

Research Article

Integration of Curative and Preventive Services for Strengthening Nutritional Outcome of Infants and Young Children

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Abstract

Introduction: Health Seeking Behavior (HSB) is vital for effectiveness of Primary Health Care (PHC) services. It important to understand the dynamics of HSB within the context of PHC services for preventing malnutrition among Infants and Young Children (IYC).

Aim: To study whether integration of preventive and curative services can improve HSB in PHC and enhance the nutritional status of children.

Methods: Global data for 70 countries including 35 African, 22 Asian, 7 South American and 7 Caribbean and 2 East European countries were analyzed for immunization visits, Antenatal Care Visits (ANC), attendance in institutional facilities for delivery, delivery by Skilled Birth Attendant (SBA), postnatal care for the mother and postnatal care for the newborn, family planning visits, Acute Respiratory tract Infections (ARI), fever and treatment of Diarrheal Disease (DD). Data for impact on nutritional status included Low Birth Weight (LBW), stunting, wasting and overweight. Descriptive statistical analysis and Pearson's correlation was used for analysis.

Results: Overall preventive visits were highest for any ANC (89±11) and immunization visits and lowest for family planning (52±21) and postnatal care for the newborn (51±33). HSB for curative services were highest for fever (62±15) and lowest for DD (44±18). Significant correlations were present for newborn care with ARI visits (P<0.05) and between visits for vaccination with DD and fever at P<0.05. HSB for vaccination was inversely correlated with stunting but not wasting. HSB for maternity services except family planning correlated positively with HSB for ARI and fever and inversely with LBW, stunting and wasting at P<0.05.

Conclusions: Integration of preventive and curative services can strengthen PHC and should start from pregnancy. Immunization services represent opportunities for counseling in nutrition and early signs of sickness in the child for preventing delay in management and thereby improving nutritional status of children.

Keywords: Vaccination visits; Health seeking behavior; preventive services; curative services; antenatal services; wasting; stunting; infants and young children; primary health care; integration of services.

Introduction

Nutritional status of children under-five is one of the biggest challenges facing countries all over the world. The prevalence of stunting and wasting remain high in the Middle Income Countries (MIC) and Low Income Countries (LIC), while the prevalence of obesity is on the rise not only in high income countries but also in MIC and LIC. Moreover, the superadded problems of micronutrient deficiency states manifested primarily by iron deficiency anemia, vitamin A deficiency and iodine deficiency remain to be addressed.

Child survival is influenced by prenatal care, prenatal

management, maternal age, maternal nutrition, and the process of childbirth. Improper practices during the delivery process and postnatal care of the infant affect the health outcome of infants [1].

Strengthening Primary Health Care (PHC) services through integrating preventive with curative services with nutrition counseling can assist in overcoming the problems of malnutrition [2]. Malnutrition among Infants and Young Children (IYC) is one of the major causes for the rising burden of non-communicable diseases in the world. Nutritional services begin by breastfeeding promotion early in life and adequate complementary feeding [3]. Currently indicators for measuring breastfeeding include early initiation of breastfeeding, exclusive breastfeeding at birth and for six months and continued breastfeeding for 12 and 24 months. There is lack of indicators that can measure the extent of support or counseling in breastfeeding and nutrition during antenatal care, natal

and postnatal visits, and during immunization visits and contacts with a sick child. This is because it is a subjective indicator that cannot be measured quantitatively. It is true that the outcome of nutrition services can be measured by nutritional status of children, but the inputs and processes for nutrition interventions need to be measured. Growth monitoring is a vital tool for reinforcing nutrition counseling. Still there is status quo or decline in nutritional status in low income and lower middle income countries [4].

Integration of vitamin A supplementation with vaccination of measles at 9 months in countries is one form of collaboration, within the PHC, between nutrition services and vaccination programs and has been evaluated by authors [5]. Our hypothesis is based on the assumption that tangible services in the form of vaccines and medications can be means for luring clients to attend the PHC, whereas counseling services and education are means for improving quality of services by focusing on customer needs and individualizing care provided to these clients.

Hence the aim of this study is to identify means for strengthening PHC services and to answer the question of whether integration of preventive and curative services can strengthen one another and how this can impact nutritional status of children.

Methods

Source of data: Using recent data from the national demographic health surveys for 70 selected countries that were listed in the State of the World Children (SWOC) matrix (2019) of the United Nations International Emergency Fund (UNICEF) and data from the World Health Organization (WHO) and World Bank.

Target countries: The countries under study included 35 African, 22 Asian, 7 South American and 7 Caribbean and 2 East European countries. Countries are presented in (Table 1).

Variables under study: The variables included contacts of mother with a health professional any time during pregnancy, child birth or in the postnatal period for herself or her child. They were divided accordingly as follows:

- Preventive visits for the mother before birth including antenatal care visits (ANC) (any and over 4 visits),
- Services at delivery including attendance in institutional facilities for delivery (ID), delivery by skilled birth attendant (SBA), postnatal care for the mother (PNC-Mo) and postnatal care for the newborn (PNC-NB), family planning visits (FPI).
- Curative services for the child including health seeking behavior (HSB) for symptoms of acute respiratory tract infections (ARI), fever and treatment of diarrheal disease (DD) by oral rehydration solution (ORS).
- Preventive visits for vaccination of the child with BCG, DPT1, DPT2, Polio3, MCV1, HBV3, Hib3.

Data was also included for percentages of low birth weight (LBW), stunting, wasting and overweight for each country. All the 70 countries had complete data for vaccination coverage and HSB for early childhood illness. Data were missing for a few countries for the following data: three for FPI, two for ANC > 4 visits, and 11 for PNC for mother and 9 for newborn. The respective countries with absent data are shown by asterisks in (Table 1).

Table 1: List of countries under study by geographic location in alphabetical order.

Africa (35)	Asia (22)	South America (4)	Caribbean (7)	East Europe (2)
Benin (West Africa)	Afghanistan (South Asia)	Guatemala (Central America)	Dominican Republic	Montenegro (South East Europe) Albania
Botswana (Southern Africa) (1,3)	Armenia (Asia)	Honduras (Central America)	Haiti	
Burkina Faso (West Africa)	Bangladesh (South Asia)	Guyana (South America)	Cuba	
Burundi (East Africa)	Cambodia (Southeast Asia)	Nicaragua (Central America) (3)	Kiribati (Central Pacific ocean) (3)	
Cameroon (Central Africa)	India (Central Asia)		Nauru (Oceania) (3)	
Chad (Central Africa)	Indonesia (Southeast Asia)		Solomon Islands (Oceania)	
Comoros (East Africa)	Iraq (Middle East)		Vanuatu (Oceania) (3)	
Côte d'Ivoire (West Africa)	Jordan (Middle East) Kyrgyzstan (Central Asia)			
Democratic Republic of the Congo	Lao People's Democratic Republic (Asia)			
Egypt (North Africa)	Lebanon (Middle East) (1,2,3)			
Equatorial Guinea (3)	Maldives (South Asia)			
Eswatini (Southern Africa)	Myanmar (Burma) (Southeast Asia)			
Ethiopia (East Africa)	Nepal (South Asia)			
Gabon (Central Africa)	Yemen (Middle East)			
Gambia (West Africa)	Pakistan (South Asia)			
Ghana (West Africa)	Sri Lanka (Southeast Asia) (3 PN-Mo)			
Guinea (West Africa)	Tajikistan (Central Asia)			
Guinea-Bissau (West Africa)	Thailand (Southeast Asia) (3)			
Kenya (East Africa)	Timor-Leste (Southeast Asia)			
Lesotho (Southern Africa)	Togo (West Africa) Turkmenistan (Central Asia)			
Liberia (West Africa)				
Madagascar (East Africa)				
Malawi (East Africa) (1,2,3)				
Mali (West Africa)				
Mauritania (Northwest Africa) Mozambique (East Africa)				
Namibia (Southern Africa)				
Niger (West Africa)				
Sao Tome and Principe (Central Africa)				
Senegal (West Africa)				
Sierra Leone (West Africa)				
South Africa (3 PN-Mo)				
Uganda (East Africa)				
Zambia (East Africa)				
Zimbabwe (Southern Africa)				

Countries with incomplete data for Family planning visits (1); countries with incomplete data for antenatal care > 4 times (2); countries with incomplete data for postnatal visits for mother and newborn (3); only for mother (3PN-Mo).

Statistical analysis: Data were presented as mean and standard deviation and Pearson's correlation was used to study correlations between preventive and curative services for mothers and children and to study relations between the visits and nutritional status of children using the IBM SPSS statistical package version 20. Cut off for significance used was $P < 0.05$.

Results

The countries under study totaled 70 countries representing Africa (35), Asia (22), South America (4), The Caribbean (7) and 2 from East Europe. The countries represented mostly low and middle income countries whose data from national surveys were complete for the vaccination visits and nutritional indices for stunting and wasting. The countries are listed in alphabetical order by geographic location in (Table 1).

Table 2 presents the mean and standard deviation (\pm) for contacts with health facility during pregnancy, child birth and first two years for preventive services and curative services. Mean preventive health contacts for the mother included demand for family planning (52 ± 21), any ANC (89 ± 11), ANC for over four visits (66 ± 19), delivery by SBA (77 ± 20), Institutional delivery (75 ± 20), postnatal care for mother (68 ± 22). Preventive health care contacts for child included postnatal care for the newborn (51 ± 33), vaccination visits for BCG (90 ± 9), DPT1 (91 ± 10), DPT2 (85 ± 14), Polio3 (84 ± 14), MCV1 (83 ± 15), HBV3 (85 ± 14) and Hib3 (85 ± 12). Curative care contacts for managing childhood illness included health seeking for ARI symptoms (61 ± 18), treating diarrheal episode by ORS (44 ± 18) and health seeking for diarrhea (62 ± 15).

Table 2: Distribution of mean health care contacts with health facility during pregnancy, child birth and first two years for preventive services versus curative services.

Mean % Preventive health care contacts for mother		Mean % Preventive health care contacts for child		Mean % Curative care contacts for managing childhood illness	
Family planning	52±21	PN NB	51±33	HSB ARI	61±18
Any ANC	89±11	BCG	90±9	DD ORS	44±18
ANC>4	66±19	DPT1	91±10	HSB Fever	62±15
Delivery by SBA	77±20	DPT2	85±14		
Institutional delivery	75±20	Polio3	84±14		
PN Mother	68±22	MCV1	83±15		
		HBV3	85±14		
		Hib3	85±12		

ANC: antenatal care; PN: post-natal visits for mother check-ups; PN NB: post-natal check-up for newborn; BCG: Tuberculosis vaccine; DPT: Diphtheria, Pertussis and tetanus (first and second doses); MCV: Measles, Rubella, Mumps and Varicella (Chicken pox); HBV: Hepatitis B vaccine (third dose); Hib: Hemophilic Influenza virus vaccine (third dose); HSB: health seeking behavior; ARI: acute respiratory tract infections; DD: diarrheal disease; ORS: oral rehydration solution.

Table 3 presents the relationship between postnatal preventive services and health seeking behavior for sick child and the outcome of vaccination visits and HSB on stunting and wasting in terms of nutritional status. HSB for ARI symptoms were positively with postnatal visits for newborn check-up ($r0.3$) at $P > 0.05$. The correlations between HSB for ARI symptoms and vaccination visits was poor ($r0.2$) at $P > 0.05$. There were significant positive correlations of HSB for fever and vaccination visits for BCG, DPT2, Polio3 and MCV1 ($r0.4$) at $P < 0.05$ but poorly with other vaccine visits and postnatal visits for newborn check-ups at $P > 0.05$. There were significant positive correlations of treatment of diarrheal disease by

ORS with all vaccines visits at ($r0.4$) at $P < 0.01$ except HBV3 and Hib3 ($r0.3$) at $P > 0.05$.

Table 3: Correlation of postnatal preventive services with health seeking behavior for sick child and their outcome on nutritional status.

	HSB ARI	TTT DD ORS	HSB Fever	Stunting	Wasting
PN NB	r0.3	r0.1	r0.1	r-0.5	r-0.2
BCG	r0.13	r0.4	r0.4	r-0.4	r-0.2
DPT1	r0.2	r0.4	r0.3	r-0.3	r-0.2
DPT2	r0.2	r0.4	r0.4	r-0.35	r-0.15
Polio3	r0.2	r0.4	r0.4	r-0.33	r-0.13
MCV1	r0.2	r0.4	r0.4	r-0.3	r-0.14
HBV3	r0.2	r0.4	r0.3	r-0.32	r-0.13
Hib3	r0.2	r0.4	r0.3	r-0.34	r-0.14
HSB ARI				r-0.2	r-0.1
TTT DD ORS				r-0.04	r-0.1
HSB Fever				r-0.2	r0.01

r: correlation coefficient; ANC: antenatal care; PN: post-natal visits for mother check-ups; PN NB: post natal check-up for newborn; BCG: Tuberculosis vaccine; DPT: Diphtheria, Pertussis and tetanus (first and second doses); MCV: Measles, Rubella, Mumps and Varicella (Chicken pox); HBV: Hepatitis B vaccine (third dose); Hib: Hemophilus Influenza virus vaccine (third dose); HSB: health seeking behavior; ARI: acute respiratory tract infections; DD: diarrheal disease; ORS: oral rehydration solution.

Table 4 presents the relationship between perinatal preventive services with health seeking behavior for sick child and outcome on nutritional status. Family planning visits were significantly correlated with mean for immunization visits and treatment of diarrheal episode with ORS but not with LBW, stunting and wasting. Any or over four ANC visits were positively correlated with treatment of diarrheal disease with ORS and HSB for fever ($r0.4$) and mean for immunization visits ($r0.5$) at $P < 0.05$ and inversely with LBW ($r-0.4$) and ($r-0.5$), stunting at ($r-0.5$) and wasting ($r-0.5$ and $r0.4$) at $P < 0.05$. Delivery by SBA was positively correlated with HSB for ARI symptoms ($r0.4$), HSB for fever ($r0.4$) and mean for immunization visits ($r0.5$) at $P < 0.05$. SBA was inversely correlated with LBW ($r0.6$), stunting ($r0.5$) and wasting ($r0.4$) at $P < 0.05$. Institutional delivery showed similar findings as SBA. Postnatal check-up for mothers after birth was highly correlated with HSB for ARI ($r0.5$), and fever ($r0.5$), immunization visits ($r0.6$) and inversely correlated with LBW ($r-0.7$), stunting ($r-0.6$) at $P < 0.01$ but poorly with wasting ($r-0.3$) and treatment of DD by ORS ($r0.2$) at $P > 0.05$.

Table 4: Correlation of perinatal preventive services with health seeking behavior for sick child and outcome on nutritional status.

	HSB ARI	TTT DD ORS	HSB Fever	Mean for immunization	LBW	Stunting	Wasting
Family planning	r0.2	r0.4	r0.3	r0.4	r-0.1	r-0.02	r-0.06
Any ANC	r0.3	r0.4	r0.4	r0.5	r-0.4	r-0.4	r-0.5
ANC>4	0.3	r0.4	r0.4	r0.5	r-0.5	r-0.5	r-0.4
SBA	r0.4	r0.2	r0.4	r0.5	r-0.6	r-0.5	r-0.35
Inst. Delivery	r0.4	r0.1	r0.4	r0.5	r-0.5	r-0.5	r-0.4
PN Mother	r0.45	r0.2	r0.5	r0.6	r-0.7	r-0.6	r-0.3

r: correlation coefficient; ANC: antenatal care; Inst.: institutional; PN: postnatal; HSB: health seeking behavior; TTT: treatment of diarrheal disease by oral rehydration solution; LBW: low birth weight.

Discussion

Over two thirds of women in PHC abided by preventive health contacts for the mother which included demand for family planning; ANC for over four visits; delivery by SBA; institutional delivery and postnatal care for mother. While over three quarters of the families attended with their infants and children vaccination visits. However one half or less attended with their children for seeking support and guidance in managing their sick child. Many authors reported delay in HSB for a sick child mostly in the in middle and low income countries [6]. Poverty, illiteracy and other socio-economic factors were found to influence such a behavior [7].

Our study showed that almost one half of pregnant women are deprived of adequate ANC. The World Health Organization (WHO) recommends at least four Antenatal Care (ANC) visits for all pregnant women. Poor attendance of ANC is associated with delivery of low birth-weight babies and more neonatal deaths. ANC may include education on nutrition, potential problems with pregnancy or childbirth, child care and prevention or detection of disease during pregnancy. Mbuagbaw et al., (2015) suggest that interventions are needed in order to improve ANC and postnatal care. Such interventions can also reduce LBW, maternal and neonatal outcomes [8].

Overall the HSB for ANC and postnatal care were low. Also the HSB for early childhood illness were low. However the HSB for immunizations were comparatively much higher. Interventions are thereby needed to improve HSB for both curative and preventive services and to learn from the success stories of immunization. A Cochrane review for studies in low- and middle-income countries between 2000 and 2012, identified interventions that have engaged men to improve maternal and newborn health. Thirteen studies from nine countries showed that interventions to engage men were associated with improved antenatal care attendance, skilled birth attendance, facility birth, postpartum care, birth and complications preparedness and maternal nutrition. The impact of interventions on mortality, morbidity and breastfeeding was less clear. The interventions improved male partner support for women and increased couple communication and joint decision-making, indicating that husband involvement plays an important role in reinforcement of PHC services to women and children [4].

Delayed HSB was identified as one of the major causes for high morbidity and mortality rates in a hospital in Nairobi in Kenya [9]. The delay in HSB for a sick infant was attributed to combining home remedies with conventional treatments, inability to identify life-threatening illnesses and lack of knowledge even after implementation of evidence based practice as Integrated Management of Childhood Illness [10]. In Bangladesh a similar pattern emerged related to poverty, gender disparities and poor knowledge [7].

In summary this analysis demonstrated that there were evident positive correlations between care given to the mother through ANC visits and postnatal check-ups for mother and associations with reduction of LBW, stunting and wasting. Also HSB for ARI symptoms and treatment of DD with ORS correlated with preventive care services afforded to the mother. It seems that caring for the mother provides an opportunity for building trust with the health care services for women throughout the reproductive period. It is also useful for empowering women with knowledge, raising their self-esteem and self-efficacy to care for themselves and their child and thereby cope with the responsibilities of parenthood [11,12]. It

can also prove useful for strengthening family planning programs [13].

In conclusion, our study shows that integration of preventive with curative services and vice versa can strengthen primary health care services and reduce the burden of malnutrition and mortality in low and middle income countries. The findings support the recommendations of WHO and UNICEF for supporting women and their children throughout the 1000 days to support child nutrition from conception to early childhood years and into adulthood [14]. The need for community mobilization for marketing health care services to young couples even before having children; early on from pre-conception and across the span of the reproductive cycle is detrimental for ensuring early timely HSB before complications related to morbidity, malnutrition and mortality set in [15]. Moreover, we recommend that growth monitoring become coupled with vaccination visits whereby women receive a written prescription in nutrition for the child in accordance to their needs for growth, their nutritional status, health and age. This prescription should be written by a specialized health worker in nutrition and used for monitoring and surveillance of nutrition interventions by PHC.

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