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Editorial

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This issue of the journal discussed various topics from human resources development to child abuse. A paper from Iran looked at Spirituality in Iranian community. The study was carried out to explore spirituality and spiritual coping strategies in institutionalized adolescent girls. The findings of the study provide in-depth understanding of Iranian institutionalized adolescent girls' experiences of spirituality and spiritual strategies in coping with stress which can be useful for nurses and other health care professionals for adolescents specially institutionalized adolescents. The findings can provide a framework for nursing care plans based on teaching spiritual coping strategies to decrease stresses of living in institutes.

A study from Bangladesh looked at mathematical model to marriage migration associated with distance of Comilla district in Bangladesh. In this study an attempt has been given attention to show that the polynomial model is also applicable to the same data set. It is found that marriage migration associated with distance follows polynomial model. To verify the stability of the model, cross validity prediction power is employed to the model.

Hasan M, Uddin T et Khan AR investigated the scenario of human resource development along with its different factors those affect the capacity utilization of the plant as well as dominate the expected production level. The authors used some statistical techniques they have shown that setting up training program can increase the skillness of employees.

A paper from Bangladesh looked at the effect of working status of Bangladeshi women on the decision of age at marriage and fertility in Bangladesh using national representative data from Bangladesh Demographic and Health Survey (BDHS), 2003-2004, allowing for the existence of observed characteristics that affect both age at marriage and fertility. This study reveals that employed women in such activity contribute in raising age at marriage and thereby affect fertility to reduce. This also indicated that the singluate mean age at marriage increased about 14% and 23% for male and female respectively from 1975 to 1998.

A paper from Iraq looked at tuberculosis. The authors stressed that there is clear evidence that worldwide tuberculosis is increasing. It is estimated that between 2002 and 2020, nearly one billion will be newly infected with tuberculosis, 200 million will develop the disease, and 35 million will die from tuberculosis.

However huge global interest was sparked by a report at the international AIDS conference in August, of a cluster of cases in South Africa of XDR tuberculosis with high mortality among HIV co-infected patients, with a Google search finding 130 000 hits.

A paper from Nigeria discussed the issue of child abuse and its implications.

Cultural and western world practices of bringing up children usually conflict on what constitutes child abuse. The study aimed to identify local and scientific information on child abuse for a better understanding of the problem. Also to note whether actions that culturally constitute child discipline could be termed as child abuse.

Therefore, for effective control of child abuse, it should be integrated with primary, secondary and tertiary prevention strategies.

Marriage Migration Associated with Distance in Bangladesh: An Application of Polynomial Model

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Key words: Marriage migration Mathematical modeling Polynomial Variance explained (R^2) Cross validity prediction power (CVPP) F-test.

ABSTRACT

In this study an effort has been made to fit a mathematical model to marriage migration associated with distance in Comilla district in Bangladesh. For this, data have been taken from Yadava, Soni and Sabina (2002) but the data is also available in Hosain (2000). It is to be noted that Hossain (2000) applied a Pareto-Exponential model (Morril and Pitts, 1967). Yadava, Soni and Sabina (2002) also applied exponential distribution to the same data and they showed that exponential distribution provided good approximation. In this study an attempt has been made to show that the polynomial model is also applicable to the same data set. It is found that marriage migration associated with distance follows a polynomial model. To verify the stability of the model, cross validity prediction power is employed in the model.

Introduction

It is to be mentioned here that mathematical modeling in Population Studies especially in Demography (Fertility, Mortality, Migration) in Bangladesh has been worked on a very limited scale. In the era of globalization, mathematical models are very realistic and sophisticated mechanisms to express data in mathematical terms. Mathematical models are of great use to demographers in realizing the process in differentiating among various variables to find out the functional relationships and their dynamic behaviors among various demographic phenomena. Finally, a model is important for prediction purposes. Mathematical models in demography are mainly of two groups: stochastic and deterministic.

A deterministic model has only been discussed in the present study. Deterministic models are used to describe the functional relationship between variables that take definite values. Traditionally, one can draw graphs of the demographic parameters but very few of us know in the context of Bangladesh, which models are more appropriate for the parameters.

Islam and Ali (2004) found that age specific fertility rates (ASFRs) follow a slightly modified biquadratic polynomial model whereas forward and backward cumulative ASFRs follow quadratic and cubic polynomial models, respectively in the rural community of Bangladesh. To observe the distribution or pattern of marriage migration associated with distance in Bangladesh, India and other countries of the world a number of models have been fitted to the data set (Libbee and Sopher, 1975; Morril and Pitts, 1967; Perry, 1969a and 1969b; Samuel, 1994; Sharma, 1984; Yadava et. al. 1988). Hossain gave attention to building up the model of Sharma (1984) and Yadava et. al (1988). But these models did not provide a good fit and then Hossain used the Pareto-Exponential model proposed by Morril and Pitts (1967) to present the marriage migration related to distance for his data of Bangladesh. Although the Pareto-Exponential model supplied better approximation than the models of Sharma (1984) and Yadava et. al. (1988) it did not significantly fit to the utilised data set. It is to be noted that the proposed models of Sharma (1984) and Yadava et. al (1988) are suitable for the Hindu community in India.

For this, Yadava et. al. (2002) tried to show that exponential distribution provides a better fit to the distribution of marriage migration associated with distance than the Pareto-Exponential function as applied by Hossain (2000). Also Yadava et. al (2002) compared their model with the Pareto-exponential function applied by Yadava et. al (1998).

In this study an effort has been made to build a mathematical model to total marriage migration associated with distance, that is, the same data aggregate which was already used by Yadava et. al. (2002). For this purpose, a polynomial model was chosen to be applied here. A brief discussion about the polynomial model is given below:

A general expression of the form:

$$y=f(x)=a_0+a_1x+a_2x^2+a_3x^3+\ldots+a_nx^n \quad (an \neq 0) \quad \text{(Waerden, 1948)}$$

where a_o is the constant term; a_i is the coefficient of xi (i =1, 2, 3, ..., n) but a_1, a_2,..., an are also constants but these belong to a field (a field means a non-empty set in which group for addition, group for multiplication and left as well as right distributive law hold) and n is the positive integer, is called a polynomial of degree n and the symbol x is called an indeterminate.

An effort has been made here to find out what types of models are more appropriate to total marriage migration by distance in Comilla of Bangladesh. Thus, the fundamental objectives of this study are briefly mentioned below:

i) to build up mathematical models to total marriage migration by distance and

ii) to apply cross-validity prediction power (CVPP), ρ^2_{cv}, to the model to verify how much the model is valid or not.

Methodology

Sources of Data

The data on total marriage migration associated with distance in Comilla district in Bangladesh have been taken from Yadava et. al. (2002). This data was also available in Hossain (2000) and shown in Table 1.

Mathematical Model Fitting

Using the scattered plot of marriage migration associated with distance in Bangladesh (Figure. 1), it is observed that marriage migration can be fitted by polynomial model with respect to distance. Therefore, an nth degree polynomial model is considered and the form of the model is

$$y=a_0+\sum_{i=1}^{n} a_i\ x^i+u$$

(Gupta and Kapoor, 1997)

where, x is distance; y is marriage migration; a_0 is the constant; a_i is the coefficient of x_i.

(i = 1, 2, 3, ..., n) and u is the stochastic error term of the model. Here a suitable n has been selected for which the error sum of square is minimum.

The software STATISTICA was used to fit the mathematical model.

Checking Model Validation

To check how much the model is stable, the cross validity prediction power (CVPP), ρ^2_{cv}, is applied. Here,

$$\rho^2_{cv} = 1 - \frac{(n-1)(n-2)(n+1)}{n(n-k-1)(n-k-2)}\ (1-R^2)$$

where, n is the number of cases, k = the number of regressors in the model and the cross-validated R is the correlation between observed and predicted values of the dependent variable (Stevens, 1996). The shrinkage of the model is the absolute value of the difference of and R2. The stability of R2 of this model is equal to 1- shrinkage.

F-test

To verify the measure of the overall significance of the fitted model as well as the significance of R2, the F-test is employed to this model. The formula for F-test in mathematics is as follows:

$$F = \frac{R^2/(k-1)}{(1-R^2)/(n-k)}$$

where k is the number of parameters to be estimated, n is the number of cases and R2 is the coefficient of determination in the model (Gujarati, 1998).

Application of the Model and Results

The polynomial model is assumed for marriage migration due to distance in Comilla in Bangladesh and the fitted equation is

$$y = 1025.557-169.5126x+9.613215x^2-0.182286x^3$$

t-stats- (105.562) (-47.561) (27.80423) (-19.2117)

p-value- (0.000) (0.000) (0.00001) (0.0000)

providing R^2=0.999714324 and ρ^2_{cv}=0.998875. This is the polynomial of degree three i.e. cubic polynomial.

From these statistics we see that the fitted model is highly cross-validated and its shrinkage is 0.000839. These imply that the fitted model is 99.8875% stable. Moreover, all the parameters of the fitted model are also highly statistically significant with 99.9714324% of variance explained. Moreover, the stability of R^2 of this model is also more than 99%.

In this study the calculated value of F-test is 4665.96, that is, a large quantity which means that the fitted model is overall highly significant at 1% level of significance. Therefore, from these statistics we see that the fitted model and corresponding R^2 are highly statistically significant. As a result, the model is a good fit. Thereafter, the prediction is done and the predicted values of the model are also demonstrated in the last column of Table1.

Conclusion

In this paper it is found that a third degree polynomial model is fitted to the distribution of marriage migration associated with distance in a Muslim community in Bangladesh. The results show that this model is also applicable or suitable even if Hossain fitted the Pareto-Exponential model and Yadava et. al. showed that the exponential distribution provided better approximation than Hossain. Hence it is concluded that the pattern of marriage migration due to distance follows a 3rd degree polynomial model.

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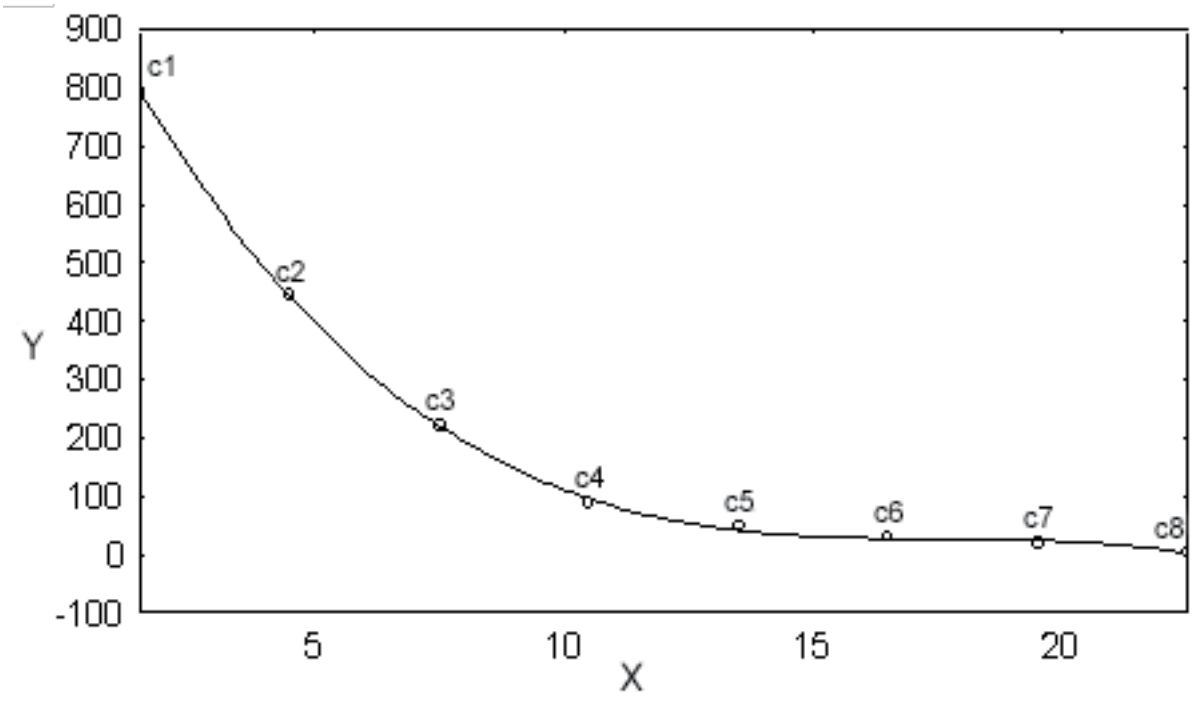
Table 1 Distribution of Marriage Migration Associated with Distance in Comilla in Bangladesh

Distance (in miles)	Number of Migrants	Predicted Values
0-3	792	792.3030
3-6	442	440.8074
6-9	219	218.0541
9-12	87	94.5130
12-15	48	40.6537
15-18	29	26.9459
18-21	18	23.8593
21-24	4	1.86360

Fig. 1 Observed and Fitted Marriage Migration Associated with Distance in Comilla in Bangladesh

Model: y= a0+a1*x+a2*x^2+a3*x^3

y= (1025.557)+(-169.5126)*x+(9.613215)*x^2+(-0.182286)*x^3



EFFECT OF THE WORKING STATUS OF BANGLADESHI WOMEN ON AGE AT MARRIAGE AND FERTILITY

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Key Words: **Age at marriage, working status of women, children ever born**

ABSTRACT

This paper is on the effect of working status of Bangladeshi women on the decision of age at marriage and fertility in Bangladesh, using national representative data from Bangladesh Demographic and Health Survey (BDHS), 2003-2004, allowing for the existence of observed characteristics that affect both age at marriage and fertility. It is well known that working status of women is an important socio-economic variable and that has drawn considerable attention from researchers engaged in the study of fertility differentials and determinants. This study reveals that employed women in such activity contribute in raising age at marriage and thereby affect the reduction of fertility. This also indicated that the singular mean age at marriage increased about 14% and 23% for males and females respectively from 1975 to 1998.

Introduction

Fertility in Bangladesh has long been a topic of interest to researchers because of its apparent relationship with mortality and indirectly with the acceptance of modern contraception. Studies in fertility differentials in Bangladesh are useful for proper planning and policy formation regarding population. Numerous prominent studies have been conducted in Bangladesh over the years in the past emphasizing identification of fertility determinants. The rapid decline of fertility from over 6.5 births per women to 3.2 births, in the last two decades in Bangladesh is indeed, a historical record in demographic transition. However, recent statistics suggest that despite a continuing increase in contraceptive use, the fertility decline in Bangladesh has stalled. The possibility of fertility decline in Bangladesh with special attention to the role that might be played by further improvements in women's education, working status of women, mass media, and family planning services has been studied. In particular, we began a brief review of the programmatic development, policy evolution and social and economic transformation in Bangladesh that might have influenced couples family building strategies. Then the medium variant scenario of the UN projection indicates that Bangladesh will achieve replacement level of fertility (UN, 1991).

The working status of women has a valuable effect on age at marriage and fertility. It is well known that socio-economic and demographic factors play an important role in delaying marriage in a society (Dixon, 1971). The socio-economic factors, and women working status have been widely recognized to have an effect on marital postponement. It is hypothesized that working status delays marriage. Again women's status is widely acknowledged as one of the main determinants of fertility in developed countries (Mac Donalad, 2000). But its potential contribution to reduce fertility and other aspects of reproductive health in developing countries has also been universally acknowledged (ICPD and UNFPA, 1994). If the purpose of working status of women is the development of career opportunities, time spent in the labor market, may lead to further increase in age at marriage. The relationship between working status of women and fertility may be studied by two approaches: (1) that which considers female labor force participation to be determinants of family size and (2) that which has consistently shown an inverse relationship between the number of children ever born and labor force participation or experience (Balakrishran et al.,1979).

A negative relationship between women's labor force participation and fertility can be expected on both sociological and economic grounds. From a sociological perspective, women's participation in the labor market is seen as inconsistent with

their traditional role as mothers and homemakers. This "role-incompatibility hypothesis" envisages a negative relationship between women's employment and fertility. The intensity of the relationship will depend on the degree of incompatibility (UN, 1985). Increased labor force participation of women has been proposed repeatedly in both the demographic literature and population policy statements as a means of promoting development and reducing fertility in developing country (Miah and Mizan, 1991 and UN, 1985). In this study working status of women has been classified into two categories: these are (1) Earn cash for work: women are defined in this study as those who are working outside the home for money indicated by 'Yes' and (2) Do not earn cash for work: women are those who have never been employed outside the home for money indicated by 'No'.

In Bangladesh, there is ample evidence to suggest that the trend towards marriage is a less dramatic: age at marriage in those countries, a geographical area that lags far behind others in Asia (M.N. Islam & I.U. Ahmed, 1998). It is a common belief that age at marriage is inversely related to fertility, particularly in countries with no popular or effective use of contraceptives. This means that delayed marriage increases the interval between generations and hence puts an independent barrier to long range population growth by reducing the population of marriage in the reproductive ages relative to total population growth. The singulate mean age at marriage (SMAM) calculated from the proportion single from various sources is presented in table 1.

There has been change in marriage pattern in Bangladesh. From the Figure 1 we observed that singluate mean age at marriage increased about 14% for male and 23% for female during this period. Singular mean age at marriage demonstrates that there has been a long standing trend towards later marriage in Bangladesh and it is still continuing. The age at marriage has increased by 4.3 years from 15.9 years in 1974 to 20.2 years in 1998, implying an annual increase at only 0.18 years. So, the aim of this paper is to investigate the effect of working status of women on age at marriage and fertility.

Data Source

The data for the present study have been taken from Bangladesh Demographic and Health Survey (BDHS), 2003-2004 which is a nationally representative survey of 11,440 women age 10-49 and 4297 men age 15-54 from 10500 households covering 361 sample points (clusters) throughout Bangladesh; 122 in urban areas and 239 in rural areas. This survey is the fourth in a series of national-level population and health surveys conducted as part of the global Demographic and Health Surveys (DHS) program. It was selected from the master sample maintained by the Bangladesh Bureau of Statistics (BBS) for the implementation of the surveys before the next census (2001). It is designed to provide data to monitor the population and health situation in Bangladesh as a follow-up to the 1993-94, 1996-97 and 1999-2000 BDHS surveys. Previous surveys included only ever-married women and currently married men; this is the first DHS survey in Bangladesh to also include never-married men; i,e., the sample for the survey was ever-married women age 10-49 and all men age 15-54. The BDHS data entry and editing program were written in Integrated System for Survey Analysis (ISSA) and data processing commenced in mid December 1999 and was completed by end of April 2000.

Method

Multiple Classification Analysis (MCA) requires one dependent variable and two or more independent variables. The dependent variable can be either a continuous or a categorical variable but all the independent variables must be categorical variables. MCA can equally handle the nominal and ordinal variables and can also deal with linear and non-linear relationships of predictor variables with dependent variables (Andrew F.M., James N.M., John S. and Laurak K., 1973).

Mathematically, the model can be expressed by the following equation:

$$Y_{ijk} = y + a_i + b_j + c_k + \text{---------} + e_{ijk}$$

where,

Y_{ijk} is the value or score of an individual who falls in the i category of the of factor A, J th category of the factor B and k th category of the factor.

y is the grand mean of Y.

a_i is the effect due to the i th category of the factor A, which is equal to the difference between y and the mean of its category of factor A.

b_j is the effect due to j th category of the factor B, which is equal to the

Table 1: Singular Mean Age at Marriage in Bangladesh, 1975-1998.

Years	Singular Mean Age at Marriage	
	Male	Female
1975	24	16.3
1981	23.9	16.6
1989	25.5	18
1991	25	18.1
1993-94	25.6	18.2
1996	27.6	20
1998	27.6	27.6

difference between y and the mean of its category of the factor B.

c_k is the effect due to the k th category of the factor C, which is equal to the difference between y and the of its category of factor C.

e_{ijk} is the error related with Y_{ijk} score of the individuals.

In order to assess the intensity of working status of women on their age at marriage and children ever born per ever-married women, multiple classification analysis (MCA) is adopted. The co-efficient η^2 and β^2 obtained from MCA respectively provide the unadjusted and adjusted coefficients. While η^2 shows how well a single predictor explains variation in age at marriage and β^2 shows the proportion of variation explained by a predictor taking into account the proportion explained by the other predictors.

Results and Discussion

The government of Bangladesh in 1984 established the legal age at marriage as 18 years for females and 21 years for males; the law is hardly observed in rural areas. As a result, the age at marriage remains appreciably law in such places. Table 2 shows that mean age at marriage by current age and working status of women in all the divisions of Bangladesh. The salient features of the Table are: The lower age cohorts that mean 10-14 age groups have shown lower age at marriage and 20-29 age groups have shown higher age at marriage of working status of women under consideration. This reveals that an increasing trend of age at marriage from time to time. We also observed that women who had work have a higher age at marriage than who do not work. Hence, the working status of women is associated with increased age at marriage.

Several studies have shown that age at first marriage is inversely related to fertility (Amin & Faruqee, 1980; Ahmed, 1982). Early marriage of women is conducive to high fertility while late marriage has been argued to have a fertility reducing effect (Coale, 1975). Table 3 reveals that the average age at marriage both unadjusted and adjusted by working status of women with the values of η^2 and β^2 produced from MCA. We observed that the women who did not work seem to have the higher fertility than those who work. The lowest net mean difference in age at marriage for women who did not work is 0.006 years in Chittagong division and highest is 0.109 years in Sylhet division. The contribution of working status of women on age at marriage given by η^2 and β^2 are also depicted in the Table 3. The proportion of variation in age at marriage explained by working status of women is η^2 = 0.006 and β^2= 0.006 is the lowest in Khulna division and η^2 = 0.109 and β^2= 0.109 is the highest in Sylhet division.

Table 4 indicates that the mean number of children ever born per ever married women by working status of women shows that those who did not work have lower fertility expect

Table 2: Mean Age at Marriage by Current Age and Working Status of Women in all Divisions of Bangladesh (1999-2000).

Age Group	Working Status of Women					
	Barisal		Chittagong		Dhaka	
	Yes	No	Yes	No	Yes	No
14-Oct	-	12.7	13.7	12.9	13	12.9
15-19	14.22	14.55	14.55	14.73	14.35	14.48
20-24	15.68	15.48	15.39	16.08	15.01	15.51
25-29	14.88	14.86	15.07	15.91	15.28	15.57
30-34	15.35	16.25	16.17	15.71	14.97	15.29
35-39	15.27	14.84	15.75	15.02	14.73	15.04
40-44	15.77	14.55	15.3	14.75	14.61	14.72
45-49	14.46	14.25	16.03	15.51	14.28	14.34
Total	15.16	15.03	15.54	15.51	14.87	15.11

	Khulna		Rajshahi		Sylhet		Bangladesh	
	Yes	No	Yes	No	Yes	No	Yes	
14-Oct	14	12.8	13.3	12.9		13	13.5	
15-19	14	14.23	14.29	14.26	14.73	15.1	14.49	
20-24	14.96	15.21	14.53	15.05	14	16.01	15.55	
25-29	14.75	15	14.33	14.83	15.29	16.65	15.46	
30-34	14.66	14.86	14.98	14.54	15.42	16.65	15.44	
35-39	15.15	14.56	14.47	14.46	15.27	15.89	15.04	
40-44	15.29	14.11	14.32	14.63	15.37	15.23	14.69	
45-49	14.42	13.69	13.7	13.65	14.65	15.01	14.24	
Total	14.79	14.63	14.44	14.54	15.04	15.92		

Table 3: Results of MCA of Age at Marriage by Working Status of Women in all Divisions of Bangladesh.								
Working Status of Women	**Barisal**				**Chittagong**			
	Unadjusted Mean	**Adjusted Mean**	**Coefficients**		**Unadjusted Mean**	**Adjusted Mean**	**Coefficients**	
			η^2	β^2			η^2	β^2
Yes	15.15	15.15	0.02	0.021	15.53	15.53	0.006	0.006
No	15	15			15.48	15.48		
Working Status of Women	**Dhaka**				**Khulna**			
	Unadjusted Mean	**Adjusted Mean**	**Coefficients**		**Unadjusted Mean**	**Adjusted Mean**	**Coefficients**	
			η^2	β^2			η^2	β^2
Yes	14.87	14.87	0.03	0.032	14.79	14.79	0.03	0.031
No	15.07	15.07			14.6	14.6		
Working Status of Women	**Rajshahi**				**Sylhet**			
	Unadjusted Mean	**Adjusted Mean**	**Coefficients**		**Unadjusted Mean**	**Adjusted Mean**	**Coefficients**	
			η^2	β^2			η^2	β^2
Yes	14.44	14.44	0.013	0.013	15.04	15.04	0.109	0.109
No	14.51	14.51			15.91	15.91		
Working Status of Women	**Bangladesh**							
	Unadjusted Mean	**Adjusted Mean**	**Coefficients**					
			η^2	β^2				
Yes	14.86	14.86	0.028	0.028				
No	15.05	15.05						

Table 4: Mean Number of Children Ever Born per Ever-Married Women by Age and Working Status of Women in all Divisions of Bangladesh (2003-2004).

Age Group	**Working Status of Women**													
	Barisal		**Chittagong**		**Dhaka**		**Khulna**		**Rajshahi**		**Sylhet**		**Bangladesh**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
15-19	0.56	0.62	0.83	0.77	0.68	0.73	0.73	0.64	0.69	0.71	0.6	0.7	0.71	0.7
20-24	1.64	1.56	1.59	1.72	1.6	1.69	1.41	1.53	1.64	1.58	1.89	1.86	1.6	1.66
25-29	2.82	2.83	2.71	2.88	2.54	2.5	2.23	2.37	2.49	2.5	3.46	2.89	2.58	2.64
30-34	2.92	3.53	3.42	4.02	3.59	3.42	2.79	3.15	2.67	3.31	3.4	3.96	3.1	3.54
35-39	3.51	4.29	4.69	4.74	4.28	4.04	3.16	3.59	3.72	3.86	4.53	4.75	3.82	4.19
40-44	4.15	4.99	5.83	5.21	4.34	4.3	3.55	4.14	3.82	4.37	5.03	5.65	4.35	4.71
45-49	5.21	6.1	5.81	5.87	5.02	5.46	4.93	4.96	4.71	5.78	5.65	6.11	5.04	5.7
Total	3.08	3.13	3.61	3.17	3.1	2.85	2.65	2.59	2.92	2.73	3.61	3.36	3.08	2.94

Barisal division than those who had worked. This Table also shows that Khulna division has the lowest fertility and Sylhet division has the highest fertility than other divisions. Thus, the increase of working status of women is associated with decline in fertility.

Table 5 suggests that the mean number of children ever born per ever married women both unadjusted and adjusted by working status of women with the values of h2 and b2 produced from MCA. We observed that the women who had worked are the highest fertility than who did not work. The lowest net mean difference in children ever born per women who had worked is 0.004 years, lowest is Barisal division and highest is 0.071 years in Chittagong division. Thus, the working status of women has come out to be stronger determinants in lowering the number of children ever born of Bangladeshi women.

Women working outside the home may have an influence on fertility. They are always sincere and aware of contraceptive methods, have better communication with their husbands and can participate in family decision making and family formation. Table 6 reveals that working status of women has a negative effect on place of residence except Barisal division; and access to mass-media except Sylhet division, and duration of breast-feeding and ideal number of children in all divisions of Bangladesh. Working status of women also shows a positive relationship on children ever born, except Dhaka division and contraceptive use method in all divisions of Bangladesh. Female education is used as a measure of working status of women, almost effectively as using a large number of other variables. The high negative significant correlation between female education and working status of women is -0.166 and the second negative significant correlation between husbands approving family planning and working status of women is -0.084.

Conclusion

The evidence presented above leaves no doubt regarding the important role played by working status of women. Working status of women has come out to be the stronger determinant in raising age at marriage of Bangladeshi women.

Table 5: Results of MCA of Mean Number of Children Ever Born per Ever Married Women and Working Status of Women in all Divisions of Bangladesh.

Working Status of Women	Barisal				Chittagong			
	Unadjusted Mean	Adjusted Mean	Coefficients		Unadjusted Mean	Adjusted Mean	Coefficients	
			η^2	β^2			η^2	β^2
Yes	3.06	3.06	0.004	0.004	3.6	3.6	0.071	0.073
No	3.09	3.09			3.15	3.15		
Working Status of Women	Dhaka				Khulna			
	Unadjusted Mean	Adjusted Mean	Coefficients		Unadjusted Mean	Adjusted Mean	Coefficients	
			η^2	β^2			η^2	β^2
Yes	3.08	3.08	0.058	0.059	2.64	2.64	0.02	0.025
No	2.99	2.99			2.55	2.55		
Working Status of Women	Rajshahi				Sylhet			
	Unadjusted Mean	Adjusted Mean	Coefficients		Unadjusted Mean	Adjusted Mean	Coefficients	
			η^2	β^2			η^2	β^2
Yes	2.91	2.91	0.056	0.051	3.61	3.61	0.04	0.041
No	2.67	2.67			3.35	3.35		
Working Status of Women	Bangladesh							
	Unadjusted Mean	Adjusted Mean	Coefficients					
			η^2	β^2				
Yes	3.08	3.08	0.033	0.036				
No	2.9	2.9						

Table 6: Correlation Between Working Status of Women and others Socio-Economic and Demographic Variables in all the Divisions of Bangladesh (1999-2000).

Divisions	Variables								
	Place of Residence	Female Education	Children Ever Born	Access to Mass - Media	Age at Marriage	Duration of Brest -Feeding	Husbands Approve Family Planning	Current Contraceptive Methods	Ideal Number of Children
Barisal	0.007	-0.126**	0	-0.107	-0.003	-0.089	0.084	0.05	-0.033
Chittagong	-0.23	-0.04	0.1	-0.063*	0.012	-0.068*	-0.004	0.016	-0.047*
Dhaka	-0.082**	-0.076**	-0.012	-0.065**	-0.019	-0.049	0.003	0.013	-0.059**
Khulna	-0.03	-0.093*	0.025	-0.039**	-0.001	-0.073*	0.045	0.03	-0.025
Rajshahi	0.068*	-0.166*	0.019	-0.157**	-0.023	-0.021	-0.016*	0.027	-0.049*
Sylhet	-0.077**	0.022	0.011	0.041	0.041	-0.082*	-0.004	-0.024	-0.019
Bangladesh	-0.018	-0.090*	0.009	-0.087*	-0.016	-0.002	0.002	0.02	-0.054**

This indicates that the women who earn cash for work have a depressing affect on fertility. It is also observed that fertility decreases with increased female literacy rate and female economic activity rate. Women participation on employment should be increased and encouraged, hence, increase the working status of Bangladeshi women and age at marriage to reduce fertility. The rise in age at marriage in Bangladesh has been remarkably slow during the last 24 years. The above discussion leads to the conclusion that the working status of women is one of the most viable means for enhancing the status of women vis-à-vis raising the age at marriage and to reduce fertility in Bangladesh.

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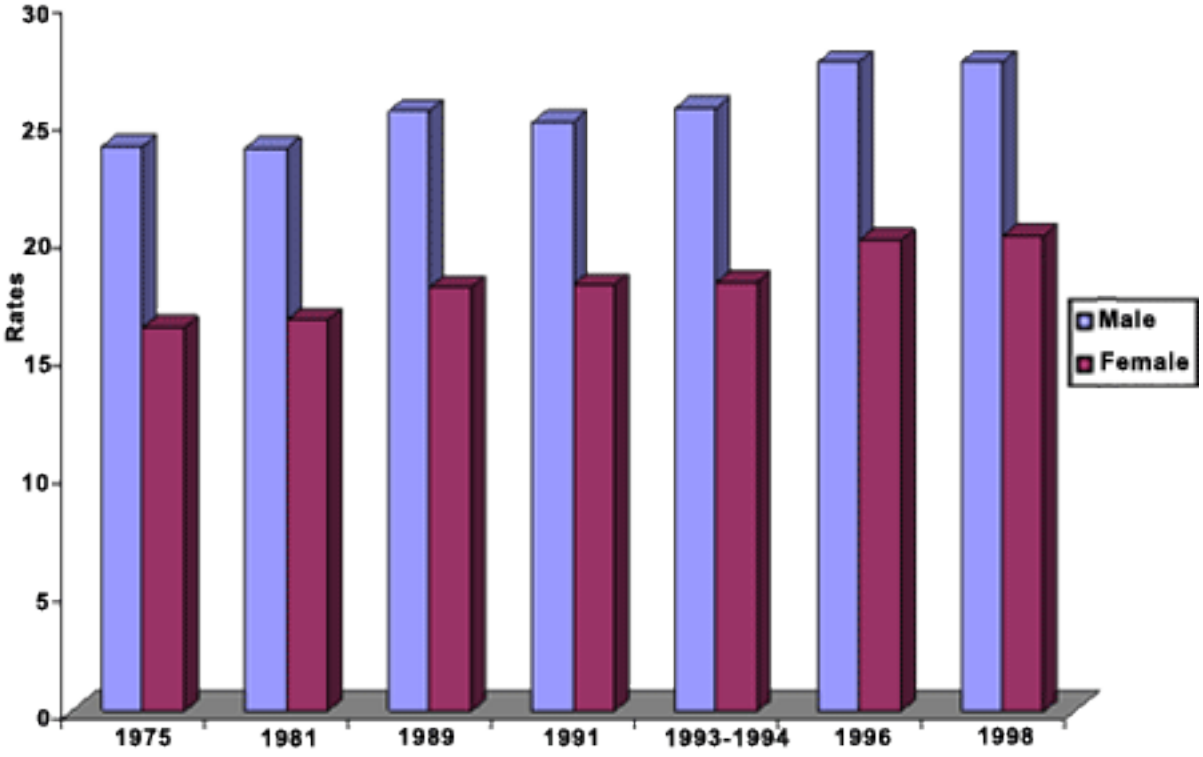
Figure 1: Singulate Mean of Age at Merriage in Bangladesh 1975-1996



UNDERSTANDING CHILD ABUSE AND ITS IMPLICATIONS FOR CONTROL IN NIGERIA

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ABSTRACT

Introduction
Cultural and western world practices of bringing up children usually conflict on what constitutes child abuse. Child abuse is an emerging public health problem in Africa especially with increasing frequency of HIV/AIDS.

The study aimed to identify local and scientific information on child abuse for a better understanding of the problem; also to note whether actions that culturally constitute child discipline could be termed as child abuse. This is necessary because reliable statistics are limited in most parts of Africa including Nigeria probably due to lack of understanding of what constitutes child abuse.

Methods
Review of relevant literature was done to integrate western and local knowledge of child abuse for effective control measures and better understanding of what constitutes child abuse. Data were analyzed qualitatively.

Result
Findings noted that actions like rape, incest, child prostitution, and sexual abuse, which are termed as child abuse in western cultures, are also viewed as child abuse in Nigeria. In contrast, activities like street trading, child battering, and child labour termed as child abuse in developed countries, are seen in Nigeria as traditional ways of training up a child.

Conclusion
For effective control of child abuse, it should be integrated with primary, secondary and tertiary prevention strategies.

Conceptual framework and structure of paper

Childhood years are treasured because that is the time when parents and/or guardians strive to fulfill their potential roles of nurturing so that children can develop to adolescents and live lives of fulfillment with their families, communities and societies. Children in African settings are viewed as future generations. Understanding exploitative actions against them has an important impact on their overall development. Since child survival is a key factor in developing countries including Nigeria, where the higherthe number of children in a family, the higher the rating of the economic and social status of that family, child abuse which most directly affects children's health and survival should not be encouraged. Unfortunately, dearth of information on better understanding of child abuse makes it relevant to use cultural and acceptable methods to prevent child abuse rather than importing strategies that are working in developed countries.

Methodology

The paper draws from literature from fields of medicine, public health, nursing, optometry, sociology, anthropology, education, psychology, biosocial sciences, and social psychiatry. Articles from peer-reviewed journals and materials from leading national organizations like African Networks for protection and prevention of child abuse and neglect in Nigeria. (ANPPCAN) were included.

What is already known on this topic

Child abuse is an emerging public health problem in Africa especially with increasing frequency of HIV/AIDS. Aggregate studies have shown that associated actions like physical beating, sexual violence, and others, which result in injuries, and expose children to blood borne infections including HIV/AIDS lead to child abuse[1].

Unfortunately, reliable statistics are limited in most parts of Africa including Nigeria because of lack of understanding of what constitutes child abuse. The question is, what actions are classified as child abuse?

No doubt, authors view actions that constitute child abuse from different perspectives. Some see beating children mercilessly as ideal for child discipline,[1-3] others see this as serious child abuse [4-6]. Traditionally, children are abused when food is denied, when served a different meal from the family menu and/or when given left over or putrefied food. Also children are abused when lured into having sex with blood relations, or when forced to carry heavy loads not commensurate with their ages.

The objective of this study is to understand actions that encourage child abuse so as to initiate prevention.

Factors that affect control of Child abuse

Factors that discourage prevention of child abuse in Nigeria include:

Ignorance of what constitutes child abuse

Review of previous works shows various conflicting opinions on

attitudes that constitute child abuse. For instance, while [7-9] see battering deviant children as child abuse,[10] views this as a corrective measure. Lack of distinction between cultural and western styles of child upbringing is the major cause of faulty child rearing in developing countries[11,12]. Therefore, programmes for reducing child abuse are dependent on individuals' perception of what is classified as child abuse.

Literacy level

Low literacy level is an important predictor of increased child abuse and of poor participation in activities to discourage child abuse [13].

Therefore, health education programmes targeted at low literate groups and aimed at controlling child abuse should involve using non-print information materials like town criers, radio, video, and television based-education.

Organizational and co-ordination issues

Studies have shown that since the majority of parents and /or guardians live in rural areas so that effective child abuse control should be decentralized from the urban areas to rural[13,14]. It would therefore be useful to incorporate child abuse control measures into existing primary health care programmes so as to involve community, local government and other interested groups.

Local and western initiatives

Parents and/or guardians in Africa, including Nigeria should view child abuse as a problem and take concrete actions to tackle the problem in the continent. This could be achieved if functional organizations with similar interests came together to form pressure groups to fight against child abuse. A strong and united body can press on governments of member countries to include child abuse control strategies in available National Health Care programmes. One advantage of forming pressure groups would be to integrate local and scientific knowledge of child abuse for a better understanding of the problem without compromising good intentions and actions that govern successful child upbringing in Nigeria.

Types of child abuse

The study noted 5 interrelated types of child abuse and activities and /or behaviours that influence abuse from different perspectives. These are as follows:

Physical abuse

Studies have shown that more than three million children are physically abused in developing countries[15]. Physical abuse has been found to constitute the most common type of child abuse. Physical abuse includes beating, abandonment, slapping, pushing, flogging, and other actions that leave serious injures on the abused[16, 17]. Also physical abuse includes denying children time for extracurricular activities[18-20]. In Nigeria, most children do not have time for extracurricular activities because they assist in breadwinning jobs.

In understanding physical abuse, cultural methods for disciplining erring children such as starving, hitting on the head, putting pepper on the eyes and genital organs should be reviewed. While some authors like[21, 22] view these actions as processes of discipline, and ways of gaining ascendancy and control over children [23-25], others see these actions as serious child abuse[26-27].

However, beating is very common in developing countries including Nigeria. Parents beat their children and teachers beat their pupils. Beating has been described by [28] as the causes of orthopedic injuries, intraocular and retinal hemorrhage, periorbital edema, fractures and bruises as well as the cause of long-term traumagenic effects on children.

While most of these actions enumerated above may not be perceived as child abuse in Nigeria and other developing countries, it is important to note that such actions could negatively influence development and survival of children. Children in African cultures are valued as resource pools from which future generations are predicted, therefore, actions meted to them should not be hazardous to their overall health.

Moral abuse

Moral abuse occurs when children are exposed to immoral influences. These include parents using abusive substances in the presence of their children, and/or sending children to purchase such materials[29]. In Nigeria, children run errands of purchasing substances like cigarettes, alcohol and others for entertaining visitors. Such errands as noted by[30] are regarded as abuse while studies by[31] see this as part of children's obligation to parents and elders.

Studies by[32] have identified actions that coerce young pupils into having sexual relationships as moral abuse. These actions include: rape, writing love letters, fondling breasts, buttocks, thighs, private parts, showing pornographic materials and also acting as "sugar daddies" or "sugar mummies".

Emotional abuse

Studies have identified conditions under which children are exposed to emotional abuse. These conditions include nurturing children under states of anxiety and confusion where tender loving care needed for overall development is denied. Also included are nurturing children where domestic violence, wife battering, poor interpersonal relationships and emotional instability abound[33]. Further studies by Ellis showed victimization and rejection as serious emotional abuses, which lead to low self-worth and poor mental development[34]. In traditional society, victimization and rejection are used to gain control. For instance, husbands use wife battering to gain ascendancy over erring women while parents and/or teachers use beating to subdue children's excesses and gain control and respect.

Medical abuse

Widner argues that medical abuse occurs when children are exposed to situations that encourage infections, isolation, depression and others [36]. He identified external ear perforation, scarification, tribal marks, and others that encourage blood-borne infections such as HIV/AIDS, malaria and others as medical abuse. He viewed cultural import of female circumcision (female genital cutting/mutilation),

which is aimed at checking excess libido and promiscuity as serious medical abuse. He emphasized that distortions of anatomical positions of varying tissues result in reproductive health problems including vesico-vaginal fistula (VVF) and/or vesico-rectal fistula (VRF), which encourage isolation and rejection of cases. The problem is that to date, female circumcision is widely practised in most rural areas of Nigeria and is not viewed as child abuse.

Widner found correlation between starvation, dental caries, water intoxication and child abuse. He noted that using starvation as a disciplinary measure to erring children exposed them to the risk of malnutrition and/ or infections while mouth odour from dental caries result to isolation , rejection, depression and low self-esteem.

In water intoxication or forcing children to drink copious amounts of water , his studies showed that 60% of infants (0-3 months) who were forced to drink copious amounts of water (over 6 litres a day) , died after drinking. The few that survived came down with seizures, emesis (vomiting), coma, hyponatremia (low blood salt) and others. Understanding water intoxication as an abuse is important in rural areas where inclusive breast-feeding is practiced, and water constitutes main source of fluid given to infants. Therefore, the need to understand this would avoid confusion in correct interpretation of exclusive breast-feeding.

Educational abuse:

Educational abuse occurs when children are exposed to actions like corporal punishment, hawking, street trading, and others that lead to school absenteeism and/or denial of basic education[37].

Corporal punishment, traditionally used by elders and teachers to gain supremacy over pupils is viewed by[38] as abuse. Pupils are made to kneel on rough cement surfaces for offences like coming late to school and/or making noise in class and others.

Elders and/or guardians who use corporal punishment as a veritable method of child discipline should understand its negative impact of retarded growth on children and consider using a cascade of other methods that encourage development [38].

CONTROL OF CHILD ABUSE

Public health concepts like primary, secondary and tertiary prevention strategies would be useful.

Primary prevention:

Training of individuals

Control of child abuse should be translated into action by training personnel as health educators to identify public health issues on child abuse at community levels. Using Auxiliary Health Workers will be effective because of direct communication with peers which could easily influence attitudes. This training should be continuous and regular.

Public education

Public education should be used to create awareness and sensitize society on programmes to control child abuse. Such programmes should be culturally sensitive, acceptable and community based.

Communities should be involved in developing and implementing programmes and centers for information dissemination should be created to reach people at grass roots levels.

Anti child abuse campaigns

In Nigeria, there are only sporadic campaigns against child abuse organized by a few interested groups and non-governmental organizations. To protect children against risk behaviours (like child labour, trafficking and others), the Government should participate in this campaign by invoking appropriate legal sanctions to perpetrators of this. There is also need to integrate local and western methods of child rearing to evaluate the impact on children.

Environmental strategies

Organizations that would act as child protection agencies at Federal, State and Local Government levels should be instituted. These protection agencies could initiate workable frameworks, guidelines and legislation to protect from child abuse. Efforts towards these developments would be to enlighten the public on child abuse control strategies, and thereby enforce guidelines and legislations on abuse.

The need for these could be exemplified with what happens in the Niger Delta parts of Nigeria, where children contribute to family income by abandoning their education and engaging in illegal scooping of oil thereby exposing themselves to hazards of oil spillage. Government could, in the circumstance, enunciate strong policies and legislation to prevent parents and their children from such environmental hazards that are capable of exposing them to medical problems like burns, cancer and others.

Secondary/ tertiary prevention

Facilities for adequate management of child abuse should be made available at secondary and tertiary levels so as to take care of emerging multiple (psychological, social and physical) problems of anti child abuse campaigns and education. These referral and resource centers could be useful in providing diagnosis, detection and management of cases. Facilities for research would be highly needed to consistently evaluate the effectiveness of some interventions. This could be achieved through the use of available data in the anti child abuse prevention Agencies.

Diagnostic and treatment services

In developing countries including Nigeria, budget for secondary and tertiary health care services is less than 5%, which is the expected minimum budget by World Health standards. Limited budget is a major problem in health sector service provisions. Lack of infrastructure and technical expertise negatively affect management of cases. Most health care services are inaccessible and unaffordable to the abused because of long distances, bad roads and lack of finance. These factors contribute to delay and/or entail poor management of emerging problems of child abuse.

Therefore, child abuse control

measure should be established at zonal/tertiary centers so as to limit proliferation of under-utilized centers that may not serve the target groups.

Training of specialists

The need to train specialists in various fields of endeavour for effective management of compelling problems of child abuse should not be overemphasized. Staff should be trained in Psychology, stress management, orthopaedics, rehabilitation, record keeping, palliative and data management. They should also be trained on how to identify child abuse. Scholarships and fellowships could be extended to such staff to motivate them. **Research**

Research is needed for effective evaluation of the control measures and treatment modalities. Outcomes of such studies may encourage greater understanding of child abuse and show how scientific and traditional knowledge could be integrated in child rearing. Data on child abuse should be made available for research, planning and relevant health care policy implementation for children.

Factors that negatively affect control Measures

Nigeria is faced with many factors that negatively affect prevention of child abuse. Harsh economic conditions that force children to play breadwinner roles, breakdown of social networks and amenities due to poverty are among factors that discourage human and material developments in Nigeria. These factors affect understanding of child abuse.

Conclusion

There is lack of understanding of factors that influence child abuse in Nigeria. This lack of understanding stems from the fact that some researchers are unable to distinguish between child abuse and western and cultural styles of child discipline. The need to sustain lofty cultural norms and tradition of child rearing in Africa and Nigeria in particular,. should not lose trends of avoiding factors that influence child abuse. With concerted efforts, and well planned interventions, indigenous and western methods of child rearing could be coordinated and upheld without encouraging child abuse.

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REVIEW ON TUBERCULOSIS

ABSTRACT

There is clear evidence that worldwide tuberculosis is increasing. It is estimated that between 2002 and 2020, nearly one billion will be newly infected with tuberculosis, 200 million will develop the disease, and 35 million will die from tuberculosis.

The most profound influence on the incidence of tuberculosis is HIV infection, particularly in Sub-Saharan Africa, where HIV and tuberculosis form a lethal combination, each speeding the other's progress.

HIV infection has been estimated to account for an excess of 34% of new cases. In countries with high burdens of both tuberculosis and HIV, the continued increase in tuberculosis will depend upon the level and trend of both HIV and tuberculosis infection in the community.

Other factors contributing to the global resurgence of tuberculosis include poverty, overcrowding ,increased travel/immigration, breakdown of tuberculosis control programs, multidrug resistant tuberculosis (MDR), and incomplete treatment.

Recently, specifically in March 2006 a paper published by Morbidity and Mortality Weekly Report (Were the authors trying to "sex up" their report) they had chosen the abbreviation XDR tuberculosis However huge global interest was sparked by a report at the international AIDS conference in August, of a cluster of cases in South Africa of XDR tuberculosis with high mortality among HIV co-infected patients, with a Google search finding 130 000 hits.

Introduction

What is XDR tuberculosis, and how concerned should we be about it? (XDR refers to Extreme Drug Resistance). As defined in Morbidity and Mortality Weekly Report an XDR isolate is resistant to Isoniazide and rifampicin (i.e. the definition of multidrug resistance), two of the first line anti-tuberculosis drugs and resistant to at least two to three of the six classes of the second line antimicrobials (amino glycosides, polypeptides, fluroquinolones, thiomides, cycloserine and para-aminosalicylic acid). However, at a WHO meeting in Geneva on October 9-10 2006 ,the definition of XDr tuberculosis was revised to resistance to isoniazise plus rifampicin, to floroquinolones, and to either amino glycosides or capreomycin (a polypeptide).

What is the current evidence of XDR-TB?

The MMWR paper reported a survey of 17,690 tuberculosis isolates collected worldwide (almost 12,000 of them were from South Korea) between 2000-2004. 3,520 (19.9%)isolates were multiple drug resistant, of which 347 (2%) were XDR. Among patients with XDR tuberculosis, those in the USA were 64% more likely to die during treatment than patients with the multi drug - resistant form, and those in Latvia were 54% more likely to die or have treatment failure. Although the MMWR study identified XDR tuberculosis from all parts of the world, only one isolate from Africa was XDR. However, the subsequent report from the rural Msinga district of kwazulu Natal, South Africa, described 536 patients with tuberculosis, of whom 221 had a multi drug resistant form and 53 of these were XDR. 52 of the 53 patients died, with a median survival time of just 16 days after giving a sputum sample.

Genotyping of the studies of isolates from 46 of the 53 patients showed 39 to be genetically similar, belonging to the Kwazulu Natal family of tuberculosis strains. A cluster of cases of multi drug resistant tuberculosis in Guateng, South Africa, is not at present believed to involve the strain from Kwazulu Natal. However, South Africa is not alone in experiencing outbreaks of XDR tuberculosis: a recent paper in Clinical Infectious Diseases describes two epidemiologically related clusters of cases in Iran, and a letter in BMJ reports an outbreak in Norway that has been going on for at least a decade.

Although the reports of clusters of XDR tuberculosis are as yet limited, they suggest that strains have emerged (or will emerge) in many locations and on many occasions, a worrisome development. A further concern is that with the ease of international travel. XDR strains might move rapidly from their place of origin. Ever since it has been possible to treat tuberculosis with antimicrobials, it has been clear that drug resistance emerges as a result of poor prescribing practices and suboptimal control programs. Organisms exposed to just antibacterial drug, or sub-standard doses of several drugs, – will acquire resistance by genetic mutation, and further suboptimal exposure to additional agents will encourage accumulation of multiple levels of resistance.

For all that the International Standards for Tuberculosis Care (ISTC) were developed through a year long inclusive process, guided by a 28 member steering committee. The purpose of ISTC is to describe a widely endorsed (an up-to-date list of endorsers can be found at http://www.stoptb.org) level of care that all practitioners, public and private, should seek to achieve in managing patients who have, or are suspected of having tuberculosis. The ISTC differ from existing guidelines in that they describe what should be done, whereas guidelines describe how the action is to be accomplished. The ISTC are not intended to replace neither WHO nor local guidelines and were written to accommodate local differences in practice.

The main target audience for ISTC is the broad group of health care

professionals who provide diagnostic and treatment services for tuberculosis outside of government tuberculosis programs. It is anticipated the ISTC will be used as a tool to unify approaches to tuberculosis care between public (at least government tuberculosis control programs) and private providers.

Another anticipated use of the ISTC is to serve as a focus of curricula for medical, nursing, and allied health students a well as for in-service education. The ISTC is to apply to patients of all ages, including those with smear-positive, smear-negative and extra pulmonary tuberculosis caused by drug resistant Mycobacterium tuberculosis complex organisms, and tuberculosis combined with HIV infection.

The basic principles of care for people with, or suspected of having, tuberculosis are the same worldwide: a diagnosis should be established promptly and accurately; standardized treatment regimen of proven efficacy should be used, together with appropriate treatment support and supervision; the response to treatment should be monitored; and the essential public health responsibilities must be carried out. Prompt and accurate diagnosis and effective treatment are not only essential for good patient care; they are also the key elements in the public health response to tuberculosis.

Thus, all providers who undertake evaluation and treatment of patients with tuberculosis must recognize that as well as delivering care to an individual, they are also assuming an important public health function that entails a high level of responsibility to the community, as well as to the individual patients.

Standards for diagnosis

Standard 1

All persons with otherwise unexplained cough lasting 2-3 weeks or more should be evaluated for tuberculosis.

Standard 2

All patients (adults, adolescents, and children who are capable of producing sputum) suspected of having pulmonary tuberculosis should have at least two, and preferably three, sputum specimens obtained for microscopic examination. When possible at least one early specimen should be obtained.

Standard 3

For all patients (adults, adolescents, and children) suspected for having extra pulmonary tuberculosis, appropriate specimens from the suspected sites of involvement should be obtained for microscopic, and where facilities and resources are available, for culture and histopathological examination.

Standard 4

All people with chest radiographic findings suggestive of tuberculosis should have sputum specimens submitted for microbiological examination.

Standard 5

The diagnosis of sputum smear-negative pulmonary tuberculosis should be based on the following criteria: at least three negative sputum smears (including at least one early morning specimen); chest radiograph findings consistent with tuberculosis; and lack of response to a trial of broad spectrum antimicrobial agents .(Note: because the fluroquinolones are active against M tuberculosis complex, and thus may cause transient improvement in people with tuberculosis, they should be avoided). For such patients, if facilities for culture are available, sputum cultures should be obtained. In people with known or suspected HIV infection the diagnostic evaluation should be expedited.

Standard 6

The diagnosis of intra-thoracic (i.e. pulmonary, pleural, and mediastinal or hilar lymph node) tuberculosis in symptomatic children with negative sputum smears should be based on the finding of chest radiographic abnormalities consistent with tuberculosis and either a history of exposure to an infectious case or evidence of tuberculosis infection (positive tuberculin skin test or interferon gamma release assay). For such patients, if facilities for culture are available, sputum specimens should be obtained (by expectoration, gastric washing, or induced sputum) for culture.

The following are clinical features suggestive of tuberculosis in children based on theWHO guidelines published in 2000:

The risk of tuberculosis is increased when there is an active case (infectious, smear positive tuberculosis) in the same house, or when the child is malnourished, is HIV infected, or has had measles in the past few months.

Consider tuberculosis in any child with a history of:

- unexplained weight loss or failure to grow normally.
- unexplained fever, especially when it continues for more than 2 weeks*chronic cough*exposure to an adult with probable or definite pulmonary infectious tuberculosis.

On examination:

- fluid on the side of the chest (reduced air entry, stony dullness to percussion),
- enlarged non-tender lymph nodes or a lymph node abscess, especially in the neck,
- signs of meningitis, especially when these develop over several days and the spinal fluid contains mostly lymphocytes and elevated protein,
- abdominal swelling, with or without palpable lumps,
- progressive swelling or deformity in the bone or a joint, including the spine.

Standards for Treatment

Standard 7

Any practitioner treating a patient for tuberculosis is assuming an important public-health responsibility. To fulfill this responsibility the practitioner must not only prescribe an appropriate regimen, but also be capable of assessing the adherence of the patient to the regimen and addressing poor adherence when it occurs. By so doing the provider will be able to ensure adherence to the regimen until treatment is completed.

Standard 8

All patients (including those with HIV infection) who have not been

treated previously should receive an internationally accepted first line treatment regimen using drugs for known bioavailability. The initial phase should consist of 2 months of isoniazide, rifampicin, pyrazinzmide and ethambutol. (Ethambutol may be omitted in the initial phase of treatment for adults and children who have negative sputum smears, do not have extensive pulmonary tuberculosis or severe forms of extra-pulmonary disease and who are known to be HIV negative).

The dose of anti-tuberculosis drugs used should conform to international recommendations .Fixed dose combinations of two (isoniazide and rifampicin), three (isoniazide, rifampicin, and pyrazinamide), and four (isoniazide, rifampicin, pyrazinamide and ethambutol) drugs are highly recommended, especially when medication ingestion is not observed.

Standard 9

To foster and assess adherence, a patient-centered approach to administration of drug treatment, based on the patient's need and mutual respect between the patient and the provider, should be developed for all patients. Supervision and support should be gender sensitive and age-specific and should draw on the full range of recommended interventions and available support services, including patient counseling and education.

A central element of the patient-centered strategy is the use of measures to assess and promote adherence to treatment regimen and to address poor adherence when it occurs. These measures should be tailored to the individual patient's circumstances and be mutually acceptable to the patient and the provider.

Such measures may include direct observation of medication ingestion (directly observed therapy [DOT]) by a treatment supporter who is acceptable and accountable to the patient and to the health system.

Standard 10

All patients should be monitored for response to therapy, best judged in patients with pulmonary tuberculosis by follow-up sputum microscopy (two specimens), at least at the time of completion of the initial phase of treatment (2 months), at 5 months, and at the end of treatment. Patients who have positive smears during the 5th month of treatment should be considered as treatment failures and have therapy modified appropriately (see standards 14 and 15). In patients with extra-pulmonary tuberculosis and in children, the response to treatment is best assessed clinically. Follow-up radiographic examinations are usually unnecessary and might be misleading.

Standard 11

A written record of all medications given, bacteriologic response, and adverse reactions should be maintained for all patients.

Standard 12

In areas with a high prevalence of HIV infection in the general population where tuberculosis and HIV infection are likely to co-exist, HIV counseling and testing is indicated for all tuberculosis patients a part of their routine management. In areas with lower prevalence rates of HIV, HIV counseling and testing is indicated for tuberculosis patients having a history suggestive of high risk of HIV exposure.

Standard 13

All patients with tuberculosis and HIV infection should be evaluated to determine if antiretroviral therapy is indicated during the course of treatment for tuberculosis. Appropriate arrangements for access to antiretroviral drugs should be made for patients who meet indications for treatment.

Given the complexity of co-administration of anti-tuberculosis treatment and retroviral therapy, consultation with a physician who is an expert in this area is recommended before initiation of concurrent treatment for tuberculosis and HIV infection, regardless of which disease appeared first. However, initiation of treatment for tuberculosis should not be delayed. Patients with tuberculosis and HIV infection should also receive cotrimoxazole as prophylaxis for the infections.

Standard 14

An assessment of the likelihood of drug resistance, based on history of previous treatment, exposure to a possible source case having drug-resistant organisms, and the community prevalence of drug resistance, should be obtained for all patients. Patients who fail treatment, and chronic cases, should always be assessed for possible drug resistance. For patients in whom drug resistance is considered to be likely, culture and drug susceptibility testing (DST) for isoniazide, rifampicin and ethambutol should be done promptly.

Standard 15

Patients with tuberculosis caused by drug –resistant (especially) organisms should be treated with specialized regimens containing second line anti-tuberculosis drugs. At least four drugs to which the organisms are known or presumed to be susceptible should be used and treatment should be given for at least 18 months. Patient-centered measures are required to ensure adherence. Consultation with a provider experienced in treatment of patients with MDR tuberculosis should be obtained.

Standards for public health responsibilities

Standard 16

All providers of care for patients with tuberculosis should ensure that people (especially children under 5years of age and those with HIV infection) who are in close contact with patients who have infectious tuberculosis are evaluated and managed in line with international recommendations. Children under 5years of age and people with HIV infection who have been in contact with an infectious case should be evaluated for both latent infection with M tuberculosis and for active tuberculosis.

Standard 17

All providers must report both new and re-treatment tuberculosis cases and their treatment outcomes to local public-health authorities, in conformance with applicable legal requirements and policies.

Recommended tuberculosis treatment for people not treated previously

Ranking	initial phase	continuous phase
Preferred	isoniazide, rifampicin, pyrazinmide, ethambutol*+ Daily or 3 times per week for 2 months	isoniazide,, rifampicin daily or 3 times per week for 4 months
Optional	isoniazide, rifam picin ,pyrazinmide, ethambutol Daily, 2 months	isoniazide ,ethambutol daily, 6 months**

* Streptomycin may be substituted for ethambutol +Ethambutol may be omitted in the initial phase of treatment for adults and children who have negative sputum smears, do not have extensive pulmonary tuberculosis or sever forms of extra pulmonary diseases ,and who are known to be HIV negative.

** Associated with higher rate of treatment failure and relapse, should generally not be used in patients with HIV infection.

Doses of first-line anti tuberculosis drugs in adults in children

Drug	Recommended dose in mg/kg body weight (range) Daily	Three times weekly
Isoniazide	5(4-6), maximum 300 daily	10
Rifampicin	10(8-12), maximum 600 daily	10(8-12), maximum 600 daily
Pyrazinamide	25(20-30)	35(30-40)
Ethambutol	children 20(15-25)*, adults15 (15-20)	30(25-35)
Streptomycin	15 (12-18)	15(12-18)

*The recommended daily dose of ethambutol is higher in children (20mg/kg)than in adults (15mg/kg),because the pharmacokinetics are different (peak serum ethambutol concentrations are lower in children than in adults receiving the same mg/kg dose)

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SPIRITUALITY AND SPIRITUAL COPING STRATEGIES IN IRANIAN INSTITUTIONALIZED ADOLESCENT GIRLS: A QUALITATIVE STUDY

ABSTRACT

Background: Spirituality in Iranian community, as an important aspect has a historical background. According to holistic approach, providing spiritual care for clients in different settings, considered as a nurse's responsibilities. Despite the number of institutionalized adolescents, there are a few studies to assess spirituality in this group.

Objective: This qualitative study was carried out to explore spirituality and spiritual coping strategies in institutionalized adolescent girls.

Methods: In this qualitative study, 15 adolescent girls were interviewed during January-June 2006 about the role of spirituality and spiritual strategies in coping with stresses of living in institutes. Interviews were analyzed using content analysis method.

Result: The main themes emerging from this study included spiritual attitude toward life, trust in God, differentiation between spirituality and religiosity, spiritual coping strategies, spirituality in difficult life conditions and situations to apply spirituality.

Conclusion: The findings of the study provide in-depth understanding of Iranian institutionalized adolescent girls' experiences of spirituality and spiritual strategies in coping with stress which can be useful for nurses and other health care professionals for adolescents specially institutionalized adolescents. The findings can provide a framework for nursing care plans based on teaching spiritual coping strategies to decrease stresses of living in institutes.

Key words and phrases: spirituality, spiritual coping, spiritual strategies, institutionalized adolescents.

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Introduction

According to the 2006 census, 37.46% of the Iranian population were aged 19 or less. At that time, there were 8,726,761 adolescents between 15 to 19 in Iran that nearly half of them,4,283,860, were girls[1]. As per records of the Social Welfare Organization of Iran, there were approximately 18,000 children and adolescents in the age group 0-18 living in orphanage care in this country, which is known as "children and adolescents homes". 8,375 of these youngsters were placed in institutes, 9,072 in foster care, and a small number had been adopted[2].

Adolescence is one of the most dynamic and complex transitions in the lifespan[3] which is recognized to be a time of rapid change that can be stressful and difficult, drawing on all of one's resources[4].

The experience of an adolescent in an institute is very different from that of an adolescent in a family and institutes do not allow for individualized attention[5]. In this regard, one of the major areas which should be assessed in institutionalized children is their coping skills[6].

Significant interest in the coping process has been evident in the research literature over the last 30 years however the role of religion and spirituality in coping has received relatively little attention as a specific area of study[7]. In addition, very little research has specifically examined how institutionalized adolescents cope with stress.

Religious belief is an important mechanism for coping with many crises[8] and spirituality and religion are important factors for coping with life stressors[9]. Faith and spirituality have been proposed as resilience factors in adolescents. Resilience has been described as "good adaptation under extenuating circumstances" which is associated with healthier living and the ability to overcome adverse situations[10].

Spiritual-religious coping refers to how one's spiritual or religious beliefs, attitudes, and practices affect one's reaction to stressful life events. Religious coping measures the internal resources and reactions[11]. Spiritual coping appears to be most useful in situations of extreme stress that are out of one's control and may operate primarily as a form of emotion-focused coping[12]. Empirical studies have shown a clear connection between stressful life events and various forms of spiritual-religious involvement. In times of crisis people translate their

general religious orientation into specific methods of spiritual-religious coping[13].

The prevalence of spiritual coping generally depends on the type of stressor, sample characteristics and situational factors[7]. In pediatric coping studies, which include sex as a variable of interest, some sex differences in the use of specific strategies are emerging. Girls are more likely than boys to seek social support and engage in emotion-focused avoidance to cope with illness or pain[14]. As spiritual coping is often conceived as emotion focused[7], it seems that girls apply this kind of coping more often than boys.

Although research has indicated that spiritual coping strategies are associated with adaptation to out of control stresses (like living in institutes), there is no information about how Iranian institutionalized adolescent girls cope with such a condition compared. Therefore, the purpose of the current study was to obtain a more in-depth understanding of the spiritual coping strategies used by Iranian institutionalized adolescent girls so that culturally sensitive healthcare and culturally relevant coping strategies may be promoted by healthcare providers.

Method

A descriptive design with purposive sampling was used to understand the nature of the phenomenon under study. The data were collected through in-depth interviews with participants, which were tape-recorded and transcribed verbatim. The sample size was determined by data saturation.

Participants were 15 Iranian institutionalized adolescent girls between 14 and 20, during the period January-June 2006. All of them residing at institutes in Tehran and were Muslim. The average of their age was 17.8. The participants were informed about the study and assured of confidentiality and anonymity.

Content analysis was used to study the data. The interviews were transcribed verbatim and analyzed concurrently with data collection. Throughout the study, issues of rigor and trustworthiness in qualitative methodology were addressed.

Results

Six main themes were derived from analysis of data collected by interviewing the girls in institutes with respect to spirituality and spiritual approaches when facing with problems. Table 1 outlines the themes and their elements.

Table 1: The main themes and their elements

- Spiritual attitude toward life
- Belief in God as the sole reliable existence
- Distinction between spirituality and religion
- Spiritual coping mechanisms
- Belief in God's support
- Collaborative opposition
- Belief in God's will
- Spiritual approaches
- Conditions for applying spirituality
- All conditions
- Hard conditions

Spiritual attitude toward life: One of the reflections of spirituality in the life of adolescent girls was their attitude toward life in a way that they accepted their condition as a destiny or preference from God. For example, one of them said, "I'm satisfied with my life because God wants it like this; surely, it's been His wisdom, God wills it with thoughtfulness and we also shape our life." Another point in the statements of girls, reinforcing their spiritual attitude toward life was their belief in a holy and supreme aim in the existence. One of them said, "The aim of life is to reach to God and ourselves. …The main aim of life is to find the real self and God."

Belief in God as the sole reliable existence: Lack of a trustful person beside the adolescents is one of effective factors in their tendency toward God as a trustworthy entity. This repeated theme was evident in the statements of a girl, "There is nobody here to keep your secret. I wish I had somebody with whom I share my secrets and rely on it and express my feelings but nobody is here; it is a lack. This relates to the faith that God can only be trusted."

Distinction between spirituality a nd religion: The adolescents made distinction between the two concepts of spirituality and religion and considered themselves spiritual rather than religious although both aimed at reaching to God. …, "I know myself as a spiritual youth not religious. Maybe, a spiritual guy thinks more and a religious one acts more. The spiritual one, for example, thinks of God but the religious one prays and reads His holy book. Spirituality and religion are with each other. I like to be both spiritual and religious. By having both, I reach to God."

Spiritual coping mechanisms: One of common features in the girls was trust and reliance on God in problems and in facing with stresses of life. One of them said, "Somebody like me with no father, no mother, and in all nobody, has some guys around but nobody helps in problems. If she does not believe in God to help her in problems,… Many had to take drugs and got psycho. When I believe in God and feel sure to be guided and be helped, my problems become so easier. I always feel there is God helping me. When I see my past life, I see it."

Differences between the ideas resulted from the types of help the girls asked from God to cope with problems, which were classified in the three following groups.

- **Belief in God's support**
  Some girls believed that due to their special conditions in terms of family and deprivation from some blessings such as having parents, God has a particular kind of attention to them. "All men relates themselves to somebody, the one who can be better for them or solve their problems, the one who is nearest to them and love them and be the most pathetic. Well, God is like this."
- **Collaborative opposition**
  Another group of the adolescents while believing the concept of "reliance" considered faith in an effort to solve problems as important. One of the girls stated,

"Spirituality is so effective. When a problem occurs, we should think of its spiritual aspects and not limit our thoughts to its looks. So, we can solve it better and life seems better. I see life more positively but it is better to note both outside and inside…for example, if we just say that this problem is a test from God and don't solve it, life not only does not get better but the problem also gets bigger and makes the things worse."

- **Belief in God's will**
  The other group of interviewees believed that, in some circumstances, God does not solve problems in spite of having the ability to do it. One of the girls said, "I believe in God. The ultimate power is God. Maybe it takes a second for God to do something that lasts many years for us! Of course, He doesn't do it but if I were God, I do the things much sooner. God acts very late."

Spiritual approaches: Adolescent girls referred to a range of ways considered spiritual from their view points. One of them asserted that spiritual approaches were effective in her coping process in the occurrence of problems. …"I leave it to God. Whatever is, let's happen. I cry, talk with my friends, vow too much, burn candle in holy places, and pray… Music makes me very easy. I myself play instrument… I think praying makes people very near to God. I talk with Him and He plays a major role in my life."

One of the spiritual coping mechanisms largely influential according to most subjects was praying. One of them defined praying as "praying is saying what we want and need from God. It's a request from God and it's good because it gives rest."

The adolescent girls considered faith as an important factor in coping with problems. One of them defined it as "a sincere link with God which is very interesting and not at all complex. It's so good because it protects us from bad events." The girls mentioned that peace would be the result of faith. One of them said, "If you have less contact with God, you surely have less peace. When I think to God much and feel a strong friendship with Him, I have more peace but when I am busy of things and feel disturbed."

Conditions for applying spirituality

- **All conditions**
  Some girls thought of spirituality as an available means in all situations and made no special condition for applying spiritual approaches. One of them said, "Spirituality needs no condition. It is available all the time. Spirituality is not always related to physical things."
- **Hard conditions**
  Another group of the girls emphasized that although spirituality can be applied in all conditions, people seek for it in hard conditions. One of them said, "When you need help and have problem in life which cannot do anything about it, spirituality is helpful. If you have no problem, you can be spiritual but it is stronger during problems."

Discussion

This study is the first qualitative research regarding the role of spirituality and spiritual coping with stresses of life in adolescent girls between 14 and 20 residing at institutes. According to the results, the subjects had some spiritual attitude toward life and looked at their special situation with such a view point. It seems that such attitude toward life is present among Iranian women. In a study regarding coping process in women with breast cancer, findings showed that religious attitude was one of essential factors in reducing fear[15].

The girls having distrust to others considered God as the sole reliable existence in their life and tried to make a profound relation and connection with Him. According to Erikson's developmental psychosocial theory, the most important outcome of childhood in the first year of life is to attain trust. Trust is formed during relations and interactions with others and the most critical period in shaping this sense is this period. Attaining this sense requires unconditional support and care from a sole caregiver during this time; the particular problems of these girls can be, therefore, attributed to the lack of formation of it.

In this study, the girls generally believed that spirituality is a more extended concept than religion and can contain other notions such as being religious. Accordingly, what was considered more important for them was faith to God and effective relation with Him which could be achieved by various rituals and convictions. Distinction between spirituality and religion as well as realization of its vastness over religion is in conformity with literal and related literature. Spirituality is a more broad term than religion. Although, many express their spirituality in the form of religious manners. Thus, although all humans may not be religious, everybody searching for the meaning of actualization is necessarily spiritual [11].

The girls thought that relying on God and applying spiritual approaches to face with problems and tensions in life were very effective and believed in their efficiency. Spiritual-religious coping may be psychologically helpful because it leads to emotional peace and personal capabilities[16]. A group of the girls while believing the permanent presence of God and receiving His special support (resulted from their particular familial condition) were certain that God would solve their problems in any circumstances and only relying on Him could be sufficient for this. In contrast, another group while considering that reliance on God would be essential in problems believed in effort and struggle of man to confront difficulties of life. Besides the above groups, another group of the girls had different ideas and looked at the issues with uncertainty. They believed that God would be inattentive and somehow indifferent to their situation.

Pendleton and coworkers (2002) explained spiritual coping mechanisms in children with cystic fibrosis, which agrees with the findings of this study. They identified: a) spiritual-religious collaborative coping in which the child together with God as members of a group tries to cope with stress; b) belief in God's support, i.e., a conviction

that God will certainly help the child, protect it and make it peaceful; and c) belief in God's intervention, that is, believing that God with His infinite power can reduce its stress[17].

In current study, the girls enumerated different approaches by which they could somehow cope with stresses they encountered. These approaches are the same as those referred in other studies. For instance, Mauck and Schmidt (2004) named such spiritual approaches as praying, therapeutic touch, Yuga, meditation, music and art[18]. Similarly, one of the most important spiritual approaches unanimously stated by the girls because of its efficiency and importance was praying. They believed that praying is relation with God and expression of desires and needs to Him which its ideal and valuable outcome is to achieve peace. In many instances, praying is considered as "facing of humans with themselves" or as "an attempt to relate with God." Social scientists think that religious conducts have a buffering role in reducing stress. It seems that praying reinforces religious adaptation and this leads to reduction of the effects of negative factors on mental health. In addition, religion has more effects on mental health of those with higher levels of stress. Accordingly, praying should be regarded as one of behavioral guidelines to control hard circumstances[19].

Findings showed that the girls believed faith is one of significant factors in coping with life stresses, leading to hope, peace and a positive feeling toward life and future. Sowell et al (2000) contend that such beliefs as faith in God, destiny, fate and … regarding the rules of nature are ones that enable an individual to create a conception out of hard conditions of life and to maintain his hope. These beliefs as an immense and powerful resource can suppress negative emotional responses in stressful events[20].

According to the girls, the conditions to apply spirituality or the appropriate time to utilize spiritual approaches range from all possible situations to only hard circumstances of life and stressful events. According to the studies of Fetzer institute (2003), there is an evident relationship between stressful events of life and different forms of spiritual as well as religious involvement. In the event of crisis, individuals modify their religious tendencies into different spiritual-religious approaches. Although spiritual and religious variables in individuals are assumed stable, spiritual experiences and spiritual-religious coping mechanisms may be influenced by daily vicissitudes. For example, studies have shown that higher levels of religious coping are associated with confrontation with more severe and stressful negative life events[13].

Findings of this study may provide a detailed description of the role of spirituality and spiritual coping approaches to face with life stresses in institutes for adolescent girls. In fact, most of them suggested a positive role for spirituality and its approaches that were considered valuable by the girls. It seems that these findings can be used by health care providers including nurses as a framework for providing care in such centers. The care may be aimed to promote adaptation in the adolescents and, based on education and reinforcement of spiritual approaches, to confront with hard conditions of life.

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HUMAN RESOURCE DEVELOPMENT FOR PRODUCTIVITY INCREASE OF MILK VITA AT BAGHABARIGHAT dAIRY LANT IN BANGLADESH

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ABSTRACT

The aim of this paper is to investigate the scenario of human resource development along with its different factors that affect the capacity utilization of the plant as well as the expected production level. We have collected data from 122 employees out of 155 employees of Baghabarighat Dairy Plant in Bangladesh. By using some statistical techniques we have shown that setting up a training program can increase the skills of employees. Some remarkable causes like old machinery, unskilled manpower, mismanagement, political pressure, lack of proper training, and insufficient supply of milk restrain the proper utilization of the plant.

Introduction

Several authors have focused their study on the productivity of Milk Vita[1]. Azad et al explained the time trend behavior of production by this plant along with the plants situated in Takerhat, Sree-Nagor, Manikgonj, Rangpur and Tangail. Razzak et al (1995) found a unique relationship of milk production to the availability of feed and fodder[3].

Cady et al. also observed the effect of seasons or different months of the year on quality milk production and found that significant effects exist regarding the season of milk production. Milk fat production trends both in qualitative and quantitative aspects, including seasonal effect, at Sree-Nagor Milk Shed Area (MSA) on Milk Vita production in Munshigonj of Bangladesh were investigated by[5] Hasanuzzaman et al) and found that season has a large effect on fat value. Thus, we observe that most of the researchers have drawn their attention to the productivity analysis of the dairy plant only.

On the other hand[4] Chandra and Gupta showed that HRD (Human Resource Development) training played a predominant role in productivity increase of Tasar Culture. However, there is an increasing demand of human resource development through additional training, proper management of the plant, and many other related factors to increase the productive performance of the plant substantially.

In recent years, HRD and management programmes have been playing a key role in enhancing productivity and quality improvement in various sectors by improving the skills of the workers. To our knowledge no research has been conducted regarding human resource development that may have a significant impact of productivity increase of Milk Vita products. Our aim is to investigate the present scenario of HRD related factors; those that influence productivity and quality improvement for Milk Vita dairy plant at Baghabarighat in Bangladesh.

Conceptual Framework of the Study

Human Resource Development in the organizational context is the process by which the employees of the organization are helped in a continuous planned way to:

(a) acquire or sharpen capabilities required to perform various functions associated with their present or expected future roles;

(b) develop their general capabilities as individuals and discover and exploit their own inner potentials for their own and/or organizational development purposes and

(c) develop an organizational culture in which supervisor, subordinate relationships, teamwork and collaboration among subunits are strong and contribute to the professional well-being, motivation and pride of employees[2].

So, Human Resource Development is the process of increasing the knowledge, the skills and the capacities of all people in society. In economic terms it could be described as the accumulation of human capital and its effective investment in the development of an economy. In this sense, we consider all of the manpower of the industry (Baghabarighat Dairy

Plant) as human resource and their development is human resource development. But it is clear to us that Human Capital Formation is the first term of Human Resource Development, which is the process of acquiring and increasing the knowledge, skills and experience that are critical for economic development. So, human capital formation is thus associated with investment in man and his development as creative and productive resources[6]. The industrial staff have education, knowledge, skills, and experience so that we can consider them (manpower) as human capital. HRD is needed by any organization that wants to be dynamic and growth oriented or to succeed in a fast changing environment. The objectives of HRD are

(i) to maximize the utilization of human resources

(II) to provide an opportunity for the development of human resources in an organization for full expression of their talent and manifestation of talents.

(iii) development of constructive mind and overall personality of the employees

(iv) to develop the organizational health, culture and effectiveness

(v) to develop the sense of team sprit, team work and inter team collaboration

(vi) to generate systematic information to obtain human resources[2].

The functioning of HRD is the identification of potential of each person in the industry, identification of organizational goals, and to know the organizational future goals. The direction of HRD would be careful to identify those programs that can develop the industry.

Human Resource Management (HRM) is basically the management of people for the effectiveness of organization. It may be defined as a planned process of acquiring, developing, motivating and maintaining the employees as core resources of the organization for the most effective realization of common goals. HRM itself has several components:

1. acquisition of HR which consists of human resource planning, recruitment, selection and placement, and socialization;
2. development of HR which consists of training and development, performance appraisal, and organizational development;
3. motivation of HR includes financial and non financial rewards, employee participation, job-enlargement and job enrichment, and quality of work life;
4. maintenance of HR comprises both maintenance factors and maintenance elements. Some maintenance factors are fair company policy and administration, quality of supervision, relations with supervisors, peers and subordinates, salary and wages, job security, and working conditions and status. On the other hand, employee benefits and services, safety and health care programs, and labor relations are maintenance elements[2].

Methods and materials

We have collected the data from Baghabarighat Dairy Plant in Bangladesh. Among 155 employees, 122 were interviewed. The rest of employees declined to be interviewed. The interview was conducted using a prescheduled questionnaire.

Some popular statistical tools have been used to analyze our collected data. We have constructed frequency tables to cite the percentage distribution of several variables. Contingency analysis was performed to investigate the association among qualitative variables. For contingency analysis we have tested the following null hypothesis:

H_0: There is no association between the variables against the alternative hypothesis

H_1: H_0 is not true.

All contingency tables have been prepared on the basis of classification of variables. From each contingency table, examination of associations between the components and the various segments of the components have been made by computing chi-square test statistics of the form

$$\sum_i \sum_j \frac{o_{IJ}^2}{E_{IJ}} - N \sim x^2_{(r-1)(c-1)}$$

Where O_{ij} and E_{ij} are the observed and expected frequency of (i,j) th cell, respectively.

To study the statistical relationship among the quantitative variables such as length of service, capacity utilization of plant, amount of needed money for cattle purchase (interest free credit), and number of clients for distribution of donation money we have performed correlation analysis. Correlation analysis has been done constructing correlation matrix of the form

	X_1	X_2	X_3
X_1	1	r_{12}	r_{13}
X_2	r_{12}	1	r_{23}
X_3	r_{13}	r_{23}	1

Where r_{12} , r_{13}, and r_{23} are the correlation coefficient between X_1 and X_2, X_1 and X_3, and X_2 and X_3, respectively.Some of our variables are quantitative but discrete in nature. So, it is very difficult to fit a linear regression model to explain the variation of discrete dependent variables (capacity utilization of plant) with the help of discrete explanatory variables. Thus, we have converted some quantitative variables to dummy variables coding as

$$Z = \begin{cases} 1, \text{ if the value is greater than or equal to the average value} \\ 0, \text{ otherwise} \end{cases}$$

Using these dummy variables we have fitted the logistic regression model of the form

$$P(Y) = \frac{e^{\alpha+\Sigma\beta x_1}}{1+ e^{\alpha+\Sigma\beta x_1}}, \quad i= 1,2,3,...,k$$

Results and Discussion

We have constructed a frequency distribution of manpower by their departmental works (Table 1). Though 50% of manpower is engaged in the production department, the rest of the manpower workforce is in factory related departments. Among the factory related departments (factory, maintenance, quality, store, accounts, and sales center) the maintenance sector is the largest. There are equal numbers of supervisors and

assistants (27%). 12.3% are caretakers, and only 5.7% are skilled workers (Table 1)

From Table 2 we have observed that only 34.4% of the manpower is working (service length) more than 10 years and the length of service for the remaining (65.6%) manpower is less than 10 years. Only 27.9% of the manpower of Baghabarighat Dairy Plant has their educational qualification at, at least graduate level. However, 23.8% of employees are below S.S.C. level (Table 2). Although Baghabarighat Dairy Plant needs well trained personnel, the number of trained employees are only 23.83% of which 3.33% are foreign and 20.5% are locally trained (Table 2).

We have collected some information based on the personal opinion of the employees. Among 122 employees 11.5% expressed that their job performance is excellent and 87.7% expressed it as good (Table 3). Again, 91.0% of employees said that there is no need to recruit extra employees for the plant. On the other hand, only 2.5% and 6.6 % of employees demanded more or less manpower regarding sustained manpower. 82% of manpower demanded the additions be skilled but 18.0% did not reply describing the reason for these skills (Table 3).

Capacity utilization of the plant is not exact (100%) in the eyes of 22.1% of manpower. To clarify the reasons for no full utilization of the plant among 27 (22.1% of the total respondent) respondent 59.27%, 22.22%, and 11.11% indicated old machinery, mismanagement, and insufficient sources of milk, respectively. For the development of the plant more than 93% of employees suggested recruiting more skilled manpower, adding more instrumental facilities, and providing government subsidies (Table 4).

Study on dissatisfaction of manpower indicated that more than 50% of employees are dissatisfied with the mismanagement of the plant. Again, 30.91% of employees are dissatisfied with the lower educational qualification of staff involved in management of the plant (Table 5). From Table 5 we see that about 36.36% of manpower are not satisfied in their work because of insufficient salary, pressure of work, and insufficient working facilities. On the other hand, 18.18% are suffering from political pressure.

Encouragement is a factor to achieve maximum production in any industry. We have studied the encouragement system and have found that 72.1% of manpower demand self-motivation, patriotism, and officer's inspiration to encourage him/her to perform one's duty in a timely manner (Table 6). More than 98% of employees expressed that development of manpower by training, and 100% of them demanded a training program for every one after a certain interval.

From the correlation matrix (Table 7) we see that the number of clients is negatively significantly related at a 5% level of significance with the length of service. In other words, we may say that employees with more service years propose a subsidy for the least number of clients who were supplying milk to the plant. Again, the number of clients (those who supply milk to the plant) and subsidy (amount of money) in favor of clients to purchase cattle are positively related at a 1% level of significance, that is, amount of total subsidy under this plant should be based on the number of clients but not on a fixed basis.

We have studied the association among job performance, educational qualification, and training (Table 8). The table shows that there is a significant association among job performance, educational qualification, and training when the level of job performance is good.

Further, a logistic regression model has been fitted to investigate the impact of independent variables (Educational qualification (X1) and Training (X_2) on the dichotomous variable (skills, Y) defined as

$$Y=\begin{cases}1, \text{ if the value is greater than or equal to the average value}\\ 0, \text{ otherwise}\end{cases}$$

The fitted logistic regression model can be written as

$$P(Y)=\frac{e^{0.390x1-1.008X2}}{1+e^{0.390x1-1.008X2}}$$

and the parameters are incorporated in Table 9. From Table 9 we find that the independent variables (educational qualifications and training) have a significant impact on dependent variable (skills) at a 5% level of significance.

Conclusion

Baghabarighat dairy plant is well organized with its different factory related departments. However, skilled manpower is not sufficient and most of the workers in this plant are not well trained. Furthermore old machinery, mismanagement, political pressure and insufficiency of milk supply impede the expected production level of the plant. Recruiting more skilled manpower, scheduling round training to the employees making them dynamic and growth oriented, adding more instrumental facilities, providing government subsidies, and creating a suitable working environment; were problems that can be solved accordingly.

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Table 1: Percentage distribution of manpower according to their designation and department

Designation		Department	
Officer/Junior officer/ Manager/Day-manager	3.3 (4)	Factory	0.8 (1)
Assistant manager	4.9 (6)	Production	50.0 (61)
Supervisor	27.0 (33)	Maintenance	26.2 (32)
Assistant supervisor	27.0 (33)	Quality	4.9 (6)
Storekeeper	0.8 (1)	Store	6.6 (8)
Packer	8.2 (10)	Accounts	9.8 (12)
Caretaker	12.3 (15)	Sales Center	1.6 (2)
Skilled worker	5.7 (7)		
Processor	1.6 (2)		
Lab attendant	1.6 (2)		
Spray operators/Man	2.5 (3)		
Simple personnel	4.9 (6)		
Total	100.0 (122)	Total	100.0 (122)

Here, values in parentheses indicate the frequency

Table 2: Length of service, educational qualification and training of manpower

Length of service		Educational qualification		Training	
Years	**Percent**	**Level**	**Percent**	**Type**	**Percent**
1-10	65.6 (80)	MS/B.Sc.Eng/Dipl. Eng	16.4 (20)	Foreign	3.33 (4)
10-20	16.4 (20)	B.A./B.Sc./B.Com.	11.5 (14)	Local	20.5 (25)
20-30	16.4 (20)	H.S.C	23.0 (28)	None	76.2 (93)
30+	1.6 (2)	S.S.C.	25.4 (31)		
		Below S.S.C.	23.8 (29)		
Total	100.0 (122)	Total	100.0 (122)	Total	100.0 (122)

Here, values in parentheses indicate the frequency

Table 3: Job performance, needed employee and skills

Job performance		Needed employee		Skills	
Performance	**Percent**	**Employee**	**Percent**	**Reason**	**Percent**
Excellent	11.5 (14)	Not needed	91.0 (111)	1. By no comment	18.0 (22)
Good	87.7 (107)	More needed	2.5 (3)	2. Foreign/local training	4.9 (6)
Not good	0.80 (1)	Below needed	6.6 (8)	3. By engaged with job training	1.6 (2)
				4. Experienced in relevant sector	62.3 (76)
				5. 1 and 2	0.8 (1)
				6. 1 and 3	8.2 (10)
				7. 2 and 3	2.5 (3)
				8. 1, 2 and 3	1.6 (2)
Total	100.00	Total	100.00	Total	100.0 (122)

Here, values in parentheses indicate the frequency.

Table 4: Capacity utilization of plant and plant development suggestions

Capacity utilization of plant		Reason of not fully utilization of plant		Plant development suggestions	
Utilization	**Percent**	**Reason**	**Percent**	**Suggestions**	**Percent**
Unknown	1.7 (2)	Insufficient source of milk	11.11 (3)	1. Adding more skilled man-power	0.8 (1)
Below 50%	0.8 (1)	Insufficient officers/ employee	7.40 (2)	2. Reducing excess manpower	0 (0)
70% to 90%	21.3 (26)	Mismanagement	22.22 (6)	3. Adding more instrumental facility	4.9 (6)
100%	76.2 (93)	Old machinery	59.27 (16)	4. Government subsidy	0.8 (1)
				5. 1, 3, and 4	93.5 (114)

Total	100.00 (122)	Total	100.00 (27)	Total	100.00 (122)

Here, values in parentheses indicate the frequency

Table 5: Dissatisfaction with management and for ongoing job situation

Dissatisfaction with management		**Dissatisfaction with ongoing job situation**	
Reason	**Percent**	**Reason**	**Percent**
1. Unskilled	1.81 (1)	1. Insufficient salary	18.18 (2)
2. Lower educational qualification	30.91 (17)	2. Pressure of work	0 (0)
3. Political undertaking	3.64 (2)	3. Insufficient working facility	0 (0)
4. Officers unwillingness	1.81 (1)	4. Political pressure	18.18 (2)
5. Mismanagement	50.91 (24)	5. 1 and 2	18.18 (2)
6. 2 and 3	1.81 (1)	6. 1, 2, and 3	36.36 (4)
7. Others	9.10 (5)	7. Others	9.1 (1)
Total	100.00 (55)	Total	100.00 (11)

Here, values in parentheses indicate the frequency

Table 6: Encouragement, manpower development and training program

Encouragement to obey the duty		**Development of manpower**		**Training program**	
Who to encourage?	**Percent**	**Opinion**	**Percent**	**Do one need?**	**Percent**
1. Self motivated	6.6 (8)	By training	98.4(120)	Yes	100.0 (122)
2. Officers inspiration	0 (0)	Adding new	0.8 (1)	No	0 (0)
3. Patriotism	0.8 (1)	No need	0.8(1)		
4. 1 and 3	18.0 (22)				
5. 1, 2, and 3	72.1 (88)				
6. Others	2.5 (3)				
Total	100.00 (122)	Total	100.0 (122)	Total	100.0 (122)

Here, values in parentheses indicate the frequency

Table 7: Correlation Matrix

	Length of service	**Capacity utilization of plant**	**Amount of money for cattle purchase**	**No. of clients for distribution of donation money**
Length of service	1.00	-0.103	-0.088	-0.180*
Capacity utilization of plant		1.00	0.127	0.088
Amount of money for cattle purchase			1.00	0.543**
No. of clients for distribution of donation money.				1.00

** (**) Correlation is significant at 0.05 (0.01) levels (2 tailed).*

Table 8: Association among educational qualification, training and job performance

Job performance	Educational qualification	Training			Total	d.f.	Pearson-chi-square	Asymp. sig.(2-sided)
		Foreign	Local	None				
	Masters/B.Sc. Engineer	3	2	1	6			
	BA/B.Sc./B.Com.	1		1	2			
Excellent	H.S.C.			2	2	8	9.8	0.279
	S.S.C.		2	1	3			
	below S.S.C.		1		1			
	Masters/B.Sc. Engineer		7	6	13			
	BA/B.Sc./B.Com.		2	10	12			
Good	H.S.C.		4	22	26	4	15.141	0.004
	S.S.C.		1	27	28			
	below S.S.C.		6	22	28			

	Masters/B.Sc. Engineer			1	1		No statistics are computed because educational qualification and training are constants.
	BA/B.Sc./B.Com.						
Not good	H.S.C.						
	S.S.C.						
	below S.S.C.						

Table 9: Logistic regression

Independent Variables	Coefficient	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
							Lower	Upper
X1	0.390	0.183	4.559	1	0.033	1.477	1.033	2.113
X2	-1.008	0.258	15.240	1	0.000	0.365	.220	.605

Here, dependent variable is skills (Y) of the employee.