The Causes of Changes in Fertility in Northern Namibia: Ovamboland,1927–2010, and Kavango Region,1935–1979

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Abstract

The main aim of this study was to analyse fertility change in Ovamboland (North-Central Namibia) (1927–2010) and the Kavango region (North-East Namibia) (1935–1979) in Northern Namibia. According to the results, the fertility change was quite similar in both areas: fertility declined during the 1950s compared to the preceding period, 1935–1949. We can assume that the main reason for this early fertility decline was changes in the number of migrant workers (out-migration), which caused changes in both the marriage age and birth intervals. In both Ovamboland and in the Kavango region, fertility increased from the late 1950s into the early 1960s and the fertility transition started at the end of the 1970s. In both areas, the increase in fertility during the late 1950s and early 1960s was probably due to the improved health situation. Fertility transition started at the end of the 1970s, but mortality had already started to decline before that. The main causes of this declining fertility at the end of the 1970s and during the 1980s were improved access to modern methods of contraception and probably also the increased level of education. As a result of the HIV epidemic, mortality increased in Ovamboland at the end of the 1990s and early 2000s. The declining fertility in the same period was probably linked to this increased mortality due to AIDS, while the increased fertility after 2008 is, in turn, probably linked to management of the HIV epidemic.

Introduction and aims of the study

Demographic development in Africa, and in particular in sub-Saharan Africa, is becoming a major issue. The population of Africa is currently about 1.2 billion, but in 2060 it is estimated to exceed about 2.6 billion (World Population Prospects 2015). Although fertility rates are still high, there are also great regional variations in fertility,

and it has even declined in many regions of Africa. The fertility transition in Africa has been widely studied, lately by the World Bank (Canning et al. 2015), which links the future of fertility transition to the economic development in Africa. From a historical point of view, however, the first recorded signs of fertility decline in Africa appeared during the 1940s and 1950s in North-Central Namibia (Ovamboland) and during the 1960s in South Africa (Notkola and Siiskonen 2000, 68; Caldwell and Caldwell 1993, 231). Parish registers from 1925 onwards from Northern Namibia are a good source for analysing the early changes in fertility. Other historical records, such as administrative and missionary records, can be used for interpreting the results. Archives of the native administration, originally created during the period of South African rule, provide a variety of information for contextualising the research agenda and interpreting results. These administrative archives are stored at the National Archives of Namibia in Windhoek. The Archives of the Finnish Evangelical Mission are stored at the National Archives of Finland in Helsinki, but microfilmed duplicates are available also at the National Archives of Namibia.

The primary aim of this study is to analyse and compare fertility change in Ovamboland, or North-Central Namibia (1927–2010) and in the Kavango region, or North-East Namibia (1935–1979). The secondary aim is to find possible explanations for the early fertility change in these two areas. New archival material was collected for this purpose. The third aim is to describe fertility change after 2001 in North-Central Namibia and to evaluate how much this is linked to improvements in the situation regarding the HIV epidemic.

Parish register data

North-Central Namibia was known as Ovamboland during German and South African colonial rule. It is one of the regions in Namibia most severely affected by the HIV epidemic. The name of the Kavango region has remained the same since the 1920s. The ecology, history, economy, and culture of Ovamboland has been described well (Notkola and Siiskonen 2000, 7–16). Compared to Ovamboland, the Kavango area is more remote. The region is dominated by the Kavango River, one of the longest rivers in Africa. Particularly in earlier history, the population was concentrated along the banks of the Kavango River (see Yaron et al. 1992).

The area formerly known as Ovamboland is currently divided into four administrative regions – Ohangwena, Omusati, Oshana and Oshikoto – and these formed the Northwest Health Directorate until the early 2000s. North-Central and North-East Namibia were selected as the study regions are based on the availability of parish register data. According to the Population and Housing Census of 2011, 40% of the Namibian population, 847 259 people, lived in North-Central Namibia (GRN/NSA 2014). At the beginning of the 2000s, more than 70% of people living in the study region belonged to the Evangelical Lutheran Church in Namibia, or ELCIN (Shemeikka et al. 2005).

These figures are even higher, if we take the Kavango region into account.

The parish registers maintained by the ELCIN are the result of work by the Finnish Evangelical Mission, which began operating in the study region in 1870. The Finnish Missionary Society started working in Kavango in the 1920s, and the first mission station was established in Nkurenkuru in 1929 (Kyrönseppä and Ihamäki 1969). Congregations were established by missionary workers, and the system of registering their members was based on the Scandinavian parish register system. This system has remained essentially unchanged up to the present day (Siiskonen et al. 2005). Separate registers are used to record events that take place in each parish, including baptisms, marriages, migration in or out of the congregation and deaths. A main register (the main book) is used to aggregate all information at family level. In practical terms, members of congregations are participating in a population register system. Our previous studies indicate that results based on parish register data correspond quite well with calculations based on census data and surveys (Notkola and Siiskonen 2000; Notkola et al. 2000). Parish register data can be used to estimate mortality and fertility among both members of the ELCIN and the whole population of North-Central Namibia.

Parish register data from eight congregations in Ovamboland were used here to analyse the period 1927–1985. The sample congregations were Elim, Nakayale, Oshigambo, Okahao and Tshandi (Figure 1). In Kavango, the parishes were Nkurenkuru, Rupara and Mupini (Figure 2). These congregations cover both economic and administrative centres and outlying areas, including settlements close to and far away from main transportation routes. The number of marriages analysed, after exclusions, was 771 in the Kavango region (1935–1979) and 7019 (1927–1985) in Ovamboland.

The data from North-Central Namibia alone was collected for the years after 1980, using parish registers from the same eight congregations (Figure 1). For these congregations, all available information concerning married couples and their children was collected for the period from 1 January 1980 to 28 February 2005. In addition, new data for the years 2005–2012 was collected during the summer of 2012. The family reconstitution method was used to extract demographic data from microfilmed registers (Notkola and Siiskonen 2000). The data included information on births, baptisms, migrations and deaths occurring in 3,343 families. After the exclusion of 324 families (955 individuals) due to missing dates of birth for one or more family members, the sample included 2,887 mothers, 2,879 fathers, and 12,810 children. In cases where only the birth month was missing, the month of June was used. When the birth day was missing, the 15th day of the month was used.

In addition to parish register data we used vital statistics, Namibia Demographic and Health Survey (NDHS) data and Population Housing Census data from 1991, 2001 and 2011. The reliability of the data has been analysed in several previous publications (e.g. Notkola et al. 2000; Shemeikka 2006; Shemeikka et al. 2005, 2013; Siiskonen et al. 2005).

Figure 1. Ovamboland (North-Central Namibia): Location of congregations studied using parish register data. Interview data is not used in this study.

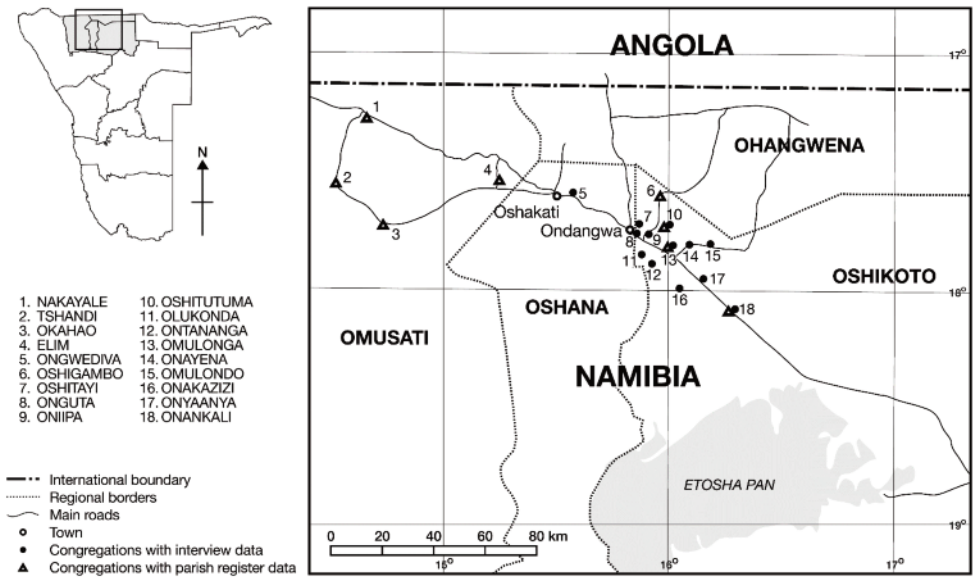


Figure 2. Location of sample parishes in Ovamboland (North-Central Namibia) and Kavango (North-East Namibia), 1927–1985

How well do members of the ELCIN represent the whole population of North-Central Namibia?

During the 1950s, membership of the Evangelical Lutheran Church in Namibia rose to half of the region's total population. For most of the period covered by the current study, 60-70% of the population belonged to the ELCIN, so ELCIN members represent the majority of the population of the study region (Shemeikka 2006, 60; based on ELCIN statistics). Congregations in the former Ovamboland had 552,000 members at the end of 2001, and thus approximately 71% of the 780,000 inhabitants of the Ohangwena, Omusati, Oshana and Oshikoto regions (GRN/NPC 2003) were members of the Evangelical Lutheran Church. According to the 2000 NDHS data, 85% of the interviewed women in the study region were Protestants (Shemeikka 2006, 61).

The large proportion of ELCIN members in the study population means that knowledge of the demography of ELCIN members provides information about the majority of the population of the study region. ELCIN members can therefore be taken to be a fairly good representation of the population of the study region as a whole.

Reliability of parish register data

One possible limitation of data from parish registers is that children who died before baptism are not recorded. Nevertheless, the influence of this factor is reduced by the parental wish to have a weak or sick child baptised before he or she dies. The mean age of children at baptism was 6.4 months in the data as a whole and 5.7 months during the period 1960–2000. There were differences between the congregations in children's age at baptism (Shemeikka et al. 2005, 89).

According to the 2000 NDHS (GRN/MoHSS 2003), the infant mortality rate in the study region was 50 per thousand live births during the period 1991–2000. Of deceased children, 62.3% died in the neonatal period, that is, within one month of birth, and 37.7% died in the post-neonatal period, that is, aged between one and eleven months. Assuming that deaths were distributed evenly during the post-neonatal period, some 80% of infant deaths would have occurred during the first six months after birth. This means that about 40 of each thousand children born would have died before baptism, assuming that children are baptised at an age of about six months and that weak and sickly children are not baptised at a younger age than others. This would lead to a deficiency of 0.2 children in the total fertility rate (TFR) in the period 1990-2000. Instead of being 4.2, TFR would have been 4.4 during this ten-year period (Shemeikka 2006).

The level of infant mortality in the 2000 NDHS is, however, relatively low. According to estimates by Notkola and colleagues (2004) based on parish register data, post-neonatal mortality was 49 per thousand in the period 1994–2000, compared to 19 per thousand in the period 1991–2000, assessed using data from the 2000 NDHS (GRN/MoHSS 2003). It is possible that register-based data is even more accurate than data based on interviews for estimating levels of infant mortality in a population where

the prevalence of HIV is high. This is because women living with HIV are more likely to be missing from the interview data than other mothers (because of their higher mortality and morbidity), and also because the children of these women living with HIV are more likely to have HIV than other children, increasing their mortality rates. Mortality under the age of five in South-West Africa from 1925–1990 was estimated based on parish registers and other data sources (Notkola et al. 2000). Deaths are missing from the parish data, but the adjusted results indicate almost exactly the same level of under-five mortality as the 1991 census data for the same parishes. Assuming this higher level of infant mortality, the TFR would have been around 4.6 in the period 1990–2000, taking into account children who died under the age of six months, that is, before their baptism. If 5–10% of children were missing from the parish registers for 1960–1989 because they died before being baptised, this would have resulted in a deficit of 0.3–0.7 in the TFR.

The sex ratio at birth (i.e. the number of males per 100 females) in parish register data was 97 for the entire data set and 96 for the period 1960-2000. In most of the world's populations, slightly more new-born babies are boys. In sub-Saharan Africa, however, the sex ratio at birth (103.3) is lower than the global average (105.5). There are also regional differences within sub-Saharan Africa: among the Bantu of southern and eastern Africa, the sex ratio at birth is 101 (Garenne 2004). According to Garenne (2004), the sex ratio at birth in the 1992 NDHS was 98.5. Furthermore, according to the 2001 Population and Housing Censuses, the sex ratio at birth among babies born during the 12 months preceding the census was 100 in the Northwest Health Directorate of Namibia (Shemeikka 2006, 63). The sex ratios in parish register data are therefore relatively well in line with those from other sources, indicating only a modest effect of the under-registration of children who died before baptism.

Results

Fertility change 1927–1980

Based on reliability analysis, the fertility in North-Central Namibia from 1927–2004 can be well analysed using parish registers. The results show that fertility in the research area began to decline in the 1930s. This fertility decline continued until to mid-950s (Figure 3).

Fertility declined in the Kavango region in the same way as in Ovamboland, when the confident intervals are taken into account (Table 1). There may have been no early fertility decline (during the 1930s and 1940s) in the Kavango region, and fertility decline might have started slightly later in Kavango than in Ovamboland. Statistically, the difference in fertility rates between these two areas is not significant, (Table 1). The problem with analysing the Kavango data is that the number of followed marriages is quite small. In any case it is quite clear that in both areas, fertility declined during the 1950s compared to the preceding period, 1935-1949 (Figure 3 and Table 1).

Figure 3. Total marital fertility rate in Ovamboland 1927-2003.
Sources: Notkola and Siiskonen 2000; Shemeikka, Notkola and Siiskonen 2008.

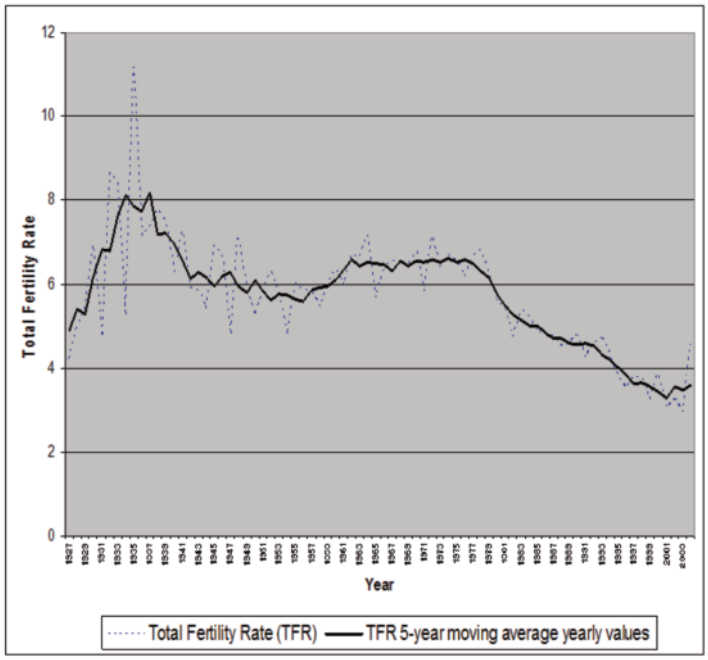


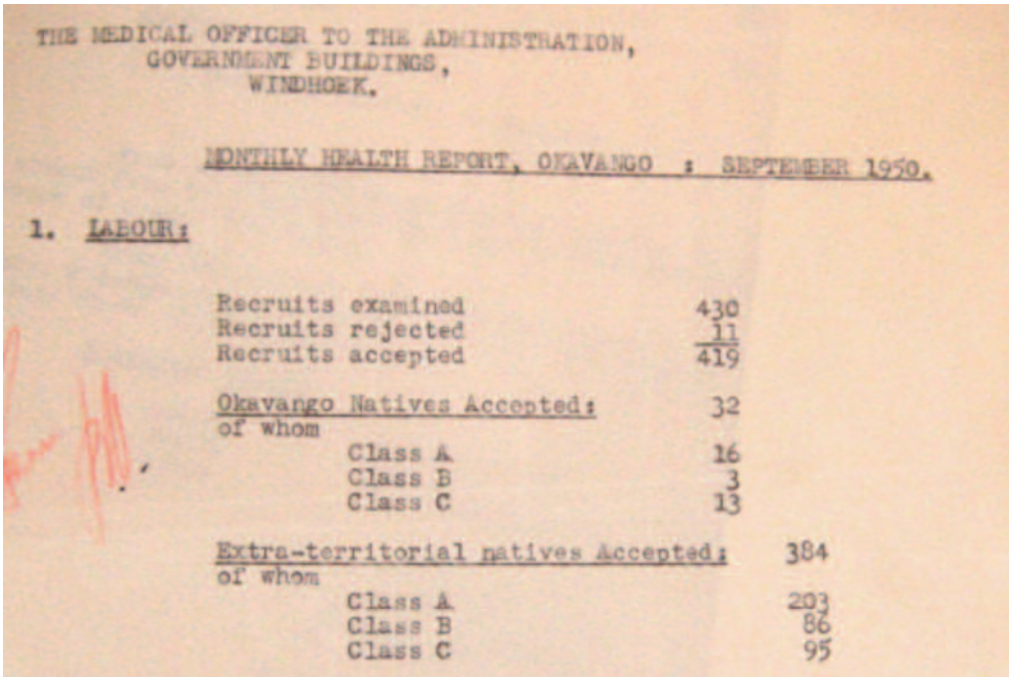
Table 1. Total marital fertility rate (women 15–49 years) in Ovamboland and in the Kavango region 1935–1979
Sources: Lemström 1999; Notkola and Siiskonen 2000.

	Kavango	95% Confidence interval	Ovamboland
1935-49	7.7	6.0-9.3	6.5
1950-59	5.5	4.8-6.2	5.7
1960-69	6.6	6.1-7.1	6.5
1970-79	5.7	5.4-7.1	6.2

The main reason for this early fertility decline was fluctuation in the number of migrant workers (out-migration), which caused changes in marriage age and in birth intervals (see Notkola and Siiskonen 2000, 87). During the 1930s the number of migrant workers varied annually between 2,000–4,000 men from Ovamboland, but increased after that, to around 10,000 men at the end of the 1940s and 12,584 men in 1955 (Notkola and Siiskonen 2000, 157). The same kind of development can be seen also in the recruitment of migrant workers from Angola.

We can assume that the nature of out-migration changed also in the Kavango region during the 1950s, although it is difficult to get good information about recruitments of migrant workers in the area. One of the most important tasks of Native Commissioners (who were responsible for the administration of native affairs in South-West Africa) in the Kavango region was to organise and lead the recruitment of migrant workers. Native Commissioners were assisted by the local native recruiters and this work was controlled by the local chiefs (images 1 and 2).

Image 1. Regional Medical Officer, Monthly Health Report 1950.
Source: National Archives of Namibia (NAN)



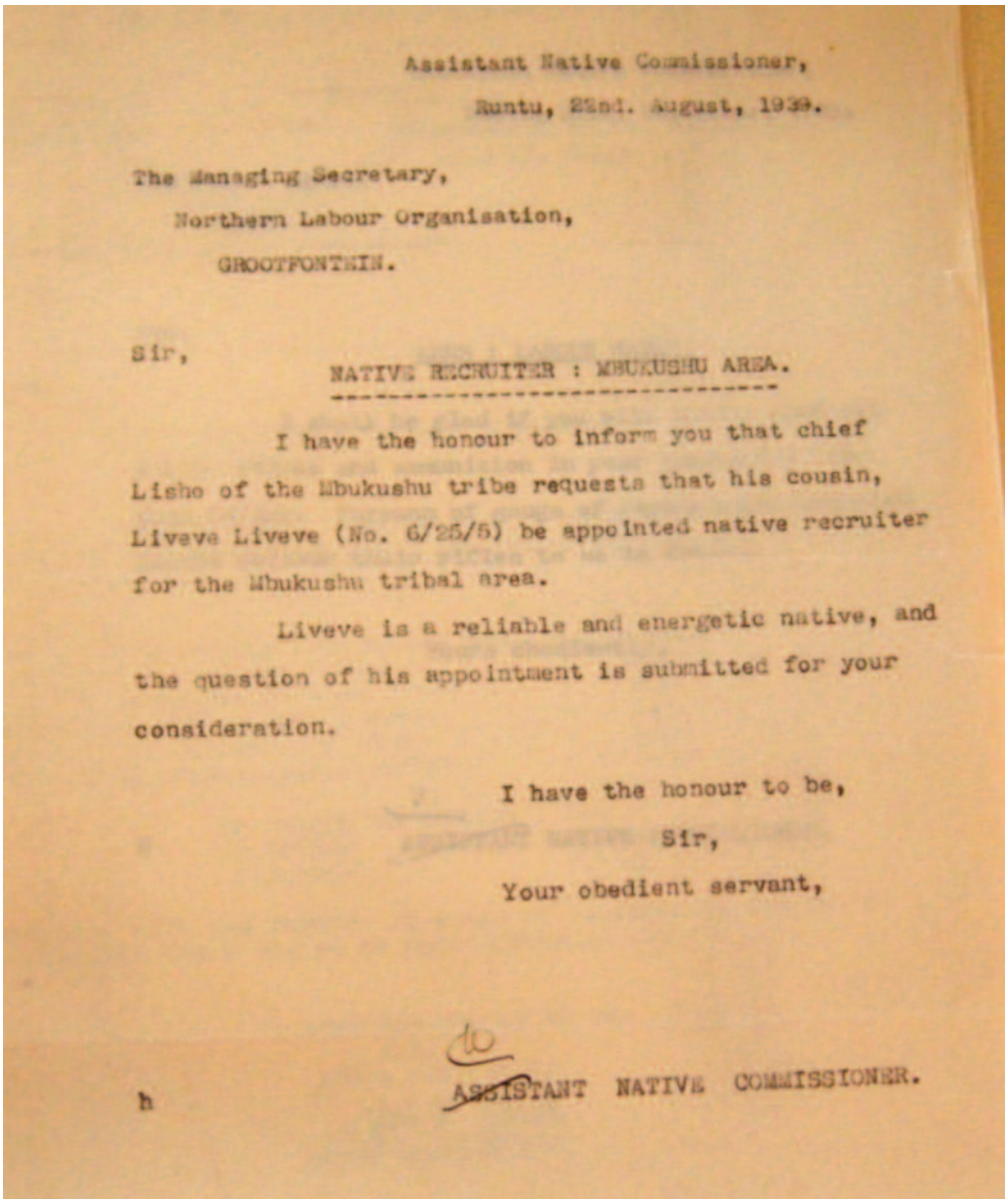
THE MEDICAL OFFICER TO THE ADMINISTRATION,
GOVERNMENT BUILDINGS,
WINDHOEK.

MONTHLY HEALTH REPORT, OKAVANGO : SEPTEMBER 1950.

1. LABOUR:

Recruits examined	430	
Recruits rejected	11	
Recruits accepted	419	
Okavango Natives Accepted:	32	
of whom		
Class A	16	
Class B	3	
Class C	13	
Extra-territorial natives Accepted:		384
of whom		
Class A		203
Class B		86
Class C		95

Image 2. Letter of Assistant Native Commisioner, Runtu, 22 August 1939.
Source: NAN, Assistant Native Commissioner to the Managing Secretary 1939.



Assistant Native Commissioner,
Runtu, 22nd. August, 1939.

The Managing Secretary,
Northern Labour Organisation,
GROOTFONTEIN.

Sir,

NATIVE RECRUITER : MBUKUSHU AREA.

I have the honour to inform you that chief Lisho of the Mbukushu tribe requests that his cousin, Liveve Liveve (No. G/25/5) be appointed native recruiter for the Mbukushu tribal area.

Liveve is a reliable and energetic native, and the question of his appointment is submitted for your consideration.

I have the honour to be,
Sir,
Your obedient servant,

h

ASSISTANT NATIVE COMMISSIONER.

The system was the same as the one used in Ovamboland in the 1940s (Notkola & Siiskonen 2000, 115–121). Migrant worker recruitment in the Kavango region was also high: monthly numbers were about 400-500 men, although most of them probably came from Angola. There is no reason to assume that the recruitment of migrant labourers from Kavango was different from the development in Ovamboland.

The explanations for increased fertility at the end of the 1950s and early 1960s are linked to improved sexual health in Ovamboland. This is because in the 1950s, penicillin and streptomycin began to be used to treat both syphilis and gonorrhoea (Notkola & Siiskonen 2000, 85).

Mortality among children and adults decreased in Ovamboland during the 1950s (Notkola et al. 2000, 157-158). Fertility was quite stable at the end of the 1960s and started to decline again a decade later; this decline continued until the end of the 1990s (Shemeikka et al. 2005).

In both regions, there was a fertility increase in the early 1960s and the fertility transition started at the end of the 1970s (Figure 3 and Table 1). We can assume that also in Kavango, as in Ovamboland, the increased fertility can be partly be explained by the lower prevalence of infertility in area.

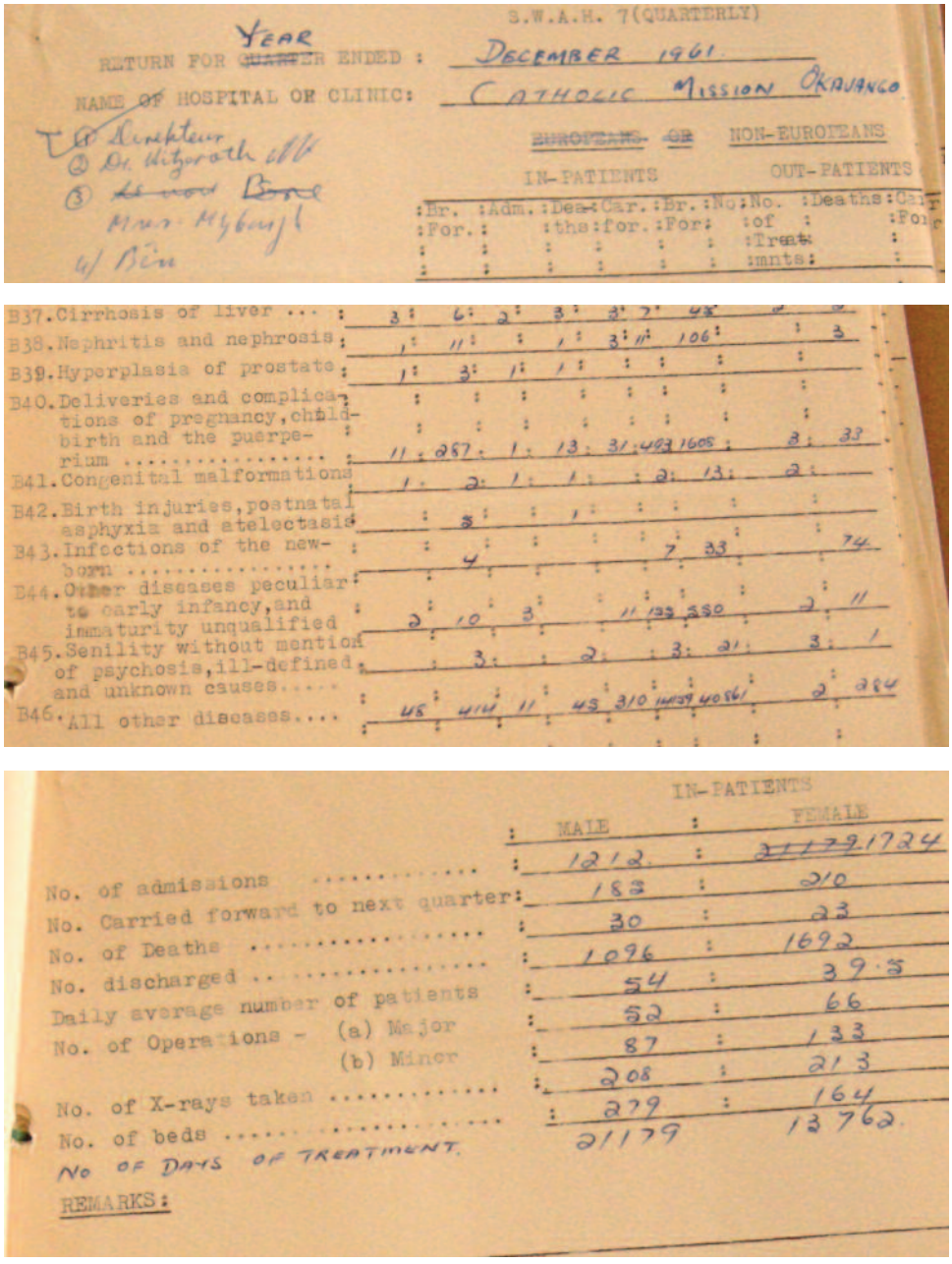
The Finnish Evangelical Mission started medical work in Kavango in the early 1950s. The next significant step forward was taken in 1951, when a nurse was placed at the new mission station of Mpungu on the western border of Kavango, about 25 miles west of Nkurenkuru and the Kavango River. Thus the medical work in Mpungu was led by a qualified nurse from the very beginning. Two or three nurses sent by the Finnish Missionary Society served in the State Hospital of Rundu in Kavango since 1953. It was not until 1952, however, that the Missionary Society was able to send the first doctor to Kavango. In that year, Dr Melander moved from Onandjokve to Nkurenkuru and extended the small outpatient clinic there into a proper hospital (Kyrönseppä and Ihamäki 1969, 31). According to the annual health report (Director of Health Services 1962) of the Finnish Mission in Okavango, the total number of treatment days in 1962 was 46,212 days. The number of patients treated in that year was 1,127 males and 1,282 females.

At the same time, the Royal Catholic Mission was also active in Kavango and had several mission hospitals in the area. In 1961, the number of treatment days at the Royal Catholic Mission was 34,941 (Image 3). In this year, the total number of deliveries and pregnancy complications at the Royal Catholic Mission was 287 for Europeans and 493 for non-Europeans. In addition, the Dutch Reformed Mission was working in Maseru from the early 1960s. There are no good estimates about the population of the Kavango region but about 30,000 persons were probably living in the area in early 1950s (Regional Medical Officer, Monthly Health Report 1950.)

It is important to notice that infant and child mortality decreased in Ovamboland during the 1960s (Notkola & Siiskonen 2000, 94). Although we are not able to analyse mortality in Kavango due to the small numbers of followed families, we can assume that the same happened in Kavango, too. The missionary hospitals were active in the

Kavango region, providing better drugs to cure venereal diseases, raising the number of health examinations for recruited workers, and taking care of more pregnancies in small hospitals, helping to decrease infant mortality. As a result, recorded fertility increased in Kavango during the 1960s.

Image 3. Statistical report of activities in 1961.
Source: NAN, Director of Health Services 1961.



S.W.A.H. 7(QUARTERLY)

RETURN FOR ~~QUARTER~~ YEAR ENDED : DECEMBER 1961

NAME OF HOSPITAL OR CLINIC: CATHOLIC MISSION OKAVANGO

~~EUROPEANS~~ OR NON-EUROPEANS

	IN-PATIENTS				OUT-PATIENTS		
	Br. For.	Adm.	Deaths	Car. for.	Br. For.	No. of Treatments	Deaths
B37. Cirrhosis of liver ...	3	6	2	3	3	2	43
B38. Nephritis and nephrosis	1	11		1	3	11	106
B39. Hyperplasia of prostate	1	3	1	1			
B40. Deliveries and complications of pregnancy, childbirth and the puerperium	11	287	1	13	31	493	1605
B41. Congenital malformations	1	2	1	1		2	13
B42. Birth injuries, postnatal asphyxia and atelectasis		3		1			
B43. Infections of the newborn		4			7	33	
B44. Other diseases peculiar to early infancy, and immaturity unqualified	2	10	3		11	133	350
B45. Senility without mention of psychosis, ill-defined and unknown causes.....		3		2		3	21
B46. All other diseases....	45	414	11	43	310	1439	4086

	IN-PATIENTS	
	MALE	FEMALE
No. of admissions	1212	~~2179~~ 1724
No. Carried forward to next quarter:	182	210
No. of Deaths	30	23
No. discharged	1096	1692
Daily average number of patients	54	39.5
No. of Operations - (a) Major	52	66
(b) Minor	87	133
No. of X-rays taken	208	213
No. of beds	279	164
NO OF DAYS OF TREATMENT.	21179	13762

REMARKS:

Fertility change during the 1980s

The causes of the fertility transition in the 1980s have been analysed by Shemeikka (2006). Improved access to modern methods of contraception is one of the main reasons for this decline, and another is increased levels of education. Educational work by missionaries and churches was important (Shemeikka 2006, 105). However, according to the parish register data, the decline in fertility stopped after the year 2001 (Table 1). This result is consistent with the results of the NDHS 2013 (GRN/MoHSS 2014).

Mortality in Namibia 1990–2010 based on parish registers

Mortality in Namibia is analysed because it is one of the factors affecting the latest developments in fertility. The reliability of mortality data is also analysed by comparing the parish register mortality results to mortality results based on the NDHS.

Comparisons of mortality rates during different periods show that mortality levels in 1994–2004 were clearly higher than in 1980-1993, with a substantial increase in mortality among men aged 30–54 (Figure 4) and women aged 25–49 (Figure 5). Mortality also increased among older persons. One consequence of these changes is an altered age profile for mortality in 1994-2004 compared to that of 1980–1993. In the decade 1994–2004, death rates reached a local peak in individuals aged 40–44 (men) and 35–39 (women), then declined with increasing age before rising again for people in their late sixties (Shemeikka et al. 2013).

Mortality was highest from 1997–2002 (Figure 6). After that, male mortality started to decline. We can compare this mortality decline (based on parish registers) to the results from the NDHS of 2000, 2007 and 2013 (Masquelier et al. 2015). The pattern of the decline is quite similar in both studies. This mortality decline has been linked in Eastern and Southern Africa to the increased use of antiretroviral therapy (ART). The Network for Analysing Longitudinal Population-based HIV/AIDS Data for Africa has shown that "The mortality rates have been relatively static before the availability of ART. Mortality declined rapidly thereafter, with typical declines between 10 and 20% per annum. Mortality declines have been more pronounced for women" (Reniers et al. 2014, 533). Due to the small numbers of deaths, the yearly female mortality cannot be studied based on parish registers for 2000–2010. Based on the NDHS, "adult mortality levels have begun to decline once again in East Africa, in some instances before the large-scale expansion of antiretroviral therapy programmes" (Masquelier et al. 2014, 161). The role of the availability of ART in recent mortality decline in Africa is expected to remain a matter for discussion in the future.

Figure 4. Age-specific death rates per 1000 person-years among men aged 20–64 years with 95% confidence interval (CI), North-Central Namibia, 1980-1993 and 1994–2004. Source: Shemeikka et al. 2013.

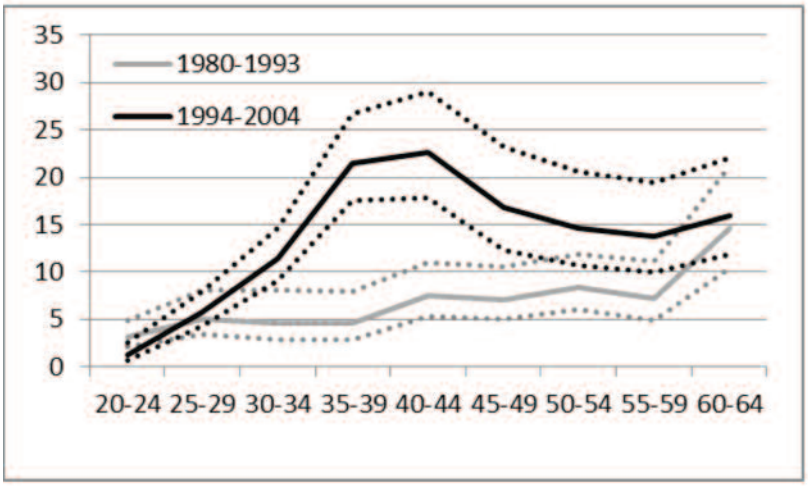


Figure 5. Age-specific death rates per 1000 person-years among women aged 20-64 years with 95% confidence interval (CI), North-Central Namibia, 1980–1993 and 1994–2004.
Source: Shemeikka et al 2013.

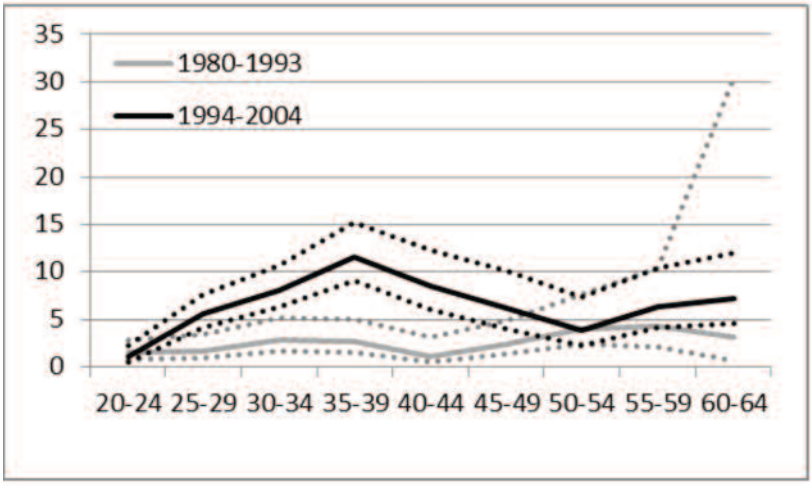
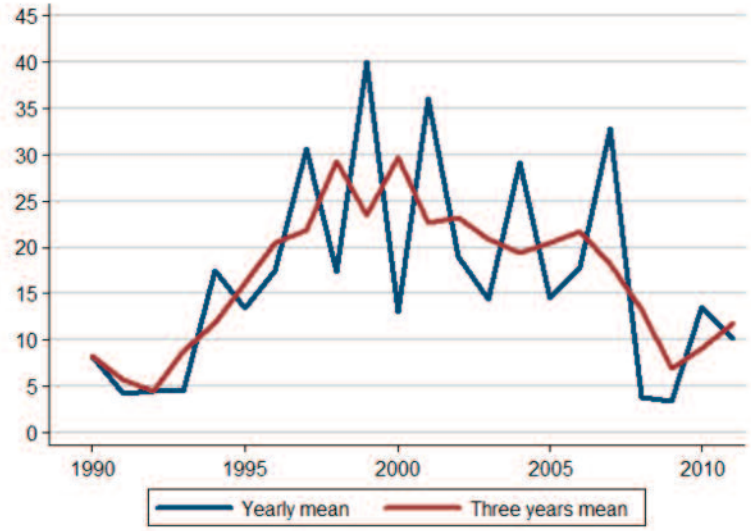


Figure 6. Mortality (o/oo) among males aged 30–39 years, North-Central Namibia 1990–2012.
Based on parish records from eight parishes (see Figure 1).



Fertility development in North-Central Namibia during the 2000s

According to the parish register data, the decline in fertility ended after the year 2003 (Table 2). During the early 2000s, the total fertility was between 2.6 and 3.1, but since 2008, fertility has increased. The causes of this fertility development are unknown. This small increase in fertility in the years 2007-2010 is inconsistent with the results of the 2013 NDHS (GRN/MoHSS 2014). Mortality increased in Namibia during the end of the 1990s, was quite stable during the early 2000s and decreased markedly after the HIV epidemic from 2005. Based on this, we can propose that decreased mortality and increased fertility at the end of the 2000s are linked, although this hypothesis requires further testing. Previously, it was estimated that in Namibia, fertility declined by about 10% at the end of the 1990s as a result of the HIV epidemic (Shemeikka 2006), while the increase in fertility after the HIV epidemic peaked in 2008 was about 10% (Table 2).

Table 2. Total (marital) fertility rate (TFR) in North-Central Namibia from 2001–2010. Based on parish records from eight parishes.

Year	TFR 15-49	NOC	TFR (25–39)	NOC
1996	3.7	166	2.6	126
1997	3.6	153	2.2	108
1998	3.2	126	2.1	92
1999	3.2	120	2.2	93
2001	3.1	102	1.8	67
2002	2.9	93	1.9	65
2003	2.7	73	1.8	57
2004	2.6	70	1.8	54
2005	4.8	66	1.8	53
2006	3.0	66	1.9	53
2007	2.8	68	2.0	5
2008	3.4	77	2.2	59
2009	3.9	67	2.1	6
2010	4.6	72	2.2	61

NOC=Number of children

Conclusion

The main aim of this study was to analyse fertility change in Ovamboland, or North-Central Namibia (1927–2010) and the Kavango region, or North-East Namibia (1935–1979). It was found that the early fertility change in both areas was quite similar: fertility declined during the 1950s compared to the period 1935–1949.We can assume that the main reason for this early fertility decline was fluctuation in the number of migrant workers, which caused changes in marriage age and in birth intervals. During the 1930s, the number of migrant workers varied annually between 2,000–4,000 men from Ovamboland, but increased to over 10,000 men from the 1940s. The nature of out-migration changed also in the Kavango region during the 1950s. Although it is difficult to get good information about the recruitment of migrant workers in Kavango, there is no reason to assume that the nature of out-migration there was different from Ovamboland. Increased out-migration is an important factor in explaining the lower fertility in the Kavango region during the 1950s.

In both regions, fertility increased from the late 1950s into the early 1960s. In Ovamboland and in Kavango, the cause of this increased fertility was the improved health situation. In both regions, the increased fertility can partly be explained by a decline in infertility. During the 1950s, penicillin and streptomycin began to be used to treat both

syphilis and gonorrhoea. In both regions, the missionary activities linked to the development of health care were quite extensive and we can assume that this was a factor in the increase in fertility from the late 1950s.

The fertility transition started at the end of the 1970s in both regions. Mortality started to decline before that. Improved access to modern methods of contraception and probably also increased level of education caused a decline in fertility in the 1980s. Educational work by missionaries and churches was also important, while we may only speculate about the role of the civil war in fertility development. The decline in fertility in Ovamboland continued until the end of the 1990s and, according to the parish register data, it ended only after 2001.

Due to the HIV epidemic, mortality increased in North-Central Namibia during the end of the 1990s and early 2000s. The declining fertility at the end of the 1990s was probably linked to this increased mortality, and the increased fertility after 2008 is again probably linked to the reduced number of deaths from AIDS with the introduction of antiretroviral therapy.

Vital statistics based on parish registers cover the area of North-Central Namibia quite well, and long-term changes in mortality and fertility can be analysed, from the 1920s to the 2010s. There are very few areas in Africa for which we able to produce fertility and mortality data for such a long period.

The collection and analysis of parish register data is not expensive, in particular if we compare the costs of conducting demographic and health surveys or censuses. Only a limited amount of parish data is used here. Digitalisation of all historical parish records data in Namibia would greatly improve access and enable further research.

Parish register data underestimate the mortality and fertility levels somewhat, but these deficiencies can be corrected. Correction of parish record data is, however, time consuming (see Notkola and Siiskonen 2000, 44–48). Nevertheless, the results from parish records are comparable to those from other demographic data sources. The quality of the data remains poor in certain sectors, however: infant mortality rates are particularly difficult to calculate.

The civil registration and vital statistics system in Namibia has recently been comprehensively assessed (GRN/MHA 2014). Statistics still need to be produced, however. When the civil registration system in Namibia is further developed, the possibilities of using parish registers concurrently should be fully exploited. The quality of parish registers can and needs to be improved, which requires training for the persons responsible for keeping the records.

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