Under-Diagnosis of Severe Conditions Requiring Urgent Referral in Children in Developing Countries:

An Under Appreciated Problem

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March 2008

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Abstract

Under-diagnosis of severe conditions requiring urgent referral is widespread in developing countries. Assessment, diagnosis, and treatment provided by government physicians to 579 children under 5 years of age was observed and compared to a gold standard determined by well-trained physician-observers. This work focuses on the 38 children determined by the observers to be suffering from serious illness warranting immediate admission or referral to a hospital. 87 % of children suffering from serious illness were under-diagnosed by the government physicians. Under-diagnosis results largely from hurried and incomplete assessment. 74% of children requiring urgent referral were under-treated, putting them at greater risk of death. High levels of under-diagnosis and under-treatment of serious illness have been reported in other studies, but have been given little attention. Our purpose is to raise awareness about this serious problem.

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INTRODUCTION

In 1995, as the Integrated Management of Childhood Illness (IMCI) strategy was first introduced the newsletter Child Health Dialogue ran a series of articles emphasizing that "fast action" of health workers at first-level facilities "in recognising a severely ill child, starting treatment immediately, and convincing and assisting the family to refer the child to hospital often makes the difference between life and death." (Campbell and Cutting 1995: 1) IMCI case management guidelines are structured to be sensitive to serious illness, thus increasing the likelihood that children will receive the care they need. (Kalter et al. 1997: 72)

However, studies assessing management of childhood illness in health facilities in Africa and Asia have shown that serious illness, requiring urgent referral, is commonly under-diagnosed and under-treated. (Odhacha, et al. 1998; Rowe et al. 2001; Hadi 2003) Two recent WHO studies of health facilities implementing the IMCI strategy identified a total of 20 children with severe conditions requiring urgent referral. More than half of these cases were under-diagnosed by the local health care providers, and even among the cases correctly identified and referred only one case received appropriate pre-referral treatment. (WHO 2003; 2004) Among children requiring urgent referral, inadequate referral or delays in transferring to a proper health facility result in higher mortality. (Reyes et al. 1997; Al Fadil et al. 2003)

A study published in 1998 urged "further investigation ... to determine why health workers perform poorly in classifying and treating severe disease...". (Odhacha et al. 1998:1000). Yet, we have found no studies that focus on under-diagnosis of serious illness. In this note we document under-diagnosis and under-treatment of severe illness by

government physicians in Egypt. Our goal is to raise the profile of this problem, and to stimulate research on ways to improve the performance of health care providers.

METHODS

The care provided to 579 children, aged less than five years, and suffering from diarrhea or cough, was observed. These children were treated by 115 physicians working in 80 government health facilities, including rural health units, urban health centers, and the outpatient clinics of first level referral hospitals. Physicians working in these facilities were the target of national case management training programs.

Data were collected from July 1997 through January 1998, before the implementation of the IMCI strategy in Egypt. However, the National Control of Diarrheal Diseases and ARI case management projects were well-established by this time, and the IMCI strategy is generally consistent with the disease specific guidelines. Well-trained physician observers (hence-forth observers) watched the work of the GHF physicians, recording the components of the history taking and physical examination that were undertaken, and the physicians' diagnosis and prescribed treatment. After the physician finished her/his work with the child, the observer conducted his (all observers were male) own assessment, classification, and treatment in a separate room and separately counseled the mother, all unobserved by the physician. The observers' work is considered a "gold-standard" to which the work of the physician is compared. Additional details of the study design are in Langsten, el-Mougi and Black 2005.

This work was approved by the ethical review boards of the American University in Cairo and the Johns Hopkins University. The parents of children observed and the GHF physicians gave verbal informed consent.

RESULTS

The observers identified a total of 38 children (6.6% of the all children studied) suffering from severe illness requiring urgent referral to a hospital. The government health facility physicians referred a total of 13 children (2.2% or all children observed). Ten of these children overlap with those referred by the observers; the remaining 3 were referred by the physicians only, not by the observers.

Almost all cases diagnosed as severe illness by the observers were under-diagnosed by the GHF physicians. For example, most of the cases that were referred by the observers were diagnosed as severe pneumonia (13 cases), very severe disease (12 cases), and severe malnutrition (8 cases in which malnutrition is the only, or main, problem; 7 additional cases in which malnutrition appears together with another serious illness). The physicians diagnosed one case of severe pneumonia, no cases of very severe disease, and two cases of severe malnutrition–both of these children were also suffering from diarrhea with severe dehydration. Among the 38 cases of severe illness requiring referral diagnosed by the observers, the physicians classified 13 of the children as having pneumonia. Two of these children were referred. Physicians diagnosed bronchitis, asthma, ear infections, and simple colds in another 15 of the children referred by the observers, and referred 2 of these children also. The only illness on which there was general agreement was diarrhea with severe dehydration. The same 4 children were diagnosed and referred or admitted by both the physicians and observers.

The main cause of under-diagnosis appears to be incomplete assessment of many of the children. The generally poor assessment of children by GHF physicians in Egypt has been documented elsewhere. (Langsten, El-Mougi, & Black 2005) The possible effects of poor assessment on under-diagnosis of serious illness are best illustrated by examining

specific diagnoses. Consider first the 13 cases of severe pneumonia identified by the observers. Even though chest-indrawing has low specificity, both the ARI case management (MOH 1990) and the IMCI (MOH, n.d.) guidelines consider it a sufficient sign for a diagnosis of severe pneumonia. Other signs of severe pneumonia include stridor in a calm child and rapid breathing, in addition to the chest-indrawing. The observers identified chest indrawing and/or rapid breathing in 12 of the 13 cases of severe pneumonia requiring referral. (Two children had chest-indrawing only; one child had neither chest-indrawing nor rapid breathing. None of the children had stridor.) The GHF physicians checked neither chest indrawing nor the respiratory rate in 7 of the 13 children. They checked both chest-indrawing and the respiratory rate in two children, just chest-indrawing in two, and only the respiratory rate in another two.

When the physicians evaluated signs and symptoms, their assessments generally agreed with those of the observers. The physicians found chest-indrawing in all four children checked, and rapid breathing in 3 of the 4 children whose respiratory rate was counted. The physicians listened to the chest sounds of all 13 of these children, and also found no children with stridor. However, even when the physician and observer agreed on the presence of signs and symptoms, the physicians tended to under-diagnosis the child's illness. In two cases both the physician and observer found chest-indrawing and rapid breathing. The physicians diagnosed non-severe pneumonia in both cases.

A similar situation is found for the 12 cases the observers referred with very severe disease. According to both the ARI and IMCI guidelines, the presence of any general danger sign (child unable to drink or breastfeed, recent or current convulsions, or lethargic or unconscious) is sufficient for a diagnosis of very severe disease. The observers recorded that eight of the 12 children with very severe disease were reported to have difficulty drinking and

suckling. In addition, four were lethargic or comatose; while three had other signs and symptoms considered indicators of very severe disease according to the ARI guidelines. For 9 of the 12 children the GHF physicians checked none of the general danger signs, and none of these children were diagnosed with very severe disease. Again, however, even when danger signs were checked, and the assessment of the physician agreed with that the observer, diagnoses differed. Three children with at least one danger sign present where under-diagnosed; two of these children were, nevertheless, referred.

As noted above, under-diagnosis does not always lead to under-treatment. However, 28 of the children suffering from severe illness were not referred. Most (20, 71% of those not referred) were prescribed an antibiotic. However, 6 children determined by the observers to require urgent referral, with an antibiotic administered immediately, before the child was moved to the hospital, were sent home by the physicians with no antibiotic prescribed. One of these was a 5 month old child, whose mother reported to the GHF physician that the child was lethargic and had difficulty drinking, two clean signs of very severe disease.

DISCUSSION and CONCLUSION

We have shown that in Egypt, physicians in the government health clinics under-diagnosed 87 percent, and failed to refer 74 percent, of children suffering from serious illness requiring urgent referral or admission to a hospital. These results are consistent with the findings of others who report that between 57 percent and 87 percent of seriously ill children were not referred. (Odhacha et al. 1998; Rowe et al. 2001; Hadi 2003; WHO 2003; 2004) In our study, under-diagnosis appears to be related to poor assessment. Most children found to be in need of referral were not checked for general danger signs, nor for chest indrawing; neither was their respiratory rate counted. These results are consistent with earlier work in

Egypt that found that chest indrawing was not readily recognized (Gadomski et al 1993) and a study in Botswana where there were also lapses in checking for danger signs. (Boonstra, Lindbaek, and Ngome 2005)

A recent study in Egypt, however, found substantially better quality of assessment. Although only 47 percent of children had all 10 main assessment tasks carried out, a mean of 9.4 tasks was performed for each child. Moreover, 95 percent of all children were checked for the three general danger signs, and the respiratory rate was counted for 97 percent of children with cough or difficulty breathing. Still, the physicians who conducted these assessments under-diagnosed 3 of the 6 cases classified by the surveyors as having severe conditions requiring urgent referral or admission to a hospital (WHO 2003: 19). The failure to refer children in need of urgent referral is important because such failures have been shown to be associated with a greater risk of death from acute respiratory infections (Reyes et al. 1997; Al Fadil et al. 2003). In the Eastern Mediterranean region acute respiratory infections account for 19% of deaths to children under 5 years of age (Williams et al. 2002).

Although some previous studies have noted under-diagnosis of serious illness, they tend to emphasize encouraging results reflected by accurate diagnosis and treatment of disease in general (Hadi 2003). In the Egypt IMCI assessment carried out by the WHO, none of the six recommendations addresses the issue of under-diagnosis of serious illness (WHO 2003). Only one of the studies that mentions under-diagnosis stresses the importance of better understanding "why [health workers] perform poorly in classifying and treating severe disease" (Odhacha 1998:1000). A decade later little has been done to address this issue. If mortality among children under 5 is to continue to decline in developing countries it is essential that the IMCI and other such programs emphasize the importance not only of

complete and accurate assessment, but also of correct diagnosis, and prompt and proper treatment.

ACKNOWLEDGMENTS

Study design and data collection were supported by USAID through the Johns Hopkins Family Health and Child Survival Cooperative Agreement with USAID and through a subcontract from the Clark Atlanta Child Survival Project to the Department of International Health of the Johns Hopkins School of Public Health. Thanks to Dr. Magdi Moustafa Kamel for helping to train and coordinate the research team in Minya.

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