

A study of fertility among elite families in Dali Prefecture during the Ming Dynasty—with epitaphs as the primary source

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Abstract. The practice of composing epitaphs was widespread in Dali Prefecture during the Ming Dynasty, leaving a considerable body of epitaph literature for later generations. These epitaphs often contain detailed information about the fertility and childbearing patterns of the families of the deceased, making them valuable historical sources for studying family fertility in premodern China. Statistical analysis of fertility records preserved in these epitaphs shows that elite families in Dali Prefecture during the Ming Dynasty had an average of 4.22 children, with families having two to six children being the most common. Fertility patterns also varied across different family structures and historical periods. As Dali Prefecture was located on the southwestern frontier of the Ming Empire, a systematic examination of fertility among its elite families can, to a certain extent, shed light on the distinctive patterns of fertility and reproductive preferences in frontier regions during the Ming Dynasty.

Keywords: Ming Dynasty, Dali Prefecture, elite groups, fertility behavior

1. Introduction

Since the 1980s, the establishment and development of historical demography in China have led to significant advances in research on such demographic issues as family size, marriage, fertility, and longevity in premodern China. With regard to studies of fertility during the Ming and Qing dynasties, the sources used by scholars can generally be divided into two categories. The first consists primarily of traditional historical sources such as genealogies, chronological biographies, and household registers. For example, Cui-rong Liu conducted a quantitative analysis of demographic behaviors—including marriage, fertility, and longevity—in families during the Ming and Qing dynasties, using 50 genealogies as her principal sources. She concluded that the average number of children born within marriage during the Ming and Qing periods was 2.94. Based on a sex ratio of 106, she estimated the marital fertility rate at 6.06 children [1]. Xi-zhe Peng and Yang-fang Hou, drawing on genealogical materials, conducted a case study of births and fertility control among families in the Jiangnan region during the Ming and Qing dynasties and concluded that the number of children per family generally ranged between five and six [2]. Zhong-qing Li and Wen-lin Kang analyzed fertility behavior among families in Daoyi Village, Liaoning, during the Qing Dynasty using household-register materials from

the Shengjing Imperial Household Department preserved in the Liaoning Provincial Archives [3]. The second category consists of studies based on epitaph literature. For instance, Shu-ji Cao used mathematical and statistical methods to analyze the number of children born to adults during the Ming Dynasty and concluded that the average number of children per family was 2.7 [4]. Hong-li Li conducted a quantitative analysis of fertility among scholar families in Shanghai during the Ming and Qing dynasties based on 544 epitaphs. The study found a considerable gap between the actual level of fertility and fertility preferences among scholar families in Shanghai during the Ming and Qing periods, and estimated the average number of children per family at 4.28 [5].

Overall, research on fertility during the Ming and Qing dynasties has generally been grounded in historical demography and has employed statistical methods to conduct quantitative micro-level studies of fertility rates, age at childbearing, birth intervals, rates of early childhood mortality, and the number of children per family, yielding substantial findings. Nevertheless, several limitations remain. Existing research has tended to focus disproportionately on the Jiangnan region, while fertility in frontier areas has received comparatively little attention. In terms of source materials, scholars have relied heavily on transmitted documents such as genealogies, resulting in a relatively high degree of source homogeneity. Moreover, genealogical materials have inherent limitations. Genealogies may list only adult males or individuals who participated in a line of generational succession, while omitting information about other members of the population. They therefore provide relatively few statistical indicators and draw on a limited range of samples, making it difficult to capture the fertility patterns of families across an entire region. This may result in what can be described as an "explanatory deficit" in the statistical findings. By contrast, epitaphs often provide relatively comprehensive and reliable information about the deceased's marriage, family life, and children. In this respect, they offer significant advantages over genealogical records and constitute exceptionally valuable historical sources for the study of family fertility in premodern China.

In light of these considerations, and building on previous scholarship, this article takes epitaph literature as its principal source material and examines fertility among elite families in Dali Prefecture during the Ming Dynasty. Any shortcomings in this study are respectfully submitted for correction and criticism by scholars in the field.

2. Elite groups and epitaph literature in Dali Prefecture during the Ming Dynasty

Dali, as a major strategic center in western Yunnan, occupied an important position in the local history of Yunnan. According to the Jiajing-era *Gazetteer of Dali Prefecture*, "Dali lies upstream of the entire province and serves as a strategic gateway to western Yunnan. Whenever the state faces trouble from the various frontier peoples, the routes to them must pass through here" [6]. In the second month of the fifteenth year of the Hongwu reign (1382), Ming forces pacified Dali and captured Duan Shi, the Chief Administrator of Dali. They subsequently reconquered various areas of western Yunnan and essentially brought Yunnan under control. Building on the administrative system inherited from the Yuan Dynasty, the Ming court adjusted the local administrative structure of Yunnan, "establishing prefectures, departments, and counties under the jurisdiction of the Yunnan Provincial Administration Commission, totaling fifty-two prefectures" [7]. It replaced Dali Circuit with Dali Prefecture, which "administered three subprefectures: Zhaozhou, Dengchuan, and Yunlong. It also administered three counties. Of these, Taihe was directly governed as the prefectural seat, while Yunnan and Langqiong were administered separately under the subprefectures. It also exercised jurisdiction over twelve Chief Official Offices" [8]. These comprised Zhaozhou (present-day Fengyi Town,

Dali City), Dengchuan Subprefecture (present-day Dengchuan Town, Eryuan County), and Yunlong Subprefecture (present-day Yunlong County); Taihe County (present-day Dali City), Yunnan County (present-day Xiangyun County), and Langqiong County (present-day Eryuan County); and twelve Chief Official Offices (located approximately in the area of present-day Midian Town, Xiangyun County). Although the administrative boundaries of Dali Prefecture had been largely established during the Hongwu period, the region was characterized by considerable ethnic diversity and complex social conditions, and its political and economic circumstances differed from those of the interior. To strengthen local governance, in the seventh year of the Hongzhi reign (1494), the court "detached nine *li* from Taihe, one *li* from Zhaozhou, and two *li* from Yunnan County" [9] to establish Binchuan Subprefecture (present-day Binchuan County). From this point onward, Dali Prefecture comprised four subprefectures, three counties, and one Chief Official Office. This administrative area constitutes the geographical scope of the present study.

2.1. The composition of elite groups in Dali Prefecture during the Ming Dynasty

The concept of "local elites" originated in scholarly extensions of the definition of the *gentry* and developed through three successive stages: the gentry-centered approach, the local-gentry approach, and the elite-centered approach. Local elites were groups that occupied relatively prominent positions and exercised influence in grassroots society. As an important social stratum involved in the interaction and negotiation between the central government and local society, they included locally established hereditary families, traditional literati, and other prominent local lineages. Compared with the traditional literati, the concept of local elites encompassed a broader range of social groups. From the Ming Dynasty onward, the role of local elites in local society became increasingly prominent. There has been considerable debate among scholars over how local elites should be defined. Shou-xian Gao argues that local elites consisted of three categories. The first was occupational elites, including *liangzhang* (grain-tax heads), *lizhang* (community heads), and other leaders of grassroots organizations in areas where the grain-head and *lijia* systems were implemented. The second was status-based elites, including traditional literati, as well as various officials who had either obtained office through the civil service examinations or entered officialdom through other channels. The third was non-status-based elites, including individuals of outstanding virtue and ability who had earned the trust of local residents, wealthy households with substantial economic resources, and leaders of religious organizations who exercised a certain degree of authority in local society [10]. This study adopts the same understanding of the term "elite".

The composition of the elite groups in Dali Prefecture during the Ming Dynasty differed considerably from that of the interior and can be broadly divided into hereditary, clerical, and cultural elites. The hereditary elites of Dali Prefecture during the Ming Dynasty originated from prominent aristocratic families that had enjoyed certain privileges under previous dynasties. After the Ming court conquered Dali, it sought to stabilize the local order as quickly as possible by cultivating alliances with powerful hereditary families and enlisting their assistance in grassroots administration. For example, the court implemented the *lijia* system and appointed members of hereditary families as *lizhang*, assigning them responsibility for supervising and collecting taxes. In this way, the Ming government sought to strengthen its control over grassroots society. The people of the Dali region had traditionally held Buddhism in high esteem, and the large number of Buddhist clergy exerted considerable influence on local society. The Ming court established the Azhali Monastic Administration Office in the Dali region, incorporating Azhali religious practices into the state's system of religious administration. Although Azhali religion declined during the middle and late Ming period as state governance in the region became more deeply consolidated, elite members of the Buddhist clergy continued to possess a certain degree of discursive influence in local society and played a role in shaping grassroots governance. The Buddhist

clergy therefore constituted the second major category of local elites. In addition, following its establishment of rule over Dali, the Ming court implemented frontier-governance measures such as "resettling migrants to consolidate the frontier" and "promoting Confucian education". These policies altered the social structure previously dominated by hereditary local families. Under Ming rule, the expansion of Han Chinese migration, the promotion of Confucian education, the transformation of the social status of hereditary families, and improvements in the economic environment collectively broadened the social base of the elite in Dali Prefecture. Cultural elites with a strong command of Confucian learning gradually emerged. The formation of these cultural elites was closely connected with the development of Confucianism in the Dali region. During the Ming Dynasty, Dali Prefecture developed a strong social ethos that valued Confucian learning and education. By the Jingtai period, Dali Prefecture was already described as a place where "there were few merchants and artisans but many men of letters; the people delighted in studying the classics and histories and held teachers and friends in high esteem. In years when the civil service examinations were held, the number of successful candidates consistently surpassed that of other prefectures" [8]. By the Tianqi period, this tendency had become even more pronounced: "The customs are rooted in the Han tradition, and there are many men of letters among the people. The calligraphy shows the brushwork of the Jin masters. Success in the examinations is particularly flourishing; scholars value integrity and moral courage, revere Buddhism, and local customs tend toward extravagance" [9]. This group became an important force in the cultural development of Dali Prefecture and exerted a significant influence on the region's social and historical trajectory. In addition, the influx of migrants stimulated economic development in Dali Prefecture and contributed to the rise of wealthy households and merchant groups. These groups likewise played a role in local society that should not be overlooked.

2.2. Sources of epitaph materials from Dali Prefecture during the Ming Dynasty

Since the Song and Yuan dynasties, the people of the Dali region had increasingly adopted burial customs influenced by funerary traditions from the Central Plains, and the practice of composing epitaphs gradually became more widespread. By the Ming Dynasty, the practice of erecting tombstones and composing epitaphs in Dali Prefecture had flourished to a degree comparable to that in the interior. Not only high-ranking officials, wealthy landowners, and members of the local gentry were enthusiastic about erecting commemorative steles and commissioning epitaphs, but ordinary people also followed suit. As a result, a large number of epitaphs were produced and preserved. With regard to the process by which an epitaph was composed, the bereaved family would first provide the deceased's biographical account or genealogical record to the author, who would then compose the text. The text would subsequently be transferred onto stone through rubbing or inscription, and finally carved by a stone craftsman. Epitaphs thus survive in two forms: manuscript copies and stone inscriptions. Accordingly, the epitaph materials used in this study comprise both transmitted textual collections and excavated stone inscriptions.¹ At present, there is no complete compilation of Ming-dynasty epitaphs from Dali Prefecture. Epitaph materials are mainly found in published records and excavated artifacts, and are scattered across local gazetteers, collected works, genealogies, and compilations of inscriptions. In view of this, and following the principle of "comprehensive sampling", this study draws on

¹ For the purposes of this study, "epitaphs" is used in a broad sense to include not only epitaphs buried inside tombs, but also tomb steles, tomb inscriptions, tomb tablets, spirit-way steles, and related forms of funerary inscription erected above ground. Other terms for epitaphs include *kuangzhi*, *muji*, *zangzhi*, and *shoucang ming*.

existing scholarship and collected the following Ming-dynasty epitaphs from Dali Prefecture: more than 200 epitaphs from the *Dali Congshu: Epigraphic Materials* (excluding inscriptions in Sanskrit) [11], more than 190 from the *Collected Stone Inscriptions from Different Historical Periods in China: Dali Volume* [12] 196 from the *Catalogue of Ancient Inscriptions Preserved in Dali City* [13], 55 from *Famous Steles of Dali through the Ages* [14], 49 from the genealogies of the Dong family of Shicheng and the Zhao family of Longguan included in the *Dali Congshu: Genealogies* [15], 15 from the *Collected Biographies and Epitaphs of Yunnan* [16], 12 from the *Collected Works of Li Yuanyang* [17] and 10 from the *Extant Drafts of Master Yang Hongshan* [18]. On the basis of these materials, this study focuses on members of the elite groups of Dali Prefecture during the Ming Dynasty. After duplicate epitaphs were removed, 20 epitaphs containing no information on fertility were excluded, leaving a final sample of 236 valid epitaphs.

Several points concerning sample selection require clarification. To further ensure the appropriateness of the sample, the epitaphs were first arranged chronologically according to the dates on which they were composed or erected. The sample was then selected according to the following criteria. First, with respect to the chronological range, epitaphs for individuals who were born during the late Yuan or the Ming Dynasty and died during the Ming Dynasty were included, whereas those for individuals born in the late Ming and deceased in the early Qing were excluded. Second, epitaphs often recorded adopted sons, foster sons, or sons-in-law who had married into the deceased's family alongside biological children. Such individuals were not counted as biological children. For example, the *Epitaph of Yang Xijia, a Senior Student at the County School and Holder of a Granary Stipend*, records: "Mengkun and Mengpeng, together with their foster brother Mengjiao, stand in the lineage; may they perhaps preserve the legacy of their forebears" [13]. Yang Mengjiao was an adopted son of the deceased and was therefore not counted among the deceased's biological children. Third, epitaphs were excluded when the number of sons was recorded but the number of daughters was unclear. For example, the *Tomb Inscription for Yang Sheng, a Retired Scholar*, states that Yang Sheng's wife, Lady Yin, "bore three sons: the eldest, Yong, served in the Provincial Administration Commission and was appointed Assistant Postmaster of Fuling Station in Sichuan; he married Lady Qian. The second, Qin, married Lady Chen. The youngest, Yu, married Lady Yang. All [the daughters-in-law] were dutiful in serving their parents-in-law and fulfilled the obligations of a wife. The daughters they bore were all married into distinguished families" [11]. This passage establishes that Yang Sheng had three sons. However, the number of daughters can only be inferred from the character "all" (*jie*), which may indicate two or more daughters, and the precise number is not explicitly stated. The epitaph was therefore excluded from the sample. Fourth, epitaphs containing erroneous or contradictory fertility information were excluded. For example, Yang Shiyun's *Funerary Biography of Mr. Jing'an* states that Dong Bi "first married Lady Yang, who predeceased him, and then married Lady Liu, who also died. He had two sons, both by Lady Yang: the elder was Fan; the younger was Jie, a student at the prefectural school who was capable of carrying on the family's learning. He died three days after the death of the Master. What a pity" [18]. This account indicates that although Dong Bi's first wife, Lady Yang, died before him and he subsequently remarried Lady Liu, Lady Liu bore no children, while Lady Yang bore two sons. However, Yang Shiyun's *Funerary Biography of Lady Dong* records: "Her son Daosheng died young; the next was Fan; the next was Jie, a student at the prefectural school" [18]. This account indicates that Dong Bi and Lady Yang actually had three sons, with their eldest son dying young, rather than two sons as stated in the former account. Such contradictory evidence was therefore excluded from the statistical sample.

3. Statistical analysis of the number of children in elite families in Dali Prefecture during the Ming Dynasty

Table 1. Distribution of the number of children in elite families in Dali Prefecture during the Ming Dynasty according to epitaph records

Number of children	Number of families	Percentage of families	Total number of children	Sons	Daughters
0	9	3.26	0	0	0
1	26	9.42	26	22	4
2	38	13.77	76	65	11
3	47	17.03	141	105	36
4	36	13.04	144	85	59
5	45	16.3	225	150	75
6	29	10.51	174	104	70
7	26	9.42	182	106	76
8	8	2.9	64	38	26
9	5	1.81	45	15	30
10	2	0.72	20	10	10
11	1	0.36	11	11	0
13	1	0.36	13	8	5
14	1	0.36	14	8	6
15	2	0.72	30	17	13
Total	276	—	1,165	744	421

Note: The number of children born to a family represents the combined number of children born to all wives and concubines in the household.

Fertility levels reflect, to a certain extent, the level of political, economic, and cultural development attained by Chinese society at different stages of its historical development. Calculating the fertility rate of a particular region can therefore provide an indication of its overall level of development. In modern demography, the fertility rate refers specifically to the fertility of women of reproductive age and is calculated as the ratio of the total number of births to the number of women of reproductive age. However, polygynous family structures, including households with multiple wives or concubines, were common in premodern society. It is therefore problematic to use the fertility rate as the principal measure when examining the number of children born within individual families. Accordingly, this study uses the average number of children born per family as its principal measure, calculated by dividing the total number of children born by the total number of families. Although the average number of children per family is not widely used in modern demography, it is more useful than the fertility rate for investigating the number of children born in premodern families. From the epitaph materials of Dali Prefecture during the Ming Dynasty, the author collected 236 epitaphs containing explicit records of childbearing. These epitaphs involve a total of 276 families,² with

² The 276 families referred to in this study are not necessarily equivalent to 276 individual epitaph subjects. Some epitaphs record the fertility of the deceased's parents, siblings, or sons. In such cases, each separately documented family was counted as an independent family for statistical purposes.

1,165 children recorded. Of these, 744 were sons, accounting for 63.86% of all recorded children, while 421 were daughters, accounting for 36.14%. The distribution of family size by number of children is presented in Table 1.

After the number of children recorded in the epitaphs of elite families in Dali Prefecture was grouped according to the categories shown in Table 1 and the data were subjected to quantitative analysis, several characteristics of fertility among elite families in Dali Prefecture during the Ming Dynasty can be identified.

First, families with two to six children were the most common among the elite families of Dali Prefecture during the Ming Dynasty. Each of these categories accounted for more than 10% of all families, and together they represented 70.65% of the total sample. Among them, families with three and five children were the most numerous, accounting for 17.03% and 16.30%, respectively.

Second, the number of children per family varied considerably. The minimum number of children recorded was zero, with nine families having no recorded children. The maximum was 15 children, recorded in two families, both of which belonged to officials. For example, the *Epitaph Inscription for Bao Jie, Deceased Commander-in-Chief of the Dali Guard, Grand General of the Zhaoyi Rank and Senior Cavalry Commander*, records that Bao Jie "first married Lady Pan, who predeceased him. He subsequently married Lady Zhou. He had ten sons: the eldest, Shen and Yuan, both died; the next, Han, succeeded to his father's official rank; the next were Yun, Peng, Wen, Cheng, Huai, and [illegible]. He had five daughters, who married Liu Yu, a Battalion Commander; Bai Quan, a Military Commander; Zhang Shun; Dai Ji; and A Ji, a Prefect" [11].

Third, with regard to the sex composition of children, elite families in Dali Prefecture during the Ming Dynasty showed a marked preference for male offspring. Among the 276 sampled families, a total of 1,165 children were recorded, including 744 sons and 421 daughters, producing a sex ratio at birth of 177. This figure is considerably higher than the natural sex ratio at birth.³ Because epitaphs sometimes omit information about the number of daughters when recording children, however, this sex ratio may be higher than the actual ratio of male to female births.

Fourth, dividing the total number of children by the 276 families represented in the sample yields an average of 4.22 children per family among elite families in Dali Prefecture during the Ming Dynasty. The average numbers of sons and daughters were 2.70 and 1.52, respectively. Thus, the average number of sons per family exceeded the average number of daughters by 1.16.

It should be noted that the average number of children per family calculated from Table 1 is based on the 276 sampled families as a single aggregate. However, these 276 families encompassed different family structures, occupations, and periods of life. To further investigate the specific fertility patterns of elite families in Dali Prefecture during the Ming Dynasty, it is therefore necessary to conduct a more detailed analysis by category.

4. Analysis of fertility among elite families in Dali Prefecture during the Ming Dynasty

According to the information recorded in the epitaphs, the elite population of Dali Prefecture encompassed

³ Demographers and anthropologists generally consider the natural sex ratio at birth to be approximately 105–106 boys per 100 girls. Because girls have a higher survival rate than boys and women have a longer average life expectancy than men, this ratio generally results in a sex ratio of approximately 100 among men and women reaching marriageable age in a given society. See Ping Yao, *The Life Course of Women in the Tang Dynasty*. Shanghai: Shanghai Ancient Books Publishing House, 2004, p. 251.

three dimensions of variation: different family structures, different social statuses, and different periods of life. Accordingly, in order to more accurately reconstruct the actual fertility patterns of elite families in Dali Prefecture during the Ming Dynasty, this study classifies the 276 sampled families according to family structure, occupational and social status, and period of life, and examines fertility patterns among elite families in Dali Prefecture from these different perspectives.

4.1. Fertility patterns under different family structures

Table 2. Number of children in elite families in Dali Prefecture during the Ming Dynasty by family structure according to epitaph records

Number of children	Monogamous households				Polygynous households with multiple wives or concubines			
	Number of families	Share of families (%)	Sons	Daughters	Number of families	Share of families (%)	Number of families	Share of families (%)
0	8	3.65	0	0	1	1.75	0	0
1	21	9.59	17	4	5	8.77	5	0
2	32	14.61	56	8	6	10.53	9	3
3	38	17.35	85	29	9	15.79	20	7
4	28	12.79	66	46	8	14.04	19	13
5	33	15.07	108	57	12	21.05	42	18
6	23	10.5	85	53	6	10.53	19	17
7	24	10.96	98	70	2	3.51	8	6
8	6	2.74	27	21	2	3.51	11	5
9	3	1.37	10	17	2	3.51	5	13
10	1	0.46	5	5	1	1.75	5	5
11	1	0.46	11	0	0	0	0	0
13	0	0	0	0	1	1.75	8	5
14	0	0	0	0	1	1.75	8	6
15	1	0.46	7	8	1	1.75	10	5
Total	219	—	575	318	57	—	169	103

The practice of men taking secondary wives or concubines had long existed in premodern Chinese society. Compared with the general population, members of the elite enjoyed higher social status and possessed greater economic resources, which gave them greater capacity to take concubines and have children with them. Elite households therefore existed under two principal family structures: monogamous households and polygynous households with multiple wives or concubines. To facilitate an analysis of fertility under these different family structures, the author classified the 276 families identified from the epitaph materials of Dali Prefecture during the Ming Dynasty into two categories: monogamous households and polygynous households with multiple wives or concubines.⁴ The analysis shows that, among the 276 families, 219 were monogamous households,

⁴ The polygynous family structure referred to in this study includes both remarriage following the death of a wife and the practice of taking a secondary wife or concubine.

accounting for 79.35%, while 57 were polygynous households with multiple wives or concubines, accounting for 20.65%. It can thus be seen that nearly four-fifths of elite families in Dali Prefecture during the Ming Dynasty were monogamous households. The specific fertility patterns under the two family structures are presented in Table 2.

After quantitatively analyzing the number of children born in the 219 monogamous households and 57 polygynous households with multiple wives or concubines listed in Table 2, the following conclusions can be drawn.

First, in terms of the distribution of family fertility, families with two, three, four, or five children were relatively common among monogamous households, with families having three children being the most numerous, accounting for 17.35% of the total. Among polygynous households with multiple wives or concubines, families with three, four, or five children were relatively common, extending one category beyond the peak range observed among monogamous households. Families with five children were the most numerous, accounting for 21.05%.

Second, in terms of the range of family fertility, the minimum number of children in both types of households was zero. However, among polygynous households with multiple wives or concubines, only one household had no children. This was the household of He Rangshi, a resident of Taihe County who died at the age of 60 and had two wives but "ultimately remained without an heir" [11]. The maximum number of children in both family structures was 15, with one household in each category reaching this number. Compared with monogamous households, however, the range of the number of children was somewhat wider among polygynous households with multiple wives or concubines. Only three monogamous households had ten or more children, accounting for 1.38%, whereas such households accounted for 7% of polygynous households with multiple wives or concubines.

Third, in terms of the sex composition of children, monogamous households had a relatively high sex ratio. Based on the numbers of sons and daughters born under the two family structures, monogamous households had a total of 575 sons and 318 daughters, yielding a male-to-female sex ratio of 181. Polygynous households with multiple wives or concubines had 169 sons and 103 daughters, yielding a sex ratio of 164. The difference may be attributable primarily to the unequal sample sizes and certain random factors.

Fourth, in terms of the average number of children per family, monogamous households had an average of 4.08 children, including an average of 2.63 sons and 1.45 daughters. Polygynous households with multiple wives or concubines had an average of 4.77 children, including an average of 2.96 sons and 1.81 daughters. Thus, the average number of children was slightly higher in polygynous households with multiple wives or concubines than in monogamous households.

4.2. Fertility patterns among families of different social statuses

In order to strengthen governance in frontier regions during the Ming Dynasty, the court sought to incorporate the hereditary elite of Dali through conciliatory policies. It also recruited local talent into the state bureaucratic system, selecting members of the hereditary elite to study at the Nanjing Imperial College, appointing them to educational and clerical positions, and incorporating them into the *lijia* system [19]. Based on the social status of the elite groups, this study divides them into two categories. The first is the status-based elite, comprising grassroots organizational leaders responsible for supervising tax collection following the transformation of the traditional hereditary elite of Dali, including *lizhang* (community heads), *laoren* (community elders), and *baozhang* (bao heads), as well as officials who entered government service either through the civil service examinations or through other channels. The second is the non-status-based elite, including prominent local families, wealthy households, and leaders of religious organizations and other groups that exercised a certain

degree of social authority. Of the 276 sampled families, 135 were status-based elite families, accounting for 48.92%, while 141 were non-status-based elite families, accounting for 51.08%. The specific fertility patterns of families belonging to the two status categories are presented in Table 3.

Table 3. Fertility among elite families of different social statuses in Dali Prefecture during the Ming Dynasty according to epitaph records

Number of children	Status-based elite families				Non-status-based elite families			
	Number of families	Share of families (%)	Sons	Daughters	Number of families	Share of families (%)	Number of families	Share of families (%)
0	5	3.7	0	0	4	2.84	0	0
1	15	11.11	13	2	11	7.8	9	2
2	14	10.37	25	3	24	17.02	40	8
3	22	16.3	51	15	25	17.73	54	21
4	16	11.85	33	31	20	14.18	52	28
5	22	16.3	75	35	23	16.31	75	40
6	18	13.33	61	47	11	7.8	43	23
7	12	8.89	46	38	14	9.93	60	38
8	3	5.93	15	9	5	3.55	23	17
9	3	5.93	10	17	2	1.42	5	13
10	1	0.74	5	5	1	0.71	5	5
11	1	0.74	11	0	0	0	0	0
13	0	0	0	0	1	0.71	8	5
14	1	0.74	8	6	0	0	0	0
15	2	1.48	17	13	0	0	0	0
Total	135	—	370	221	141	—	374	200

A comprehensive analysis of the data in Table 3 reveals the following characteristics of fertility among elite families of different social statuses in Dali Prefecture during the Ming Dynasty.

First, among status-based elite families, those with one to six children each accounted for more than 10% of the total. Families with three and five children were the most numerous, each accounting for 16.30%. Among non-status-based elite families, those with two to six children were relatively common, with the distribution of family size more concentrated around the peak than that of status-based elite families. Families with three children were the most numerous, accounting for 17.73%.

Second, in terms of the distribution of the number of children, status-based elite families exhibited the widest range, from zero to 15 children. Among non-status-based elite families, the range was narrower, from zero to 13 children. Only two non-status-based elite families had ten or more children, indicating a relatively even distribution of family size.

Third, with regard to the sex composition of children, the 135 status-based elite families had a total of 591 children, including 370 sons and 221 daughters, producing a sex ratio of 167. The 141 non-status-based elite families had 574 children, including 374 sons and 200 daughters, producing a sex ratio of 187. The sex ratio among status-based elite families was therefore lower than that among non-status-based elite families. This difference may be explained primarily by the fact that status-based elite families sought to consolidate their political position by using marital alliances to strengthen the influence of the household or lineage. For example, the *Epitaph of General Han, Commander of the Martial Virtue Rank*, records: "He had four daughters: the eldest married Xi Xiang, a Battalion Commander; the second married Zhao Xi, a Battalion Commander; the third married Qian Sen, a student at the county school; and the fourth married Chen Shi, a Battalion Commander" [11].

Fourth, calculations show that status-based elite families had an average of 4.38 children, including 2.74 sons and 1.64 daughters, whereas non-status-based elite families had an average of 4.07 children, including 2.65 sons and 1.41 daughters. Overall, although the average number of children among status-based elite families was slightly higher than that among non-status-based elite families, the difference was relatively small. One important reason is that status-based elites included a substantial number of official and bureaucratic families. Because many of these officials served away from their places of origin, they spent relatively little time with their families, resulting in longer intervals between births and a shorter period of active childbearing. This gave rise to a distinctive pattern of family fertility. For example, Dong Zhi, as recorded in the *Epitaph of Lord Dong*, had only two sons because he "went to Bian to attend upon the Prince of Zhou. Many years passed—more than forty years—and he never once saw the faces of his parents, siblings, or other relatives" [13]. The prolonged separation of husband and wife thus resulted in extended birth intervals and, to some extent, constrained family fertility.

4.3. Fertility patterns among families across different periods

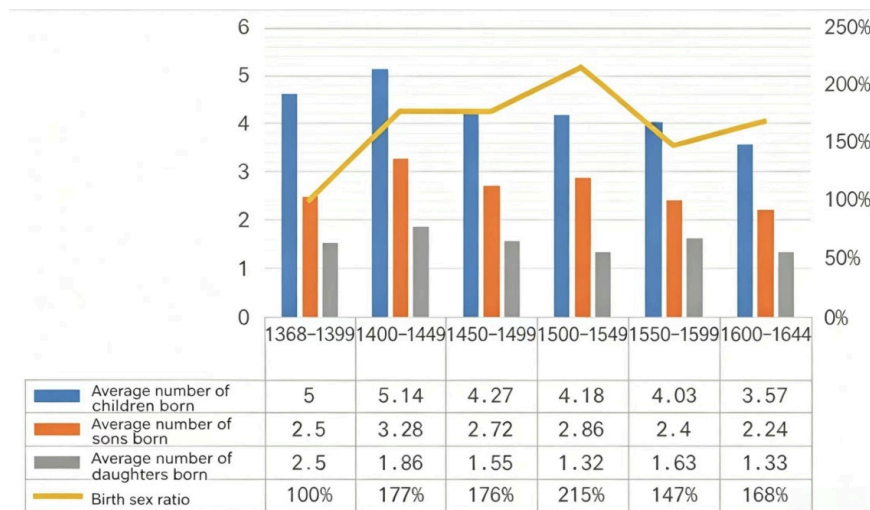


Figure 1. Average number of children in elite families in Dali Prefecture across different periods according to epitaph records

Differences in the periods of life in which individuals lived were accompanied by differences in the social environments they experienced, which in turn resulted in variations in family fertility. Cao Shu-ji, using epitaphs from the Ming Dynasty, examined fertility by classifying periods according to the year of the deceased's death and dividing them into 25-year and 50-year intervals [4]. Following the 50-year interval used

in his study, this article calculates the average number of children per family across different periods. From the sample, 211 cases with clearly recorded birth and death dates were selected. The average number of children per family during each period is presented in Figure 1. As shown in Figure 1, the average number of children per family among the elite families of Dali Prefecture during the Ming Dynasty first increased and then declined. From the second half of the fourteenth century to the first half of the fifteenth century, the average number of children per family increased from 5.00 to 5.14, indicating an upward trend. Thereafter, the figure declined steadily, falling from 4.27 in the second half of the fifteenth century to 3.57 in the first half of the seventeenth century. Cao Shu-ji's study of fertility in the Ming Dynasty at the national level found that the number of children per family began to decline in the second half of the fifteenth century, but remained relatively stable at around 2.6 during the first half of the sixteenth century before rising somewhat to 2.8 in the second half of the sixteenth century [4]. By contrast, among elite families in Dali Prefecture, both the average number of sons and the average total number of children continued to decline throughout the periods under examination. This pattern was therefore clearly different from the national trend in fertility. According to Cui-rong Liu, fluctuations in fertility may have been associated with natural and social conditions in particular localities, including droughts, floods, famines, and epidemics [1]. Between the first year of the Zhengde reign (1506) and the fourth year of the Tianqi reign (1624), the *Tianzhi* records as many as 17 earthquakes, floods, droughts, freezing disasters, and epidemics in the Dali Prefecture region. Of these, seven different natural disasters occurred between the twentieth year of the Wanli reign (1592) and the forty-second year (1614) [9]. For example, in the thirty-fourth year of the Wanli reign (1606), "hail fell in Yunnan County, as large as chicken eggs and three-edged in shape; it penetrated more than a *chi* into the ground, destroying all the crops and walls. People and livestock that ate the spoiled grain became ill and died" [9]. The repeated occurrence of natural disasters adversely affected the living conditions of the population and contributed to the continued decline in the average number of children among elite families in Dali Prefecture during the Ming Dynasty, thereby producing a distinctive regional pattern of fertility.

In summary, among different family structures, the average number of children per family among elite families in Dali Prefecture during the Ming Dynasty ranged from 4.08 to 4.77. Across families of different social statuses, the average ranged from 4.07 to 4.38. When examined across different periods of life, the average number of children first increased and then declined. Overall, the average number of children per family was 4.32. The impact of recurring natural disasters contributed to a successive decline in fertility among elite families in Dali Prefecture from the second half of the fifteenth century onward, producing a fertility pattern that differed from the national trend. Nevertheless, the average number of children per family among elite families in Dali Prefecture generally remained between four and five.

5. Conclusion

Fertility is an important indicator for assessing the overall level of development of a given region. As Fei Xiaotong observed, "The renewal of social members is the mechanism through which the integrity and continuity of the social structure are maintained. Raising children is not a private matter that individuals can freely choose or abandon; rather, it is a task related to the survival and security of society" [20]. Dali Prefecture was located on the southwestern frontier of the Ming Empire, and its elite, as members of the upper and middle strata of society, can to some extent provide insight into fertility levels in frontier regions during the Ming Dynasty. Using epitaph materials from the Ming Dynasty, this study conducts a quantitative analysis of fertility among elite families in Dali Prefecture. It also compares their fertility patterns with those of scholar families in Shanghai during the Ming Dynasty in order to investigate the reproductive behavior of this group

and the factors underlying it. The study finds that the number of children in elite families in Dali Prefecture ranged from 0 to 15, with families having two to six children being the most common. The average number of children per family was 4.22, and the sex ratio at birth was 177. With regard to different family structures, most elite households in Dali Prefecture during the Ming Dynasty were monogamous. Monogamous households had an average of 4.08 children, with three-child families being the most common. Polygynous households with multiple wives or concubines had an average of 4.77 children, with five-child families being the most common. Across families of different social statuses, the average number of children ranged from 4.07 to 4.38. From a chronological perspective, the average number of children per family increased slightly from 5.00 during the Hongwu period to 5.14 during the Zhengtong period, after which it entered a downward trend. The frequent occurrence of natural disasters contributed to a fertility pattern that differed from the national trend, with the average number of children declining progressively from 4.27 in the second half of the fifteenth century to 3.57 in the first half of the seventeenth century. Overall, elite families in Dali Prefecture during the Ming Dynasty had an average of approximately four to five children. At the same time, the sex ratio at birth reveals a pronounced gender imbalance. These distinctive fertility patterns among elite families in Dali Prefecture during the Ming Dynasty provide valuable historical evidence and may offer certain insights into understanding the development and future trends of population fertility in contemporary society.

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