The word ‘prevalence’ of congenital heart disease (CHD) usually means the estimated population of people with CHD at any given time. The term ‘incidence’ of CHD means the annual diagnosis rate or the number of new cases of CHD diagnosed each year. Most of the recent studies in the Gulf region measured the incidence of CHD in children.1,2 There are various local studies on the pattern of CHD,3,4 and these studies are descriptive analyses of a selected sample. Our study is the first community-based national prevalence study of symptomatic CHD in children and adolescents in Saudi Arabia, and includes CHD presenting with symptoms or clinical signs. Excluded are asymptomatic patent ductus arteriosus in the first 3 months of life; simple bicuspid aortic valves; isolated peripheral pulmonary artery stenosis with no clinical significance; and minor atrial shunts across defects measuring less than 5 mm.

METHODS
Our study was part of the Health Profile of the Saudi Children and Adolescents Project. The sample was

| Diseases                          | Number of cases | Prevalence per 10 000 |
|-----------------------------------|-----------------|-----------------------|
| Ventricular septal defect         | 18 males, 26 females, 44 (46%) | 10 |
| Atrial septal defect              | 2 males, 6 females, 8 (8.5%)  | 2 |
| Other non-cyanotic CHD*           | 3 males, 4 females, 7 (7.5%)  | 2 |
| Cyanotic CHD†                     | 5 males, 5 females, 10 (11%)  | 2 |
| Unspecified CHD                   | 14 males, 12 females, 26 (27%) | 6 |
| Total CHD                         | 42 males, 53 females, 95 (100%) | 21 |

*Patent ductus arteriosus 1, coarctation of the aorta 1, aortic stenosis 2, pulmonary stenosis 2 and Ebstein’s anomaly 1. Tetralogy of Fallot 3, transposition of great arteries 2, complex cyanotic heart disease 5.

RESULTS
During the period 2004-2005, of a total of 45 682 children and adolescents, 95 had CHD for a prevalence of 21 per 10 000. The types of diseases are shown in Table 1. Ventricular septal defect (VSD) was the commonest diagnosis, occurring in 44 of the 95 (46.3%) children with CHD with the highest prevalence of 10 per 10 000.
The next most common group was unspecified CHD in 26 of 95 (27.4%) for a prevalence of 6 per 10 000. The remainder of the cases, such as cyanotic CHD, atrial septal defects (ASD), and other non-cyanotic CHD occurred much less commonly with a prevalence of about 2 per 10 000 each.

The distribution of CHD according to sex of patients showed a slight predominance in females, with 53 girls and 42 boys, for a female to male ratio of 1.3:1 (Table 1). VSD was slightly more common in females with a female to male ratio of 1.4:1. ASD was seen more in girls with a female to male ratio of 3:1. Cyanotic CHD was equal in both sexes.

The regional distribution of CHD showed that the Central Region had the highest prevalence of 27 per 10 000, followed by the Northern and the Eastern Regions, with a prevalence of 25 per 10 000 each and the Southwestern Region prevalence of 21 per 10 000. The prevalence was less common in the northwestern region, with 10 children only (prevalence 9 per 10 000).

To assess the prevalence of CHD more accurately, the results were related to sample size in each region: North Western Region (Makkah and Madinah regions)=10 711, Central Region (Riyadh and Qassim regions)=11 194, Eastern Region (Damam region)=4420, Northern Region (Jouf, Northern Border, Hail and Tabuk regions)=8 959, and the Southwestern Region (Assir, Giza, Najran and Al Baha regions)=10 398.

**DISCUSSION**

The prevalence of CHD in Saudi children is compared with other studies in Table 2. The prevalence in our study was lower than in hospital-based studies due to variations in methods and age differences, whereas the prevalence was higher than in school-based studies due to age differences. The prevalence of CHD is related to the relative frequency of VSD, whereas the most common type of CHD. The majority of VSD are closed spontaneously in early childhood, so the prevalence of CHD in this community-based study (which includes a wide age range) was expected to be lower than in hospital-based studies, which are done usually in infants or newborns. The prevalence of CHD also depends on the diagnosis of minor cardiac defects such as small atrial septal defect, small patent ductus arteriosus, and mild pulmonary valve stenosis. These minor lesions were not diagnosed in this community study due to subtle clinical signs. Most newborns with severe types of complex cardiac lesions die before 1 year of age, which also reduces the prevalence of CHD in older children. These factors explain the low prevalence of CHD in this study in comparison with hospital-based studies.

Our study showed a low prevalence of CHD compared with similar community-based studies in other countries such as China and India, which is either due to actual low prevalence in Saudi Arabia or under-re-
Symptomatic congenital heart disease

The prevalence was 42 per 10,000 in Indian children younger than 15 years and 50 per 10,000 in Chinese children (aged 3–18 year), which are higher than the prevalence of 21 per 10,000 in Saudi Arabia.

According to the KFSH study, the southwestern region of Saudi Arabia near the border with Yemen and the northern part of the Eastern Region appear to exhibit a higher burden of CHD. Our study demonstrates a Central Region dominance followed by the Eastern Region and the Northern Region, with the last being the Southwestern Region. The KFSH study was hospital-based using data on admitted patients, while our study was community based, which explains the difference between the two studies.

A limitation of our study is that the group of children with unspecified CHD is a large group (27% of total children with CHD). These children were diagnosed as having CHD, but without supporting medical reports from concerned hospitals and thus our diagnosis is based on history and clinical examination only. These children were kept in a separate group to avoid bias and included in the total prevalence of CHD in the Kingdom, but their significance in the prevalence of various types of CHD cannot be ignored.

This nationwide community-based study for CHD has revealed a relatively low frequency of CHD, the commonest being VSD, with the frequency lower than reported from other populations. We still need supportive community-based studies to measure the prevalence of CHD in different regions of the country. In addition, we need a multicentric study on the epidemiology of CHD to assess the pattern of CHD in Saudi Arabia, and the survival and outcome of affected babies.

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