Original Article

School Screening For Scoliosis in the Eastern Part of Nepal

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Abstract

Background

Scoliosis is common in children of school going age particularly in the adolescents. This condition is asymptomatic and often children present in the advanced stage of this condition with large deformity. Therefore, early detection avoids the problems associated with large curves.

Material and Methods

Retrospective analysis of data obtained from screening of eight schools in the eastern part of Nepal between April 2016 and May 2017 was done; Morang district (5 schools) and Sunsari district (3 schools). A consultant Orthopaedic Surgeon, a trained Physiotherapist and an Orthopaedic nurse conducted school screening for scoliosis using the Adam's forward bend test in the Morang district while the latter two were involved in screening in the Sunsari district. The data collected included demographics, number of positive cases and treatment prescribed.

Results

5505 children {2840 boys (51.6%) and 2665 girls (48.4%)}were screened for scoliosis in this period. Majority of patients were from the Morang district (86.2%). All six children (five girls and one boy) who were found to have positive Adam's forward test had adolescent idiopathic scoliosis. One child had a curve of 35 degrees and bracing was started. Rest of the children had curves less than 25 degrees and were kept on regular follow up. The referral rate was 1.1 per 1000 children screened for scoliosis.

Conclusion

Though the overall prevalence of scoliosis appears to be less in our population, school screening is still important for two main reasons. This may be the only way to detect cases early so that treatment can be instituted before deformity becomes large. Secondly, this activity would also spread awareness about this little known condition in the community.

Key words

Scoliosis; school screening; Adam's forward bend test

Introduction

Scoliosis is a lateral curvature of spine greater than 10 degrees [1]. This condition is known to occur most commonly in the adolescents and the etiology is unknown in majority of them. Children with this condition are otherwise asymptomatic [2]; therefore, it is not uncommon for children to present late with big deformities.

Progression of scoliotic curve is determined by skeletal maturity and curve magnitude [3-4]. Early detection and intervention in the form of bracing prevents curve progression for the curve magnitude

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between 25 and 40 degrees [5-7] in skeletally immature adolescents. While curves in the surgical range (50 degrees and above) are better managed early with minimal complications thus halting progression.

The actual incidence of scoliosis in Nepal is yet to be determined. This study aimed to review the data on children of school going age who were screened for scoliosis in the Morang and the Sunsari districts in the eastern part of Nepal to estimate the prevalence of scoliosis in this region of the country.

Material and Methods

A retrospective review of data obtained from school screening program for scoliosis between April 2016 and May 2017 was done. IRC approval was obtained.

Five schools in the Morang and three schools in Sunsari districts in the eastern part of Nepal were screened for scoliosis in this period. A consultant Orthopaedic Surgeon, a trained Physiotherapist and an Orthopaedic nurse conducted school screening for scoliosis using the Adam's forward bend test in the Morang district while the latter two were involved in screening in the Sunsari district. Since no such screening has been done in the past in this region, all children of school going age (from nursery to standard ten) were screened. The consent for screening was taken from the school authorities after briefing them in detail about the purpose and procedure for screening.

The following data were collected: number of students screened, age, gender, number of students who were referred and number who came for further evaluation; number of students who had scoliosis and Cobb angle; treatment given (brace, surgery, none) and number of patients with spinal deformities other than scoliosis.

Categorical and discrete variables were summarized with frequency and percentages. STATA version 12.0 (STATACorp. College Station, TX) was used to analyze the data.

Results

A total of 5505 children were screened for scoliosis in this period. There were 2840 (51.6%) girls and 2665 (48.4%) boys (Table 1). Majority of children screened were from the Morang district, n = 4748 (86.2%); girls 2488 (52.4%) and boys 2260 (47.6%). The number of children screened in Sunsari district was 757 (13.8%) out of which 405 (53.5%) were boys and 352 (46.5%) were girls.

Table 1: Demographic Data

School	District	Boys	Girls	Total	Suspected Cases	Sex
School 1	Morang	362	456	**818**	0	
School 2	Morang	284	358	**642**	0	
School 3	Morang	738	711	**1449**	1	Girl - 1
School 4	Morang	403	372	**775**	0	
School 5	Morang	473	591	**1064**	3	Girls - 2; Boy -1
School 6	Sunsari	61	50	**111**	0	
School 7	Sunsari	274	247	**521**	2	Girls - 2
School 8	Sunsari	70	55	**125**	0	
Total		2665	2840	5505	6	

Six children (five girls and one boy) were found to have positive Adam's forward bend test and were referred to the hospital for further evaluation. All these children were found to have scoliosis. The referral rate was 1.1 per 1000 children screened for scoliosis. All except one child had curves less than 25 degrees (Table 2) and were kept on regular follow up. Bracing was started for the child with curve of 35 degrees (case 4).

Table 2: Children with Identified Idiopathic Scoliosis				
Case	Age	Sex	Cobb Angle	Treatment
1	12	F	15	Observation
2	11	F	18	Observation
3	11	F	20	Observation
4	14	M	35	Bracing
5	13	F	12	Observation
6	12	F	16	Observation

Out of eight schools screened for scoliosis, suspected cases were identified in only three schools (two schools in Morang district and one school in Sunsari district). All the suspected cases were found to have idiopathic scoliosis and none of them had congenital or other types of scoliosis.

Discussion

Early detection of scoliosis in children prevents devastating physical and psychological problems associated large curves. Curves greater than 100 degrees are associated with major respiratory problems [1]. Similarly, large deformities are known to have high psychological impact in the minds of adolescents and these children are often observed to have low self-esteem [8]. Scoliotic curves greater than 50 degrees at skeletal maturity have been observed to progress at the rate of one degree per annum leading to significant morbidity [1] School screening for scoliosis helps in early detection of cases.

Early intervention in the form of bracing has been found to be very effective to prevent progression of scoliosis for curves between 25 to 40 degrees [5-7] in the skeletally immature adolescents. The school screening for scoliosis in the present series detected one child with a curve of 35 degrees in whom bracing was started. Remaining children were also skeletally immature with the risk of curve progression and hence were kept on regular follow up.

Numbers of studies have reported diverse referral rates following school screening for scoliosis. Lonstein reported a referral rate of 34 per 1000 children screened in Minnesota, the USA [9]. In a population-based study of Yawn et al in Rochester (the USA), the referral rate was 41 per 1000 and 74% of the children who were referred were identified to have scoliosis [10]. Similarly, the referral rate was 23 per 1000 for screening done in the District of Columbia (the USA) [11]. However, only 47% of children who were referred actually came to the hospital for further evaluation and 54% of those who reported had scoliosis. The referral rate in the current series was 1.1 per 1000 children screened for scoliosis. Six children were referred and all six children were confirmed to have structural scoliosis. Only one of these needed active treatment in the form of bracing. The incidence of scoliosis has been found to be higher in the Caucasians than in the Blacks [10]. The actual incidence of scoliosis has not yet been determined in the Nepalese population. The lower referral rates in the present series could be due to lower incidence of scoliosis in our patient population. However, a prospective study with a larger cohort is needed to determine the true incidence.

Early detection of scoliosis is possible in developed countries where 'School Health Program'[11-12] exists and the school nurses do scoliosis screening routinely. Any suspected cases then are referred to the hospital. In countries like ours where school health program is nonexistent, routine screening by a team of experts from a hospital still has a significant role in overall care of children with scoliosis for two main reasons. Firstly, this may be the only way to detect the children with scoliosis early when they can still be treated effectively by nonoperative treatment methods like bracing. Secondly, this would also be an important means to spread awareness in the Nepalese

community about this little known condition.

Though this is one of the few studies on prevalence of scoliosis in Nepal, it has number of limitations. This is a retrospective study with its intrinsic biases. Though we could have an estimate of prevalence of scoliosis in this region but the sample size was small to generalize the results to the whole population.

Conclusion

Although the overall prevalence of scoliosis appears to be less in our population, school screening for scoliosis is still important as a public health program for early detection of cases and to increase the consciousness about scoliosis in the general population.

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