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Research Article

Structural quality of antenatal clinics in the public health sector in a Northern district in Kerala, India

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ABSTRACT

Background: To achieve the 5th Millennium Development Goal countries throughout the world are investing more energy and resources in providing equitable, adequate maternal health services. Objectives of the study was to assess the quality of structural attributes in the antenatal clinics in public health sector.
Methods: A cross sectional study was conducted in 30% of the institutions at various levels in the public health sector in Kozhikode district during September to February 2010-11. Structural quality was assessed using a checklist. A 3-point score was used. Mean score was used for comparing between different levels. The actual score for each attribute was calculated as percentage of maximum total and standard of 60 % was taken as cut off to categorize facilities as good or poor.
Results: Out of the 28 institutions studied, 12 had good score for structural attributes. Attributes like general infrastructure, availability of basic diagnostic equipments and maintenance and cleanliness of health facility scored well at all levels. General Infrastructure was found to be good in 23 health facilities; maintenance was good in 17 facilities and 19 facilities scored well for Basic Diagnostic Equipments. Basic Laboratory Facilities was grossly inadequate in all institutions especially at the PHC level. Only 8 facilities had Adequate Drugs Supply. The overall score for all the structural attributes (p 0.008) was found to be significantly different between the various levels of public health sector with good scores at MCH, TH and BPHC level and difference in scores was found to be significant with regards to availability of Basic Laboratory Services (p 0.032); Basic Diagnostic Equipments (p 0.031) and availability of drugs (p 0.005).
Conclusions: Further improvement in this regard is necessary in the PHCs, BPHCs and CHCs.

Keywords: Antenatal care, Quality, Structural attributes, Public health sector

INTRODUCTION

The 5th goal in Millennium Development Goals is "To improve maternal health". One way to achieve the target of 75% reduction in maternal mortality ratio is by improving the availability, accessibility, quality and use of services during pregnancy, childbirth and postpartum[1] for treatment of complications that may arise during pregnancy and childbirth. The quality of maternal care offered by a facility is very much dependent on the resources available (general infrastructure, equipments, skilled manpower, drugs), accessibility and adherence to predefined criteria for delivery of services.[2]

The Maternal and Child Health services are delivered through government run Subcentres (SC), Primary Health Centres (PHC), Community Health Centres (CHC) and Government hospitals, and through private hospitals/ clinics/ nursing homes.[3] The private health sector in India is very strong. In order to strengthen the public health system, Government of India has launched the National Rural Health Mission in 2005.[3]

Over 99% institutional deliveries, high coverage of immunizations, access to universal health care etc. are some of the highlights of the Kerala model of health care, a state in South India. With the development of infrastructural facilities, the service provision and utilization is almost complete in Kerala when compared to other states. There are 5094 SCs, 909 PHCs, 107 CHCs, 14 district hospitals, five Woman and Child Hospitals and Five Medical Colleges with Mother and Child wing spread uniformly throughout Kerala and about 5320 JPHNs focusing mainly on delivery of maternal and child health services.[4]

Objective:

To assess the quality of structural attributes of Health Care Institutions providing antenatal care in the public health sector in Kozhikode district of Kerala.

METHODS

Study Design: Cross sectional study

Study Setting: Health care institutions providing maternal and child care functioning at various levels in the public health sector, namely 65 Primary Health Centres (PHC), 7 Block Level Primary Health Centres (BPHC), 7 Community Health Centres (CHC), 3 Taluk Hospitals (TH) and 3 Mother and Child Hospitals (Govt Medical College, 2 General Hospitals and Woman & Child Hospital, Kottaparambu) of Kozhikode district in North Kerala.[5] Subcentres were excluded due to feasibility issues.

Study Period: September 2010 and February 2011.

Sample size: Arbitrarily, 30% of institutions were selected from each strata that is 20 PHCs, 3 BPHCs, 3 CHCs, 1 TH and 1 MCH.[6]

Sampling technique: Stratified Random Sampling.

Data collection: The data regarding structural attributes in the selected institutions were collected by passive observation using a structured checklist. The variables included in the checklist were with reference from Bulletin of World Health Organization 2003,81(2).[7] It was modified to suite local situation taking into account national and international standards.

Measured Variables:

The structural facilities were assessed using the following attributes: General Infrastructure (7 attributes), Availability of Basic Diagnostic Equipments (7 attributes), Availability of Basic Laboratory Services (5 attributes), Maintenance of Health Facility (3 attributes) and Drugs Available in these Health Facilities (10 attributes).

a) General infrastructure (waiting area; privacy of examination room; examination table; water to wash hands; drinking water; Toilets with water; waste disposal) - minimum score 0; maximum score 14
b) Basic diagnostic equipment available (Sphygmomanometer; weighing machine; stethoscope; inch tape; gloves; patellar hammer, speculum) - minimum score 0; maximum score 14
c) Basic Laboratory facilities available (hemoglobin measurement; detection of pus cells in urine; detection of glucose in urine; detection of protein in urine; Pap smear; microscope) - minimum score 0; maximum score 12
d) Maintenance of facility (maintenance of floors and walls; Cleanliness of health facility and toilets) - minimum score 0; maximum score 6
e) Drugs available (Iron sulfate and folic acid; calcium; injection tetanus toxoid; paracetamol; ampicillin; methyldopa; Furosemide; mebendazole; penicillin vials; insulin) - minimum score 0; maximum score 20
f) Man power attributes- The health care provider conducting the antenatal clinic.

Analysis- Data was coded and entered in MS Excel and analyzed using SPSS 16 version. Descriptive analysis was done. For each criterion under structural attributes, a 3 point scoring was used. Present and to the mark (in good working condition or as expected as per standard guidelines) was scored 2 points; present but not to the mark (or not properly functioning) was scored 1 point and absent as 0 point. The mean score for structural attributes were calculated. Scoring facilitated comparison between health facilities; the variation between different levels of public health sector was analyzed using appropriate tests. The actual score for each attribute was calculated as percentage of maximum total and facilities with mean percentage score less than 60 % was considered to have poor structural quality.

RESULTS

All the selected 28 institutions conducted antenatal clinics weekly and daily clinics were conducted in the TH and MCH studied. 24 hour delivery services were available only in three institutions. In 25 institutions JPHN alone conducted the clinics. The median number of antenatal women reporting in the antenatal clinic per day was 22 (range 6 – 172). Table No: 1 depicts the status of various structural attributes in the selected institutions. In this study out of the 28 health facilities surveyed, privacy of examination room was noted in 24 facilities (including both meeting the expected standards and not meeting the expected standards) with lesser privacy in the PHCs as compared to higher levels. There were eight facilities without drinking water, though all facilities had water to wash hands. Examination tables were available in only 22 antenatal clinics observed. A waiting area and waste disposal system was present in all the institutions studied.

Table 1: Assessment of Structural attributes at different levels of health care.

Attributes	Level of health care institution					Total, N= 28, N (%)
	PHC,n=20	BPHC,n= 3	CHC,n=3	TH,n=1	MCH,n = 1	
General Infrastructure						
Privacy of examination room						
Present & to the mark	10	1	1	1	0	13 (46.43)
Present but not to the mark	6	2	2	0	1	11 (39.28)
Absent	4	0	0	0	0	4 (14.28)
Waiting area						
Present & to the mark	9	2	2	1	1	15 (53.57)
Present but not to the mark	11	1	1	0	0	13 (46.43)
Absent	0	0	0	0	0	0 (0)
Toilets with water						
Present & to the mark	12	2	2	0	1	17 (60.71)
Present but not to the mark	6	1	0	1	0	8 (28.57)
Absent	2	0	1	0	0	3 (10.71)
Water to wash hands						
Present & to the mark	20	3	3	1	1	28 (100)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	0	0	0	0	0	0 (0)
Drinking water						
Present & to the mark	9	1	1	0	1	12 (42.86)
Present but not to the mark	6	0	1	1	0	8 (28.57)
Absent	5	2	1	0	0	8 (28.57)
Examination table						
Present & to the mark	12	1	1	1	1	16 (57.14)
Present but not to the mark	3	1	2	0	0	6 (21.43)
Absent	5	1	0	0	0	6 (21.43)
Waste disposal system						
Present & to the mark	6	0	1	1	1	9 (32.14)
Present but not to the mark	14	3	2	0	0	19 (67.86)
Absent	0	0	0	0	0	0 (0)
Availability of Basic Diagnostic Equipments						
Sphygmomanometer						
Present & to the mark	15	2	2	1	1	21 (75)
Present but not to the mark	3	1	1	0	0	5 (17.86)
Absent	2	0	0	0	0	2 (7.14)
Weighing machine						
Present & to the mark	20	3	3	1	1	28 (100)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	0	0	0	0	0	0 (0)
Stethoscope						
Present & to the mark	20	2	3	1	1	27(96.43)
Present but not to the mark	0	1	0	0	0	1 (3.57)
Absent	0	0	0	0	0	0 (0)
Inch tape						
Present & to the mark	3	1	0	0	1	5 (17.86)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	17	2	3	1	0	23(82.14)
Gloves						
Present & to the mark	13	2	0	1	1	17 (60.71)
Present but not to the mark	6	0	2	0	0	8(28.57)
Absent	1	1	1	0	0	3 (10.71)

Patellar hammer						
Present & to the mark	0	0	0	0	1	1 (3.57)
Present but not to the mark	0	0	0	1	0	1 (3.57)
Absent	20	3	3	0	0	26(92.86)
Speculum						
Present & to the mark	16	1	0	1	1	19(67.86)
Present but not to the mark	4	1	2	0	0	7 (25)
Absent	0	1	1	0	0	2 (7.14)
Availability of Basic Laboratory Facilities						
Microscope						
Present & to the mark	2	2	3	1	1	9 (32.14)
Present but not to the mark	0	1	0	0	0	1 (3.57)
Absent	18	0	0	0	0	18(64.29)
Hemoglobin measurement						
Present & to the mark	12	2	3	1	1	19(67.86)
Present but not to the mark	2	1	0	0	0	3 (10.71)
Absent	6	0	0	0	0	6 (21.43)
Test for the detection of glucose in urine						
Present & to the mark	4	2	2	1	1	10(35.72)
Present but not to the mark	0	1	1	0	0	2 (7.14)
Absent	16	0	0	0	0	16(57.14)
Test for detection of pus cells in urine						
Present & to the mark	0	2	2	1	1	6 (21.43)
Present but not to the mark	0	1	0	0	0	1 (3.57)
Absent	20	0	1	0	0	21(75)
Test for detection of protein in urine						
Present & to the mark	2	2	2	1	1	8 (28.57)
Present but not to the mark	0	1	0	0	0	1 (3.57)
Absent	18	0	1	0	0	19(67.86)
Maintenance of Facility						
Cleanliness of health facility & toilets						
Present & to the mark	10	2	0	1	0	13 (46.43)
Present but not to the mark	9	0	3	0	1	13 (46.43)
Absent	1	1	0	0	0	2 (7.14)
Maintenance of floors and walls						
Present & to the mark	10	2	0	1	1	14 (50)
Present but not to the mark	10	1	3	0	0	14 (50)
Absent	0	0	0	0	0	0 (0)
Cleanliness of sheets						
Present & to the mark	12	3	0	1	0	16 (57.14)
Present but not to the mark	6	0	3	0	1	10 (35.71)
Absent	2	0	0	0	0	2 (7.14)
Availability of Drugs						
Iron folic acid						
Present & to the mark	5	3	1	0	1	10(35.71)
Present but not to the mark	13	0	2	0	0	15 (53.57)
Absent	2	0	0	1	0	3 (10.71)
Calcium						
Present & to the mark	5	2	1	0	1	9 (32.14)
Present but not to the mark	1	0	0	1	0	2 (7.14)
Absent	14	1	2	0	0	17 (60.72)
Injection tetanus toxoid						
Present & to the mark	20	3	3	1	1	28 (100)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	0	0	0	0	0	0 (0)
Paracetamol						
Present & to the mark	20	3	3	1	1	28 (100)
Present but not to the mark	0	0	0	0	0	0 (0)

Absent	0	0	0	0	0	0 (0)
Ampicillin						
Present & to the mark	16	3	3	1	1	24 (85.71)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	4	0	0	0	0	4 (14.29)
Penicillin						
Present & to the mark	1	2	0	1	1	5 (17.86)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	19	1	3	0	0	23 (82.14)
Frusemide						
Present & to the mark	15	2	3	1	1	22 (78.57)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	5	1	0	0	0	6 (21.43)
Insulin						
Present & to the mark	3	2	2	1	1	8 (29.6)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	17	1	1	0	0	19 (70.4)
Methyldopa						
Present & to the mark	1	0	0	0	1	2 (7.14)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	19	3	3	1	0	26 (92.86)
Mebendazole						
Present & to the mark	1	1	0	0	1	3 (10.71)
Present but not to the mark	0	0	0	0	0	0 (0)
Absent	19	2	3	1	0	25 (89.29)

Table 2: Mean scores for the various structural attributes.

Structural attributes	Mean score (SD)						F	Significance
	PHC	BPHC	CHC	TH	MCH	Total		
General infrastructure *(min 0: max 14)*	10.10 (1.97)	9.33 (1.53)	9.67(2.52)	12	12	10.11(1.93)	0.602	0.665
Basic Diagnostic Equipments*(min 0; max 14)*	9.45 (1.54)	7.67(2.08)	9(1)	14	10	9.39 (1.79)	3.211	0.031
Availability of Laboratory Services *(min 0; max10)*	4(3.71)	0.33(0.577)	6(5.29)	12	12	4.39(4.28)	3.176	0.032
Maintenance of Health Facility*(min 0; max 6)*	4.45 (1.47)	4.67(1.53)	4(2)	5	3	4.39(1.45)	0.328	0.856
Availability of drugs *(min 0; max 20)*	10.3(3.246)	10(0.0001)	12(1.73)	20	20	11.14(3.77)	4.942	0.005
OVERALL SCORE *(min 0; max 64)*	37.90(7.93)	31.67(3.055)	41.67(1.017)	63	57	39.4(9.66)	4.492	0.008

All institutions had a weighing machine in good working condition. Stethoscopes were present in all institutions but it was not in proper working condition in one institution. Sphygmomanometer was present in 26 health facilities and 26 facilities had a speculum. Out of 28, 26 institutions did not have a patellar hammer and 23 did not have an inch tape. It was found that 18 institutions did not have microscope, this was wholly accounted for by the absence in the lower institutions like PHC. Basic laboratory facilities were present to the standards in only less than 10 institutions. Though cleanliness was present in 26 health facilities, it was not to the mark in 13 facilities. In this study, Iron Folic acid tablets were available in 25 health facilities but 15 facilities reported that the quality of the obtained tablets were poor and hence could not be dispensed to the antenatal women. Injection tetanus toxoid was available in all institutions in sufficient quantity and quality. All institutions had paracetamol tablets. Methyl dopa was absent in 26 institutions and so was mebendazole. As per the pharmacist at a centre, methyl dopa is not commonly prescribed and hence was not indented.

The overall score for structural attributes was found to be significantly different between the different levels of public health sector (p 0.008) with good scores at TH and

MCH level and a poor score at the PHC level (Table 2). On comparing the scores obtained for various attributes between the various levels of health care, the difference in scores was found to be significant with regards to availability of Basic Diagnostic equipments (p 0.031), availability of Basic Laboratory Services (p 0.032) and availability of drugs (p 0.005).

Table 3: Assessment of health facilities based on quality of various structural attributes.

Structural attributes	PHC		BPHC		CHC		TH		MCH		Total	
	Mean % score	institutions with good quality care n=20	Mean % score	institutions with good quality care n=3	Mean % score	institutions with good quality care n=3	Mean % score	institutions with good quality care n=1	Mean % score	institutions with good quality care n=1	Mean % score	institutions with good quality care N=28
General infrastructure	72.14	17	66.64	2	69.07	2	85.71	1	85.71	1	72.19	23
Basic Diagnostic Equipments	67.5	14	54.78	1	64.28	2	100	1	71.43	1	67.07	19
Availability of Laboratory Services	33.33	5	2.75	0	50	2	100	1	100	1	36.58	9
Maintenance of Health Facility	74.16	12	77.83	2	66.67	2	83.33	1	50	0	73.16	17
Availability of drugs	51.5	5	50	0	60	1	100	1	100	1	55.71	8
Overall score	59.22	8	49.48	0	65.11	2	98.44	1	89.06	1	61.27	12

Table 3 shows the Mean percentage scores for various attributes distributed across different levels of public health sector and the proportion of institutions with a score above the cut off indicating good quality of antenatal care (more than or equal to 60%). Though the overall score for the 28 institutions studied was 61.27%, the score was poor for attributes like availability of basic laboratory services (36.58%) and availability of drugs (55.71%). Attributes like general infrastructure (72.19%), availability of basic diagnostic equipments (67.07%) and maintenance of health facility (73.16%) scored well indicating good quality. Basic laboratory services were found to be inadequate in the PHCs and BPHCs while availability of basic diagnostic equipments was inadequate in the BPHCs. Availability of drugs was poor in PHCs and BPHCs.

DISCUSSION

82.14% institutions had good General Infrastructure, similar to the Tanzanian study where the physical infrastructure of all first-tier public and private facilities was reasonably good.

Privacy of examination room was observed in 85.71% health facilities (includes both meeting expected standards and not meeting expected standards) in comparison to 100% in the study by Boller C et al[8] in Tanzania. In this study, all facilities had a waiting area, whereas only 43% had in the study by Boller C et al. Most (89%) facilities in the present study had toilets with water in comparison to 29% in the Boller C et al study. All the health facilities in the present study had water to wash hands after examination in comparison to 29% in Boller C et al study.

67% institutions had good score for availability of Basic Diagnostic Equipments like BP apparatus, weighing machine, stethoscope, etc. But in a few institutions though the equipments were present they were not in working condition. Sphygmomanometer was available in 92.6% health facilities studied here when compared to 86% in the Tanzanian study by Boller C et al.[8] Gloves were absent in 11.1% health facilities, almost comparable to the finding of 14% in Boller C et al study.

Basic Laboratory Services was grossly inadequate in most institutions especially at the PHC, BPHC and CHC level. In this study, 21.43% health facilities did not have facilities for hemoglobin measurement, which is slightly higher than the finding in the Tanzanian study[8] (14%). In this study, 42.86% had facilities for detection of glucose in urine, 32% had facilities for detection of protein in urine and 25% had facilities for detection of pus cells in urine when compared to the Tanzanian study by Boller C et al, where only 29% had facilities for detection of glucose and protein in urine.

Maintenance and cleanliness of health facilities (including toilets) was satisfactory in only half the facilities whereas in the Boller C et al study[8], cleanliness of facility was satisfactory in 100% but cleanliness of toilet was satisfactory in only 57%.

Availability of drugs was generally poor. Only a quarter institutions had adequate drugs supply. At the PHC level only 10% had satisfactory drug supply. Our findings with regards to availability of Iron Folic acid tablets are similar to the Tanzanian study by Boller C et al[8] (88.9%- our study, 86% - comparative study) and Injection tetanus toxoid (100% in both studies).

CONCLUSION

One third of the institutions had good overall score for structural attributes. TH and MCH had structural facilities to provide good quality antenatal care with respect to all attributes. Availability of basic laboratory services and availability of drugs have to be improved at the lower levels like PHCs and CHCs. Maintenance of facility should be upgraded at MCH level.

Though the overall score at the PHC level was poor (59.22%), three attributes namely general infrastructure (72.14%), availability of basic diagnostic equipments (67.5%) and maintenance of health facility (74.16%) scored well. At the BPHC level most attributes scored grossly below the cut off level. Except for availability of basic laboratory services (50%) the scores for the CHCs were adequate. In the TH studied, all attributes had a score above 60% and two attributes namely availability of basic laboratory services and availability of drugs scored 100%.

Recommendations:

- Improvements in general infrastructure like privacy of examination rooms, provision of examination tables and stepping up cleanliness in the antenatal clinics.
- Availability and maintenance of Diagnostic equipments have to be improved according to the level of health care facility.
- Upgrade laboratory services especially at PHC levels. Deal with supply shortages of reagents.
- Ensure adequate supply of good quality IFA tablets and make provision for supply calcium tablets to the antenatal women.
- Maintain a Complaint register in the health facility.

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