

A Pediatric Cardiology Outreach Clinic in a Local Hospital: An Experience Review from South Sharqiyah, Oman

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Abstract

Objectives: Specialized pediatric cardiology clinics conducted in local Hospitals are an important part of delivering specialized care to patients close to their homes. The purpose of this study is to review our experience of a specialized pediatric cardiology outreach clinic conducted in Jaalan Bani Bu Ali Hospital, South Sharqiyah, Oman between March 2018 and June 2022.

Methods: Patients records for each patient seen were reviewed to determine: patients demographics, reason of referral, underlying diagnosis and outcome of the clinic visit.

Results: Over the study period, 29 clinics were conducted and 360 patients were seen. 200 (55.6%) were male with a median age of 13 months. 271 (75.3%) patients were referred because of cardiac murmur. The majority of patients had normal cardiac evaluation 177 (49.2%). The commonest congenital heart diseases detected were mild pulmonary valve stenosis (14.7%) and moderate to large secundum atrial septal defects (13.7%). Significant cardiac lesions detected included severe pulmonary hypertension (2.2%), tetralogy of Fallot (2.2%) and cor triatriatum sinistrum (0.5%). Overall, 70 patients (19.5%) referred for tertiary care Hospitals and 179 (49.7%) were reassured and discharged.

Conclusions: Our study showed that conducting a specialized pediatric cardiology outreach clinic in an overpopulated areas is effective and well accepted by families. It reassures many families and reduces unnecessary travel to specialized centers. It helped in detecting patients with significant cardiac defects who they need urgent care. Conducting specialized clinics in primary and secondary health canterers could be implemented by other subspecialities to reduce the long waiting list.

Keywords: Outreach clinics, pediatric cardiology, Echocardiography, Congenital Heart disease.

Introduction

The incidence of congenital heart disease (CHD) in Oman is 7.1/1000 live births, which is similar to the international literature.¹ Wilayat Jaalan Bani bu Ali is a district in south sharqiyah governorate with an estimated population of over **107,637** as per the national center for statistics and information census in 2020.² It is about 350 kilometers south of Muscat. Currently there is only one primary care level Hospital and other local health centers spread over the wide area of the wilayat. Providing specialized pediatric cardiology care in local Hospitals is limited in most parts of the world. Centers providing such care are located mainly in major cities. Referring such patients to pediatric cardiology clinics overwhelms these clinics and increases the waiting list. The majority of referrals turned to have normal findings and

requires reassurance but some require urgent or semi urgent care. Conducting specialized pediatric cardiology clinics with pediatricians in the local Hospitals is an important part of delivering specialised care to patients close to their homes. Patients and families attending a local specialist clinic have less travelling time and financial benefits. These clinics provide the cardiologist with an opportunity to educate staff, improve local care, and offer early management and intervention if required sooner for certain paediatric heart problems and reassure others who have normal findings. Our aim in the present study is to review our experience of conducting a pediatric cardiology outreach clinic in Jaalan Bani Bu Ali Hospital in South Sharqiyah, Oman from March 2018 till June 2022.

Methods

Following approval of the study from the Centre of studies and Research at Directorate General of planning and studies at Ministry of Health, we reviewed the records for each patient seen in the outreach clinic between March 2018 and June 2022 to determine: patients demographics, reason of referral, underlying diagnosis, outcome of the clinic visit and clinic size. These data were extracted from the patient's electronic system (Al Shifa) and the clinic log book. Descriptive statistics were used for analysis of data using the statistical Package for Social Science (SPSS) software for windows version 25 (SPSS Inc., Chicago, IL, USA). Frequencies for categorical variables and means and medians for continuous variables were obtained.

Results

A pediatric cardiologist did 29 outreach clinic visits over the study period (from March 2018 and June 2022) in Jaalan Bani Bu Ali Hospital in the South Sharqiyah region. The visits comprised new consultations from local health care providers and follow-up visits for patients previously seen in tertiary paediatric cardiac centers. The visits were conducted once per month or as required, in liason with the local Hospital, according to the waiting list.

Over the study period, 360 individual patients were seen, 200 (55.6%) were male and 160 (44.4%) were female with a median age of 13 months (1 day - 156 months). The maximum number of patients seen in each clinic was 21 referrals and the lowest number was 6. The majority of the referrals were because of an accidentally discovered heart murmur, 271 (75.3%). Other reasons for evaluation were as follows: 21 (5.8%) patients were followed up after a diagnosis of congenital heart disease, 17 (4.7%) patients were followed up after cardiac and interventional cardiac procedures, 12 (3.3%) patients were evaluated for suspected trisomy 21, 9 (2.5%) patients were reviewed as part of evaluation for arrhythmia and syncope, another 9 (2.5%) were assessed as part of evaluation for recurrent chest infections and 3 (0.8%) patients were referred for suspected acquired heart disease [Table 1]. The majority of children attended the clinic had normal cardiac evaluation 177 (49.2%). The commonest congenital heart disease (CHD) lesions detected were mild pulmonary valve stenosis, moderate to large secundum atrial septal defects and combined secundum atrial septal defect and ventricular septal defect accounting for 14.7%, 13.7% and 6.0% respectively from the group having abnormal echocardiographic examination, [Table 2]. Significant cardiac lesions needing urgent or semi-urgent referral to tertiary care centre included severe pulmonary hypertension, tetralogy of Fallot, severe pulmonary valve stenosis, severe aortic valve stenosis and cor triatriatum sinister accounting for 2.2%, 1.6%, 1.6%, 1.1% and 0.5% respectively. Three (50%) patients were found to have features of non compaction cardiomyopathy out of the six patients who were referred because of palpitation. The majority of patients 6/9, (67%) who were referred because of recurrent chest infection had normal cardiac evaluation. One patient was found to have severe pulmonary hypertension out of the three patients who were referred because of syncope. Overall, 70 patients (19.5%) required referral to tertiary care Hospitals, 111 (30.8%) patients followed up locally and 179 (49.7%) were reassured and discharged. The clinic was well accepted by families, local staffs and administration as it helped to deliver care to these patients close to their home and reassured many.

Table 1: Patients' demographics and reasons for referrals (n 360).

Parameter	Results	Percentage (%)
Age, median, months (range), (days)	13 (1-156)	
Sex (M/F)	200/160	55.6/ 44.4

Reason for referrals:

Cardiac murmur	271	75.3
Follow up after a diagnosis of CHD	21	5.8
Cardiac screening for DS	12	3.3
Follow up / cardiac surgery	9	2.5
Follow up/ cardiac catheterization	8	2.2
Recurrent chest infections	9	2.5
Palpitation	6	1.7
Syncope	3	0.8
Suspected acquired heart disease*	3	0.8
Others **	18	5%

Legend: CHD = congenital heart disease, DS = Down syndrome

** Kawasaki disease, myocarditis*

*** Exertional symptoms, developmental delay, failure to thrive, dysmorphic features*

Table 2: Echocardiographic findings of the patients seen the pediatric cardiology outreach clinic (n 360).

Findings	Number	Percentage out of total patients (n 360)	Percentage (%) out of abnormal Echo (n 183)
Normal	177	49.2 (177/360)	50.8 (183/360)
Moderate to large secundum ASD	25	6.9	13.7
Mild PS	27	7.5	14.7
Small midmuscular VSD	21	5.8	11.5
Small secundum ASD	22	6.1	12.0
PFO	19	5.3	10.2
ASD secundum + VSD	11	3.1	6.0
Severe PHTN	4	1.1	2.2
Mild AS	4	1.1	2.2
Non-compaction CMP	5	1.4	2.7
ASD+ PDA	4	1.1	2.2
Multiple VSD	4	1.1	2.2
TOF	3	0.8	1.6
Severe PS	3	0.8	1.6
Sinus venous ASD	2	0.6	1.1
AVSD	3	0.8	1.6
Small PMVSD	2	0.6	1.1
Moderate to large PMVSD	2	0.6	1.1
Small PMVSD	2	0.6	1.1
Moderate to severe MR	2	0.6	1.1
ASD+VSD+PDA	2	0.6	1.1
Situs inverses totalis	2	0.6	1.1
HCM	4	1.1	2.2
Moderate to severe AS	2	0.6	1.1

Small PDA	2	0.6	1.1
Moderate to large PDA	1	0.3	0.5
Cor triatriatum sinistrum	1	0.3	0.5
Double aortic arch	1	0.3	0.5
DCM	1	0.3	0.5
Mild AR	1	0.3	0.5
Prosthetic mitral valve	1	0.3	0.5
Anomalous LUPV to LIV	1	0.3	0.5
Moderate to severe PR	1	0.3	0.5

Legend: ASD = atrial septal defect, PS = pulmonary valve stenosis, VSD = ventricular septal defect, PFO = patent foramen ovale, PHTN = pulmonary hypertension, AS = Aortic stenosis, CMP = Cardiomyopathy, PDA = Patent ductus arteriosus, TOF = Tetralogy of Fallot, AVSD = Atrioventricular septal defect, PMVSD = Perimembranous ventricular septal defect, MR = Mitral valve regurgitation, HCM = Hypertrophic cardiomyopathy, DCM = Dilated cardiomyopathy, AR = Aortic regurgitation, LUPV = Left upper pulmonary vein, LIV = left innominate vein, PR = Pulmonary valve regurgitation.

Definitions: (by Echocardiography assessment)

** Pulmonary valve stenosis: Mild: < 40mmHg, moderate: 40- 60 mmHg severe: > 60 mmHg*

** Aortic valve stenosis: mild: mean gradient <25 mmHg or PG <40 mmHg, moderate: mean gradient 25 to 40 mmHg or PG 40 to 70 mmHg, severe: mean gradient >40 mmHg PG >70 mmHg*

** Atrial septal defects (diameter): Trivial ≤ 3 mm, small > 3 to ≤ 6 mm in diameter, moderate > 6 to ≤ 8 mm in diameter, large > 8 mm in diameter*

** Ventricular septal defects classified in comparison to the diameter of the aortic valve annulus: small: less than or equal to 25%, moderate: between 25 – 75%, large: > 75%*

** Patent ductus arteriosus: very small:< 1.5 mm, small: 1.5- 3mm, moderate: > 3 mm – 5 mm, large: > 5 mm*

** Pulmonary hypertension assessment by echocardiography: An echocardiographic assessment of a peak Tricuspid valve velocity > 2.8 m/s suggest pulmonary hypertension after excluding right ventricular outflow tract obstruction*

Discussion

The availability of pediatric cardiac care units is limited in most parts of the world. In developing countries, pediatric cardiac care units are concentrated in major cities, cater to enormous number of children and are not accessible to vast segments of population. It may be difficult to bring the child for echocardiographic diagnosis to the clinic for a variety of financial, social, and other practical reasons. Conducting specialized outreach clinics has been shown to be visible, convenient with significant financial benefits.^{3,4} Patients with non urgent and mild problems can be assessed and managed locally while those with moderate or severe problems can be transferred on a priority basis for further diagnostic clarification or management cutting down the otherwise long waiting periods for appointments which sometimes may make the problem more complex or even worse result in death without a proper diagnosis and work-up.⁵ This study reported here showed that the majority of referrals could be reassured by a single visit to a specialist in the local Hospital (49.2%) as the majority had innocent heart murmurs.^{5,6} This obviously will have a great impact on these families. It will reduce the financial cost and parental stress. Moreover, more urgent cases will be seen earlier in the specialized centers and so helping in reducing the long waiting time. Our study also showed that significant cardiac lesions needing urgent tertiary cardiac care like severe aortic stenosis, severe pulmonary stenosis and obstructed cor-triatriatum sinistrum could be picked up early and referred in time thus reducing the high morbidity and mortality associated with delayed diagnosis and intervention. Wagsta et al reviewed their experience of pediatric cardiology outreach clinic from Royal Brompton Hospital in the United Kingdom and concluded that is an increasing need for local pediatric cardiology services. They recommended increasing the number of pediatric cardiologists, or developing local expertise (general paediatricians with an interest in cardiology.⁷ Al harbi et al. from Saudi arabia showed that 55% of echocardiography done by experienced pediatric echo sonographers were normal and did not need referral to cardiac centers.⁸ Other Specialized outreach clinics are practiced world wide. A study conducted by Bon et al to evaluate outreach clinics held by specialists in general practice in England, found that the process of care and the efficiency was of higher quality than outpatients care.⁹ Reid et al did a cost analysis of outreach psychiatry clinics and found that running such clinics has a substantial cost savings for the public health care system and can reduce the travel cost burden for patients who do not have public travel funding.¹⁰ The other benefit of conducting pediatric cardiology outreach clinics is that they provide the opportunity for the cardiologist to train the local staffs to do screening echocardiography especially in the setting of intensive care units. Such service will be utilised more if

telemedicine is readily available locally.¹¹ A Cochran systematic review concluded after evaluating 73 outreach interventions that specialist outreach clinics in primary care and rural Hospital settings can improve access, outcomes and service use.¹² There are some challenges however: local facilities are not always ideal, and as the clinic is usually a consultant led, it might not be that frequent due to the staff increasing commitments in their institutes. Furthermore, availability of the necessary equipments like basic echocardiography and electrocardiography machines are mandatory to run such clinics smoothly.

Conclusion

Our study showed that conducting a specialized pediatric cardiology outreach clinic in an overpopulated areas is effective and well accepted by families. It reassures many families and reduces unnecessary travel to specialized centers. It helped in detecting patients with significant cardiac defects who they need urgent care. Conducting specialized clinics in primary and secondary health centers could be implemented by other subspecialties to reduce the long waiting list.

Disclosure

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