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The Impact of Infant Feeding Method on Childhood Obesity/Overweight Levels of Children at Ages 2, 3, and 4 Years

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Abstract

Increasing prevalence of childhood obesity/overweight is a worldwide concern with the risk of adult obesity. Prevention means identifying causes and evidence-based strategies. The purpose was to determine the impact of infant feeding method (breastfed, formula-fed, and mixed-fed) of children 0–6 months of age on childhood obesity/overweight levels determined by BMI at 2–4 years. Participants were 45 males and females with medical records on infant feeding method and height and weight scores. Medical records data (ages 2–4) were collected and recorded on a code sheet. BMI scores were calculated using the CDC's BMI percentile rankings/categories. Descriptive statistics indicated formula-fed infants had > BMI% in the overweight/obese category (2.2–8.95%) than mixed-fed infants (2.2–6.7%), and breastfed infants had the lowest BMI (0.0–2.2%). The results of the Kruskal–Wallis test were not significant ($p < 0.05$) for differences in obesity/overweight levels at three ages by infant feeding method. Research with a large randomized sample is recommended.

Keywords

child health; obesity; overweight; infant care; breastfeeding

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Introduction

Breastfeeding has been practiced since the beginning of mankind and is defined as the feeding of an infant or young child from a women's breast (World Health Organization [WHO], 2010; Women, Infants, and Children [WIC], 2010). Breast milk is the recommended diet for all infants, and it has immunological, nutritional, social, maternal, economical, and environmental benefits (American Academy of Pediatrics, 2005; American Dietetic Association, 2001; Breastfeeding Basic, 2011; California Department of Public Health, 2009; Centers for Disease Control and Prevention [CDC], 2010; Hoddinott, Tappin, & Wright, 2008; U.S. Department of Health and Human Services [USDHHS], 2010; WHO, 2010). Data from 2011 indicate that only 39% of 0- to 5-month-olds in low-income countries are exclusively breastfed (United Nations Children's Fund [UNICEF], 2014). In 2010, the breastfeeding initiation rate in the United States was 73.2%; rates have fluctuated throughout the 20th century and reached an all-time low of 24% in 1971 (CDC, 2010; WIC, 2010; WHO, 2010).

Feeding of infants is classified into three categories. Exclusive breastfeeding is when the infant only receives breast milk without additional food or drink, not even water (UNICEF, 2010; WHO, 2010). Exclusive formula feeding is the feeding of an infant or a young child with only prepared formula rather than breast milk. Mixed feeding is the feeding of an infant with both breast milk and other foods or liquids such as prepared formula (Engebretsen, Shanmuga, Sommerfelt, Tumwine, & Tylleskar, 2010).

Literature Review

Over the past 30 years, the frequency of overweight children, defined as body mass index (BMI) greater than the 85th percentile for age and gender, has tripled worldwide (Thibault & Rolland-Cachera, 2003). Data from the International Obesity Task Force indicated that 22 million of the world's children under 5 years of age are overweight or obese (Deitel, 2002). The prevalence of overweight preschool-aged children in the United States is of epidemic proportions (Goodell, Wakefield, & Ferris, 2009; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Overweight children are at increased risk of becoming overweight adults (CDC, 2010, 2011; Horta, Bahl, Martines, & Victora, 2007; Parikh et al., 2009). In several meta-analyses and epidemiologic studies worldwide, an association was found between breastfeeding and reduced risk of childhood obesity (Arenz, Ruckerl, Koletzko, & von Kries, 2004; Harder, Bergmann, Kalischnigg, & Plagemann, 2007; Michels et al., 2007; Stuebe, 2009).

Feeding Choice

Advantages of exclusive and extended breastfeeding are well documented (American Academy of Pediatrics, 2005; Barnes, Cox, Doyle, & Reed, 2010).

Breastfeeding seems to benefit premature infants in all aspects of growth (Bergner, Weintraub, Dollberg, Kopolovitz, & Mandel, 2009). Exclusive breastfeeding for the first 6 months for all infants may save as many as 1.5 million children each year by preventing death from diarrheal disease (Robert, Carnahan, & Gakidue, 2013; Save the Children, 2010; WHO, 2010). Increasing prevalence of childhood obesity is a worldwide concern (Goodell et al., 2009; WHO, 2010). The problem is that breastfeeding rates are low, especially in developed countries, and breastfeeding may help prevent childhood obesity. Formula feeding has become popular and easier to administer.

Research shows that exclusive breastfeeding is associated with rural residence, nonsmoking and nonworking mothers, multiparous mothers, term infants, mothers with spousal support, positive attitudes of family members, and support of health care professionals (Breastfeeding Basic, 2010; Dabritz, Hinton, & Babb, 2009; Haughton, Gregorio, & Perez-Escamilla, 2010; Tan, 2011; USDHHS, 2010). Maternal education, age, social class, religion, and ethnicity seem to influence breastfeeding prevalence (Bolton, Chow, Benton, & Olson, 2009; CDC, 2010).

The CDC (2010) and the position papers by the American Dietetic Association (2001) claim that potential barriers to breastfeeding are embarrassment in public places, a short maternity leave for mothers working outside the home, inflexible working hours, lack of paid breastfeeding time or breast pumping breaks, and aggressive marketing of human milk substitutes.

Recent research has shown that formula-fed infants grew faster, did not learn to self-regulate their energy intake, and had higher cholesterol and plasma insulin concentrations than breastfed infants. The faster growth of infant was associated with the development of childhood obesity (Breastfeeding Basic, 2011; Dubois & Girard, 2006; Li, Fein, & Grummer-Strawn, 2010; Reilly et al., 2005). Mixed-fed infants seem to have higher risks of diarrhea than exclusively breastfed infants (Engebretsen et al., 2010).

Body Mass Index (BMI)

Body mass index (BMI) is a reliable indicator of body fatness for most children and teens (CDC, 2011) and is an obesity indicator. BMI does not measure body fat directly, but BMI correlates to direct measures of body fat such as underwater weighing and dual energy x-ray absorptiometry (Mei et al., 2002). BMI is calculated from a child's height and weight. BMI is a reliable indicator of body fatness for most children and teens according to the CDC (2011). For children at 2, 3, and 4 years of age, obesity is the BMI \geq 95th percentile, overweight is the BMI \geq 85th percentile and $<$ 95th percentile, normal weight is the BMI \geq 5th percentile and $<$ 85th percentile, and underweight is the BMI $<$ 5th percentile (CDC, 2011).

Childhood Obesity

Identifying causes and prevention strategies, such as breastfeeding infants, is an important step in preventing childhood obesity (CDC, 2010; Michels et al., 2007; USDHHS, 2010). Overweight children are at increased risk of being overweight adults (CDC, 2010; Horta et al., 2007). The determinants of obesity among preschool-aged children (0–5 years) are maternal diabetes, maternal smoking, rapid infant growth, no or short breastfeeding, obesity in infancy, short sleep duration, < 30 minutes of daily physical activity, consumption of sugar-sweetened beverages (Monasta et al., 2010). Epidemiological data demonstrate that breastfeeding is strongly correlated with reductions in pediatric overweight and obesity, LDL cholesterol, blood pressure and related disorders, type 2 diabetes, and cardiovascular dysfunction (Stolzer, 2011). Fisher, Birch, Wright, and Picciano (2008) found evidence that breastfeeding through the first year benefits infant feeding style and the child's intake of food that extends past breastfeeding into the toddler phase. Breastfeeding through the first year of life affects children's leaner growth status and reduced adiposity. This finding suggests that breastfeeding at 12–13 months may have dietary intake effects that continue into the second year of a toddler's life.

The purpose of the investigation was to determine the impact of infant feeding method (breastfed, formula-fed, and mixed-fed) of children 0–6 months of age on childhood obesity/overweight levels compared to childhood BMI scores at 2, 3, and 4 years.

Methods

The dependent variable was BMI category (obesity, overweight, normal weight, and underweight rankings) recorded for each child based on height and weight scores for BMI percentile rank at ages 2, 3, and 4 for each child (CDC, 2011). The independent variable was feeding method (exclusive breastfeeding, exclusive formula-feeding, and mixed feeding) at ages 0–6 months recorded for each child.

Participants

Participants were male and female children at least 4 years of age with medical records on infant feeding method (0–6 months); height and weight scores recorded at ages 2, 3, and 4 years; and certified birth dates. Data collection for the population was from a small Texas town in the United States. The human subjects review permission was obtained from the institutional review board. Permission was obtained from the pediatrician to access the children's recorded scores of feeding method, age, height, and weight from medical records. Consent was obtained from the parent volunteers, who self-reported their child's medical record scores of feeding method, age, height, and weight. The study was approved by the Lamar University Institutional Review Board.

The small nonrandomized convenience sample was limited to 45 participants from one pediatrician's office and from self-report of parent volunteers, so the participants may not be representative of all children in Southeast Texas. More than 50% of the children were of low SES. There was no gender differentiation, and all other factors associated with childhood overweight/obesity reflected by BMI categories were not considered in the study. Additional limitations were instrument accuracy, measurement accuracy by medical personnel, ages 2–4, selection bias, and maturation.

Instrumentation

Instrumentation included measurements recorded on the code form (see Table 1) from the medical records for participants. Data were collected and recorded on height, weight, age, feeding method category (CDC, 2010), and BMI measurements from the medical records from one pediatrician's office and from self-reported medical records documents with scores of children from the parent volunteers (from their child's pediatrician's office) and recorded on a score sheet for each participant including a case number. Height (inches) and weight (pounds) scores were measured and previously recorded by medical personnel with Detecto 439 Mechanical Eye-Level Dual Reading Scale With a Height Rod (tested with weights traceable and approved by U.S. Bureau of Standards; Industrial Commercial Scales, n.d.). Feeding method category was determined by those recorded for 0–6 months as exclusively breastfed, exclusively formula-fed, or mixed-fed using the CDC (2010) categories. Age was determined by birth dates recorded for 0–6 months and 2, 3, and 4 years. The BMI measurements recorded were repeated measures at three ages (2, 3, and 4 years). BMI scores were calculated using height and weight scores recorded on CDC (2011) growth charts. BMI scores of participants were calculated using the following formula and categorized as determined by the CDC (2011):

$$\frac{\text{Weight (lb)} * 703}{[\text{Height (in.)}]^2}$$

or

$$\frac{\text{Weight (kg)}}{[\text{Height (m)}]^2}$$

BMI category ranks (CDC) designated were obese, overweight, normal weight, or underweight.

The BMI percentile rankings (CDC) were > 95th to < 5th percentile. For children (2, 3, and 4 years), obesity is the BMI ≥ 95th percentile, overweight is the BMI ≥ 85th percentile and < 95th percentile, normal weight is the BMI ≥ 5th percentile and < 85th percentile, and underweight is the BMI < 5th percentile.

Table 1
Code Form

Year	I/M	FC	Height				Weight				BMI				BMI percentile				BMI rank			
			2	3	4	2	3	4	2	3	4	2	3	4	2	3	4					
I	3	34.75	40.5	40.5	32	39.5	43	18.6293	16.93	18.43	90	>85	<95	6	5	7						
M	2	34.5	38.5	44	29.8	36	39.8	17.5713	17.07	14.434	>85	>85	25	5	5	5						
I	3	32.75	35.5	38	27.3	30.1	33.3	17.8607	16.79	16.188	>85	>85	>85	5	5	5						
M	2	36.5	40	42.3	40	44	48.5	21.1071	19.33	19.1	<95	<95	<95	7	7	7						
M	3	35	39.5	42.8	30	35	37.8	17.2163	15.77	14.521	>85	50	25	5	5	5						
I	3	34.5	37.3	40	27.3	29.5	33.8	16.0947	14.95	14.829	>50	25	>50	5	5	5						
M	3	37.25	40	43	39	40	43.5	19.7591	17.58	16.539	<95	<85	>85	7	6	5						
M	3	34	37.5	40.8	26.5	31.5	33.5	16.1155	15.75	14.182	>50	50	10	5	5	5						
I	1	34	37.5	39.5	25.8	31.5	35	15.6594	15.75	15.77	<25	50	<50	5	5	5						
I	2	34.1	38	40	25	30.5	34.5	15.1142	14.85	15.158	>25	25	>50	5	5	5						
M	2	33	36.5	39.8	26.5	32	36	17.107	16.89	16.017	>75	>85	>75	5	5	5						
I	3	35.5	37.9	41.8	26.2	32	38.8	14.615	15.66	15.628	>10	>50	<50	5	5	5						
I	2	35.25	40	42.5	33	37.5	42.8	18.6703	16.48	16.638	<85	>85	>85	6	5	5						
M	2	35.25	37.5	40.5	29.5	31.5	37	16.6901	15.75	15.858	<50	50	<50	5	5	5						
I	2	36.5	39.3	41	37	40.8	46.2	19.5241	18.6	19.321	<95	<95	<95	7	7	7						
I	1	34	38	40.5	29	33	36.3	17.6358	16.07	15.537	>85	<50	<50	5	5	5						
I	2	35	39	42.5	25.4	30.5	32.3	14.5765	14.1	12.552	<5	5	>5	5	5	4						
M	3	35	38.3	42.5	31	37.8	42	17.7902	18.14	16.347	>85	>85	75	5	5	5						

Table 1 (cont.)

Year	I/M	FC	Height				Weight				BMI				BMI percentile				BMI rank			
			2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4		
M	2	2	35.25	37.8	42	25.8	31.3	37.5	14.5685	15.42	14.945	<5	>50	>50	5	5	5					
M	2	2	34.5	36.3	41.5	28	35.5	41.3	16.5377	18.99	16.838	50	<95	<85	5	7	6					
M	2	2	33.5	38	41.8	29.5	40.8	54	18.4794	19.84	21.779	<85	<95	<95	6	7	7					
M	2	2	34	38	41.8	28	30	34	17.0277	14.61	13.713	>75	>25	>5	5	5	4					
M	3	3	34.5	37	39.8	26	28.5	31	15.3564	14.64	13.792	>25	>25	<5	5	5	5					
I	2	2	35.75	38.5	40.3	29.5	31.8	35.5	16.2265	15.06	15.405	>50	25	<50	5	5	5					
M	3	3	34.5	37.3	39.8	29.3	32	36.5	17.276	16.21	16.24	>75	<50	75	5	5	5					
M	2	2	34.5	37	38.9	25	28.8	32.5	14.7658	14.76	15.099	>10	<10	>50	5	5	5					
M	2	2	34.5	38.3	42.5	30	36	42.5	17.719	17.3	16.541	>85	<85	>85	5	6	5					
M	2	2	33.25	37.8	41	25.8	31.5	36	16.3738	15.54	15.055	>50	>50	>50	5	5	5					
M	2	2	34.5	37	40.3	25.3	31	34	14.9135	15.92	14.754	<10	<50	<25	5	5	5					
M	1	1	35	39	42.3	27.1	31.5	35	15.5521	14.56	13.784	25	<10	5	5	5	5					
M	3	3	34	38	41.5	28	33	37.5	17.0277	16.07	15.307	>75	<50	50	5	5	5					
M	3	3	37	40	42.8	34.5	39	43.5	17.7162	17.14	16.733	>85	>85	>85	5	5	5					
M	3	3	37.5	40.3	42.5	38	42.5	51	18.9966	18.44	19.849	>95	<95	<95	6	7	7					
M	2	2	34.8	38	42.5	30	35.8	41	17.4148	17.4	15.957	75	<85	>75	5	6	5					
I	2	2	33.75	37.5	40	25.5	30	34	15.7379	15	14.939	>50	25	<25	5	5	5					
I	2	2	35	39.5	43	31	35	38.8	17.7902	15.77	14.733	>85	50	50	5	5	5					
M	2	2	34	36.3	39	27	31.5	36	16.4196	16.85	16.639	50	<50	>75	5	5	5					

Table 1 (cont.)																						
Year	I/M	FC	Height				Weight				BMI				BMI percentile				BMI rank			
			2	3	4	2	3	4	2	3	4	2	3	4	2	3	4					
M	2	31.5	35.8	39	26	29.3	33.5	18.4208	16.09	15.484	<85	50	50	50	6	5	5					
I	3	33	37.8	41	26	31.5	36	16.7842	15.54	15.055	<50	>50	>50	>50	5	5	5					
I	1	36	40.5	44	28	34	41.5	15.1883	14.57	15.069	>25	<10	25	5	5	5						
I	1	33.75	36.5	41.3	21.5	27.7	34.2	13.2692	14.62	14.13	>5	<5	<10	4	5	5						
I	1	33.5	36.5	41.5	26	30.5	35	16.2869	16.09	14.287	>50	<50	>25	5	5	5						
M	1	36	39.5	43.3	29	34.5	41.3	15.7307	15.54	15.467	>50	>50	>50	5	5	5						
M	1	37.5	40	42	37	46	55	18.4967	20.21	21.919	<85	<95	<95	6	7	7						
M	3	33.5	37	40	35	42	50	21.9247	21.57	21.969	<95	<95	<95	7	7	7						

Statistical Analysis

Statistical analysis was performed using SPSS 19.0 (Norusis, 2006). Descriptive statistics for the sample participants were reported as frequencies and percentages at ages 2, 3, and 4 years: feeding method category (0–6 months), BMI scores, BMI percentile rankings, and BMI category. An analysis of variance was performed. A Kruskal–Wallis test (Rice, 2007) was used to determine the relationship among the three infant feeding methods and the BMI percentile rankings (based on height and weight) and categories at ages 2, 3, and 4 years, respectively (determined by birth dates), at the .05 level of significance. Feeding method, age, and BMI percentile were nonparametric in nature.

Findings/Results

Descriptive statistics on feeding method indicate the participants had a low rate of exclusive breastfeeding. Only 17.8% ($n = 8$) were exclusively breastfed up to 6 months of age. Fifty percent ($n = 22$) of the participants were never breastfed but were exclusively formula-fed, and 33.3% ($n = 15$) were mixed-fed. For socioeconomic status (SES), 17 children or 38% were insured (medium to high SES) and 28 children or 62% were on Medicaid (low SES). The majority of participants were of low SES.

At ages 2, 3, and 4 years, formula-fed infants had > BMI% in the overweight/obese category (2.2–8.95%; $n = 4$) than mixed-fed (2.2–6.7%; $n = 3$) and breastfed infants (0–2.2%; $n = 1$); the mean BMI scores were highest among formula-fed (15.95–16.94) and mixed-fed children (16.37–17.54) compared with breastfed children (15.75–15.98); and the highest overweight/obese rates were formula-fed infants (11.1%, $n = 5$, Year 2; 13.3%, $n = 6$, Year 3; 8.9%, $n = 5$, Year 4), and the next highest were mixed-fed infants (8.9%, $n = 4$, Year 2; 6.7%, $n = 3$, Year 3; 6.7%, $n = 3$, Year 4). Thus, children who were exclusively breastfed seemed less likely to be overweight or obese according to the descriptive statistics (see Table 2).

A Kruskal–Wallis test (Rice, 2007) was used to compare the outcome of obese/overweight for participants with different feeding methods (ages 0–6 months) and at ages 2, 3, and 4 years. A statistically insignificant difference ($p > .05$) was found among the three feeding methods and the three ages ($p = .709$ at 2 years, $p = .339$ at 3 years, $p = .775$ at 4 years). As shown in Table 3, a statistically insignificant difference was found among the three feeding methods and Year 2 BMI category ($p = 0.709$) with a mean rank of 18.81 for exclusive breastfeeding, 23.50 for exclusive formula feeding, and 24.50 for mixed-feeding. Similar insignificant results were found for the Year 3 ($p = 0.399$) and Year 4 ($p = 0.775$) BMI category as well. Therefore, the $p < 0.05$ ($p = 0.399$, Year 2; $p = 0.709$, Year 3; $p = 0.775$, Year 4) indicated no significance differences in the groups (see Table 3).

Table 2

Code Prevalence of Underweight, Normal Weight, Overweight, and Obesity and Mean BMI at 2, 3, and 4 Years of Age by Infant Feeding Choice

Feeding choice (0–6) months	<i>n</i>	U-wt	N-wt	O-wt	O	BMI	
		%	%	%	%	<i>M(SD)</i>	95% CI
<u>2 Yr</u>							
EBF	8	2.2	13.3	2.2	0.0	15.98(1.58)	[14.66, 17.30]
EFF	22	0.0	37.8	6.7	4.4	16.94(1.69)	[16.20, 17.69]
MF	15	0.0	24.4	4.4	4.4	17.54(1.82)	[16.54, 18.55]
<u>3 Yr</u>							
EBE	8	0.0	15.6	0.0	2.2	15.93(1.85)	[14.38, 17.47]
EFF	22	0.0	35.6	4.4	8.9	16.44(1.62)	[15.72, 17.15]
MF	15	0.0	26.7	2.2	4.4	16.74(1.73)	[15.78, 17.70]
<u>4Yr</u>							
EBF	8	0.0	15.6	0.0	2.2	15.75(2.60)	[13.57, 17.92]
EFF	22	4.4	35.6	2.2	6.7	15.95(2.00)	[15.07, 16.84]
MF	15	0.0	26.7	0.0	6.7	16.37(2.21)	[15.15, 17.60]

Note. U-wt = underweight; N-wt = normal weight; O-wt = overweight; O = obese; BMI = body mass index; CI = confidence interval; EBF = exclusive breastfeeding; EFF = exclusive formula feeding; MF = mixed feeding.

Table 3

Year 2, 3, and 4 BMI and Feeding Choice

Feeding choice	Test statistics				
	Chi-sq	<i>df</i>	<i>n</i>	<i>M(Rank)</i>	<i>p</i>
Year 2	.689	2			.709*
EBF			8	18.81	
EFF			22	23.50	
MF			15	24.50	
Total			45		

Table 3 (cont.)

Feeding choice	Test statistics				
	Chi-sq	df	<i>n</i>	<i>M</i> (Rank)	<i>p</i>
Year 3	1.839	2			.339*
EBF			8	21.00	
EFF			22	24.09	
MF			15	22.47	
Total			45		
Year 4	.510	2			.775*
EBF			8	22.75	
EFF			22	22.14	
MF			15	24.40	
Total			45		

Note. EBF = exclusive breastfeeding; EFF = exclusive formula feeding; MF = mixed feeding.

* $p > .05$.

There is no relationship among infant feeding methods on childhood obesity/overweight levels of children at ages 2, 3, and 4 years. Therefore, we accept the null hypotheses with no significant results. However, the descriptive statistics through frequencies and percentages seemed to show differences among feeding method and childhood overweight/obesity.

Discussion

Based on descriptive statistics, we documented in the present investigation lower overweight/obesity among children who were exclusively breastfed as infants. We also found that the exclusive breastfeeding rate was low in the participants, as it is worldwide. Using a Kruskal–Wallis test, we found a statistically insignificant difference among the three feeding methods at the three ages. Therefore, there is a need to replicate this investigation with a large randomized sample size and to collect additional demographic information for analysis. Of the participants, 62% were from low-income families, which warrants further investigations into the role SES, poverty, and feeding choice may play on the relationship of breastfeeding and obesity in 2- to 4-year-olds. SES plays a global role in low breastfeeding rates. In a study of determinants of early child feeding practices in rural Kenya, a barrier to exclusive breastfeeding the first 6 months was poverty, including low SES (Gewa, Oguttu, & Savaglio, 2011). However, exclusive breastfeeding prevalence in developing and developed countries worldwide is low as evidenced by this study with a focus on developing countries (Imdad, Yakoob, & Bhutta, 2011). The Pan Ameri-

can Health Organization (2015) states, “Longer breastfeeding may reduce the risk of overweight and obesity by about 12%, helping fight the serious chronic diseases associated with these conditions” (Breastfeeding Helps Prevent Overweight in Children section, para. 1).

Several international meta-analyses and epidemiology studies found an association between breastfeeding and reduced risk of childhood obesity/overweight (Harder et al., 2007; Michels et al., 2007; Stuebe, 2009). One group of researchers found that breastfeeding was associated with a reduced risk of obesity at age 4 years only among White children (Bogen, Hanusa, & Whitaker, 2004), and another group found that exclusively breastfed infants had lower rates of overweight or obesity compared to exclusively formula-fed or mixed-fed infants (Gillman et al., 2001).

Breastfeeding promotion interventions increased exclusive breastfeeding and all breastfeeding rates from 4–6 weeks old and at 6 months. There was a larger impact of these promotion interventions in developing countries (Imdad et al., 2011). Researchers in a study in Bangladesh recommended breastfeeding support services (Joshi et al., 2014). Statistically significant increases in exclusive breastfeeding were shown in 372 worldwide studies because of breastfeeding promotion interventions. Combined individual and group counseling interventions were most successful, and these had greater impact in developing countries (Haroon, Das, Salam, & Bhutta, 2013). In an investigation in developing and developed countries, interventions recommended to reduce the risk of obesity in later life were improving the nutritional status of mothers during pregnancy and enhancing breastfeeding as to directions of exclusive breastfeeding (Yang & Huffman, 2013). This indicates a need for replicating this research with a longitudinal study beyond 4 years of age and in developing countries and considering race/ethnicity and SES.

Conclusions

Increasing prevalence of childhood obesity/overweight is a worldwide concern with the risk of adult obesity (UNICEF, 2014). Many factors are associated with breastfeeding initiation and duration such as maternal education, age, social economic status, religion, marital status, obesity, and ethnicity (Bolton et al., 2009; CDC, 2010). According to the CDC (2011), 1 out of 3 children are obese or overweight before their fifth birthday. In another investigation, researchers found a relationship among parental smoking, maternal obesity, and childhood obesity (Hilson, Rasmussen, & Kjolhede, 2004). Research concerning the relationship among SES, parental obesity and maternal smoking, and breastfeeding and obesity levels is needed.

UNICEF (2014) supports breastfeeding efforts through multiple communication channels, strategies, communication, and advocacy efforts. UNICEF recommends appropriate national level policies and legislation for breastfeed-

ing, health system level support interventions, and community-based level support systems globally. Findings from the descriptive statistics for this investigation and other investigations may reinforce efforts to develop educational programs and strategies and mass media campaigns targeting pregnant mothers, mothers of infants, and fathers to teach them about the importance of breastfeeding to prevent childhood obesity worldwide. Health and medical personnel need to consider stronger recommendations of breastfeeding for new mothers. Researchers in future research should consider other factors and developing nations and causes and include advanced age levels as well as toddlers and preschoolers to find appropriate strategies to prevent childhood obesity. Many researchers are eagerly awaiting clear evidence-based strategies that can be delivered to parents about how to prevent worldwide childhood obesity (Stuebe, 2009). Breastfeeding may be a way to begin prevention in the early childhood years and reduce the global obesity epidemic in children in all countries.

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Making a Difference in Malawi and Zambia Through Health Education and Public Health Best Practices

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Abstract

A 2-year U.S. Department of State–funded project* was conducted with the purpose of engaging health professionals from Malawi and Zambia who are actively involved in health care and health education for marginalized populations to develop, implement, and evaluate health education and public health interventions/programs. Twenty-six health professionals from Malawi and Zambia, referred to as Global Health Fellows, participated in the 2-year program, of which the main training component was conducted in the United States. Fellows were exposed to health education and public health best practices and developed an action plan to address a health problem of concern in their respective communities/countries. After completion of the program, Fellows received \$300 to implement their action plans. Teams of Americans involved in the training program participated in follow-up visits to Malawi and Zambia to observe real-time progress on Fellows' respective action plans. The

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project was successful in creating an educational experience focused on health education best practices as well as implementation of action plans to address selected health problems in Malawi and Zambia.

Keywords

global health education; millennium development goals; health education in Malawi; health education in Zambia

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Introduction

Background

Malawi and Zambia have a common border and were once one country under the Federation of Rhodesia and Nyasaland. The majority of Malawians and Zambians live in rural areas. Both countries face high levels of poverty with more than 60% of the population living on less than \$2 per day (World Vision, 2010). In Zambia, 1 in 5 children is underweight and 46% of the population is undernourished. Malnutrition is also high in Malawi as 47.1% of the children under age 5 are stunted, 12.8% are underweight, and wasting (being of low weight for height) is at 4% (World Vision, 2010). The chronic food crisis is a major cause of malnutrition and has increased risk of disease. The situation is exacerbated by the prevalence of HIV in both countries. According to Malawi Demographic and Health Survey 2010 (National Statistical Office, 2011), 11% of the Malawi adult population (aged 15–49) is HIV positive, whereas 12.7% of the Zambian adult population is HIV positive (UNAIDS-Zambia, n.d.). In Malawi, nearly 53% of the people live below the poverty threshold and nearly 75% of secondary school-aged children are either working or staying at home to care for their siblings instead of going to school.

Both Malawi and Zambia adopted the Millennium Development Goals (MDGs) of the United Nations (2010) and targets for development. These eight goals (eradicate extreme hunger and poverty; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases; ensure environmental sustainability; and develop a global partnership for de-

velopment) are the world's time-bound and quantified targets for addressing health and social problems (United Nations Millennium Project, n.d.). These goals are also intended to address human rights including education, shelter, and security. Both countries are committed to achieving the MDGs but have been constrained by insufficient resources. However, with regard to the MDGs relating to health, Malawi and Zambia have been working on the following priorities: reducing the maternal mortality ratio, reducing the mortality rate among children under the age of 5 years, improving hygiene and access to safe water, and improving nutrition.

In Malawi, attaining health-related MDGs is guided by the Health Sector Strategic Plan (HSSP). The HSSP succeeded the Program of Work framework of 2004–2010. The HSSP summarizes 12 priority diseases within the Essential Health Package (EHP) including HIV/AIDS, perinatal conditions, malaria, diarrheal disease, malnutrition, noncommunicable diseases, and tuberculosis. Through the HSSP, the government is putting more emphasis on public health approaches of disease prevention by enhancing integrated and multisectorial health promotion and health education approaches and increasing community participation to prevent the priority diseases of the EHP (Government of Malawi: Ministry of Health, 2011). The attainment of the health-related MDGs in Zambia is guided by the National Health Strategic Plan with the major aim of improving the health status of the Zambian population (Government of Zambia: Ministry of Health, 2011).

Because of the severe shortage of professional staff in the health sectors of both countries, many communities, particularly in rural areas, do not have easy access to public health information and services. According to the World Health Organization (2010), the minimum number of health care professionals (physicians, nurses, and midwives) required to provide key health care services that can meet the MDGs is 23 per population of 10,000. With an average density of seven professionals to 10,000 people, Malawi and Zambia are therefore far below the optimum number of health professionals. This human resource constraint has a serious impact on the two countries' capacities to implement effective and efficient strategies for reducing child mortality and improving maternal health in line with the MDGs, for example, through educating women in reproductive health, nutrition, hygiene, and sanitation.

Health education at the school and community levels are necessary and strategic to promote adoption of healthful behaviors to reduce the incidence and prevalence of communicable diseases. In both countries, there are efforts toward promoting community outreach activities so people have the knowledge and capacity to use locally available resources to prevent and reduce disease spread and also to build the community capacity in early identification of diseases and timely referral to health facilities. Malawi has trained high school-educated individuals as health surveillance assistants to serve as a bridge be-

tween communities and health facilities to ensure that diseases are identified early through screening and also to conduct health promotion activities within the communities (Kok & Muula, 2013). In addition to community health education and health promotion, at the facility level, health education is incorporated within routine service provision. For example, at AnteNatal and Under Five clinics, health education is conducted prior to provision of routine care. Topics are usually centered on nutrition, hygiene, family planning, and other health-related topics to promote people's knowledge of personal and community disease prevention behaviors. Unfortunately, male participation in these health education activities is low, yet men are the decision makers of the families. Both countries are also making deliberate efforts to promote males' participation in the health and well-being of their families.

Given that many of the health issues that Malawians and Zambians face could/should be addressed through health education best practices, it is imperative that health workers in both countries become familiar with public health and health education best practices. Two strategic mechanisms chosen to ground this effort were to educate health workers in the art and science of health education and public health and to arrange for them to participate in a health education immersion experience. To that end, a comprehensive health education/public health global health training program was developed and implemented.

Purpose

In February 2010, funding was received from the U.S. Department of State to develop an educational experience for health and media professionals from Malawi and Zambia. The purpose of this project was to engage professionals who are actively involved in maternal and child health care and health education to develop, implement, and evaluate health education/ public health interventions/programs focused on specific health problems. This paper provides a description of how this overall project was conceptualized and implemented.

Method

Accomplishing the purpose of this project required (1) partnering with in-country nongovernmental organizations (NGOs), (2) recruiting health and media professionals in Malawi and Zambia, (3) developing a 4-week educational experience based in the United States, and (4) planning for follow-up visits to Malawi and Zambia by teams of Americans to observe the progress on the Fellows' action plans. The flow of activities can be found in Table 1.

Table 1
Activities Involved in the Global Exchange



Partnerships

The Department of Population Health Sciences and the School of Education at Virginia Tech partnered with the Malawi Health Equity Network (MHEN) in Lilongwe, Malawi, and World Vision in Lusaka (WVZ), Zambia, to recruit professionals from Zambia and Malawi and coordinate experiences for the U.S. teams visiting projects in Zambia and Malawi.

MHEN's goal is to promote equity and equality in health care systems in Malawi (Malawi Economic Justice Network, n.d.). This NGO is active in advocacy and networking with government and communities and places a high

value on the importance of health education. WVZ is a high-profile NGO that provides and sponsors comprehensive health education programs throughout Zambia (World Vision, 2010).

Recruiting Zambian and Malawian Health Professionals

Health education/public health professionals who worked in school or community settings and in particular with maternal and child health issues were eligible for consideration. In addition, media professionals whose work was focused on health communications were also eligible for consideration as candidates for this project. Through radio, newspaper advertisements, and e-mails administrators, MHEN and WVZ conducted the initial recruitment in their respective countries. The initial recruitment announcements yielded hundreds of applicants. MHEN and WVZ evaluated all applications and identified a pool of applicants meeting the criteria for participation.

Sixty (30 from each country) qualified candidates were identified and invited for in-person interviews. Project directors from Virginia Tech traveled to Malawi and Zambia. One week was spent in each country conducting 1-hour interviews with each applicant. The interviewers were the Virginia Tech project directors and administrators/staff from the respective partner agencies. Each candidate was asked the following questions:

- How did you find out about the competition for our program?
- What are the most crucial health education needs in your community?
- Do you have ideas on how to meet those needs?
- Describe your communication style and interactions with others.
- Please give an example of an experience you had when you thought you were particularly successful in something you planned or implemented.
- What is the most challenging aspect of your present work?
- What do you want to learn in the United States?

Deliberations followed the completion of all in-country interviews. Through this competitive process, 28 Zambian and Malawian Global Health Fellows from the health, education, and journalism sectors were selected for U.S. exchanges (seven from each country in Years 1 and 2). Successful candidates, now referred to as Global Health Fellows, were congratulated and invited (required) to attend a Department of State in-service the next day. At this in-service, they learned how to obtain a U.S. visa and the dos and don'ts of behaviors while in the United States. For example, do not hitchhike; do not ask people in the United States about personal income, age, or marital status; and make an appointment before visiting someone. Due to personal reasons, two of the Fellows were not able to participate, resulting in 26 participants.

Malawi and Zambia Global Health Fellows Program Logistics

A program such as this one requires implementation of numerous logistical details. After the interviewing and recruitment of health professionals, project directors needed to work with the U.S. embassies in Malawi and Zambia to get final approval for visas for participants. For the most part, this went smoothly with much embassy cooperation. Round-trip airline flights and hotel accommodations had to be confirmed, and with cooperation from a local travel agency and hotel, both of these activities went smoothly.

Project directors closely reviewed the participants' backgrounds and interests so appropriate educational programs and immersion experiences could be developed. To develop a meaningful experience for participants, project directors worked with faculty from Virginia Tech and community-based health professionals to tailor participants' programs based on their backgrounds and interests. Draft copies of the program were shared with participants and revised to meet their needs and interests.

The last major task was finding American families who would host the Fellows for the third week. This was a requirement of the Department of State grant and necessary because during the third week each Fellow was placed in a different community agency. The purpose was to provide an opportunity for the Fellow to live with an American family and experience how the family functions on a day-to-day basis and gain a better understanding of American culture.

In addition to providing food and shelter to a Fellow, the host family arranged for the Fellow to be transported to and from his or her respective field placement. Host families were volunteers and received no recompense.

Results

Weeks 1 and 2: Classroom Experience

The U.S.-based educational experience lasted 4 weeks (see Table 2). Weeks 1 and 2 consisted of all-day seminars at Virginia Tech. Topics covered included health education/promotion, health behavior, health communication including writing radio scripts, environmental health, epidemiology, health care systems, health evaluation, public health programming, grant writing, and program sustainability.

Table 2*Four-Week Educational Experience*

Four-Week Educational Experience
<u>Weeks 1 and 2: Seminars at Virginia Tech</u> <u>Topics</u> <ul style="list-style-type: none"> • Environmental Health • Epidemiology • Health Education/Promotion • Health Communication • Health Care Systems • Health Disparities • Public Health Programming • Public Health Evaluation • Grant Writing • Program Sustainability
<u>Week 3: Immersion Experience</u> <u>40-Hour Placement (immersion experience) in</u> <ul style="list-style-type: none"> • New River Valley Health District • Free Clinic of the New River Valley • Child Health Investment Partnership • Community Services Boards • Roanoke County Prevention Council • Television and Radio Stations
<u>Week 4: Washington, DC</u> U.S. Department of State Conference Networking With Respective Embassies

The seminars were conducted by content area experts and included Virginia Tech faculty, health district professionals, health care professionals, health communication and media professionals, and extension professionals.

At the end of each day, Fellows provided written responses to the following questions: (1) What did you learn about _____? (2) Will you be able to use this information in your work? If so, how? (3) Was anything missing from the presentations that would have been helpful for you? This feedback was then discussed by the coordinators, and if immediate revisions to the program were needed, they were integrated into other presentations.

The in-class education program was well received and in a few instances content was added based on the end-of-day feedback. For example, most of the group wanted more content on health behavior theory, and as a result, a special unit was integrated into the program.

Week 3: Immersion and Family Experience

During Week 3, in addition to living with an American family, each Fellow participated in a 40+ hour immersion experience in a health agency such as the New River Valley Health District, Carilion Health Services, Free Clinic of the New River Valley, Child Health Investment Partnership, Community Services Boards, Prevention Council of Roanoke County, Rescue Mission, and television and radio stations. This immersion experience provided an opportunity for the Fellows to work with a preceptor and also to observe how American health professionals implement American health education and public health best practices in addressing specific health problems. The professionals with whom they worked most closely not only served as mentors but also helped with finalizing their action plans.

The immersion experiences and family placements were successful. Fellows reported enjoying the immersion experience especially in terms of observing theory to practice and meeting and networking with health education and public health professionals. In all instances, host families were happy to help and were welcoming to the Fellows. Fellows also reported enjoying the family placement, feeling welcomed, and appreciating the efforts families went through to transport them and make them a family member. Lastly, the group members felt that they were able to incorporate what they learned from the classroom-based experience and the immersion experience into their action plans.

Action Plans

Participants developed action plans addressing a health problem in their home countries appropriate for a health education intervention. The action plans were developed in consultation with content specialists from Weeks 1 and 2: the immersion experience preceptor and faculty from the Department of Population Health Sciences. The format of the action plans consisted of documentation of the health problem/issue, measurable objectives, intervention, resources needed to implement the intervention, evaluation, and sustainability plans (see Figure 1).

Goal:						
Objective:						
Activities	Personnel	Resources needed	Cost	Evaluation	Who is responsible?	Timeline
Budget Justification						
Sustainability Plan						

Figure 1. Action plan template.

Participants developed a budget to implement their action plans. Following the budget review, they received a maximum of \$300 to implement the plans—a modest budget by U.S. terms but a meaningful amount for Malawi and Zambia.

Action plans were evaluated using a checklist containing the elements necessary for actions plans, namely, (1) successfully framing the health issue/problem, (2) developing measurable objectives to address the problem, (3) developing appropriate intervention(s) to meet the objectives, and (4) developing an evaluation to determine the degree to which the program objectives were reached. The project coordinators reviewed the action plans. Feedback was offered and if necessary action plans were revised.

Action plans were in compliance to the criteria and for the most part required few revisions. A brief summary of each action plan can be found in Table 3.

Table 3*Global Health Fellows' Action Plan Summaries*

Country	Project title	Brief description	Impact
Zambia	Income-Generating Activities by HIV-Positive Mothers to Improve Nutrition	10 existing village groups of women and orphans planted gardens where none had existed before to provide produce for better nutrition and to market for money	300 villagers
Zambia	Weekly Health Column in <i>Times of Zambia</i>	A weekly health column was initiated	25,000 readers (daily circulation)
Zambia	Songs on Health Issues for Radio Broadcast	Songs written highlighting that TB is not a family disease	100,000 listeners
Zambia	Health Literacy Program for 40 Churches	Church Volunteers trained to work with groups of men and women regarding reproductive health	80 volunteers trained with 1,280 attending the reproductive health workshops
Zambia	School Sanitation Project	Training and skits on how to use hand-washing facilities	1,000 students
Zambia	Youth Sensitization on Malaria Through Soccer Tournaments	Malaria nets are often used for fishing and not for prevention. Message regarding how to use malaria nets disseminated at soccer tournaments	> 10,000 youth
Malawi	Health Action Plan for a Secondary School	Stomach aches and diarrhea are serious problems contributing to absenteeism and decreased educational opportunities. Sink and soaps were purchased and a curriculum developed focused on proper use and risk reduction	400 children
Malawi	Community-Based Food Supplement Sustainability Program	A goat house was built and five goats were purchased to provide nourishment for children under 5. Administered by a local health center and churches. Goat milk can also be sold for revenue	100 children
Malawi	Community Bicycle Ambulance	A bicycle was converted to be an ambulance to transport pregnant and critically ill children	3,000 villagers will have access to the bicycle ambulance

Table 3 (cont.)

Country	Project title	Brief description	Impact
Malawi	Community-Based Support to Vulnerable Children	Project provides nutritious porridge to primary school children	100 children
Malawi	Community Health Scorecard	Comprehensive set of activities to determine factors related to health status, community engagement, resources, and responsiveness	500 villagers
Zambia	Male Involvement in Neonatal Maternal and Child Health	Networking with health care providers and community organizations to increase awareness among men and husbands of pertinent neonatal and child health by inviting men to participate in maternal health care	300 males
Zambia	Improving Households Resilience Through Economic Strengthening	Empowering village women who have been impacted by HIV/AIDS to strengthen their community economically through building a goat shelter and selling goat milk	25 children
Zambia	Expanding HIV Protection for Youth	Development of an intervention to reduce risk and vulnerability to new HIV infections among 5- to 18-year-olds through peer education	150 people
Zambia	Weaning Determines Children's Nutritional Status	Program to educate mothers through effective preparation of food to increase the nutritional status of children	200 village women
Zambia	Modern Family Planning	Health communications broadcasted in multiple languages highlight family planning issues	Thousands
Zambia	Increasing SRH Services for Adolescents	Building capacity of health providers and peer educators to promote contraception with adolescent girls	120 girls
Zambia	Health Practices	Using print media to develop a series of articles to influence government and decision makers	Thousands
Malawi	Chickens for Health	Support for families headed by HIV-positive women with children through building a facility for chickens and raising chickens for food	33 children
Malawi	Community Empowerment for a Vibrant Society	Development of a 1-day workshop for health centers focused on how to communicate with the local hospital	120 center personnel

Table 3 (cont.)

Country	Project title	Brief description	Impact
Malawi	Health and Sanitation Awareness Project	A system for hand washing was built and implemented along with an education component	2,000 students
Malawi	Promoting Access to Youth Friendly Health Services	A community health score card was developed to assess whether community health services were providing youth friendly health services	90 youth
Malawi	Air Quality: My Responsibility	One-day workshop to educate a village about the dangers of burning tires as fuel to make beer for sale and to consider alternatives	450 villagers
Malawi	Peer Education on Sexual Reproductive Health and HIV/AIDS for Secondary School Youth	Program to train nurses to serve as peer educators for youth about sexual practices and protection	100 nurses
Malawi	Peer Educators on HIV/AIDS for Churches	Train pastors' wives to serve as peer educators in HIV/AIDS prevention	225 pastors

A wide range of issues and problems were addressed in the action plans. One plan was focused on installing a sink and developing an educational intervention for hand washing to reduce the spread of disease in the school. Another plan was focused on raising goats for supplying nutritional goat milk to the village and for selling goat milk for village income. Other plans involved health education mass communication messages via print media or radio. Regardless of the focus of the plan, each plan had a health education component that was developed in accordance with best practices.

Week 4: Department of State Conference

The last week, Week 4, was spent in Washington, DC, where the Fellows attended a Department of State conference focused on reviewing best practices and sustainability. The conference also provided each Fellow an opportunity to network with Fellows from other Department of State-funded programs.

End of Program Evaluation

Fellows completed an evaluation at the end of their exchange experience in the United States. The evaluation involved Fellows rank ordering (1) topics that were presented that were most relevant to their work, (2) presentations from which they learned the most, (3) topics for which there was no familiarity prior to the educational experience, and (4) degree of enjoyment for special

events (socials, movies, visits to museums, etc.). Results show minor variations in terms of relevance of the experiences but in all cases were overwhelmingly positive and reflected a program that was meaningful for the Fellows.

Follow-Up Visit

Within 6 months after Fellows returned to their respective countries, two teams of Americans, most of whom had been involved in the educational programs, visited each project in Malawi and Zambia. One team visited Malawi and one team visited Zambia. Each team observed the real-time progress of the Fellows' action plans and if necessary helped with issues and sustainability. Each project was evaluated based on the evaluation framework in the action plan. In all cases, over both years, the Global Health Fellows were successful in achieving the specific objectives in their action plans and the extent to which the projects were felt to be sustainable.

Conclusion

Through partnering with the MHEN and WVZ, Malawian and Zambian health and media professionals who participated in the project learned about U.S. health education and public health best practices through (1) classroom-based delivery of content by experts; (2) participation in an immersion experience in an American health agency; and (3) development, implementation, and evaluation of an action plan focused on a specific health problem.

U.S. professionals who participated in the delivery of the classroom/community-based educational experience or served as preceptor for the immersion experience learned (1) how others work with limited resources in situations of great demand for health services and health education; (2) how others work in environments characterized by limited or lack of communication infrastructure, inadequate health facilities, and poor supply of water and electricity; (3) how others apply networking and skills transfer opportunities; and (4) about impacts of culture on the concept of care and prevention through observing colleagues' attitudes toward "clients." Exposure to different cultural settings helped U.S. participants to appreciate cultural diversity and enhance their openness to different colleagues and clients in today's global village in which they practice their community health-based professions.

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Health Behaviors Among First-Year College Students in a Private University in the Dominican Republic

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Abstract

The purpose of this study was to evaluate the health behaviors of first-year college students attending a medium-sized private university in the Dominican Republic. Data were collected from 333 students enrolled in a university orientation course for first-year students using a modified version of the Youth Risk Behavior Survey. Findings from this study suggest risky health behaviors are more likely to be found among males, who were more likely to carry a gun to school, to use tobacco products, and to use steroids. Because students spend a good portion of their lives attending institutions of higher learning in the Dominican Republic, it is recommended that universities take steps to implement health promotion and disease prevention programs designed to improve the health status of those students.

Keywords

Dominican Republic; adolescents; risk factors; health behaviors

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Introduction

The transitional developmental stage known as adolescence, typically between 13 and 19 years of age, is characterized by exploration, feelings of invincibility, personal identity, and search for independence (Lightfoot, 1997; United Nations Children's Fund [UNICEF], 2012). Negative decisions and risk behaviors started during adolescence have a direct impact on the morbidity and mortality indicators for this population group, which accounts for approximately 20% of the world's population (UNICEF, 2012). Problems related to poor decision making and inappropriate health choices are exacerbated by adolescents' inability to focus on the long-term implications of their decisions. Similarly, health promotion and disease prevention efforts are severely curtailed by the limited research on adolescents' perception, definition, and application of health concepts especially in middle and lower income countries (Arrivillaga, Salazar, & Correa, 2003; Maddaleno, Morello, & Infante-Espínola, 2003; UNICEF, 2012).

Latin American Youth

Adolescents (aged 13–18) and young adults (aged 18–25) account for over 25% of the population of the Americas. Given their increasing number, adolescent health can be said to be key to the social, economic, and political development of the region. In recognition of their growing importance, the Pan American Health Organization has proposed a new conceptual framework focused on human development and the promotion of health within the context of family, community, social, political, and economic development (Cunningham, McGinnins, Garcia Verdy, Tesliuc, & Verner, 2008; Maddaleno et al., 2003). In this framework, the adolescent population is placed at the forefront of governments' agendas to assist them in improving their own conditions including their health status.

In an increasing body of research, it has been suggested that adolescents in Latin America face challenges not experienced by adolescents in other parts of the world. Low literacy rates, high unemployment rates, restrictive upward mobility opportunities, and armed conflicts are among the issues Latin American adolescents face (Blum, 2004; Maddaleno et al., 2003; Pons, Queralt, Mars, Garcia-Merita, & Belager, 2010; UNICEF, 2012). Similarly, Blum (2004) found that changes in population characteristics, including migration and education, have an impact on mortality and morbidity among adolescents. These factors singularly and collectively have a profound impact on adolescents perception of health and risk taking.

Studies Related to Adolescent Risk Behavior

Researchers have suggested that negative outcomes in adolescent health are related to behavioral choices that increase risk factors among that popula-

tion group. Data from the United States continue to denote negative health behaviors among American adolescents (Eaton et al., 2010). In a study among a sample of Colombian university students, the researchers found that first-year students exhibited a number of risky health behaviors that could have immediate and long-term negative effects on their health status (Alonso Palacio, Pérez, Alcalá, Lubo Gálvez, & Consuegra, 2008). Peña, Cabrera-Nguyen, Chavez, and Fernández (2010) reported similar findings among Dominican adolescents.

In studies related to use of alcohol and mind-altering substances, researchers have found negative behaviors among adolescents in several Latin American countries including Argentina, Central America, and the Dominican Republic (Alderete, Kaplan, Nah, & Perez-Stable, 2008; Dormitzer et al., 2004; Epstein, Botvin, & Diaz, 2001; Guilamo-Ramos et al., 2011). In a study among college students in Cali, Colombia, Arrivillaga et al. (2003) found that knowledge does not always translate into healthy behaviors. Based on these results, they concluded that there is a need to design health promotion programs targeting adolescents and enabling them to contemplate psychosocial processes such as learning, cognition, motivation, and emotion.

Drug use among adolescents continues to be a concern to parents and public health officials (Garcia-Vega, Menéndez Robledo, Fernández García, & Cuesta Izquierdo, 2012; López, Schwartz, Prado, Campo, & Pantin, 2008; Sánchez-Suárez & Galera-Sueli, 2004). Pilon, O'Brien, and Piedra-Chavez (2005) found that gateway drugs such as alcohol, tobacco, and marijuana are the most often consumed mind-altering substances by students in Ecuador. In a national study by the Consejo Nacional de Drogas (2008) in the Dominican Republic, low prevalence rates in drug use among school-attending adolescents were found. According to the study, less than 2% of respondents indicated having used inhalable drugs such as glue. A similarly low usage rate was reported for marijuana use (1.6%). In the same study, it was found that less than 1% of Dominican adolescents reported ever having used cocaine.

Risky sexual behaviors of adolescents have received increasing attention in recent decades. However, few studies have been focused on the sexual behavior of adolescents in certain geographic areas in Latin America. In a study of adolescents in Brazil, Soares Dos Dantos and Félix de Oliveira (2009) found that the rate of correct answers in an instrument measuring knowledge, attitudes, and behaviors about HIV/AIDS was higher in low complexity questions (knowledge) and decreased with increasing degree of complexity (behaviors). In other studies in Latin American countries, it has been suggested that adolescents have been exposed to basic information related to HIV/AIDS, its transmission, modes, and some prevention messages; however, they have not translated that knowledge into actions that may prevent infection with the virus (Dussailant, 2010; Escalante-Romero, Cerrón-Vela, Salazar-Granara, & Mezones-Holguín, 2008; Gonçalves Câmara, Castellá Sarriera, & Carlotto,

2007; Gálvez-Buccollini, DeLea, Herrera, Gilman, & Paz-Soldan, 2009). Despite the studies listed above, Latin American countries lack comprehensive surveillance systems designed to track the health status and risk behaviors of adolescents. This is especially true in middle-income countries such as the Dominican Republic, which focus a lot of their resources in primary care rather than prevention.

According to *The World Factbook* (Central Intelligence Agency, n.d.), over 10.3 million people reside in the Dominican Republic, a country bordered by the North Atlantic and the Caribbean Sea. According to the same source, 18.5% of the population in 2014 was between ages 15 and 24, making it the third largest population group in the country. According to data from the 2010 Dominican Republic National Census, 18.1% of individuals aged 16 to 24 are enrolled in institutions of higher learning (Arboleda, 2014). This is not surprising since postsecondary education starts a few years earlier in the Dominican Republic than it does in the United States, somewhere between 16 and 18 years of age.

Despite the importance of their demographic composition, little information exists to understand the behavioral patterns of individuals in this demographic group, information that can be used to develop health promotion and disease prevention strategies designed to minimize negative health outcomes. The purpose of this descriptive study was to evaluate health behaviors of college students at a medium-sized university in the eastern part of the Dominican Republic

Method

The Youth Risk Behavior Surveillance System (YRBSS) was developed by the Centers for Disease Control and Prevention (CDC) and was designed to monitor the six highest health risk behaviors that have been found to affect the health status of school-aged populations including unintentional injuries and violence, sexual behaviors, alcohol and other drug use, tobacco use, unhealthy dietary behaviors, and inadequate physical activity. In the United States, the YRBSS is conducted by the CDC, and state, territorial, tribal, and local surveys are conducted by state, territorial, and local education and health agencies and tribal governments (CDC, n.d.; Eaton et al., 2010). Results from these studies provide the foundation for many health promotion and disease prevention programs in the United States.

Although high-income countries such as the United States have highly developed health and disease surveillance systems, the same is not true for middle- and low-income countries, making it necessary to obtain base information before programs can be developed. Data for this study were collected using a modified version of the Youth Risk Behavior Survey (YRBS). The modified version has been used in El Salvador, Colombia, Mexico, and the Dominican Republic. Since the original YRBS was developed in English, the Latin

American version has been translated by language experts and back translated to verify its accuracy. To ascertain its cultural appropriateness to each of the countries, a panel of cultural experts also evaluated the translated instrument for face validity. All participants completed the 99-item YRBS, including seven demographic variables. The modified version of the YRBS was designed to assess health behavior including (a) unintentional and intentional injuries, (b) tobacco use, (c) alcohol and other drug use, (d) sexual behavior, (e) dietary behaviors, and (f) physical activity.

Participants

Study participants were 333 male and female undergraduate students representing approximately 95% of first-year students attending a medium-sized private university in the eastern Dominican Republic. Instructors of the six sections of the university introduction course were contacted about the study and asked for permission to distribute the survey in their classes. All instructors agreed to have their students participate in the study, which was approved by the institutional review boards at two universities. Study participants were provided with an informed consent form and a printed copy of the survey, and a member of the research team remained in the classroom to answer questions the students might have. For the purpose of this analysis, only students between ages 16 and 24, the typical college age in the Dominican Republic, who completed all items in the survey instrument were included ($n = 299$), yielding a final usable return rate of 89.8%. Thirty-four study respondents were excluded from the data analysis because they either exceeded the targeted age group or did not complete all items in the survey.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 21.0 was used to analyze the data in this study. Data analysis included the use of descriptive statistics for demographic characteristics. Chi-square analyses were used to determine differences in unintentional injuries, violence, tobacco use, alcohol and other drugs, sexual behaviors, dietary, and physical activity between males and females. Differences between males and females were considered statistically significant at $p < 0.05$. The results show the percentages of students who responded to the item overall and by gender. In some cases, the numbers and percentages in the tables refer only to those who completed the specific questions.

Results

The final sample consisted of 299 students between ages 16 and 24 years ($M_{\text{age}} = 18.58$, $SD = 1.63$). Fifty-seven percent of the participants were female ($n = 171$), and 97% reported they were heterosexual ($n = 258$). Fifty-one percent

indicated they were Mestizo ($n = 153$), 18% White ($n = 54$), 12% Black ($n = 35$), 10% Indigenous ($n = 30$), and 9% other race ($n = 26$).

Behaviors That Contribute to Unintentional Injuries

Table 1 shows that 75% of study respondents who rode in a motorcycle in the past 12 months rarely or never used a helmet; similarly, 87% of those who rode a bicycle rarely or never used a helmet when riding. Close to 17% of those who drove a vehicle rarely or never used a seat belt, and 47% rarely or never used a seat belt when someone else drove. Similarly, 34% of study respondents rode with a driver who had been drinking alcohol, and almost 25% of those who drove did it after drinking alcohol.

A chi-square analysis showed a significant difference between males and females with respect to using a helmet when riding a motorcycle, using a seat belt when driving or when someone else drove, and driving after drinking alcohol. Females were less likely than males to use a helmet when riding a motorcycle ($\chi^2 = 15.61$, $p < .001$) and less likely to wear a seat belt when someone else drove ($\chi^2 = 9.52$, $p < .05$). Males were less likely than females to wear a seat belt when driving ($\chi^2 = 27.11$, $p < .001$) and more likely than females to drive after drinking alcohol ($\chi^2 = 40.04$, $p < .001$).

Table 1

Behaviors That Contribute to Unintentional Injuries

Category	Overall <i>n</i> (%)	Gender <i>n</i> (%)	
		Male	Female
Rarely or never wore helmet when riding a motorcycle**	138(75.0)	64(64.6)	72(86.7)
Rarely or never wore helmet when riding a bicycle	172(86.8)	80(88.9)	90(84.9)
Rarely or never wore seat belt when driving***	49(16.5)	25(20.3)	24(14.0)
Rarely or never wore seat belt when some else drove*	141(47.2)	47(37.6)	93(54.3)
Rode with driver who had been drinking alcohol	101(34.2)	44(35.5)	56(33.3)
Drove when drinking alcohol***	35(24.5)	29(35.8)	5(8.5)

Note. Number and percentage are based on those who answered the particular question.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Behaviors That Contribute to Violence

Overall, a small percentage of students reported that they carried a weapon during the last 30 days (5%), carried a gun (2%), carried a weapon to school

(2%), or were threatened or injured with a weapon at school (3%). Approximately 13% of the participants were involved in a fight during the last 12 months, 6% did not go to school due to safety concerns, almost 13% had property stolen or damaged at school, and almost 5% reported they were forced to have sexual intercourse during their life. The data show that males were more likely than females to carry a gun (see Table 2).

Table 2
Behaviors That Contribute to Violence

Category	Overall <i>n</i> (%)	Gender <i>n</i> (%)	
		Male	Female
Carried weapon	11(3.7)	8(6.4)	3(1.8)
Carried gun*	6(2.0)	6(4.9)	0(0)
Carried weapon to school	5(1.7)	4(3.2)	1(0.6)
Threatened or injured with a weapon at school	9(3.0)	6(4.8)	3(1.8)
Involved in physical fight	40(13.4)	20(16.0)	20(11.7)
Did not go to school due to safety concerns	19(6.4)	11(8.8)	8(4.7)
Had property stolen or damaged at school	38(12.7)	22(17.6)	16(9.4)
Forced to have sexual intercourse	14(4.8)	6(4.8)	8(4.9)
Seriously considered attempting suicide	20(6.9)	7(5.7)	13(7.8)
Made suicide plans	20(6.9)	7(5.7)	13(7.8)
Attempted suicide	20(6.9)	7(5.7)	13(7.8)
Suicide attempt treated by doctor or nurse ^a	10(50.1)	4(57.1)	6(50.5)

Note. Number and percentage are based on those who answered the particular question.

* $p < .05$.

^aNumber and percentage based on those who attempted suicide.

Suicide Ideation

Around 7% of the participants considered attempting suicide, made a plan for suicide, or attempted suicide during the past 12 months. Out of those who attempted suicide, almost 53% were treated by a doctor or nurse (see Table 2). A chi-square analysis showed that more males than females reported that they carried a gun ($\chi^2 = 8.32$, $p < .05$). No significant differences were found among the other variables.

Tobacco Use Behaviors

Almost 17% of the participants reported that they had smoked cigarettes and almost 5% reported that they smoke cigarettes daily. Of those who reported that they had smoked, 21% smoked before age 13 years. Only 4% of the participants ($n = 12$) reported being current cigarette smokers, and out of those, close to 17% smoke between six and 10 cigarettes daily, all of them smoke while at school, 75% had bought cigarettes at a store, and almost 42% had tried to quit smoking. A chi-square analysis showed that females were more likely than males to have tried smoking cigarettes before age 13 years ($\chi^2 = 11.87, p < .05$). Finally, less than 6% reported being current smokeless tobacco users and less than 1% used smokeless tobacco at school (see Table 3).

Table 3

Tobacco Use Behaviors

Category	Overall	Gender $n(\%)$	
	$n(\%)$	Male	Female
Ever smoke cigarettes	48(16.6)	24(19.7)	24(14.4)
Ever smoke cigarettes daily	14(4.9)	8(6.6)	6(3.7)
Smoke cigarettes before age 13 years [*]	12(21.0)	3(10.3)	9(32.1)
Current cigarette smoker	12(4.2)	8(6.7)	4(2.5)
Smoke 6–10 cigarettes daily ^a	2(16.7)	2(25.0)	0(0)
Smoke cigarettes at school ^a	12(100)	8(100)	4(100)
Bought cigarettes at store ^a	9(75.0)	6(75)	3(75)
Tried to quit smoking cigarettes ^a	5(41.7)	3(37.5)	2(50.0)
Current smokeless tobacco use	15(5.5)	9(7.8)	6(3.8)
Use smokeless tobacco at school ^b	2(13.3)	2(22.2)	0(0)

Note. Number and percentage are based on those who answered the particular question. ^{*} $p < .05$.

^aNumber and percentage based on those who are current cigarette smokers. ^bNumber and percentage based on those who use smokeless tobacco.

Alcohol and Other Drug Use Behaviors

Almost 69% of study participants reported that they had drunk alcohol, with almost 16% of them trying alcohol before age 13 years. Forty-one percent reported being current alcohol drinkers, with 34% reporting binge drinking within the past 30 days and 7% reporting drinking alcohol at school.

A small percentage of students reported having used marijuana (3%), with less than 1% having tried marijuana before age 13 years. Forty-four percent of those who reported having used marijuana were current marijuana users ($n =$

4) and 11% ($n = 1$) had used marijuana at school. One percent or less reported having used cocaine, having used cocaine at school, having used inhalants, and having used inhalants at school. Approximately 6% had taken steroids without a doctor's prescription, around 5% had injected illegal drugs, and less than 4% had been exposed to illegal drugs at school (see Table 4). A chi-square analysis showed that males were more likely than females to report using steroids without a prescription ($\chi^2 = 18.63$, $p < .01$). No significant differences were found among the other variables.

Table 4
Alcohol and Other Drug Use Behaviors

Category	Overall <i>n</i> (%)	Gender <i>n</i> (%)	
		Male	Female
Ever drank alcohol	195(68.6)	93(75.0)	102(63.8)
Drank alcohol before the age of 13 years	45(15.7)	27(29.0)	16(15.7)
Current alcohol use (past 30 days)	120(41.5)	58(46.7)	61(37.7)
Binge drinking ^a	41(34.2)	19(32.8)	22(36.1)
Drank alcohol at school ^a	9(7.5)	7(12.1)	1(1.6)
Ever used marijuana	9(3.2)	5(4.1)	4(2.5)
Used marijuana before the age of 13 years ^b	1(0.4)	1(0.8)	0(0)
Current marijuana use ^b	4(44.4)	3(60.0)	1(25.0)
Used marijuana at school ^b	1(11.1)	1(20.0)	0(0)
Ever used cocaine	4(1.4)	3(2.5)	1(0.6)
Current cocaine use ^c	4(1.4)	3(2.5)	1(0.6)
Ever used inhalants	4(1.3)	3(2.5)	1(0.6)
Ever used illegal drugs	2(0.7)	2(1.6)	0(0)
Ever took steroid without doctor's prescription [*]	18(6.3)	15(12.5)	1(0.6)
Ever injected illegal drug	12(4.2)	6(4.9)	6(3.7)
Had been offered, sold, or given illegal drug at school	10(3.5)	6(5.0)	4(2.5)

Note. Number and percentage are based on those who answered the particular question.
^{*} $p < .01$.

^aNumber and percentage based on those who drank alcohol in the past 30 days. ^bNumber and percentage based on those who used marijuana. ^cNumber and percentage based on those who used cocaine.

Sexual Behaviors That Contributed to Unintended Pregnancy and STIs

Overall, 50% of the students reported that they have had sexual intercourse, with less than 5% reporting that they had sexual intercourse before age 13 years. Almost 37% of the participants who reported having had sexual intercourse reported having had more than four sexual partners during their lifetime, and 41% of the students reported having had sexual intercourse with at least one sexual partner during the last 3 months.

Sixty-seven percent of those who have had sexual intercourse reported using a condom and almost 83% reported using a form of birth control the last time they had sexual intercourse. Eight percent of those who were sexually active reported drinking alcohol, and almost 2% reported using drugs before the last time they had sexual intercourse. The majority of participants were taught about AIDS/HIV at school (90%) or talked to parents or other adults about this topic (80%). Finally, only 6% of the sexually active students reported having been told by a doctor or nurse that they have an STI (see Table 5).

A chi-square analysis showed a significant difference among males' and females' sexual behaviors. Males were more likely than females to report having had sexual intercourse ($\chi^2 = 31.75, p < .001$), having had sexual intercourse before age 13 years ($\chi^2 = 48.01, p < .001$), having had more than four sexual partners during their lifetime ($\chi^2 = 32.11, p < .001$), having had sexual intercourse within the past 3 months ($\chi^2 = 11.61, p < .05$), having used a condom the last time they had sexual intercourse ($\chi^2 = 21.14, p < .001$), and having drunk alcohol before sexual intercourse ($\chi^2 = 3.88, p < .05$). Females were more likely than males to report using a form of birth control ($\chi^2 = 16.53, p < .05$).

Table 5

Sexual Behaviors That Contributed to Unintended Pregnancy and STIs, including HIV

Category	Overall	Gender <i>n</i> (%)	
	<i>n</i> (%)	Male	Female
Ever had sexual intercourse**	145(51.1)	84(70.0)	58(36.0)
Had first sexual intercourse before the age of 13 years**a	13(4.7)	13(10.9)	0(0)
Had sexual intercourse with four or more partners during their life**a	47(36.5)	41(55.4)	5(9.6)
Had sexual intercourse with at least one partner in the last 3 months*a	118(41.5)	69(57.5)	46(28.6)

Table 5 (cont.)

Category	Overall <i>n</i> (%)	Gender <i>n</i> (%)	
		Male	Female
Condom use last sexual intercourse** ^a	90(67.2)	64(51.8)	23(43.4)
Birth control use* ^a	111(82.8)	62(79.5)	46(86.8)
Drank alcohol before last sexual intercourse* ^a	25(8.4)	19(25.3)	6(11.3)
Used drugs before last sexual intercourse ^a	5(1.7)	3(4.0)	1(1.9)
Were taught in school about AIDS and HIV infection	262(90.3)	113(91.1)	148(90.8)
Talked to parents or other adults about HIV/ AIDS	231(79.9)	101(82.1)	128(78.5)
Were told by a doctor or nurse that had STI	8(6.0)	5(6.4)	2(3.8)

Note. Number and percentage are based on those who answered the particular question.

* $p < .05$. ** $p < .001$.

^aNumber and percentage based on those who reported having had sexual intercourse.

Dietary Behaviors

Forty-one percent of the participants reported that they eat at least one to two servings of fruit per day. Similarly, less than 40% of respondents indicated that they eat at least one to two servings of vegetables, either uncooked (29%) or cooked (37%), on a daily basis. However, most participants indicated that they eat one to five servings of grains (84%), one to two servings of dairy, and one to three servings of proteins (79%) daily. A chi-square analysis showed that females were more likely than males to eat one to five serving of grains daily ($\chi^2 = 16.10$, $p < .01$), but less likely to eat cooked vegetables ($\chi^2 = 6.34$, $p < .05$) daily. Males were more likely than females to report eating one to two servings of dairy ($\chi^2 = 13.35$, $p < .01$) and eating one to three servings of proteins daily ($\chi^2 = 11.65$, $p < .01$; see Table 6).

Table 6

Dietary Behaviors

Category	Overall <i>n</i> (%)	Gender <i>n</i> (%)	
		Male	Female
Ate at least 1–2 servings of fruit	121(40.9)	56(44.8)	65(38.0)
Ate 1–5 servings of grains**	249(84.1)	98(79.0)	148(87.6)

Table 6 (cont.)

Category	Overall	Gender <i>n</i> (%)	
	<i>n</i> (%)	Male	Female
Ate at least 1–2 servings of un-cooked vegetables	86(29.5)	44(36.0)	42(24.7)
Ate at least 1–2 servings of cooked vegetables*	109(37.1)	50(40.3)	59(34.7)
Consumed at least 1–2 servings of dairy**	185(62.3)	85(68.5)	98(57.6)
Ate 1–3 servings of proteins**	233(78.6)	122(81.1)	168(77.9)

Note. Number and percentage are based on those who answered the particular question.

* $p < .05$. ** $p < .01$.

Physical Activity

Over half of the students participated in exercise or physical activity (58%) or stretching activities (52%) and walked or bicycled at least for 30 minutes (53%) at least once per week (see Table 7). Less than one third participated in muscle strengthening activities (29%) or attended physical education classes (25%), and less than 10% played on at least one sports team. A chi-square analysis showed that males were significantly more likely than females to participate in exercise or physical activity ($\chi^2 = 15.80$, $p < .01$), stretching activities ($\chi^2 = 18.00$, $p < .001$), and muscle strengthening activities ($\chi^2 = 62.35$, $p < .001$); attend physical education classes ($\chi^2 = 17.09$, $p < .01$); and play on at least one sports team ($\chi^2 = 30.47$, $p < .001$).

Table 7

Physical Activity

Category	Overall	Gender <i>n</i> (%)	
	<i>n</i> (%)	Male	Female
Participated in exercise or phys act**	172(58.5)	85(68.5)	87(51.2)
Participated in stretching act**	155(52.4)	78(62.4)	77(45.0)
Participated in muscle strengthen- ing act**	87(29.4)	66(52.8)	4(12.3)
Walked or bicycled at least 30 mins	158(53.4)	71(56.8)	57(50.9)
Attended physical educ class**	75(25.3)	49(27.8)	35(20.5)
Played on at least one sports team*	29(9.7)	16(12.8)	13(7.8)

Note. Number and percentage are based on those who answered the particular question.

* $p < .05$ for gender. ** $p < .01$ for gender. *** $p < .001$ for gender.

Obesity, Overweight, and Weight Control

Approximately 15% of participants in the study described themselves as being overweight (see Table 8). Furthermore, less than 25% were trying to lose weight by controlling their diets, exercising, or doing something else. There were no statistical differences by gender in these variables.

Table 8
Obesity, Overweight, and Weight Control

Category	Overall	Gender <i>n</i> (%)	
	<i>n</i> (%)	Male	Female
Described themselves as over-weight	45(15.4)	15(12.3)	30(17.7)
Trying to lose weight	66(22.5)	23(18.5)	43(25.4)
Followed diet to lose weight or keep from gaining weight	43(14.5)	15(12.1)	28(16.5)
Exercised to lose weight or keep from gaining weight	62(21.0)	30(25.7)	31(35.3)
Didn't eat for less than 12 hours to lose weight or keep from gaining weight	14(4.7)	6(4.8)	7(4.1)
Took diet pill, powers, or liquids to lose weight or keep from gaining weight	11(3.7)	4(4.7)	7(6.3)

Note. Number and percentage are based on those who answered the particular question.

Discussion

The aim of this study was to provide baseline information on health behaviors and practices among first-year college students in a medium-sized university in the Dominican Republic. Results from this study revealed a number of risk-taking behaviors among participants that may contribute to higher morbidity and mortality factors among the studied population. The results related to low use of helmets was similar to the findings in other studies (Cerezo & Méndez, 2012; Pillon et al., 2005), and considering the high number of people who reported low use of helmets, even low to moderate accident rates could result in preventable injuries or even deaths. Furthermore, considering that motorcycles are a primary mode of transportation among the target population, health promotion messages designed to increase the use of helmets may decrease head injuries among the target population.

In this study, some study participants reported suicide. These findings, while similar to those found in a similar population in Colombia (Alonso Palacio et al., 2008), suggest that suicide attempts may be higher in this population

group than previously anticipated. The finding that women are more likely to engage in these behaviors is similar to the findings reported by Arias López et al. (1999) among Dominican teenagers.

Although a large percentage of study respondents claimed to have had information about STDs and HIV/AIDS, the results suggest that knowledge does not translate into behavior, as the commonly preventive practice of condom use was lower than expected. The data suggest that the educational component is not internalized properly to prevent these diseases.

Tobacco use in adolescence is considered a gateway to the exploration of additional mind-altering substances as the individual grows older. The higher percentage of smoking among males is similar to that found in groups of university students from Ecuador (Pillon et al., 2005), Brazil (Pillon et al., 2005), and Colombia (Alonso Palacio et al., 2008). Since tobacco use may start early in adolescence, perhaps even before students enter a university, some Dominican researchers have suggested that starting prevention at this stage may be too late (Peña et al., 2010). Despite the recommendation given by the researchers quoted before, and given that smoking is a risk factor for the development of many diseases, and because universities are establishments with a captive concentration of this population, the data suggest that institutions of higher learning should develop policies designed to regulate the use of tobacco on campus and to mitigate cigarette consumption within academic institutions.

A high percentage of students in this sample population reported using alcohol. Results from this study are similar to those reported by other researchers (Epstein et al., 2001; Guilamo-Ramos et al., 2011), and the documented relationship between alcohol use and other risk behaviors including irresponsible sexual behaviors indicate that universities in the Dominican Republic should play a key role in addressing alcohol use among their students.

Results from this study suggest that most students obtain their physical activity outside the university setting. This is not surprising given that most institutions of higher learning in the Dominican Republic do not include physical activity as a required course in their curriculum. The lack of structured physical activity, outside sports such as soccer, may be correlated to the body composition of body weight of study respondents.

In this study, however, there was a significant limitation of data obtained through the YRBS. As indicated above, this instrument was designed to collect information about six specific areas that have been found to affect the health status of adolescents in the United States adversely. The instrument does not address other determinants of health including cultural beliefs, low literacy rates, high unemployment rates, restrictive upward mobility, and armed conflicts, among others. This is an important limitation because decision making, risk taking, and prevention are largely associated to cultural background as suggested in the literature (Kasperson et al., 1988; Uchino, 2009). It was also

suggested in the literature that cultural values largely determine the way in which an individual behaves and perceives reality; furthermore, elements such as religion, sociocultural traditions, values, and morals appear to be among the most important factors influencing risk perception and reduction among adolescents (Baban & Catrinel, 2007). It is therefore important that future studies expanding on the baseline data collected on this study be focused on those variables to provide a more comprehensive view of the health status of adolescents attending universities in the Dominican Republic.

A second limitation to this study is the small number of individuals who participated. Although the 333 respondents represent a significant proportion of first-year students at this institution, the sample size is smaller than in the more comprehensive national surveys conducted in the United States, making it difficult to draw direct comparisons between the two countries. For instance, the 2013 YRBS contained information from 21 large urban school districts spread across 42 states. The smaller sample, however, does not eliminate the findings from this study, which was designed to provide much needed data in a nonexistent comprehensive surveillance system.

Conclusion

The World Health Organization has advocated for declaring health a universal human right (Organización Mundial de la Salud, 1978, 2013). In fact, the international definition of health suggests that it is the result of genes, environment, access to health care, and individual behaviors, which collectively are called determinants of health. Becoña Iglesias, Vázquez, and Oblitas (2004) suggested that a person's health status is the reflection of what they do and more often than not reflects inappropriate health behaviors. Given its developmental nature, adolescence is a prime time for the development of positive health behaviors designed to reduce morbidity and mortality among a population likely to take many risks that may negatively impact health status and should therefore be a high priority for the development of health promotion and disease prevention interventions (Murphy, 2005).

Data from this study suggest that Dominican adolescents enrolled in institutions of higher learning represent a distinct population group in a country with over 10 million inhabitants. Individuals in the target group represent close to 19% of the population, and this provides a strong incentive to develop health promotion and disease prevention programs targeting this group. Based on the data collected in this study, interventions focused on risky behavior such as alcohol consumption and unprotected sexual activity may be good starting points to improve the health status of the target population. Specific areas will be determined by the society and be driven by the baseline data provided in this study.

As indicated above, future studies should be focused on the role of culture and risk-taking behavior. Other areas for research include the self-reported health status, access to health care services, and other health determinants. The YRBS was not designed to address the relationships between spirituality and drug use among Latin American adolescents, yet it has been suggested in the literature that there is a relationship that merits further investigation (Chen, Dormitzer, Bejarano, & Anthony, 2004); therefore, researchers in future studies should explore the correlation between religiosity and health behaviors and use faith beliefs as a mediating variable in controlling risk behavior. Finally, this study should be replicated among a larger number of students at several universities in different parts of the country to provide a more comprehensive surveillance profile of health status among this population segment.

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Differences Between Male and Female Indian College Students in Their Knowledge of HIV/AIDS and Preferred Sources of Information

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Abstract

In recent years in India, the rates of HIV prevalence have declined overall, but the epidemic is still growing in some regions and within some populations (AVERT, 2012). India has aggressively tackled its HIV problem and has made significant progress in reversing the epidemic, reducing new infections by 57% from 2001 to 2011, resulting in decreasing HIV prevalence from 0.49% in 2007 to 0.27% in 2014. The National AIDS Control Organization (2005) reported that 31% of India's HIV infections were among the 15–29 age group. Today, India's HIV epidemic has moved from being concentrated in commercial sex worker and IV drug user groups to the general public, particularly to young people. Unfortunately, India's youth harbor misconceptions about HIV and lack education regarding various aspects of the disease. The UNFPA (2010) stated that mass media can be used successfully in educating young people about HIV. The purpose of the study was to study the level of HIV-related knowledge among Indian college students and examine the effect of different media on their knowledge of HIV/AIDS. The participants for the study were chosen as intact groups from colleges in India. Two-way analyses of variance were conducted to investigate the differences in knowledge about the HIV based on sources of information and gender among Indian college students. ANOVA results did not show a statistically significant main effect for gender and type of source of information on knowledge about the HIV; however, the interaction between the Internet as a source of information and gender was statistically significant, $F(1, 345) = 5.618, p = .018$, partial $\eta^2 = .016$. When the Internet was identified as being a primary source of information about HIV/AIDS, the level of knowledge of the HIV for males was statistically significantly higher than that of women with 1.6% of the effect on HIV/AIDS knowledge attributed to the interaction between the Internet and gender.

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Keywords

HIV/AIDS in India; preferred sources of HIV-related information; knowledge of HIV; Indian college students

Globally, individuals under age 25 make up about one quarter of the population of individuals living with HIV, and in 2010, people between ages 15 and 24 accounted for 42% of new HIV infections worldwide (Joint United Nations Program on HIV/AIDS [UNAIDS], 2010). HIV/AIDS continues to be a major global health concern especially among young people, who are particularly at risk because they often do not have access to sexual and reproductive health programs, including age-appropriate HIV prevention education. In some parts of the world, it may be illegal or considered culturally inappropriate for young people to be educated formally in sexual matters. In addition, young people engaging in commercial sex work or intravenous drug abuse may experience a greater level of stigma and exploitation than adults, moving them further away from access to HIV prevention education. Young women aged 15 to 24 account for 66% of new HIV infections among young people. They are especially vulnerable because of issues resulting from poverty and low social standing such as sexual coercion, gender-based violence, and transactional sex (UNAIDS, 2010; Yadav, Makwana, Vadera, Dhaduk, & Gandha, 2011).

In India, in recent years, the rates of HIV prevalence have declined overall, but the epidemic is still growing in some regions and within some populations (AVERT, 2012). India has aggressively tackled its HIV problem and has made significant progress in reversing the epidemic, reducing new infections by 57% from 2001 to 2011, resulting in decreasing HIV prevalence from 0.49% in 2007 to 0.27% in 2014. However, over the past decade, HIV prevalence has increased in historically low prevalence states and new groups such as the transgendered community are experiencing a surge in new HIV infection (National AIDS Control Organization [NACO], 2014). In some Indian states, rates of new HIV infection are rising in the younger age group (The World Bank, 2012). In 2005, 35% of all reported AIDS cases in India were in the 15 to 24 age group, indicating the vulnerability of the younger population to the epidemic (NACO, 2005; World Health Organization, 2006).

In the late 20th and early 21st centuries, India experienced rapid globalization and Indian urban youth have easy access to global media. Increased exposure to Western cultures through the media may have influenced changes in the sexual behaviors of Indian youth. According to Jaya and Hindin (2009), Sujay (2009), and Bhugra, Mehra, De Silva, and Bhintade (2007), changes in the sexual behavior of young Indians have increased their vulnerability to HIV/AIDS, STIs, and unintended pregnancies. India's HIV/AIDS epidemic was

initially concentrated among commercial sex workers, their partners, and IV drug users, but now has moved to the general population and also to younger Indians (The World Bank, 2012).

Therefore, HIV prevention education needs to begin early. Education is an important component of HIV prevention that is used to increase HIV-related knowledge and affect sexual behavior (Fonner, Armstrong, Kennedy, O'Reilly, & Sweat, 2014). Risk of exposure to HIV for young people is associated with a lack of knowledge about HIV modes of transmission (Al-Khenji, Al-Kuwari, Al-Khal, & Al-Thani, 2012). In India, targeted HIV prevention programs have been used to successfully raise awareness of the modes of transmission of HIV and have reduced the sharing of needles/syringes and increased the use of condoms among various groups (Armstrong, Humtsoe, & Kermode, 2011). HIV prevention education in India began over two decades ago and has evolved significantly over the years. Today, HIV prevention messages in the Indian media are focused on fighting AIDS-related stigma and discrimination and providing basic information about HIV and preventing HIV through the use of condoms and reducing the use of infected needles (Khan, 2014). The United Nations Population Fund (2010) stated that mass media can be used successfully in educating young people about HIV. Bertrand, O'Reilly, Denison, Anhang, and Sweat (2006) conducted a comprehensive review of mass media interventions and concluded that the media, particularly television and radio, were effective in increasing the knowledge of HIV transmission among young people. A major source of HIV/AIDS-related information for individuals in the developing world is the media, which includes television, radio, the Internet, and magazines or newspapers.

In a study by Singh et al. (2012), women living in rural northern India acquired most of their information regarding HIV/AIDS from television (41.17%), followed by radio (32.94%). The researchers also found that women living in urban areas of northern India also obtained much of their information from the television (90.36%) and radio (48.19%). However, they also acquired a great amount of knowledge from newspapers and magazines (71.08%). Sarkar, Danabalan, and Kumar (2007) found that the sources of knowledge for married women in Pondicherry were the T.V. (81.98%), radio (42.79%), and newspapers (15.76%). Health care providers, who could be considered more reliable sources of HIV/AIDS-related information, were reported by only 10.8% of the women as being a major source of information. Another study about reproductive health awareness among adolescents in a western state of India indicated that for most adolescents aged 14 to 20 the primary sources of information regarding human reproduction were schoolbooks, television, teachers, friends, and parents (Kotecha et al., 2012). Yet another study of pre-university girls in South India reported that the top sources of information about HIV/AIDS were TV and magazines (Manjula, Kashinakunti, Geethalaksmi, & Sangam, 2012).

Despite the ubiquity of HIV/AIDS-related information in the media, much of India's youth harbor misconceptions about HIV and lack education regarding various factual aspects of the disease. In a study of rural Indian youth, Yadav et al. (2011) found that although the majority of Indian youth in the study had heard of HIV/AIDS and knew some of the modes of transmission such as sexual contact and needle sharing, they still had misconceptions about HIV. Many believed that there was a vaccination for HIV, and there was confusion regarding transmission during birth.

UNAIDS (2010) reported that only 17% of Indian males and 21% of Indian females could correctly identify two ways of preventing the transmission of HIV. Indian youth are also less educated about HIV/AIDS than other countries. In a study conducted by Peltzer, Nzewi, and Mohan (2004), HIV knowledge and attitudes of university students across three countries, the United States, South Africa, and India, were compared. The results of the study indicated that compared to South African or American youth, Indian youth were least aware of the HIV modes of transmission. Changes in levels of knowledge can be affected by education. However, prior to implementing educational strategies, it is important to identify the preferred or primary sources of HIV information for such groups.

Purpose

Governmental and nongovernmental HIV/AIDS prevention programs in India are in their second decade and have achieved measurable success in reducing HIV prevalence. Many studies have been conducted to measure the level of knowledge of HIV/AIDS and sexually transmitted diseases (STDs) of Indians over the past decade. The purpose of this study was to ask the question, how much do Indian college students know about HIV/AIDS in the second decade of the HIV epidemic in India? Given that India has wasted no effort in employing mass media (TV, newspapers, radio, etc.) to educate Indians about HIV/AIDS, a secondary purpose of the study was to identify the primary sources of information regarding HIV/AIDS for Indian college students and examine the differences between male and female college students in their knowledge about HIV/AIDS based on their preferred sources of information.

Theoretical Framework

The current study was primarily exploratory in nature; the overarching question was, what do Indian college students know about HIV/AIDS today? The researchers also wondered whether a particular medium had a more or less powerful effect on their knowledge of HIV/AIDS. Elements of Everett Rogers's (2003) diffusion of innovation theory were considered in this exploration. Roger's model can be used to explain the spread of innovations expressed as ideas and actions within communities. The model can also be used to describe

the characteristics and social conditions of the “adopters” or users of the innovation. Green, Ottoson, Garcia, Hiatt, and Roditis (2014) stated that factors such as source of the message and credibility of the content of the message, the medium of dissemination of the message, the unique needs of the user, and the context or situation mediate the ultimate utilization of knowledge. Therefore, it is important to create a message that provides consistently accurate information about the “innovation”—the demystification of HIV/AIDS as a disease and clarifying prevention methods. Second, dissemination, which according to Green et al. (2014) is different from the natural diffusion of the message, must be conducted through channels familiar and accessible to the users. In the current study, the efficacy of media channels in their dissemination of the message about HIV/AIDS and STDs was examined.

Method

Ethical Considerations

Data for the study were collected from urban, English-speaking Indian college students. Intact groups of college students from four Indian colleges were chosen for the study. Permission to conduct research in India was obtained from the researchers’ institutional review board after obtaining written permission from the college principals and other administrative personnel. Prior to data collection, the primary researcher provided detailed information to the participants about the study orally and in writing (informed consent form) and outlined the voluntary nature of their participation.

Research Questions

The questions that guided the research were as follows:

- RQ1: What is the overall level of knowledge of HIV/AIDS of Indian college students?
- RQ2: Are there any significant mean differences for knowledge of HIV/AIDS between male and female students?
- RQ3: What are the participants’ primary sources of information regarding HIV/AIDS?
- RQ4: With whom were the participants most likely to discuss STDs or HIV?
- RQ5: Are there any significant mean differences for knowledge of HIV/AIDS by the top four sources of information? Is there a significant interaction effect on knowledge of HIV/AIDS and the different sources of information for males and females?

Research Instruments

A modified version of the International AIDS Questionnaire - English version (IAQ-E) comprising 17 questions about knowledge of HIV/AIDS was

used in the research. The questionnaire has four subscales: Facts About HIV/AIDS, Myths About HIV/AIDS, Personal Risk, and Attitudes Toward People With HIV/AIDS. In other words, the IAQ was designed to assess the participants' ability to tease out the facts from the myths regarding modes of transmission of HIV, their perceptions of personal risk regarding contracting HIV/AIDS, and their attitudes toward people with HIV/AIDS. The subscale about the assessment of attitudes was excluded from the present analysis because it was not relevant to the main research question. The items intended to assess the participants' level of facts regarding modes of transmission of HIV included statements such as "HIV can be contracted by sharing needles." Items regarding myths of modes of transmission included statements such as "Indians are less likely to get AIDS than people in other countries," and items about personal risk included "AIDS only affects intravenous drug users." The response options for all except four items ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). A total of four items were reverse coded; for example, the statement "HIV can be transmitted through oral sex" was coded from 1 (*strongly agree*) to 5 (*strongly disagree*). The overall IAQ-E is known to have a high internal consistency reliability (Cronbach's $\alpha = .88$; Davis, Sloan, Macmaster, & Hughes, 2006). A second demographic survey comprising 19 questions including a question about the participants' preference sources of information about STDs and HIV/AIDS was also administered. The question on the demographic survey pertaining to sources of information was as follows: "In general, what has been your most important source of information about STDs information such as HIV/AIDS?" Response options for this question were as follows: Internet, newspapers/magazines, radio, school teachers, health professionals (e.g., a medical doctor or nurse), friends, and family members. Participants were directed to identify all options that were applicable, with a response of "yes" or "no" for each. A second question in the demographic section queried the participants about with whom they discussed STDs or HIV/AIDS. The options were girlfriend/boyfriend, husband/wife, school teacher, health professionals (e.g., a medical doctor or nurse), family member, friend of the same sex, friend of the opposite sex, online chat, or email with a stranger. As with the earlier question, participants were instructed to identify all options applicable with a "yes" or "no" response for each.

Data Analysis

Data were analyzed using SPSS version 21. Descriptive statistics including frequencies, central tendency, and variability were calculated. The primary measure—the IAQ-E—is a Likert-type scale wherein data are operationalized on the interval scale, such that independent *t* tests and 2×2 factorial ANOVA tests can be used for analysis (Brown, 2011; Carifio & Perla, 2007). For noncon-

tinuous or categorical data, chi-square (χ^2) tests were conducted on the data to answer the research questions.

Results

Demographics

Data for the study were collected from 426 Indian college students using the IAQ-E and a demographic survey. The students were selected from four universities located in an urban area in a large mid-western city in India. The mean age of the participants was 21 years ($SD = 2.6$), and there were more male participants (71.4%) than female participants, reflecting the gender distribution of the enrollment at the universities. Most of the participants (64.6%) were in their third year of college, and most of them (99.3%) were full-time attendees. Most of the participants were of the Hindu faith (88.7%), reporting that they were *somewhat religious* (40%), and most of them were not (ever) married (96.1%). Fifty-six percent of the participants reported that they were in *good* health and 31.1% indicated that they were in *very good* health. Most of the participants (83.9%) reported that they did not smoke cigarettes, consume illegal drugs (96%), or drink alcohol (75%). For the types of media the participants had at their homes, 85.6% reported they had a radio, 95.3% had a television, 84.2% had Internet access, 91.5% had a telephone, and 94.1% had newspapers and/or magazines.

RQ1: What Is the Overall Level of Knowledge of HIV/AIDS of Indian College Students?

The participants' Knowledge of HIV/AIDS was measured using the IAQ-E, which consisted of 17 questions with response options on a 5-point Likert-type scale ranging from *strongly agree* to *strongly disagree* and included questions such as "HIV can be spread by coughing and sneezing." Cronbach's alpha for overall internal consistency reliability coefficient for this scale was measured at .698. Possible scores on the IAQ-E ranged from 17 to 85, and the higher the score, the more accurate the knowledge about HIV modes of transmission. The scores on the IAQ-E modes of transmission scale for the sample ($n = 351$) ranged from 33 to 74 ($M = 57.09$, $SD = 6.82$), indicating a fairly accurate knowledge of HIV modes of transmission. In other words, the participants were able to indicate correctly that HIV is not transmitted through casual contact.

RQ2: Are There Any Significant Mean Differences for Knowledge of HIV/AIDS Scores Between Male and Female Students?

Overall, there was no statistically significant mean difference for Knowledge of HIV/AIDS scores between males and females. The percentages of responses are indicated in Table 1.

Table 1

Response Percentages on the International AIDS Questionnaire (IAQ –E)

Question	Gender	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
Q1. HIV can be spread by coughing and sneezing.						
	Males	3.2	6.5	5.0	16.8	68.5
	Females	2.5	9.3	2.5	20.3	65.3
Q2. HIV can be contracted by sharing cigarettes.						
	Males	0.7	8.5	11.3	27.1	52.5
	Females	0.9	9.5	19.8	23.3	46.6
Q3. HIV can be contracted by sharing infected needles.						
	Males	83.5	11.3	2.1	1.4	1.8
	Females	77.6	18.1	1.7	1.7	0.9
Q4. HIV/AIDS can be spread through hugging an infected person.						
	Males	2.1	3.2	5.3	13.1	76.2
	Females	0.9	2.6	2.6	14.9	78.9
Q5. HIV can be transmitted through the air.						
	Males	2.1	3.5	8.8	20.7	64.9
	Females	0.9	1.7	10.3	20.5	66.7
Q6. HIV/AIDS can be spread through swimming pools.						
	Males	3.5	12.7	24.3	21.1	38.4
	Females	3.4	11.0	28.0	23.7	33.9
Q7. HIV can be contracted through toilet seats.						
	Males	2.8	12.8	26.0	25.6	32.7
	Females	3.4	14.5	35.0	23.1	23.9
Q8. Mosquitos can spread HIV.						
	Males	9.6	16.0	18.9	21.4	34.2
	Females	5.9	15.1	16.0	26.1	37.0
Q9. HIV can be transmitted from mother to baby during pregnancy.						
	Males	51.6	33.6	8.1	2.8	3.9

Table 1 (cont.)

Question	Gender	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
Q10. HIV is spread through infected sperm.	Females	56.7	28.3	7.5	4.2	3.3
	Males	60.4	23.3	9.5	4.2	2.5
Q11. Indians are less likely to get AIDS than people in other countries.	Females	63.2	26.3	6.1	1.8	2.6
	Males	6.0	18.4	25.4	24.7	25.4
Q12. AIDS only affects intravenous drug users.	Females	8.5	18.6	24.6	24.6	23.7
	Males	5.4	6.8	25.0	31.8	31.1
Q13. AIDS only affects prostitutes.	Females	0.0	4.4	29.2	37.2	29.2
	Males	7.8	7.8	13.1	27.0	44.3
Q14. AIDS only affects homosexuals.	Females	7.8	6.9	8.6	35.3	41.4
	Males	3.2	7.7	9.5	30.3	49.3
Q15. You can protect yourself against AIDS by being vaccinated for it.	Females	3.4	3.4	13.6	37.3	42.4
	Males	8.5	14.1	21.5	20.4	35.6
Q16. Condom use during intercourse decreases the risk of HIV transmission.	Females	7.1	22.1	23.0	24.8	23.0
	Males	61.5	28.9	5.3	1.4	2.8
Q17. HIV can be transmitted through oral sex.	Females	38.5	46.2	8.5	0.9	6.0
	Males	19.5	23.8	17.0	15.5	24.1
	Females	14.4	22.0	28.8	16.9	17.8

As indicated earlier, the response options on each item were *strongly agree*, coded as 1, to *strongly disagree*, coded as 5; therefore, on Questions 3, 9, 10, and 16, a lower mean score indicated a response was generally *strongly agree*, which was appropriate. Noteworthy here is the difference between males' and females' mean response on Question 16, "Condom use during intercourse decreases the risk of HIV transmission." Males (61.6%) were more likely than females (38.5%) to respond correctly (*strongly agree*) to this question. Of all the 17 items on the IAQ-E, Question 16 is one of two items that addresses the issue

of HIV prevention—the differences in mean scores between males and females indicates a difference between the genders about knowledge of preventing HIV.

An independent sample t test indicated no statistically significant difference between mean scores for males and females for the overall IAQ-E, $t(349) = .925, p > .05$. See Table 2.

Table 2

Differences in Mean Scores of Items on the International AIDS Questionnaire (IAQ-E) for Males and Females

Question	Male <i>M</i> (<i>SD</i>)	Female <i>M</i> (<i>SD</i>)	Mean difference
Q1. HIV can be spread by coughing and sneezing.	4.41 (1.05)	4.36 (1.075)	.044
Q2. HIV can be contracted by sharing cigarettes.	4.22 (.997)	4.05 (1.062)	.170
Q3. HIV can be contracted by sharing infected needles.	1.27 (.732)	1.30 (.675)	-.034
Q4. HIV/AIDS can be spread through hugging an infected person.	4.58(.894)	4.68 (.733)	-.103
Q5. HIV can be transmitted through the air.	4.43 (.942)	4.50 (.816)	-.076
Q6. HIV/AIDS can be spread through swimming pools.	3.78 (1.187)	3.74 (1.143)	.044
Q7. HIV can be contracted through toilet seats.	3.73 (1.134)	3.74 (1.111)	.230
Q8. Mosquitos can spread HIV.	3.54 (1.354)	3.73 (1.267)	-.187
Q9. HIV can be transmitted from mother to baby during pregnancy.	1.74 (.998)	1.69 (1.011)	.047
Q10. HIV is spread through infected sperm.	1.65 (.986)	1.54 (.894)	.106
Q11. Indians are less likely to get AIDS than people in other countries.	3.45 (1.221)	3.36 (1.265)	.088
Q12. AIDS only affects intravenous drug users.	3.76 (1.124)	3.91 (.872)	-.147
Q13. AIDS only affects prostitutes.	3.92 (1.260)	3.96 (1.219)	-.035
Q14. AIDS only affects homosexuals.	4.15 (1.080)	4.12 (.997)	.029
Q15. You can protect yourself against AIDS by being vaccinated for it.	3.61 (1.321)	3.35 (1.252)	.261
Q16. Condom use during intercourse decreases the risk of HIV transmission.	1.55 (.882)	1.90 (1.020)	-.348**
Q17. HIV can be transmitted through oral sex.	3.04 (1.600)	3.02 (1.301)	.026

** $t(399) = 3.428, p < .01$.

RQ3: What Are the Participants' Preferred Sources of Information Regarding STDs and HIV/AIDS?

The participants' preferred sources of information about sexually transmitted diseases (STDs) and HIV/AIDS is described in Figure 1.

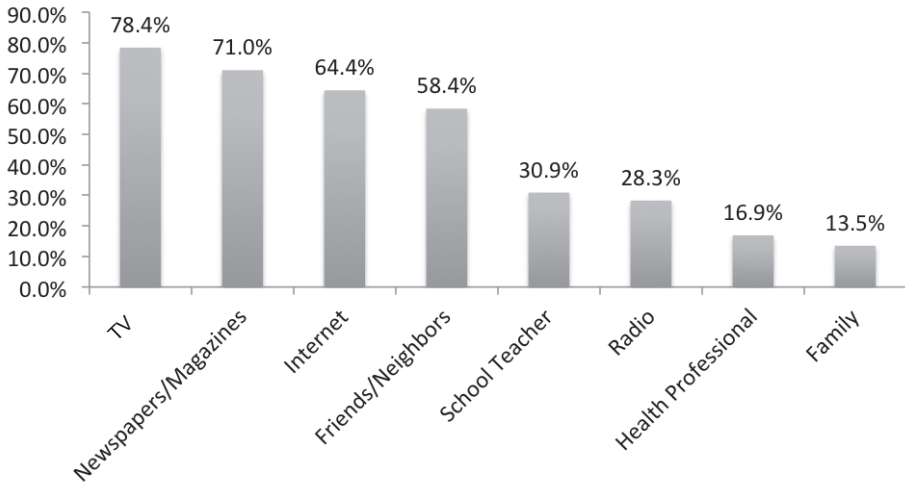


Figure 1. Preferred sources of information about STDs and HIV/AIDS.

The top four significant sources of information about STDs and HIV/AIDS for the participants were the T.V. (78.4%), Newspapers and Magazines (71.0%), the Internet (64.4%), and Friends and Neighbors (58.4%). Relatively less important sources of information regarding STDs and HIV/AIDS were school teachers, the radio, health professionals, and family members. Subsequent analyses about mean differences in Knowledge of HIV/AIDS scores between males and females were restricted to the top four sources of information. The difference between the genders regarding their preferences for the sources of information about STDs and HIV/AIDS is provided in Table 3.

Table 3

Differences Between Males and Females Regarding Preferred Sources of Information About STDs and HIV/AIDS

What has been an important source of information regarding STDs and HIV/AIDS?

Source of information	Male (%)	Female (%)	χ^2
TV	80.1	74.2	1.763
Newspapers/Magazines	70.8	71.7	.034

Table 3 (cont.)

Source of information	Male (%)	Female (%)	χ^2
Internet	70.4	49.2	16.916**
Friends/Neighbors	61.1	51.7	3.163
School Teacher	28.9	35.8	1.93
Radio	30.2	23.3	2.014
Health Professional	16.9	16.7	.005
Family	12.3	16.7	1.40

** $p < .01$.

A chi-square test was conducted to measure the difference between males and females for their choices of sources of information about STDs and HIV/AIDS. Both males and females responded similarly to their preferences regarding sources of information about STDs and HIV/AIDS except for the Internet. Only 49.2% of the female participants chose the Internet as an important source of information compared to 70.4% of the males. The difference between males and females for the Internet was statistically significant.

RQ4: With Whom Were the Participants Most Likely to Discuss STDs or HIV/AIDS?

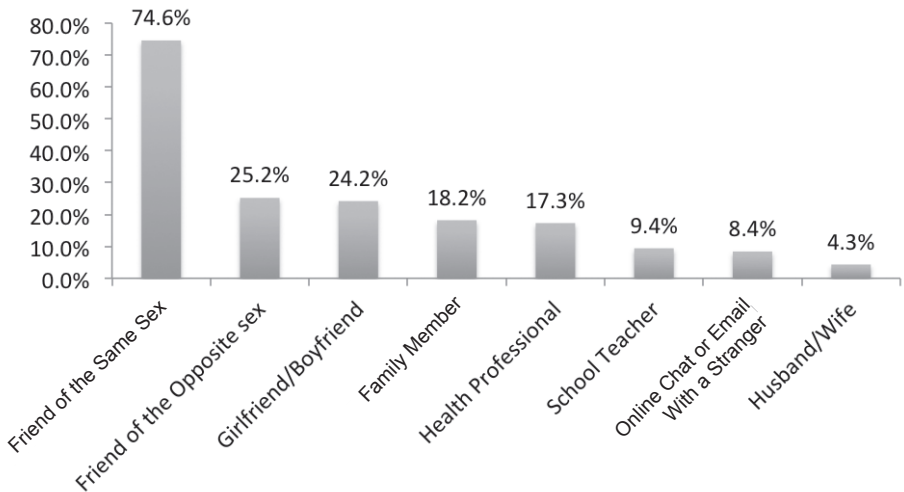


Figure 2. Preferred sources of information about STDs and HIV/AIDS.

A vast majority (88.2%) of the participants reported that they had discussed STDs or HIV/AIDS with one or another person. In particular, 74.6%

of the participants reported that they were likely to discuss HIV/AIDS and STDs with a friend of the same sex, 25.2% with a friend of the opposite sex, and 24.2% with a girlfriend or boyfriend. See Figure 2 and Table 4.

Table 4

Differences Between Males and Females Regarding Their Choices of People With Whom to Discuss STDs and HIV/AIDS

With whom of the following people do you discuss STDs and HIV/AIDS?			
Person	Male (%)	Female (%)	χ^2
Friend of the Same Sex	78.0	65.8	6.595*
Friend of the Opposite Sex	30.1	12.8	13.307**
Girlfriend/Boyfriend	21.7	30.8	3.800
Girlfriend/Boyfriend	13.7	29.9	14.910**
Health Professional	18.3	14.5	.852
School Teacher	9.7	8.5	.124
Online Chat or Email With a Stranger	12.3	0	15.835**
Husband/Wife	5.0	2.6	1.209

* $p < .05$. ** $p < .01$.

The top three persons with whom male participants reported discussing STDs and HIV/AIDS were a friend of the same sex (78%), a friend of the opposite sex (65.8%), and a girlfriend or boyfriend (21.7%). In the case of the female participants, the top three persons with whom they chose to discuss STDs and HIV/AIDS were a friend of the same sex (65.8%), a girlfriend or boyfriend (30.8%), closely followed by family members (29.9%). Not only were the differences between males and females in their preferences with whom they chose to discuss STDs and HIV/AIDS statistically significant, but they were also noteworthy. The female participants were not likely to discuss STDs or HIV/AIDS with a friend of the opposite sex, but preferred discussing with a family member. Also, male participants were far more likely than female participants to discuss STDs and HIV/AIDS with a stranger on email or through an online chat. Both male and female participants were less likely to discuss STDs and HIV/AIDS with health professionals, school teachers, or their husbands and wives. The difference between male and female participants' preferences were statistically significant for choosing a friend of the same sex, a friend of the opposite sex, family member, and stranger online as discussion partners on the topic of STDs and HIV/AIDS.

RQ5: Are There Any Significant Differences for Knowledge of HIV/AIDS by the Top Four Sources of Information—TV, Newspapers and Magazines, Internet, Friends and Neighbors? Is There a Significant Interaction Effect on Knowledge of HIV/AIDS and the Top Four Sources of Information for Males and Females?

The effect of the top four sources of information (TV, Newspapers and Magazines, Internet, Friends and Neighbors) and gender on the Knowledge of HIV/AIDS was examined using a factorial (two-way) analysis of variance.

RQ4.1: Is there a significant main effect for TV as a source of information on Knowledge of HIV/AIDS? And is there an interaction effect? The results of the two-way analysis of variance (ANOVA) results did not show significant differences in the mean scores for Knowledge of HIV/AIDS based on TV as a source of information, $F(1, 346) = 2.65, p = .104$. The interaction between gender and source of information on the participants' Knowledge of HIV/AIDS was not statistically significant, $F(1, 345) = 2.291, p = .131$.

RQ4.2: Is there a significant main effect for Internet as a source of information on Knowledge of HIV/AIDS? And is there an interaction effect? The two-way ANOVA results showed a statistically significant main effect for the Internet as a source of information on Knowledge of HIV/AIDS, $F(1, 346) = 6.63, p = .01$. The interaction between gender and the Internet as a source of information on the participants' Knowledge of HIV/AIDS was statistically significant; however, estimates of effect size indicate a low strength of association, $F(1, 345) = 5.618, p = .018$, partial $\eta^2 = .016$.

RQ4.3: Is there a significant main effect for Newspapers and Magazines as a source of information on Knowledge of HIV/AIDS? And is there an interaction effect? There was no significant main effect for Newspapers and Magazines as a source of information on Knowledge of HIV/AIDS, $F(1, 346) = .576, p = .448$. The interaction between gender and Newspapers and Magazines as a source of information on the participants' Knowledge of HIV/AIDS was not statistically significant, $F(1, 346) = 1.158, p = .875$.

RQ4.4: Is there a significant main effect for Friends and Neighbors as a source of information on Knowledge of HIV/AIDS? And is there an interaction effect? There was no significant main effect for Friends and Neighbors as a source of information on Knowledge of HIV/AIDS, $F(1, 346) = .640, p = .424$. The interaction between gender and Friends and Neighbors as a source of information on the participants' Knowledge of HIV/AIDS was not statistically significant, $F(1, 346) = .973, p = .325$.

Discussion

The purpose of the study, as indicated earlier, was to explore Indian college students' level of knowledge of HIV/AIDS, to examine differences between

male and female Indian college students in their knowledge of HIV/AIDS, identify their preferred sources of information regarding HIV/AIDS, and explore the possibility of the effect of the type of source of information on their knowledge of HIV/AIDS. The study yielded important results.

Level of Knowledge of HIV/AIDS and Differences Between Males and Females in Their Knowledge of HIV/AIDS

Overall, the participants in the study had highly accurate knowledge about HIV/AIDS. The data indicate that the participants seemed to know that HIV/AIDS could not be acquired through casual contact. Although there was no statistically significant difference between genders for knowledge about HIV/AIDS, males scored slightly higher than females overall. Interestingly, more females than males were likely to be ambivalent, answering “neither agree nor disagree” for items such as “HIV can be contracted through toilet seats” or “HIV can be contracted by sharing cigarettes.” It was apparent that a significant proportion (between 21.5% and 35%) of the participants were apt to answer *neither agree nor disagree*—the mid-value on “sensitive” questions such as “AIDS only affects homosexuals.” Baka, Figgou, and Triga (2012) stated that by choosing the mid-value question on a Likert-type scale, the respondent may be stating that he or she is either “not interested,” “not sure,” or “has no opinion.” On the other hand, the participants might be motivated to choose the mid-value because they are unwilling to state truthfully and conclusively how they feel as they are trying to provide socially appropriate responses. De Jong, Pieters, and Stremersch (2012) stated that embarrassment or cultural taboos associated with sensitive questions can interfere with participants’ ability to answer truthfully on surveys. According to Miller (2011), this is common for self-report surveys on sensitive topics, such as topics related to sexual behaviors. Losby and Wetmore (2012) also stated that midpoint responses on a Likert scale can be variously interpreted as “do not know,” “indifferent,” “unsure,” “undecided,” or “unwilling to answer.” For the purpose of this research, a midpoint response was interpreted either as “unwilling to answer” or “do not know.”

A troubling finding was the statistically significant difference in mean scores for males and females for the question, “Condom use during intercourse decreases the risk of HIV transmission.” Of the males, 61% responded *strongly agree* compared to only 38.5% of the females. This indicates a significant—not only statistical, but also practical—disparity in the level of knowledge for this important fact. As Roth, Krishnan, and Bunch (2001) stated, “Consistent, and correct use of condoms....continue to play an important role in the reduction and prevention of HIV/AIDS transmission” (p. 65). It is therefore essential that both men and women understand that condoms are effective in preventing the spread of HIV.

Top Preferred Sources of Information About HIV/AIDS and Sexually Transmitted Diseases

The top four preferred sources of information about HIV/AIDS and STDs for the participants in the study were the T.V., Newspapers, the Internet, and Friends and Neighbors—in this order. This finding supports predictions and evidence from prior studies. In 1999, Chatterjee indicated that T.V. was an important source of AIDS-related information for married women and that information received from T.V. has the potential of increasing AIDS-related awareness. The National Readership Study Survey of 2006 indicated that 112 million households in India have a T.V., and 61% of households have either a cable or satellite service (Jensen & Oster, 2009). Agarwal and de Araujo (2014) also stated that in India newspapers have been successful in increasing HIV/AIDS-related knowledge. Grover, Chakraborty, and Basu (2010) claimed that there are approximately 81 million Internet users in India, of whom 72% are young people (< 50 years old), mainly checking email (87%) and also seeking general information (80%). Akerkar, Kanitkar, and Bichile (2005) studied 880 Indians of whom 75% used the Internet for retrieving medical information. As for Friends and Neighbors as sources of information, Chatterjee indicated that exposure to AIDS-related information on T.V. creates the opportunities for discussion among friends and partners in social networks.

Differences Between Males and Females in Their Top Preferred Sources of Information About HIV/AIDS and STDs

In this study, yet another important finding was revealed: Males were more likely than females to refer to the Internet for HIV/AIDS and STD-related information. This finding too is supported by prior research. More males than females overall seem to use the Internet (Grover et al., 2010). At this time, the reason for this trend is unclear.

Differences Between Males and Females Regarding Their Choice of People With Whom to Discuss HIV/AIDS and STDs

Males were more likely than females to discuss HIV/AIDS and STDs with friends of the same sex and friends of the opposite sex. Females were slightly more likely than males to choose their significant others and overwhelmingly more likely than males to talk to their family members about HIV/AIDS and STDs. Males were also more likely to chat online than females about HIV/AIDS and STDs. This reticence in Indian females to talk to strangers or persons of the opposite sex about private or taboo issues may be born out of cultural

mores. Discussing issues of a personal, private nature may be more comfortable with members of the same sex and family members than with others for young college-going females in a conservative culture.

Difference Between Males and Females in the Knowledge of HIV/AIDS Based on the Source of Information

The results of the study indicate no statistically significant difference in knowledge among males and females for the sources of information except the Internet. This result was not surprising given the difference between males and females for their preferred sources of information and the greater likelihood of more males than females to not only access the Internet but also choose to chat online with strangers about HIV/AIDS and STDs.

Agarwal and de Araujo (2014) proposed that on the whole, mass media improved the quality of HIV/AIDS knowledge for Indian men and women, but its effect may be varied because of the juxtaposition of cultural taboos and need for honest communication about HIV. Messages about HIV prevention, including condom use, on Indian television are often censored, limited, restricted, or diluted by politicians who may be squeamish about addressing culturally taboo issues in public forums (Roth et al., 2001). It was evident from the data that the source of information itself did not have a statistically significant effect on level of knowledge among males and females.

Implications for Health Education

As prior studies have indicated, in the developing world, young people in urban settings are better educated about HIV/AIDS and STDs than young people in rural areas. The setting for the current study was four large urban universities where the youth have considerable exposure to mass media. The students in urban settings, such as those described by Mehrotra, Zimmerman, Noar, and Dumenci (2013) immersed in a less restrictive, even westernized society, are better “plugged in” than young people in rural areas. Their fairly high level of overall knowledge regarding HIV/AIDS was, as a result, not surprising. Mass media have been successfully used to propagate HIV prevention education, and this may be true for young people in urban India.

Similar to young people in China, Botswana, Tanzania, and Turkey, the top sources of information about HIV/AIDS for young Indians were TV, radio, newspaper, and the Internet (Bastien, Leshabari, & Klepp, 2009; Batane, 2013). Consulting a health professional such as a medical doctor or nurse was not a popular option for the participants of the study. Unfortunately, this finding was common across other studies. The best quality of HIV/AIDS information can be obtained from a health professional, but it may be important for the Indian government to advertise the existence of National AIDS Control Organization, an online clearinghouse of HIV/AIDS information.

The Internet as a source of information was considerably more popular with males than females—a finding reflected in other studies. One can only speculate as to the reason for this disparity between the genders. Further research exploring females and why the Internet was not an important source of information is necessary, especially because the Internet is omnipresent and could be beneficial in disseminating accurate information about HIV/AIDS. More males than females were likely to chat online with a stranger about HIV/AIDS. Given that females preferred, above all, to seek friends of the same sex and family members to discuss HIV/AIDS or STDs, it is understandable that they would be reluctant to chat with a disembodied stranger in a virtual world. In light of this, same-sex peer education programs may be the best source of information for females. The Internet provides information of varying quality and depth regarding HIV/AIDS. India's own NACO is an excellent clearing-house of information regarding HIV/AIDS, and it would be useful to know how many young people are aware of this online resource and have used it.

There continues to be a small difference between genders for the knowledge of HIV/AIDS, with the females lagging a little behind the males. This finding was similar to those in many other studies. Females contract HIV at different rates than males. As indicated earlier, 66% of new infections in young people in the world are among females. In addition to knowing less than males about HIV/AIDS, females are socially less powerful and therefore unable to negotiate safe sex. This is true in the Indian context. Mehrotra et al. (2013) found that Indian college students are more likely than ever to engage in premarital sexual activity, especially in the urban setting. Indian male college students are more likely than females to access sexual information and culturally had more freedom to engage in sexual activity and sexually risky behavior than females. In light of this power differential, it is imperative for Indian female college students to not only become aware of their own HIV and STD risk, but also be able to maneuver skillfully through the cultural challenges they may encounter. Here as well, same-sex peer education is an appropriate method.

In India, marriage is “universal”—everyone is expected to be married and women are expected to be virginal at the time of marriage—so the female participants of the study were mostly unmarried and may not have been able to perceive themselves being at any risk for contracting HIV and therefore may not be interested in learning about modes of transmission. Again, making this risk more immediate through same-sex peer education could be valuable.

The current study underscored the importance of ensuring that young people and other vulnerable groups have timely and accurate information about threats to their health, particularly from HIV/AIDS. Through capitalization on prominent sources of information, customization of the message, personalization of the HIV risk, and use of peer education, it may be possible to reduce knowledge gaps between the genders.

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Health Education Classroom Practices in Primary Schools: An Observational Study From Pakistan

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Abstract

In this study, we examined health education practice in Child-to-Child (CtC) classrooms in urban and rural primary school settings in Pakistan to describe and compare practice critically. Structured observations of health lessons were carried out in 67 randomly chosen primary classrooms from Health Action Schools in urban ($n = 32$) and rural ($n = 35$) contexts. Health education practices were found to be more “participatory” in rural classrooms than in urban ones. Using a multivariate analysis, we identified three factors that contributed independently to the use of participatory approaches in classroom practices: the HEALTH aggregate (i.e., intensity of health education training, use of a health manual, and regularity of health teaching), teachers’ attendance at staff development workshops, and children’s gender. This study provides insight into a largely unexamined area of health education CtC classroom practice. This research in primary classrooms of Pakistan furthers the understanding of health education classroom practices in the context of professional development of teachers for health promotion.

Keywords

health education; Child-to-Child; classroom practice; schools; observation

This study is a part of the doctoral thesis of the first author for which she was enrolled in the Department of Education at the University of Oxford. The field-work for the study was carried out in rural and urban schools of the province of Sindh in Pakistan.

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Introduction

Many factors—family, peers, school, and community—shape the health of young people (Denman, Moon, Parsons, & Stears, 2002; National Academy of Sciences [NAS], 1997; St Leger, 2004). Among others, the school is the only organized public institution amenable to being restructured and mobilized to promote societal goals (NAS, 1997). Most important, schools have links to several influences on children's health, including family, peers, and the local community. This access puts schools in an ideal position from which to initiate interaction between key influences on children's health behavior, to create supportive environments, and to reinforce messages from outside the school setting (Green & Kreuter, 1991; Nutbeam, Wise, Bauman, Harris, & Leeder, 1993). Capitalizing on this strategic position, for most of the 20th century, school administrators have included school health as a part of schooling. It has taken forms such as provision of vaccinations, delivery of health information, development of skills and attitudes of individuals, and a more comprehensive “eco-holistic” approach to health education known as Health Promoting Schools (HPS). This HPS approach has been strongly promoted by the World Health Organization (WHO) and is being implemented in countries throughout the world to assist schools in improving health knowledge and practices (e.g., Hawes, 2003; Konu & Rimpelä, 2002; Rothwell et al., 2010; WHO, 1996).

The Child-to-Child (CtC) approach to health education, which is the focus of this article, fits well in the broader context of HPS and emphasizes skill-based health education through interactive classroom teaching and building of links between school and community. Since its inception, variants of the CtC approach have been implemented in over 70 developed and developing countries through education, health promotion, and community development programs. A step-by-step educational methodology, which has been developed to put this action-oriented approach into practice, is presented in Figure 1 (Bailey, Hawes, & Botany, 1992).

What follows is a theoretical background of the CtC approach firmly rooted in Bruner's “act of learning.” As presented in Table 1, the CtC approach provides a framework for children to acquire knowledge on health issues and transform and evaluate it along with their teachers (Bruner, 1977). Active learning appears to be a major theme in the theoretical framework of Bruner, which seems to have a major influence on the CtC approach, according to which learning is an active process in which learners construct new ideas or concepts based upon their current knowledge. Furthermore, Bruner's model of learning highlights the role of effective interactions between children and their teachers, peers, and environment in providing opportunities for the process of active learning.

LEARNING AND DOING: LEARNING PLACE AND LIVING PLACE**Class/school****Home/community****Step 1**

Understanding the health topic
Learning about diarrhoea and dehydration.

**Step 2**

Finding out more



(1) A survey at home and with neighbours. Who suffers from it? How is it treated?

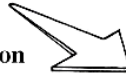


(2) Discuss findings. Which babies are most at risk? Which local remedies are helpful?

Step 3

Planning and taking action

(1) Plan action (How can children help to prevent and treat diarrhoea?)



(2) Helping mother at home when the baby has diarrhoea. Washing hands after cleaning the baby's bottom. Telling 'what we learnt at school' why this is important.

(3) Making puppets and preparing our play.

(4) Performing the play in the village square.

Step 4

Evaluation

(1) 'What did we do? How well did our show work? Should we change it next time?'



(2) 'Can we remember all we learnt? Can we all make a rehydration drink?'

(3) Carrying on with actions to prevent and treat diarrhoea at home.

Figure 1. The Child-to-Child four-step approach. Adapted from *Health Promotion in Our Schools*, by H. Hawes, 1997, London, England: Child-to-Child, p. 41.

Table 1*Act of Learning*

Acquisition of new information: The information that runs counter to or is a replacement for what the person has previously known implicitly or explicitly. At the very least, it is a reinforcement of previous knowledge.

Transformation: The process of manipulating knowledge to make it fit new tasks. People learn to unmask or analyze information, to order it in a way that permits extrapolation or interpolation or conversion into another form.

Evaluation: Checking if the way information has been manipulated is adequate to the task. Is the generalization fitting, have we extrapolated appropriately, are we operating properly?

Note. Adapted from *The Process of Education* (2nd ed.), by J. Bruner, 1977, Cambridge, MA: Harvard University Press, pp. 48–49.

As advocated in the model, the CtC approach provides a framework for children to extend their knowledge and skills through inquiry (Hawes, 1988; Hubley, 1998; Kassam-Khamis, 2005; Kassam-Khamis & Bhutta, 2006). However, it does not imply that children should always be in the leading role (e.g., taking the initiative, making decisions). In other words, the CtC approach does not condemn the need for active teaching. Through the model, teachers are encouraged to bring accurate, challenging, and demanding content to a classroom and present it in a clear, structured, and sequential manner. Children might need to remember some of the facts (e.g., WHO's immunization schedule) and rules (e.g., for making oral rehydration solution) and require practice to reinforce their skills (e.g., making oral rehydration solution). For teachers to be effective, interaction and eliciting active participation from students instead of relying merely on the chalk-and-talk method are stressed in active teaching. The process gives stable hooks to which the learning may be attached (Muijs & Reynolds, 2005)

When active learning and active teaching are used together, it can be argued that instead of a loose interpretation of participatory learning during which children always have the lead role and take responsibility for everything, there is a balanced practice during which children are provided with opportunities to benefit from teacher-initiated teaching as well as explore for themselves, as advocated in other disciplines (e.g., Gupta, 2009; Siraj-Blatchford & Sylva, 2004). With a balanced approach, the CtC framework has an emphasis on involving children in acquiring health knowledge and developing life skills by promoting understanding rather than by using persuasion. As presented earlier (Figure 1), the teacher facilitates the learning of children over four steps through a variety of activities and ways of classroom organization. Throughout the four steps, the children also learn and practice skills that are precursors

to healthy behavior. Some of the examples of those skills are problem solving (e.g., how to create awareness among the community about the importance of washing hands), communication and creative thinking (e.g., conducting a survey, reporting findings, taking action), and critical thinking (e.g., reflecting on their activities “what went well and why,” “what did not go well and why”). Through the four steps in Bruner’s (1977) act of learning (Table 1), it is evident that, strictly speaking, children acquire new knowledge during the first two steps, through classroom teaching, discussion with peers, and studying their environment. During the third step of the CtC approach, they transform their acquired knowledge into action and then evaluate their action. It can be argued that effective CtC classrooms, in which children make progress on cognitive and social outcomes, strike a balance between an instructional approach and children’s initiatives, in which classroom management is strong and the teaching is extremely motivating. Furthermore, a balanced practice in CtC classrooms places emphasis on improving children’s skills in metacognition so they can become self-regulated learners.

Since the launch of CtC, numerous studies, mostly qualitative case studies or surveys, have been carried out to explore the development of the CtC approach and to assess its role in improving children’s health knowledge and skills (e.g., Evans, 1993; Kirby, Mann, Pettitt, & Woodhead, 2002; Komba, Ayoub, & Issa, 1996; Pridmore & Stephens, 2000; Somerset, 1987). A common theme running through the literature points to the contribution of CtC in enhancing children’s health knowledge and practices. The role of the approach in improving classroom practice in primary schools has been addressed in most of these studies and reported to have “worked” for some contexts; however, evidence supporting this argument came mostly from self-reported data (e.g., interviews/surveys) from active participants. Classroom observations were made for some of the studies; however, qualitative descriptions were found to be the only method of presenting classroom practice.

Informed by the CtC methodology, the Health Action Schools (HAS) project, which is the focus of this study, aims to develop prototypes of HPS in different social and educational contexts of Pakistan (Hawes & Khamis, 1997). The HAS project began as a 3-year (1998–2001) action research project in partnership with Save the Children, UK at the Aga Khan University Institute for Educational Development (AKU-IED). It started with five pioneer schools and expanded across the country. Teachers in HAS taught health content either as a separate subject or across curricula using carrier subjects such as science, language, and social studies. On average, they taught 30 lessons per year or one lesson per week as health education topics cannot be taught in one lesson, but over a series of CtC steps that link lessons at school with action at home or in

the community (Figure 1). The HAS teachers have been teaching health topics through the CtC approach, which can be grouped under three main themes (though the first theme was focused on more):

- hygiene and disease prevention (e.g., malaria prevention),
- environmental and community health (e.g., preventing accidents), and
- family and social health (e.g., caring for children who are sick) (Kassam-Khamis, Shivji, & Bhutta, 2007).

Findings of the project studies point to the use of participatory approaches in teaching health lessons (Carnegie & Kassam-Khamis, 2002; Kassam-Khamis & Bhutta, 2006). As in other studies discussed earlier, qualitative observations were used to assess classroom practices of HAS teachers.

Qualitative observations may be useful in many ways in understanding classroom practices. Nevertheless, quantitative studies about classroom processes are required, as with any other discipline (e.g., Apter, Arnold, & Swinson, 2010; Galton, Hargreaves, Comber, Wall, & Pell, 1999; Sylva, Hurry, Mirelman, Burrell, & Riley, 1999), in the field of school health to generate more generalizable data to inform policy and practice. Furthermore, this study is a modest yet important step in addressing this gap.

It can be argued that CtC is not only about classroom teaching, but also about going beyond classroom boundaries. In school-based health education, the classroom plays an important role in offering children a conducive environment to learn content and life skills, providing an opportunity for structured and spontaneous discussions, providing a platform for planning and practicing community activities, and providing a place for reflecting on those activities. Execution of community activities is a crucial part of classroom activities; however, if the latter is not observed, the former might not give the complete picture. For example, observation of an anti-smoking rally in which school children participate by carrying banners with relevant health messages might not tell much about children's contribution in planning for the rally. Possibly, children had been "used" as "loudspeakers" to convey messages that they hardly understood. Classroom observation would help to address these issues. We were, however, cognizant of the importance of school-community links—an important element of a health-promoting school—but it was beyond the scope of this study.

The prime aim of this study was to describe and compare health education classroom practice in urban and rural primary schools in the Sindh province of Pakistan. It was also to explore factors (e.g., school, classroom, and teachers) that could be associated with the observable characteristics of classroom practice.

Method

A quantitative approach was employed to conduct the observational study. Structured observations were carried out in 67 primary classrooms that were selected randomly from two strata to represent HAS from urban ($n = 32$) and rural ($n = 35$) settings of the Sindh province (Robson, 2002). Population lists of health education teachers were requested from relevant authorities in urban and rural areas, and these were provided. Teachers were randomly selected from these lists. Randomization incorporated at this stage was to minimize sampling bias so the sample would be more likely to be representative (Black, 1999; Punch, 2000; Robson, 2002).

Sample classrooms were recruited from urban ($n = 12$) and rural ($n = 35$) Health Action Schools. A majority of these classrooms represented private schools in urban and rural settings. Urban classrooms represented private schools that were established by individuals, whereas rural classrooms were recruited from a network of private schools that was established by a nongovernmental organization—Sindh Education Foundation (SEF)—in remote areas of Sindh to enhance girls' education. At the time of data collection, this was the only organized rural project in the province in which health education was taught. Except for two rural classrooms, all were multigrade in which more than one grade was taught together, usually by one teacher. Conversely, only two urban classes were multigrade. The criteria set for including teachers in the study were (i) training in the CtC approach and (ii) a minimum of 6 months of experience of teaching health lessons in primary classes. The research participants took part on the basis of their informed, written consent. The study was approved by the Central University Research Ethics Committee of University of Oxford, United Kingdom.

An observational tool, health education CtC classroom profile, was adapted for the study from previous research (Bhutta, 2002). The classroom profile consisted of 32 items organized under six subscales as shown in Table 2.

The scoring scheme used for the profile is the same as defined for the widely used valid and reliable Early Childhood Environment Rating Scale (ECERS) (Harms, Clifford, & Cryer, 1998). Each item in the profile is presented on a 7-point scale, with descriptors for 1 (*inadequate*), 3 (*minimal*), 5 (*good*), and 7 (*excellent*). Inadequate (1) defines classroom practice that does not meet the basic criteria of provision and teaching–learning practices (e.g., unavailability of basic material, no efforts for the active involvement of children, harsh discipline, no planning, inaccurate content) in a primary classroom. The minimal

(3) ratings are usually focused on the provision of some basic material, some use of active methods to involve children, minimal planning, and accurate content. The good (5) rating describes classroom practice in which communication is encouraged among children through active methods, relevant and accurate health content, as well as sufficient physical facilities. The excellent (7) ratings required a supportive environment for children, a range of teaching strategies to maximize children's involvement in active thinking, detailed yet flexible planning, relevant and accurate content reinforced through co-curricular activities, and provision of advanced material (e.g., television, computer). An example item in the profile is presented in Table 3.

Table 2

Structure of the Health Education CtC Classroom Profile

I - Physical set-up	19. Teacher's assistance
1. Classroom furnishing	IV - Children's involvement in decision making
2. Material	20. Understanding the health topic
3. Classroom displays	21. Finding out more
4. Indoor space	22. Planning and taking action
5. Health and hygiene facilities	23. Evaluation
II - Classroom interactions	V - Planning and monitoring
6. Teacher-child interaction	24. Planning
7. Teacher-child communication	25. Schedule
8. Peer interaction	26. Children's assessment
9. Discipline	27. Monitoring
10. Building interest	28. Teacher's self-assessment
11. Teacher's expectations	
III - Teaching methods and approaches	
12. Variety of active methods	VI - Structure of health education activities
13. Active or passive	29. Teaching time
14. Questioning	30. Community activities
15. Group work	31. Co-curricular activities
16. Content	32. Human resources
17. Start and closure of the lesson	
18. Teacher's instructions	

Table 3

Child-to-Child Health Education Classroom Profile: An Item

Questioning ^a					
Inadequate	2	Minimal	4	Good	Excellent
1		3		5	7
1.1 The teacher does not ask questions (e.g., only disciplinary or procedural questions).		3.1 A few children are asked questions (e.g., only the outspoken children are asked questions).		5.1 Most of the children are asked questions.	7.1 Questions are directed to all students (e.g., girls and boys, quiet and outspoken, younger and older children).
1.2 The teacher does not use appropriate language to ask questions (e.g., use of jargon that is difficult to comprehend).		3.2 The teacher sometimes uses appropriate language to ask questions (e.g., when questions need to be rephrased).		5.2 The teacher usually uses appropriate language to ask questions.	7.2 The teacher gives appropriate feedback regularly ^d (e.g., acknowledges right answer, probes/prompts for correct answer).
1.3 The teacher does not give feedback (e.g., no acknowledgement of correct responses, wrong health content remains unattended) or gives negative feedback (e.g., criticizes incorrect answers).		3.3 The teacher asked only closed-ended questions (e.g., does not require explanation, only yes or no response questions).		5.3 The teacher asks open-ended questions ^b (e.g., why, how, what if questions).	7.3 Children ask open-ended questions (e.g., to the teacher, other children).
		3.4 The teacher sometimes gives limited feedback (e.g., acknowledges right answers from hesitant children, appreciates response from outspoken children).		5.4 The teacher gives appropriate wait time ^c (e.g., gives time to think and then asks for a volunteer or picks a student to respond).	7.4 The teacher redirects students' questions (e.g., invites responses from other students before responding to the questioner).
		3.5 Limited response by the teacher to the children's questions, if asked.		5.5 Most of the time the teacher gives appropriate feedback (e.g., acknowledges right answer, probes further for correct answer).	
				5.6 Children's questions are encouraged (e.g., invites questions through planned activities).	
NA permitted					

^a **Questioning:** To give credit for this item, several instances of questioning must be observed during one observation. ^b **Open-ended question:** To give credit for this item, several instances must be observed during one observation when the teacher uses open-ended questions that encourage children to give longer and more complex answers; however, the teacher may ask close-ended questions to probe to elicit responses, for example, and that should not lead to score lower. Children's age and developmental level must be considered. The teacher may ask what and where questions to young children and why and how questions to older children. ^c **Wait time** depends on the nature of questions being asked. The teacher needs to give more time (i.e., 15–20 s) for a question that demands a longer answer and more thinking than a question that only requires a yes or no answer or a short answer (i.e., 3–5 s). The purpose of wait time is to differentiate classroom questioning from interrogation during which children are showered with questions one after the other without giving them time to reflect and respond properly. ^d **Regular appropriate feedback:** To give credit for this descriptor several instances need to be observed during one observation.

Demographic information was gathered through a questionnaire developed for the study to obtain data about the characteristics of the participating schools (e.g., system), classrooms (e.g., children's gender), teachers (e.g., qualifications), and history of health education (i.e., health education training, use of the health manual, regularity of health teaching). Most of the factors in the questionnaire are self-explanatory; however, three elements of the history of health education (i.e., health education training, use of health manual, and regularity of health teaching) require further explanation:

- Health education training is the number of days of training in CtC health education pedagogy attended by participating teachers over the 3 academic years preceding the observations made for the current study. These training were facilitated by the HAS directly or by Master Trainers (MTs) trained by HAS. The training aimed to orient teachers with the CtC participatory approaches (e.g., steps in CtC methodology, children's participation, active methods of teaching, school-community links). Practicum was organized to give teachers opportunities to implement their plans in a guided environment. These training varied in duration (i.e., 1 day to 2 weeks) and patterns (i.e., refresher sessions on participatory pedagogical strategies to full-fledged workshop on overall CtC methodology).
- Use of health manual (i.e., teacher guide), which was usually developed during the training held for MTs at AKU-IED. These MTs then oriented teachers with the use of the manual as part of the health training in their respective schools. The manual provided teachers with six planned health education topics on priority health issues based on the CtC step approach. It can be argued that teachers in primary schools in Pakistan usually use textbooks to teach other subjects, but there are no published textbooks to teach about health issues. These guides not only provided accurate and relevant health content for selected topics, but also offered ideas about suitable pedagogical strategies to teach the content.
- Regularity of health teaching means teaching health education content (five to six health topics) in 25–30 lessons per year or one lesson per week. This construct (i.e., regularity of health teaching) would be interpreted and practiced in different ways in different contexts. However, we adopted the definition of regularity of health teaching from the Health Action Schools project. Information was gathered on the status of the regularity of teaching health education over the academic year preceding the observations made for the current study.

The fieldwork for this study was carried out between September 2003 and May 2004. A demographic questionnaire was administered in face-to-face interviews with teachers. To avoid many of the problems associated with comparing information gathered in two settings (i.e., urban and rural) much effort was invested in ensuring that procedure for data collection was consistent. Each participating classroom was visited for 2 days, for orientation and observation, respectively. Sample classrooms were allocated approximately the same amount of time for orientation (e.g., talking to the teacher and children, drawing a classroom map), which ranged between 2 and 2.5 hours. Formal observations of health lessons, on the second day, lasted for one block of different durations (40–60 minutes) depending on the individual schedule of the schools.

During observations, the observer occupied a place at the back of the classroom. However, with the teachers' prior consent, the observer moved around during group work. As far as possible, the observer was not to interact with the teacher or the students during the observations. The completion of the profile involved one observation of a health lesson as well as talking to the teachers about aspects of the routine that could not be noticed during the observation (e.g., children's involvement in decision making in CtC steps that were not observed). To rate some of the items, teachers' records (e.g., planning) were also consulted. Figure 2 shows a filled segment of a score sheet that was used for scoring profile items. It provides space to check all descriptors within items as yes, no, (or not applicable), in addition to giving the item a numeric score. The key words and phrases were written next to each item for any given score to be fully explained. Examples from these notes were used to discuss results.

3. Classroom displays										Notes		
	Y	N		Y	N		Y	N				
1.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	most displays from the previous health topics not all can reach two children's stories are displayed
1.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7.2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
						5.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
						5.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

Figure 2. A segment of a score sheet.

Internal consistency for the profile was assessed using Cronbach's alpha. The values of alpha for subscales ranged from 0.64 (physical set-up and planning and monitoring) to 0.91 (classroom interactions). Alphas for two subscales were somewhat lower (0.64) than those found for the rest of the subscales and total score (0.77), but the magnitude was acceptable (Field, 2005). The results of internal consistency supported the use of the profile's total and subscale scores to describe overall classroom practice and characteristics of

specific aspects, respectively. To establish interrater reliability of the profile, independent observations were carried out by two observers (i.e., the first author and a trained observer) in 10 representative urban and rural classrooms. Weighted kappa for subscales ranged between 0.78 (physical set-up) to 0.81 (structure of health education activities) with a kappa value of 0.81 for the total score. Reliability coefficients demonstrated good interrater reliability of the profile (Fliess, 1981; Landis & Koch, 1977). Satisfactory interrater reliability helped to add methodological rigor; nevertheless, due to financial constraints, observations for the study presented in this article were carried out by the first author.

Data gathered during the study were analyzed using Statistical Package for the Social Sciences (SPSS 11). Bivariate analysis (independent *t* test/Mann-Whitney for skewed distribution) was used to compare the overall profile and subscale scores to gauge differences between urban and rural classroom practice (Field, 2005). Multivariate analysis was then carried out to explore factors contributing independently to the quality of health education classroom practice. A pre-analysis of multicollinearity revealed an extreme overlap among three factors of history of health education in schools (i.e., health education training in days over the 3 academic years preceding observations, use of health manual, and regularity of health education lessons). After an extensive exploration, an index was developed that was an aggregate of standardized scores of these three variables (Allison, 1999). The index was labeled as HEALTH aggregate. A total mean profile score was used as an outcome variable. Separate models were developed for school, classroom, and teacher factors. A parsimonious regression model (presented in this paper) was then built using variables that retained significance in the three models.

Results

Demographics Across Regions

General demographics of children and teachers across urban and rural groups are summarized in Table 4.

Table 4

A Summary of Demographics

General demographics		Urban (<i>n</i> = 32)	Rural (<i>n</i> = 35)	Total (<i>n</i> = 67)	Differences
					Mann-Whitney <i>U</i> =
Age (years)	<i>M</i> (<i>SD</i>)	10 (1.80)	9.61 (1.27)	9.80 (1.55)	471.000, ns

Table 4 (cont.)

General demographics		Urban (<i>n</i> = 32)	Rural (<i>n</i> = 35)	Total (<i>n</i> = 67)	Differences
Age range (years)	<i>M</i> (<i>SD</i>)	6.20 (2.14)	2.44 (0.95)	4.40 (2.52)	Mann–Whitney <i>U</i> = 67.000, <i>p</i> < 0.001
Class size	<i>M</i> (<i>SD</i>)	26.50 (7.34)	27.49 (5.39)	27.01 (6.36)	Mann–Whitney <i>U</i> = 541.500; ns
Teachers					
Gender	Male	7 (22%)	8 (25%)	15 (22%)	$\chi^2(1)$ 0.009, ns
	Female	25 (78%)	27 (75%)	52 (78%)	
Age (years)	<i>M</i> (<i>SD</i>)	30.84 (7.43)	23.37 (3.38)	26.90 (6.8)	Mann–Whitney <i>U</i> = 203.000, <i>p</i> < 0.001
Teaching experience (years)	<i>M</i> (<i>SD</i>)	7.53 (5.79)	4.57 (0.85)	6.00 (4.28)	Mann–Whitney <i>U</i> = 528.000, ns
Tenure (time spent in current school)	<i>M</i> (<i>SD</i>)	4.57 (0.85)	4.34 (3.94)	4.46 (2.77)	Mann–Whitney <i>U</i> = 306.000, <i>p</i> < 0.001
Academic Qualification	Secondary school (10 years of school)	1 (3%)	21 (60 %)	22 (33%)	$\chi^2(2)$ 28.820, <i>p</i> < 0.001
	Higher secondary school (12 years of school)	11 (34%)	10 (29%)	21 (31%)	
	Bachelor's/ master's degree (14–16 years of school)	20 (63%)	4 (11%)	24 (36%)	

Table 4 (cont.)

General demographics		Urban (<i>n</i> = 32)	Rural (<i>n</i> = 35)	Total (<i>n</i> = 67)	Differences
Professional Qualification	No professional qualification	11 (34%)	34 (97%)	45 (67%)	
	Certificate in teaching	15 (47%)	1 (3%)	16 (24%)	$\chi^2(2) 29.931$, $p < 0.001$
	Bachelor's/master's degree	6 (19%)	0 (0%)	6 (9%)	

No difference was observed in urban and rural groups in terms of class size, gender ratio of teachers, and children's age. However, there were more female teachers ($n = 52$, 78%) recruited for the study. This participation pattern reflected gender ratio of primary school teachers in general, and female staff outnumbered male staff. Furthermore, because of the multigrade set-up, variation in the children's ages in rural classes was higher compared to their urban counterparts. There were other factors when urban and rural samples appeared to be in two distinct groups. The rural teachers were younger, had less teaching experience, had spent more time in the current school, and had less academic qualification than their urban counterparts. A majority of the teachers ($n = 45$, 67%) did not have professional qualification in the area of teaching. All but one teacher with professional qualifications came from urban schools.

The three demographic factors that contributed significantly to health education practices deserve to be explained separately to better understand results of the study. An overview of these three factors is presented in Table 5, followed by a detailed description.

Table 5

Demographical Factors Associated With Participatory Practices: An Overview

Factors	Urban (<i>n</i> = 32)	Rural (<i>n</i> = 35)	Total (<i>n</i> = 67)	Differences
Single-gender/Coeducational classes				
Single-gender classes	7 (22%)	21 (60%)	28 (42%)	$\chi^2(1) = 9.988$, $p < 0.01$
Coeducational classes	25 (78%)	14 (40%)	39 (58%)	

Table 5 (cont.)

Factors		Urban (<i>n</i> = 32)	Rural (<i>n</i> = 35)	Total (<i>n</i> = 67)	Differences
Status of attendance in staff development workshops 3 years preceding observations					
Did not attend staff development workshops (NO)		12 (38%)	0 (0%)	12 (18%)	$\chi^2(1) = 15.989$, $p < 0.001$
Attended staff development workshops (YES)		20 (62%)	35 (100%)	55 (82%)	
History of health education (HEALTH aggregate)					
Health education training (in days) 3 academic years preceding observations	<i>M</i> (<i>SD</i>)	4.00 (2.04)	6.5 (11.30)	5.3 (2.10)	Mann–Whitney <i>U</i> = 933.500, $p < 0.001$
Use of health manual (No/Yes)	Did not use health manual	26 (81%)	0	26 (39%)	$\chi^2(1) 46.471$, $p < 0.001$
	Used health manual	6 (19%)	35(100%)	41 (61%)	
Regularity of health education lessons (No/Yes)	Did not teach health regularly	30 (94%)	0	30 (45%)	$\chi^2(1) 46.471$, $p < 0.001$
	Taught health regularly	2 (6%)	35 (100%)	37 (55%)	

Single-gender and coeducational classes. Overall, there were more coeducational ($n = 39$, 58%) than single-gender ($n = 28$, 42%) classes. However, rural classes were predominantly single gender ($n = 21$, 60%), whereas the urban group had more coeducational classes ($n = 25$, 78%). All single-gender classes in this sample, except one, had girls. Differences were significant across the two regions ($p < 0.01$).

Staff development training. Staff development training workshops are the professional development activities used to provide in-service support to teachers to improve their classroom practice. These professional development events were not focused on health education. The workshop content varied from general issues (e.g., assessment strategies) to specific ones (e.g., displays in science classrooms). These workshops ranged from 1 day to 2 weeks. All rural ($n = 35$, 100%) and 20 (62%) urban teachers reported attending staff development workshops during the 3 academic years preceding observations. In academic and professional qualifications, more urban teachers fell into the higher categories, whereas rural teachers superseded their urban counterparts in staff development training. It would be important to recall here that the rural sample was drawn from a network of schools established and run by the SEF. Informal discussion with sample teachers and management revealed that staff development was a regular feature of SEF and participation in these workshops was mandatory for teachers.

History of health education. Evidently, rural teachers had an advantage over their urban counterparts in terms of health training and its implementation (Table 5). They had attended more days of health education training during the 3 academic years preceding observations, had been provided with a health manual, and had been teaching regularly over 1 academic year preceding data collection. The difference across groups for all three variables were significant ($p < 0.001$).

A detailed analysis of demographic characteristics revealed that the urban sample was more varied than the rural sample. The difference of variability in the two groups could be explained in the context of school management. Thirty-five rural schools, though scattered geographically in five areas of Sindh, are run by one organization (i.e., SEF) and have similar school policies including the teaching of health education. Conversely, 12 urban schools in this sample were run by different management bodies that may be different in aspects such as recruitment and professional development policy in general and taking health education in particular.

Comparison of Classroom Practice by Region

The total mean profile score of the whole sample was 3.4 ($SD = 0.64$), and rural classes scored higher ($M = 3.84$, $SD = 0.45$) than their urban counterparts ($M = 3.01$, $SD = 0.52$) with a significant difference, $t(65) = -7.014$, $p < 0.001$. To examine further the characteristics of health education practices within urban and rural classes, the quality was categorized according to three broader levels: scores below 3 represent inadequate practices, scores of 3 but less than 5 represent mediocre practices, and scores of 5 or higher are good practices (Helburn, 1995; Tietze & Cryer, 2004). The overall profile score was put into this framework, and about 75% of all classes in this sample had profile scores

between 3 (minimal) and less than 5 (good). Altogether, 53% of urban classes scored in the lowest range. On the other hand, none of the rural classes exhibited inadequate practices. No classes in urban or rural schools had scores in the highest range.

Results of further analysis that was conducted at subscale level are presented in Table 6. Of the six subscales, rural classes scored significantly higher on five ($p < 0.01$). A reversed pattern was observed for physical set-up in which urban classes demonstrated a significantly better quality than their rural counterparts ($p < 0.01$).

Table 6

Comparing Mean Scores of Urban and Rural Classes Across Subscales

Subscales	Urban ($n = 32$)		Rural ($n = 35$)		Differences
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Physical set-up	3.96	0.73	2.93	0.75	$t(65) = 4.217$, $p < 0.01$
Classroom interactions	3.74	0.90	4.30	0.78	$t(65) = -2.775$, $p < 0.01$
Teaching methods and approaches	3.65	0.84	4.22	0.83	$t(65) = -2.790$, $p < 0.01$
Children's involvement in decision making	3.01	0.58	3.45	0.57	Mann-Whitney $U = 771.500$, $p < 0.01$
Planning and monitoring	2.40	0.39	3.31	0.22	Mann-Whitney $U = 1096.000$, $p < 0.01$
Structure of health education	2.23	0.34	3.90	0.34	Mann-Whitney $U = 1119.500$, $p < 0.01$

For rural classes, with the exception of physical set-up, which fell just below 3, all of the scales are between 3 (minimal) and less than 5 (good). For urban classes, scores on three subscales, namely, physical set-up, classroom interactions, and teaching methods and approaches are between 3 (minimal) and less than 5 (good), whereas the scores on two subscales (i.e., planning and monitoring, structure of health education activities) fell below the minimal requirements, and the mean score on children's involvement in decision making was minimal.

The subscale physical set-up for which urban classes scored higher was focused on physical facilities such as space, furnishings, and teaching material, whereas the five subscales for which the rural group scored higher are much

more focused on classroom processes (i.e., classroom interactions, teaching methods and approaches, children's involvement in decision making) and covered elements that may contribute to quality in classroom processes (i.e., planning and monitoring, structure of health education activities).

Exploring Associations

A parsimonious model for health education was built by regressing the total mean profile scores upon factors that retained significance in the school, classroom, and teacher factors models. The results of the last step of the parsimonious model are presented in Table 7.

Table 7
Factors Associated With Participatory Practice

Factors	B	β	<i>p</i>
Constant	2.929	-----	0.001
Coeducational (0)/Single-gender (1) classrooms	0.271	0.210	0.022
Staff development workshops (not attended = 0, attended = 1)	0.486	0.294	0.004
HEALTH aggregate	0.106	0.451	0.001

Overall, the model explains 51% of the variance in the total mean profile scores for health education with a significant linear relationship, $F(3, 64) = 23.696$, $p < 0.01$. Evidently, children's gender, teachers' attendance in staff development workshops, and the HEALTH aggregate are independently associated with the health education classroom practice. However, the stronger effect size for the HEALTH aggregate ($\beta = 0.45$) illustrates that it contributes to predicting the score on the profile for health education over and beyond other covariates.

Discussion

Health Education Classroom Practice: Urban–Rural Differences

Differences between urban and rural groups were pronounced, with rural teachers scoring higher than urban ones on all aspects except physical set-up. The high score on the subscale physical set-up requires adequate indoor space, material for teaching, furnishings, and health and hygiene facilities. Most urban classes, though not well equipped, except a few from a high-income private school, were provided with basic facilities such as a safe electricity supply, bet-

ter furniture, and running water. Conversely, rural classes ranged from open air set-up, a straw hut, or a dilapidated mud building with crumbling walls, to a relatively better concrete building. Most of them did not have electricity or running water. These differences might be explained partly by the economic climate in which the educational systems operate in urban and rural settings. Some of the requirements in physical set-up (e.g., availability of electricity) though necessary and basic were more expensive than other requirements (e.g., blackboard and chalk) of the profile. The rural groups in this study came from poverty-stricken areas and therefore might consider these items difficult or even impossible to provide.

The rural teachers were found to provide a more supportive classroom environment and showed involvement in their interaction with children (e.g., praised children's efforts). Being a multigrade set-up, one of the striking features of rural classes was "elders taking responsibility for younger ones" in teaching-learning activities (e.g., during group work, fourth graders helped third graders to learn a poem on eye hygiene). On the other hand, in urban classes, there were fewer opportunities for peer interaction. The teachers seemed to display a rather reserved gesture (e.g., less appreciation for children's efforts). Use of harsh discipline (e.g., physical punishment) was neither observed nor reported in urban or rural classes.

In rural classes, emphasis was placed on varying ways of organizing the classroom (e.g., whole class teaching, group work, individual tasks) and the use of active methods (e.g., questioning, picture stories, poems). The teachers used low-cost and discarded material to enrich their teaching (e.g., socks, buttons, and cotton to make puppets for a health-related puppet show). Teachers asked questions during health education lessons to instruct (e.g., What advice would you give to Rashman to get rid of head lice?). On the contrary, in most of the urban classes, group work or individualized work of children was less emphasized. Teachers brought some activities into classrooms such as stories or pictures, but rarely provided opportunities for children to be engaged (e.g., read a balanced diet story in a detached manner). The teachers mostly asked questions at the end of the lessons, usually to check memory (e.g., How many types of intestinal worms did we learn today?).

The dynamics of classroom questioning, regardless of type and time of questioning and quality of feedback the teacher provided, resonate with the Initiation-Response-Follow-Up model (Sinclair & Coulthard, 1975) in both types of classes. According to this model, the teacher poses a question, children give a response, and the teacher gives feedback (e.g., appreciative or corrective). Much is left to be desired in terms of children's questions in urban and rural classes. Arguably, health education classes could provide many opportunities to nurture children's questioning skills as they may see the direct relevance of the content to their daily life. However, it is a skill that needs to

be developed, and perhaps teachers' own mastery in questioning skills, grip on content knowledge, and encouragement for children to forward their queries are prerequisites to make classrooms inquiring communities (Hurry & Parker, 2007; Pardhan & Bhutta, 2004).

As far as the health content, most of the topics discussed in urban and rural classes can be grouped under one major theme: hygiene and disease prevention (e.g., cough and cold, diarrhea). However, some of the urban teachers taught environmental and community health (e.g., safe neighborhood) or family and social health (e.g., helping persons with disabilities). In most cases, the basic health content delivered in the classroom was accurate. Nevertheless, in some cases, usually in urban classes, and some rural ones too, teachers attempted to give too many health messages (e.g., fifth graders were taught about type, causes, symptoms, and prevention of intestinal worms during a 40-minute lesson) or wrong ones (e.g., eat less food during coughs and colds). There could be many reasons that underpin the delivery of wrong health messages including indigenous beliefs and practices and lack of accurate content knowledge to counter those beliefs. For instance, it is possible that teachers did not have access to accurate content or they might not have read the available content thoroughly (e.g., available resource books). Whatever the reasons, wrong health messages taught through participatory strategies could have adverse ramifications. Therefore, a combination of accurate health content and participatory methods is fundamental for any meaningful health education activity.

The evidence suggested that unlike urban participants, the rural ones encouraged children to express their views, in a limited sense, as the discussion of a health topic progressed through the CtC step approach (e.g., teachers shared survey questions and children shared their views of where and when they should administer the survey). However, there were only a few examples where their ideas were reported to be considered. It can be argued that encouraging children to share their views might be considered the first step on the ladder of children's participation. However, the next and most important step is to take these ideas on board (Hart, 1992, 1997; Nilsson, 2005; Shier, 2001), which is a skill teachers need to develop to strike a balance between structured planning and children's initiative.

In rural classes, the progress of health education was tracked through monitoring (e.g., classroom observations followed by discussion). A few rural teachers shared their diaries in which they had highlighted the strengths and weaknesses of their health lessons, and there was no such example in urban schools. There was rarely any example of classroom support for urban teachers. Assessment of children was limited to end-of-lesson questions (or in some rural cases, tests) to check content retention. As far as planning, rural teachers were following ready-made plans (i.e., health manual); however, in many cases, their contribution was obvious in modifying the plan (e.g., writing an alterna-

tive health story) or preparing materials (e.g., drawings, posters) for implementation. Apart from a few urban teachers who had pre-prepared plans (e.g., provided during training at AKU-IED), others did not share written plans.

In general, classroom activities in rural schools were extended into the community through surveys (e.g., children went in groups to find out how many people in the village clean their teeth regularly) and taking action (e.g., parents attended a school event during which children presented a puppet show on eye hygiene). Also, health-related activities were integrated into some of the major co-curricular events (e.g., children presented health-related dramas in educational seminars conducted by SEF for rural communities). The community was reported to be receptive and supportive in most of the rural cases. Conversely, in urban classes, few examples of community activities were reported (e.g., children surveyed the number of people with disabilities and type of disabilities they had). In spite of more than one trained teacher in some urban schools, there was rarely any example of accessing this available human resource (e.g., peer support).

Discussion so far has revealed that even though rural participants outscored their urban counterparts, neither the urban class nor the rural class reached a level that could be described as good in the profile.

Factors Associated With Classroom Practice

HEALTH Aggregate

A strong positive association among the three elements of the HEALTH aggregate illustrated that teachers who had attended relatively more training had also been provided with a manual and were implementing health teaching regularly. It can be argued that focused health education training, underpinned by an understanding of the CtC approach alone, may not lead to improved classroom practices. The training may help teachers to learn about the theoretical assumptions of the CtC approach and ways to implement it. A health manual would help them to apply the training according to the protocol (e.g., the four-step approach) without placing additional burden of planning on the teachers. Also, teachers might be accustomed to following a textbook for other subjects, and the manual could provide them with a textbook-cum-teacher guide for health education. Nevertheless, without regular health education teaching, the training and manual might result in nothing more than an additional training certificate and a pile of training material kept safely in a cupboard.

Why was it that some teachers (all rural and two urban) in this sample taught health education regularly and others (urban) could not manage to do that? Considering regularity of teaching as a proxy for personal commitment and institutional support, a speculated response to this question could be two-fold: first, teachers' commitment and second, support from the school manage-

ment. No one could possibly deny the importance of the teachers' willingness, to accept change and take responsibility to teach health education. However, one needs to be careful in expecting teachers' commitment with minimal or no support from the management to initiate and sustain an innovation such as health education, which lacks standing in the school curriculum in Pakistan. It might be easier for teachers to leave out health education, in the absence of encouragement and support from the school management, in favor of high status subjects (e.g., mathematics, science). The commitment at an organizational level can have a strong influence on the successful implementation of health education as it indicates the school's commitment to health promotion as part of its organizational practice (McBride, Midford, & Cameron, 1999; St Leger, 1998). Researchers studying school effectiveness/improvement have also found the leadership of schools to be important (Fullan, 1986; Mortimore, Sammons, Stoll, Lewis, & Ecob, 1988; Rowland & Higgs, 2008; Sebastian & Allensworth, 2012). Perhaps the management in urban schools assumed that their responsibility ended once they made the decision to send their teachers for health education training. They might not have worked out an implementation plan carefully before sending teachers for health education training, which may have led to a lack of the type of support that teachers require for the regular teaching of health education.

In contrast, rural management seemed to play an important role not only in initiating health education in rural schools, but also in ensuring its regular implementation by identifying health as a core area of the curriculum. Additionally, the management took the close-knit community on board by sharing the health education implementation plan for them to appreciate their role and cooperation to extend classroom activities to the community. It is possible that the teachers' commitment and organizational support worked in harmony in rural areas to implement health education regularly, which led to relatively better health education classroom practice.

Staff Development Workshops

The results of the multivariate analysis highlighted the contribution of professional development workshops to the use of participatory methods. The exact nature of the training could only be ascertained by collecting qualitative data (e.g., in-depth interviews with teachers), which was constrained by time and financial considerations. However, some speculation can be made in the context of differences between urban and rural participants. Rural teachers reported attending a series of workshops during the 3 academic years preceding observations, whereas 12 (38%) urban teachers did not attend any workshop during this period. Informal discussions with teachers and management bodies revealed that these workshops were more likely to be need based and regular for rural teachers. Conversely, urban teachers reported that they were usu-

ally sent randomly by school management to attend staff development training conducted by private and public sectors. In addition, the rural teachers shared that they were followed up in the classroom by school management, whereas there was rarely any example of follow-up of staff development workshops for urban teachers. The argument of teachers' commitment and managerial support to translate learning at these workshops into classroom teaching could be equally applicable here.

Single-Gender/Coeducational Classes

Single-gender classes scored higher on the profile than coeducational ones. The majority of the rural classes were single gender (i.e., all girls). In a coeducational set-up, the lower score might be explained by the differential participation of girls and boys in classroom activities. Researchers studying teacher-student interactions have reported that boys receive more attention than do girls (e.g., Smith, Hardman, & Higgins, 2007; Swinson & Harrop, 2009).

Findings of this study, however, do not resonate consistently with the results of previous research. In the coeducational sample classes, several teachers were observed putting boys and girls together in groups, perhaps with the intention of enhancing participation from both genders. However, this strategy did not seem to work in all situations. In some cases, girls were observed to shy away from sharing their ideas in groups with their male counterparts or boys remained silent. In some instances, the teacher contributed to this differential participation by focusing on either girls or boys. It might also be explained in terms of similarity between teacher's and children's gender. It was found that out of 28 single-gender classes, 26 were taught by female teachers. Thus, teachers may have felt more comfortable teaching a group of children of the same gender.

Arguably, the influence of three factors might also speak of differences between classroom practices of urban and rural participants as the latter were advantaged over the former on all factors. Additionally, in rural classes, somewhat younger and less qualified teachers who started teaching relatively recently might be more receptive to innovations introduced to them through health education training and staff development workshops. On the other hand, their older, experienced, and more qualified counterparts who have already spent more years in the profession might feel content with their teaching practice and perhaps find it difficult to deviate from the norm. Nevertheless, teachers' commitment is part of the equation that should not lead to overlooking the second yet important element, that is, managerial support.

The rural teachers had more structured managerial support and encouragement to initiate and implement health education. However, it could not substitute separate analyses for urban and rural groups, which was necessitated by the small sample size in the two groups.

Conclusion

Teachers are the primary implementers of innovation such as health education. The teachers' willingness and commitment are imperative in implementing health education and improving classroom practice. However, teachers whose *modus operandi* is transmitting knowledge to children in a didactic set-up cannot change their practices overnight. Many factors militate against the implementation of health education in general and participatory approaches in particular including lack of professional development, protected time for health education, organizational support, and research evidence to inform policy and practice. However, these issues should not halt health education activities, but provide challenges that can be surmounted.

In line with this argument, it is worth recalling one of the important findings of this research: the strong association between the three elements of the HEALTH aggregate (i.e., health training, provision of health manual, and regular teaching). These factors are not only interdependent but also have close ties with organizational support, which is conducive to the initiation, implementation, and institutionalization of health education activities in and around the school. It might be more relevant for policy makers and practitioners to consider the impact of packages of factors, rather than to try to assess the effects of one particular feature in isolation from the rest.

Although rural participants outscored their urban counterparts, neither the urban nor rural classes reached a level that could be described as good in the profile. The rural teachers have taken health education on board and have been supported in their efforts by their school management, but they have a long way to go to achieve a balance of active teaching and active learning in their classrooms.

To our knowledge, this is the first study that has been carried out to explore CtC classroom practices using structured observations and may provide a modest foundation for other researchers who want to take the same line of inquiry. This study raises many possibilities in terms of future research. First, to illuminate and broaden understanding of classroom practices of those who are trained in the CtC approach, larger and more representative sample studies can be conducted to have sufficient power to produce generalizable data. Second, efficacy of the observational tool—CtC health education profile—can be explored systematically as a self-assessment tool using experimental design. The profile may provide the teachers in intervention groups with a new language, criteria for assessing their own practice, and a framework for improvement. Third, the future research within the CtC approach could benefit from ethnographic investigation of educational and home factors influencing children's participation in health education and promotion activities. Finally, one of the important needs for future research emerging from the current research

is to conduct a child outcome study. Arguably, the ultimate beneficiaries of any educational innovation are children, and it is imperative to investigate this aspect—the child outcome—systematically. This future study would help to investigate child outcomes using a value-added design that could be employed to examine the gains in health knowledge, attitudes, and practices of a selected cohort of children over time.

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