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Impact of Accreditation on the Quality of Healthcare Services: a Systematic Review of the Literature

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BACKGROUND AND OBJECTIVE: Accreditation is usually a voluntary program in which trained external peer reviewers evaluate a healthcare organization's compliance and compare it with pre-established performance standards. The aim of this study was to evaluate the impact of accreditation programs on the quality of healthcare services

METHODS: We did a systematic review of the literature to evaluate the impact of accreditation programs on the quality of healthcare services. Several databases were systematically searched, including Medline, Embase, Healthstar, and Cinhal.

RESULTS: Twenty-six studies evaluating the impact of accreditation were identified. The majority of the studies showed general accreditation for acute myocardial infarction (AMI), trauma, ambulatory surgical care, infection control and pain management; and subspecialty accreditation programs to significantly improve the process of care provided by healthcare services by improving the structure and organization of healthcare facilities. Several studies showed that general accreditation programs significantly improve clinical outcomes and the quality of care of these clinical conditions and showed a significant positive impact of subspecialty accreditation programs in improving clinical outcomes in different subspecialties, including sleep medicine, chest pain management and trauma management.

CONCLUSIONS: There is consistent evidence that shows that accreditation programs improve the process of care provided by healthcare services. There is considerable evidence to show that accreditation programs improve clinical outcomes of a wide spectrum of clinical conditions. Accreditation programs should be supported as a tool to improve the quality of healthcare services.

Accreditation is usually a voluntary program, sponsored by a non-governmental organization (NGO), in which trained external peer reviewers evaluate a healthcare organization's compliance and compare it with pre-established performance standards.¹ Quality standards for hospitals and other medical facilities were first introduced in the United States in the "Minimum Standard for Hospitals" developed by the American College of Surgeons in 1917. After World War II, increased world trade in manufactured goods led to the creation of the International Standards Organization (ISO) in 1947.² Accreditation formally started in the United States with the formation of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) in 1951. This

model was exported to Canada and Australia in the 1960s and 1970s and reached Europe in the 1980s. Accreditation programs spread all over the world in the 1990s.³ There are other forms of systems used worldwide to regulate, improve and market the services of healthcare providers and organizations, including Certification and Licensure. Certification involves formal recognition of compliance with set standards (e.g., ISO 9000 standards) validated by external evaluation by an authorized auditor. Licensure involves a process by which governmental authority grants permission, usually following inspection against minimal standards, to an individual practitioner or healthcare organization to operate in an occupation or profession.³ Although the terms accreditation and certifica-

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tion are often used interchangeably, accreditation usually applies only to organizations, while certification may apply to individuals, as well as to organizations.²

The aim of this study was to evaluate the impact of accreditation programs on the quality of healthcare services. Another recently published review of the literature related to accreditation had several limitations.⁴ It was not limited to health services accreditation, but also included heterogeneous types of accreditation programs, including medical education accreditation programs. In our review, we limited our search to health services accreditation. Second, the period covered in the search in the other review was only up to May 2007 and several important publications have been published since May 2007. Third, several important papers relevant to accreditation were missed in the other review.

METHODS

A comprehensive updated search of several electronic bibliographic databases was performed, including Medline, from 1996 to June 2009; Cinhal, from 1982 to June 2009; Embase, from 1980 to June 2009; and HealthStar, from 1980 to June 2009. Several keywords were utilized in different combinations, including “accreditation,” “health services,” “quality,” “quality indicators,” “quality of health care,” and “impact.” We included all studies that evaluated the impact of general or subspecialties accreditation programs on the quality of healthcare services. No language restrictions were used. We excluded studies that were published in “abstract” format only, studies evaluating the cost of accreditation and studies that evaluated the attitude of healthcare professionals towards accreditation. The

bibliographies of all selected articles and relevant review articles were reviewed to identify additional studies. Experts in the area of accreditation were contacted to identify relevant studies. We included studies with different study designs, including clinical trials, observational studies and qualitative studies.

Our search identified 520 references. An analysis of abstracts of the citations was conducted to identify substantial studies relevant to health services accreditation (by AK). Fifty-one studies were identified as potentially eligible for inclusion in the review. The full text of these studies was reviewed. Twenty studies were excluded that described the attitude of healthcare professionals towards accreditation. Five studies were excluded that described the cost of accreditation of healthcare services. The assessment of quality of included studies was performed using the US Preventive Services Task Force approach (Table 1).⁵ We could not assess and compare the quality of included studies as there are no standardized criteria to assess and compare the quality of studies of different study designs; however, we described important quality features of each included study, including the study design and sample size.

RESULTS

Twenty-six studies were identified (Table 2). Ten studies evaluated the impact of a general accreditation program on the overall performance of hospitals. Nine studies evaluated the impact of a general accreditation program on a single aspect of hospital performance. Seven studies evaluated the impact of subspecialty accreditation programs.

The impact of general accreditation programs on the overall performance of hospitals

In the South African randomized controlled trial, 20 randomly selected public hospitals, stratified by size, were selected. Ten of these hospitals were randomized to the accreditation program in 1998; the other 10 served as controls. Survey data from the Council for Health Services Accreditation of Southern Africa (COHSASA) program were used; in addition, data on 8 indicators of hospital quality of care were collected by an independent research team. About 2 years after accreditation began; intervention hospitals significantly improved their average compliance with COHSASA accreditation standards, while no appreciable increase was observed in the control hospitals. However, with the exception of nurse perceptions of clinical quality, the independent research team observed little or no effect of accredita-

Table 1. Study quality grading approach.

Study quality	Description
Good	Comparable groups are assembled initially and maintained throughout the study; reliable and valid measurement instruments are used and applied equally to the groups; important outcomes are considered; and appropriate attention is given to confounders in analysis.
Fair	Comparable groups are assembled initially, but some questions remain, viz., whether some differences occurred in follow-up; measurement instruments are acceptable and generally applied equally; some but not all important outcomes are considered; and some but not all potential confounders are accounted for.
Poor	Groups assembled initially are not close to being comparable or maintained throughout the study; unreliable or invalid measurement instruments are used or not applied at all equally among groups; and key confounders are given little or no attention.

Table 2. Description of included impact studies.

Study	Objectives	Design	Results	Quality
AlTehtawy, ¹⁴ Egypt, 2009	To determine the effect of accreditation on patient satisfaction and provider satisfaction and the impact of accreditation on compliance to some accreditation standards	A prospective cohort study of 60 health units — 30 units already submitted for accreditation and 30 pair-matched units not programmed for accreditation	Mean patient satisfaction scores were significantly higher among the accredited non-governmental health units regarding cleanliness (mean, 81.3 vs. 71.9; $P < .001$), waiting area (mean, 85.7 vs. 73.8; $P < .001$), waiting time (mean, 75.2 vs. 67.8; $P = .005$), unit staff (mean, 90.6 vs. 83.2; $P = .005$), and overall satisfaction (mean, 90. vs. 79.5; $P < .001$). The distribution of error rates by error category was similar between accredited and non-accredited hospitals. There was no significant difference in error rates by accreditation status. Five non-accredited hospitals achieved accreditation status during the study period (7 months).	Good
Barker et al., ¹⁹ 2002, US	To identify the prevalence of medication errors among 36 institutions accredited by JCAHO and non-accredited hospitals	A prospective cohort study	Accredited plans have higher HEDIS scores but similar or lower performance on patient-reported measures of health plan quality and satisfaction. A substantial number of the plans in the bottom decile of quality performance were accredited suggesting that accreditation does not ensure high quality care. Accreditation was associated with increased enrollment in the early years of the accreditation program; however, plans denied NCOA accreditation do not appear to suffer enrollment losses. NCOA accreditation is positively associated with some measures of quality but does not assure a minimal level of performance.	Good
Beaulieu et al., ¹⁶ 2002, US	To determine the performance of accredited plans on quality indicators and the impact of accreditation on enrollment.	Analysis of databases containing 1996 data on health plans' National Committee on Quality Assurance (NCQA) accreditation status, organizational characteristics, Health Plan Employer Data and Information Set (HEDIS) scores, and patient-reported quality and satisfaction scores.	In 104 vessels (88 patients) the study from a non-accredited vascular laboratory overestimated the degree of stenosis. In 19 arteries (19 patients) disease severity was significantly underestimated by non-accredited vascular laboratories. The study involved a large number of non-accredited laboratories, but only a few accredited laboratories.	Fair
Brown et al., ²⁷ 2004 US	To compare concordance of findings of carotid duplex ultrasound scanning between accredited and non-accredited laboratories.	Retrospective review of carotid duplex ultrasound scanning.	Significant improvement in compliance with standards occurred in overall scores (0-10 score) and in 7 out of 13 functional areas, including the following: Management of information1 (mean, 6.9 vs. 8.8; $P = .030$) Leadership (mean, 5.4 vs. 8.5; $P = .004$) Patient care (mean, 5.8 vs. 8.2; $P = .011$) Admission and assessment (mean, 5.6 vs. 7.9; $P = .002$) Laboratory services (mean, 5.5 vs. 7.9; $P = .013$) Human resources1 (mean, 3.2 vs. 6.9; $P < .0001$) Radiology services1 (mean, 5.2 vs. 6.2; $P = .05$) Overall1 (mean, 4.8 vs. 6.6; $P = .01$)	Good
Bukonda et al., ⁷ 2003, Zambia	To describe outcomes of Zambia Hospital Accreditation Program from 1997 to 2000	Data were collected through a review of written documents, interviews with major stakeholders, hospital visits and discussions with implementers		

Table 2 (continued). Description of included impact studies.

Study	Objectives	Design	Results	Quality
Chandra et al., ²⁵ 2009, US	To evaluate the association between the Society of Chest Pain Centers (SCPC) accreditation and adherence to evidence-based guidelines for non-ST-segment elevation myocardial infarction (NSTEMI). The secondary objective was to describe the clinical outcomes and the association with accreditation	Analysis of data from patients with NSTEMI.	Of 3238 patients treated at 21 accredited hospitals and 323 non-accredited hospitals, those at SCPC-accredited centers (n=3,059) were more likely to receive aspirin (98.1% versus 95.8%; odds ratio [OR], 1.73; 95% confidence interval [CI], 1.06 to 2.83) and B-blockers (93.4% versus 90.6%; OR, 1.68; 95% CI, 1.04 to 2.70) within 24 hours as compared to patients at non-SCPC-accredited centers (n=30179).	Good
Chen et al., ¹⁶ 2003, US	To examine the association between JCAHO accreditation of hospitals and hospitals' quality of care, and survival among patients hospitalized for a acute myocardial infarction	Analysis of data from JCAHO, including 134579 patients treated at 4221 hospitals	The use of aspirin on admission was highest in hospitals accredited with recommendations and lowest in hospitals with conditional accreditation. Aspirin use at any time during hospitalization was similar across accreditation categories. Patients admitted to hospitals accredited with recommendations had the highest use of beta blockers on admission and at any time during hospitalization, while patients admitted to hospitals with conditional accreditation had the lowest use. Acute reperfusion therapy rates were lowest among patients admitted to conditionally accredited hospitals. Hospitals accredited with recommendations had lower 30-day mortality rates than the overall risk-standardized rate; non-surveyed hospitals had higher rates. Patients admitted to hospitals accredited with recommendations had lower 30-day mortality rates than patients admitted to hospitals with lower accreditation levels. Surveyed hospitals with higher accreditation levels tended to be larger-volume teaching centers and to be located in urban settings with on-site facilities for cardiac procedures.	Fair
Duckett, ⁸ 1983, Australia	To assess the role of the accreditation program of the Australian Council on Hospital Standards (ACHS) in changing hospitals' quality of care	Longitudinal study of 23 hospitals	Surveyed hospitals were more likely to increase and improve their links with the medical staff and to have a more structured, formalized medical staff organization. 'Nursing organization,' 'physical facilities' and 'safety' were the areas most affected by accreditation.	Good
Frasco et al., ²⁴ 2005, US	To assess the effects of JCAHO pain initiative on opioid use	Retrospective chart review of 1 082 patients	The JCAHO pain initiative appeared to have improved perioperative pain management without visible adverse effects. Increased use of opioids for comparable types of surgeries between the two time periods suggests that, after the JCAHO pain management initiative, pain management was intensified without any clinically significant adverse effects.	Good
Griffith et al., ¹¹ 2002, US	To compare 7 general hospital-performance measures against Joint Commission scores	Analysis of data from a total of 742 hospitals	Joint Commission measures are generally not correlated with outcome measures. The few significant correlations that appear are often counterintuitive. A potentially serious disjuncture exists between the outcome measures and Joint Commission evaluations	Good
Hadley et al., ¹³ 1988, US	To assess whether JCAHO accreditation and certification by the Health Care Financing Administration (HCFA) were related to 7 hospital characteristics reflecting quality of care	Data analysis of 216 state psychiatric hospitals	The analysis revealed a weak relationship between accreditation or certification status and the indicators of quality of care. Accredited or certified hospitals were, however, more likely to have higher values on specific indicators than hospitals without accreditation.	Good

Table 2 (continued). Description of included impact studies.

Study	Objectives	Design	Results	Quality
Juul et al., ⁹ 2005, Denmark	To examine the availability and quality of clinical guidelines on perioperative diabetes care in hospital units before and after international accreditation during the conduction of a randomized controlled trial	Interventional "before-after" study in 51 units (38 surgical and 13 anesthetic) in 9 hospitals	Among the 27 units without guidelines before the trial, significantly more accredited units compared to non-accredited units had a guideline after the trial (9/10, 90%, compared to 5/17, 29%, respectively). The improvement in the Systematic Development Scale scores was significantly higher in the accredited than in non-accredited units ($P < .01$).	Good
Mazmanian et al., ²⁸ 1993, US	To examine the similarities and differences between accredited and non-accredited cognitive rehabilitation facilities	Survey of 398 facilities	There were no significant differences in the organization and delivery of cognitive rehabilitation therapy in Commission on Accreditation of Rehabilitation Facilities (CARF)-accredited and non-CARF-accredited programs.	Good
Menachemi et al., ²² 2008, US	To evaluate quality outcomes in accredited and non-accredited ambulatory surgical centers (ASCs)	Data analysis of a total of 364 ASCs were reviewed	For colonoscopy patients, JCAHO-accredited facilities had lower rates of 30-day unexpected hospitalizations (1.83% versus 1.96% for AAAHC versus 2.00% for state agency; $P = .01$) and marginally lower rates of 7-day unexpected hospitalizations (0.61% versus 0.63% for AAAHC versus 0.69% for state agency; $P = .09$). In addition, AAAHC facilities had marginally lower unadjusted 30-day hospitalization rates among cataract patients (1.13% versus 1.25% for the Joint Commission versus 1.20% for state agency; $P = .08$).	Good
Miller et al., ¹² 2005	To examine the association between JCAHO accreditation scores and the Agency for Healthcare Research and Quality's Inpatient Quality Indicators and Patient Safety Indicators (IQIs/PSIs)	Data analysis from 24 states for 2116 institutions	Most institutions scored high on JCAHO measures despite IQI/PSI performance variation with no significant relationship between them. Principal component analysis found 1 factor each of the IQIs/PSIs that explained the majority of variance on the IQIs/PSIs. Worse performance on the PSI factor was associated with worse performance on JCAHO scores ($P = .02$).	Good
Oh et al., ²³ 2006, Korea	To assess the status of infection surveillance and control programs (ISCPs)	Cross-sectional survey	The number of newly employed full-time or part-time infection control nurses (ICNs) and the number of new infection control service (ICS) organizations increased sharply from 1994 to 1996, with the accreditation of medical care in 1995, and then decreased until 1998. Response rate (52%).	Fair
Parthasarath et al., ²⁸ 2006, US	To study the effect of American Academy of Sleep Medicine accreditation of sleep centers and sleep-medicine certification of physicians on the management of patients with obstructive sleep apnea (OSA)	Self-reported national web-based survey	Lack of accreditation or certification status of providers was independently associated with discontinuation of PAP therapy (odds ratio [OR] 1.9; 95% confidence interval [CI], 1.1-3.2; $P = .03$). Certified physicians and accredited centers were more likely to educate their patients and received greater satisfaction ratings than non-certified physicians and non-accredited centers ($P < .05$).	Fair
Pasquale et al., ²¹ 2001, US	To evaluate the impact of 5 trauma center characteristics (including accreditation status) on survival outcome in 9 serious injury categories	A retrospective analysis of data from 24 accredited trauma centers including 88 723 patients meeting registry criteria; 13 942 patients met the serious injury criteria	Both Level I and Level II centers had significantly higher than predicted survival rates for 6 of the 9 injuries studied. Accreditation and adherence to the standards put forth by the Pennsylvania Trauma Systems Foundation confers a survival benefit regardless of level. Both Level I and Level II centers had significantly higher survival rates than predicted for 6 of the 9 injuries studied.	Good

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Table 2 (continued). Description of included impact studies.

Study	Objectives	Design	Results	Quality
Pollack et al., ⁷ 2008, US	To evaluate if accreditation is correlated with the standards for minimum methadone dosages	Analysis of data from a sample of outpatient treatment facilities in 1988 (n5172), 1990 (n5140), 1995 (n5116), 2000 (n5150) and 2005 (n5146)	JCAHO-accredited units were significantly 12 percentage points more likely to adhere to the recommended 60 mg/d minimum dosage guideline, and were significantly more likely to provide doses exceeding 80 mg/d (the threshold identified as recommended practice). Intervention hospitals improved their average overall scores from 48% to 78%, whereas control hospitals maintained the same scores throughout (43%). Significant positive change was observed in 20 of 21 elements in the intervention hospitals. No meaningful change occurred in any service element in the control hospitals. After the intervention period, the intervention hospitals reached a level of 76% compliance on the critical standards (range, 55% to 96%), whereas the controls were unchanged, with 38% compliance (range, 25% to 49%). The difference in means was significant ($P < .001$). The first quality indicator survey occurred, on an average, 10 months after the baseline survey in intervention hospitals.	Good
QAP, ⁸ 2003, South Africa	To assess the effects of an accreditation program (the Council for Health Services Accreditation of Southern Africa [COHSASA]) on public hospitals' processes and outcomes	A prospective, randomized control trial with hospitals as the units of analysis	Accreditation was significantly associated with quality of care. An accredited doctor's average score was on the margin 6 percentage points higher than average score of a doctor without accreditation. A total of 4 197 hospitals reported core measures for AMI, of which 178 (4%) were accredited. The rate of percutaneous coronary intervention was greater in hospitals with accredited chest pain centers (ACPCs) (92.8% vs. 80.8%), and consequently, fewer patients at ACPCs received thrombolysis (7.2% vs. 19.2%) There was significantly greater compliance with all AMI core measures at hospitals with ACPCs ($P < .0001$), except for time to thrombolytics. Hospitals with ACPCs had larger, more-often-teaching facilities and were more frequently urban.	Fair
Quimbo et al., ¹⁵ 2008, Philippines	To examine the correlation of accreditation of physicians, with the quality of inpatient pediatric care	Written case scenarios designed to measure the quality of clinical care; 145 physicians were included	In both years, overall infection control performance score was significantly associated with accreditation status. Accreditation was associated with significantly higher overall infection control performance scores of 2.8 points in 2004 and 3.2 points in 2005. Of the 638 hospitals surveyed, 460 (72%) responded in 2004, 423 (66%) responded in 2005, and 335 responded in both years (52%).	Good
Ross et al., ²⁸ 2008, US	To determine if adherence to CMS core measures for acute myocardial infarction (AMI) is correlated with the accreditation status of the Society of Chest Pain Centers hospitals	Retrospective cohort study		Fair
Sekimoto et al., ²⁹ 2008, Japan	To identify the impact of accreditation on infection control infrastructure and performance	Self-administered questionnaire of 335 hospitals; 93 had no accreditation in both years, 31 were newly accredited in 2005, and 211 were accredited in both years.		Fair

Table 2 (continued). Description of included impact studies.

Study	Objectives	Design	Results	Quality
Simons et al., ³⁰ 2002, Canada	To measure outcomes within a single regional trauma system of 3 trauma centers and to compare outcomes in the 1 accredited center to those in non-accredited centers	A cross-sectional survey	Only one center (hospital A) developed a trauma program consistent with Canadian accreditation criteria. Over the 7 years of the study, survival for adult blunt trauma patients at hospital A was statistically better than at hospital B or C ($P=0.001$). Odds ratio (OR) was 2.06 for hospital A versus hospital B and 1.47 for hospital A versus hospital C. Differences between hospitals B and C were also significant ($P=0.001$), with OR=0.70. TRISS-adjusted mortality odds ratios covering all years (1992-1998) indicated improved survival for blunt, non-hip fracture adult patients at hospital A compared with hospital B ($P=0.001$) and hospital C ($P=0.05$). Odds ratio was 2.71 for hospital A versus hospital B and 1.38 for hospital A versus hospital C. Over the 7 years of the study, survival for patients with Injury Severity Score [ISS] ≥ 16 at hospital A was statistically better than at hospital B ($P=0.001$) or C ($P=0.01$). Odds ratio was 2.79 for hospital A versus hospital B, and 1.61 for hospital A versus hospital C.	Good
Tan et al., ³¹ 2004, Singapore	To identify changes in the quality indices of cervico-vaginal cytology service preceding and following laboratory accreditation by the College of American Pathologists	Analysis of cervico-vaginal cytology — quality indices for 2001 (post-accreditation) were compared with those for 1997 (pre-accreditation).	A comparison between data for 1997 and 2001 shows the following: (a) a higher inadequacy rate (1.3% vs. 0.7%; $P<0.001$) in 2001; (b) maintenance of a low ratio of atypical squamous cells of undetermined significance to squamous intraepithelial lesion (0.79 and 0.76, respectively); (c) overall positive predictive values of positive cytology of 82% and 87%, respectively; (d) relatively few changes to the original cytologic diagnoses following review of significant cytohistologic discrepancies (4 cases and 2 cases, respectively); (e) a higher subsequent positive yield of squamous intraepithelial lesions following diagnoses of 'atypical squamous cells of undetermined significance' in 2001 (41% vs. 19%; $P=0.02$).	Good
Wells et al., ¹⁸ 2006, US	To evaluate how well licensing and JCAHO accreditation actually correlate with staffing and treatment practices	Cross-sectional survey (n= 1,137)	JCAHO accreditation was positively associated with two elements of treatment comprehensiveness: the percentages of clients receiving physical examinations and mental health care.	Good

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tion on 7 other indicators of quality, including patient's satisfaction (n=1923), which was not found improved among accredited hospitals compared to non-accredited hospitals.⁶ In a large analysis of the Zambia Hospital Accreditation Program (n=79 hospitals), accreditation was associated with significant improvement in compliance with standards in the overall scores, and in 7 out of 13 important functional areas.⁷ In a longitudinal study of 23 hospitals in Australia, hospitals were monitored over 2 years for their response to accreditation requirements and the general changes in accreditation in the hospital's environment. There was an increase and improvement in the structure of medical staff organization, nursing organization and physical facilities and safety.⁸ In another study conducted in Copenhagen on 51 units (38 surgical and 13 anesthetic), significantly more accredited units had guidelines in place compared to non-accredited units. The improvement on the Systematic Development Scale was significantly higher in accredited than in non-accredited units.⁹ In an analysis of the National Committee on Quality Assurance (NCQA) and Health Plan Employer Data and Information Set (HEDIS) databases, accredited plans had higher HEDIS scores, but similar or lower performance on patient-reported measures of health plan quality and satisfaction. A substantial number of the plans in the bottom decile of quality performance were accredited, suggesting that accreditation does not ensure high-quality care.¹⁰ In an analysis of data from 742 hospitals using 7 performance measures against JCAHO accreditation scores, Joint Commission measures were found to be not correlated with outcome measures.¹¹ In another large analysis of JCAHO accreditation scores and the Agency for Healthcare Research (AHRQ), Inpatient Quality Indicators (IQI) and Patient Safety Indicators (PSI) (n=2116 institutions), worse performance on the PSI factor was associated with worse performance on JCAHO scores ($P=.02$).¹² In a large data analysis of 216 state psychiatric hospitals, there was a weak relationship between accreditation and indicators of quality of care.¹³ In a large Egyptian study involving 30 units already submitted for accreditation and 30 pair-matched units not programmed for accreditation, the overall satisfaction score of providers was significantly higher among accredited health units. Most of the checked standards had compliance above 90% in accredited units and were significantly higher than compliance in non-accredited units.¹⁴ In a cross-sectional survey (n=145) conducted in the Philippines, using vignettes or case scenarios scores,

the quality of clinical care was significantly higher among accredited physicians compared to non-accredited physicians.¹⁵

The impact of general accreditation programs on a single aspect of a hospital's performance

In a large analysis of data from Centers for Medicare and Medicaid Services (CMS) in US (n=134 579 patients from 4221 hospitals), patients treated at accredited hospitals were more likely to receive higher quality of care for the management of acute myocardial infarction (AMI) than those treated at non-accredited hospitals. In this study, the mortality rate was lower post AMI in accredited hospitals than in non-accredited hospitals.¹⁶ In a cross-sectional survey conducted in the US in 1988 (n=5172), 1990 (n=5140), 1995 (n=5116), 2000 (n=5150) and 2005 (n=5146), methadone maintenance facilities accredited by JCAHO were more likely to adhere to the recommended dosage guideline of methadone, compared to non-accredited hospitals.¹⁷ In a large cross-sectional survey of outpatient substance abuse treatment programs conducted in the US (n=1137), JCAHO accreditation was positively associated with two elements of treatment comprehensiveness: the percentages of clients receiving physical examinations and mental health care.¹⁸ In an American prospective study (n=36 institutions), medication error rates were similar between accredited and non-accredited hospitals. In this study, 5 non-accredited hospitals achieved accreditation during the study.¹⁹ In a large cross-sectional survey conducted in Japan over 2 consecutive years (n=638 hospitals), the overall infection control performance score was significantly associated with accreditation status.²⁰ In a retrospective analysis at 24 accredited trauma centers in the United States (n=88 723 patients), accreditation was significantly associated with higher survival rates for patients presenting with six types of trauma injuries.²¹ In an analysis of huge data from ambulatory surgical centers in the US, there was a significant reduction in unexpected hospitalizations in patients undergoing colonoscopy (n=315 070) in accredited ambulatory surgical centers (ASC) compared to non-accredited ASC. In this study, there was also a reduction in unexpected hospitalizations in patients undergoing cataract surgery (n=245 154; $P=.08$) in accredited ASC compared to non-accredited ASC.²² In a large cross-sectional survey of acute care hospitals (n=85), the number of newly employed full-time or part-time infection control nurses (ICNs) and the number of new infection control service (ICS) orga-

nizations increased sharply from 1994 to 1996 with the accreditation of medical care services in 1995, and then decreased until 1998.²³ In a retrospective chart review (n=1082), JCAHO pain initiatives on opioids use significantly improved perioperative pain management without a visible increase in adverse effects.²⁴

The impact of subspecialty accreditation programs

A large analysis was conducted in the United States to evaluate the association between the Society of Chest Pain Centers (SCPC) accreditation and adherence to evidence-based guidelines for the management of AMI (n= 33 238 patients treated at 344 hospitals). Patients treated at accredited centers (n=3059) were significantly more likely to receive aspirin and B-blockers within 24 hours than patients at non-accredited centers (n=30 179).²⁵ In another large retrospective analysis conducted in the US (n= 4197 hospitals), the rate of percutaneous coronary intervention was greater in hospitals accredited by the Society of Chest Pain Centers than in non-accredited hospitals (92.8% vs. 80.8%). There was significantly greater compliance with eight acute myocardial infarction (AMI) core measures at accredited hospitals compared with non-accredited hospitals.²⁶ A retrospective analysis (n=178) reviewed the findings of carotid duplex ultrasound scanning performed at accredited and non-accredited laboratories in the United States (accreditation by the Intersocietal Commission for Accreditation of Vascular Laboratories). There was a significant overestimation by non-accredited laboratories of the degree of stenosis of carotid arteries in 51% of patients. In this study, there was a significant underestimation of the degree of stenosis of carotid arteries by non-accredited laboratories among 11% of patients.²⁷ In a self-reported web-based survey, lack of accreditation (by the American Academy of Sleep Medicine accreditation) was independently associated with suboptimal sleep medicine management. Accredited centers received greater satisfaction ratings than non-accredited centers.²⁸ In a large survey of 398 cognitive rehabilitation therapy facilities in the US, there were no significant differences in the organization and delivery of cognitive rehabilitation therapy in facilities accredited by Commission on Accreditation of Rehabilitation Facilities (CARF) and in non-CARF-accredited facilities.²⁹ In an analysis of data from three Canadian trauma centers, over 7 years, survival of blunt trauma patients at the accredited hospitals was statistically better than survival at non-accredited hospitals.³⁰ A large analysis of cervico-vaginal

cytology showed a modest overall positive predictive value of positive cytology in laboratory accredited by the College of American Pathologists.³¹

DISCUSSION

General accreditation programs appear to improve the structure and process of care, with a good body of evidence showing that accreditation programs improve clinical outcomes. The best study that evaluated this area was the Quality Assurance Program (QAP) trial. Randomization of this important trial controlled for important factors known to affect a hospital's ability to comply with and achieve accreditation standards for indicators such as hospital size, staffing levels, staff qualifications and budget levels. The first quality-indicator survey occurred, on an average, 10 months after the COHSASA baseline survey in the intervention hospitals. It is possible that these hospitals had already made considerable progress that was not captured because the first round of the survey was too late to be a true baseline, which may explain the lack of effect of accreditation on the selected quality indicators.⁵ Evidence is consistent from several studies to support a positive impact of general accreditation programs on different specific clinical outcomes, including the management of AMI, trauma, ambulatory surgical care, infection control and pain management. Several studies have shown a significant positive impact of subspecialty accreditation programs in improving clinical outcomes in different subspecialties, including sleep medicine, chest pain management and trauma management (Table 2). General accreditation programs of health organizations and accreditation of subspecialties should be encouraged and supported to improve the quality of healthcare services. One of the most important barriers to the implementation of accreditation programs is the skepticism of healthcare professionals in general and physicians in particular about the positive impact of accreditation programs on the quality of healthcare services.^{32,33} There is a need to educate healthcare professionals about the potential benefits of accreditation to resolve any skeptical attitude of healthcare professionals towards accreditation.

Conclusion

There is consistent evidence that shows that general accreditation programs improve the process of care provided by healthcare services. There is considerable evidence to show that general accreditation programs improve clinical outcomes of a wide spectrum of clinical conditions. There is also considerable evidence to

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show that accreditation programs of subspecialties improve clinical outcomes. Accreditation programs should be supported as a tool to improve the quality of healthcare services.

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