PERGAMON

Social Science & Medicine 57 (2003) 2423–2434

SOCIAL SCIENCE & MEDICINE

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Networked for change? identifying obstetric opinion leaders and assessing their opinions on caesarean delivery

Richard L. Kravitz[a,*], David Krackhardt[b], Joy Melnikow[a], Carol E. Franz[c], William M. Gilbert[d], Andra Zach[e], Debora A. Paterniti[a], Patrick S. Romano[a]

[a] *Center for Health Services Research in Primary Care, University of California, Davis, 4150 V. Street Suite 2500, Sacramento, CA 95817, USA*

[b] *Heinz School of Public Policy and Management and Graduate School of Industrial Adminstration, Carnegie Mellon University, Pittsburgh, PA, USA*

[c] *Department of Psychiatry, University of California, Davis, Sacramento, CA, USA*

[d] *Department of Obstetrics and Gynecology, University of California, Davis, Sacramento, CA, USA*

[e] *California Office of Statewide Health Planning and Development, Sacramento, CA, USA*

Abstract

The objective was to determine whether obstetric opinion leaders can be identified and to characterize them in terms of their demographic and professional characteristics and their attitudes toward caesarean delivery. In late 1998, we surveyed 527 obstetricians, 138 family physicians, and 80 certified nurse midwives (overall response rate, 57.8%) practicing in a stratified random sample of California hospitals with at least 1000 annual deliveries ($n = 52$). Participants reported on demographic and professional characteristics and attitudes towards caesarean delivery; they also checked off those hospital colleagues from whom they had sought or would seek advice on labour and delivery. A composite measure of nomination frequency was used to characterize each respondent's degree of "opinion leadership". All analyses were corrected for the complex survey design. Using a nomination cutoff of 0.4 (0–1 scale), opinion leaders were identified in 31% of California hospitals; they were identified in 81% of hospitals using a cutoff of 0.2. Compared with their peers in the lowest fifth of the nomination distribution, clinicians in the top fifth were younger and more likely to be male, to speak English as a first language, to practice obstetrics, to have a maternal–foetal medicine subspecialty, and to practice in higher volume hospitals ($p < 0.05$). Regardless of discipline, opinion leaders held attitudes concordant with reducing the caesarean delivery rate more often than non-opinion leaders. However, only 48% of obstetrical opinion leaders would support reducing the caesarean delivery rate to levels targeted by Healthy People 2000. In conclusion, obstetric opinion leaders could be identified in many California hospitals. However, they did not consistently support policies designed to reduce the caesarean delivery rate. The results have implications for the generalizability of opinion leader strategies.

Keywords: USA; Caesarean section; Obstetricians; Opinion leaders

Introduction

Physicians are intimately involved in nearly every aspect of medical decision making. Yet considerable evidence suggests that their decisions are not always evidence based, patient-centred, or cost-effective (Nordin-Johansson & Asplund, 2000; Little et al., 2001; Chapman, Stone, Sandberg, Bell, & Neumann, 2000). Getting physicians to alter their practices could have substantial impact on health care quality and costs. However, the usual approaches to changing physician behaviour have shortcomings. Financial incentives are

*Corresponding author. Tel.: +1-916-734-1248; fax: +1-916-734-8731.

E-mail address: rlkravitz@ucdavis.edu (R.L. Kravitz).

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doi:10.1016/S0277-9536(03)00137-0

effective but blunt, and they tend to encourage changes in volume of care but not necessarily appropriateness or quality (Rogers et al., 1990). Traditional forms of continuing medical education have been disappointing (Davis et al., 1999). Practice guidelines are often ignored (Lomas, 1991). Reminders, audit and feedback, and computerized decision aids have proven useful in some settings but not in others (Thomson O'Brien et al., 2000a; Oxman, Thomson, Davis, & Haynes, 1995). The search continues for ways to improve physician practice at a reasonable cost.

One promising approach to changing physician behaviour is the use of local clinical opinion leaders. According to one definition, opinion leaders are health professionals nominated by their colleagues as "educationally influential" (Hiss, MacDonald, & David, 1978). Their utility as change agents is predicted by social influence theory, which posits that clinicians may be "influenced significantly by colleagues' judgements of the value and significance of [an intervention] and/or by their decisions to use or ignore it" (Mittman, Tonesk, & Jacobson, 1992). In practice, however, use of local opinion leaders has not been uniformly effective: the most comprehensive review to date found that the results were statistically significant and clinically important in only 2 of 8 clinical trials (Thomson O'Brien et al., 2000b).

Locock, Dopson, Chambers, and Gabbay (2001) recently adduced two possible reasons for these mixed results. First, opinion leaders may be difficult to identify, in part because they are not all cut from the same cloth. Some opinion leaders (e.g., "acknowledged experts") may be more valuable during the introduction of an innovation, whereas others (e.g., "respected peers") may be more important during the implementation and consolidation phase. Second, opinion leaders may not always support a practice change or innovation and may in fact be hostile to it. Thus, in attempting to discern whether opinion leaders might successfully influence practice in their clinical communities, it is important to know something of their attitudes and opinions.

Obstetric care is a rich area for investigation of the role of opinion leaders. During the late 1980s, a number of professional organizations, consumer groups, health plans, and the federal government launched initiatives designed to combat what was then termed an "epidemic" of caesarean delivery in the United States. Caesarean rates declined in the early 1990s but have again risen steadily since 1997—a trend that is international in scope (Leung, Lam, Thach, Wan, & Ho, 2001; Murray & Serani Pradenas, 1997). Although the clinical issues are controversial, many experts believe that the current US caesarean section rate of 24% could be safely reduced. Decisions about mode of delivery are known to be influenced by social as well as clinical factors (Hurst & Summey, 1984). The organization of obstetric practice in the United States is such that obstetrical clinicians (including obstetricians, family physicians, and nurse midwives) are likely to encounter one another in the hospital, providing ample opportunity for clinical interaction and mutual influence during rounds, conferences, consultations and informal meetings.

Previous studies and case reports have relied primarily on informal methods to identify opinion leaders. For example, in a trial of educational visits to enhance use of systematic reviews in obstetric units, the investigators visited the "lead obstetrician and midwife on the labour ward... because they had usually been nominated to hold these positions by peers as being the most involved in labour ward management, policy making, and training" (Wyatt et al., 1998). In a trial of education and opinion leaders to improve adherence to dementia guidelines, another research group asked neurologists to list up to three local colleagues who were knowledgeable, compassionate, and skilled as teachers (Gifford et al., 1999; Holloway, Gifford, Frankel, & Vickrey, 1999). The neurologists most frequently mentioned in a given region were asked to serve as project opinion leaders.

Sociometry is the use of quantitative approaches to describe relationships within social networks. We employed sociometric techniques to identify local obstetrical opinion leaders in 52 California hospitals. In so doing, we asked three research questions. First, can opinion leaders be identified? If networks of obstetrical providers are so diffuse that clinicians with disproportionate influence cannot be identified in most hospitals, then the generalizability of the opinion-leader approach must be questioned.

Second, what demographic and professional characteristics are associated with high opinion-leader status? We expected that obstetrical opinion leaders would be distinguished by personal and professional characteristics traditionally associated with higher professional status such as (middle) age, (male) gender, and advanced clinical training (i.e., subspecialization). Confirmation of these relationships would support the validity of sociometric methods for identifying opinion leaders. In addition, finding strong associations between clinicians' outward characteristics and opinion leader status might facilitate efficient searches for opinion leaders in future projects aimed at changing clinician behaviour.

Our third research question was how do the attitudes, beliefs, and opinions of obstetrical opinion leaders differ (if at all) from those of their sociometrically less-esteemed colleagues? Even if obstetrical opinion leaders are identifiable in most hospitals, they will not be useful allies for reducing the current caesarean delivery rate safely and appropriately unless they are positively inclined to do so or can be so persuaded (Coleman, Katz, & Menzel, 1957; Coleman et al., 1957).

Methods

Sampling of hospitals

Using data available from the California Office of Statewide Health Planning and Development (OSHPD), we identified 194 California hospitals where at least 1000 infants were delivered in 1995. The sampling frame was limited to these hospitals because hospitals with very low obstetrical volumes were unlikely to have sufficient obstetrical providers for meaningful network analysis.

The 194 hospitals with at least 1000 deliveries in 1995 accounted for 88.7% of all deliveries in California in that year. We divided the 194 hospitals into 4 strata and randomly selected 52 hospitals for possible inclusion in the study: (1) 12 of the 47 with at least 3000 deliveries; (2) 14 of the 58 with 2000–2999 deliveries; (3) 4 of the 6 with 1000–1999 deliveries and a caesarean delivery rate exceeding 30%; and (4) 22 of the 83 with 1000–1999 deliveries and a caesarean delivery rate of 30% or less. All hospitals with more than 3000 annual deliveries had a caesarean rate of less than 30%, as did 56 of 58 hospitals with 2000–2999 deliveries.

In conjunction with OSHPD, we sent letters to the medical staff offices of sampled hospitals, requesting that they provide the research team with the names, addresses, and phone numbers of all obstetricians, family physicians, and certified nurse midwives with obstetrical privileges at their facility. After a follow-up phone call, hospital response rates among the high, medium, and low volume hospitals were 79%, 83%, and 75%, respectively. We replaced each non-responding hospital with another hospital selected at random from the same stratum, repeating the process until sampling quotas (detailed above) were met.

Survey implementation

Using names and addresses obtained from study hospitals, we mailed surveys to potential study clinicians in early summer, 1998. Cover letters were prepared on letterhead supplied by the California Chapter of the American College of Obstetricians and Gynecologists (Cal-ACOG), the California Academy of Family Physicians, and the California Nurse-Midwives Association. Each survey packet included a copy of the questionnaire, a cover letter, and in the case of family physicians and nurse midwives, a $5 cash payment. (Cash payments were not provided to obstetricians on the advice of Cal-ACOG). Non-respondents received follow-up mailings (including an additional copy of the questionnaire) approximately 4 and 8 weeks after the first mailing. In Fall, 1998, we made telephone calls to the offices of all clinicians not responding to one of the three mailings to encourage completion of the survey. The entire protocol was approved by the appropriate human subjects committees at the University of California, Davis, and the California Health and Welfare Agency.

Survey measures

Participants were asked to provide demographic and professional information including year of birth, year of medical school graduation, gender, race/ethnicity, first language, and primary practice setting (solo, single-specialty group, multispecialty group, staff/group model HMO, university, other). They were also asked to identify themselves as obstetricians, family physicians, or certified nurse midwives and to estimate the number of deliveries and caesarean sections performed during the past month and the percentage of deliveries they considered "high risk". (Nurse midwives do not perform caesarean deliveries and were therefore skipped out of this question.) We estimated the proportion of deliveries performed via caesarean section by dividing the number of "deliveries you performed or supervised during your most recent month of uninterrupted professional practice" into the "number of [these] deliveries that were caesarean sections".

Attitudes towards caesarean delivery were assessed with an 8-item Caesarean Opinion Scale. Items tapped respondents' views of the current caesarean rate (e.g., "Reducing caesarean section rates tends to improve patient care.") and their attitudes towards public health initiatives aimed at encouraging vaginal delivery (e.g., "I would support efforts to decrease the caesarean delivery rate in California to 15%."). Items were modified from previous studies (Sonnad, Moyer, & Bernstein, 2000; Kahn KL, personal communication) and consisted of a statement followed by a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Three items had reverse polarity; their scores were subtracted from 6 to generate an 8-item internally reliable scale (Cronbach's alpha = 0.87; range of item-scale correlations, 0.49–0.78). Higher scores on this scale represent a more favourable attitude toward efforts to reduce the current caesarean delivery rate. All items included in the scale are listed in the appendix.

Participants were provided with a printed list of all the obstetricians, obstetrically active family physicians, and certified nurse midwives at the index hospital. (The "index hospital" is the hospital from which we obtained the clinician's name.) The 52 lists (one for each hospital) contained between 4 and 132 names (median 22). Beside each name, study subjects were asked to check a box in response to the following questions:

- Have you sought advice on labour and delivery from this person in the past 3 months?
- Would you turn to this person for labour and delivery advice in the future?
- Would you go out your way to obtain this person's advice?

The "future advice" item was included to measure behavioural intentions, which have been shown to complement measures of past behaviour in predicting future conduct (Fishbein & Ajzen, 1975). Respondents could also write in the names of clinicians not appearing on the printed list. A sample of the questionnaire is available from the corresponding author on request.

Measurement of opinion leader status. For each respondent we created three sets of nomination scores, each reflecting the number of times the respondent was checked off by his or her colleagues in response to the questions described above (Faust, 1997; Scott, 2000; Wasserman & Faust, 1994).[1] Respondents were allowed to nominate persons outside their profession or specialty (e.g., nurse midwives could nominate obstetricians and vice-versa.). To adjust for hospital size, each nomination score was normalized by dividing the number of nominations received by the total possible number of nominations (equal to the number of responding clinicians in a given hospital, minus 1). Normalized nomination scores could range from 0 to 1, with 0.5 indicating that the respondent was nominated by exactly half of his or her (responding) colleagues.

Fig. 1 depicts data from one hospital. Of 30 responding clinicians, 9 selected clinician #40 (who did not respond to the survey) as someone who they had gone to in the past for labour and delivery advice. The normalized nomination-past score for Clinician #40 is calculated as $9/(30-1)=0.310$.

The three nomination scores (past, future, and out-of-way) were highly correlated (average inter-item correlation = 0.83, Cronbach alpha = 0.94) and so were averaged into a single composite nomination score. This composite had mean 0.11, median 0.059, minimum 0, maximum 0.74, and standard deviation 0.12. To deal with the non-normality of this key measure, clinicians were ranked according to the composite nomination score and divided into fifths. For analyses based on the assumption of multivariate normality, we used the square root of the composite measure, which had better statistical properties than the untransformed measure (namely, mean 0.24, median 0.27, standard deviation 0.18).

Statistical analysis

All analyses were adjusted for the complex sampling design and for survey non-response using the appropriate procedures ("svy") in Stata 6.0 (StataCorp, 1999). Results were weighted to account for different sampling and response probabilities. Standard errors and associated *p*-values and 95% confidence limits were corrected for clustering of physicians by hospital.

[1] Nomination score is known to network analysts as "indegree" or "indegree centrality", which refers to the number of input nodes to each node of a network.

Independent associations between clinicians' personal and professional characteristics and opinion leader status (as measured by the composite nomination score) were assessed using design-corrected multinominal logistic regression. This approach gives the relative risk of being in opinion leader groups 2, 3, 4, or 5 (equal fifths with successively higher nomination scores) relative to group 1 (lowest nomination score) for clinicians with a given characteristic compared to a reference group. Unlike multiple linear regression, multinominal (polytomous) logistic regression is not bound by assumptions about linearity, and it preserves more information than dichotomous logistic regression. The exponentiated coefficients are not odds ratios but rather relative risk ratios (StataCorp, 1999).

Weighted estimates of the percentage of obstetricians and of "other clinicians" who agreed with each of the 8 opinion statements were generated for the five ordered opinion leader groups (defined by quintiles). (Family physicians were grouped with nurse midwives because their attitudes were similar.) Because preliminary graphical analysis showed that the proportion in agreement tended to rise with ascending opinion leadership quintile, we tested the significance of the association between opinion leader status (within specialty) and opinions by regressing the mean scale score for the opinion items on the square root of the composite nomination score. Similar methods were used to assess the overall relationship between opinion leadership and mean Caesarean Opinion Scale score. We also used design-corrected multiple linear regression to assess predictors of obstetricians' self-reported caesarean delivery rates (Eltinge & Scribney, 1996).

Response rates

After 3 mailings and a phone call, the overall adjusted survey response rate was 57.8%. The adjusted rate was calculated as the number of useable responses ($n = 745$) divided by the number of subjects on the mailing list (less the number moved, no longer in obstetrical practice, or dead). Response rates at individual hospitals ranged from 42% to 87%. By comparison, in a recent review of 321 surveys published in medical journals, the mean overall response rate for physician surveys was 54% (Asch, Jedrziewski, & Christakis, 1997).

3. Results

3.1. Respondent characteristics

Seventy-one percent of respondents were obstetrician–gynecologists, 19% were family physicians, and 11%

were certified nurse midwives (Table 1). The mean age was 48 years; 35% were female and 29% were non-white. About 19% were not native speakers of English (data not shown in table). A majority (60%) reported working in solo or single-specialty group practice. The average respondent delivered 16 infants per month, of whom 20% were "high risk". Among obstetricians and family physicians, the average proportion of infants delivered by caesarean section was 20% and 13%, respectively (Table 1). The median composite nomination scores were 0.072 for obstetricians, 0.022 for family physicians, and 0.078 for nurse midwives (Table 1); scores at the 95th percentile were 0.394, 0.120, and 0.305, respectively (data not shown in table).

Identifiability of opinion leaders within hospitals

To determine which of our 52 hospitals had identifiable opinion leaders, we selected two arbitrary composite nomination score cut-offs: 0.20 and 0.40. These scores are equivalent to receiving nominations from 20% and 40%, respectively, of participating peers. In studies of organizations, normalized nomination scores rarely rise much above 0.5. Twenty percent is taken to mean substantial peer respect/support and 40% is taken to imply decisive support. Using the 0.20 cut-off, more than four-fifths of hospitals (including 11 of 12 high obstetrical volume hospitals) had at least one identifiable opinion leader (Table 2). Using the more stringent 0.40

Table 1
Demographic and professional characteristics of respondents to a survey of all obstetric providers at 52 randomly selected California hospitals

Characteristic	All respondents	Obstetrician–gynecologists	Family physicians	Certified Nurse Midwives
	$N = 745$ (100%)	$N = 527$ (70.9%)	$N = 138$ (18.6%)	$N = 80$ (10.5%)
Age, mean years (SE)	47.8 (0.45)	48.8 (0.49)	43.0 (0.65)	45.8 (1.1)
Female (percent)	34.8	29.4	33.2	97.6
Ethnicity (percent)				
White, not Hispanic	70.6	68.6	73.6	86.8
Black, not Hispanic	4.6	4.9	3.5	2.7
Hispanic	6.3	5.7	9.4	7.2
Asian or Pacific Islander	14.4	16.4	9.6	2.3
Other	4.1	4.4	4.0	1.1
Practice setting (percent)				
Solo	34.1	39.6	18.3	3.7
Single-specialty group	25.6	23.9	31.9	31.7
Multispecialty group	13.5	12.4	23.3	6.4
Staff or group model HMO	15.0	15.0	4.3	36.9
Academic	7.1	6.3	12.6	4.9
Other	4.7	2.8	9.6	16.4
Maternal–fetal medicine/peri-natology subspecialty (percent)	—	7.6	—	—
Number of deliveries per month, mean (SE)	15.9 (0.96)	18.1 (0.99)	4.5 (0.52)	14.6 (2.34)
Estimated percentage of deliveries considered "high-risk", mean (SE)	20.0 (1.47)	22.7 (1.62)	9.56 (2.24)	10.2 (3.56)
Number of cesarean sections per month, mean (SE)	—	3.74 (0.22)	0.67 (0.12)	—
Percentage of infants delivered by cesarean section (mean %)[a]	—	20.3 (0.61)	13.3 (1.98)	—
Sociometric measures				
Normalized nomination score—"past," mean (SE)	0.106 (0.012)	0.117 (0.015)	0.042 (0.015)	0.097 (0.018)
Normalized nomination score—"future," mean (SE)	0.131 (0.013)	0.143 (0.16)	0.059 (0.015)	0.130 (0.02)
Normalized nomination score—"out of way," mean (SE)	0.092 (0.010)	0.104 (0.013)	0.037 (0.016)	0.068 (0.013)
Composite nomination score, median	0.059	0.072	0.022	0.078

[a]Number of estimated cesarean deliveries past month divided by number of estimated total deliveries × 100.