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Referral Outcomes of Identified Health Problems and Difficulties Related to School Medical Inspections in Government Schools in an Education Zone in Sri Lanka

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ABSTRACT

Background and Introduction: School Medical Inspections (SMI) assess the health status of children, and provide opportunities for early detection, referral and prevention of disease conditions among school-aged children in Sri Lanka. There is paucity of data on the outcomes of referrals and difficulties encountered in relation to SMI. This study aimed to describe the outcomes of identified health problems in SMI and the difficulties encountered by public health staff in the conduct of SMI in an educational zone in the Kandy District, Sri Lanka.

Methods: This study was comprised of a quantitative and a qualitative component. The quantitative component - a descriptive cross-sectional study was conducted with secondary data of 87 government schools in the Katugasthota educational zone in Kandy district, Sri Lanka. The study sample consisted of 2,876 children in whom health problems were identified and referrals were made. The qualitative component - key informant interviews (KIIs) were conducted among 5 Medical Officers of Health (MOH) and 10 Public Health Inspectors (PHIs) to identify the difficulties they encountered related to SMI.

Results: The overall SMI coverage was 88.6%. Dental caries was the main health problem identified (22.9%, N=2,247). Other leading conditions included: skin diseases (1.1%, N=110); anemia (2.1%, N=202); visual defects (1.8%, N=182); and suspected heart disease (1.2%, N=120). Of the referrals, 92.1% (N=2,071) were for dental caries; 84.6% (N=154) were for visual defects; 90% (N=108) were for suspected heart diseases; 100% (N=110) were for skin diseases; 100% (N=202) were for anemia; and 66.6% (N=8) were for behavioral problems. Support from the schools to conduct the SMI was not satisfactory; parents faced many obstacles in obtaining services at the referral centers.

Conclusions and Implications for Translation: There was a high coverage of SMI. Referral outcomes for dental caries, skin diseases and anemia were relatively high. Follow-up of area PHI in referral-outcome tracking and management should be strengthened. It is necessary to improve the priority services provided to referred school children in hospital settings.

Keywords: • School Medical Inspection • Health Defects • Referrals • Sri Lanka • School Health

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I. Introduction

Healthy children are assets to a nation, and ensuring their well-being is of paramount importance. Sri Lanka has around 10,000 schools within which nearly 4 million children are getting their education. School enrollment is reported to be 98%, with a mere overall dropout rate in grade 9 of 2.18% and 3.16% for boys and girls, respectively.¹ The Department of Health Services runs a special school health program, coordinated at the central level by the Family Health Bureau in collaboration with the Ministry of Education.

School health activities in Sri Lanka have been modified with time and currently delivered as a bundle in relation to the *Health Promoting Schools Initiative* from 2008.² School Medical Inspection (SMI), which includes detection of health-related issues among school children supported by clinical examination, is one important component of school health activities. SMI has a century-long history, having commenced in 1919.^{3,4}

Currently during the SMI, all children in schools with less than 200 children, children in grades 1, 4, 7 and 10, and schools with 200 or more children should be annually examined. Due to the lower number of students in schools with less than 200 students, all students are annually examined. However, in schools with a large number of students, it is practically difficult to conduct SMI annually for each student. Grades 1, 4, 7 and 10 are selected to ensure that student undergo SMI at least once every 3 years. Additionally, children, even from other grades suspected or identified by teachers or parents, as having a health problem, are also required to be examined. Children are screened by a medical officer for pathology related to general, cardiovascular, respiratory or any other systemic health examinations. Other elements of SMI package for which relevant members of the healthcare team contribute include: weighing, vision and hearing screening, dental examination, vaccination, de-worming, vitamin and iron supplementation, behavioral analysis, etc. Record keeping is done using pre-designed registers, records and returns by the related health-unit of that geographical location

which is also called “office of the Medical Officer of Health (MOH).”

The Public Health Inspectors (PHIs) are the officers at the grass root level who are directly responsible to the MOH, for arranging school health activities. Organization of SMI is handled by the PHIs, in consultation with the MOH and school principals. Specific screening has to be completed by the PHIs, 2 - 3 days before the SMI, during which the PHI identifies visual, hearing, or nutritional problems and make entries in the student's health record. On the day of SMI, the Medical Officer examines all the students, giving special attention to students who were identified with health problems by the PHI. Children identified as having health problems and with behavioral problems identified by teachers are referred to the specialist clinic through a referral card for further treatment. Parents of such children are given advise on the importance of the referral. After the completion of the necessary treatment, the referral card is handed over to the class teacher, and it is important that the student, parents and the class teacher be made aware about this by the PHIs. The PHIs conduct at least 3 follow-up visits per child (to the school) at 2 weeks, 6 weeks and 12 weeks, respectively, following SMI.

Even though the national figure for SMI coverage is 87%, and the number of children identified with any health problems is 40.1%, there is paucity of data on the proportion of children with their health problems corrected.⁵ Referral outcome tracking is a very important responsibility of the PHI, since it is the only method in determining the usefulness and the utility of the referrals. The school health registers, records and returns could be used in determining the outcomes of these referrals. Furthermore, it is essential that policy planners address the difficulties encountered by the public health staff in the conduct of SMI, in order to further improve SMI quality.

The objectives of this study were two-fold: one, to describe the outcomes of the identified health problems of school children during SMI; and secondly, to explore the difficulties experienced by public health staff in conducting the SMI.

2. Methods

One component of this study was done with secondary analyses of the SMI related data related to 87 government schools in a selected district in hill country of Sri Lanka in 2016. The second qualitative component was done with key informant survey of public health staff who administer SMI. A descriptive cross-sectional study was conducted using SMI-related records of 87 government schools in the Katugasthota educational zone in Kandy district. The Kandy district is one of the 26 administrative districts in Sri Lanka and located in the central region. It consists of a population of 1,476,000 dispersed in an extent of 1,940 km². Kandy district has four educational zones: (1) Kandy, (2) Katugasthota, (3) Theldeniya, and (4) Wategama. The Katugasthota educational zone was selected as it consisted a considerable number of small and large schools. Of the 87 schools in the Katugasthota educational zone, 35 schools consisted of less than 200 students and 52 schools had more than 200 students. The study population consisted of all children in grades 1,4,7,10 who underwent SMI. Inclusion criteria included

children whose records indicated identification of a health problem and a referral being made using the referral card, H-606 in the year 2016. The study sample consisted of records of 2,876 such children.

A data extraction format was developed to extract data related to the identified health problems. This was developed using the modified-Delphi technique with the participation of experts in school health. The experts included two public health specialists, two Medical Officers of Health, one Supervising Public Health Inspector and one Public Health Inspector. The developed format was pre-tested in relation to the records of three schools in the Kandy district. The data collection was done by three experienced medical officers who were conversant with SMI's. The data collectors cross checked their data with the data available with the area Public Health Inspectors. Outcomes of the referrals were also extracted.

Key informant survey was conducted with a group comprising of randomly selected 5 Medical Officers of Health and 10 Public Health Inspectors from the Medical Officer of Health (MOH) Offices in the Katugasthota

Table 1: School Medical Inspection (SMI) coverage

Medical officer of health area	Children to be examined	Children examined	SMI coverage %
Hasalaka	3,922	3,642	92.9
Udadumbara	2,137	1,969	92.1
Meda dumbara	5,005	4,195	83.8
Total	11,064	9,806	88.6

Table 2: Health problems identified at the School Medical Inspection (SMI)

Defect	MOH Area Hasalaka (N=3,642)		MOH Area Udadumbara (N=1,969)		MOH Area Medadumbara (N=4,195)		Total (N=9,806)	
	No	%	No	%	No	%	No	%
Dental caries	840	23.0	512	26.0	895	21.3	2,247	22.9
Visual defects	48	1.3	37	1.8	97	2.3	182	1.8
Hearing defects	01	0.02	01	0.05	01	0.02	03	0.03
Suspected heart disease	41	1.1	36	1.8	43	1.02	120	1.2
Skin diseases	23	0.6	31	1.5	56	1.3	110	1.1
Anemia	45	1.2	63	3.2	94	1.9	202	2.1
Behavioral problems	05	0.13	06	0.3	01	0.02	12	0.1
Total	1,003	27.5	686	34.8	1,187	28.3	2,876	29.3

N= Total number examined, MOH- Medical Officer of Health

educational zone. A key informant guide was used to conduct the interviews with the key informants. The interviews were moderated by the principal investigator. Ethical clearance was obtained from the Ethical Review Committee, Faculty of Medicine, University of Peradeniya. Permission to conduct the study was obtained from relevant authorities of the District Health Department and the Zonal Director of Education.

3. Results

3.1. School Medical Inspection Coverage

The selected education zone coincided with three MOH areas. The coverage of School Medical Inspection was above 90% in two MOH areas and over 80% in the other.

3.2. Health Problems Identified

Of the total school children examined, 29.3% had health problems. Dental caries constituted the highest percentage (22.9%). Visual defects were identified in 1.8% of the children, and 2.1% were anemic. Of the students, 1.2% were suspected of having heart diseases and 1.1% had skin diseases.

3.3. Referral Outcomes

Table 3 summarized the outcomes of the referrals made. Of the numbers referred, 100% of the children with anemia and skin diseases had taken treatment. Of the dental caries, 92.1% had attended the referral center. Only 66.6% of the children with behavioral problems, 84.6% with visual defects and 90% of suspected heart diseases had attended the referral center.

3.4. Findings from Key Informant Interviews

At the key informant survey conducted among the MOHs and PHIs, two PHIs said:

“the support given by the school authorities to conduct the SMI is not satisfactory. They give more importance to the classroom activities and do not perceive the SMI as an important item in the school calendar.”

Another PHI said the following about difficulties scheduling children for SMIs:

“it is difficult even to get a date for the SMI especially during the first term. The school sports meets are held during the first term and they say that it is difficult to release the children for the SMI due to sports practices.”

Two PHIs said the following about the lack of interest in teachers on SMI follow-up:

“only certain teachers are interested in following-up whether the child has attended the hospital for the referral made. The teachers can easily reach the parents and persuade them to take the children to the referred hospital. But many teachers are not interested in doing that.”

Three PHIs reported about work overload saying:

“we are overburdened with work. Many new activities are introduced into our duty lists. Conducting SMI is a huge task which we have to definitely carry out.”

Regarding vacant PHI areas, two PHIs said:

“there are PHI areas vacant for many years. It is very difficult to do follow-up visits in a vacant area especially with the work overload.”

Table 3 : Outcome of referrals made for identified health problems at the School Medical Inspection (SMI)

Defect	MOH Area Hasalaka			MOH Area Ududumbara			MOH Area Medadumbara			Total		
	NR	NA	%	NR	NA	%	NR	NA	%	NR	NA	%
Dental caries	840	768	91.4	512	476	93.0	895	827	92.4	2247	2,071	92.1
Visual defects	48	39	81.2	37	31	83.7	97	84	86.6	182	154	84.6
Hearing defects	01	01	100.0	01	01	100.0	01	03	75.0	06	05	83.3
Suspected heart disease	41	37	90.2	36	32	88.9	43	39	90.7	120	108	90.0
Skin diseases	23	23	100.0	31	31	100.0	56	56	100.0	110	110	100.0
Anemia	45	45	100.0	63	63	100.0	94	94	100.0	202	202	100.0
Behavioral problems	05	03	60.0	06	04	66.6	01	01	100.0	12	08	66.6

NR=Number referred, NA –Number attended, MOH- Medical Officer of Health

Two MOH said the following about issues in human resources and other logistics:

“SMI is a huge task especially with lack of staff, logistic facilities, transport facilities, having to attend clinics and other routine activities of the MOH office.”

One MOH remarked on the importance of doing SMI:

“although there are many practical difficulties in doing SMI, the healthcare staff perceives that conducting SMI is important, especially in detecting disease conditions such as heart disease which may be lifesaving. We do SMI not only to achieve coverage but also to save the lives of school children.”

Four PHIs highlighted financial difficulties among parents saying that:

“during follow-up visits we find that children of parents in lower socioeconomic class and from far away rural areas do not promptly take the child to the referred hospitals. This is mainly due to the parents being daily wage earners without any stable income and will lose the income if the child is taken to the hospital.”

According to one PHI, there are issues in transportation, adding that:

“some parents find it difficult to bear the transport cost. Transport services are poor, with only few buses ply in remote areas.”

One PHI spoke about the impact of parents' level of education:

“due to the poor education level, parents do not understand where to take the child and do not understand the importance of taking the child to a specialist.”

According to two PHIs, multiple hospital visits are often required for SMI:

“for certain disease conditions where investigations have to be done, many visits have to be made to the hospital. Some parents do not complete the follow-up due to this.”

One PHI talked about the patient journey that the referred children have to go through the outpatient department. According to the PHI:

“in certain hospitals the child has to go through the outpatient department and thereafter to the clinic, which means at least two visits have to be made before the child is being seen by a specialist. These

difficulties discourage the parents in attending the referral centers.”

4. Discussion

To our knowledge, this is the first documented study that describes the outcomes of referrals as well as a qualitative exploration of difficulties encountered in the conduct of SMI in Sri Lanka. The SMI coverage of the selected zone was higher than the national figure of 87%.⁵ Even though the attendance to the referral centers was satisfactory for some identified health problems, notable exceptions were identified by this study. In addition, the practical difficulties of the healthcare staff elicited in the qualitative component will be beneficial for policy planners in identifying the key areas that should be addressed on priority basis.

This study showed that there is an 88.6% high coverage of SMI. This is due to the high priority given by the MOH offices in conducting SMI's. This activity is monitored by the Consultant Community Physicians (CCPs), Medical Officer Maternal Health (MO-MCH), Regional Epidemiologists and other supervisory staff at district and higher levels. The MOH Offices are instructed to carry out the SMI during the first term of the school calendar. This will allow sufficient time for referral and follow-up of children identified with health problems. Similar results of high inspection rates (99.5%) for the school health examination was found in South Korea.⁶

Of the children examined, 29.3% had at least one health problem. Studies of mass-screening physical examinations in South Korea showed that between 13% - 21% of the children examined had some health defects or adverse conditions that required attention.⁷ Dental caries constituted the highest percentage (22.9%) of health problems identified in the present study. This is in line with the national data where the highest prevalent health problem was dental caries.⁸ A study by Hye-Jung Shin⁶ found that 51.5% of children who had SMIs had dental caries. The high rates of dental caries may be due to the fact that children frequently consume foods like sweets and sugar containing biscuits and do not wash/brush after eating which leads to formation of dental caries. The Ministry of Health provides dental care services

to the school children through School Dental Clinics manned by School Dental Therapists and Adolescent Dental Clinics manned by Dental Surgeons.

During the SMIs, children with dental problems are referred to the Dental Therapist/Dental Surgeon. Dental Therapists carry out special dental clinics at the school premises to treat the children identified with dental problems. Despite these dental services provided to school children, the rate of dental caries is high. The probable reason may be that the children are not subjected to annual dental screening. They are screened at the SMI in grades 1,4,7 and 10. This means a child is screened once in three years. During this period of high risk behavior of school children with regard to dental health, the chances of acquiring dental caries is high. Ideally, dental screening should be carried out at least annually for every school child. However, this is practically not possible due to the limited number of Dental Therapists and Dental Surgeons presently available.

The percentage of children suspected of having heart disease in the study was 1.2%. The children are referred to a Pediatrician/Cardiologist at the nearest hospital. The children are examined by specialists and undergo required diagnostic tests. The children found to have cardiac problems are treated and followed-up in specialized clinics. It is very important to detect cardiac problems at an early stage. If not detected, the condition may progress and not be reversible and ultimately result in premature death. For the majority of school children, especially in rural areas with low access to healthcare services, children of parents of low educational level, and those in poverty, the SMI is the only occasion where they would be medically screened. Hence, the SMI play a major role in prevention and treatment of disease conditions of school children.

Hearing problems among the screened children was low at 0.03%. The children are not subjected to a proper audiometric hearing test at the SMI due to practical issues of limited instruments and high cost. Hearing is checked using crude measures which are not reliable. This may miss children with hearing problems, especially early stage hearing difficulties. The teachers and parents should be made aware of the early signs

of hearing loss and encouraged to refer the child to a medical practitioner.

In this study, it was found that 1.1% of children suffered from skin diseases and 2.1% suffered from anemia. These children are given iron folate treatment and treated for skin diseases by the Medical Officers conducting the SMI. The class teacher is made aware of the treatment schedule and is instructed to contact the parent and handover the medication and advise them how to administer the treatment.

There are many factors associated with failing to meet the healthcare needs of children. These include socioeconomic status such as access to care, dysfunctional family, health illiteracy, lack of trust in healthcare professionals, caregiver's belief systems (i.e., inconsistent with Western medicine), child's attitudes and behavior (reluctant to comply), the healthcare professional's lack of cultural competence, and lack of communication in the clinical setting.⁹ Gaps in services and inadequate policies and programs can also be considered etiological factors for children with unmet healthcare needs.^{10,11} The outcome of the referrals in our study shows that 92.1% of children with dental caries, 90% with suspected heart problems, 83.3% with hearing defects, 84.6% with visual problems, and 66.6% with behavioral problems had visited the relevant referral centers/clinics. If they do not attend the referred centers, a child with life threatening condition may be left alone without the attention of the health sector and the disease condition may get further aggravated. If so, the main objective of the school health program would not be achieved.

The high rate of dental caries being attended may be due to the Dental Therapists visiting the schools and following-up with the children. The low rates of other identified health problems may be due to the children having to travel long distances to a tertiary care hospital with a Cardiologist/Eye Surgeon/Psychiatrist, difficulty in getting an clinic appointment to be seen by the specialists, ignorance of parents on the importance of taking the child to a specialist due to low educational background, and due to poverty as the parents may not be interested in taking the child since they would lose the daily wage to which the entire family is dependent on.

The key informant survey conducted revealed that the support from the school authorities must be improved for the accomplishment of SMI. This may be due to the school authorities being more interested in covering the school syllabus on time, which is monitored by the Ministry of Education, than the SMI which is not closely monitored by the educational authorities. Poor socioeconomic level and low educational level of school children's parents negatively affect the compliance with the hospital referrals. This factor cannot be solely addressed by the health sector. The medical officers and PHIs can only facilitate this process by educating the parents on the importance of taking children for referrals at the SMI and during the follow-up visits. In addition, the assistance of the Public Health Midwife who is the key domiciliary healthcare worker can be obtained to persuade the parents to take the children to the referral center.

This study was limited to one educational zone in the Kandy district due to the schools being located across a large geographical area; this made data collection practically difficult. This would affect the generalizability of the study findings. However, the selected education zone had a mixture of small and large government schools representing the two categories of schools.

5. Conclusion and Implications For Translation

There was a high coverage of SMI in the study setting. The referral outcomes for dental caries, skin diseases and anemia were relatively high. However, the other disease conditions needed improvement and the area PHI should closely follow-up with the children and encourage the parents to take the children to their referred medical centers. The present system at some hospitals that are seeing referred school children was not user-friendly and should be streamlined so that priority would be given to SMI referrals and investigations be carried out during the first visit.

Compliance with Ethical Standards

Conflicts of Interest: The authors declare that they have no conflicts of interest. **Financial Disclosure:** Nothing to declare. **Funding/Support:** Self funded. **Ethics Approval:** Obtained from Ethics Review Committee, University of Peradeniya, Sri Lanka. **Disclaimer:** None. **Acknowledgments:** None.

Key Messages

- ▶ School Medical Inspection coverage in Sri Lanka was high and Medical Officers of Health and Public Health Inspectors play key roles in maintaining high coverage despite heavy workload, human resource and other logistic issues.
- ▶ The mechanisms available in hospitals for seeing children referred from School Medical Inspections was not user-friendly and should be modified to improve compliance.

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