Knowledge and Use of Oral Rehydration Therapy for Childhood Diarrhoea in India: Effects of Exposure to Mass Media

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India's National Family Health Survey (NFHS) was conducted in 1992–93 under the auspices of the Ministry of Health and Family Welfare. The survey provides national and state-level estimates of fertility, infant and child mortality, family planning practice, maternal and child health, and the utilization of services available to mothers and children. The International Institute for Population Sciences, Mumbai, coordinated the project in cooperation with 18 population research centres throughout India, the East-West Center Program on Population in Honolulu, Hawaii, and Macro International in Calverton, Maryland. The United States Agency for International Development provided funding for the project.

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Knowledge and Use of Oral Rehydration Therapy for Childhood Diarrhoea in India: Effects of Exposure to Mass Media

Abstract. *Diarrhoea is a major cause of illness and death among young children in India. Treatment guidelines issued by the World Health Organisation indicate that most cases of childhood diarrhoea can be treated at home by increased fluid intake and continued feeding during diarrhoeal episodes. In accordance with WHO guidelines, the Government of India promotes oral rehydration therapy, including the use of oral rehydration salt (ORS) packets or a recommended home-made solution (RHS) made from salt, sugar, and water. In its Oral Rehydration Therapy Programme, the government has relied heavily on the electronic mass media, including radio, television, and cinema. It also supports community-level mass media and group educational activities, which are carried out routinely in rural areas.*

This Subject Report evaluates the effects of mother's exposure to the mass media on knowledge and use of oral rehydration therapy, using data from India's 1992–93 National Family Health Survey. Results indicate that, despite a vigorous Oral Rehydration Therapy Programme for more than a decade, knowledge and use of oral rehydration therapy remain quite limited. Very small percentages of children who fall ill with diarrhoea are treated with ORS, RHS, or increased fluids, despite the fact that many of these children receive treatment from a health facility or provider. Many of the children who are treated by a health facility or provider are given unnecessary, and sometimes harmful, antibiotics and other antidiarrhoeal drugs but not ORS or RHS. The proportion receiving inappropriate treatment is slightly higher among children who are treated in the private sector.

The analysis indicates that mother's exposure to electronic mass media increases awareness and use of oral rehydration therapy. Women who are regularly exposed to radio, television, or cinema are much more likely than are unexposed women to know about ORS packets and to use ORS or RHS to treat childhood diarrhoea. In rural areas, community-level mass media and group educational activities also have positive effects on knowledge and use of ORS and RHS, independent of mother's exposure to electronic mass media and other demographic and socioeconomic variables. The results show some discrimination against girls in the use of ORS.

These findings indicate a lack of awareness of proper treatment of diarrhoea not only among mothers but also among health-care providers. There is clearly a need to

strengthen education programmes for mothers and to provide supplemental training to health-care providers, emphasizing the importance of increased fluid intake and continued feeding and discouraging the use of drugs. The Oral Rehydration Therapy Programme also needs to address the problem of discrimination against girls in the use of ORS packets. The results of this study indicate that the mass media can help in these efforts.

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FOREWORD

This Subject Report is a product of the Project to Strengthen the Survey Research Capabilities of the Population Research Centres (PRC) in India, more commonly known as the PRC project. The 1992–93 National Family Health Survey (NFHS) is a major component of this project. Findings from the NFHS provide the basis for this report.

The Ministry of Health and Family Welfare (MOHFW) launched the PRC project in 1991. The MOHFW designated the International Institute for Population Sciences (IIPS), Mumbai, as the nodal agency to provide coordination and technical guidance for the project. Various consulting organisations collected survey data during 1992–93 in collaboration with Population Research Centres in the various states. Basic survey reports and summary reports for India as a whole and for 25 states (including Delhi, which recently attained statehood) were published during 1994–95. The East-West Center (Honolulu, Hawaii, U.S.A.) and Macro International (Calverton, Maryland, U.S.A.) provided technical assistance for all survey operations. The United States Agency for International Development (USAID) provided funding for the PRC/NFHS project.

Upon completion of the basic survey reports and summary reports in December 1995, the NFHS data were released to the scientific community for further study. As part of this further research and as a continuation of the PRC/NFHS project, a Subject Reports series was established. The present Subject Report on the effects of exposure to mass media on knowledge and use of oral rehydration therapy is the 10th in this series. The research on which this report is based was conducted while K. V. Rao was a Visiting Fellow at the East-West Center. Selected findings from this report have also been published in summary form in *NFHS Bulletin* No. 11.

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INTRODUCTION

Diarrhoea is a major cause of illness and death among young children in developing countries. Globally, an estimated 1.8 billion episodes of childhood diarrhoea occur every year—a higher annual incidence than that of any other disease—and more than three million children under age five die from diarrhoea or diarrhoea-related causes annually (WHO 1995). As in other developing countries, diarrhoea is a major cause of illness and death among young children in India (GOI 1998). The main immediate cause of death from acute diarrhoea is dehydration. According to treatment guidelines issued by WHO (1995), most cases of childhood diarrhoea can be treated at home by continuing feeding and increasing fluid intake.

Because diarrhoea accounts for a significant proportion of childhood mortality in India, the government considers the Oral Rehydration Therapy Programme one of its priority activities for promoting child survival. This programme aims at educating mothers and communities about the causes, symptoms, and treatment of diarrhoea. Mothers are instructed to increase fluid intake, continue feeding, and recognize danger signs requiring treatment at a health facility. For more than a decade, the programme also emphasized the use of a solution made from widely available Oral Rehydration Salt (ORS) packets and an alternative home-made solution made from salt, sugar, and water, referred to here as Recommended Home Solution (RHS).

It is widely believed that the electronic mass media can play an important role in educating women about oral rehydration therapy in a country such as India, where about two-thirds of mothers are illiterate. Accordingly, the government has relied heavily on the electronic media to educate mothers and communities about home management of diarrhoea. Spot messages on home treatment of diarrhoea using ORS and RHS are aired on radio and television, and longer documentaries are shown in cinema halls. A number of community-level activities are also conducted to educate rural people about major public health issues, including oral rehydration therapy. Such activities include film shows, drama and song performances, exhibitions, group meetings, and training camps.

India's 1992–93 National Family Health Survey (NFHS), which provides the data for this report, does not contain questions about specific exposure to media messages on oral rehydration therapy, but it does include general questions about exposure to electronic mass media and community-level mass media and group educational activities. Using responses to these questions, this report estimates the effects of exposure to mass media on knowledge and use of oral rehydration therapy to treat childhood diarrhoea.

Exposure to mass media has been shown to have substantial effects on people's attitudes and behaviors in India. For example, in a recent study also based on NFHS data, Retherford and Mishra (1997) found that electronic mass media exposure has a

substantial positive effect on current use and intended future use of family planning, even after controlling for number of living children, urban/rural residence, and education. In another recent study based on NFHS data, Gandotra and others (1998) found that women who are regularly exposed to electronic mass media have significantly lower fertility than do other women, even after controlling for urban/rural residence and education. It appears that little research has been done on the effects of mass media exposure on knowledge and use of oral rehydration therapy to treat childhood diarrhoea. This report attempts to fill this gap.

DATA AND METHODS

This study is based on data from India's 1992–93 National Family Health Survey (NFHS). The NFHS covered 25 states (including Delhi, which recently attained statehood), representing 99 percent of India's population. Data were collected from a nationally representative sample of 89,777 ever-married women age 13–49 residing in 88,562 households. This report is based on data for the 38,161 women covered by the NFHS who gave birth during the four years before the survey and on data for the 4,558 children born in the period 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey.

Three questionnaires were used in the NFHS—one for villages (administered only in rural areas), one for households, and one for ever-married women age 13–49 within households. Three data files correspond to these three questionnaires—the village data file, the household data file, and the individual data file. This report uses information from all three NFHS data files. Selected village characteristics are used only when the analysis is done separately for rural areas.

The sample design for some states is self-weighting, but in other states certain sectors of the population, such as urban areas, are over-sampled. It is, therefore, necessary to use weights to restore the correct proportions. For tabulations at the state level, weights are designed to preserve the total number of ever-married women interviewed in the state, so that the weighted state total equals the unweighted state total. For tabulations at the national level, a different set of weights is required because sampling fractions vary from state to state. The national-level weights are designed to preserve the total number of 89,777 ever-married women who were interviewed. Thus each woman has two weights, one that is used when the state is the unit for tabulation and a second that is used when the whole country is the unit for tabulation.

A number of tables in this report contain results both for India as a whole and for individual states. In such tables, the national-level results use the national weights, and the individual state results use the state-level weights. All results (including numbers of cases where specified) are based on the weighted data. The sample design for the survey is discussed in more detail in the original NFHS report (IIPS 1995).

The NFHS included three questions on women's general exposure to electronic mass media: 'Do you usually listen to a radio at least once a week?', 'Do you usually watch television at least once a week?', and 'Do you usually go to a cinema hall or theatre to see a movie at least once a month?'. In the analysis that follows, these three types of electronic mass media are sometimes considered separately, but usually they are grouped together. Exposure to the three media is measured by a single dummy variable, defined as 1 if the respondent answered 'yes' to any of the three questions, and 0 otherwise.

The village questionnaire, used in rural areas, had additional questions on organized mass-media activities in the village, including 'number of film shows held', 'number of exhibitions held', 'number of drama/song performances held', 'number of group meetings held', and 'any leaders' orientation training camp held?'. From these questions we constructed a variable, 'village media/educational activity'. This is represented by a dummy variable defined as 1 if the village had any film show, exhibition, drama/song performance, or group meeting during the year before the survey or if any leaders' orientation training camp was ever held in the village, and 0 otherwise.

Mothers of children born during the four years before the survey were also asked a series of questions about the incidence of diarrhoea among their children. The questions used here asked whether a child had been ill with diarrhoea in the previous two weeks, whether a child had been ill with diarrhoea in the previous 24 hours, and whether the diarrhoea had been bloody.

If the mother reported that a child had been ill with diarrhoea in the previous two weeks, she was asked about any treatment given for the diarrhoea. If the child was still breastfeeding, she was asked whether she had increased the frequency of breastfeeding (one way of increasing fluid intake). She was also asked whether the child had received increased fluids aside from breast milk. Then she was asked whether she had sought advice or treatment from any of several types of health facility or provider. She was also asked whether the child had received any treatment for diarrhoea, including ORS, RHS, antibiotics or other drugs, or intravenous rehydration.

Mothers whose children did not have diarrhoea during the two weeks before the survey or who did not treat an incidence of diarrhoea with ORS were asked whether they had heard of ORS or had ever used ORS packets. Mothers who had treated an incidence of diarrhoea with RHS were asked how they had learned to prepare the solution. The possible response categories to this last question included radio, television, and printed material.

From these questions on treatment of diarrhoea, we constructed several variables. Some pertain to mothers of children born during the four years before the survey, and others pertain to children born 1–47 months before the NFHS who were ill with diarrhoea at any time during the two weeks before the survey. The variables

for mothers include whether the mother knows about ORS and has ever used ORS packets. For mothers who have used RHS, there is also a variable on whether the mother learned how to prepare RHS from the mass media, defined for this question as radio, television, and printed material. The variables for children include whether the child received treatment from a health facility or provider during the recent bout of diarrhoea, whether the child received ORS, whether the child received RHS, whether the child received more frequent breastfeeding, whether the child received increased fluids, and whether the child received antibiotics or other antidiarrhoeal drugs.

The NFHS also collected information on various socioeconomic and demographic characteristics of children, mothers, and households. The effects of mass media exposure on knowledge and use of oral rehydration therapy are likely to be confounded with the effects of some of these other variables. To avoid this problem, it is useful to control statistically, or 'adjust', for selected socioeconomic and demographic characteristics by holding them constant at their mean values. The variables included as controls in this analysis are: child's age (1–5, 6–11, 12–23, 24–47 months); sex of child (boy, girl); mother's age (13–19, 20–29, 30–49 years); residence (urban, rural); mother's education (illiterate, literate with less than middle school complete, middle school complete or higher); religion (Hindu, Muslim, other); caste/tribe (scheduled caste or scheduled tribe, other)[1]; house type (*kachcha*, *pucca* or semi-*pucca*)[2]; crowding (less than three persons per room, three or more persons per room); safe drinking water (yes, no); sanitary toilet facility (yes, no); electricity in the household (yes, no); and geographic region (north, central, east, northeast, west, south). When rural areas are examined separately, the analysis also includes controls for village media/educational activity (yes, no); distance to a health-care facility (less than two kilometres, two kilometres or greater); and whether the village is connected to the outside by an all-weather road (yes, no). For further detail on definitions of variables, see Tables 7 and 12 later in this report.

Each control variable has a rationale for inclusion. Child's age is controlled because it is correlated with frequency of diarrhoeal episodes as well as with mother's exposure to mass media. Child's gender is controlled because in India boys are more likely than girls to receive treatment for diarrhoea. Mother's age is controlled because a mother's exposure to mass media and knowledge of oral rehydration therapy

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1. Scheduled castes (SC) and scheduled tribes (ST) are castes and tribes identified by the Government of India as socially and economically backward and in need of special protection from social injustice and exploitation.

2. *Kachcha* houses are made from mud, thatch, or other low-quality materials; *pucca* houses are made from high-quality materials (such as bricks, tiles, cement, and concrete) throughout, including roof, walls, and floor; and semi-*pucca* houses are made from partly low-quality and partly high-quality materials.

are both correlated with her age. Mother's education and urban/rural residence are controlled because they are correlated with electronic mass media exposure and with access to health-care services. Religion and caste/tribe are cultural variables that control for cultural variations in child care and treatment practices. Religion and caste/tribe are also likely to be correlated with mothers' access to mass media and health-care facilities.

Controlling for household economic status is important because it is an indirect indicator of the nutritional and health status of the child as well as access to health care. Household economic status is also likely to be correlated with radio and television ownership and exposure to electronic mass media. House type, crowding, access to safe drinking water, access to a sanitary toilet facility, and household electricity all help to control for household economic status. Crowding, access to safe drinking water, and access to a sanitary toilet facility also control for unhygienic living conditions, which may be correlated with frequency of diarrhoeal episodes.

At the village level, availability of an all-weather road connecting the village to the outside is correlated with access to information and health-care facilities, and it may also be correlated with the general level of economic and social development of the village. Availability of a health-care facility within two kilometres is correlated with access to both health care and information about health care, including oral rehydration therapy. Geographic region is controlled because both media exposure and prevalence of diarrhoea in India vary by region.

The analysis focuses on how a mother's exposure to radio, television, or cinema affects her knowledge and use of oral rehydration therapy, after controlling for all these potentially confounding variables. For rural areas, the report also assesses the effects of community-level mass media and educational activities on knowledge and use of oral rehydration therapy.

The analysis is based on two sets of logistic or multinomial logistic regressions. In the first set, mothers are the units of analysis. These regressions analyse the effects of mass media exposure on mother's knowledge and ever-use of ORS packets. In the second set, the units of analysis are children who were ill with diarrhoea during the two weeks before the survey. These regressions analyse the effects of mother's mass media exposure on treatment of diarrhoea using ORS, RHS, frequency of breastfeeding, and fluid intake.

The logistic or multinomial logistic regressions are used to estimate the unadjusted and adjusted effects of mother's mass media exposure on knowledge and use of oral rehydration therapy. This involves calculating unadjusted and adjusted values of the response variable for each category of media exposure (regularly exposed or not regularly exposed). When women are the units of analysis, the unadjusted and adjusted values of the response variable are expressed as percentages of women who know about ORS packets or as percentages of women who have ever used ORS packets. When children are the units of analysis, the unadjusted and adjusted values of the

response variable are expressed as percentages of children who have received a specified type of treatment (e.g., ORS or RHS).

Unadjusted percentages are calculated from logistic or multinomial logistic regressions that have only a single predictor variable, namely media exposure. Adjusted percentages are calculated from logistic or multinomial logistic regressions that include not only media exposure but also all the control variables as predictor variables. When calculating the adjusted percentages for categories of media exposure, the control variables are held constant by setting them to their mean values in the underlying regressions. For further details of this methodology, see Retherford and Choe (1993).

Each logistic or multinomial logistic regression is calibrated by resetting the value of the constant term in the regression so that the predicted percentage (either unadjusted or adjusted) that is obtained when all predictor variables are set to their mean values equals the observed percentage. The estimation of levels of statistical significance of underlying logistic regression coefficients takes into account design effects due to clustering at the level of the primary sampling unit. The regressions were estimated using the STATA statistical software package (Stata Corporation 1997).

The regression analysis is carried out not only for India as a whole, but also for urban and rural areas separately and for boys and girls separately. In the separate analyses for urban and rural areas, the residence variable is omitted from the set of control variables. Similarly, in the separate analyses for boys and girls, the gender variable is omitted from the set of control variables.

EXPOSURE TO ELECTRONIC MASS MEDIA, PREVALENCE OF DIARRHOEA, AND KNOWLEDGE AND EVER-USE OF ORS PACKETS

This section describes variations in exposure to electronic mass media, prevalence of diarrhoea, and knowledge and use of ORS packets by selected demographic and socioeconomic characteristics, for India as a whole and for individual states.

Exposure to electronic mass media

Figure 1 shows the extent of exposure to electronic mass media among Indian women who gave birth during the four years before the survey. Thirty-nine percent of these women listen to radio at least once a week, 27 percent watch television at least once a week, and 14 percent go to a cinema hall or theatre to see a movie at least once a month. Altogether, 48 percent are regularly exposed to at least one of these electronic mass media; 52 percent are not regularly exposed to any of them.

Table 1 shows how exposure to the three types of electronic mass media varies by selected demographic and socioeconomic characteristics. Exposure does not vary

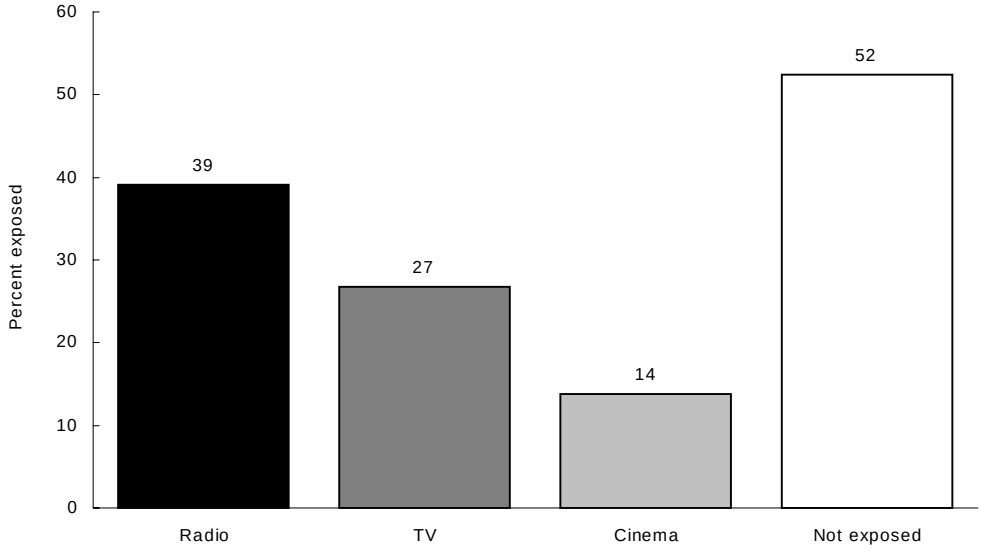

Figure 1 Exposure to radio or television at least once a week or cinema at least once a month among women who gave birth during the four years before the NFHS, India, 1992–93

much between women age 13–19 and age 20–29, but women age 30–49 tend to be somewhat less exposed to these media than are younger women. Urban and more educated women have greater exposure than do rural and less educated women. Hindu and Muslim women have lower exposure than do women belonging to other religions, and women belonging to scheduled castes or scheduled tribes have lower exposure than do other women. Exposure is relatively high among women living in *pucca* or semi-*pucca* houses, in households with less than three persons per room, in households with access to safe drinking water, in households with access to a sanitary toilet facility, and in households with electricity, compared with women in households without these amenities. Women living in south India have comparatively high electronic mass media exposure, followed by women in the western region. Women in the central region are least exposed to the electronic mass media.

Figure 2 and Table 2 show state variations in exposure to electronic mass media. In Goa, Delhi, Tamil Nadu, and Kerala, more than three-fourths of women are regularly exposed to radio, television, or cinema. At the other end of the spectrum, less than 40 percent of women are regularly exposed to these media in Bihar, Rajasthan, Assam, Uttar Pradesh, Madhya Pradesh, and Orissa.

Prevalence of diarrhoea

Table 3 shows prevalence of diarrhoea among children born 1–47 months before the NFHS, broken down by mother's exposure to electronic mass media and by selected

Table 1 Percentage of women who gave birth during the four years before the NFHS who usually listen to radio or watch television at least once a week or visit a cinema at least once a month, by selected characteristics, India, 1992–93

Variable	Exposure to electronic mass media				Number of women
	Listens to radio at least once a week	Watches television at least once a week	Visits a cinema/ theatre at least once a month	Not regularly exposed to electronic media	
Age					
13–19	39	21	18	52	4,275
20–29	42	30	15	49	24,517
30–49	31	21	8	62	9,369
Residence					
Urban	59	62	28	23	8,727
Rural	33	16	9	61	29,434
Education					
Illiterate	26	12	8	68	25,061
Literate, < middle complete	59	44	21	28	9,041
≥ middle complete	78	79	33	8	4,059
Religion					
Hindu	39	26	14	53	30,560
Muslim	37	24	10	56	5,634
Other	49	44	15	38	1,968
Caste/tribe[a]					
SC/ST	27	15	9	66	8,616
Other	42	30	15	49	29,545
House type[b]					
Kachcha	28	11	9	67	20,208
Pucca or semi-*pucca*	52	45	19	36	17,827
Crowding					
< 3 persons per room	48	35	16	43	17,045
≥ 3 persons per room	32	20	12	60	21,052
Safe drinking water					
Yes	42	33	16	48	25,661
No	33	15	10	62	12,432
Sanitary toilet facility					
Yes	71	75	29	13	5,925
No	33	18	11	60	32,193
Electricity					
Yes	55	48	21	32	17,926
No	25	7	7	71	20,181
Geographic region					
North	37	36	4	52	4,464
Central	28	18	6	66	11,090
East	32	16	9	62	8,685
Northeast	33	16	5	62	1,600
West	47	40	14	43	4,975
South	61	40	40	26	7,347
Total	39	27	14	52	38,161

a. Scheduled castes (SC) and scheduled tribes (ST) are those castes and tribes identified by the Government of India as socially and economically backward and in need of special protection from social injustice and exploitation.

b. *Kachcha* houses are made from mud, thatch, or other low-quality materials. *Pucca* houses are made from high-quality materials (such as bricks, tiles, cement, and concrete) throughout, including roof, walls, and floors. Semi-*pucca* houses are made from partly low-quality and partly high-quality materials.

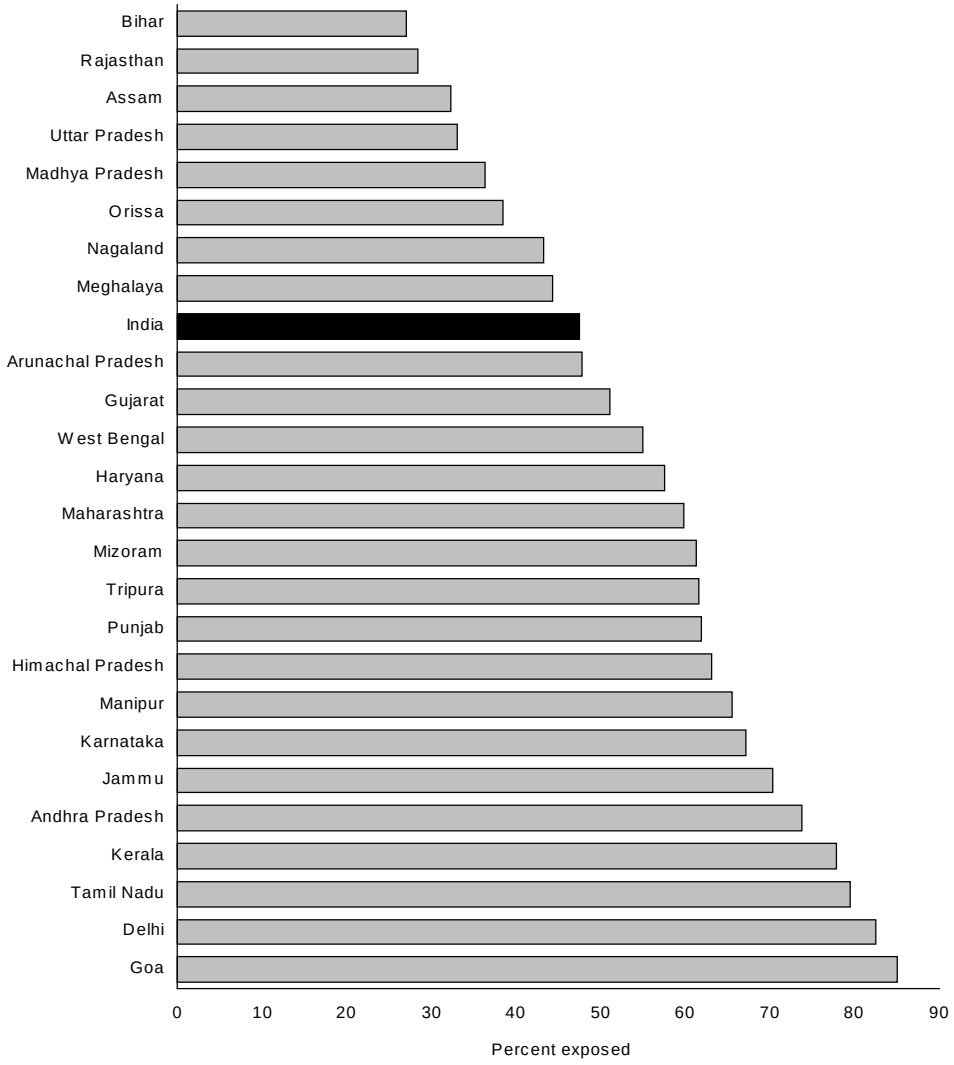

Figure 2 Exposure to electronic mass media (radio, television, or cinema) among women who gave birth during the four years before the NFHS, by state, 1992–93

demographic and socioeconomic characteristics. In India as a whole, about 10 percent of children born 1–47 months before the NFHS suffered from diarrhoea during the two weeks before the survey. Among these children, about one in eight had bloody stools, a sign of serious illness. The percentage of children suffering from diarrhoea at any time during the two weeks before the survey does not vary much by electronic mass media exposure or by any of the other socioeconomic characteristics. The only variable that appears to be substantially correlated with diarrhoea is child's age, with a peak of 16 percent prevalence among children age 6–11 months, dropping to 7 percent prevalence among children age 24–47 months. The peak at 6–11 months reflects the shift from breast milk to other liquids and foods that may be contaminated.

Table 2 Percentage of women who gave birth during the four years before the NFHS who usually listen to radio or watch television at least once a week or visit a cinema at least once a month, by state, 1992–93

State	Exposure to electronic mass media				Number of women[a]
	Listens to radio at least once a week	Watches television at least once a week	Visits a cinema/ theatre at least once a month	Not regularly exposed to electronic media	
India	39	27	14	52	38,161
North					
Delhi	59	77	6	18	1,433
Haryana	40	45	2	42	1,340
Himachal Pradesh	51	44	4	37	1,151
Jammu region of Jammu and Kashmir	63	47	3	30	1,176
Punjab	40	53	2	38	1,084
Rajasthan	26	15	5	72	2,250
Central					
Madhya Pradesh	28	23	9	64	2,828
Uttar Pradesh	28	16	4	67	6,045
East					
Bihar	24	10	5	73	2,829
Orissa	34	13	8	61	1,757
West Bengal	44	27	15	45	1,723
Northeast					
Arunachal Pradesh	41	28	16	52	473
Assam	27	13	3	68	1,469
Manipur	62	38	17	35	434
Meghalaya	36	24	4	56	514
Mizoram	55	28	1	39	349
Nagaland	42	16	0	57	462
Tripura	54	25	5	38	448
West					
Goa	68	69	4	15	949
Gujarat	42	33	11	49	1,463
Maharashtra	49	43	16	40	1,581
South					
Andhra Pradesh	59	35	51	26	1,486
Karnataka	60	35	30	33	1,753
Kerala	70	41	19	22	1,350
Tamil Nadu	61	51	45	21	1,348

a. Results for states incorporate state-level sample weights, and results for India as a whole incorporate national-level sample weights. The numbers of women in the last column are weighted numbers that incorporate these sample weights. Weights are calculated so that the total number of ever-married women age 13–49 (in a particular state or in the nation as a whole) is the same whether weighted or unweighted. This does not necessarily hold for subgroups of women, however, such as those who gave birth during the four years before the survey as in this table. For this reason, the state totals in this table do not add to the national total.

Urban residence and mother's middle school or higher education tend to lower the prevalence of diarrhoea in children, but the effects are small. Surprisingly, health-related factors such as crowded living conditions, availability of safe drinking water, and access to a sanitary toilet facility have little effect on the prevalence of diarrhoea. Prevalence is slightly lower in the northeast than in other regions. The small variation

Table 3 Percentage of children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by selected characteristics, India, 1992–93

Variable	Percentage of children ill with diarrhoea during the previous two weeks[a]			Number of children
	Any diarrhoea[b]	Bloody diarrhoea	Any diarrhoea in previous 24 hours[b]	
Mother's electronic mass media exposure				
Yes	10	1	5	21,672
No	10	1	5	23,659
Child's age				
< 6 months	11	1	7	5,641
6–11 months	16	1	9	5,881
12–23 months	13	2	6	11,853
24–47 months	7	1	3	21,988
Sex of child				
Boy	10	1	5	23,170
Girl	10	1	5	22,193
Mother's age				
13–19	13	1	7	4,557
20–29	10	1	5	30,270
30–49	9	2	4	10,536
Residence				
Urban	9	1	4	10,611
Rural	11	1	5	34,752
Mother's education				
Illiterate	10	2	5	29,630
Literate, < middle complete	10	1	5	11,009
≥ middle complete	8	1	4	4,724
Religion				
Hindu	10	1	5	35,937
Muslim	9	1	4	7,029
Other	10	1	5	2,397
Caste/tribe				
SC/ST	11	2	5	10,197
Other	10	1	5	35,166
House type				
Kachcha	10	2	5	23,714
Pucca or semi-*pucca*	10	1	5	21,505
Crowding				
< 3 persons per room	10	1	5	19,604
≥ 3 persons per room	10	1	5	25,691
Safe drinking water				
Yes	10	1	5	30,668
No	11	2	5	14,625
Sanitary toilet facility				
Yes	9	1	4	7,022
No	10	1	5	38,295
Electricity				
Yes	10	1	5	21,848
No	11	2	5	23,456
Geographic region				
North	10	1	5	5,406
Central	9	1	5	13,154
East	11	1	5	10,034
Northeast	7	1	3	1,930
West	11	1	6	6,208
South	11	1	5	8,631
Total	10	1	5	45,363

a. Includes diarrhoea in the past 24 hours.

b. Includes bloody diarrhoea.

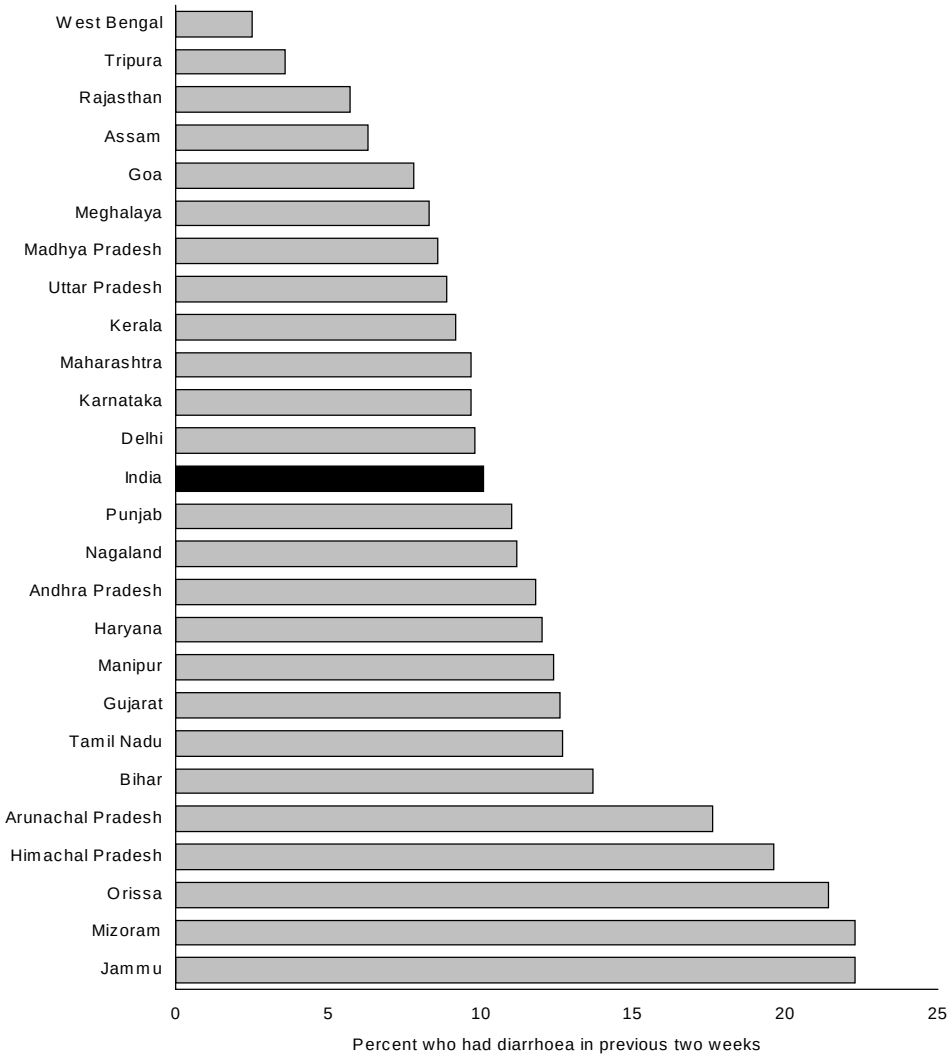

Figure 3 Children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by state, 1992–93

in prevalence by socioeconomic characteristics suggests that diarrhoea tends to strike young children in India irrespective of their socioeconomic status. Table 3 shows that prevalence of diarrhoea during the 24-hour period before the NFHS was similar to prevalence during the two weeks before the survey.

Figure 3 and Table 4 show state variations in prevalence of diarrhoea. Variations by state are substantial, but they must be interpreted with caution because the incidence of diarrhoea is somewhat seasonal and the survey was conducted at different times of the year in different states. Prevalence of diarrhoea during the two weeks before the survey varies from less than 3 percent in West Bengal to 22 percent in Mizoram and Jammu region. Surprisingly, Rajasthan, Madhya Pradesh,

Table 4 Percentage of children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by state, 1992–93

Variable	Percentage of children ill with diarrhoea during the previous two weeks[a]			Number of children[c]
	Any diarrhoea[b]	Bloody diarrhoea	Any diarrhoea in previous 24 hours[b]	
India	10	1	5	45,363
North				
Delhi	10	1	5	1,742
Haryana	12	1	6	1,678
Himachal Pradesh	20	3	8	1,445
Jammu region of Jammu and Kashmir	22	3	9	1,464
Punjab	11	1	4	1,367
Rajasthan	6	1	4	2,625
Central				
Madhya Pradesh	9	1	4	3,360
Uttar Pradesh	9	1	5	7,164
East				
Bihar	14	1	6	3,251
Orissa	21	3	9	2,016
West Bengal	3	0	0	2,014
Northeast				
Arunachal Pradesh	18	2	11	598
Assam	6	1	2	1,766
Manipur	12	2	8	525
Meghalaya	8	1	6	647
Mizoram	22	5	13	440
Nagaland	11	2	4	618
Tripura	4	1	1	499
West				
Goa	8	1	2	1,113
Gujarat	13	2	7	1,799
Maharashtra	10	1	5	1,989
South				
Andhra Pradesh	12	1	6	1,707
Karnataka	10	1	5	2,156
Kerala	9	2	3	1,553
Tamil Nadu	13	1	5	1,572

a. Includes diarrhoea in the past 24 hours.

b. Includes bloody diarrhoea.

c. Numbers of children in individual states do not add up to the total for India as a whole. See note to Table 2.

and Uttar Pradesh, which otherwise lag behind other states in health conditions and overall development, have prevalence rates lower than the national average.

Knowledge and ever-use of ORS packets

Figure 4 and Table 5 show state variations in knowledge of ORS packets among women who gave birth during the four years before the survey. In India as a whole, only 43 percent of such women know about ORS packets, indicating that the government's educational and media programmes have failed to reach more than

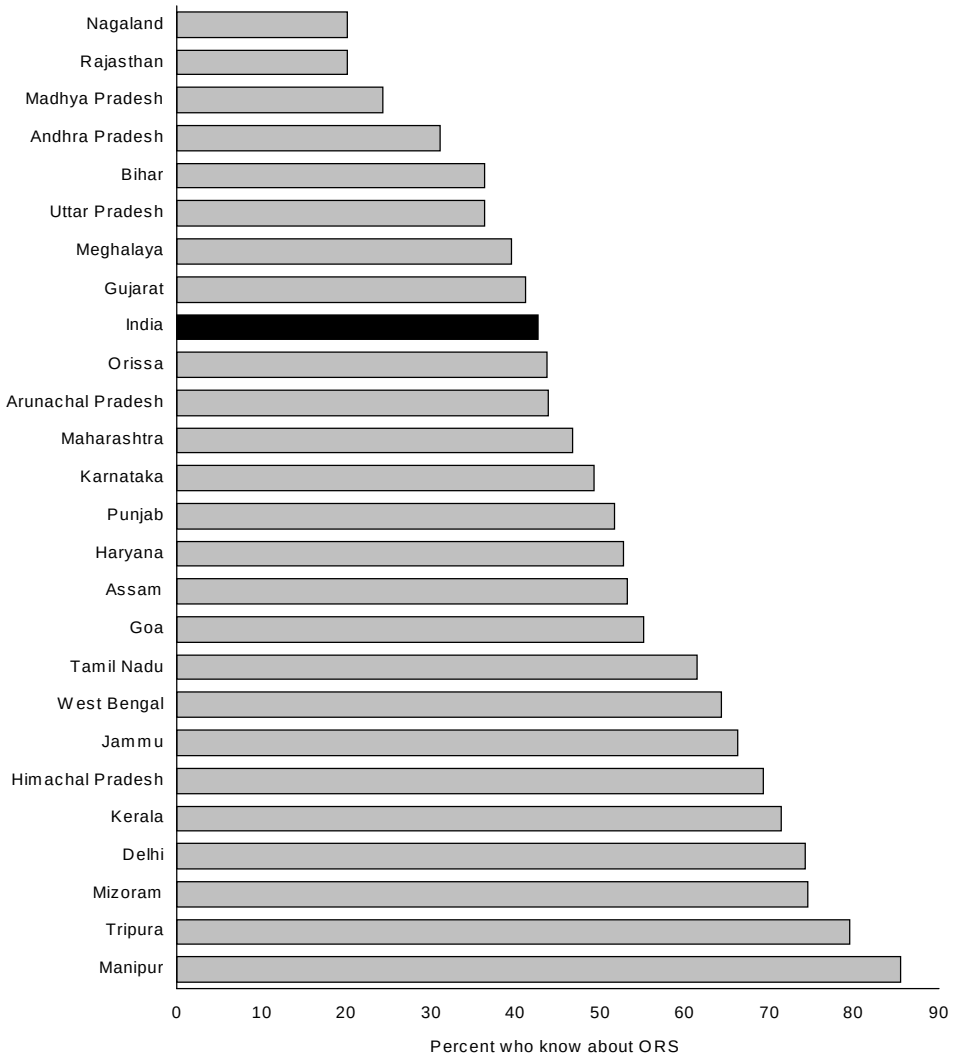

Figure 4 Knowledge of ORS packets among women who gave birth during the four years before the NFHS, by state, 1992–93

half of this target group. Knowledge of the packets varies considerably by state, ranging from 20 percent in Nagaland and Rajasthan to more than 70 percent in Kerala, Delhi, Mizoram, Tripura, and Manipur.

Figure 5 and Table 5 show that only about one-fourth of the women who gave birth during the four years before the survey ever used ORS packets. Although this proportion is low, it is not surprising given that only 43 percent of these women know about ORS. Figure 5 and Table 5 also show state variations in ever-use of ORS. In Figure 5 the states are listed in the same order as in Figure 4, according to the percentage of women who know about ORS. This makes it possible to compare the states in terms of women's knowledge and ever-use of ORS packets. Variations in the

Table 5 Percentage of women who gave birth during the four years before the NFHS who know about or have ever used ORS packets, by state, 1992–93

State	Knows about ORS packets	Has ever used ORS packets
India	43	26
North		
Delhi	74	45
Haryana	53	28
Himachal Pradesh	69	47
Jammu region of Jammu and Kashmir	66	44
Punjab	52	29
Rajasthan	20	8
Central		
Madhya Pradesh	24	10
Uttar Pradesh	36	21
East		
Bihar	36	24
Orissa	44	29
West Bengal	64	50
Northeast		
Arunachal Pradesh	44	28
Assam	53	32
Manipur	86	60
Meghalaya	40	20
Mizoram	75	39
Nagaland	20	6
Tripura	80	51
West		
Goa	55	32
Gujarat	41	23
Maharashtra	47	31
South		
Andhra Pradesh	31	16
Karnataka	49	31
Kerala	71	40
Tamil Nadu	61	32

pattern of bars in Figure 5 indicate states where ever-use of ORS packets is greater or smaller than might be expected given women's knowledge of ORS. Thus, Bihar and West Bengal stand out as states where a relatively high proportion of women who know about ORS packets have ever used them. In Kerala and Mizoram, by contrast, a relatively low proportion of women who know about ORS packets have ever used them. The large variations by state in knowledge and ever-use of ORS packets indicate that the government's Oral Rehydration Therapy Programme has been much more successful in some states than in others.

TREATMENT OF DIARRHOEA

Treatment guidelines issued by the World Health Organisation indicate that most cases of childhood diarrhoea can be treated at home by increasing fluid intake and

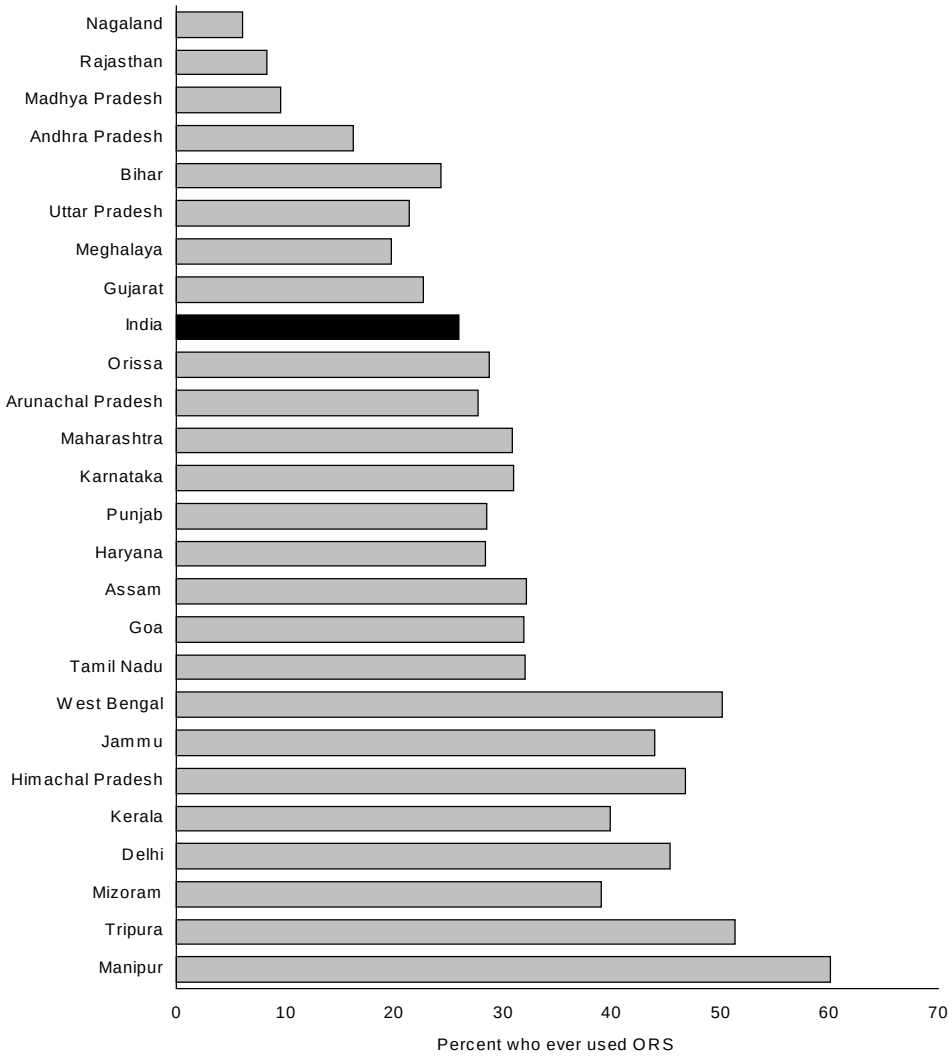

Figure 5 Ever-use of ORS packets among women who gave birth during the four years before the NFHS, by state, 1992–93

continuing feeding during diarrhoeal episodes. In the vast majority of cases, antibiotics and other antidiarrhoeal drugs commonly used for diarrhoea treatment have no practical benefits in preventing dehydration or improving nutritional status. Some of these drugs actually prolong diarrhoea, and others have dangerous and sometimes fatal side effects. WHO (1990; 1995) strongly recommends avoiding such drugs, especially for treating diarrhoea in children under age five. In accordance with WHO guidelines, the Government of India instructs mothers whose children are ill with diarrhoea to increase fluid intake, continue feeding, and recognize danger signs requiring treatment at a health facility. For more than a decade, the government's Oral Rehydration Therapy Programme has also emphasized the use of ORS packets or

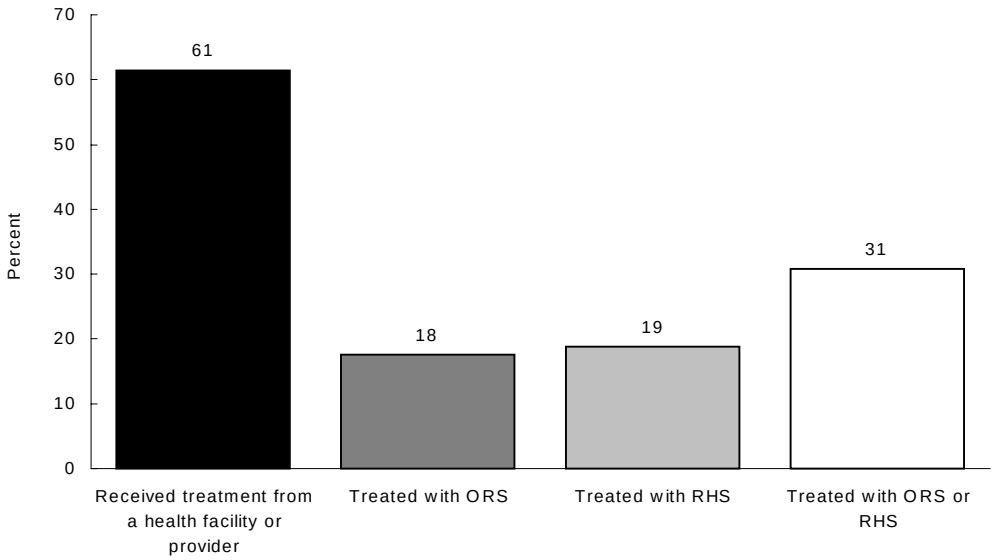

Figure 6 Treatment of children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, India, 1992–93

RHS to help prevent dehydration, which is the primary cause of death in children suffering from acute diarrhoea.

In contrast to these recommendations, Figure 6 and Table 6 show how diarrhoeal episodes that occurred during the two weeks before the NFHS were actually treated. Children, rather than mothers, are the units of analysis. In India as a whole, only 18 percent of children who were ill with diarrhoea were given ORS, and only 19 percent were given RHS. Sixty-nine percent of these children received neither ORS nor RHS.

For this group of children, Figure 7 and Table 6 show any changes in the frequency of breastfeeding and in the intake of other fluids. Among children who were still being breastfed at the time of the survey, only 7 percent received more frequent breastfeeding when they became ill with diarrhoea. Fourteen percent received less frequent breastfeeding, including cases where breastfeeding was stopped completely. Only about 10 percent received increased fluids aside from breast milk, while 20 percent received decreased fluids.

Even among children who were treated with ORS or RHS, only 8 percent received more frequent breastfeeding, while for 18 percent breastfeeding was either reduced in frequency or was stopped completely (Figure 8). Similarly, among children treated with ORS or RHS, only 14 percent received increased fluids aside from breast milk, while 25 percent received decreased fluids. These results show that the Oral Rehydration Therapy Programme has not sufficiently emphasized the importance of continued feeding and increased fluid intake during diarrhoeal episodes to replenish fluid loss and avoid dehydration.

Table 6 Percentage of children who were born 1–47 months before the NFHS and were ill with diarrhoea during the two weeks before the survey who received treatment from a health facility or provider or were given oral rehydration therapy, by state, 1992–93

State	Received treatment from a health facility or provider[a]	Given ORS	Given RHS	Given ORS or RHS	Given increased breastfeeding[b]	Given increased fluids[c]
India	61	18	19	31	7	10
North						
Delhi	66	21	29	40	11	13
Haryana	66	8	15	19	6	12
Himachal Pradesh	71	30	24	45	5	37
Jammu region of Jammu and Kashmir	71	33	22	44	6	16
Punjab	86	22	15	33	3	18
Rajasthan	51	13	14	23	5	5
Central						
Madhya Pradesh	65	23	16	34	7	19
Uttar Pradesh	66	13	13	23	18	12
East						
Bihar	59	12	14	23	6	11
Orissa	47	17	32	41	2	3
West Bengal	82	45	47	75	5	8
Northeast						
Arunachal Pradesh	38	27	12	33	3	8
Assam	36	22	22	35	12	8
Manipur	41	53	31	64	6	9
Meghalaya	67	39	11	41	5	4
Mizoram	32	21	8	24	3	13
Nagaland	12	20	14	25	15	16
Tripura	61	44	22	61	17	28
West						
Goa	70	28	18	41	13	1
Gujarat	63	13	11	21	3	6
Maharashtra	61	18	34	42	1	5
South						
Andhra Pradesh	63	23	15	33	8	7
Karnataka	65	25	18	34	2	8
Kerala	71	19	28	38	13	16
Tamil Nadu	55	19	15	27	4	5

a. Includes government/municipal hospital, private hospital/clinic, primary health centre, sub-centre, doctor, or other health professional.

b. Frequency of breastfeeding, if mother still breastfeeding at the time of the survey.

c. Fluid intake, aside from breast milk.

It is surprising that so few of the children who were ill with diarrhoea received the treatment recommended by WHO and the Indian Government because 61 percent of these children received treatment from a health facility or provider. Among those children who were ill with diarrhoea and who received treatment from a health facility or provider, 40 percent were treated with ORS or RHS, while 94 percent received antibiotics or other antidiarrhoeal drugs (not including home remedies or herbal medicines). Among these children, 35 percent received both drugs and either ORS or RHS, while 59 percent received drugs alone.

Not only do Indian mothers apparently lack awareness of the proper treatment of diarrhoea, but also health providers do not appear to be prescribing the proper

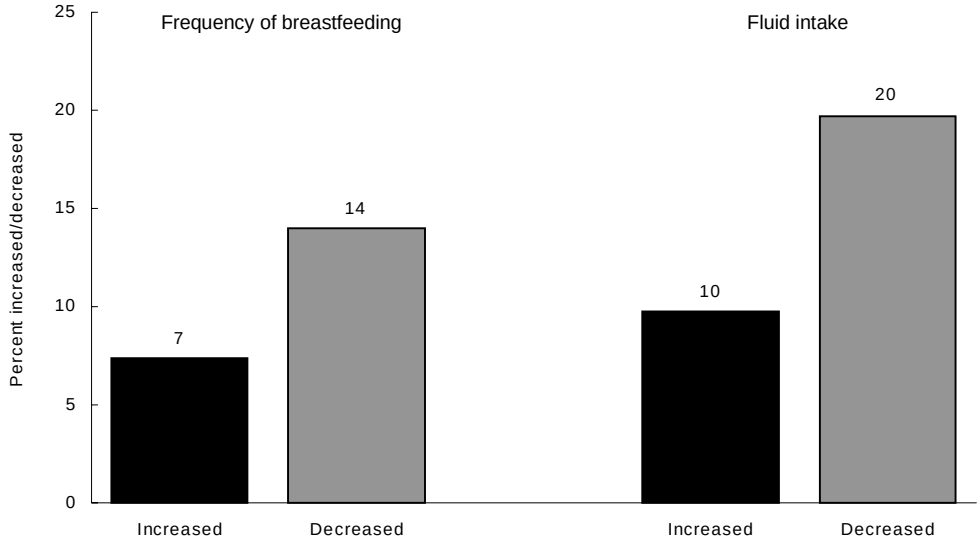

Figure 7 Change in frequency of breastfeeding, if mother still breastfeeding, and in intake of other fluids among children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, India, 1992–93

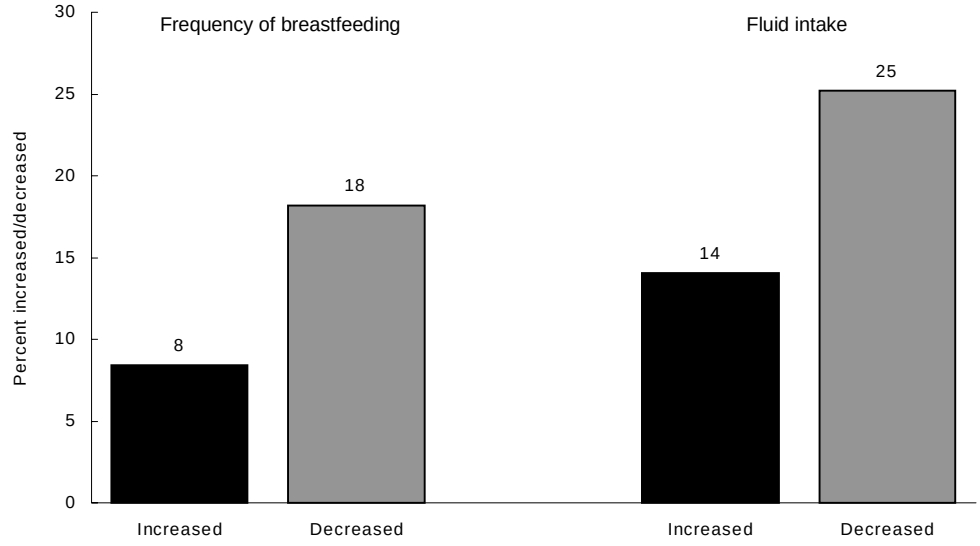

Figure 8 Change in frequency of breastfeeding, if mother still breastfeeding, and in intake of other fluids among children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey and who were treated with ORS or RHS, India, 1992–93

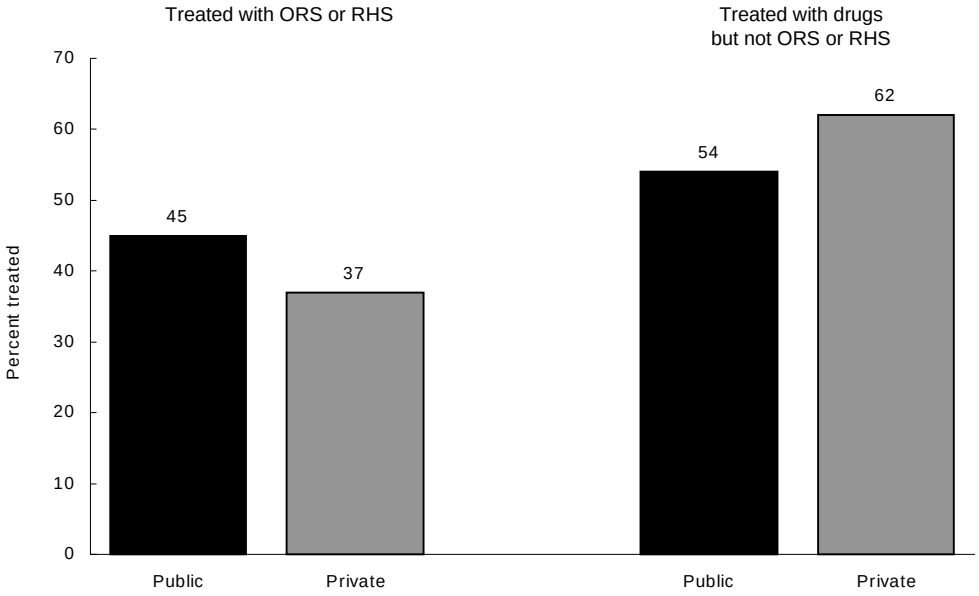

Figure 9 Differential patterns of treatment by public- and private-sector facilities or providers of children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, India, 1992–93

treatment. This conclusion is consistent with findings from other studies conducted at about the same time as the NFHS. Those studies also indicate low awareness of oral rehydration therapy among mothers, high reliance on health-care providers, high use of antibiotics and antidiarrhoeal drugs, and a tendency of health providers not to prescribe oral rehydration therapy (Singh et al. 1992; Sinha and Srivastava 1993).

Among the children who received treatment from a health facility or provider, 27 percent were treated in the public sector, 71 percent were treated in the private sector (often a pharmacy or medical shop), and 3 percent were treated in both the public and private sectors. There are major variations among states in the relative importance of the public and private sectors in the treatment of diarrhoea, but the reasons for these variations are unclear and beyond the scope of this report.

Figure 9 shows that children who received treatment from a public-sector health facility or provider were more likely to be treated with ORS or RHS (45 percent) than were children who received treatment from a private-sector facility or provider (37 percent). This difference is due almost entirely to a difference in the use of ORS, which was higher for children treated in the public sector. By contrast, 94 percent of children treated in the private sector and 91 percent of children treated in the public sector received antibiotics or antidiarrhoeal drugs. Treatment with

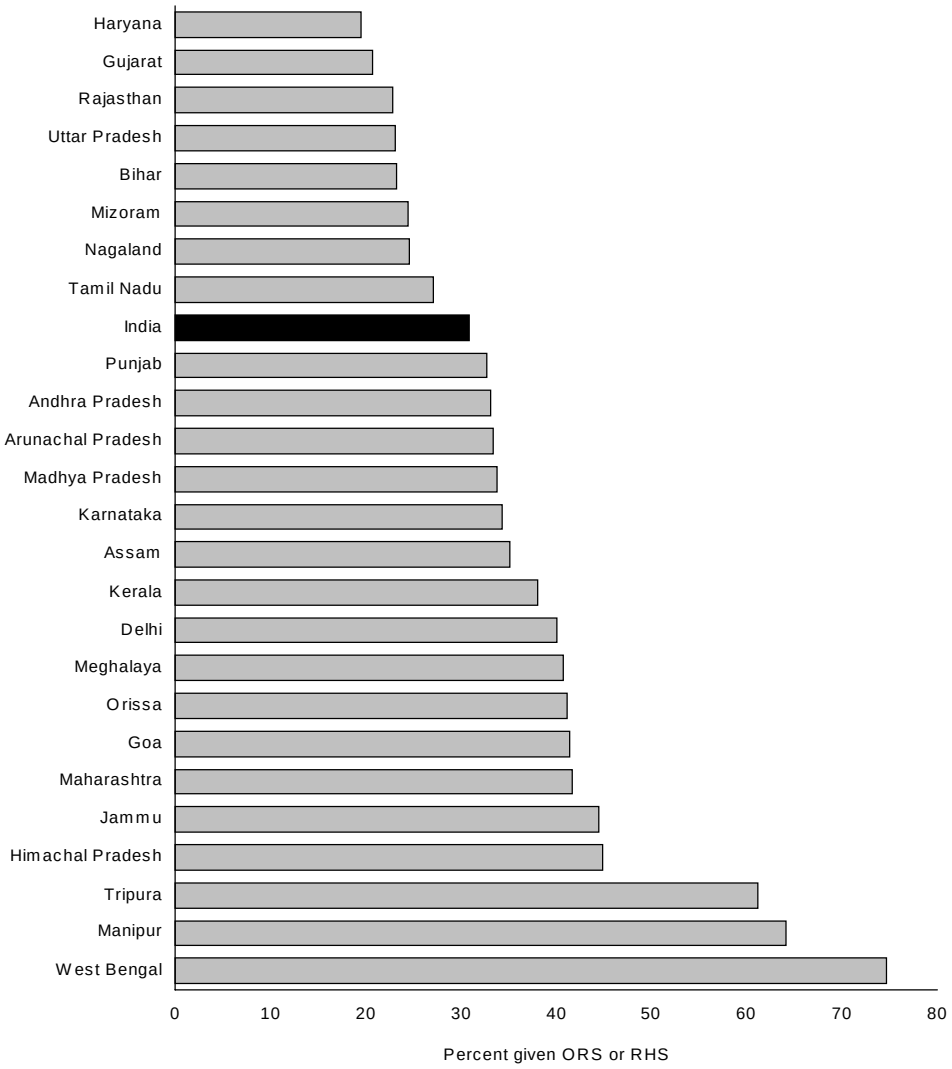

Figure 10 Treatment of children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by state, 1992–93

drugs alone, without ORS or RHS, was somewhat higher for children treated in the private sector (62 percent) than for children treated in the public sector (54 percent).

Table 6 shows state variations in diarrhoea treatment, and Figure 10 shows state variations in the use of ORS or RHS. In most states, a large proportion of children who became ill with diarrhoea received treatment from a health facility or provider. This proportion is particularly high in Punjab (86 percent) and West Bengal (82 percent). Use of ORS or RHS, by contrast, tends to be low and varies widely among states. It is particularly low in Haryana (19 percent), Gujarat (21 percent), Rajasthan (23 percent), Uttar Pradesh (23 percent), and Bihar (23 percent). In West

Bengal, by contrast, 75 percent of children who were ill with diarrhoea received ORS or RHS. (The total number of diarrhoea cases in West Bengal is only 51, however, so caution must be exercised when interpreting these results.) The percentages of children who received more frequent breastfeeding and increased fluids are low in all states, with some variation.

EFFECTS OF MEDIA EXPOSURE ON MOTHERS' KNOWLEDGE AND EVER-USE OF ORS PACKETS

A multivariate analysis shows the effects of mass media exposure on awareness and ever-use of ORS packets. The analysis focuses on women who gave birth during the four years before the NFHS, incorporating a number of controls for demographic and socioeconomic background variables.

Table 7 gives definitions of variables and their mean values. In India as a whole, 43 percent of women who gave birth during the four years before the NFHS know about ORS packets, and 26 percent have ever used them. Forty-eight percent are regularly exposed to at least one of the electronic mass media (radio, television, or cinema). Of those who lived in rural areas, 41 percent live in villages that have held at least one village-level mass media activity or other educational activity related to health and family welfare.

Sixty-four percent of these women are in their twenties. More than three-quarters reside in rural areas, and about two-thirds are illiterate. Eighty percent are Hindus, and 23 percent belong to scheduled castes or scheduled tribes. Slightly more than half live in *kachcha* houses, and similar proportions live in households without electricity and in households with more than three persons per room. About two-thirds have access to safe drinking water, but only 16 percent have access to a sanitary toilet facility. There are sharp urban/rural differences in the mean values of most of these variables. In rural areas, about one-half of these women live in villages connected to the outside by an all-weather road, and about two-thirds have access to a health facility within two kilometres of the village.

Knowledge of ORS packets

Figure 11 and Table 8 show the effects of electronic mass media exposure on knowledge of ORS packets among women who gave birth during the four years before the NFHS. Unadjusted and adjusted results are derived by logistic regression. The adjusted results incorporate controls for age, urban/rural residence, education, religion, caste/tribe, house type, crowding, access to safe drinking water, access to a sanitary toilet facility, availability of household electricity, and geographic region. The unadjusted results do not incorporate any controls.

Table 7 Definitions and mean values of variables for women who gave birth during the four years before the NFHS, by residence, India, 1992–93

Variable	Definition: Dummy variable, with value 1 if the specified condition is met, 0 otherwise	Mean[a] (percent)		
		Urban	Rural	Total
Response variables				
Knowledge of ORS	Woman knows about ORS packets	56	39	43
Ever-use of ORS	Woman has ever used ORS packets	33	24	26
Learning about RHS	Source of learning about RHS is mass media[b]	46	19	27
Predictor variables				
Electronic mass media exposure	Woman watches television or listens to radio at least once a week or visits a cinema at least once a month	77	39	48
Village media/educational activity	Any film show, exhibition, drama/song performance, or group meeting held during the past year or any leaders' orientation training camp ever held in the village	—	41	—
Age 20–29	Woman's age is 20–29 years	68	63	64
Age 30–49	Woman's age is 30–49 years	24	25	25
Residence	Residence is urban	100	0	23
Literate, < middle complete	Literate with less than a middle-school education	33	21	24
≥ middle complete	Literate with a middle-school or higher education	28	5	11
Muslim	Woman lives in a household whose head is Muslim	21	13	15
Other religion	Woman lives in a household whose head is not Hindu or Muslim	7	5	5
Scheduled caste or scheduled tribe	Woman lives in a household whose head belongs to a scheduled caste (SC) or scheduled tribe (ST)[c]	13	25	23
House type	Woman lives in a *pucca* (high quality) or semi-*pucca* house[d]	78	38	47
Crowding	Woman lives in a household with three or more persons per room	53	56	55
Safe drinking water	Woman lives in a household that uses piped/tap water, ground water, tanker truck water, or bottled water as the main source of drinking water	87	62	67
Sanitary toilet facility	Woman lives in a household that has own or shared flush toilet facility	48	6	16
Electricity	Woman lives in a household that uses electricity as the main source of lighting	80	37	47
Road	Woman lives in a village that is connected by an all-weather road	—	49	—
Health facility	Woman lives in a village that has a primary health centre, sub-centre, government hospital, private hospital, dispensary/clinic, or NGO family planning/health clinic within two kilometres	—	66	—
North	Woman lives in Delhi, Haryana, Himachal Pradesh, Jammu region of Jammu and Kashmir, Punjab, or Rajasthan	13	11	12
Central	Woman lives in Madhya Pradesh or Uttar Pradesh	23	31	29
East	Woman lives in Bihar, Orissa, or West Bengal	16	25	23
Northeast	Woman lives in Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, or Tripura	2	5	4
West	Woman lives in Goa, Gujarat, or Maharashtra	21	11	13
Number of women	Number of women in the sample who gave birth during the four years before the survey[e]	8,727	29,434	38,161

a. Mean values are based on the weighted sample.

b. In the case of this particular variable, 'mass media' include radio, television, and printed material.

c. Scheduled castes (SC) and scheduled tribes (ST) are those castes and tribes identified by the Government of India as socially and economically backward and in need of special protection from social injustice and exploitation.

d. The reference category is *kachcha. Kachcha* houses are made from mud, thatch, or other low-quality materials. *Pucca* houses are made from high-quality materials (such as bricks, tiles, cement, and concrete) throughout, including roof, walls, and floor. Semi-*pucca* houses are made from partly low-quality and partly high-quality materials.

e. Actual sample size varies slightly for individual variables depending on the number of missing values.

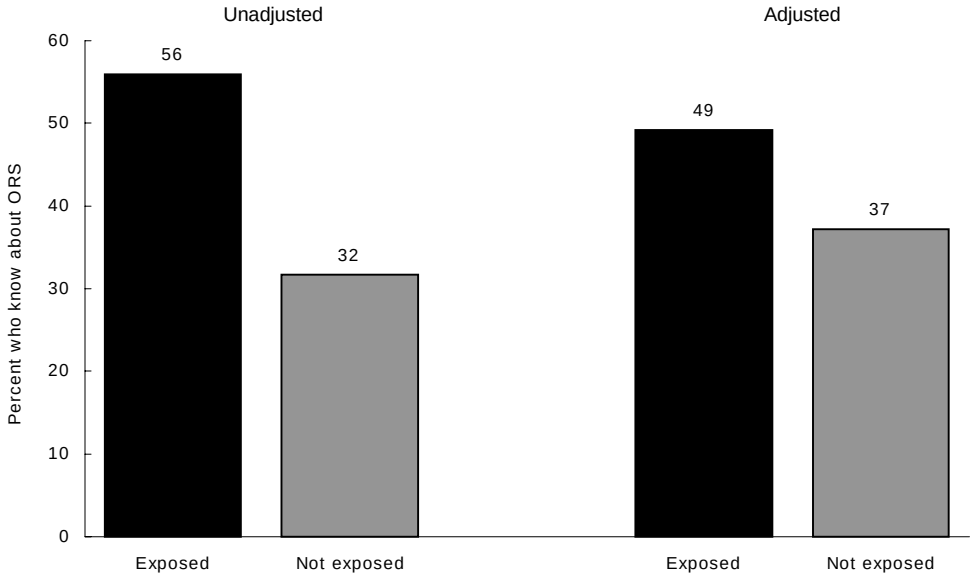

Figure 11 Effects of electronic mass media exposure on knowledge of ORS packets among women who gave birth during the four years before the NFHS, India, 1992–93

The unadjusted results in Figure 11 and Table 8 show that women who are regularly exposed to electronic mass media are much more likely than other women to know about ORS packets. Fifty-six percent of exposed women know about ORS packets, compared with only 32 percent of unexposed women. The difference between these two percentages is reduced by half—from 24 to 12 percentage points—when potentially confounding variables are statistically controlled by holding them constant at their mean values. Even with these other variables controlled, however, the effect of media exposure on knowledge of ORS packets remains considerable and highly statistically significant ($p<.0001$).

Table 8 also gives the unadjusted and adjusted effects of each of the demographic and socioeconomic variables used in the analysis. The adjusted results for each predictor variable are calculated by holding all the other predictor variables, including electronic mass media exposure, constant at their mean values. The table shows that, with or without controls, women age 20–29 are somewhat more likely to know about ORS packets than are either teenagers or older women. Without controls, urban women are more likely to know about ORS than are rural women, but, when controls are introduced in the adjusted column, the urban/rural difference becomes small and not statistically significant. This suggests that women in urban areas are more likely to know about ORS not because of their urban residence per se, but rather because of other variables, such as their education, exposure to electronic mass media, and access to health care, which are correlated with urban residence.

Table 8 Unadjusted and adjusted effects of media exposure and other factors on knowledge of ORS packets among women who gave birth during the four years before the NFHS, India, 1992–93

	Percentage of women who know about ORS packets	
	Unadjusted	Adjusted
Electronic mass media exposure		
Yes	56*	49*
No†	32	37
Age		
13–19†	36	38
20–29	45*	44*
30–49	39*	42*
Residence		
Urban	56*	42
Rural†	39	43
Education		
Illiterate†	32	35
Literate, < middle complete	59*	54*
≥ middle complete	76*	68*
Religion		
Hindu†	41	42
Muslim	47*	46*
Other	52*	43
Caste/tribe		
SC/ST	32*	38*
Other†	46	44
House type		
Kachcha†	36	41
Pucca or semi-*pucca*	51*	44*
Crowding		
< 3 persons per room†	48	43
≥ 3 persons per room	38*	42
Safe drinking water		
Yes	46*	44*
No†	36	40
Sanitary toilet facility		
Yes	66*	44
No†	39	42
Electricity		
Yes	51*	44
No†	36	42
Geographic region		
North	41*	40*
Central	33*	37*
East	47	51*
Northeast	55*	59*
West	45*	39*
South†	50	43
Number of women	38,023	37,796

Note: In this table the units of analysis are women. For definition of variables see Table 7. Both unadjusted and adjusted values are estimated by logistic regression. Significance levels take design effects due to clustering into account. Unadjusted values are based on separate logistic regressions for each predictor variable, with that predictor variable as the only predictor variable in the regression. Adjusted values are based on a single logistic regression that includes all the predictor variables in the table. For any given predictor variable in the adjusted column, the set of control variables consists of all the other predictor variables, which are set at their mean values. Models are based on the weighted sample. Number of women in the unadjusted column varies slightly for individual variables depending on the number of missing values.

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying logistic regression differs significantly from zero at the 5 percent level.

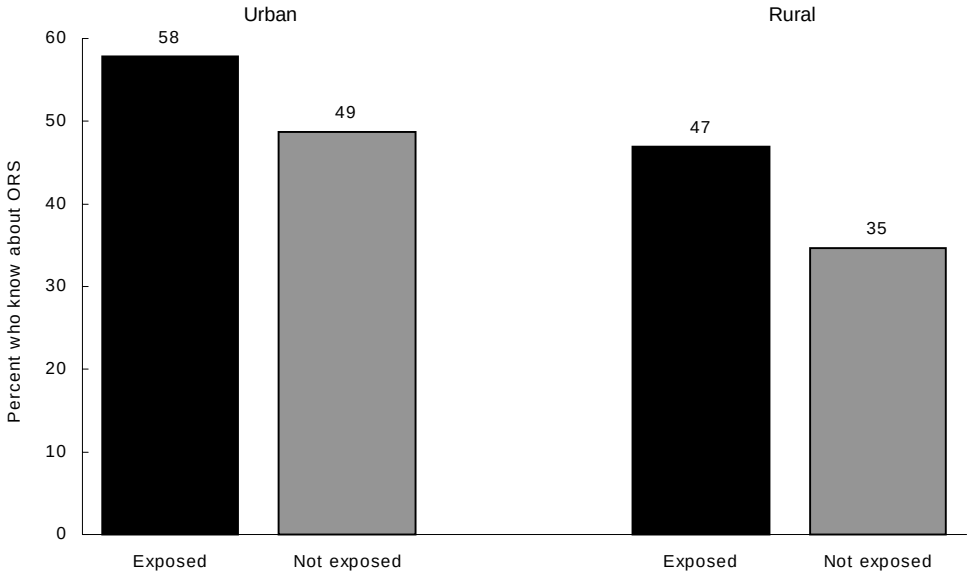

Figure 12 Adjusted effects of electronic mass media exposure on knowledge of ORS packets among women who gave birth during the four years before the NFHS, by residence, India, 1992–93

As expected, women's education has a large and highly statistically significant effect on knowledge of ORS. Even after controlling for potentially confounding variables, women who have completed middle school or higher education are almost twice as likely as illiterate women to know about ORS packets. Muslim women are somewhat more likely to know about ORS than are either Hindu women or women belonging to other religious groups. Women belonging to scheduled castes or scheduled tribes are considerably less likely to know about ORS than are other women, perhaps partly because they have relatively poor access to health care. Women living in the eastern and northeastern regions are more likely to know about ORS packets than are women living in other regions of India.

Women who live in *pucca* or semi-*pucca* houses, in households that are not crowded, or in households that have electricity, access to safe drinking water, or access to a sanitary toilet facility are more likely than other women to know about ORS packets. When other variables are statistically controlled, however, the effect of each of these variables is greatly reduced, with only the effects of house type and access to safe drinking water remaining statistically significant.

Figure 12 and Table 9 show the adjusted effects of electronic mass media exposure on knowledge of ORS packets among women who gave birth during the four years before the NFHS, broken down separately for urban and rural areas. In this analysis, the set of control variables omits urban/rural residence, and three community-

Table 9 Adjusted effects of media exposure and other factors on knowledge of ORS packets among women who gave birth during the four years before the NFHS, by residence, India, 1992–93

	Percentage of women who know about ORS packets	
	Urban	Rural
Electronic mass media exposure		
Yes	58*	47*
No†	49	35
Village media/educational activity		
Yes	—	41*
No†	—	38
Age		
13–19†	45	35
20–29	57*	41*
30–49	55*	38*
Education		
Illiterate†	42	34
Literate, < middle complete	57*	53*
≥ middle complete	72*	67*
Religion		
Hindu†	55	39
Muslim	56	44*
Other	59	38
Caste/tribe		
SC/ST	47*	36*
Other†	57	40
House type		
Kachcha†	53	38
Pucca or semi-*pucca*	56	41*
Crowding		
< 3 persons per room†	55	40
≥ 3 persons per room	56	39*
Safe drinking water		
Yes	56	41*
No†	52	37
Sanitary toilet facility		
Yes	57	39
No†	54	39
Electricity		
Yes	56	40
No†	56	39
Village has all-weather road		
Yes	—	42*
No†	—	37
Distance to health facility		
< 2 km	—	41*
≥ 2 km†	—	36
Geographic region		
North	62	33*
Central	50*	35
East	64*	46*
Northeast	77*	56*
West	46*	39
South†	58	38
Number of women	8,647	27,465

Note: In this table the units of analysis are women. For definition of variables see Table 7. Adjusted values are estimated by logistic regression. Significance levels take design effects due to clustering into account. For any given predictor variable, the set of control variables consists of all the other predictor variables in the table, which are set at their mean values. Models are based on the weighted sample.

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying logistic regression differs significantly from zero at the 5 percent level.

level variables are added for women in rural areas. Results show that the adjusted effect of electronic mass media exposure is large and highly statistically significant in both urban and rural areas. Although urban women are more likely than rural women to know about ORS packets (see Tables 7 and 8), the effect of electronic mass media exposure on knowledge of ORS is considerably greater in rural areas. The electronic mass media may play a less important role in teaching urban women about ORS packets because urban women have more access to information on health care than do rural women and are thus more likely to learn about ORS from other sources.

Table 9 includes three additional predictor variables specific to rural areas—occurrence of at least one village-level mass-media or educational activity, availability of an all-weather road, and distance to the nearest health facility. Even when the effects of general exposure to electronic mass media and various demographic and socioeconomic factors are controlled, village-level mass media and educational activities have a small but statistically significant effect on knowledge of ORS packets. Availability of an all-weather road and availability of a health facility within two kilometres of the village also have statistically significant effects.

Ever-use of ORS packets

Figure 13 and Table 10 show unadjusted and adjusted effects of exposure to electronic mass media on ever-use of ORS packets. Again, the analysis focuses on women who gave birth during the four years before the NFHS. In India as a whole, ever-use of ORS packets is considerably higher among women who have been regularly exposed to mass media than among women who have not been exposed. Controlling for the other demographic and socioeconomic variables reduces the difference between exposed and unexposed women by half (from 14 to 7 percentage points), but this difference is still considerable and highly statistically significant ($p<.0001$).

Table 10 also shows the unadjusted and adjusted effects of the demographic and socioeconomic variables included in the analysis. With or without controls, women age 20–29 are somewhat more likely to have ever used ORS packets than are either teenagers or older women. Although the unadjusted percentage of women who have ever used ORS is considerably higher in urban areas than in rural areas, the adjusted percentages are virtually the same. Women's education, by contrast, has a large and highly statistically significant effect on ever-use of ORS packets that persists after adjusting for other variables. Women who have completed middle school or higher education are somewhat more than twice as likely as illiterate women to have ever used ORS packets.

Even with other variables controlled, Muslim women are more likely to have ever used ORS packets than are Hindu women or women belonging to other religions.

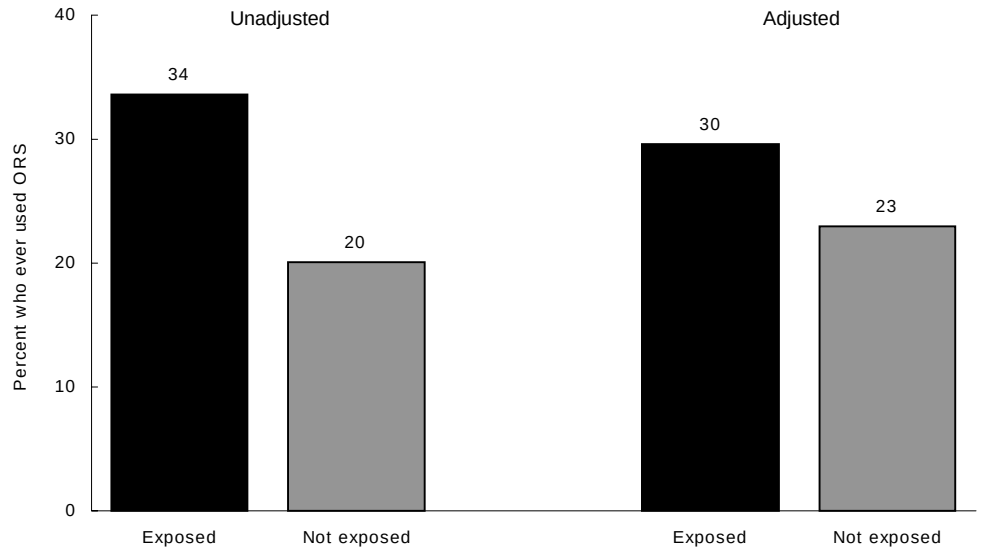

Figure 13 Effects of electronic mass media exposure on ever-use of ORS packets among women who gave birth during the four years before the NFHS, India, 1992–93

This result is somewhat surprising, inasmuch as Muslim women generally tend to make less use of health services than do other women in India (IIPS 1995). This unexpected result may occur because a mother can treat her child's diarrhoea with ORS packets without leaving her home to visit a health provider, in keeping with Muslim norms about the seclusion of women.

Women who belong to scheduled castes or scheduled tribes are less likely than other women to have ever used ORS packets, even after controlling for other variables. This is consistent with the finding that women who belong to these disadvantaged groups are less likely than other women to know about ORS, reflecting their relatively poor access to information and health services. Women who live in *pucca* or semi-*pucca* houses or in households with access to safe drinking water are more likely than other women to have ever used ORS. Women in the east and northeast are more likely than women in other regions to have ever used ORS. All these finding are consistent with results for knowledge of ORS.

Figure 14 and Table 11 show the effects of electronic mass media exposure on ever-use of ORS packets separately for urban and rural areas. As with knowledge of ORS, the adjusted effect of electronic mass media exposure on ever-use of ORS packets is small and not statistically significant in urban areas, but it is large and highly statistically significant in rural areas. The smaller effect in urban areas may occur partly because urban women have more sources of information than do rural women and are therefore more likely to learn about ORS packets from sources other than radio, television, and cinema. Urban women also have greater access

Table 10 Unadjusted and adjusted effects of media exposure and other factors on ever-use of ORS packets by women who gave birth during the four years before the NFHS, India, 1992–93

	Percentage of women who have ever used ORS packets	
	Unadjusted	**Adjusted**
Electronic mass media exposure		
Yes	34*	30*
No†	20	23
Age		
13–19†	21	21
20–29	27*	27*
30–49	25*	27*
Residence		
Urban	33*	25
Rural†	24	26
Education		
Illiterate†	20	21
Literate, < middle complete	38*	34*
≥ middle complete	46*	43*
Religion		
Hindu†	25	25
Muslim	31*	30*
Other	29*	24
Caste/tribe		
SC/ST	19*	23*
Other†	28	27
House type		
Kachcha†	22	24
Pucca or semi-*pucca*	31*	28*
Crowding		
< 3 persons per room†	29	26
≥ 3 persons per room	24*	26
Safe drinking water		
Yes	28*	27*
No†	21	23
Sanitary toilet facility		
Yes	38*	25
No†	24	26
Electricity		
Yes	30*	26
No†	23	26
Geographic region		
North	23*	22*
Central	18*	20*
East	34*	36*
Northeast	34*	37*
West	29	25
South†	28	25
Number of women	37,992	37,764

Note: In this table the units of analysis are women. For definition of variables see Table 7. Both unadjusted and adjusted values are estimated by logistic regression. Significance levels take design effects due to clustering into account. Unadjusted values are based on separate logistic regressions for each predictor variable, with that predictor variable as the only predictor variable in the regression. Adjusted values are based on a single logistic regression that includes all the predictor variables in the table. For any given predictor variable in the adjusted column, the set of control variables consists of all the other predictor variables, which are set at their mean values. Models are based on the weighted sample. Number of women in the unadjusted column varies slightly for individual variables depending on the number of missing values.

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying logistic regression differs significantly from zero at the 5 percent level.

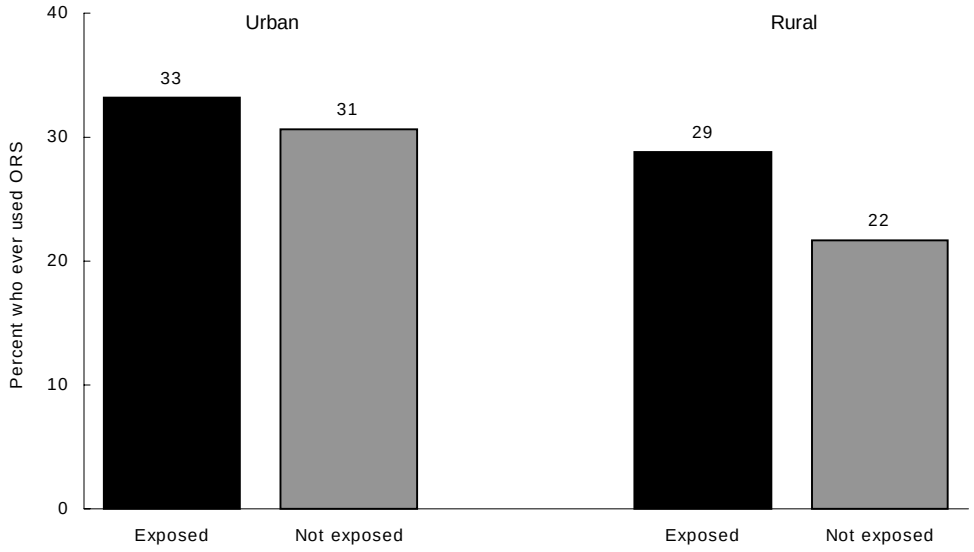

Figure 14 Adjusted effects of electronic mass media exposure on ever-use of ORS packets among women who gave birth during the four years before the NFHS, by residence, India, 1992–93

to health facilities and providers who can provide ORS packets to children who are ill with diarrhoea.

For rural areas, Table 11 gives the adjusted effects of village-level mass media and other educational activities on ever-use of ORS packets. Even when the effects of general exposure to electronic mass media and other demographic and socioeconomic variables are controlled, village mass media and educational activities have a positive and statistically significant effect on ever-use of ORS. Controlling for general exposure to electronic mass media does not change these results, which suggests that electronic mass media exposure, on the one hand, and village-level media and educational activities, on the other, have largely independent effects on ever-use of ORS.

The adjusted effects of education, religion, and caste/tribe on ever-use of ORS packets are similar in urban and rural areas. The effects of house type and access to safe drinking water are statistically significant in rural areas but not in urban areas, probably due to the smaller urban sample size. The effects of crowding, access to a sanitary toilet facility, and household electricity are negligible and not statistically significant in either urban or rural areas. In both urban and rural areas, ever-use of ORS packets is substantially higher in the east and northeast than in other regions of India. In rural areas, availability of an all-weather road and access to a health facility within two kilometres both have a positive effect on ever-use of ORS packets, but the effect of distance to a health facility is not statistically significant.

Table 11 Adjusted effects of media exposure and other factors on ever-use of ORS packets by women who gave birth during the four years before the NFHS, by residence, India, 1992–93

	Percentage of women who have ever used ORS packets	
	Urban	**Rural**
Electronic mass media exposure		
Yes	33	29*
No†	31	22
Village media/educational activity		
Yes	—	26*
No†	—	23
Age		
13–19†	26	20
20–29	33*	25*
30–49	34*	25*
Education		
Illiterate†	24	21
Literate, < middle complete	34*	34*
≥ middle complete	45*	42*
Religion		
Hindu†	32	24
Muslim	36*	29*
Other	33	22
Caste/tribe		
SC/ST	27*	22*
Other†	34	25
House type		
Kachcha†	30	23
Pucca or semi-*pucca*	33	26*
Crowding		
< 3 persons per room†	31	24
≥ 3 persons per room	34	24
Safe drinking water		
Yes	33	26*
No†	30	22
Sanitary toilet facility		
Yes	32	22
No†	33	24
Electricity		
Yes	32	24
No†	33	25
Village has all-weather road		
Yes	—	26*
No†	—	23
Distance to health facility		
< 2 km	—	25
≥ 2 km†	—	23
Geographic region		
North	34	19*
Central	25*	20
East	48*	33*
Northeast	51*	34*
West	29	25
South†	32	22
Number of women	8,639	27,445

Note: In this table the units of analysis are women. For definition of variables see Table 7. Adjusted values are estimated by logistic regression. Significance levels take design effects due to clustering into account. For any given predictor variable, the set of control variables consists of all the other predictor variables in the table, which are set at their mean values. Models are based on the weighted sample.

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying logistic regression differs significantly from zero at the 5 percent level.

EFFECTS OF MEDIA EXPOSURE ON TREATMENT WITH ORAL REHYDRATION THERAPY

This section examines the effects of mother's exposure to mass media on the use of oral rehydration therapy to treat children born 1–47 months before the NFHS who were ill with diarrhoea at any time during the two weeks before the survey. Table 12 presents definitions of variables and their mean values for these children, broken down by urban/rural residence. Table 12 is similar to Table 7, except that in Table 12 children who had diarrhoea during the two weeks before the survey are the units of analysis rather than women who gave birth during the four years before the survey.

Table 12 shows that 18 percent of children who were ill with diarrhoea during the two weeks before the survey were treated with ORS, and 19 percent were treated with RHS. Sixty-nine percent of these children did not receive either ORS or RHS. Use of ORS is about the same in urban and rural areas, but use of RHS is considerably higher in urban areas. Only 7 percent of the children who were still being breastfed were breastfed more frequently when ill with diarrhoea, whereas 14 percent were breastfed less frequently or not at all. Only 10 percent were given increased fluids (aside from breast milk) when they became ill with diarrhoea, whereas 20 percent were given decreased fluids. Changes in frequency of breastfeeding and in fluid intake are about the same in urban and rural areas.

Table 12 includes the same predictor variables as Table 7 plus child's age and gender. Mean values for most variables in Table 12, where children are the units of analysis, tend to be about the same as in Table 7, where women are the units of analysis.

Treatment with ORS packets

Figure 15 and Table 13 show unadjusted and adjusted rates of treatment with ORS and RHS for children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey. Treatment rates are broken down by mother's exposure to electronic mass media and by other demographic and socioeconomic variables. Results show that mother's exposure to electronic mass media has a large positive effect on the use of ORS. The unadjusted rate of ORS treatment is 22 percent for children whose mothers were exposed to mass media and 15 percent for children whose mothers were not exposed. Controlling for the other demographic and socioeconomic variables reduces the difference in treatment rates only slightly, to 20 percent for children of mothers exposed to mass media and 15 percent for children of mothers not exposed. The difference between the two adjusted rates is highly statistically significant ($p<.006$).

Table 13 shows that the ORS treatment rate is much lower for children under six months old. This might be because almost all children in this age range are breastfed,

Table 12 Definitions and mean values of variable for children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by residence, India, 1992–93

Variable	Definition: Dummy variable, with value 1 if the specified condition is met, 0 otherwise	Mean[a] (percent)		
		Urban	Rural	Total
Response variables				
Use of ORS	Child was given ORS when ill with diarrhoea	17	18	18
Use of RHS	Child was given RHS when ill with diarrhoea	27	17	19
Use of ORS or RHS	Child was given ORS or RHS when ill with diarrhoea	37	29	31
Frequency of breastfeeding[b]	When child was ill with diarrhoea, if mother was still breastfeeding, the frequency of breastfeeding:			
	Did not change	80	78	79
	Increased	6	8	7
	Decreased or stopped completely	14	14	14
Fluid intake	When child was ill with diarrhoea, intake of fluids other than breast milk:			
	Did not change or don't know	60	71	71
	Increased	12	9	10
	Decreased	20	20	20
Predictor variables				
Electronic mass media exposure	Mother watches television or listens to radio at least once a week or visits a cinema at least once a month	73	40	47
Village media/educational activity	Any film show, exhibition, drama/song performance, or group meeting held during the past year or any leaders' orientation training camp ever held in the village	—	39	—
Child's age 6–11	Child's age is 6–11 months	23	21	21
Child's age 12–23	Child's age is 12–23 months	34	33	33
Child's age 24–47	Child's age is 24–47 months	31	33	32
Sex of child	Child is a girl	48	48	48
Mother's age 20–29	Mother's age is 20–29 years	70	65	66
Mother's age 30–49	Mother's age is 30–49 years	22	21	22
Residence	Residence is urban	100	0	20
Literate, < middle complete	Mother is literate with less than a middle-school education	32	23	25
≥ middle complete	Mother is literate with a middle-school or higher education	21	5	9
Muslim	Child lives in a household whose head is Muslim	26	11	14
Other religion	Child lives in a household whose head is not Hindu or Muslim	6	5	5
Scheduled caste or scheduled tribe	Child lives in a household whose head belongs to a scheduled caste (SC) or scheduled tribe (ST)[c]	14	27	24
House type	Child lives in a *pucca* (high-quality) or semi-*pucca* house[d]	77	39	47
Crowding	Child lives in a household with three or more persons per room	59	57	57
Safe drinking water	Child lives in a household that uses piped/tap water, ground water, tanker truck water, or bottled water as the main source of drinking water	87	60	66
Sanitary toilet facility	Child lives in a household that has own or shared flush toilet facility	43	6	14
Electricity	Child lives in a household that uses electricity as the main source of lighting	78	38	46
Road	Child lives in a village that is connected by an all-weather road	—	49	—
Health facility	Child lives in a village that has a primary health centre, sub-centre, government hospital, private hospital, dispensary/clinic, or NGO family planning/health clinic within two kilometres	—	69	—
North	Child lives in Delhi, Haryana, Himachal Pradesh, Jammu region of Jammu and Kashmir, Punjab, or Rajasthan	12	11	11
Central	Child lives in Madhya Pradesh or Uttar Pradesh	22	26	25
East	Child lives in Bihar, Orissa, or West Bengal	14	27	25
Northeast	Child lives in Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, or Tripura	2	3	3
West	Child lives in Goa, Gujarat, or Maharashtra	22	12	14
Number of children	Number of children in the sample who were ill with diarrhoea at any time during the two weeks before the survey[e]	932	3,626	4,558

a. Mean values are based on the weighted sample

b. Percentage distribution for frequency of breastfeeding is based on children age 1–47 months who were ill with diarrhoea during the two weeks before the NFHS and who were still being breastfed at the time of the survey.

c, d, e. See notes to Table 7.

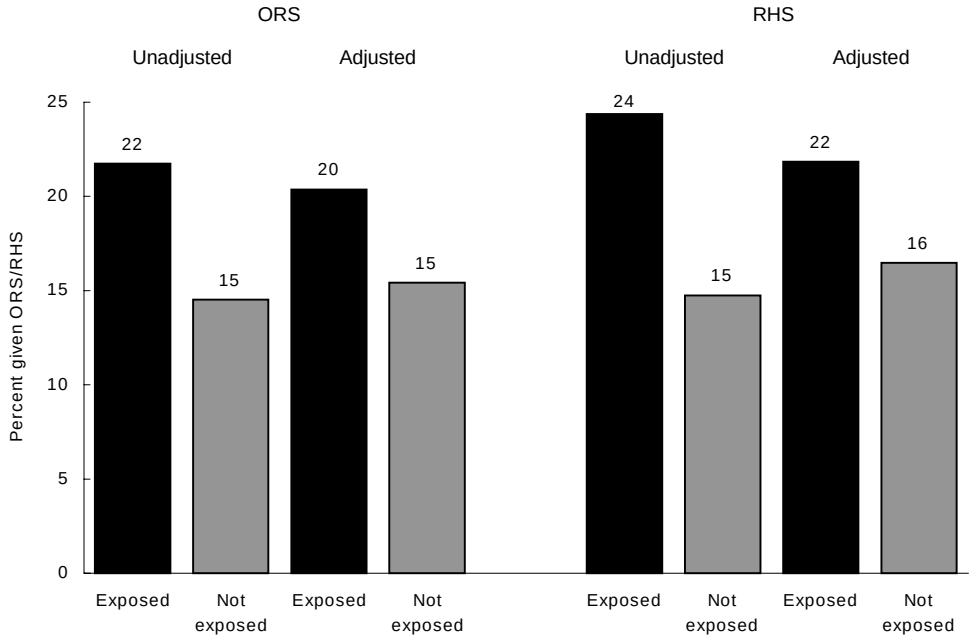

Figure 15 Effects of mother's electronic mass media exposure on use of ORS and RHS to treat children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, India, 1992–93

and they may be less likely than older children to receive other fluids, including ORS. Beyond the first six months, there is little variation in ORS treatment rates by child's age. The table also shows that ORS treatment is considerably higher for boys than for girls. The gender effect remains virtually the same after controlling for mother's electronic mass media exposure and the other demographic and socioeconomic variables. This finding indicates discrimination against girls in the use of ORS to treat childhood diarrhoea.

The adjusted ORS treatment rate is considerably lower in urban areas than in rural areas, suggesting that the government's efforts to promote the use of ORS packets have had a greater impact in rural areas. As expected, mother's education has a large effect on ORS treatment rates, an effect that is virtually unchanged after controlling

Note to Table 13: In this table the units of analysis are children. For definition of variables see Table 7. Both unadjusted and adjusted values are estimated by logistic regression. Significance levels take design effects due to clustering into account. Unadjusted values are based on separate logistic regressions for each predictor variable, with that predictor variable as the only predictor variable in the regression. Adjusted values are based on a single logistic regression that includes all the predictor variables in the table. For any given predictor variable in the adjusted column, the set of control variables consists of all the other predictor variables, which are set at their mean values. Models are based on the weighted sample. Number of children in the unadjusted columns varies slightly for individual variables depending on the number of missing values.

Table 13 Unadjusted and adjusted effects of mother's media exposure and other factors on use of ORS or RHS to treat children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, India, 1992–93

	Percentage of children treated with					
	ORS		RHS		ORS or RHS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Electronic mass media exposure						
Yes	22*	20*	24*	22*	38*	36*
No†	15	15	15	16	25	27
Child's age						
< 6 months†	9	9	11	11	17	16
6–11 months	19*	19*	20*	19*	33*	33*
12–23 months	22*	22*	20*	21*	35*	36*
24–47 months	18*	18*	20*	21*	32*	32*
Sex of child						
Boy†	20	20	19	19	33	33
Girl	15*	15*	19	19	29*	29*
Mother's age						
13–19†	16	16	17	19	28	30
20–29	19	19	19	19	32	32
30–49	15	16	19	20	28	29
Residence						
Urban	17	14*	27*	21	37*	31
Rural†	18	19	17	18	29	31
Mother's education						
Illiterate†	16	16	15	17	26	27
Literate, < middle complete	21*	20*	25*	22*	38*	36*
≥ middle complete	25*	25*	36*	29*	50*	46*
Religion						
Hindu†	18	18	18	18	30	30
Muslim	16	17	23*	22	33	33
Other	22	18	22	19	37*	33
Caste/tribe						
SC/ST	17	18	18	21	30	33
Other†	18	17	19	18	31	30
House type						
Kachcha†	17	18	17	19	28	31
Pucca or semi-*pucca*	19	17	22*	18	34*	30
Crowding						
< 3 persons per room†	19	18	21	20	34	32
≥ 3 persons per room	17	18	17*	18	29*	30
Safe drinking water						
Yes	19*	19*	20*	19	33*	32*
No†	15	15	16	18	27	28
Sanitary toilet facility						
Yes	18	14	33*	24*	42*	31
No†	18	18	17	18	29	31
Electricity						
Yes	21*	20*	23*	20	36*	33
No†	15	16	16	18	27	29
Geographic region						
North	18	16	18	17	30	27
Central	16*	17	14	16	26*	29
East	16*	17	22*	25*	33	36*
Northeast	27	28*	21	19	38	37*
West	16	15	25*	24*	33	31
South†	22	20	17	14	32	28
Number of children	4,533	4,509	4,518	4,494	4,520	4,496

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying logistic regression differs significantly from zero at the 5 percent level.

for media exposure and the other demographic and socioeconomic variables. Adjusted ORS treatment rates were also significantly higher for children living in households with electricity and in households with access to safe drinking water. There is little variation in adjusted ORS treatment rates by mother's age, religion, caste/tribe, house type, crowding, or access to a sanitary toilet facility. The ORS treatment rate is much higher in the northeast than in other regions of the country.

Treatment with RHS

Figure 15 and Table 13 show unadjusted and adjusted RHS treatment rates for children who had diarrhoea during the two weeks before the survey. The RHS treatment rate is considerably higher for children whose mothers were exposed to electronic mass media (24 percent) than for children whose mothers were not exposed (15 percent). Controlling for other demographic and socioeconomic variables reduces the difference in RHS treatment rates by about one-third—to 22 percent for children of women exposed to mass media and 16 percent for children of women not exposed. The difference between the two adjusted treatment rates remains highly statistically significant ($p<.002$).

As with ORS treatment, the RHS treatment rate is comparatively low for children under six months of age and does not vary much among older age groups. Unlike ORS treatment, however, the RHS treatment rate shows little variation by sex of child. Neither does RHS treatment vary much by mother's age or by urban/rural residence once electronic mass media exposure and other demographic and socioeconomic variables are controlled. The adjusted effect of mother's education is substantial and highly statistically significant, and the adjusted effect of access to a sanitary toilet facility is positive and statistically significant. The adjusted effects of other variables—including religion, caste/tribe, house type, crowding, access to safe drinking water, and household electricity—are small and not statistically significant. RHS treatment rates are somewhat higher in the east and west than in other regions of India.

Treatment with ORS or RHS

Table 13 also shows unadjusted and adjusted rates of treatment with ORS or RHS for children who had diarrhoea during the two weeks before the survey. As a combined category, the ORS/RHS treatment rate is inevitably higher than either the ORS treatment rate or the RHS treatment rate alone, but it is not quite as high as these two rates added together because children who were given both ORS and RHS are not counted twice. Mother's exposure to electronic mass media has a large and highly statistically significant ($p<.0001$) effect on ORS/RHS treatment, both before and after adjusting for the effects of other variables.

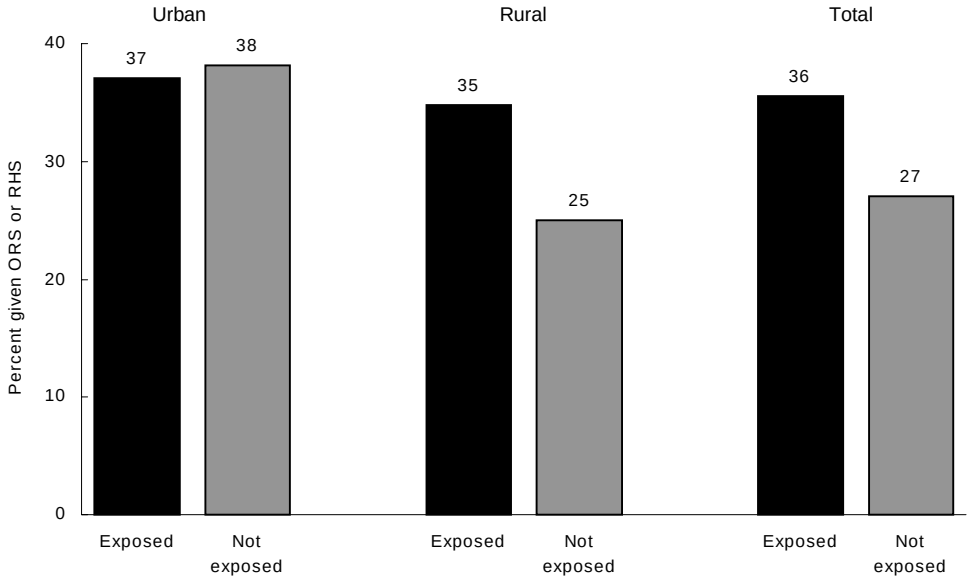

Figure 16 Adjusted effects of mother's electronic mass media exposure on use of ORS or RHS to treat children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by residence, India, 1992–93

As with ORS and RHS treatment rates, the adjusted ORS/RHS treatment rate is comparatively low among children less than six months of age and does not vary much among older age groups. The ORS/RHS treatment rate is somewhat higher for boys than for girls, reflecting the gender difference in the use of ORS discussed earlier. The ORS/RHS treatment rate rises with mother's education and is higher in households that have access to safe drinking water, but none of the other socioeconomic variables has a statistically significant effect. The ORS/RHS treatment rate is higher in the east and northeast than in other regions of the country.

Figure 16 and Table 14 show the adjusted effects of mother's electronic mass media exposure on ORS/RHS treatment, broken down separately for urban and rural areas. With the other predictor variables held constant, mother's exposure to electronic mass media has a large and highly statistically significant effect on ORS/RHS treatment in rural areas but virtually no effect in urban areas. As mentioned earlier, this pattern may occur because mothers in urban areas have more alternative sources of information, while mothers in rural areas rely more heavily on radio, television, and cinema.

Child's age and mother's education both affect ORS/RHS treatment rates rather similarly in urban and rural areas. The 'other religion' category has a large positive effect on the ORS/RHS treatment rate in urban areas but not in rural areas. In urban areas, the ORS/RHS treatment rate is significantly higher in the east than in other regions, but this regional difference is not observed in rural areas. The other socioeconomic variables do not have statistically significant effects in either urban or rural areas.

Table 14 Adjusted effects of mother's media exposure and other factors on use of ORS or RHS to treat children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by residence, India, 1992–93

	Percentage of children treated with ORS or RHS	
	Urban	Rural
Electronic mass media exposure		
Yes	37	35*
No†	38	25
Village media/educational activity		
Yes	—	27
No†	—	30
Child's age		
< 6 months†	22	15
6–11 months	42*	30*
12–23 months	45*	33*
24–47 months	33	31*
Sex of child		
Boy†	38	31
Girl	37	27
Mother's age		
13–19†	39	26
20–29	38	30
30–49	36	27
Mother's education		
Illiterate†	30	26
Literate, < middle complete	39	35*
≥ middle complete	52*	40*
Religion		
Hindu†	35	28
Muslim	38	33
Other	62*	24
Caste/tribe		
SC/ST	39	32
Other†	37	28
House type		
Kachcha†	45	29
Pucca or semi-*pucca*	35	29
Crowding		
< 3 persons per room†	38	30
≥ 3 persons per room	37	28
Safe drinking water		
Yes	38	30
No†	30	27
Sanitary toilet facility		
Yes	41	26
No†	35	29
Electricity		
Yes	38	31
No†	34	27
Village has all-weather road		
Yes	—	31
No†	—	27
Distance to health facility		
< 2 km	—	29
≥ 2 km†	—	27
Geographic region		
North	35	25
Central	31	28
East	52*	31
Northeast	39	36
West	37	30
South†	37	26
Number of children	915	3,384

ORS and RHS treatment by sex of child

The findings presented here indicate a degree of discrimination against girls in the use of ORS packets but not of RHS. It is undoubtedly more difficult for mothers to obtain ORS packets than to obtain the simple salt and sugar ingredients needed to prepare RHS, and most mothers who know about ORS packets probably perceive ORS as superior to RHS. Under these circumstances, it is plausible that son preference would translate into a higher ORS treatment rate for boys than for girls but about the same RHS treatment rate for both sexes, which is precisely what the findings in earlier sections indicate.

Figure 17 and Table 15 show the adjusted effects of mother's electronic mass media exposure on ORS and RHS treatment rates, broken down separately for boys and girls. Mother's exposure to electronic mass media has a large positive adjusted effect on ORS treatment for boys, but virtually no effect on ORS treatment for girls. By contrast, mother's exposure to electronic mass media has a positive effect on RHS treatment for both boys and girls. These findings indicate that mothers who are exposed to electronic mass media are more likely than unexposed mothers to discriminate against girls in providing treatment with ORS. The effect of mother's media exposure on the RHS treatment rate, however, is the same for boys and girls.

Table 15 also shows the adjusted effects of other demographic and socioeconomic variables on ORS and RHS treatment rates separately for boys and girls. Regarding ORS, child's age has effects similar to those noted in earlier tables, and these effects are rather similar for boys and girls. Urban/rural residence has a significant effect on the ORS treatment rate for boys, with a higher treatment rate in rural areas, but not for girls. Mother's education, access to safe drinking water, and household electricity all have positive effects on ORS treatment rates for boys but not for girls. Taken together, these findings suggest that women in relatively wealthy households are more likely than women in poor households to discriminate against girls in the use of ORS packets to treat diarrhoea. The table also shows that discrimination against girls is especially prevalent in the central and eastern regions of the country. None of the other predictor variables has a statistically significant effect on ORS treatment for either boys or girls.

Note to Table 14: In this table the units of analysis are children. For definition of variables see Table 17. Adjusted values are estimated by logistic regression. Significance levels take design effects due to clustering into account. For any given predictor variable, the set of control variables consists of all the other predictor variables in the table, which are set at their mean values. Models are based on the weighted sample.

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying logistic regression differs significantly from zero at the 5 percent level.

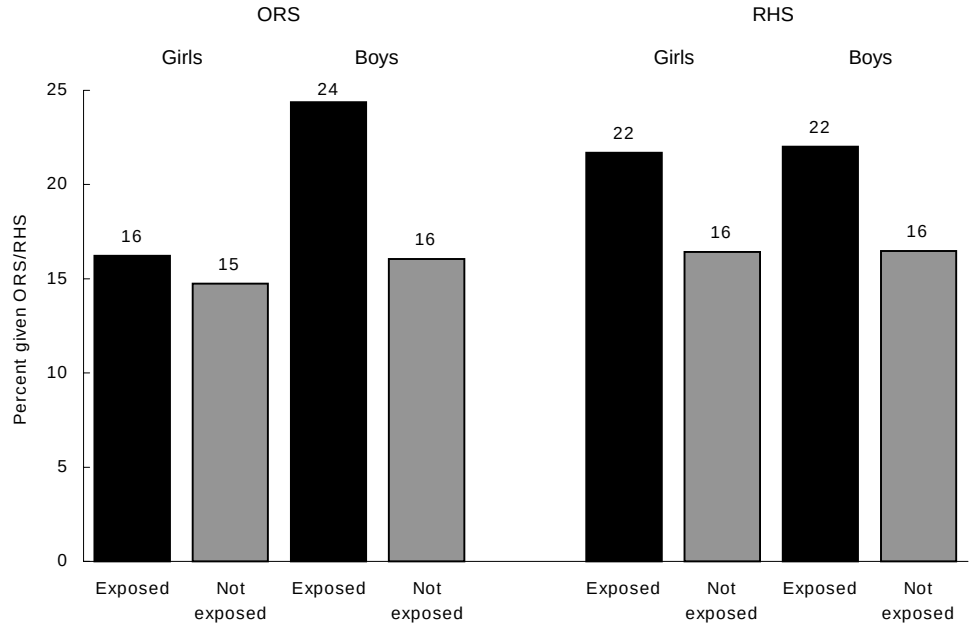

Figure 17 Adjusted effects of mother's electronic mass media exposure on use of ORS and RHS to treat children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by sex of child, India, 1992–93

For RHS, two socioeconomic variables have a greater effect on the treatment rate for boys than for girls—Muslim religion and household electricity. The other demographic and socioeconomic variables have similar effects on RHS treatment rates for children of both sexes.

In the combined treatment category, the effect of mother's electronic mass media exposure on treatment with ORS or RHS is greater for boys than for girls. Household electricity also has a greater effect on the ORS/RHS treatment rate for boys than for girls, but most of the other predictor variables have similar effects for children of both sexes. For girls, the combined ORS/RHS treatment rate is highest in the northeast, whereas for boys it is highest in the east.

Fluid intake

For children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, Figure 18 and Table 16 present the adjusted effects of mother's electronic mass media exposure on frequency of breastfeeding (for children who were still being breastfed) and on level of fluid intake aside from breast milk. Among children who were ill with diarrhoea during the two weeks before the survey, mother's electronic mass media exposure has virtually no effect on frequency of breastfeeding. Seven percent of children whose mothers were exposed to electronic

Table 15 Adjusted effects of media exposure and other factors on use of ORS or RHS to treat children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, by sex of child, India, 1992–93

	Percentage of children treated with					
	ORS		RHS		ORS or RHS	
	Girls	Boys	Girls	Boys	Girls	Boys
Mother's electronic mass media exposure						
Yes	16	24*	22*	22*	31	40*
No†	15	16	16	16	27	27
Child's age						
< 6 months†	4	13	12	9	14	18
6–11 months	18*	21*	19*	20*	31*	35*
12–23 months	19*	25*	21*	20*	34*	38*
24–47 months	18*	17	20*	22*	31*	33*
Mother's age						
13–19†	12	19	14	24	22	38
20–29	17	20	19	18	31*	33
30–49	12	19	21	20	28	30
Residence						
Urban	15	14*	22	20	31	30
Rural†	16	21	18	19	28	33
Mother's education						
Illiterate†	14	17	17	16	26	29
Literate, < middle complete	17	23*	21	23*	32	40*
≥ middle complete	20	29*	30*	28*	45*	46*
Religion						
Hindu†	15	20	19	18	29	31
Muslim	15	19	19	26*	27	39
Other	15	20	20	19	29	36
Caste/tribe						
SC/ST	15	21	21	22	31	35
Other†	16	19	18	18	28	32
House type						
Kachcha†	16	20	19	20	29	34
Pucca or semi-*pucca*	15	19	19	18	29	32
Crowding						
< 3 persons per room†	16	19	20	21	30	33
≥ 3 persons per room	15	20	18	18	28	32
Safe drinking water						
Yes	16	21*	19	19	31	34
No†	14	16	18	19	26	29
Sanitary toilet facility						
Yes	13	15	24	25	29	35
No†	16	20	18	18	29	32
Electricity						
Yes	17	23*	19	22*	29	36*
No†	14	17	19	16	29	30
Geographic region						
North	15	18	16	18	26	28
Central	13*	22	16	15	26	33
East	14	21	23*	27*	31	41*
Northeast	28	27	24	14	41*	32
West	15	15	26*	22*	32	29
South†	20	20	15	14	28	28
Number of children	2,141	2,368	2,137	2,357	2,136	2,360

Note: In this table the units of analysis are children. For definition of variables see Table 12. Adjusted values are estimated by logistic regression. Significance levels in this table take design effects due to clustering into account. For any given predictor variable, the set of control variables consists of all the other predictor variables in the table, which are set at their mean values. Models are based on the weighted sample.

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying multinomial logistic regression differs significantly from zero at the 5 percent level.

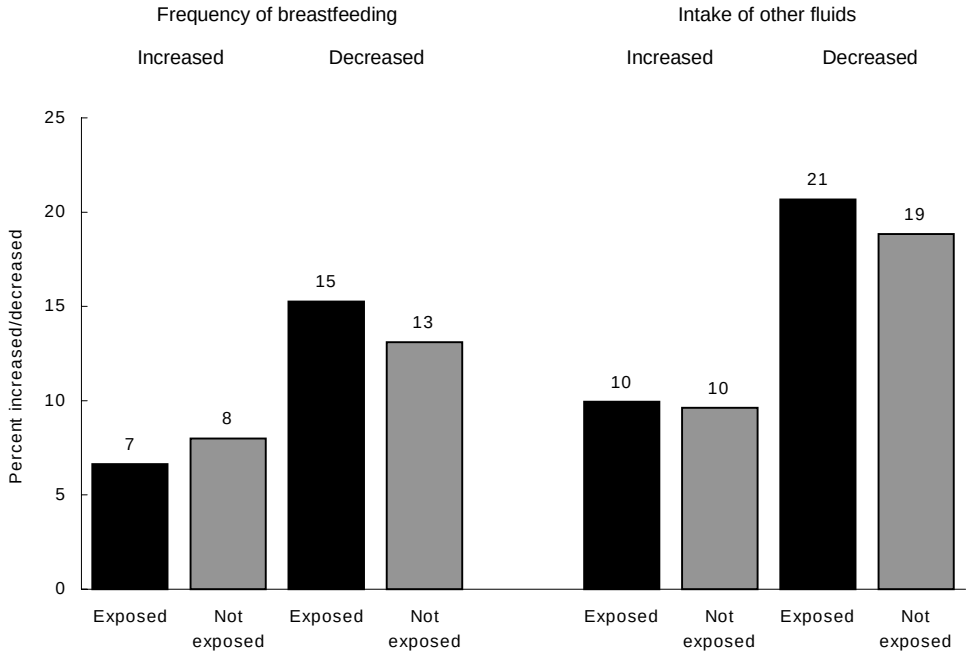

Figure 18 Adjusted effects of mother's electronic mass media exposure on frequency of breastfeeding, if mother still breastfeeding, and on intake of other fluids by children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, India, 1992–93

mass media received more frequent breastfeeding when they became ill, and 15 percent received less frequent breastfeeding. Eight percent of children whose mothers were not exposed to the media received more frequent breastfeeding when they became ill, and 12 percent received less frequent breastfeeding. The effects of mother's electronic mass media exposure on children's intake of other fluids show a similar pattern. It is noteworthy that children who were ill with diarrhoea are approximately twice as likely to receive decreased breast milk and other fluids as they are to receive increased amounts of these fluids.

Table 16 also shows the effects of selected demographic and socioeconomic variables on frequency of breastfeeding and fluid intake. There is some variation by child's age, with a smaller reduction in the frequency of breastfeeding (as indicated in the 'decreased' column) for children below six months than for older children. There are also substantial regional variations. For example, 28 percent of children in

Note to Table 16: In this table the units of analysis are children. For definition of variables see Table 12. Adjusted values are estimated by multinomial logistic regression. Significance levels in this table do not take design effects due to clustering into account. For any given predictor variable, the set of control variables consists of all the other predictor variables in the table, which are set at their mean values. Models are based on the weighted sample.

Table 16 Adjusted effects of media exposure and other factors on frequency of breastfeeding, if mother still breastfeeding, and on intake of other fluids by children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey, India, 1992–93

	Frequency of breastfeeding			Intake of other fluids		
	Same	Increased	Decreased	Same	Increased	Decreased
Electronic mass media exposure						
Yes	78	7	15	69	10	21
No†	79	8	13	72	10	19
Child's age						
< 6 months†	84	7	8	81	7	13
6–11 months	81	6	13*	76	8	16*
12–23 months	74	8	18*	69	11*	21*
24–47 months	75	9	16*	64	12*	24*
Sex of child						
Boy†	78	8	14	71	9	21
Girl	79	6*	15	70	11*	19
Mother's age						
13–19†	77	9	14	70	8	22
20–29	78	7	14	70	10	20
30–49	80	7	13	72	11	17
Residence						
Urban	80	5*	14	72	10	18
Rural†	78	8	14	70	10	20
Mother's education						
Illiterate†	79	7	14	73	9	18
Literate, < middle complete	77	8	14	68	10	22*
≥ middle complete	76	8	16	56	17*	26*
Religion						
Hindu†	78	8	14	71	10	19
Muslim	77	7	16	65	9	25*
Other	87	5	9	73	12	14
Caste/tribe						
SC/ST	79	7	15	71	9	19
Other†	79	8	14	70	10	20
House type						
Kachcha†	79	8	13	72	10	18
Pucca or semi-*pucca*	78	7	15	69	10	21*
Crowding						
< 3 persons per room†	77	7	16	70	9	21
≥ 3 persons per room	80	7	13	71	10	18*
Safe drinking water						
Yes	77	8*	15	70	10	20
No†	81	6	13	72	10	19
Sanitary toilet facility						
Yes	79	9	12	68	11	21
No†	78	7	14	71	10	19
Electricity						
Yes	77	8	15	69	11*	20
No†	80	7	14	72	9	20
Geographic region						
North	82	6	12	68	13*	19*
Central	71	17*	13*	73	16*	11
East	74	5	21*	55	9*	35*
Northeast	58	13*	28*	44	9*	48*
West	86	3*	12	76	5	19
South†	83	7	9	78	7	15
Number of children		3,230			4,514	

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying multinomial logistic regression differs significantly from zero at the 5 percent level.

the northeast experienced a reduction in the frequency of breastfeeding when they were ill with diarrhoea, compared with only 9 percent in the south. None of the other demographic or socioeconomic variables has a substantial effect on the frequency of breastfeeding.

Older children are slightly more likely than younger children to receive either increased or decreased fluids (other than breast milk) when ill with diarrhoea, while younger children are more likely to maintain the same level of fluid intake. Consistent with expectations, children of more-educated mothers are more likely than other children to receive increased fluids when ill with diarrhoea, but, surprisingly, they are also more likely to receive decreased fluids. Evidently even highly educated women do not necessarily appreciate the importance of increasing fluids when children have diarrhoea. Muslim children are much more likely to receive decreased fluids than are Hindu children or children belonging to other religions. There is considerable regional variation in the extent to which diarrhoea induces changes in children's fluid intake.

These findings indicate that most women in India, regardless of their socioeconomic background, are not aware of the importance of increasing breastfeeding and the intake of other fluids when children are ill with diarrhoea. Apparently the Oral Rehydration Therapy Programme has not sufficiently emphasized the need for increased fluids as an essential aspect of proper treatment of diarrhoea. Although socioeconomic factors do not have much effect on either the frequency of breastfeeding or amount of other fluid intake, there is considerable variation by geographic region. The reasons for this geographic variation are unclear.

Source of information about RHS

Women who reported using RHS to treat a child who had diarrhoea during the two weeks before the survey were asked where they learned to prepare the solution. Among 17 possible pre-coded responses to this question, 'mass media' were defined as television, radio, or printed material. Thus, in our analysis of responses to this question, the mass media include television and radio, but not cinema, and they also include the print media. Twenty-seven percent of mothers who gave RHS to children who were ill with diarrhoea during the two weeks before the survey learned how to prepare the solution from the mass media as defined in this way.

Figure 19 and Table 17 show the unadjusted and adjusted effects of selected variables on whether a woman identified the mass media as her source of information on RHS, with women as the units of analysis. Woman's age has no effect on whether the mass media were her source of information on RHS. Urban/rural residence, on the other hand, has a substantial effect. Even after other variables are controlled, urban women are twice as likely as rural women to have learned about RHS from

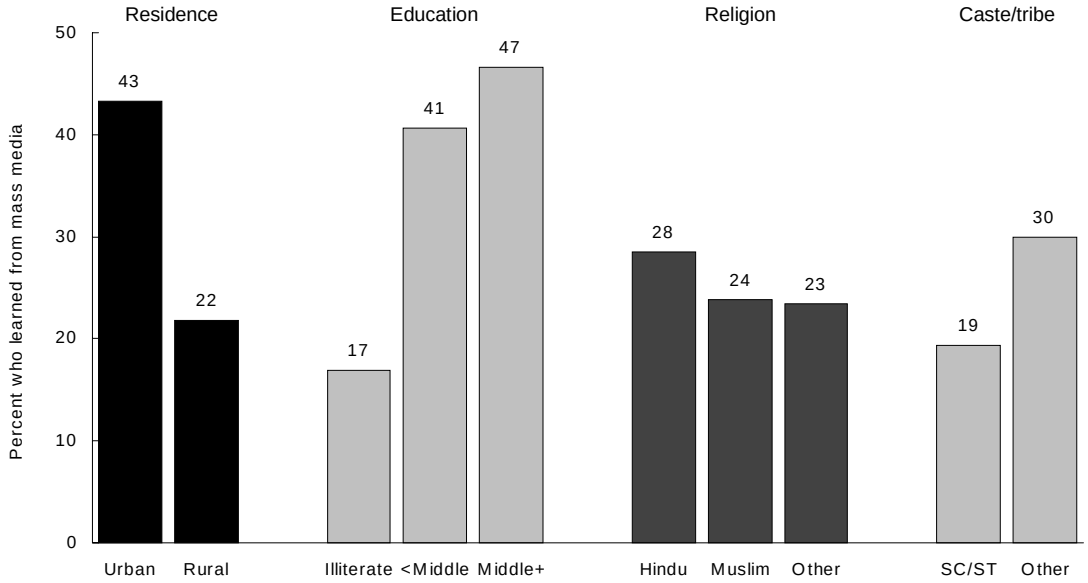

Figure 19 Adjusted percentages of women who learned about RHS from the mass media, by selected characteristics, India, 1992–93

mass media. More-educated women are more likely than less-educated women to have learned about RHS from mass media. Women who have completed middle school or higher education are nearly three times as likely as illiterate women to have learned about RHS from mass media. Religion does not have an effect on the role of mass media as a source of information on RHS, but membership in a scheduled caste or scheduled tribe does have an effect. Scheduled-caste and scheduled-tribe women are much less likely than other women to have learned about RHS from mass media.

Women living in *pucca* or semi-*pucca* houses, in households with less than three persons per room, or in households with access to a sanitary toilet facility or electricity are all much more likely than other women to have learned about RHS from mass media. The effects of these variables become much smaller and lose their statistical significance, however, when potentially confounding variables are controlled. For reasons that are not clear, women living in northern India are much more likely than women in other regions to have learned about RHS from mass media.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Results of this study indicate that in spite of the Indian Government's vigorous Oral Rehydration Therapy Programme, which has been in place for more than a decade,

Table 17 Among women who gave RHS to a child who was ill with diarrhoea during the two weeks before the NFHS, the percentage who learned how to prepare RHS from the mass media, by selected characteristics, India, 1992–93

	Percentage of women who learned about RHS from mass media	
	Unadjusted	Adjusted
Age		
13–19†	20	24
20–29	30	28
30–49	24	27
Residence		
Urban	48*	43*
Rural†	21	22
Education		
Illiterate†	15	17
Literate, < middle complete	42*	41*
≥ middle complete	56*	47*
Religion		
Hindu†	26	28
Muslim	28	24
Other	40*	23
Caste/tribe		
SC/ST	15*	19*
Other†	32	30
House type		
Kachcha†	17	26
Pucca or semi-*pucca*	39*	28
Crowding		
< 3 persons per room†	32	28
≥ 3 persons per room	23*	27
Safe drinking water		
Yes	29	25
No†	24	33
Sanitary toilet facility		
Yes	49*	28
No†	22	27
Electricity		
Yes	40*	30
No†	16	24
Geographic region		
North	45*	42*
Central	23	28
East	22	25
Northeast	23	27
West	33	30
South†	28	20
Number of women	762	760

Note: In this table the units of analysis are women, and 'mass media' include radio, television, and printed material. For definition of variables see Table 7. Both unadjusted and adjusted values are estimated by logistic regression. Significance levels take design effects due to clustering into account. Unadjusted values are based on separate logistic regressions for each predictor variable, with that predictor variable as the only predictor variable in the regression. Adjusted values are based on a single logistic regression that includes all the predictor variables in the table. For any given predictor variable in the adjusted column, the set of control variables consists of all the other predictor variables, which are set at their mean values. Models are based on the weighted sample. Number of women in the unadjusted column varies slightly for individual variables depending on the number of missing values.

†Reference category in the underlying logistic regression.

*The coefficient of the corresponding variable in the underlying logistic regression differs significantly from zero at the 5 percent level.

women's knowledge and use of oral rehydration therapy to treat childhood diarrhoea remain quite limited. According to the NFHS, only 43 percent of women who gave birth during the four years before the survey know about ORS packets, and only 26 percent have ever used them. Only 18 percent of children born 1–47 months before the NFHS who were ill with diarrhoea during the two weeks before the survey were treated with ORS packets, and only 19 percent were treated with RHS. Sixty-nine percent received neither ORS nor RHS.

The results also suggest that the government's Oral Rehydration Therapy Programme has not sufficiently emphasized the importance of increased breastfeeding and fluid intake in the treatment of childhood diarrhoea. Only 7 percent of children were given more frequent breastfeeding when they were ill with diarrhoea, whereas 14 percent were given less frequent breastfeeding, and for some of these children breastfeeding was stopped completely. Only 10 percent received increased fluids aside from breast milk, while 20 percent received decreased fluids.

Very small percentages of children who were ill with diarrhoea during the two weeks before the NFHS were treated with ORS, RHS, or increased fluids, despite the fact that 61 percent of these children received treatment from a health facility or provider. Among those who received treatment from a health facility or provider, 94 percent were treated with antibiotics or other antidiarrhoeal drugs, contrary to WHO recommendations that drugs not be used for treatment of diarrhoea in children under five. Fifty-nine percent of these children received drugs alone without ORS or RHS. Treatment with drugs appears to be widespread among both public- and private-sector providers, but it is somewhat more common in the private sector.

These findings indicate a lack of awareness of proper treatment of childhood diarrhoea, not only among Indian mothers but also among health-care providers. It is possible that many health-care providers are ignorant of the proper roles of oral rehydration therapy and drugs in the management of childhood diarrhoea. It is also possible that many providers (including some public-sector providers who have private practices on the side) prefer to prescribe drugs in order to be able to charge more money than would be possible if they simply recommended oral rehydration. Finally, the tendency of health providers to prescribe drugs may reflect parental expectations about what constitutes proper medical care of children who are ill with diarrhoea.

The analysis indicates that the electronic mass media are effective in increasing awareness and use of oral rehydration therapy. Women regularly exposed to electronic mass media are much more likely than other women to know about ORS packets and to use ORS or RHS to treat their children for diarrhoea. The effect of electronic mass media exposure on knowledge and use of ORS packets is stronger in rural areas than in urban areas, probably because urban women have access to a wider variety of services and sources of information than do rural women. Among

women who have used RHS to treat childhood diarrhoea, however, those who live in urban areas and those who have completed middle school or higher education are much more likely than other women to have learned about RHS from the mass media. In rural areas, community-level mass media and group educational activities have positive effects on knowledge and use of oral rehydration therapy over and above the effects of mother's exposure to electronic mass media and of other demographic and socioeconomic variables.

The results reported here suggest that there is some discrimination against girls in the use of ORS packets to treat diarrhoea. The use of RHS, however, is about the same for boys and girls.

There is clearly a need to strengthen educational programmes for mothers and communities and to provide supplemental training to health-care providers in the proper treatment of childhood diarrhoea. Such educational programmes need to emphasize the importance of increasing fluid intake—including greater use of ORS packets—and continuing feeding in the treatment of childhood diarrhoea. They also need to discourage the use of unnecessary and potentially harmful drugs. Finally, the Oral Rehydration Therapy Programme needs to address the problem of gender discrimination in the treatment of childhood diarrhoea. The mass media can help in these efforts.

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