Original Article

She may reach a facility but will still die! An analysis of quality of public sector maternal health services, District Multan, Pakistan

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Abstract

Objective: To assess the availability, utilization and functional capacity of the public health delivery system in terms of human resources, equipment, supplies and health provider knowledge regarding management of obstetric complications.

Methods: A cross-sectional study was conducted in March 2003 for Multan's public health delivery system. A complete inventory of equipment, supplies, drugs, staff availability and knowledge of obstetric complications management were assessed.

Results: The number and distribution of public sector facilities serving a population of 3.2 million was well beyond the minimum requirement for basic obstetric care but fell short for comprehensive Emergency Obstetrical Care (EmOC). Utilization patterns were skewed to the tertiary facility for normal and complicated deliveries. Partograms were not available, magnesium sulphate was only available at the tertiary facility, while basic supplies like iron and folate tablets, broad spectrum antibiotics, oxytocics, gloves and sutures were not available at primary or secondary facilities. Knowledge scores regarding management of obstetric complications were less than average, especially among nurses at basic or comprehensive EmOC facilities. Intensity of labour pains (nurses 59%) at basic EmOC facility and cervical dilatation by doctors at basic and comprehensive facilities were the most frequent responses for monitoring in labour.

Conclusion: Strengthening the four interlinked health system elements - human resources, access to, use and quality of services is essential though not sufficient (JPMA 56:156;2006).

Introduction

The target of 75% reduction in maternal mortality ratios by 2015 is one of the three health related UN Millennium Development Goals, the 191 UN member states have pledged to in 2000.[1] Notwithstanding, the tragedy of unnecessary high death rates for women during pregnancy, childbirth and the puerperium continue unabated in South Asia, sub-Saharan Africa and Latin America. In the developing world, measurement of maternal mortality has met with limited success due to a variety of issues including a high degree of underreporting, misclassification and inefficient estimation techniques. Furthermore, the lack of timely availability of reliable and valid data to assess progress and evaluate results of ongoing Safe Motherhood programmes and interventions creates a lacuna that must be met for evidence-based policy decision making.

The UN process indicators[2] were developed in 1997 to monitor the progress of Safe Motherhood intervention programmes by measuring the availability, utilization and quality of obstetric services. Their recommended levels provide guidelines for monitoring and evaluating the effectiveness of maternal health services and Safe Motherhood programmes. The indicators assessed include the number and distribution of facilities that provide

emergency obstetric care (EmOC) within a geographic area, utilization rates, met need for EmOC facilities, proportion of caesarean sections and case fatality rate. Needs assessment using these process and output indicators conducted in several countries illustrate the dismal state of public maternal health services.[3-6] For example, the proportion of all births in EmOC facilities was significantly below the recommended minimum of 15% in Nepal, Pakistan and India.[4-6] In Malawi, these indicators were adapted in the routine health information system to monitor a Safe Motherhood intervention program. Results of the three year study demonstrated the effectiveness of these indicators as a monitoring instrument and highlighted its relevance to service providers, programme managers and policy makers as a planning tool.[17] These studies illustrated the usefulness of using the UN process indicators to evaluate the availability, utilization and quality of obstetric services.

Pakistan, the sixth most populous country of the world with a population, estimated in 2003, of 149 million[8], continues to have unacceptably high maternal and infant mortality rates despite a GNP of US$ 652[8] that is higher than the average (US$430) for low-income countries.[9] It is estimated that annually 400,000 infant deaths and nearly 16,500 mothers die from pregnancy-related causes. The Government of Pakistan, cognizant of the poor health of mothers and children, has consistently allocated high priority to safe motherhood programs in successive national health policies and large development projects implemented during the last two decade. Specifically, the Reproductive Health Service Package of 1999 emphasized maternal health care with a focus on safe motherhood and pre/post abortion care that ensures the provision of EmOC.[10] However, overall progress has been slow due to poor implementation, governance issues and human resource constraints and is marked principally by the inability to ensure delivery of quality obstetric services and the lack of evidence to support policy and programs.[11]

Pakistan's public health delivery system functions as an integrated health complex that is administratively managed at a district level. In this structure, primary health care units called Basic Health Units (BHUs) serve 10,000 to 15,000 population; five to ten BHUs in the catchment area are linked to a Rural Health Center (RHC) serving 25,000 to 50,000 populations, while the Tehsil or Taluka (THQ) and the District Headquarters (DHQ) hospitals, provide secondary care services, serving 100,000 to 300,000 and 1-2 million persons respectively. Maternal and Child Health Centers (MCHCs) are also a part of the integrated health system, however, the number of MCHC remains limited. The MCHCs, BHUs and RHCs are primary level care facilities and are expected to provide basic obstetric care with community outreach programs offered through lady health workers. The THQ and DHQ hospitals have specialists, serve as referral centers and are expected to provide comprehensive obstetric care.[10]

Pakistan's health sector is constitutionally a provincial subject but health care delivery has traditionally been jointly administered by the federal and provincial governments with districts mainly responsible for implementation. In August 2001[12], the Government of Pakistan initiated the implementation of the "Devolution Initiative" to enhance accountability at local level and improve service delivery by devolving administrative and financial powers to districts/local authorities. The District Health System under the District Government is now responsible for planning, development and management including implementation of health care delivery from DHQ hospitals right down to the outreach programs.

The objective of this study was to assess the availability, utilization and functional capacity of the public health delivery system in terms of human resources, equipment, supplies and health provider knowledge regarding management of obstetric complications.

Methods

A cross-sectional study was designed and interviews were conducted with health providers and health managers along with observation of equipment, supplies and HMIS. Selection criteria for province were based on population and number of districts; for district on total population and rural/urban disaggregated, ethnicity, education, availability of electricity, type and number of public health facilities, crude birth rate and maternal mortality ratio.[14] Final selection included discussions with key stakeholders to gauge the 'typical' district that will provide the evidence-base to facilitate policy and programmatic strategies.

Multan district, situated in the north-west of Punjab, has a population of 3.2 million[13] distributed in three administrative sub-districts (tehsils) - Multan, Shujabad and Jalalpur Pirwala was selected as the study area. The DHQ hospital and the tertiary teaching hospital are located in Multan city. There are two THQ hospitals, eight RHCs, 72 BHUs and four MCHCs.

The study sample included public facilities at the primary and secondary level with the exception of BHUs where a 50% sample proportionate to the number of BHUs per tehsil was randomly selected assuming that a 50% random sample will adequately represent all BHUs per tehsil. The health facility interviews were completed for three MCHCs, 38 BHUs, eight RHCs, two THQs and the DHQ hospital. One MCHC and five BHUs were non-functional or closed. Doctors (n=17) and nurses, midwives

and lady health visitors (n=55) were administered the health provider questionnaires at these facilities.

Two sets of questionnaires (Health Facility and Health Provider) were distributed. The health facility questionnaire was administered to the facility in-charge/administrator. Whereas the health provider questionnaire was conducted among doctors, nurses, midwives and lady health visitors at all the sampled facilities. Verbal informed consent was obtained prior to administering the questionnaire.

The needs assessment consisted of a complete inventory of equipment, supplies and drugs required for maternal and newborn care as well as other related services (such as laboratory). Staff availability and knowledge regarding management of obstetric complications were assessed. General statistics on patient load (antenatal care, delivery and postnatal), maternal deaths, obstetric complications including near miss/severe obstetric complication, Caesarean sections, forceps, stillbirths and episiotomies were asked from the facility administrator and verified from facility registers. These statistics were collated for the 2002 calendar year.

The needs assessment study was conducted over a two week period in March 2003. The field team comprised of six obstetric residents (3 male and 3 female) who underwent a week long training program. They were closely supervised during the data collection phase to ensure quality and comparability in interviewing technique.

Frequency distribution and cross-tabulation were carried out using the Statistical Package for the Social Sciences (Version 10).15 Results for the UN Process Indicators were weighted to be representative of all BHUs that service Multan district.

Definitions

UN Process Indicators[2]: Availability of EmOC: Number of facilities that provide EmOC per 500,000 population.

Proportion of all births in EmOC facilities: Proportion of women with obstetric complications delivered at EmOC facilities.

Met need: Proportion of women with obstetric complications delivered at EmOC facilities;

Cesarean deliveries as a proportion of all births: Cesarean deliveries as a proportion of all births

Case fatality rate: proportion of women with serious obstetric complications admitted to a facility who die.

Crude Birth Rate: estimated at 40.6 per 1,000 population[14], translating to 126,544 births for Multan.

Technical competency-based knowledge: Technical knowledge regarding management of high risk pregnancy and labour, monitoring progress in labour and obstetric complications during antenatal, labour and delivery were assessed and re-categorized, based on the proportion of correct responses, into a three point Likhert scale of very good (80%), good (50%-79%) and poor (<50%) .

Nurses: includes nurses (n=4), midwives (n=13), lady health visitors (n=31) and female health technicians (n=7).

Results

For its population size, Multan district should have at least 25 basic and 6 comprehensive EmOC facilities. The district, in terms of spatial distribution even at the sub-district level far exceeds the minimum requirement for basic EmOC facilities. There are 51, 15 and 18 such facilities in Multan, Shujabad and Jalalpur Pirwala sub-districts respectively whereas the minimum required are 19, 3 and 3 respectively. Five BHUs were non-functional among the 38 randomly selected BHUs while all the RHCs were functional. However, the district falls short of meeting its minimum requirement for comprehensive EmOC services. To provide adequate coverage for obstetric complications a minimum of six comprehensive EmOC facilities are necessary for the district's 3.2 million population - there are only three, four when the tertiary facility is included. Multan sub-district has two facilities; it should have four to meet the minimum standard requirement (Table 1).

Based on the assumption that 15% of all pregnant women develop obstetric complications that require medical care; the minimum recommended number of births in an EmOC facility is 15% of all births.[2] Irrespective of whether the tertiary hospital is included or not, the public delivery system does not meet the minimum standard requirement despite a large proportion of the births reported from the tertiary hospital.

Table 1. The UN process indicators for Multan District. Multan, 2003.

UN Process Indicator	Recommended Level	Multan District[1]	Multan District[2]
Availability of EmOC[3]	1 comprehensive/500,000 4 basic/500,000	3 80	4 80
Proportion of all births in EmOC facilities	> 15%	5.5%	10.3%
Met need	100%	14.9%	23.3%
Caesarean deliveries as a proportion of all births	5-15%	0.08%	2.4%
Case fatality rate	<1%	50%	13.5%

1. Excludes tertiary hospital
2. Includes tertiary hospital

Table 2. Distribution of staffing essential equipment and supplies for obstetric and newborn care for Multan District. Multan, 2003.

Staffing and Equipment	Basic Obstetric Care		Comprehensive Obstetric Care	
	BHU (n=38)	RHC (n=8)	THQ (n=2)	DHQ (n=1)
Staffing Pattern (n)				
OB-GYN	NA	NA	1	1
Anaesthesiologist	NA	NA	0	0
Doctor	33	23	10	9
Nurse	0	0	4	3
Midwife	13	1	3	0
LHV/FHT	35	7	2	0
Antenatal Care (%)				
Examination tables	89%	100%	100%	100%
Adult weighing scales	50%	63%	50%	100%
Blood pressure apparatus	71%	88%	100%	100%
Stethoscope	63%	88%	100%	100%
Vaginal speculum	82%	100%	50%	100%
Gloves	53%	63%	0%	100%
Urine dipstik	24%	63%	50%	100%
Centrifuge for haemoglobin	37%	50%	50%	100%
Labour and Delivery (%)				
Partogram	0%	0%	0%	0%
Delivery set	71%	88%	50%	100%
Kochers clamp	13%	38%	50%	100%
Suture set	58%	63%	0%	100%
IV set	95%	88%	100%	100%
Outlet Forceps	8%	50%	0%	100%
Vacuum extraction apparatus	0%	0%	0%	100%
Newborn care (%)				
Baby scales	55%	88%	0%	100%
Foetal stethoscope	61%	88%	0%	100%
Bulb syringe	5%	38%	0%	100%
Baby Ambu bag	3%	38%	50%	100%
Baby laryngoscope	3%	13%	50%	100%
Baby endotracheal tube	5%	25%	50%	100%
Other supplies (%)				
Oxygen	58%	75%	50%	100%
Autoclave/Sterilizer	66%	100%	50%	100%
Foley catheter	26%	63%	50%	100%
Urine collection bags	11%	25%	0%	100%
Antenatal Care				
Ferrous sulfate	42%	75%	100%	100%
Folic Acid	89%	75%	50%	100%
Calcium	0%	13%	50%	0%
Tetanus toxoid	53%	88%	0%	100%
Antibiotics				
Ampicillin	8%	13%	0%	0%
Benzyl Penicillin	92%	75%	50%	100%
Gentamycin	0%	0%	0%	100%
Oxytocics				
Oxytocin/syntocinon	3%	25%	0%	0%
Ergometrine/methergine	3%	13%	0%	0%
Anti-convulsants				
Diazepam	3%	50%	0%	0%
Magnesium sulfate	0%	0%	0%	0%
Anti-hypertensives IV Fluids	0%	13%	0%	0%
Ringers lactate	97%	88%	100%	100%
Dextrose	26%	50%	50%	100%
Normal saline	32%	88%	50%	100%
Plasma expanders	3%	0%	0%	100%

Other supplies:				
Iodine/Betadine	3%	13%	0%	0%
Surgical spirit/alcohol	3%	25%	50%	100%
Lidocaine/xylocaine	87%	88%	0%	100%
Oxygen	34%	88%	50%	100%
Soap	0%	75%	50%	100%
Bleach	0%	50%	0%	100%
Chlorhexidene	3%	38%	0%	100%

NA: non applicable
OB-GYN: Obstetrician-Gynecologist; LHV : Lady Health Visitor; FHT: Female Health Technician
BHU: Basic Health Unit
THQ: Taluka Health Quarter
RHC: Rural Health Center
DHQ: District Head Quarter

Table 3. Percentage distribution of technical competency-based knowledge for high risk pregnancy, labor and management of specific obstetric complications. Multan, 2003.

Technical Competency-based knowledge for …..	Basic Obstetric Care		Comprehensive Obstetric Care	
	Nurses (n=49)	Doctors (n=9)	Nurses (n=6)	Doctors (n=8)
High risk pregnancy				
Very good	0.0 (0)	0.0(0)	0.0 (0)	0.0 (0)
Good	20.4 (10)	22.2 (2)	0.0 (0)	62.5 (5)
Poor	79.6 (39)	77.8 (7)	100.0 (6)	37.5 (3)
High risk labor				
Very good	0.0(0)	0.0 (0)	0.0 (0)	12.5 (1)
Good	14.3 (7)	33.3 (3)	0.0 (0)	37.5 (3)
Poor	85.7 (42)	66.7 (6)	100.0 (6)	50.0 (4)
Monitor progress in labour*				
Partogram	2.0 (1)	0.0 (0)	0.0 (0)	0.0 (0)
Intensity of labour pains	59.2 (29)	77.8 (7)	50.0 (3)	87.5 (7)
Interval between labour pains	30.6 (15)	0.0 (0)	50.0 (3)	50.0 (4)
Cervical dilatation	14.3 (7)	100.0 (9)	83.3 (5)	100.0 (8)
Pre-eclampsia				
Physical examination				
Very good	6.1 (3)	22.2 (2)	33.3 (2)	62.5(5)
Good	51.0 (25)	44.4 (4)	16.7 (1)	25.0 (2)
Poor	42.9 (21)	33.3 (3)	50.0 (3)	12.5 (1)
Management				
Very good	0.0 (0)	0.0 (0)	0.0 (0)	12.5 (1)
Good	22.4 (11)	55.6 (5)	33.3 (2)	75.0 (6)
Poor	77.6 (38)	44.4 (4)	66.7 (4)	12.5 (1)
Antepartum haemorrhage				
Physical examination				
Very good	2.0 (1)	0.0 (0)	0.0 (0)	25.0 (2)
Good	10.2 (5)	66.7 (6)	0.0 (0)	37.5 (3)
Poor	87.8 (43)	33.3 (3)	100.0 (6)	37.5 (3)
Management				
Very good	2.0 (1)	11.1 (1)	33.3 (2)	12.5 (1)
Good	2.0 (1)	33.3 (3)	0.0 (0)	75.0 (6)
Poor	95.9 (47)	55.6 (5)	66.7 (4)	12.5 (1)
Eclampsia				
Physical examination				
Very good	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Good	0.0 (0)	0.0 (0)	0.0 (0)	12.5 (1)
Poor	100.0 (49)	100.0 (9)	100.0 (6)	87.5 (7)
Management				
Very good	0.0 (0)	0.0 (0)	0.0(0)	12.5 (1)
Good	6.1 (3)	11.1 (1)	16.7 (1)	37.5 (3)
Poor	93.9 (46)	88.9 (8)	83.3(5)	50.0 (4)

* multiple response
Percentages are rounded; does not add to 100.0%

With regards to the met need indicator, only 15% of the women who experience serious obstetric complications are treated in the district public health delivery system whereas all women experiencing serious obstetric complications should have accessed the district public health delivery system to meet the UN process indicators minimum requirement. However, it is encouraging to note that the level rises to slightly over 23% when births from the tertiary hospital are included suggesting that perhaps the tertiary facility is over-burdened with complicated births that could possibly be handled at other comprehensive EmOC facilities.

To adequately handle all the obstetric complications requiring caesareans, between 5-15% of all births must have an operative procedure. Collated statistics from Multan's public maternity health system describes a bleak picture for meeting the recommended level. A little over 2% of all births in the district are by Caesarean, decreasing to a negligible 0.1% when Caesarean sections performed at the tertiary facility are excluded.

The case fatality rate, defined earlier, is extremely high at half of all serious obstetric complications admitted (4/8) when statistics from the tertiary hospital are excluded, declining to 13.5% (20/148) on inclusion of the tertiary facility. These are significantly higher than the recommended 1%. Cause of death included postpartum haemorrhage (10/20; 50%), eclampsia (8/20; 40%) and others (2/20; 10%).

The health care personnel staffing illustrated a skewed pattern with few if any LHVs or midwives at the RHC or higher levels. For example, the eight RHCs were manned by 23 doctors but only one midwife and seven LHVs. Two of the RHCs had no female doctors. The number of midwives and LHVs dwindled further at the higher level facilities, compensated by doctors, nurses and obstetricians. Anaesthesiologists were not available at any of the tehsil and district hospital facilities (Table 2).

Equipment at the basic and comprehensive facilities was generally short of the minimum expected levels to enable running of an effective Safe Motherhood program. However, at the DHQ hospital all essential equipment was available. It is important to note that the two THQ facilities were not provided with such essential newborn equipment as baby scales, foetal stethoscopes or bulb syringes whereas these were more often available at the lower level facilities. Furthermore, on the day that the situation analysis was conducted both THQ facilities did not have gloves, suture sets or urine collection bags (Table 2).

Such essential supplies as ferrous sulfate and folic acid that should have been available at all facilities were quite often not available. Broad spectrum antibiotics such as ampicillin were present in only 8% and 13% of BHUs and RHCs respectively and were not available at any of the facilities offering comprehensive EmOC. Furthermore, though oxytocin/syntocinon was available at 25% of RHCs, these as well as ergometrine/methergine were not available at any of the comprehensive EmOC facilities. Intravenous fluids were generally available though plasma expanders were not at any RHC or THQ facility (Table 2).

Overall, knowledge scores regarding any of the items investigated were less than average, especially among nurses at basic or comprehensive EmOC facilities. For example, all nurses at comprehensive EmOC facilities scored 'poor' for high risk pregnancy or labour. With regards to monitoring progress in labour, the most frequently mentioned items were intensity of labor pains by nurses (59%) at basic EmOC facility whereas cervical dilatation was reported by all doctors at basic and comprehensive facilities. Partograms was mentioned by only one nurse.

Knowledge scores for physical examination and initial management for pre-eclampsia, antepartum haemorrhage and eclampsia generally depicted less than average scores. For example, though nurses scores for physical examination for pre-eclampsia was 'good' (51%), management scores were more likely to be 'poor' (78%). Alternatively, doctors' scores were generally 'very good' (63%) and 'good' (75%) for physical examination and management respectively. With regards to eclampsia, physical examination scores for nurses and doctors were mainly 'poor' though management scores especially among doctors depicted a better trend (Table 3).

Discussion

The results of this study shed light on the oft quoted refrain "Why is maternal mortality persistently high in Pakistan despite a maternal health policy priority and infrastructure investments?" The reason for this is evident from the state of public sector obstetric facilities in terms of structure (spatial distribution of EmOC facilities, staffing pattern, equipment and supplies) and process (knowledge and management skills) indicators for a typical Pakistani district. It is important to note that since June 2001 Multan is a designated Safe Motherhood district under a large development project, the "Women Health Project".

The results should be interpreted in the light of some methodological constraints. First and foremost, this public sector facility study does not truly reflect Multan's maternal health status as the study sample did not include private sector health care facilities. However, the focus on public sector facilities is reflective not only of the 'free' services offered but it has the largest infrastructure available for the provision of reproductive health services mainly accessed

by the poor. Secondly, the data presented are reported or based on statistics rather than observed practices or routines. The validity of the indicators in terms of the definitions used in recording for example pre-eclampsia, might vary across facility. Thirdly it can be argued that as the study is cross sectional, it provides a snapshot of the situation that could change over time.

The UN Process Indicators for Multan are fairly typical of low income countries that have invested in physical infrastructure without significant investments in human resources, equipment and supplies. Unable to identify the facility level for initial referral while recognizing that the tertiary facility will provide the best care, healthy and moribund mothers by-pass all public sector facilities to be referred directly to the tertiary hospital. The disparity in meeting the minimum requirement for the UN Process Indicators when the data from the tertiary facility is factored in or not, illustrates this scenario. For example, the caesarean rate rises from a low of less than 0.1% to a little over 2%, the met need from about 15% to a little over 23% and so on. In both situations, the minimum requirements are not met, but the evidence gleaned from such needs assessments can help managers and policy makers to evaluate the feasibility and probable impact of their programmatic options. Should the priority rest on making the DHQ and THQ hospitals fully functional thereby reducing the load on the tertiary hospital? Alternatively, should resources be allocated to upgrading the RHCs to provide comprehensive obstetric care? The research evidence will facilitate the rationales provided to stakeholders including programme managers and various interested groups regarding decisions on the optimum use of scarce resources. However, underlying these rationales and counter arguments lie the prerequisites for an efficient and effective referral system linking the community to the comprehensive obstetric service facilities.

Assessment of provider knowledge and skills for management of obstetric complications, equipment, supplies and drugs that exemplify the quality of care offered in the health centers are of special significance. For example, owing to the lack of technical competency, partogram, an essential best practice tool to monitor progress in labor and to assist in the decision-making process with regard to referral to a higher level of care, was unavailable at any facility including the tertiary hospital. On the other hand, magnesium sulfate was available at the tertiary facility but not at any other comprehensive EmOC facility despite nearly 40% of all maternal deaths in 2002 attributed to eclampsia. Furthermore, the shortage of basic supplies such as iron and folic acid tablets, broad spectrum antibiotics, oxytocics, gloves and sutures to name a few illustrate the inefficiency in the delivery of supplies, bodes ill for the quality of care offered and reflects the poor enabling environment that skews health utilization patterns to tertiary facilities and the private sector.[11]

The results of this public sector maternal services study provides an evidence-base to identify the shortcomings in the provision of efficient and effective maternal and newborn health services in Pakistan. However, simply measuring something will not automatically improve it and indicators must be used within quality improvement approaches that focus on the whole health care delivery system. Policy makers, programme managers and stakeholders must use research findings to make informed decisions. The quality of health and other social sector service delivery in Pakistan has traditionally been poor, slowly and marginally contributing towards improvements in outcomes. A large number of interwoven factors contribute to the poor quality but predominantly results from the hierarchial centralized institutional arrangements which have been in place for a long time. The Devolution Initiative[12] of the Government of Pakistan is an attempt to address the above challenge by development of new institutional arrangements to enhance the chances of resources to be effectively used at the local level. As a result, the lately established district governments have been entrusted the task to address problems being faced by the population with a focus on improving service delivery, improving governance and local accountability. This provides a real opportunity at the local level for the new political leadership to strategically focus on key priorities of the population in health, education, and water and sanitation. If implemented effectively with good governance, financing the key priorities, the population could see quantifiable improvement in service delivery.

In conclusion, we argue for a strengthening of four interlinked health system elements - human resources, access to, use and quality of services while recognizing that a purely health system approach though essential is not sufficient. Community empowerment, strong political commitment and financial resources are the overarching elements and challenges that the Government of Pakistan must face heads on to meet the Safe Motherhood Millennium Development Goals.

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