 0.52, 95% CI: 0.38-0.70) and high-intensity (OR: 0.74, 95% CI: 0.55-0.99) care from fathers, low- (OR: 0.34, 95% CI: 0.21-0.56) and high-intensity (OR: 0.38, 95% CI: 0.24-0.60) care from paternal grandparents, and low- (OR: 0.44, 95% CI: 0.22-0.86) and high-intensity (OR: 0.54, 95% CI: 0.32-0.91) care from paternal aunts/uncles. Children also had lower odds of receiving low- (OR: 0.85, 95% CI: 0.63-1.15) and high-intensity (OR: 0.48, 95% CI: 0.33-0.70) care from their siblings in the town, but 95% confidence intervals crossed 1 for low-intensity care.

In contrast, children had much higher odds of receiving both low- (OR: 1.97, 95% CI: 1.32-2.94) and high-intensity care (OR: 1.43, 95% CI: 1.04-1.96) from distant/non-kin in the town. While maternal grandparents (low-intensity OR: 1.21, 95% CI: 0.84-1.73; high-intensity OR: 1.08, 95% CI: 0.77-1.53) and maternal aunts/uncles (low-intensity OR: 1.52, 95% CI: 1.00-2.32; high-intensity OR: 1.43, 95% CI: 0.98-2.08) also had higher odds of providing both types of care in the town, 95% confidence intervals crossed 1 for all estimates indicating no difference between the two communities regarding care from maternal kin. Full results for each allomother and each type of care are provided in Table 2, and regression models in Supplementary Materials Table S1.

Figure 1 Percentage of children who received low-intensity (supervising) and high-intensity care (washing, feeding, playing, caring when sick) from each allomother in the village and town. Restricted to children with co-resident mothers (n=728).

Table 2 Logistic regression models showing associations between town residence (reference: village) and receiving low- and high-intensity care from each allomother. Analyses restricted to children with co-resident mothers (n=728). For each model, n=728, except low-intensity care from paternal aunts/uncles for which n=727.

	LOW-INTENSITY				HIGH-INTENSITY			
	Odds Ratio	95% CI	p-value		Odds Ratio	95% CI	p-value	
Father								
Town residence	0.52	0.38	0.7	<0.001	0.74	0.55	0.99	0.04
Child's age	1.17	1.05	1.31	0.01	0.89	0.8	0.99	0.03
Intercept	1.57	1.13	2.18	0.01	1.32	0.96	1.82	0.09
Maternal GP								
Town residence	1.21	0.84	1.73	0.3	1.08	0.77	1.53	0.65
Child's age	0.91	0.8	1.03	0.15	0.86	0.75	0.97	0.02
Intercept	0.3	0.2	0.44	<0.001	0.42	0.29	0.6	<0.001
Paternal GP								
Town residence	0.34	0.21	0.56	<0.001	0.38	0.24	0.6	<0.001
Child's age	0.78	0.66	0.93	0.01	0.83	0.7	0.97	0.02
Intercept	0.35	0.23	0.55	<0.001	0.36	0.24	0.56	<0.001
Sibling								
Town residence	0.85	0.63	1.15	0.29	0.48	0.33	0.7	<0.001
Child's age	1.18	1.05	1.31	<0.001	1.53	1.33	1.76	<0.001
Intercept	0.44	0.32	0.62	<0.001	2.28	1.56	3.36	<0.001
Maternal Aunt/Uncle								
Town residence	1.52	1	2.32	0.05	1.43	0.98	2.08	0.06
Child's age	0.93	0.8	1.08	0.32	0.92	0.81	1.06	0.24
Intercept	0.16	0.1	0.25	<0.001	0.23	0.15	0.35	<0.001
Paternal Aunt/Uncle								
Town residence	0.44	0.22	0.86	0.02	0.54	0.32	0.91	0.02
Child's age	0.91	0.72	1.16	0.45	0.75	0.62	0.9	<0.001
Intercept	0.1	0.05	0.19	<0.001	0.26	0.16	0.41	<0.001
Distant/Non-kin								
Town residence	1.97	1.32	2.94	<0.001	1.43	1.04	1.96	0.03
Child's age	1.13	0.98	1.3	0.09	1.49	1.32	1.67	<0.001
Intercept	0.11	0.07	0.17	<0.001	0.68	0.48	0.94	0.02

3.4 Are results similar in households with and without paternal residence?

We investigated whether paternal co-residence was associated with the differences in allocare seen between the town and village. We used a 2-category variable for child's paternal residence, indicating whether the child lived with both biological parents (n=533) or co-resided with their mother in a household where the father was non-resident (n=193). Few children lived solely with their fathers (n=14) or were fostered/lived with neither parent (n=66); these children were excluded from analysis to avoid issues of data sparsity. Two further children were excluded due to 'Don't Know' and 'Refuse' responses. Our total sample size for this analysis was 726 children. We used a Pearson chi-squared test to analyse the correlation between the 2-category variable for paternal residence and village/town residence. Fewer children co-resided with both parents in the town (68%) than in the village (79%); and more town-based children lived in father non-resident households (32%) compared to the village (21%; chi-squared test-statistic=12.4, $p<0.001$). We used logistic regression analyses to test if allomaternal care in the town differs to the village for children who (a) reside with both parents; and (b) reside with their mothers only. Two sets of models were run: 14 models (7 carers and 2 care-types) for children with co-resident parents (results in Table 3); and 14 models (7 carers and 2 care-types) for children living with mothers in father non-resident households (results in Table 4).

Our results show that children with co-resident fathers had lower odds of receiving low-intensity care from fathers (OR: 0.63, 95% CI: 0.40-0.97), both types of care from paternal grandparents (low-intensity OR: 0.30, 95% CI: 0.17-0.53; high-intensity OR: 0.36, 95% CI: 0.21-0.61), and high-intensity care from siblings (OR: 0.44, 95% CI: 0.26-0.73) in the town versus the village (Table 3). As before, there appeared to be no difference in care from maternal kin between the two communities, with 95% Confidence Intervals crossing 1 for all point estimates. For children with non-resident fathers, there appeared to be no difference in allomaternal care provision between the town and village for any category of kin (see results in Table 4). This indicates that while fathers, paternal kin and siblings are less likely to provide care in the town, this is limited to children with co-resident fathers; for children with non-resident fathers, care from kin is the same across the village and town. In other words, the results seen in Table 2 for the full sample were similar when the analysis was restricted only to children whose fathers were co-resident.

This means that the differing patterns of kin allocare between town and village are not driven by differences in paternal residence between the two locations (full models for this analysis are provided in Supplementary Materials Tables S2 and S3). In line with this, children with both parents' co-resident had higher odds of receiving low-intensity care from distant/non-kin in the town (OR: 2.42, 95% CI: 1.52-3.87). However, it was children residing in father non-resident households who had higher odds of receiving high-intensity care from distant/non-kin in the town (OR: 2.59, 95% CI: 1.38-4.86), suggesting differences in paternal residence between the town and village may be influencing care received from distant/non-kin. In Supplementary Materials we also show results of models exploring if allomaternal care differs for children with and without co-resident fathers. These show that while allomaternal care varies substantially by paternal residence, these patterns are similar across both the town and village (Table S4).

Table 3 Logistic Regression outputs showing associations between town residence (reference: village) and receiving low- and high-intensity care from each allomother. Analyses restricted to children residing with both parents (n=533). For each model, n=533.

BOTH PARENTS' RESIDENT								
	LOW-INTENSITY				HIGH-INTENSITY			
	Odds Ratio	95% CI		p-value	Odds Ratio	95% CI		p-value
Father								
Town residence	0.63	0.4	0.97	0.04	0.84	0.59	1.19	0.33
Child's age	1.13	0.96	1.32	0.15	0.8	0.7	0.91	<0.001
Intercept	4.08	2.53	6.56	<0.001	2.65	1.78	3.93	<0.001
Maternal GP								
Town residence	0.61	0.25	1.49	0.28	0.53	0.27	1.05	0.07
Child's age	0.98	0.71	1.35	0.9	0.91	0.71	1.16	0.44
Intercept	0.06	0.02	0.14	<0.001	0.13	0.07	0.25	<0.001
Paternal GP								
Town residence	0.3	0.17	0.53	<0.001	0.36	0.21	0.61	<0.001
Child's age	0.74	0.61	0.9	<0.001	0.74	0.61	0.88	<0.001
Intercept	0.48	0.29	0.79	<0.001	0.55	0.34	0.88	0.01
Sibling								
Town residence	0.93	0.66	1.31	0.67	0.44	0.26	0.73	<0.001
Child's age	1.1	0.97	1.25	0.14	1.32	1.1	1.59	<0.001
Intercept	0.65	0.45	0.95	0.03	5.11	2.98	8.75	<0.001
Maternal Aunt/Uncle								
Town residence	1.37	0.63	3	0.43	0.88	0.48	1.6	0.67
Child's age	1.05	0.79	1.4	0.73	0.95	0.76	1.19	0.66
Intercept	0.04	0.02	0.1	<0.001	0.12	0.06	0.22	<0.001
Paternal Aunt/Uncle								
Town residence	0.64	0.31	1.3	0.22	0.61	0.34	1.1	0.1
Child's age	0.85	0.66	1.1	0.23	0.71	0.57	0.89	<0.001
Intercept	0.12	0.06	0.24	<0.001	0.29	0.17	0.51	<0.001
Distant/Non-kin								
Town residence	2.42	1.52	3.87	<0.001	1.21	0.83	1.76	0.32
Child's age	1.13	0.96	1.34	0.14	1.44	1.25	1.66	<0.001
Intercept	0.1	0.06	0.17	<0.001	0.84	0.57	1.25	0.4

Table 4 Logistic Regression outputs showing associations between town residence (reference: village) and receiving low- and high-intensity care from each allomother. Analyses restricted to children residing with mothers in father non-resident households (n=193). For each model, n=193, except for low-intensity care from paternal aunts/uncles for which n=73.

MOTHERS' RESIDENT, FATHERS' NON-RESIDENT								
	LOW-INTENSITY				HIGH-INTENSITY			
	Odds Ratio	95% CI		p-value	Odds Ratio	95% CI		p-value
Father								
Town residence	0.5	0.17	1.45	0.2	1.62	0.63	4.15	0.31
Child's age	1.01	0.69	1.46	0.97	0.8	0.58	1.1	0.17
Intercept	0.12	0.04	0.35	<0.001	0.16	0.06	0.41	<0.001
Maternal GP								
Town residence	0.56	0.29	1.06	0.07	0.59	0.31	1.12	0.11
Child's age	1.09	0.88	1.35	0.43	0.94	0.76	1.17	0.6
Intercept	2.4	1.23	4.67	0.01	3.19	1.61	6.31	<0.001
Paternal GP								
Town residence	0.81	0.27	2.45	0.71	0.65	0.23	1.89	0.43
Child's age	0.89	0.6	1.32	0.56	1.17	0.81	1.7	0.41
Intercept	0.11	0.04	0.34	<0.001	0.08	0.02	0.24	<0.001
Sibling								
Town residence	1.21	0.56	2.62	0.63	0.8	0.42	1.52	0.5
Child's age	1.35	1.04	1.75	0.02	1.79	1.41	2.26	<0.001
Intercept	0.1	0.04	0.25	<0.001	0.54	0.29	1.04	0.07
Maternal Aunt/Uncle								
Town residence	0.96	0.53	1.73	0.89	1.31	0.73	2.35	0.37
Child's age	0.99	0.81	1.21	0.9	1.02	0.84	1.25	0.82
Intercept	0.72	0.39	1.33	0.29	0.7	0.38	1.3	0.26
Paternal Aunt/Uncle								
Town residence	1				0.44	0.15	1.33	0.15
Child's age	1.18	0.62	2.26	0.62	0.81	0.54	1.22	0.32
Intercept	0.05	0.01	0.29	<0.001	0.18	0.07	0.5	<0.001
Distant/Non-kin								
Town residence	1.12	0.52	2.44	0.77	2.59	1.38	4.86	<0.001
Child's age	1.1	0.85	1.43	0.48	1.56	1.24	1.96	<0.001
Intercept	0.16	0.07	0.37	<0.001	0.36	0.18	0.7	<0.001

4. Discussion

We explored variation in allomaternal childcare provision in a transitioning context, contrasting a less market integrated village with a neighbouring, more market integrated town. Children were cared for by several allomothers in both communities. Concurrent with other literature, care was commonly received from kin members, particularly fathers (Hill and Hurtado 2009; Boyette, Lew-Levy, and Gettler 2018; Opondo et al. 2016; Hewlett 1992), siblings (Meehan 2008; Mulder and Milton 1985; Kramer 2005; Sear and Mace 2008; Kramer 2002; Lee and Kramer 2002) and maternal kin (Pollet, Nelissen, and Nettle 2009; Sear and Mace 2008; Isiugo-Abanihe 1985). Many children also received care from distant/non-kin, especially high-intensity care. Consistent with our overall hypothesis, living in the town versus the village appears to alter the childcare picture. There is partial support for our first prediction, that mothers would be less likely to receive help from their kin in the town. Children were less likely to receive both low- and high-intensity care from their fathers and paternal kin, and low-intensity care from their siblings, in the town compared to the village. However, maternal kin (aunts/uncles and grandparents) had the same odds of providing support to mothers in both communities. Second, we predicted that mothers would be more likely to receive support from non-kin in the town, and this is supported by our findings for both types of care.

As expected, we find the town was more market integrated than the village, approximated by levels of investment in human capital (i.e., the household head's education level) and engagement in farming versus market-based work. Households in the town on average also had fewer residents than households in the village, usually characteristic of urban neighbourhoods (Bentley, Goldberg, and Jasienska 1993; Walker et al. 2013; Walker 2014; Hedges et al. 2018). Town-living was also associated with more variation in children's parental residence; lower likelihood of parents being married; fewer polygynous unions; and more female-headed households. There were also clear differences in religion and ethnicity between the two communities.

Some of these individual socio-economic and demographic factors, particularly household size, may partially determine the patterns of childcare we see between the town and village. We do not explore these here as the purpose of this paper was to provide a descriptive perspective on variation in allomaternal care between a rural and

urban community in Tanzania, and not explore which particular characteristics of the town were driving variation in care. However, a next step in this research is to explore these individual and potentially causal features as modifiers of the relationship between urban living and allomaternal care.

The lower likelihood of fathers providing childcare in the town could have been reflective of the lower levels of father-child co-residence documented here compared to the village. However, results from our post-hoc analysis indicate differently. Fathers are, unsurprisingly, much more likely to provide care to children they co-reside with; however, even among households where fathers are co-resident with their children, they still have a lower likelihood of providing care in the town than in the village. This indicates that other factors are driving the variation in paternal care between the two communities. For instance, the higher likelihood of father care in the village may be attributed to the different demands of wage-based labour in the town. Farming in the village is primarily subsistence farming on family land surrounding a complex of houses and outbuildings. As such, fathers are likely spending a larger portion of their time in or near their household. In contrast, fathers in the town are labourers, traders, own or work at market shops, or have migrated away from home for employment. This may help explain the distinction seen between fathers' provision of low- and high-intensity care. Overall, a higher proportion of children received low-intensity care from their fathers than high-intensity care, indicating fathers are perhaps more inclined towards providing childcare that is not disruptive of their other activities. Further, although fathers were more likely to provide both types of care in the village than the town, this difference was greater for low-intensity care (i.e., supervision). This suggests that fathers may be less able to passively supervise children in the town – perhaps due to being away from the house for market-based work.

Schacht et al (2018) find that Mayan fathers spent more time with their families after their community became more market integrated, as they were able to repurpose time gained due to efficient agricultural production strategies (e.g., technology) towards family investment. However, these changes coincided with reduced opportunities of wage labour and higher returns for investing in children that accompany market integration (e.g., increase value of education); and were facilitated by the fathers being in monogamous unions (Schacht, Davis, and Kramer 2018). Wage-based labour may have a

reverse effect, increasing the demands on men's time and pulling them away from the family. However, while fathers may engage in less direct care in the town, this does not mean they invest less overall; and may instead be shifting the form of their investment into other types of care such as provisioning via monetary resources. Scholars have argued that shifts in human subsistence strategies in the past have coincided with shifts in family structure (Kaplan & Lancaster, 2003). While this is usually discussed in regard to shifts from foraging to farming, and a concurrent reduction in paternal care (Draper & Harpending, 1987; Kaplan & Lancaster, 2003), it is probable that paternal care also differs systematically between farming and market integrated communities.

We examined care from matrilineal and patrilineal relatives separately because a large body of research indicates that maternal and paternal relatives have different roles and impacts with regard to childcare (Volland and Beise 2002; Sear, Mace, and McGregor 2000; Sear and Mace 2008; Pollet, Nelissen, and Nettle 2009; Perry and Daly 2017; Pashos and Mcburney 2008; King and Elder 1995; King et al. 2003). Women's natal kin have largely been documented to provide more help than affinal kin. The proximate mechanisms which drive this greater helpfulness from maternal kin might involve greater emotional closeness between women and their maternal, compared with paternal, kin. Evolutionary researchers have also commonly attributed this to 'paternity uncertainty' (i.e., the probability that a man's child was not actually sired by him); but paternity uncertainty tends to be very low in human populations (Anderson, 2006), and a matrilineal bias can also be explained without the need to invoke paternity uncertainty (Perry and Daly 2017). Differences seen between patrilineal caregiving in the two locations may be partially explained by higher levels of patrilocal residence in the village and shifts towards neolocality in the town. While we did not collect data on whether the focal child resided with their maternal or paternal family, we do find that paternal relatives had a higher likelihood of providing care in the village, and this was limited to father-resident households, which may be indicative of patrilocal residence. Further, our results show that children's mothers in the town were more likely to be divorced or living apart from the children's fathers, than in the village. In these cases, mothers may seek help from non-kin, or may even be residing with their natal kin (i.e., children's maternal kin) and receiving support from them. This is supported by research among Aka foragers in the Central African Republic (Meehan 2005). Here, Meehan (2005) finds that infants who live with their mother's kin receive most allocare from these kin, especially from

women, and very little investment from fathers; whereas infants who reside with their fathers' lineage are provided high levels of paternal investment but very little care from other women. The authors suggest this could potentially be explained by female alloparents relieving fathers from their duties in matrilocal residences; substituting for a lack of paternal care in these camps; or it could be due to female alloparents being surer of genetic relatedness with infants who reside matrilocally. However, it is also of note that women's own parents (i.e., the focal child's maternal grandparents) and their siblings (i.e., the child's maternal aunts/uncles) are equally likely to help them in the town and the village. This suggests that maternal kin provide care equally whether the child and mother reside patrilocally, matrilocally or neolocally (presumably in the town). Dense housing and accessible transport links in towns also makes within-town mobility a lot easier. This may allow maternal relatives to travel more conveniently and provide support to mothers even if they reside far away or patrilocally. Several other studies have also shown the importance of investment from maternal kin even in patrilocal and patrilineal societies (Gibson and Mace 2005; Perry 2021; Pollet, Nettle, and Nelissen 2007).

Siblings had lower odds of providing high-intensity allocare in the town, but no difference was seen between the two sites for low-intensity care. This could be attributed to the difference in educational attainment between the two communities. Previous research in these two communities shows higher odds of school enrolment and progression to secondary school in the town compared to the village (Hedges et al. 2018). This may decrease older children's availability to provide high-intensity allocare to younger siblings. Hedges et al. (2018) also show that among those not attending school, children in the village (and girls in particular) participated in more productive work, including household chores, than children in the town. This is potentially reflected in our study as household chores can consist of high-intensity childcare tasks, e.g., washing, feeding etc. The difference seen between low- and high-intensity care could also be driven by the inclusion of 'playing' in the high-intensity care category. Children may be more likely to play with their siblings in the village perhaps because there are more co-resident children here (average of 2 under-5 children per household) whereas in the town there are slightly fewer co-resident children (average of 1.5 under-5 children per household) and children have more access to non-kin playmates such as neighbours. Playgroups consisting of neighbouring pre-school aged children were very commonly observed in the town, with

ages appearing to range between one and seven years old. We also note here that the children sampled in our study are not of school-going age and thus will not have been interacting with other children through school in either the village or town.

Lastly, we find that distant/non-kin were more likely to provide care to children in the town than in the village. Scholars have emphasised the covariance between relatedness and living close-by (Crittenden and Marlowe 2008; Gurven 2004; Koster and Leckie 2014), attributing cooperation between kin to the reduced geographic distances between them that help lower costs of providing support (Page et al. 2019; Clutton-Brock 2002; Nolin 2010). If residential proximity spurs cooperation, and children are living closer to more unrelated individuals in the town than in the village *as well as* closer to more unrelated individuals than related individuals, then it is unsurprising that we find non-kin to play a larger role in childcare in the town than in the village. While non-kin were also more likely to provide both low- and high-intensity care in the town than in the village, the odds ratios were greater for low- intensity care, similar to fathers. This could imply that women's friends or neighbours help with child supervision, especially if the likelihood of fathers doing so is lower, and has important implications for female friendships, which are an understudied source of support for women. Future research could explore in detail exactly who these distant and non-kin are and what motivates them to provide substantial amounts of support to mothers. Another category of non-kin allomothers can include other children – for example, children's own friends, friends of older siblings, or other children living in the neighbourhood (Emmott and Page 2019; Blurton Jones, Hawkes, and O'Connell 2005; Meehan, Quinlan, and Malcom 2013). The higher odds of receiving care from – or at least, playing with or being supervised by – unrelated children in the town could also explain the reduced odds of siblings providing care in the town. Recent work among the Agta foragers in the Philippines posits children's playgroups as another type of allocare (Page et al. 2020). In this context, allocare from unrelated children is perhaps more probable in urban neighbourhoods with greater housing density as more children are likely to live close by. This can generate increased opportunities for children to spend time in larger playgroups compared to the village where houses are more dispersed. Our post-hoc analysis also implies that it is children living in father non-resident households who have a higher likelihood of receiving high-intensity care from non-kin in the town. This may be a particular circumstance where friends and community members are stepping in to provide support.

Market integration and its impact on kin networks holds potential future implications for demography and health. Changing trends in allomothering occurring alongside urbanisation have previously been suggested to cause shifts in the demographic structure of societies (Notestein 1953; David-Barrett 2019). For example, the availability of allomaternal support and market integration are both linked to fertility outcomes; generally, high levels of allomaternal support are linked to higher fertility (Hrdy 2011, 2005a; Kramer 2014, 2010) while shifts from subsistence to wage-based economies – and associated transitions in wealth and status – are linked to lower fertility (Sear and Coall 2011; Skirbekk 2008; Colleran et al. 2015). It is thus often assumed that the breakdown of kin networks with market integration will limit the help available to women, which may in turn impact their reproductive decisions leading to declining family size. In fact, the influence of kin on women's fertility has been noted in several studies, although the relationship between two is multifaceted and context specific (Sear 2018; Snopkowski and Sear 2013). Research also shows that community-level indicators such as the socio-demographic characteristics of a woman's social network (e.g., community-level education), may be stronger drivers of fertility than individual-level characteristics (e.g., a woman's own education level) (Colleran et al. 2014). This suggests that who women regularly interact with may play an important role in their decision-making and behaviour; and studies have previously indicated that people take reproductive cues from other individuals' behaviours (Coale and Watkins 1986; Knodel and van de Walle 1979). If this is the case, it is not only the degree of support provided to women that drives fertility change, but who this support comes from. If women in urban communities are more likely to interact with non-kin than women living rurally, as shown in this paper, then urban women may be taking reproductive cues from a very different set of people compared to their rural counterparts. Lineage-based differences in who supports mothers also impacts their reproductive outcomes, with patrilineal residence and investment associated with women having higher fertility (Sear, Mace, and McGregor 2003; Snopkowski and Sear 2013; Tanskanen et al. 2014). If urban women are less likely to receive support from their children's paternal kin than rural women, as described in this paper, and patrilineal kin are more likely to be pro-natal than matrilineal kin, then lineage-based differences in allocare may play a role in fertility declines associated with urbanisation.

4.1 Limitations

All measures of care we have used are binary, measuring if each allomother provided care in the two weeks preceding the survey or not. Thus, we do not know the frequency of care provision, only whether it was provided at least once or not at all. This limits us from estimating a real quantification of the level of care provided and how this varies between the village and town, and between allomothers. Second, we describe childcare patterns for very young children, and it is possible that results would vary for children above the age of 5 years. Third, we use the village and town as proxies for market integration – it is therefore in reality a tale of two communities, and not of one village urbanising over time. It remains possible that the differences we observe reflect some unmeasured characteristic of each location, or perhaps a peculiarity of our sampled locations. That said, the two locations benefit from being geographically close and largely culturally/historically similar thus limiting the scope for this. Nevertheless, this research question has not been tested as yet and these comparisons provide useful case studies. Other studies have also used comparisons between different neighbourhoods as representative of changing socio-ecology (Nettle 2012; Hedges et al. 2018). An ideal follow-up from this work would be to test these questions using longitudinal data that allow for observation of changes in allomaternal networks as a community urbanises.

4.2 Conclusion

We tested the predictions that allomaternal care would be less likely from kin, and more likely from distant/non-kin, in a town compared to a village in Tanzania. Our predictions were partially supported, in that paternal kin and siblings were less likely to provide allocare, and non-kin more likely, in the town. However, there were no differences in care from maternal kin. This may reflect differences in the consistency of support from maternal kin across contexts, and the more facultative nature of support from paternal kin. It may also be related to matrilocal/patrilocal differences in residence; or driven by any of the features of market integration (i.e., smaller household size, higher education level, increase in wage-based labour or trade) or children's socio-demography (e.g., parents' marital or residence status) that we find associated with town residence. While it was within the scope of this paper to explore one of these factors (paternal residence) it would be instructive to investigate others in future research.

We show that while patterns of allomaternal support vary by level of market integration in terms of its source and type, it is not clear whether the frequency, duration, or quality of allomaternal helping varies by level of market integration; this would be an interesting avenue for future research. Further, as allomaternal support can improve children's survival and health, this work has important implications for child wellbeing across different contexts, particularly if care from different allomothers is associated with differentials in child outcomes. Future research on children's wellbeing in societies undergoing demographic transitions could benefit from exploring whether variation in who children receive support from impacts their health.

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