STATISTICAL IMPACT OF EDUCATION ON FERTILITY
IN SUDAN

BY

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Introduction:-

It is usually beleived that one of the reasons of fertility decline in developed countries is the education advancement of the population. As the level of education rises fertility usually decline in both economically developed and under developed countries. Futthermore numerous studies have shown the inverse relationship between education and fertility.

Education of wife is more strongly associated with fertility than education of husband (U.N, 1973 P. 98) .Several explanation have been offered for the role of education in reducing the size of families.

At first glance the contribution of education to the changing position of children who became in many ways a burden rather than a practical advantage to their parents is simple. With the spread of education the opportunities for children to work and supplement the family income became restricted to part-time economic activities. In addition other costs fall upon the shoulders of parents(especially those with many children ; even when tuition, books and other school supplies are free, new financial obligation such as clothing transportation and lunch often had to be assumed by parents).(Carleton 1975 P. 123). "Education cost to the parents lead to smaller desired family size". (National Academy of Science 1972 Vol.1. P.53)

Ronald G Ridker has urged that ,
first; The additional years of schooling place two ourdens on the family budget. They reduce the income which children would otherwise

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contribute to the family and they increase the direct cost of rearing children. Second; the additional schooling increases the parents expectations of receiving larger income later in life, reducing the number of children needed to help with old-age security. Third; if the effective price of schooling were reduced, it would became more profitable for parents to invest more in fewer children, substituting"quality" for "quantity" (Ricker,1976,P.12)

Changes in socio-economic variables can operate on ferti-lity through their influence on the number of "Intermediate Variables"that have been classified by Davis-Blake(1968)into three broad groups: Intercourse variables,conception variables,and gestation variables. For example the socio-economic variables such as education may affect conception variables through its effect on use of contraception by married couples, it may af-fect intercourse variables through its effect on age at marriage and it may affect the gestation variables through its effect on practic of abortion. Ronald and John D. Kassarda argued that schooling influences fertility in three ways:-

First; the influence of evironment,curriculum and content of schooling in shaping attitudes, values and beliefs towards pre-ference concerning family size will be explicated. Second;shool-ing affects other variables that directly influnce fertility i.e. causal links. For example the major effect of formal education on fertility comes through indirect manner like the effect of education on age at marriage , female-labour force participation, social mobility,husband-wife communication,exposure to contrace-ptive information and material, mortality and morbidity of child-ren. Third; Schooling may operate jointly with other independant variables to have an interaction effect on fertility. For Example education influences fertility by operating with other aspects of modernization such as urbanization and industrialization(Ridker, 1976, P.156)

Education can affect the norm and values of persons. Indi-viduals who go to school and who are literate tend to be more receptive to innovation and have greater opportunity to change

aditional practices and customs which are prevalent in their ieties. As in Sudan a large proportion of the population is ill believing on what is called " Ein" (Evil eye) So, Diseases d deaths are attributed to the "evil eye" and hence strangers ire avoided and children are hidden. There are also certain diseases like tuberculosis, lepnosy,veneral diseases etc. which are considered socially unacceptable. Hence people hide such diseases ifter detectation and more reluctant to go to available specialist hospitals in view of possible social stigma.

Another example in relation to attibude towards female cir-:umcision, which is widly practiced in the North; there are three iifferent types of female circumcision: The pharaonic, the Sunna ind the Intermediate. The Pharaonic is the most prevalent among the uneducated people in the rural areas and traditionalists.It nas the longest number of complications,bleeding,infection,pain, sterility and death could possibly be a consequence. Although the law prohibitsany circumcision other than the "Sunna Type" but people still adhere to the pharaonic one. As a matter of fact, since it is illegal , it is carried out clandestinely by untrained women with tradional instruments which almost result in complications and death (Ministry of planning, Khartoum, 1981.

Among new generation and educated people who recognize all these perilous, any type of female circumcision are refused totally.

One aspect of marriage custom prevalent mostly in the North which might have implications on fertility, population quality, diseases and migration is the incidence of" cross-cousin marriage" on Endogamous Marriage" in North, the most preffered bride for a boy is his cousin. This custom is changing especially in the urban areas and among the educated.

Education is very helpful and indispensable for the effective use of fertility control methods for the following reasons:-

(i)   It enable individuals to understand how a method works
      and therefore how and under what circumstances it has
      to be used .

(ii) It enable people to defend themselves against superstitions
      and false rumours which otherwise might lead them to sus-
      pect the most efficient methods and to place in less reli-
      able or unreliable methods .

(iii) For methods like rhythm a certain minimum level of educa-
       tion is absolutely necessary in order to be able for exa-
       mple to estimate " Safe period"

Data Sources and Manipulation:-

The First Report of Sudan Fertility Survey has not yet been
finished but the preliminary tables extrated by computer could be
obtained, by the researchers, S.F.S. was limited to ever-married
women in the reproductive ages (15-49).

The S.F.S's questionnaire followed closely the recommendations
made by W.F.S.. Slight adoptation were made to meet the conditions
of like in Sudan.

The main purpose of the study was to investigate the fertility
history of women in the sample, their attitudes towards family
size, and the extend and effect of knowledge and use of contracep-
tive, on fertility level and socio-economic status of husband and
wives in the sample. The data of S.F.S. were collected only for
the Northern Region. Some dificulties and disturbances hindered
its coverage of the Southern Regions. The Survey was conducted in
1978 and the sample size was 3115 ever-married women. Table 1 show
the numbers of these women by level of education and by age groups.
It can be seen from this Table that the longest number of women
who have no schooling amounts to 2424,the next who have incomplete
primary 471 and the last who have primary and over is 220. Which
represent about 77.8 percent, 15.1 percent and 7.1 percent respec-
tively.

Table (1)
Even-married Women according
to level of education and age - groups

Age group	No Schooling	Incomplete primary	primary & Over	Total
15-19	148	53	25	226
20-24	325	128	56	509
25-29	525	126	72	723
30-34	383	86	37	506
35-39	515	53	16	584
40-44	277	18	6	301
45-49	251	7	8	266
Total	2424	471	220	3115
%	77.8%	15.1	7.1	100

Source: Sudan Fertility Survey ,1978 unpublished data.

Two indirect methods are used to estimate the actual level and pattern of fertility of the survey population. In this contest the reported data on the number of chilren everborn to women in reproductive ages (comutative fertility) could be used to obtain indirect estimation for fertility. The First method is that developed by Brass (P/F ratio) based on the comparison of accumulated current age specific fertility rates with the mean number of children everborn by women in the childbearing ages (Brass,1975). The Second is Relational Combertz model based on the reported number of chilren ever born only. (Adopted from Aziz, 1979)

Estimation of Age Specific Fertility rates :-

The First Method:

This method requires data about number of births occuring in the year preceding the survey and the number of children everborn, where both have to be tabulated by age of women. Brass utilzed these data by designing a technique for estimating fertility. The basic principle for this method is that it accepts the A.S.F.R. obtained from the reported births in the preceding year (fi) as a correct indication to the pattern of fertility and accepts the average number of children ever born (Pi) to younger women below age 30 as a correct indication for the level of fertility on the assumption that reports of younger women are much better and omission or inaccurate data can be considered as religible.Cummulated values of current fertility can be calculated directly from (fi). Brass has calculated multiplying factors (wi) based on a model of fertility distribution and reported average number of children ever born.

These factors adjust the current fertility rates to make it comparable with the mean parities in a way that Fl.Wl . is comparable to P_1, $5f_1 + f_2.w_2$ is comparable to p_2 and so on (Brass, 197! It suggested that the ratio f_1/f_2 and the mean of fertility $\bar{m}$ are to be used for selecting the appropriate multiplying factors wi (U.N. 1967)

The application of this technique requires a condition of approximately constant fertility in the recent past years.

This condition is satisfied for Sudan population, the majority of individuals did not use any type of-contraception and the socio-economic status among them is low which enable the expectation of constant fertility.

Table 2 (a),(b) and (c) explains in detail the application of this method on S.C.S. in 1978, according to educational level.The categories of educational level according to S.F.S. are no schooling incompleteprimary, and primary and over.

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The estimated total fertility rate as derived from the adjusted age-specific fertility rates are 7.9, 6.7 and 4.6 correspond to no schooling, incomplete primary, and primary and over respectively.

Combining incomplete primary and primary and over to be as literete, the estimation of A.S.F.R.Forthis new category could be seen in Table .2(d) by comparing with those who have no schooling as (illiterate). It is clear that the difference is highly significant between the two categories; due to the influence of education. The net gain of literate women are 2.3 (The difference between T.F.R for literate and no schooling women ,i.e 7.9-5.6=2.3)

Table (2)

Estimation of A.S.F.R by Brass Technique
according to level of education(Sudan
1978)No Schooling women.

Table 2 (a)

age group	fi	pi	Fj	Wi	fj+wifi	pi/Fi	$\hat{f}i$
15-19	0.257	0.6959	-	2.6007	0.668	1.0418	0.233
20-24	0.437	2.3262	1.285	2.9209	2.5614	0.9082	0.397
25-29	0.377	3.4610	3.47	3.0527	4.6209	0.7490	0.342
30-34	0.290	4.9034	5.355	3.1621	6.2720	0.7818	0.263
35-39	0.231	5.9126	6.805	3.3203	7.5720	0.7809	0.210
40-44	0.094	6.0289	7.96	3.7248	8.3101	0.7255	0.085
45-49	0.056	6.133	8.43	4.8154	8.700	0.7084	0.051
			8.71				1.581

T.F.R = 7.905 f_1/f_2 = 0.588

Table 2.(b)

Incomplete Primary

age group	fi	pi	Fj	Wi	fj+wifi	pi/Fi	$\hat{f}i$
15-19	0.3585	0.9623	-	2.552	0.9150	1.0517	0.269
20-24	0.4375	2.1563	1.7925	2.464	2.8707	0.7511	0.329
25-29	0.4127	3.5317	3.98	2.587	5.0480	0.6996	0.310
30-34	0.3256	5.7326	6.0435	2.709	6.9257	0.8277	0.245
35-39	0.1887	5.7925	7.6715	2.915	8.2216	0.7045	0.142
40-44	0.0556	6.6111	9.2995	3.548	9.4968	0.6961	0.042
45-49	-	5.2857	10.243	4.828	10.243	0.5160	-
							1.337

T.F.R. = 6.685

$f_1/f_2 = 0.819$

Table 2. (c)

Primary & over

age group	fi	pi	Fj	Wi	fj+wifi	pi/Fi	f̂i
15-19	0.2	0.4	-	1.885	0.377	1.061	0.151
20-24	0.3929	1.4643	1.0	2.394	1.941	0.7544	0.296
25-29	0.3333	2.5972	2.9645	2.543	3.812	0.681	0.251
30-39	0.1892	3.892	4.631	2.658	5.134	0.758	0.143
35-39	0.125	4.063	5.577	2.815	5.929	0.685	0.094
40-44	-	3.333	6.202	3.192	6.202	0.537	-
45-49	-	4.75	-	-	-	-	-

T.F.R. = 4.625 f_1/f_2 = 0.509

0.925

Table 2. (b)

Estimation of A.S.F.K by Brass Technique

for women who can read and write (literate woman)

Age group	f_i	p_i	F_j	W_i	$f_j + w_i f_i$	p_i / F_i	$\hat{f}_i$
15-19	0.308	0.7821	-	2.857	0.880	0.8888	0.215
20-24	0.423	1.9457	1.54	2.9516	2.7915	0.6970	0.296
25-29	0.384	3.1920	3.66	3.0702	4.8390	0.6596	0.268
30-34	0.285	5.1789	5.58	3.1840	6.4874	0.7983	0.199
35-39	0.174	5.3913	7.005	3.3631	7.5902	0.7103	0.121
40-44	0.042	5.7917	7.875	3.8732	8.0377	0.7206	0.029
45-49	-	5.000	8.085	4.9503	8.085	0.6184	-
							1.128

T.F.K. = 5.64

$f_1 / f_2 = 0.726$

Method II

Brass has used the Gombertz model to estimate fertility. The advantage of this model is that the function describes the age pattern of fertility quite well by the use of three parameters and that a simple transformation leads to a unique relation of fertility with age.

The Model is expressed as:

$$y(x) = - \ln (- \ln F(x)/F) = \alpha + \beta_x \qquad (1)$$

where $F(x)$ is the comulated age specific fertility rates to exact age x.

F is the end of child bearing i,e it is the parameter approximately the total fertility rate.

α and β are two parameters which fix a particular pattern of the system. α is a location and β is a dispersal parameter.

The linear property of transformation makes interpolation, graduation, and fitting very simple and elementary.

In this method, therefore the mean number of live births per women (P_i) by age group of women may be used to estimate the age pattern of fertility and thus the level of fertility. One of the advantages of this method is that it estimating the fertility as is neccessary in the Brass techinque.

Using equation (1) and Replacing $F(x)$ by P_i we get

$$- \ln [- \ln \frac{P_i}{F}] = \alpha + \beta y_s (x) \qquad (2)$$

Where $y_s (x)$ is a standard set of values derived from standard fertility pattern chosen to represent an average shape.

Now equation (2) has three unknown F, α and β, which can be estimated by the method of selected points taking three values of p_i.

The accuracy of the method will mainly depend on the selection of P's.

The selection of the pi values should be made on the basis of the knowledge of the age pattern of fertility as well as the correct reporting of the number of children everborn. Suppose the selected P_i's are denoted by P_1, P_2 and P_3. Then by simplifying equation (2) , it may shown that

$$z = \frac{\ln p(3) - \ln p(2)}{\text{len } p(2) - \text{len } p( )} = \frac{e^{-\beta y_s(2)} - e^{-\beta y_s(3)}}{e^{-\beta y_s(1)} - e^{-\beta y_s(2)}} \qquad (3)$$

where the number 1,2 and 3 refer to the three selected age groups. Since $P_1, P_2, P_3, y_s(1)$, $y_s(2)$ and $y_s(3)$ are all known; then by trial and error, equation (3) will provide a solution for β . Once β is known ($\hat{\beta}$), then α can be estimated from this equation

$$e^{-\alpha} = \frac{\text{len } p(3) - \text{len } p(2)}{e^{-\beta y_s(2)} - e^{-\beta y_s(3)}} \qquad (4)$$

and finally F, from equation

$$F = \exp \{ \ln p(3) + e^{-\alpha} \cdot e^{-\beta y_s(3)} \} \qquad (5)$$

Now by substituting the estimates of α and β ($\hat{\alpha}$ and $\hat{\beta}$), then estimates of y(x) can be obtained from

$$\hat{y}_{(x)} = \hat{\alpha} + \hat{\beta} \ y_s(x)$$

These $\hat{y}(x)$ values can then be convented into $\frac{F(x)}{F}$ as:-

$$\frac{\hat{F}(x)}{F} = \exp (-e^{-\hat{y}(x)}) \qquad (6)$$

Since, the value of $\hat{F}$ is known, the comulative fertility F(x) can be estimated from

husbands were reporting about their use rather than their wives ˙. This possibility is ruled out because husbands- as well as wives were asked about every method on the list.Also, the strong correlation between the reporting of husbands and wives on the ever -use of the specific methods of birth control- which will be discussed later- confirms that thiskind of bias does not exist.

The methods of contraception used

The agreement between the responses of the different groups of information on the methods of birth control used by them is remarkable. Almost all respondents, wives as will as husbands, who reported ever use of birth control mentioned the use of pills. Male sterilization has never been used in both samples and very rare use of the diaphragm was noticed especially in the rural areas. Table(III) shows that in the rural sample the most popular methods among the wives, after the pill of course, are prolonged lactation, withdrawal, IUD, the condom and rhythm. These same methods enjoy the same degree of popularity among the rural husbands except that the rhythm methos comes first. The less popular methods reported by the rural couples were famale sterilization, injections, abstinence and other methods. It is noted that abstinence was never mentioned by rural husbands as a method used by them for the purpose of birth control. However, sexual abstinence during certain periods of the married life is a well known and observed tradition. Abstinence is practiced after giving birth and also at times of mouring.

In the urban sample both husbands and wives gave exactly the same relative importance to the methods of birth control used. Both of them stated that rhythm, condom, withdrawal, IUD and injections are the most commonly used methods after the pill. On the other hand,   famale sterilization, lactation, abstinence and other methods are less common.The urban husbands were more liable to mention abstinence than their rural counterparts and also more than the urban wives.

Table 3(a)

Estimation of A.S.F.R. by linear Inter-
polation on Modified Gompertz Scale.
No. Schooling women, (S.F.S.,1978)

Age group	Pi	$Y_s(x)$*	$\check{y}(x)$	$\frac{F(x)}{F}$	$\hat{F}(x)$	A.S.F.R
15-19	0.6959	-0.6913	-0.8034	0.1072	0.6963	0.139
20-24	2.3262	0.0256	-0.1189	0.3242	2.1063	0.282
25-29	3.4610	0.700	0.5251	0.5535	3.5956	0.298
30-34	4.9034	1.4787	1.2686	0.7549	4.9036	0.262
35-39	5.9126	2.626	2.3640	0.9102	5.9130	0.202
40-44	6.0289	4.8097	4.4490	0.9884	6.4206	0.102
45-49	6.0289			1.0000	6.4961	0.015

T.F.R = 6.5   1.3

i	Age of Women	Pi	$Y_s(i)$
1	15-19	0.6959	-0.6913
2	30-34	2.3262	1.4787
3	35-39	3.4610	2.6260

z	β	$e^{-\alpha}$	α	F
0.0959	0.9548	1.1541	-0.1433	6.4961

$$\hat{Y}(x) = -0.1433 + 0.9548\, y_s(x)$$

* Adopted from Aziz A.Abdel.
  Fertility and Mortality in Jordan. C.D.C.
  1979, Table 3.2.41, Unpublished M Phil Thesis.

Table 3(b)

Estimation of age specific fertility
Rates by Gomperts Method
Incomplete Primary Women

Age group	Pi	$Y_s(x)$	$\hat{Y}(x)$	Fx/F.	$\hat{F}(x)$	A.S.F.R
15-19	0.9623	-0.6913	-0.6728	0.14089	0.9631	0.193
20-24	2.1562	0.0256	-0.14227	0.31572	2.1583	0.239
25-29	3.5317	0.700	0.3568	0.49662	3.3949	0.247
30-34	5.7326	1.4787	0.9330	0.67478	4.6127	0.244
35-39	5.7925	2.6260	1.7820	0.84510	5.7771	0.233
40-44	6.6111	4.8097	3.3979	0.96710	6.6111	0.167
45-49				1.000	6.836	0.045

T.F.R = 6.84   1.368

i	Age groups	Pi	$y_s(x)$
1	15-19	0.9623	-0.6913
2	20-24	2.1563	0.0256
3	40-44	6.6111	4.8097

z	β	$e^{-\alpha}$	α	F
1.3887	0.73999	1.7594	-0.1612	6.336

$$\hat{Y}(x) = -0.1612 + 0.7399 \, y_s(x)$$

Table 3(c)

Estimation A.S.F.R by Gombertz Method

<u>primary and over women</u>

Age group	Pi	$Y_s(x)$	$\hat{Y}(x)$	F(x)/F	$\hat{F}(x)$	A.S.F.R
15-19	0.4	-0.6913	-0.8437	0.0978	0.3998	0.0800
20-24	1.4643	0.0256	0.4291	0.5215	2.1322	0.347
25-29	2.5972	0.7	1.6265	0.8215	3.3589	0.245
30-34	3.8919	1.4787	3.0091	0.9519	2.8919	0.107
35-39	4.0625	2.6260	5.0462	0.9936	4.0625	0.034
40-44	3.3333	4.8097	8.9233	0.9999	4.0882	0.005
				1.000	4.0887	0.0001

T.F.R. = 4.09

0.8181

i	Age group	Pi	$Y_s(x)$
1	15-19	0.4	-0.6913
2	20-24	3.8919	1.4787
3	25-29	4.0625	2.6260

Z	β	$e^{-\alpha}$	α	F
0.01885	1.7755	0.6813	0.3837	4.0887

$$\hat{Y}(x) = 0.3837 + 1.7755 \, Y_s(x)$$

Table 3(d)

Estimation of A.S.F.R by Gombertz Method
<u>literate women</u>

Age group	Pi	$y_s(x)$	$\hat{Y}(x)$	$F(x)/F$	$\hat{F}(x)$	A.S.F.R
15-19	0.7821	-0.6913	-0.6603	0.1444	0.7835	0.157
20-24	1.9457	0.0256	0.5695	0.5679	3.0819	0.460
25-29	3.1920	0.700	1.7265	0.8370	4.5424	0.292
30-34	5.1789	1.4787	3.0623	0.9543	5.1789	0.127
35-39	5.3913	2.6260	5.0305	0.9935	5.3915	0.043
40-44	5.7917	4.8097	8.7766	0.9998	5.426	0.007
45-49	5.00			1.000	5.4269	—

T.F.R = 5.43   1.086

i	Age group	Pi	$Y_s(x)$
1	15-19	0.7821	-0.6913
2	30-34	5.1789	1.4787
3	35-39	5.3913	2.6260

z	B	$e^{-\alpha}$	α	F
0.0213	1.7155	0.5912	0.5256	5.4269

$$Y(x) = 0.5256 + 1.7155 \, Y_s(x)$$

Table (4)

Summary of Estimation A.S.F.R By

Method I   and   Method II(S.F.S. 1978)
(Brass)   (Gomberts)

Age gorup	No Schooling		Incomplete primary		primary & over	
	M.I	M.II	M.I	M.II	M.I	M.II
15-19	0.233	0.139	0.269	0.193	0.151	0.080
20-24	0.397	0.282	0.329	0.239	0.296	0.347
25-29	0.342	0.298	0.310	0.247	0.251	0.245
30-34	0.263	0.262	0.245	0.244	0.143	0.107
35-39	0.210	0.202	0.142	0.232	0.094	0.034
40-44	0.085	0.102	0.042	0.167	-	0.005
45-49	0.051	0.015	-	0.045	-	0.0001
	1.581	1.3	1.337	1.368	0.925	0.8181
T.F.R	7.91	6.5	6.85	6.84	4.625	4.09

Source : Table 2 (a,b,c)
      and Table 3 (a,b,c)

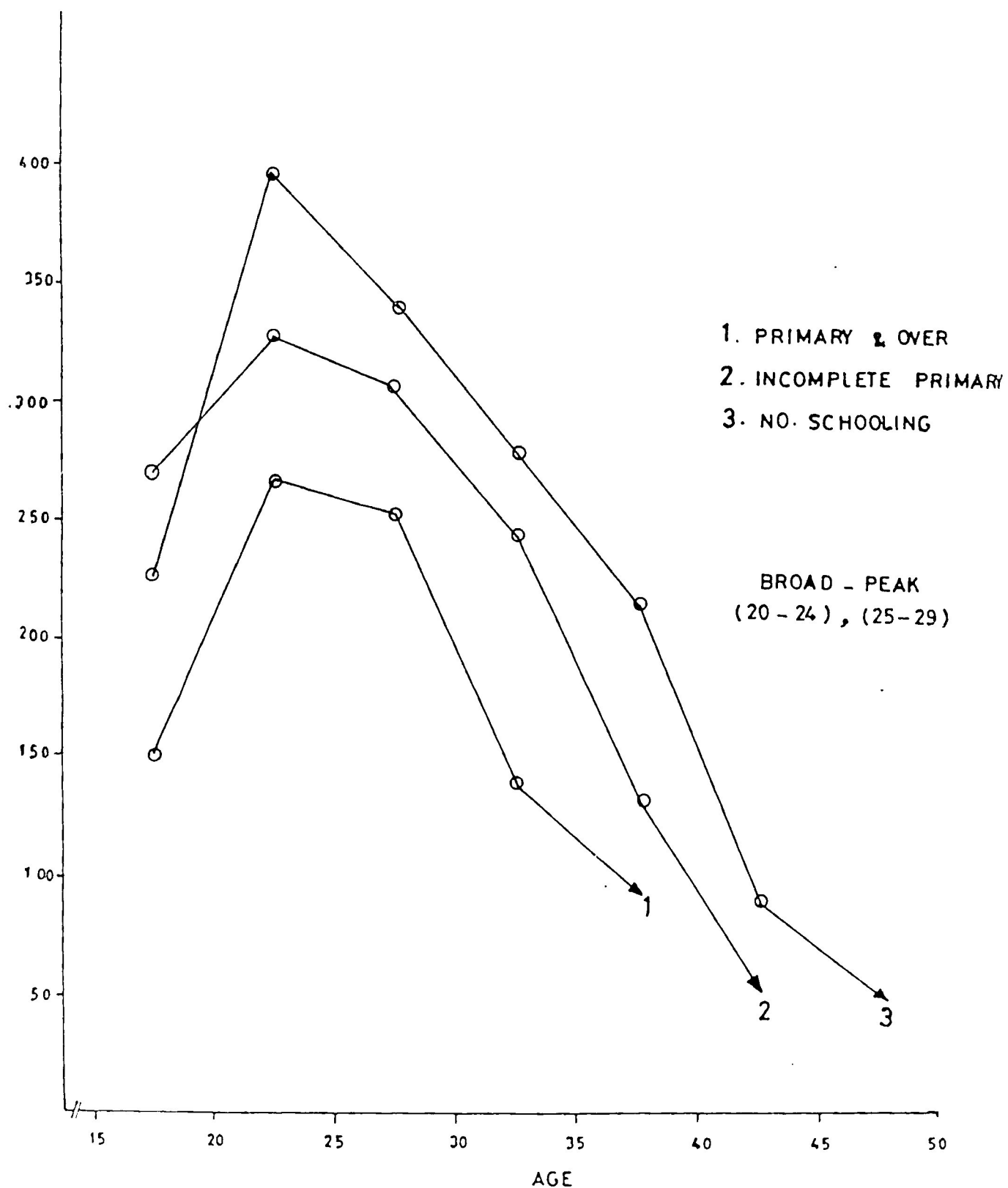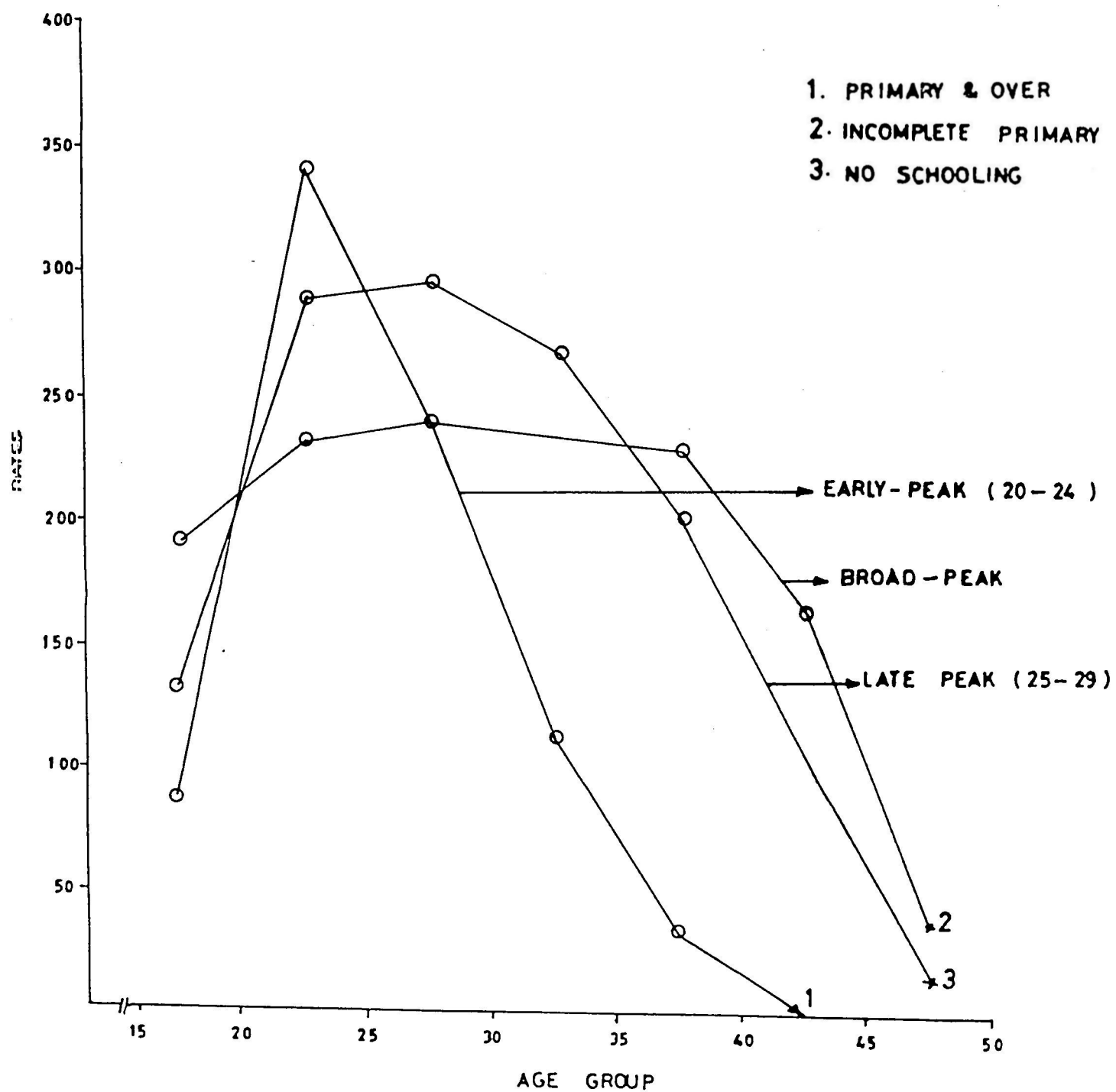FIG.1 : A·S·F·R· FOR ALL WOMEN BY EDUCATIONAL LEVEL ACCORDING TO METHOD I.

1. PRIMARY & OVER
2. INCOMPLETE PRIMARY
3. NO· SCHOOLING

BROAD – PEAK
(20 – 24) , (25 – 29)

FIG. 2 : A.S.F.R. FOR ALL WOMEN ACCORDING TO EDUCATIONAL LEVEL BY METHOD II.

1. PRIMARY & OVER
2. INCOMPLETE PRIMARY
3. NO SCHOOLING

EARLY-PEAK (20-24)

BROAD-PEAK

LATE PEAK (25-29)

RATES

AGE GROUP

sharply, because the educated women tend to complete family size early. On the other hand women who postpone their marriage to later ages -due to schooling-try to recover the reproductive period already lost by producing on the average more children. But beyond age (20-24), the fertility performances slows down which might be because of the fact that women postpone their marriage up to that age might be motivated to reduce their fertility by using some methods of modern contraception, might have become less fecund as the level of fecundity decreases with increasing age or might have even become sterile.

Looking at figure 2, one can observe that pattern obtained from the fitting of the relational Gombertz model for those who have incomplete primary depicts different pattern of fertility which is bread over almost the whole reproductive periods. It seems that relational combertz model over estimates the level of fertility at older ages at the expense of younger ones. But this curve shape is well-known when applying Rational Gombertz methods (Sultan , 1980, P.70, and Magdi 1980 P. 95)

In general women with extremely and moderately low education are more fertile, and woman with extremely high education are less fertile.

Age at First Marriage:-

Factors affecting and determining fertility are numerous. Some of them are biological but the majority are social. It is obvious that human reproduction from fertilization to the successful delivery of live birth involves a multitut: of biological events but several of these events are determined by many social factors. There is a relationship between the physiological and sociological factors affecting fertility. Davis and Blake have presented the widely known " Intermediate variables" classification.

This analytical framework classifies the physiological factors that affect fertility into a set of intermediate variables through which any social factors, influencing the level of fertility must operate. Age of first marriage is one of the factors affecting

Table (5)

Mean Number of children ever-born
to all ever-married women by
age at first marriage and
by level of education

level of education	Age at first Marriage								
	<15	15-17	18-19	20-21	22-24	25-29	30	Total	Standardised
No schooling	5.07	4.19	3.65	3.57	3.8	3.16	2.8	2551	4.36
Incomplete primary	4.47	3.49	3.07	2.65	2.76	1.0	1.0	413	3.63
Primary and over	2.32	2.86	1.98	2.75	1.69	1.79	1.33	160	2.32
Total	1230	956	419	224	174	84	27	3114	
Standardised	4.85	4.03	3.49	3.41	3.55	2.8	2.49		

Source: Table 2.26 from Computer's Table S.r.S.1978.

exposure to intercourse. A delay in the age at first marriage decreases the childbearing period and increases the proportion of singles. The educated people usually marry at later age because they postpone their marriage till they complete their education and find the desired partner, while marriage among illiterat takes place at younger ages.

It is interesting to discuss the variations in age at first marriage between educational levels and its influence on fertility. Table 5. Shows mean number of children ever born according to age at first marriage and educational level. The standardised mean number of children ever born in last coulumn is equal 4.36, 3.63 and 2.32 for no schooling , incomplete primary and primary and over respectively. After controlling level of education it is clear that higher mean number of children ever born among those early age at first marriag.

Table 6 shows that age of first marriage increases with level of education. It can be seen from the last coulumn in this table that the standardised age at first marriage according to educational attainment varies from level to level. While age to first marriage for women who have no schooling is equal 16.3 years, it reaches to 20.3 for women who have primary and over with net gain 4.0 years between higher and lower level. Delaved marriage shortens the period between generation and hence puts an independent brake on long range population growth. (Davis and Blake, 1968)

Use of Contraceptives:-

The use of contraceptives is one of the factors affecting exposure to conception.

Education enables female to know more about contraceptive methods and, makes her more likely to be aware of it and their proper use. If she decided to have a small family, she is able to limit the number of her children.

The knowledge and use of contraception is recent in Sudan. In 1965 The Family Planning Association was formed. The concept that

Table (6)

Mean Age at first Marriage of
those aged 20 and over by current age and
level of education

Current Age

level at Education	20-24	25-29	30-34	35-39	40-44	45+	Total	St.
No Schooling	15.5	16.3	15.8	16.8	16.6	17.4	2276	16.3
Incomplete Prim.	16.3	17.1	16.8	17.8	17.6	16.8	418	17.1
Primary & Over	18.4	19.5	20.6	21.9	22.0	19.9	195	20.3
Total	509	723	506	584	301	266	2889	

Source: Table 1.1.3 Computer's Table S.F.R. 1978

Table (7)

Percent dist. of all ever-married
according to contraceptive use and level
of Education.

level of Education	Never used	past user	Current user	
No. Schooling	92.2	5.9	1.9	100%
Incomplete Prim.	67.7	21.2	11.0	100%
Primary & over	35.0	35.9	29.1	100%

Source Table 4.5.5. Computer's Table of S.F.S.

family planning constitutes a medical service associated with child and mother care was adopted. The acceptors of family planning at Sudan family planning Association clincs in Khartoum was 1567 women in 1972/3 which is about 1.3 % of the married women of the capital (Khalifa 1981).

The import of contraceptives has steadily increased during the past years. The imported contraceptive pills has reached 9 million tablets in 1975 and 15 million tablets in 1978. Imported injections has reached 4000 and and 7000 in 1975 and 1978 respectively. IUD's are used on a very small scale (Khalifa, 1978).The Survey showed that the knowledge of some methods of perventing conception is already widespread among males and females in Khartoum. This is due to the role of the more educated persons who are living in the capital. Table 7 shows the relation between education and contraceptive use. The percentage of never used is very high among those who have no schooling. It reaches to 92.2% while the percentage of never used among those have primary and over equals 35%. Furthermore the percentage of past users among who have no schooling is equal 5.9, where it reaches to 35.9 % among those who have primary and over. In case of current users the percentage is equal 29./% and 1.9 % from those who have primary and over and no schooling respectively. It is clear that the higher percentage of currently using contraception coinciding with those who have better education. This conclusion could be supported from Table 8 which shows the percentage of " Exposed" who are currently using contraception,including sterilization by number of living children and by level of education.

Contraception use is considered to be one of the important intermediate variables accounting for educational
        fertility differential. A slight progressive education for wives from no schooling to incomplete primary increased the proportion of those who are us contraception as shown in Table.7

Freedman (1967,P.45) states that some social and economic development is a necessary condition for the widespread of the adoption of family limitation in high fertility countries, and also he urgued (1968, p.220) that a variety of control measures, including some

Table (8)

Percentage of "Exposed" who are
currently using contraception, including
sterilization by number of living children
and by level of education.

| Nuber of living children | level of Education | | | |
	No. Scho.	Incomp. pr.	pr. & Over	Total
0	0.3	10.0	13.9	3.1
1	0.6	13.6	47.2	6.4
2	1.8	5.5	40.0	5.4
3	3.7	11.4	55.2	8.2
4	1.0	22.4	47.6	6.3
5	3.4	21.6	75.0	7.2
6	1.3	17.9	75.0	5.8
7	8.5	43.8	50.0	11.6
8	4.9	10.5	0	5.7
9+	3.8	27.3	0	5.9
Total	2.5	14.9	41.6	6.4

* "Exposed" Women consists of women who are currently married
except those who believe themselves sterile but not for con-
traceptive reasons

forms of contraception have been available potentially in under-developed areas and that past failure, to use them more extensively has, been a result of normative pressures for high fertility.

Moreover education can change norms and attitudes towards family planning ; where education increases the ability to regulate fertility, and thus its effect on completed fertility is negative for both male and female education.

It is hypothesized that wife's education is more important than husband's knowledge and forming attitude (Chocran,1979,P.90)Education is also expected to make people more receptive to new ideas and more likely to improve the use of contraceptives.

Breast Feeding and Abstinence.

Breast feeding is one of the important involuntary methods of fertility control in most developing countries. Breast feeding has an inhibitory effect on ovulation and thus increases the birth interval and reduces natural fertility (Bongaarts, 1978,p.115).

Prolonged breast feeding (i,e luctation) and abstinence is widely practiced among uneducated persons.

Table 9 shows the length of post-partum abstinence by level of education. This length is inversely related to education of women.

In Rural ereas women reliant on prolonged lactation as main method of preventing pregnancy, it was rarely used by the urban women for that purpose.

Data on breast feeding were collected in S.F.S. (1978), for women with at least 2 pregnancies whose penultimate pregnancy was a life birth that survival at least 12 months,in table 10. It was found that the mean length of breast feeding is 16.8 months for no schooling, 13.9 months for incomplete primary and 10.8 months for primary and over. A wife who had some schooling is less likely to prolong breast feeding for the purpose of preventing conception. The educated women are able to select any other effective method than that.

Table (9)

The percent dist. of women according to the length of post partum
Abstinence in the last closed pregrancy interval by level of edu-
cation confined to women with at last two pregnancies (including
any current pregnancy)

Level of Education	Length of abstinence in Months												mean	S.Tot.	N.S.	Total
	0	1	1*	2	3	4-5	6	7-8	9-11	12	13+				
No. Scho.	7.7	0.9	5.7	2.5	6.0	22.6	12.9	23.2	8.7	7.0	2.8	10.0	2078	15	2094
Incom.Primeray	10.6	1.4	2.4	7.1	5.9	34.8	13.4	15.3	4.1	3 5	1.6	6.6	323	-'	323
Primary & Over	11.9	4.4	1.3	7.5	8.2	40.9	14.5	8.2	1.9	0.6	0.6	5.2	101	1	102
Total	8.2	1.1	5.1	3.3	6.1	24.9	13.0	21.6	7.8	6.3	2.6	9.4	2503	16	2518

1* exactly 40 days

Source : Table 6.4.2.4 Computer Tables of. S.F.S.

S.Table = Sub Total

N.S. = Nat. Stated

Table (10)

The percentage of distribution of women according to the length of breast-feeding in the last closed pregnancy interval by level of education and by current age.

Confired to women with at least two pregnancies (including any current pregnancy) Whose penultimate pregnancy was a life Birth that Sunvival at least 12 months.

level of Education	Not Fed	Until died	0	1	2	3	4-5	6	7-8	9-11	12	13-17	18	19-23	24	25-29	30+	Mean	S.-Total	N.S	Total
						Length of Breast-feeding in months															
No. School	0.7	2.5	0	1	0.5	0.3	1.4	1.2	2.0	6.7	17.6	14.4	22.7	8.1	19.9	0.4	1.4	16.8	1751	48	1799
Incomp. Primary	1.2	1.0	0	0.0	1.5	1.9	1.9	4.8	14.8	14.8	23.0	14.0	18.6	4.6	10.4	0	0.5	13.9	262	5	267
primary & Over	2.2	0.0	1.5	3.6	3.6	2.9	1.5	8.8	9.5	15.3	20.4	13.9	10.9	1.5	4.4	0	0	10.8	87	1	88
Total	0.8	2.2	0.1	0.3	0.6	0.8	1.5	1.6	2.6	8.1	18.4	14.3	21.7	7.4	18.1	0.4	1.2	16.2	2101	53	2154

Source: Table 6.2   A   Computer's tables of S.F.S, 1978.

S.Total=Sub Total

N.S. =No 1 Stated.

Unfortunately there is no data about the various methods of contraception tabulated from data of S.F.S. to study which is more effective to prevent conception. According to a case study in Khartoum province by Khalifa (1979), both husbands and wives gave exactly the same relative importance to the methods of birth control used. Both of them states that rhythm, condom, withdrawal ,IuD, and injection are most commonly used methods after Pills. Pills have been used almost allover the users of contraceptive methods in the survey population. Male sterilization has never been used and diaphragm is the least to be used.

Generally, the usage of contraception has shown to be closely linked to educational level of wife where the proportion of wives, using contraceptives rises with the increase of educational attainment, especially beyond the primary level. It is expected that low levels of education would be associated with low levels of contraceptive use and that, conversely, the proportion of users would be higher among the better educated.

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