Association between Maternal and Adult Offspring Utilization of Primary Healthcare*

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Abstract

Background: Healthcare behavior occurs within the context of the family unit. Little research has investigated the influences among adult family members regarding their use of medical care services.

Objectives: To investigate the effects of maternal attendance patterns and maternal self-assessed health status on those of adult children.

Methods: This study was a retrospective cohort, analyzing both patient records for physician visits and mailed self-administered questionnaires regarding subjective health assessment. We evaluated a unique study group of multi-generational families with free and equal access to medical services at a primary care kibbutz clinic in Israel. This enabled an exclusive focus on the association between the use of healthcare by mothers and their grown children.

Results: Controlling for the subjects' age, gender and number of chronic diagnoses, a significant association exists between the family physician visit rates of a mother and those of her grown offspring (P = 0.03). Low self-health assessment is associated with higher levels of physician utilization (P = 0.003). Maternal self-health evaluation is associated with her adult children's own self-health evaluation (odds ratio 5.9, P = 0.04) and their rates of physician utilization (one additional offspring visit per year for low maternal self-health, P = 0.02).

Conclusions: A mother's behavior patterns measured via self-rated health status and physician visit rates serve as a proxy for maternal attitudes regarding healthcare, and these attitudes are possibly imparted to her children for life. This study provides unique evidence for a maternal health behavior effect on grown children, and enables a more complete understanding of families attending the primary care clinic.

IMAJ 2007;9:86–89

Organic disease affects the frequency of physician visits by an individual patient. However, it is known that besides morbidity, background characteristics such as age [1-3], gender [4-6], economic status [7], psychosocial attitudes [8] and family [9-12] all influence the choice to seek medical care. The interaction between a patient's health problems and family support in Israel has also been described previously [13].

An individual's health-related decisions are made within the context of his/her household [9]. Few researchers have focused on the range of influences that family members exert upon one another, focusing primarily on the effect of a mother's health behavior on that of her young children [14-16] and occasionally

of paternal effects as well [17]. Minors visit the physician according to their mothers' care-seeking behavior, but little is known whether parental effects continue to influence grown offspring into adult life. Our goal was to investigate mother-offspring determinants of health behavior in an adult population at a family practice clinic.

Methods

Study population and setting

The study population comprised residents of a kibbutz, a communal settlement, located in central Israel. The kibbutz is among the most economically homogeneous societies in the western world, with parents and their adult offspring (and often grandparents) residing in the same community. This reduces the number of confounding variables affecting medical care use, enabling a more focused study of the care-seeking patterns of families.

In conducting the first study in this field we tried to minimize confounding variables via the unique setup found on kibbutz. A single family practitioner (A.L. and his occasional replacement) ran a clinic three times a week. All residents lived within walking distance of the clinic and benefited from universal medical coverage with no co-payment for clinic use or medications.

The study population comprised all married couples residing on the kibbutz with one or more joint children also living on the kibbutz who were at least 16 years old at study onset. From age 16, kibbutz children move to housing separate from their families and usually visit the family physician unaccompanied by a parent. Analyzing our data relating only to individuals over 21 years of age yielded practically identical results to those shown below.

Data and statistics

We surveyed complete patient medical records at the kibbutz clinic from 1 January 1996 (when A.L. began working on site) to 30 September 1999. Each individual's medical record was examined for the total number of visits to the kibbutz physician and his substitute during the 45 month study period. Not included in this study were administrative visits, gynecologic and obstetric visits, and preventive care visits for occult blood testing and mammography. Annual checkups are not performed routinely in Israel. The number of chronic diagnoses for each individual was based on written medical records and joint evaluation by the medical staff of the kibbutz.

A self-administered questionnaire was sent via community mail. Non-respondents were given at least one telephone remind-

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er. Each individual was asked to provide biographical information and to evaluate their own overall health status according to a 5 point scale (1 = excellent, 5 = poor) used widely in previous studies [16,18].

We performed statistical analysis using SPSS version 12.0.0 for Windows, using Student's *t*-test for continuous variables and a chi-square test for categorical variables. All tests were two-tailed. We used a multivariate linear regression model to control for potential confounders including age, maternal age, gender, and number of chronic diagnoses.

We used odds ratio for low offspring self-health assessment by means of a logistic regression model, which controlled for the same variables as in the linear regression described above. We evaluated the patients' self-health score as a binary variable by using the median, with high binary self-health score of 1–2 on questionnaire and low binary self-health score of 3–5.

Results

Altogether, 226 kibbutz residents from 58 different families met the study criteria. Of these families, 53 were two-generational (parents and their children) and 5 were three-generational. Within each three-generational family, two sets of parent-child relationships were analyzed (grandparents to parents, parents to children). Therefore, among 63 married couples there were 105 total offspring included in our study, with 63 daughters and 42 sons. The same couples had 51 offspring who did not live on the kibbutz during the study period (33% of the total number of offspring). The ages of all individuals ranged from 16 to 80 years at study onset, with a mean age of 43.1 ± 17.5 years. Age distribution was as follows: < 18 years old 5%, 18–25 years 21%, 26–45 years 24%, 46–65 years 38%, and > 65 years 12%. The average number of individual visits to the kibbutz physician was 3.6 per annum.

Older patients visited the family practitioner more than their younger counterparts did (one additional visit per year for each decade of increasing age, $P < 0.001$). Women visited the doctor more than men (3.7 versus 3.4 visits per year respectively, not significant). Patients with chronic disease visited the doctor more than those without chronic conditions (5.4 vs. 2.3 visits per year, respectively; using the *t*-test, $t = 7.78$, $P < 0.001$). We therefore used a linear regression model controlling for the subjects' age, mothers' age, gender, and number of chronic diagnoses in order to examine maternal-offspring associations of health behavior.

Since a patient's number of visits to the physician was used as a major outcome variable and is not normally distributed, we used logarithmic transformation to improve normality. However, the corresponding linear regression yielded practically identical results, so for the sake of simplicity we present the number of physician visits and not its log transformation. The correlation between physician visits and patient age was linear until age 50 years and exponential thereafter, and was best described by adding the variables [age + age squared].

There was a statistically significant association between the number of family physician visits by an individual patient and the number of physician visits by his/her mother ($P = 0.03$) [Table 1,

Table 1. Number of additional offspring visits to the family physician (FP visits) associated with each of the conditions below*

Independent co-variable	No. of additional offspring FP visits	Confidence interval 95%	Significance
Model 1 (n=105) *r* = 0.57			
Adult offspring living on kibbutz			
Female gender	1.17 per year	0.51–1.84	0.001
No. of chronic diagnoses	1.24 per year	0.78–1.70	< 0.001
No. of maternal physician visits	0.106 per maternal visit	0.012–2.00	0.03
Model 2 (n=157) *r* = 0.72			
Mothers and adult offspring responding to questionnaire			
Female gender	0.90 per year	0.04–1.75	0.04
No. of chronic diagnoses	1.11 per year	0.77–1.44	< 0.001
Low binary self-health score**	1.36 per year	0.47–2.26	0.003
Model 3 (n=84) *r* = 0.57			
Adult offspring whose mothers responded to questionnaire			
Female gender	1.24 per year	0.47–2.02	0.002
No. of chronic diagnoses	1.31 per year	0.76–1.85	< 0.001
Low maternal binary self-health score**	0.98 per year	0.16–1.80	0.02

* Controlling for age, age squared, and (only in Models 1 & 3) maternal age and age squared

** Low binary self-health score = marked 3–5 on questionnaire (versus high binary self-health score = marked 1 or 2 on questionnaire)

FP = family physician

Model 1], but not his/her father. For every ten maternal physician visits over time, a given individual came to the family physician on average once more. When limiting this model to only one offspring per family or to only daughters there was no change in this association.

A total of 157 participants (70%) completed the self-administrated questionnaire regarding self-health evaluation. Responders and non-responders (n=69) were different in that responders were older (average age 47.4 years vs. 33.5 for non-responders), had a higher number of family physician visits (4.2 per year vs. 2.1 for non-responders) and had more chronic conditions (1.1 vs. 0.4 for non-responders); using *t*-tests all were significant ($P < 0.001$).

In the regression models we used self-health score as a binary variable (at the median, 48% responding high, 52% low) and adjusted for age, age-squared, gender, and chronic diagnoses. Using multiple regression, there was a significant association between self-reported health and an individual's number of physician visits ($P = 0.003$) [Table 1, Model 2]. Using logistic regression with the patients' binary self-health status, we found a significant relationship between a mother's self-reported health status and that of her grown children (odds ratio = 5.9, $P = 0.04$) [Table 2]. Testing this relationship a step further with a linear regression model, we found an association between *maternal* binary self-health score and number of *offspring* physician visits (one additional offspring visit per year for low maternal self-health, independent of offspring self-health score, $P = 0.02$) [Table 1, Model 3].

Table 2. Odds of having low offspring self-health assessment using a logistic regression model (n=51)*

Independent co-variable	Odds ratio	95% confidence interval	Significance
Chronic diagnosis	2.43**	0.83–7.13	0.1
Low maternal binary self-health score***	5.89	1.06–2.81	0.04

* Controlling for age, age squared, maternal age and age squared and gender.
** Odds ratio for one additional chronic diagnosis
*** Low binary self-health score = marked 3–5 on questionnaire (versus high binary self-health score = marked 1 or 2 on questionnaire)

Discussion

The primary care physician visit rate in our study (3.6 per year per patient) is comparable to surveys done both on kibbutz and in other western societies [19]. Our study confirmed previously reported findings that increasing age, female gender, and existing morbidity each increase the likelihood of a patient to visit the doctor [1-6].

The decision to utilize health services is made within the context of the family unit, involving a "dynamic process of interpretation and behavior" [20] regarding symptoms and stressors. Maternal attitudes towards the medical system are passed on to family members in the next generation and affect these individuals' use of healthcare services. Previous studies (published from the 1960s through the 1980s) have investigated the association between parents' healthcare utilization and that of their children under 18 years old [14-16,21-23], often demonstrating that maternal physician utilization is the best predictor of children's use of medical services [14-16].

Objective and subjective indicators of health status (measured in this study as the number of chronic diagnoses and self-rated health, respectively) each affect rates of physician utilization. While it is evident that morbidity itself motivates a patient to visit the doctor, studies have shown that self-rated health status (when controlling for actual disease) may be the most important determinant of family practitioner visits [15,16,24,25]. Despite the measurement error involved in quantifying this complex psychosocial factor, our study confirms that a patient's self-rated health exerts a strong effect on physician use, independent of actual morbidity. Patients with low self-rated health seek physician care at significantly higher rates than those with high self-health status.

In our study maternal self-rated health was associated with offspring physician visits. A mother's health behavior (frequency of physician visits) and attitudes (self-rated health) reflect her approach to the healthcare system. These beliefs, which may result in chronic over- or underuse of health services, are apparently imparted to her offspring from early in life throughout adulthood.

In western societies, most grown children move away from their parents' home community, making research of ongoing family influences difficult. Our study investigated multi-generational families residing on a kibbutz, where parents and their grown children live in the same immediate locale with identical access to the healthcare system. Though the size of the effect was small, this analysis indicates that a mother's (and not a father's) physician utilization is significantly associated with that of her grown children.

It has been hypothesized that "maternal doctor visits represent a proxy for maternal belief-orientation toward the health system" [16]. This study may provide unique confirmation that maternal health behavior influences her offspring even after they have reached adulthood. Behavior patterns regarding the interpretation of illness symptoms, which are learned from the mother/caretaker in childhood, apparently continue throughout an individual's later life.

Limitations

The findings of this study should be interpreted with several limitations in mind. All physician visits related to a single family practice and thus may not reflect a universal trend in patient attendance to primary care. Responders (157 total) and non-responders (69 total) to the study questionnaire were different in certain respects: for example, responders were older, had a higher average number of family physician visits, had more chronic conditions, and perhaps other characteristics.

Our study population over-represented strong nuclear families, whereas single-parent families (rare on this kibbutz) and unmarried individuals were not investigated. Only grown children who chose to reside on the kibbutz like their parents were included in our study. The health behavior of those living off the kibbutz versus those included in this study may differ. There are also some problems with generalizing data from the kibbutz to western society at large.

This study did not specifically measure health beliefs, yet the associations between maternal and adult offspring healthcare utilization and self-rated health status remain. This research might be extended in the future to a broader investigation of health beliefs among parents and their children.

Conclusions

The maternal-offspring relationship plays a crucial role in determining an individual's health behavior throughout adulthood. A mother's behavior patterns such as self-rated health and doctor visits serve as a proxy for maternal attitudes regarding the healthcare system, and these attitudes are possibly imparted to her children for life.

This study of married spouses and their adult children supports previous findings that healthcare utilization should be viewed within the context of the family unit. Since family utilization patterns may be more stable than those of individuals, there is an opportunity to institute educational programs to change healthcare-seeking behavior. Such intervention is best aimed at affecting mothers' attitudes concerning their own use of health services, where this is possible.

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The secret of joy is the mastery of pain

Anais Nin (1903-1977), French writer

I don't necessarily agree with everything I say

Marshall McLuhan (1911-1980), American cultural historian and communications theorist

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Capsule

Toward defeating blindness in the elderly

Age-related macular degeneration (AMD) is a common cause of blindness in the elderly and is characterized by a breakdown of light-sensitive cells in the retina that results in progressive loss of central vision. The neovascular, or "wet" form of AMD is especially devastating for patients because vision loss is rapid. Studying a Chinese population, DeWan et al. (Science 2006;314:989) identified a single nucleotide polymorphism (SNP) in the HTRA1 gene that confers a greatly increased risk of developing wet AMD.

The HTRA1 gene, located on chromosome 10q26, encodes a heat shock serine protease, and the SNP resides within the gene's promoter region. Yang et al. (p. 992) found that the same SNP also increases AMD risk in a Caucasian population and is associated with higher expression levels of HTRA1 messenger RNA and protein. Identification of this gene may ultimately lead to improved diagnosis and treatment of AMD.

Eitan Israeli