

# Effect of maternal education on the rate of childhood handicap

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## ABSTRACT

**Objectives:** The objectives of this study were to determine the relation between maternal education and various maternal risk factors, identify the impact of maternal education on the risk of childhood handicap and estimate the proportion of childhood handicap that can be prevented by maternal education.

**Methods:** Data was collected from all married women attending the two major maternity and child hospitals in Jeddah during April 1999. Women with at least one living child were interviewed for sociodemographic factors and having at least one handicapped child. The risk of having a handicapped child and the population attributable risk percent were calculated.

**Results:** Some potential risk factors are dominant in our society as approximately 30% of women did not attend school and 84% did not work. Consanguineous marriages accounted for about 43%. Pre-marriage counseling was limited as only 10% of women counseled before marriage. The proportion of unemployment and consanguineous marriages decreased significantly by increase in maternal

education level. Conversely, the proportion of women reporting pre-marriage counseling increased significantly by increase in maternal education level. Approximately, 7% of women reported having at least one handicapped child. The risk of having a handicapped child showed a significant sharp decline with increase in maternal education level. At least 25% of childhood handicap can be prevented by achieving female primary education and up to half of cases can be prevented if mothers finish their intermediate education.

**Conclusion:** Female education plays a major role in child health. The results of this study suggest investment in female education, which would have substantial positive effects in reducing incidence of childhood handicap in Jeddah.

**Keywords:** Childhood handicap, maternal education, attributable risk.

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Childhood handicap is a major public health concern especially in developing countries as over three quarters of the world's handicapped children under 15 years of age are estimated to live in this area.<sup>1</sup> It is very difficult to define where child health begins. In dealing with child health, one should recognize that it is an outcome of many intervening factors that start as early as the parent's early childhood and adolescence. In the last decades, this discipline has developed tremendously. The health professionals have begun to move from a narrow concept of maternal health to a more

inclusive one that recognizes the role of much more fundamental issues substantially influencing child health.<sup>2</sup> Among these conditions, are all factors affecting maternal development that are consequently reflected on her offspring. The economic, social, cultural and educational environment in which girls grow to womanhood, marry and child-bear affects their future reproductive health and children.

In the Arab World, some potential risk factors issue of the traditions and beliefs still exist. Women's illiteracy, early marriage, multiparity and consanguineous marriages are still dominant.<sup>3-6</sup>

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Saudi Arabia has undergone tremendous economic development in the recent years. Consequently, there has been marked improvement in the health care services and frank decline in infant morbidity and mortality. Development of health care services has emerged the problem of handicapped children as more feeble children survive. The prevalence of major disabilities was estimated to be around 4%.<sup>7</sup> Female education has advanced and more girls are urged to attend schools. However, the level of illiteracy among women remains elevated and about 39% of girls do not attend schools.<sup>8</sup> Also traditionally, girls marry at a young age,<sup>4,6</sup> which interrupts their education at an early stage. This phenomenon is not unique for the Kingdom but is dominant in the Middle East Area.<sup>4,6</sup> Female education has been previously recognized as a major risk factor for child health. At present, our understanding of risk factors are mostly derived from studies in the Western Countries where maternal illiteracy does not exist. Few experiences come from the Third World Area and need to be strengthened through research.

The objectives of this study were to: 1) Determine the relation between maternal education and various maternal risk factors in Jeddah; 2) Estimate the impact of maternal education level on the risk of childhood handicap and 3) Calculate the population attributable risk percent (PAR%) of childhood handicap that can be eliminated by maternal education.

**Methods. Study site and data source.** Jeddah city is one of the largest cities of the Kingdom of Saudi Arabia with a population of 2.1 million.<sup>9</sup> In Jeddah, there are two major governmental maternity and child hospitals that drain around 60%<sup>3</sup> of women of low and medium social class in Jeddah City. These two hospitals contain 290 inpatient beds and serve around 2000 patients per month. A cross-sectional study was performed in these two maternity hospitals to collect data on all married women with at least one living child during April 1999 either as patient (inpatient or outpatient) or healthy (who accompanied their child, any family member or a friend). Two trained medical students, under direct supervision of the medical staff, using structured questionnaires, interviewed women who accepted participation in the study in each hospital. A pilot study was carried out to test the questionnaire. Information on sociodemographic factors and having a handicapped child were collected. A total of 914 women were identified. In all, 826 (90%) were eligible for the study and 713 (86%) accepted participation. The protocol was approved by the members of the Department of Community Medicine and Primary Health Care, Faculty of Medicine and Allied Health Sciences, King Abdulaziz University.

All study population gave their approval to be included in the study.

**Data and statistical analysis.** Data entry and analysis were carried out using SPSS version 9.05 for windows. Maternal education was categorized according to school education in the Kingdom as no school (0 years of schooling), primary (1-6 years of school education), intermediate (7-9 years of school education), secondary (10-12 years of school education) and university education or above (at least 13 years of education). Nationality was defined as mother's nationality of origin. Working mothers were those who always worked prior to delivery of the handicapped child. The women were counted as having a handicapped child if she reported to have at least one living child under 15 years suffering from an actually established physical, mental, auditory and/or visual handicap as diagnosed by a medical person. The proportion of women reporting a handicapped child was calculated as: Number of women actually having at least one handicapped child, multiplied by 100, and divide by the total number of women in the study.

Chi-square test was used to detect significant differences between proportions. Chi-square test for trend in proportions was calculated to detect significant trends. Logistic regression model was fitted to calculate adjusted odds ratio for various maternal education levels and the category university or above was taken as the reference group. The dependent outcome was having at least one handicapped child (0 = no, 1 = yes). Adjustment was

**Table 1 -** Sociodemographic characteristics of women attending two major governmental maternity hospitals in Jeddah.

Variables	Categories	No (%)
Nationality	Saudi	419 (59)
	Non-Saudi	294 (41)
Educations	No school	211 (30)
	Primary school	121 (17)
	Intermediate school	119 (17)
	Secondary school	134 (19)
	University & higher	128 (18)
Working status	Housewife	597 (84)
	Working	116 (16)
Consanguinity	No	404 (57)
	Yes	309 (43)
Premarriage counseling	No	639 (90)
	Yes	74 (10)
Handicapped child	No	665 (93)
	Yes	48 (7)

**Table 2** - Potential risk factors by maternal educational level among women attending two major governmental maternity and child hospitals in Jeddah.

	No school (n=211) No. (%)	Primary school (n=121) No. (%)	Intermediate school (n=119) No. (%)	Secondary school (n=134) No. (%)	University & higher (n=128) No. (%)
Housewives*	198 (94)	114 (94)	110 (92)	108 (81)	67 (52)
Consanguineous marriages*	109 (52)	55 (46)	47 (40)	53 (40)	45 (35)
Premarriage counseling*	12 (6)	9 (7)	12 (10)	21 (16)	20 (16)
*P<0.001					

only carried out for mother's nationality, education level, working status and consanguinity.

The population attributable risk percent (PAR%) of mother's educational level, was calculated as follows:  $PAR\% = (OR - 1) \times P_c$ , divided by Odds Ratio (OR) x 100, where: OR = odds ratio and  $P_c$  = proportion of exposed cases.

**Results.** A total of 713 married women with at least one living child were included in the study. Their current age at time of data collection ranged 16-50 years (mean 31.3+/-0.3) and current parity ranged from 1 to 16 with an average of four living children. As shown in Table 1, the majority was of Saudi nationality (59%). Approximately, 30% never attended schools and 84% were housewives. Consanguineous marriages accounted for 43% and only 10% reported counseling before marriage. Approximately, 7% of women reported having at least one handicapped child. The proportion of housewives and consanguineous marriages showed a significant decline by the increase in the maternal

educational level. Conversely, the proportion of women who counseled before marriage increased with higher maternal educational level (Table 2).

The risk of having a handicapped child showed a sharp decline with increase in maternal education level (Table 3). Mothers who never entered schools (OR=6.1, 95% CI=1.6-23.3) and those with maximum 6 years of education (OR=5.8, 95% CI=1.4-23.7) were at highest risk to have a handicapped child than those reaching university education. Still mothers with intermediate level of education were at 5 times (95% CI=1.1-19.4) more risk to have a handicapped child. Although mothers reaching secondary education were at triple risk than those with university education, results did not reach statistical significance. None of the interactions reached statistical significance. The attributable risk percent demonstrated that maternal education could be of benefit in preventing childhood handicap in the population as approximately 25% of cases could be eliminated by allowing mothers to primary education and around a half could be prevented if their mothers finished intermediate education.

**Table 3** - Adjusted odds ratio for the impact of maternal education on having a handicapped child among women attending two major governmental maternity and child hospitals in Jeddah.

	OR	95% CI	P-value	PAR%
<b>Maternal education</b>			0.031	
No school	6.1	1.6-23.3	-	24.7
Primary school	5.8	1.4-23.7	-	14.1
Intermediate school	4.6	1.1-19.4	-	13.1
Secondary school	3.6	0.9-14.2	-	13.6
University & higher	1.0	Reference	-	Reference
PAR%-Population attributable risk percent, OR-Odds ratio				

**Discussion.** Maternal development and child health are a single rubric and there is no advantage in looking to them as two different situations. The environment in which girls grow to womanhood undoubtedly affects their child's health. Thus, it is wise to try to intervene early in future mother's development. The results of this study confirm previously published research on the existence of maternal risk factors in our society<sup>3,4,6,8</sup>. Approximately, 30% of women did not attend school and 84% were unemployed. Illiteracy and female unemployment are two factors documented to have a negative impact on maternal and child health<sup>10-17</sup> and are prominent in Middle East Region.

Data on maternal age and parity at the handicapped childbirth were not possible to consider as one woman could report more than one handicapped child. However, the mother's current

age being as low as 16 years indicates early marriages and childbearing. Also, high parities up to 16 children demonstrates this potential risk factor. These risk factors are dominant not only in the Kingdom but most of the Middle East Area.<sup>4,6</sup> Early marriage is fraught with insecurities throughout the childbearing period. Early married mothers by age alone fall into a high risk category as they are biologically and psychologically immature.<sup>18-20</sup> Multiparity is an additional factor leading to poor pregnancy outcome.

Consanguineous marriage that is known to be intimately related to handicap is a wide spread practice in the Kingdom<sup>3,4</sup> related to culture norms and was seen from the data to account for around 43% of cases. This striking high proportion is reported in the Third World Countries particularly the Arab World,<sup>3-5,21-24</sup> Although consanguineous marriage is dominant in the Kingdom, there are no organized obligatory pre-marriage counseling programs. This was reflected by the low proportion (10%) of women who reported pre-marriage counseling.

Our results have demonstrated that maternal education level was seen to influence the woman's pattern of life, access to health care services and her child's health. Low educated women were mainly the housewives showing high proportion of consanguineous marriages and lower proportions of pre-marriage counseling. Around, 7% of women reported having at least one handicapped child. The risk of having a handicapped child was highly related to the level of maternal education. The higher the maternal education level, the less the risk of childhood handicap. Mothers with education up to intermediate school were at much higher risk to have a handicapped child than those with secondary school education or above. Attending primary school could reduce 25% of childhood handicap while finishing intermediate school could prevent half of cases. These findings are in agreement with previous investigations, which have demonstrated high risk of perinatal mortality among illiterate and low educated mothers.<sup>11-17</sup> Female education is the major clue for future health of populations through two main trajectories. First, maternal state of well-being, as education rectifies women's awareness that is reflected on the quality of her life. The higher the woman's level of education, the healthier will be her life through healthier active life style, nutrition habits, economic conditions and personal hygiene. Female education will motivate women to continue their carrier, discourage early marriage, have a better marriage prospectus and even if cultural norms compel consanguineous marriages, girls will be

aware of the importance of pre-marriage counseling and access to health care services throughout their reproductive life. Second, through the quality of life of her offspring. Education strengthens mother's awareness of appropriate feeding practice, regular childcare, early detection and better management of life threatening conditions and efficient raising of children.

In conclusion, the results of this study emphasize that the risk of having a handicapped child declines with increase in maternal education level. Thus, investment in female education will protect future mothers and their children from considerable health hazards. Moreover, female education will have substantial positive effects in reducing the incidence of childhood handicap in Jeddah.

## References

1. Helander EAS. Prejudice and dignity: An introduction of community-based rehabilitation, New York: USA; United Nations Development Program 1993.
2. Sai FT, Nassim J. The need for reproductive health approach. *Int J Gynecol Obstet* 1989; suppl. 3: 103-113.
3. Milaat WA, Du V, Florey CH. Perinatal mortality in Jeddah, Saudi Arabia. *Int J Epid* 1992; 21: 82-90.
4. Harfouche JK, Verhostrate LJ. Child Health. The state of child health in the Eastern Mediterranean region. WHO/EMRO Technical Publication. Alexandria: Egypt; 1983; 9: 131-163.
5. El Hamamsy L. Early marriage & reproduction in two Egyptian villages. Occasional Monograph, The Population Council/UNFPA. Cairo: Egypt; 1994.
6. Shawky S, Milaat WA. Early Teenage Marriage and Subsequent Pregnancy Outcomes. Accepted for publication.
7. Al-Turaiki MH. National project for disability rehabilitation. King Fahad National Library. Riyadh: Kingdom of Saudi Arabia; 1997.
8. United Nations Population Fund. The state of the world population 1997. Geneva: UNFPA; 1997.
9. Milaat W. Public Health around the World: Saudi Arabia. *Public Health Medicine* 1999; 1: 34-38.
10. Seagar J, Olson A. Women in the World: An International Atlas. New York: Simon & Schuster; 1986. p.24.
11. Bicego GT, Boerma JT. Maternal education and child survival: A comparative study of survey data from 17 countries. *Soc Sci Med* 1993; 36: 1207-1227.
12. Becerra J, Atrash H, Perez N, Saliceti JA. Low birthweight and infant mortality in Puerto Rico. *Am J Public Health* 1993; 83: 1572-1576.
13. Victora CG, Huttly SRA, Barros FC, Lombardi C, Vaughan JP. Maternal education in relation to early and late child health outcomes: Findings from a Brazilian cohort study. *Soc Sci Med* 1992; 889-905.
14. Adetunji JA. Infant mortality in Nigeria: Effects of place of birth, mother's education and region of residence. *J Biosoc SCI* 1994; 26: 469-477.
15. Kabagarama D, Mulford CL. The relation between women's education, nutrition, fertility, GNP per capita and infant mortality: Implications for the role of women in development. *Int Contemp Sociol* 1989; 26: 189-200.
16. Caldwell JC. Routes to low mortality in poor countries. *Popul Dev Rev* 1986; 12: 171-220.

17. Terra de Souza AC, Cufino E, Peterson KE, Gardner J, Vasconcelos do Amaral MI and Ascherio A. Variations in infant mortality rates among municipalities in state of Ceará, Northeast Brazil: An ecological analysis. *IJE* 1999; 28: 267-275.
18. Moerman ML. Growth of the birth canal in adolescent girls. *Am J Obstet and Gynecol* 1982; 143: 523-528.
19. Hayes L, Crovitz E and Durham NC. Adolescent Pregnancy. *Southern Medical Journal* 1979; 72: 869-874.
20. Dott AB, Fort AT. Medical and social factors affecting early teenage pregnancy. *Am J Obstet and Gynecol* 1976; 125: 532-536.
21. Al-Salem M, Rawashdeh N. Consanguinity in North Jordan: Prevalence and Pattern. *J Biosoc Science* 1993; 25: 553-556.
22. Gevi D, Nathan R, Freudilich M. Consanguinity and congenital heart disease in rural Arab population in Northern Israel. *Human Hered* 1986; 36: 213-217.
23. Hamamy HA, Al-Bayat N, A-Qubaisy W. Consanguineous matings in the Iraq urban population and the effect of pregnancy outcome on infant mortality. *Iraq Med J* 1986; 34: 65-80.
24. Saha N, Al-Shaykh F. Inbreeding levels in Sudan. *Biosoc Science* 1998; 20: 333-336.