Paediatric utilisation of a teaching hospital and a community health centre

Predictors of level of care used by children from Khayelitsha, Cape Town

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Rationale. Inappropriate utilisation of hospital services for primary curative care aggravates inefficiencies and inadequacies in health care delivery. Identification of reasons for such malutilisation may assist the development of appropriate strategies for development of rationally organised primary and secondary care services that will provide improved quality of care.

Subjects. Children under 6 years of age living in Khayelitsha.

Objectives. To ascertain: (*i*) the proportion of visits made to Red Cross Children's Hospital (RXH) that could be more appropriately handled at primary care level; (*ii*) reasons for attendance at RXH, compared with attendance at a large community health centre (Site B day hospital) in Khayelitsha; (*iii*) predictors of inappropriate attendance at the teaching hospital for primary care problems.

Methods. A case-referent study design was used to compare children attending RXH with children attending Site B day hospital. All care-givers attending the respective outpatient departments on 2 randomly selected days were included in the study sample. Data were collected by semi-structured interview and record review, on reasons for attendance, demographic and social variables relating to the child and care-giver, as well as clinical data on the final diagnosis contained in the patients' folders. Criteria for determining appropriateness of attendance by level of care were developed a *priori* via a modification of published measures.

Main outcome measures. Reasons for attendance at the facility, appropriateness of the visit by level of care and predictors of inappropriate attendance at the teaching hospital.

Results. Sixty-nine per cent of RXH visits were identified as inappropriate for a tertiary institution. The main reasons given by care-givers for attending Site B were convenience and the prohibitive cost of travel to RXH.

Mothers interviewed at RXH reported problems with failure of treatment at primary care clinics, and being turned away at Site B because of overcrowding as the main reasons for attending RXH. Attendance at RXH was predicted by: (*i*) children who were infants; (*ii*) no other domestic child care responsibilities for the care-giver; and (*iii*) no previous attendance documented in the hospital folder.

Conclusion. Appropriate service utilisation by level of care needs to be improved. Users' choice of service appears to be a rational decision based on the accessibility of local primary care services and perceptions of the quality of these services. More appropriate use of primary care facilities therefore requires better access and perceived quality.

Health services for children under 6 years of age in greater Cape Town are characterised by a number of inefficiencies, including the separation of preventive and curative services at community level, and the inappropriate utilisation of specialist hospitals for simple clinical problems. Inappropriate utilisation results in overburdening of existing tertiary resources, low levels of efficiency and staff demoralisation. The recent, free provision of medical services for children under 6 years old has reportedly aggravated the overloading of hospital outpatient departments.

Evidence of inappropriate utilisation of hospitals has increased in recent years. A 1990 review of paediatric admissions to the medical wards at a large teaching hospital in Cape Town found that 51% of admissions could have been handled at a lower level of care,[1] while a more recent study suggested that up to 80% of children from Khayelitsha admitted with gastro-enteritis to a rehydration unit at the same hospital could be managed in a community-based setting.[2] A similar finding of inappropriate utilisation of teaching hospitals by adults has also been documented in Durban[3] and in the inpatient wards at Groote Schuur Hospital in Cape Town.[4]

However, central to improved patterns of utilisation is the need to integrate existing preventive and curative primary care services and to improve the capacity of local facilities to deliver high-quality care.[1,2,5]

Khayelitsha is a large housing development outside of Cape Town with approximately 350 000 residents, the majority of whom live in informal site-and-service settlements. Paediatric services in Khayelitsha are fragmented, provided at a range of different facilities. The Community Health Centre at Site B, Khayelitsha, is the largest primary care complex in the area and contains, on the same grounds, a local authority (Regional Services Council) clinic providing predominantly preventive and promotive services, a Cape Provincial Administration (CPA) day hospital and a maternity obstetric unit (MOU) run by the Peninsula Neonatal and Maternity Services (PNMS). The day hospital provides a 24-hour curative service and has a basic laboratory and X-ray facility, as well as a functioning rehydration unit. Despite sharing the same building, the day hospital and clinic operate entirely independently.

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Other sources of curative care in Khayelitsha are at the Site C Nolungile facility, 6 km away, which runs a combined preventive-curative service on weekdays only, and there are a number of private GPs in the established brick housing areas. A few non-governmental organisations also run a mixture of curative and preventive services in the area. Red Cross Children's Hospital (RXH) is a paediatric teaching hospital located some 25 km west of Khayelitsha and is intended to provide tertiary services for the entire Western Cape. Effectively, there are no secondary hospital services located within easy reach of Khayelitsha.

Services at Site B are generally regarded as inadequate, and severe staff shortages, heavy patient loads and poor quality of service are commonly reported,[6] particularly at the day hospital where median waiting times have been found to be over 5 hours.[7] This situation has been thought to lead to additional loads on tertiary paediatric institutions in the metropolitan area, particularly RXH. Existing data suggest that up to 40% of all public sector consultations for Khayelitsha children under 6 take place at RXH.[8]

Moves to integrate curative and preventive service provision for children under 6 in Khayelitsha have been started, and this study was commissioned in order to assist the implementation and evaluation of the integrated service.

Aims and objectives

This study aimed to evaluate the extent of, and reasons for, inappropriate utilisation of a tertiary hospital's paediatric services for Khayelitsha children under 6 years old. The objectives were: (i) to determine demographic, geographic and socio-economic variables among children and their care-givers attending the outpatient departments at RXH and at Site B day hospital; (ii) to identify the presence of a referral letter, a history of previous attendance at the facility and the final diagnosis for each visit at RXH and Site B day hospital; (iii) to classify the appropriateness of attendances at RXH according to final diagnosis; (iv) to describe reasons given by the care-giver for attendance at the facility; and (v) to identify from the above variables the significant predictors of attendance at RXH compared with Site B.

Methods

A case-referent study design was used to compare the children attending RXH and Site B, with patients attending RXH being the 'cases' and patients attending Site B being the referent group. The study population included all children under 6 years of age who used RXH and Site B day hospital. Site B was sampled on the Monday and Thursday of the first week in July 1994, and RXH on the Monday and Thursday of the following week. All patients attending the respective general outpatient departments were sought for participation in the study. The number of participants seen was compared subsequently to attendance numbers recorded for the same days in the informatics systems at the hospitals, so as to assess the extent to which all children's attendances were captured. Patient and care-giver data were obtained by interview conducted by a single observer using a semi-structured questionnaire. Reasons for attending were recorded by means of an open-ended question and responses were post-coded. The choice of a Monday and Thursday was made to balance the patient load of different weekdays and the same days in consecutive weeks were chosen for the two study sites.

Data on diagnosis and management for each subject were extracted from health facility records 2 weeks after the interview survey was completed by linking interview data to the patient's hospital number. These data on diagnostic outcome were graded by appropriateness for level of care using a substantial modification of criteria reported by Rutkove et al.[3] Visits were defined as appropriate for a referral facility if one or more of the following criteria were met: (i) Admission to the facility or overnight observation; (ii) the presence or reported presence of a referral letter for the visit; (iii) referral to a speciality clinic after the visit; (iv) taking of an X-ray or blood test that was not available at Site B; and (v) a clinical diagnosis compatible with the need for referral from primary level.

Clinical review of hospital data from records required to ascertain criterion 5 above was made retrospectively by a medical practitioner (L.L.). Other criteria used by Rutkove et al. (request for a patient to return for review within a week, abnormal X-ray findings and ordering of laboratory tests[3]) were judged not to be useful in this setting, since Site B has both a radiology department and a small laboratory and only visits requiring blood and X-ray tests that were not available at Site B were included in the criteria. Moreover, doctors' reasons for recalling a patient may have little to do with the appropriateness of the consultation, especially given the knowledge of poor facilities in the community, and this was not used to estimate appropriateness.

These criteria were only used for classifying the appropriateness of RXH visits. Site B is the primary contact facility for most of Khayelitsha. Because the study was focused on inefficiencies in the primary-secondary/tertiary interface, no assessment of appropriateness was made at Site B, where all visits were assumed to be appropriate.

Validity of questionnaire data was assessed by comparing residence and child age documented on the folder with those reported by the care-giver.

Analysis

Data obtained on interview and record review were entered onto Dbase 3+, and univariate and bivariate analyses were performed with Epi-Info.

Multivariate logistic regression, using site of attendance as outcome and a range of possible predictors, was performed with SAS. The model was tested using forward stepwise logistic regression, with a criterion of $P < 0.15$ for improvement in model fit for inclusion. Variables entered into the model were: (i) age of the child; (ii) duration of residence in Cape Town (less than 6 years v. 6 or more); (iii) number of hospitals providing services to children known to the care-giver; (iv) number of children that the care-giver was responsible for looking after; (v) schooling of care-giver; (vi) reported presence of a referral letter; (vii) unemployed status of care-giver; and (viii) previous attendance (documented from the folder) at the institution where the care-giver was interviewed.

Similar regressions were performed, excluding those visits at RXH regarded as appropriate for a tertiary institution.

Comparison of folder data to those obtained on interview was by means of kappa statistic for residence and Pearson's correlation coefficient for the age of the child. The kappa statistic is a measure of agreement between categorical variables that excludes the effects of chance agreement. Statistics of 0.7 or higher indicate excellent agreement, between 0.4 and 0.7 fair to good agreement, and less than 0.4 indicates poor agreement.[9]

Results

A total of 181 clients participated in the study. One hundred and sixteen (64.1%) were interviewed at Site B day hospital and 65 (35.9%) at RXH. This represented a response rate of 100% at Site B day hospital. At RXH, 65% of all apparently eligible care-givers, who made outpatient visits recorded on the hospital informatics system for that day, were interviewed. Incorrect addresses and erroneous inclusion of speciality clinics in the informatics scanning could have accounted for this discrepancy.

Thirty-two per cent of children were infants under the age of 12 months. Care-givers bringing the children were predominantly female (97%), and the mean age of the care-givers was 28.8 years (range 15 - 54). RXH patients were more likely to be infants than Site B patients (51% v. 22%; $P < 0.01$). Care-givers of Site B patients were more likely to be responsible for at least one other child at home (OR = 1.47; 95% CI 1.03 - 2.11; $P = 0.02$) and were slightly less educated (mean years of schooling 8.2 v. 9.0; $P = 0.07$).

Forty (22.1%) respondents reported being employed, of whom a minority (2) reported informal sector activities. Most care-givers were unemployed (66.9%) or students (11.0%). There was no association between unemployment and site of attendance on bivariate comparison. However, fewer student care-givers were seen at RXH (6.2%) than at Site B (13.8%), although this was not statistically significant. No significant differences were found with regard to residential address or type of dwelling (shack v. brick) among the two groups.

The mean number of years resident in Cape Town for care-givers was 8.48 (SD 8.57). However, the range was wide (1 - 41 years). Only 27.1% of care-givers reported having been in Cape Town for 2 years or less. This was slightly higher at Site B (29.3%) than at RXH (23.1%) but the difference was of borderline statistical significance (OR = 1.38; 95% CI 0.65 - 2.96; $P = 0.06$)

Knowledge of the availability of other paediatric facilities was good among both groups. Eighty-six per cent of RXH users knew about, and 68% had used, Site B, while 95% of Site B users had used RXH before. The data indicate a high degree of crossover in use.

Documentation of reported previous attendance was found in 91 (78%) children attending Site B day hospital and 39 (60%) at RXH. There was no significant association between the presence of documentation of previous attendance in the folders and dwelling type or duration of residence in Cape Town. Out of 11 respondents who reported having a referral letter, only 2 were traced in the folders at the 2 week follow-up. Reporting of a referral letter was higher at RXH (10.8% v. 3.5%).

The reasons given by the care-givers for attending the institution where they were interviewed are summarised in Table I below.

Table I. Care-givers' reasons for attendance at the institution at which they were interviewed (%)

Site B (N = 116)

31.0	Near and convenient
18.1	Care-giver always takes the child to Site B
11.2	Cannot afford elsewhere
6.9	Asked by parent
5.2	Knew of the service
4.3	Referred
3.4	Confidence or satisfaction with anticipated treatment
1.7	Asked by RXH to attend at Site B for follow-up
1.7	Cannot go to RXH without a referral letter
1.7	Severity/mildness of child's illness
14.6	Other reason or response not classifiable

RXH (N = 65)

21.5	Treated at another PHC service (including Site B) for current problem — child not better, or for past problem with no improvement
20.0	Anticipated (13.8%; 9 cases) being turned away, or actually turned away (6.2%; 4 cases) at Site B the previous day
18.5	Formal or informal referral to RXH by health services
10.8	Expressed confidence or satisfaction with expected treatment at RXH
9.2	Severity of child's illness
7.7	Previous attendance at RXH by same child or sibling
12.3	Other reason or response not classifiable

Table based on post-coding of most important reason given.

Diagnoses were obtained from folders of 62 children attending RXH and 106 children at Site B. Of the 10 untraced subjects at Site B, 6 were children whose care-givers gave up waiting in the queue and left before the child saw the doctor. At Site B, 154 diagnoses were identified (average of 1.5 diagnoses per visit), while at RXH, 78 diagnoses were made (average of 1.3 diagnoses per visit). Upper respiratory tract infections (40.9%), skin conditions (9.7%) and worm infestation (7.8%) were the most common diagnoses recorded at Site B, while upper (23.1%) and lower respiratory infections (19.2%), gastro-enteritis (10.3%) and worm infestation (7.7%) were the most common at RXH. Pneumonia was diagnosed in 5 patients at RXH and only 1 at Site B. Gastro-enteritis was diagnosed less often at Site B (5.2%) than at RXH (10.3%).

There was no association between site of attendance and any of the following variables: admission, being asked to return for follow-up, having laboratory tests or X-ray abnormality, and the presence of a referral letter in the folder.

Thirty-one per cent of attendances of Khayelitsha patients at RXH were judged to be appropriate on the basis of the criteria outlined earlier. Clinical criteria alone for appropriateness were used in 6 of these cases (including 3 of pneumonia, 1 of chronic otitis media, 1 lower respiratory tract infection (LRTI) and 1 case of fluid hernia). In 4 cases the RXH doctor asked the patient to return for follow-up for

conditions that were judged to be appropriate for follow-up by primary care facilities (2 skin rashes, 2 LRTI). These were not included as appropriate for RXH. Typical diagnoses of inappropriate visits included upper respiratory tract infection (URTI) (31%), LRTI (24%), gastro-enteritis (13%) and worms (11%). All visits at Site B were considered to be appropriate for Site B.

Of the 43 children who were inappropriate attenders, 4 (9%) had been turned away at Site B the previous day and 9 (21%) reported bypassing Site B because they anticipated being turned away. Among the others, reasons for travelling to RXH included 'informal' referrals from family members or other health workers (no referral letter), and a previous attendance at RXH for unrelated problems.

Results of multiple logistic regression used to model the likelihood of attendance at RXH are presented in Table II. Significant predictors of attendance at RXH were the child's being an infant and the absence of other domestic child care responsibilities on the part of the care-giver, while non-significant but positive associations were shown for the absence of past attendance in the folder and long-term residence in Cape Town (6 years or more). Variables entered in the model that were not significant included the schooling of the care-giver, the presence of a referral letter, unemployed status of the care-giver and the number of hospitals in Cape Town known to the care-giver.

Table II. Significant predictors of attendance at RXH*

Variable	Odds ratio	Lower limit	Upper limit
Patient is an infant	3.65	1.76	7.54
No other domestic child care	2.92	1.43	5.97
No evidence of past attendance in folder	2.02	0.97	4.21
Arrived in Cape more than 5 years ago	1.82	0.91	3.62

* Forward stepwise multiple logistic regression using P < 0.15 as the criterion for inclusion in the model.

The regressions were repeated excluding the 19 visits at RXH regarded as tertiary level consultations and the results were similar except that the presence of other children to care for at home fell out of the model. The point estimates for the odds ratio for infants (3.02), residence greater than 5 years (1.77) and absence of past evidence of previous attendance in folders (3.32) were similar in direction of association and approximate magnitude, but the latter variable became significant at the 95% level.

Agreement between folder and interview data appeared good. The Pearson's correlation coefficient for agreement between reported age of the child and age (in months) recorded on the folder was 0.91 (95% CI 0.89 - 0.93). The kappa statistic for agreement on residence was 0.59 for patients at RXH and 0.77 for Site B. Thirteen (20%) of the children attending RXH who live in Khayelitsha had a Guguletu or Nyanga address on their folders. Only one of the Site B patients resident in Khayelitsha had a folder with an address outside of Khayelitsha. The misclassification of address was significantly higher at RXH (Fisher's exact test, $P \ll 0.001$).

Discussion

The data in this study suggest substantial inappropriate utilisation of paediatric services for children under 6 in Khayelitsha. A high proportion of RXH visits (69%) could be managed more appropriately at primary care level. Given that approximately 40% of public sector daytime curative consultations involving children under 6 from Khayelitsha take place at RXH,[6] there is great scope for reducing patient loads on teaching hospitals by correcting inappropriate utilisation. The World Health Organisation estimates that over 80% of all consultations could be managed at primary level with only 3 - 5% requiring tertiary level care.[10] Based on these study data, if all inappropriate visits at RXH were to be seen at primary level, the proportion of consultations for children under 6 from Khayelitsha seen at primary level would rise to over 80%.

The study may have underestimated the proportion of inappropriate RXH outpatient visits. The criteria used for inclusion as appropriate visits for RXH were on the generous side, as most pneumonias and lower respiratory infections could be managed at either primary or secondary care level, and the presence of a referral letter may not necessarily reflect referral for an appropriate level of care. Considerable cost-savings may result from a redistribution of these primary level visits to a community health centre, where personnel costs and other overheads are lower, and where expensive investigations are less frequently applied.

However, it appears that many care-givers attending RXH have made rational and fairly well-informed choices. If the child is an infant, if they are free from other child care responsibilities, if they have lived longer in Cape Town or if they have been turned away or anticipate being turned away at Site B day hospital, care-givers are more likely to choose RXH. This is supported by the finding that most RXH users knew of services available at Site B, yet chose to go to RXH, despite the additional time and transport costs involved. Care-givers appear to be responding to real problems in the quality of care at Site B day hospital, such as overcrowding and long waiting times[6,7,11] and the likelihood of being turned away from the facility. While the Site B complex was established as the main primary care facility for Khayelitsha residents, problems of malutilisation are not due to irrational patient behaviour. It is the responsibility of the health service authorities to improve access and quality of primary care if malutilisation is to be corrected.

A key issue not explored in depth in this particular study is the lack of a secondary level of medical care, since most of the cases reached RXH directly from community health centre level. It could be argued that the outpatient department provides a secondary level of care between first contact care and highly specialised services. The interfaces between primary and secondary, and between secondary and tertiary care, are critical issues in health care planning globally[12,13] and are increasingly gaining attention in South Africa given moves toward district health care planning.[14] A further operational deficiency demonstrated was the poor use of referral letters, despite the importance of this communication for optimal clinical management.[15] While 11 patients reported having a referral letter on arrival, only 2 patients had evidence of the letter in their folders 2 weeks later. These additional inefficiencies in utilisation and

management compound the evident mismatching between patient choices and hospital level of care.

Some methodological issues for future health services research emerged in this study. Incomplete agreement between interview data and folder information in respect of patient address may limit the validity of research findings based on only one source of data, such as clinic or hospital records. Similarly, lack of previous documentation of attendance may confound study findings. In this study, the high proportion of children at Site B with evidence of previous attendance may have a number of explanations: Firstly, clerical staff at the Site B facility may either be more familiar with patient names (and less likely to misspell them) and addresses, or may be able to retrieve files more easily than staff at RXH. Staff censure, open or implicit, of care-givers bringing children to RXH for inappropriate reasons may also encourage the giving of different addresses with each visit. These factors may bias future studies.

Alternatively, it is possible that the difference in documented attendances may reflect a real difference due to the perceived severity of the child's condition by the care-giver, who will take the child to Site B for less serious problems but to RXH if they think the child is seriously ill. Because severe illness is less common than mild morbidity, this could account for the number of children with no past history of attendance at RXH. The perceived seriousness of the child's illness as a motivating factor is supported by the qualitative research findings at the same study sites[16] and also by the fact that younger children were more likely to be brought to RXH, since one would anticipate care-givers to be more concerned about the health of infants.

The main weaknesses in the study may relate to a fairly low response rate at RXH (65%) and, given the study design, to the inability to blind observers to the 'outcome' status of the subjects. This may introduce sampling and measurement biases, especially if the non-responders differ significantly from those included in the study. However, if such biases are present, we do not believe these to be a strong effect, as judged from the consistency with results of qualitative interviews at RXH and Site B day hospital[16] and from informal feedback from staff at both sites.

Despite any limitations, this study has clearly emphasised the need to strengthen peripheral primary care services, and to improve the access to and quality of such services. A similar study of the management of diarrhoeal disease[2] previously led to the establishment of a primary level rehydration room in Khayelitsha to improve access and utilisation patterns, and similar interventions are needed to address the full spectrum of inappropriate utilisation of health services for primary level illness. The Site B facility currently consumes a sizeable portion of primary care public health expenditure in the region, yet is failing to meet the objectives required of a PHC facility.

Data in this study suggest that one of the best ways to prevent inappropriate hospital use is to reduce waiting times or the risk of being turned away at primary care clinics. The clinic network in the Western Cape is currently being expanded, which can be expected to improve access to primary care. Effective access, however, requires that clinics be fully staffed, preferably with professionals who have diagnostic and curative skills. More efficient clinic organisation could also reduce waiting times,[11] and functional integration of curative and preventive services could reduce inefficiency while increasing appropriateness of care.[17] Improved staff-patient communication aimed at improving transfer of information as well as at affirming patients' dignity may also encourage patients to use clinics appropriately,[16] but this may require considerable cultural changes which would take time.

Shortly after this study was completed, President Mandela announced a policy of free health care for all pregnant women and children under 6 years of age, which has reportedly exacerbated inappropriateness of health care attendance patterns (D. McCoy, Child Health Unit, Cape Town, September 1995 — personal communication). Application of bypass fees (charged when patients omit first attendance at an appropriate primary care facility) may be effective in discouraging inappropriate hospital use.[18] However, unless primary care facilities are available, as well as functionally accessible in communities, such strategies are both unfeasible and morally indefensible. In practice, it may be impossible to identify those patients who do have effective access to primary level facilities. Furthermore, the perception of the introduction of some form of user fee may make such a strategy politically unacceptable at a time when expectations of delivery in health care are high.[19]

Recommendations to integrate the preventive (Regional Services Council) and curative (day hospital) services at Site B for children under 6 years[5,7] were being operationalised in 1994. The plans comprised a nurse-based service, supported by medical officers from RXH and sessional staff to provide integrated curative and preventive paediatric care at Site B. Such a strategy, coupled with improved management of local facilities, could enable the provision of high-quality, accessible PHC services in the community, and reduce the inappropriate consumption of scarce health care resources at specialist hospitals.

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