

Teens in the Twenty-First Century Still Prefer People Over Machines: Importance of Intervention Delivery Style in Adolescent HIV/STD Prevention

Sara M. Pendleton
Bonita Stanton
Lesley A. Cottrell
Sharon Marshall
Robert Pack
James Burns
Catherine Gibson
Ying Wu
Xiaoming Li
Matthew Cole

Sara M. Pendleton, MD, is affiliated with Carmen and Ann Adams Department of Pediatrics, Children's Hospital of Michigan, Wayne State University. Bonita Stanton, MD, is Schontaus Family Professor and Chair, Carmen and Ann Adams Department of Pediatrics, Children's Hospital of Michigan, Wayne State University. Lesley A. Cottrell, PhD, is Assistant Professor, Department of Pediatrics, West Virginia University. Sharon Marshall, MD, is Assistant Professor, Carmen and Ann Adams Department of Pediatrics, Children's Hospital of Michigan, Wayne State University. Robert Pack, PhD, is Assistant Professor, Department of Community Medicine, West Virginia University. James Burns, MD, is Section Chief, Department of Pediatrics, West Virginia University. Catherine Gibson, MPH, is Program Coordinator, Department of Pediatrics, West Virginia University. Ying Wu is Research Assistant Professor, West Virginia University. Xiaoming Li is Professor, Carmen and Ann Adams Department of Pediatrics, Children's Hospital of Michigan, Wayne State University. Matthew Cole, MS, MA, is affiliated with Wayne State University.

Address correspondence to: Sara M. Pendleton, MD, Division of Ambulatory Pediatrics, Carmen and Ann Adams Department of Pediatrics, Children's Hospital of Michigan, Wayne State University, 3901 Beaubien Boulevard, Detroit, MI 48201 (E-mail: spendlet@med.wayne.edu).

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ABSTRACT. *Purpose:* To assess and compare youth satisfaction with two delivery approaches to a HIV/STD risk reduction intervention targeting adolescents: an on-site, face-to-face (FTF) approach versus a long distance interactive televised (DIT) approach.

Methods: A convenience sample of 571 rural adolescents ages 12-16 years who participated in an HIV/STD risk reduction program were assessed by an anonymous, written, process evaluation questionnaire. Factor analysis and reliability testing evaluated psychometric properties. Student's *t* tests evaluated differences between the two intervention approaches for individual items and the four factors.

Results: Factor analysis identified four underlying factors: (1) Interventionist Leadership Characteristics, (2) Interventionist Warmth, (3) Connection, and (4) Programmatic Assessment/Clarity: Student's *t* tests demonstrated that all four factors consistently favored the FTF over the DIT approach ($p < .05$).

Conclusions: These findings indicate that participants randomized to the FTF conditions were significantly more satisfied than the DIT-based group. These findings highlight the need for research regarding program implementation that may alter acceptability of the adolescent HIV risk reduction intervention approach. doi:10.1300/J499v08n02_06 [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2007 by The Haworth Press. All rights reserved.]

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Human Immunodeficiency Virus (HIV) and other sexually transmitted infections are significant health problems for adolescents and young adults. Surveillance data analyzed from 33 states and US dependent areas with integrated HIV and AIDS reporting systems for the period between January 2001 and June 2005 indicate that young people (aged 13 to 24 years) accounted for a much greater proportion of HIV (12%) than AIDS cases (4%). These data also show that even though the estimated AIDS incidence (the number of new cases diagnosed during a given time period, usually a year) is declining (with the exception of an increase reported in 2005), there has been an annual increase in the estimated number of newly diagnosed AIDS cases among young people

from 2002 to 2005 (Centers for Disease Control [CDC], 2006a). HIV remains a high ranking cause of death. Among persons 25-44 years old, HIV was the most common cause of death in 1994 and 1995. In 2000, it was the 5th leading cause of death, after unintentional injury, cancer, heart disease, and suicide in this age group (CDC, 2002). Recent estimates suggest that while representing 25% of the ever sexually active population, 15- to 24-year olds acquire nearly one-half of all new STDs (Weinstock, Berman, & Cates, 2004). For example, among women, the highest age-specific rates of reported chlamydia in 2005 were among 15- to 19-year-olds (2796.6 cases per 100,000 females) and 20- to 24-year-olds (2691.1 cases per 100,000 females) (CDC, 2006b). Further, as in previous years, 15- to 19-year-old women had the highest rate of gonorrhea (624.7 per 100,000 population) compared to women in all other age categories in 2005. Among men, 20- to 24-year-olds had the highest rate of gonorrhea (436.8 per 100,000 population) (CDC 2005).

While a variety of approaches, including written questionnaires, interactive computers, telephone interviews, and audiocassette formats, have been employed to assess adolescent risk reduction programs; delivery of interventions has largely been confined to onsite, face-to-face (FTF) formats or through the mass media (Romer et al., 1997). A broad research spanning multiple age ranges, ethnicities, and gender has demonstrated that providing behavioral interventions to small groups of adolescents in a FTF format can successfully reduce behavioral risk (CDC, 2001a; Kim, Stanton, Li, Dickersin, & Galbraith, 1997; Kirby, 1995; Kirby, et al., 1994; Stanton, Kim, Galbraith, & Parrott, 1996). Accordingly, many investigators and health educators have utilized a small group, FTF format to deliver HIV risk reduction programs to adolescents. The putative advantages of this format have been well documented and include leader responsiveness, tailoring to individual and group concerns, and emotional connectedness with the participants. These contextual attributes have been postulated to be important in leading to interpersonal competence of the recipients of the message in the FTF format (Carl, 1991; Garrison, 1990). In urban environments, a small group, FTF format is convenient, and program content integrity (e.g., the correct facts, adherence to the curriculum) can be monitored and maintained with relative ease. However, in rural settings, the FTF format may not be convenient or even feasible given shortages of trained staff in remote settings, and difficulty supervising staff posted in remote geographic locations (Bushy, 1993; Carl, 1991; Curtis, 1993; Prentice-Dunn & Rogers, 1986). A generalized mass media approach

may overcome these logistic barriers and alter perceived social norms (Romer et al., 1997).

Emerging technologies, such as the internet and videoconferencing, offer an alternative to FTF delivery methods. A form of telemedicine, long distance interactive televised (DIT) approach facilitates contacting clients in rural and geographically dispersed areas (Brown, 1998; Ellis, 2004; Farrell & McKinnon, 2003). The availability of DIT infrastructure throughout the United States and globally is both substantial and expanding rapidly (Grigsby & Brew, 2000; Grigsby & Sanders, 1998; Myers, 2003). Despite this availability, currently DIT remains highly underutilized and under-evaluated (Grigsby & Brew, 2000; Grigsby & Sanders, 1998; Hassol, et al., 1997; Threlkeld, 1993; Threlkeld & Brzoska, 1994; Whitten & Franken, 1995). Much of the literature available on the intervention approach focuses on the technology itself, with little evaluation of implementation factors such as subject comfort and logistic issues (Dick, Filler, & Pavan, 1999; Mair & Whitten, 2000; Taylor, 1998). While the literature regarding DIT as a means of transmitting information, especially in adult learning situations, is well established (Phillips & Peters, 1999; Souder, 1993; Wihles & Burnhom, 1991), its use in medical consultation (linking of a patient with a health care provider) and teleconferencing (linking a group of individuals) is more limited (Taylor, 1998). Some literature exists suggesting that interpersonal connection can be achieved through DIT; however, this literature is relatively small and has generally been confined to adults in one-on-one sessions, often with a therapist with whom the patient has a previously established relationship, or as a booster session after FTF interactions (Cameron, Bashshur, Halbritter, Johnson, & Cameron, 1998; Doolittle, et al., 1998; Farand, Lafrance, & Arocha, 1998; Gammon, Bergvik, Bergmo, & Pedersen, 1996; Gammon, Sorlie, Bergvik, & Hoifodt, 1998; Hassol, et al., 1997; Shores, et al., 2004). Relevant to the current interest in a format for the delivery of an interactive group intervention, there is evidence that teams communicate less effectively through DIT formats than FTF settings (Warkentin, Sayeed, & Hightower, 1997). While there is reason to speculate that adolescents in groups, rather than as single individuals, might find it more difficult to connect to a group leader through DIT, it is also possible that adolescents might find it easier to discuss sensitive topics such as sexual risk behavior through a less personal, more indirect approach such as DIT. Therefore, while presumption and speculation exist, an evidence base for the delivery of theory-based, small group HIV-prevention efforts delivered through DIT rather than direct FTF is not currently available.

The current study was conducted as part of a larger evaluation in which we were investigating the relative effectiveness of FTF and DIT delivery of an HIV behavioral risk reduction intervention in rural settings. Issues in intervention delivery, such as interpersonal connectedness and leader responsiveness, which are postulated to be important for learning situations and might vary by intervention delivery format (Carl, 1991; Garrison, 1990), have not been assessed through a standardized format for adolescent HIV risk reduction interventions. Therefore, prior to comparing these attributes between the two intervention delivery formats, assessment instruments had to be developed and evaluated.

Accordingly, in the present study we sought to develop and validate an instrument to evaluate the qualitative components of intervention delivery and subsequently to compare elements of context delivery between the two intervention delivery formats, FTF and DIT. We hypothesized that similar to other telemedicine approaches that have been found to be comparable to FTF interventions, such as internet and telephone (e.g., Aziz & Kenford, 2004; Gollings & Paxton, 2006; Reese, Conoley, & Brossart, 2006), youth participation would not differ by intervention delivery mode and that perceived interpersonal and group dynamics would not differ between the two intervention delivery formats. We also describe some of the logistic issues encountered in DIT implementation.

METHODS

Population

The population chosen for this study is adolescents living in rural areas of West Virginia (WV). Twelve counties (out of a total of 55) classified as *rural* by the Department of Health and Human Resources (West Virginia Department of Health and Human Resources, 1999) with elevated levels of teen pregnancy, poverty, and low maternal education relative to the state of WV were selected. Approximately 95% of the WV population is Caucasian and an estimated 31% of children less than 18 years live in poverty. Mean educational levels are low: 45% of parents have not graduated from high school. The teen birth rate in the selected counties averages 72 per 100,000 (CDC, 2001b). According to the 2005 Youth Risk Behavior Survey (YYBS), in WV, 42% of high school students have consumed alcohol in the last month (29% reporting heavy

binge drinking); 8% reported ever using cocaine; and 16% report ever using inhalants (CDC, 2006c). Fifty-two percent of high school students are sexually experienced and rate of not using condom or birth control during last sexual intercourse are reported as 39% and 76% respectively (CDC, 2006c).

Subjects

A convenience sample of 571 adolescents 12-16 years of age was identified and invited to participate in the study by community members who served as project representatives. Two approaches to subject identification were employed, a community-based and a school-based approach. The community-based approach consisted of local recruitment efforts within community facilities (e.g., churches, after school clubs, recreation centers). Specifically, interested facilities (assessed via introductory letter and initial contact) allowed project representatives to describe the project and to distribute the necessary consent/assent forms to adolescents and their parents. All interested adolescents, after providing appropriate informed consent/assent, were randomized to a treatment or control group and organized into same sex groups to receive the intervention, which was delivered at the same facility.

Adolescents were also recruited using a school-based approach in which local school systems were invited to participate by offering the program as a supplement to their health or physical education curricula. Recruitment procedures were similar to those of the community-based approach with project representatives distributing and collecting completed consent/assent forms from students who were enrolled in a health or physical education course at the time of enrollment. Students who did not give consent or assent were incorporated into another classroom that was not participating in the project. Adolescents with identified severe cognitive and/or disruptive emotional disorders were not invited to participate. The research protocol was approved by the West Virginia University Institutional Review Board. All youth and parents provided written, informed consent and assent. Compensation was ten dollars for this phase of the study.

Intervention

The HIV risk-reduction program, *Focus on Kids*, was originally developed and implemented for inner city, African-American adolescents (Stanton, Li, Galbraith, Feigelman, & Kaljee, 1996; Stanton, et al.,

1996). Based on the Protection Motivation Theory, the effectiveness of the *Focus on Kids* program in decreasing adolescent risk behaviors (e.g., early initiation of sexual intercourse, unprotected sexual intercourse) and increasing protective behaviors (e.g., condom use) has been well documented (CDC, 2001a).

A culturally adapted version of the *Focus on Kids* program was developed to compare the effectiveness of the program to adolescents living in rural WV settings. Information from focus group discussions and individual interviews conducted to assess unique characteristics of the rural setting and adolescent risk behavior within this setting was used to make cultural modifications of the original curriculum. Structurally, the organization of the curriculum was changed so that the discussions and skill building exercises associated with sexual intercourse were presented in the last four sessions. Exercises and scenarios were modified to reflect those more commonly experienced by rural adolescents (e.g., attending a "field party" with friends). Finally, additional exercises related to goal setting, the influence of other adults engaging in risk behaviors, and parental monitoring networks were incorporated throughout the culturally adapted curriculum.

Delivery Approach

Information used in the present study was obtained from two groups of adolescents who had been randomly assigned to receive the culturally adapted version of *Focus on Kids (Focus on Kids-WV)* for rural adolescents. All groups consisted of same-sex, friendship groups of 6-14 adolescents. While both groups of adolescents received the same curriculum, the delivery methodology differed. One group of adolescents received *Focus on Kids-WV* through the FTF format in which the Lead Interventionist and Assistant Interventionist delivered the program in the same room as the adolescents. The other group of adolescents was assigned to receive *Focus on Kids-WV* through the DIT format and received the curriculum contents by watching and interacting with the Lead Interventionist on television monitors, approximately 14x18 inches in diameter, while being assisted by an on-site Assistant Interventionist who arranged and provided the necessary materials on-site for the adolescents. Although it would be possible to "hook up" many sites with the single lead interventionist site, in this study each lead interventionist was connected to only one DIT site. (The lead interventionist did not have any students at his/her site and so was focused only on the youth in the DIT site.) In the majority of cases we used the exist-

ing resources of West Virginia University known as the *Mountaineer Doctor Television (MDTV)*, a two-way system that utilizes a T-1 telephone line to carry sound and image. The T-1 line provides natural looking movement and sound. Local technical problems and absence of local MDTV sites required use of alternative facilities in some areas. Project staff attempted to keep the curriculum content and the amount of time used to deliver the program similar for both groups. Given the mountainous terrain of West Virginia, 53 interventionists were trained for a full day by the central FOK research team and monitored by spot checks. The interventionists maintained an internal monitoring form describing the materials covered to assure comparability of intervention delivery across sites. All interventionists who led the DIT groups also led the FTF groups to limit bias.

Measures

As part of the process evaluation, adolescents were asked to complete a process evaluation entitled the *Student Survey* created specifically for this project to assess the learning contexts for both the FTF and DIT groups. The *Student Survey* consisted of 28 items measuring aspects of the method and interventionist skill, leader responsiveness to the group and the intervention situation, leader connectedness to the group, and interpersonal trust. The scale was developed from questionnaires previously used by Balas et al. (1997), Dick et al. (1999), Horn (Kim Horn, personal communication), and Loane et al. (1998), as well as several questions of our own. The questions were written in the form of a statement such as "I think that the lead trainer has high expectations of group members". Adolescents were asked to respond anonymously to each item based on a 7-point Likert scale (1 = strongly agree to 7 = strongly disagree).

The *Student Survey* was administered on-site and took approximately three to five minutes to complete. To encourage accurate replies, the surveys were anonymous and therefore not linked to the database in the overall study.

Implementation Issues

Project staff noted implementation issues in the study section log.

Data Analyses

Questionnaire Development. Three items were reverse coded to maintain homogeneity of direction of responses among the 28 items.

Factor analysis was performed on the 28 relevant items from the *Student Survey* to explore underlying constructs. Exploratory factor analysis using Principal Component Analysis with Varimax Rotation with Kaiser Normalization was conducted without restricting the number of loadings to explore the underlying factorial structures of the *Student Survey*. Four factors with eigenvalues greater than 1 were retained. The factors were examined by the research team and assigned names based on underlying themes. Mean of the raw scores of the individual items on each scale were computed as the factor score. Each of the four scales underwent reliability testing.

Intervention Delivery Comparison. Student's t test was conducted to compare adolescent responses to each of the 28 items on the *Student Survey* based on implementation group. The Levene's robust test for homogeneity of variance was conducted to test the equality of variances between the two groups of intervention. For items with unequal variances, Welsh's correction was used. Student's t tests were also conducted to compare each of the four factor scales on the *Student Survey* based on the intervention delivery mode. All tests were conducted using SPSS (SPSS, 2002).

Implementation Issues. Qualitative analyses were completed on data recorded regarding implementation issues.

RESULTS

Program Access: Participation and Completion

Since the *Student Survey* was anonymous and did not contain demographic data, demographic information for the overall intervention study is presented (Table 1). Youth were randomized to the FTF or DIT conditions from 20 sites in the 12 counties of West Virginia. Youth assignment did not differ significantly with respect to any of the key demographic and behavioral variables. Overall, among the 571 subjects who completed baseline assessments and were randomized to either FTF or DIT, the subsequent intervention participation rate was 81% (465/571). Intervention attendance rates differed significantly between conditions. Among those assigned to FTF, participation in one or more sessions was 90% (395/441); among those assigned to DIT, participation was 57% (70/123) ($p < 0.001$). The median grade level for students in both the DIT and FTF groups was grade 9. There were no differences between conditions for sexual risk variables. Among the

TABLE 1. Sample Characteristics of Youth by Intervention Approaches

	Face-to-Face (FTF) (n=441)	Interactive TV (DIT) (n=130)
Intervention Completion** n (%)	395 (90%)	70 (57%)
Age (years)* mean (S.D.)	14.4 (1.1)	14.0 (1.3)
Gender n (% female)	308 (70%)	101 (78%)
Grade (year) median (variance)	9 (1.7)	9 (2.3)
Ever had sexual intercourse n (%)	103 (26%)	30 (23%)
If yes, had sexual intercourse in last 6 months n (%)	78 (76%)	20 (67%)
Student Survey Completion** n (% of Intervention Completion)	372 (94%)	33 (47%)

*p<.05

**p<.001

465 who participated in the intervention study, 405 (87%) also completed the *Student Survey*. This *Student Survey* convenience sample was representative of the intervention study and included 94% (372/395) for FTF and 47% (33/70) for DIT ($p < 0.001$). All youth in both groups who were offered the survey agreed to complete it.

Instrument Design: Factor Analysis

Extraction Method was the Principal Component Analysis with Varimax Rotation with Kaiser Normalization (SPSS, 2002). Rotation converged in 6 iterations. Factor analysis resulted in 4 component factors (see Table 2) with eigenvalues over 1 and accounted for 62% of the variance. All items loaded strongly (> 0.50) only on the corresponding component except item 13 (trainer takes time to know group members) which loaded modestly on all four factors and item 17 (I could talk freely with trainer) which loaded both on factor 1 and 3. All items were retained on components based on highest loading.

As depicted (Table 2), Factor 1 contained 11 items representing interventionist leader characteristics such as knowledge and organization of materials and implementation. This first factor accounted for 22% of the variance and demonstrated strong reliability ($\alpha = .93$). Factor 2 contained 7 items representing interventionist warmth. This second factor

TABLE 2. Rotated Component (Factor) Matrix

(Factor Loadings)	Factors			
	1	2	3	4
FACTOR 1 INTERVENTIONIST LEADERSHIP CHARACTERISTICS ($\alpha=.93$)				
2 Trainer has good knowledge	.762			
4 Trainer is creative	.760			
5 Trainer relates well to group members	.751			
3 Trainer has humor	.735			
6 Trainer encourages discussion	.726			
11 Trainer has good communication skills	.635			
10 Trainer works well with group member	.612			
1 Trainer has high expectations of group members	.592			
12 Trainer is a good listener	.584			.459
9 Trainer makes program interesting	.572			
13 Trainer takes time to know group members	.437			
FACTOR 2 INTERVENTIONIST WARMTH ($\alpha=.89$)				
20 I did not get to know trainer well		-.832		
19 I have trouble paying attention		-.809		
18 I feel isolated from trainer		-.796		
8 Trainer has warm personality		.745		
7 Trainer has patience		.701		
30 Trainer would not criticize me		.649		.492
26 Trainer connected with other kids in my group		.603		
FACTOR 3 CONNECTION ($\alpha=.86$)				
22 I feel connected to group members			.789	
25 Trainer knew what it was like in my town			.692	
21 Eye contact with trainer was just right			.660	
17 I could talk freely with trainer	.499		.590	
28 Able to confide in trainer and trainer wants to listen			.581	
16 Seems like program was developed for me and my friends	.456		.526	
FACTOR 4 PROGRAMMATIC ASSESSMENT/CLARITY ($\alpha=.83$)				
24 Can see displays clearly			.400	.629
29 Expect trainer to tell truth*				.620
23 Can clearly hear everything				.614
27 Expect trainer to play fair*				.607

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations.
(Loadings less than .4 suppressed for increased readability.)

accounted for 16% of the variance and demonstrated strong reliability ($\alpha = .89$). Factor 3 contained 6 items representing connection among individual, interventionist, and group. This third factor accounted for 14% of the variance and demonstrated strong reliability ($\alpha = .86$). Factor 4 contained 4 items representing programmatic assessment and clarity. This fourth factor accounted for 11% of the variance and demonstrated strong reliability ($\alpha = .83$).

Assessment of Intervention Dynamics by the Participants

All items for both groups scored consistently with relatively favorable ratings. The means for the FTF group ranged from 1.6-2.4 (and 3.3-3.7 for the three reverse coded items). The means of the DIT group were slightly higher, ranging from 1.6-3.1 (and 3.2-3.6 for the reverse coded items).

As shown in Table 3, Student's *t* test for equality of means found that responses to 13 of the 28 variables (46%) were statistically different between the two groups ($p < .05$). The direction of the mean difference consistently favored the FTF intervention for all variables. The statistically different items clustered in two factors: Factor 2 *Interventionist Warmth* (7 items out of 7; 100%) and Factor 3 *Connection* (4 items out of 7; 57%). All 4 factor scales were significantly different in favor of the FTF format over the DIT format (Table 3).

Implementation Issues

Although not evident in pilot testing, three broad categories of challenges were encountered during implementation in the real-world situations: access, scheduling, and leader "ownership" of the group intervention.

Although all counties hosted or were proximate to a county with a DIT site, subjects were nevertheless required to travel long distances in these sparsely populated mountainous sites. There was greater flexibility in site selection for the FTF youth, enabling leaders to identify locations closer to the homes of the youth. The terrain of WV is harsh with heavy snowfall in the winter and frequent flooding in the summer; as a result, both scheduled DIT and FTF sessions were frequently cancelled.

The primary DIT system in this study, MDTV, was established to deliver medical consultations. Therefore, there was some competition for transmission time and the schedules of the youth and interventionists

TABLE 3. Assessment of Intervention Dynamics by FTF and DIT Participants

	FTF Mean (SD)	DIT Mean (SD)	Sig.	t-test 95% CI	
				Lower	Upper
FACTOR 1 INTERVENTIONIST LEADERSHIP CHARACTERISTICS	1.8 (0.9)	2.2 (1.0)	*	-.72	-.07
2 Trainer has good knowledge	1.6 (1.1)	1.9 (1.4)		-.64	.15
4 Trainer is creative	2.0 (1.2)	2.2 (1.5)		-.79	.31
5 Trainer relates well to group members	1.8 (1.1)	2.0 (1.4)		-.66	.16
3 Trainer has humor	2.1 (1.4)	2.3 (1.7)		-.69	.32
6 Trainer encourages discussion	1.8 (1.2)	1.8 (1.3)		-.53	.36
11 Trainer has good communication skills	1.7 (1.1)	2.2 (1.3)	*	-.87	-.04
10 Trainer works well with group members	1.7 (1.2)	2.2 (1.6)		-.99	.16
1 Trainer has high expectations of group members	2.1 (1.3)	2.6 (1.3)		-.93	.03
12 Trainer is a good listener	1.6 (1.0)	1.9 (1.1)		-.64	.10
9 Trainer makes program interesting	1.9 (1.2)	2.6 (1.6)	*	-1.21	-.07
13 Trainer takes time to know group members	2.1 (1.4)	2.5 (1.5)		-.89	.09
FACTOR 2 INTERVENTIONIST WARMTH	2.7 (1.5)	3.7 (1.5)	**	-1.45	-.37
20 I did not get to know trainer well *	3.6 (2.2)	4.8 (2.2)	**	-2.01	-.42
19 I have trouble paying attention *	3.2 (2.3)	4.5 (2.4)	**	-2.1	-.47
18 I feel isolated from trainer *	3.4 (2.3)	4.4 (2.1)	*	-1.8	-.18
8 Trainer has warm personality	2.2 (1.6)	3.1 (1.7)	**	-1.45	-.27
7 Trainer has patience	2.2 (1.7)	3.1 (2.0)	*	-1.58	-.15
30 Trainer would not criticize me	2.2 (1.9)	2.9 (2.1)	*	-1.45	-.09
26 Trainer connected with other kids in my group	2.3 (1.6)	3.1 (1.5)	**	-1.35	-.22
FACTOR 3 CONNECTION	2.2 (1.0)	2.6 (1.1)	*	-.82	-.07
22 I feel connected to group members	2.4 (1.5)	2.2 (1.4)		-.33	.73
25 Trainer knew what it was like in my town	2.3 (1.3)	3.0 (1.8)	**	-1.24	-.24
21 Eye contact with trainer was just right	2.3 (1.4)	2.9 (1.4)	*	-1.09	-.10
17 I could talk freely with trainer	1.9 (1.3)	2.1 (1.5)		-.71	.22
28 Able to confide in trainer and trainer wants to listen	2.0 (1.2)	2.8 (1.6)	**	-1.27	-.36
16 Seems like program was developed for me and my friends	2.2 (1.4)	2.6 (1.4)		-.86	.15
FACTOR 4 PROGRAMMATIC ASSESSMENT/CLARITY	1.7 (0.9)	2.1 (1.0)	*	-.70	-.01
24 Can see displays clearly	1.6 (1.1)	1.6 (0.8)		-.38	.38
29 Expect trainer to tell truth	1.6 (1.1)	2.5 (1.7)	**	-1.53	-.29
23 Can clearly hear everything	1.7 (1.1)	1.8 (1.1)		-.57	.22
27 Expect trainer to play fair	2.0 (1.3)	2.3 (1.5)		-.89	.25

The *Interventionist* was referred to as *Trainer* during the intervention. Significance is two-tailed. * $p < .05$
 ** $p < .01$. The Likert response scale range is from 1 (strongly agree) to 7 (strongly disagree). *a* indicates reverse coded item. The Likert response scale for these items is from 1 (strongly disagree) to 7 (strongly agree).

could not always be accommodated. Although evening and weekend hours, ideal for intervention delivery to adolescents, were less congested, DIT technicians were often not available at one or both sites (the broadcasting site for the leader or the receiving site for the youth and assistant trainer). In a few instances, technical difficulties interrupted or delayed transmission of the system or proxy systems.

Finally, we observed that while in the FTF groups the Lead Interventionist was very much in command, this dynamic was not obviously present in the DIT groups. The Assistant Trainer, responsible in both settings for supplies and bringing the youth to the site, did not assume this role in the DIT site. Hence, the DIT sites, in contrast to the FTF sites, did not have a clear leader.

DISCUSSION

The results of this study underscore the importance of examining both *process* and *context* issues in intervention delivery and identify several areas in which an intervention delivered through an FTF format may fundamentally differ from a DIT format. Contrary to our hypothesis, participation rates and completion of intervention-related tasks (e.g., return of completed the *Student Surveys*) were lower among DIT compared to FTF youth. Moreover, youth did not react as favorably to the DIT delivery format as they did to the FTF format. Among the 28 items, youth ranked half significantly less favorably for the DIT approach compared to the FTF approach. For each of the four factors measured by the *Student Survey*, FTF ratings were significantly higher than DIT ratings.

Although the literature is replete with pilot studies and non-randomized studies reporting acceptable levels of patient satisfaction with DIT interactions, there is a dearth of randomized trials designed to contrast the two delivery formats (Taylor, 1998). The extant literature, while generally supporting the substitution of DIT for FTF, is derived largely from patients who elected the DIT approach voluntarily, often in lieu of a long wait for an onsite clinical consultation (Goldberg, Low, & Lewis, 1996; Norton, Burdick, Phillips, & Berman, 1997; Oakley, et al., 1997; Taylor, 1998). Many authors have commented on low utilization of the DIT services (Shile, et al., 1996; Whitten & Franken, 1995). Therefore, despite generally high enthusiasm for the concept of DIT, evidence supporting its use and acceptance in real-life situations is generally lacking, with few studies attempting to examine process and context issues in its

application (Dick et al., 1999; Guilfoyle et al., 2003; Whitten & Adams, 2003).

Despite our hypothesis to the contrary, there is cause to expect that youth may find interventions delivered through a DIT format less comfortable than that delivered through an FTF format. Although the relative anonymity of technologies such as computer and audio-cassette have been favorably received by adolescents (Paperny, Aono, Lehman, Hammar, & Risser, 1990; Romer et al., 1997), and DIT has been reported to work well for information transmission among adolescents and young adults (Taylor, 1998; Cox, White, Brinson, and Ramey, 2000), DIT has been more problematic for exchange of socio-emotional information (Chidambaram, 1996; West Virginia Department of Health and Human Resources, 1999). Socioeconomic and demographic factors, such as smaller rural communities and less than high school education, have been found to affect satisfaction with telehealth education programs (Bynum, Cranford, Irwin, & Denny, 2003). Group cohesiveness, postulated as important to group function, has been found to be lower in other DIT formats compared to FTF formats (West Virginia Department of Health and Human Services, 1999). To overcome this problem, research suggests that prior to DIT interactions, participants should first interact FTF (Cameron et al., 1998; Dick et al., 1999; Doolittle et al., 1998; Farand et al., 1998; Gammon et al., 1996; Gammon et al., 1998). Indeed, among youth who are familiar with a school nurse, telemedicine is efficacious for various preventive and acute care interventions (Lessard & Knox, 2000).

The substantially lower participation rate by youth assigned to the DIT format compared to those assigned to the FTF format is consistent with the literature that despite articulated acceptance of DIT by patients, it is not well utilized. Likewise, access and scheduling problems have been identified in the literature as contributing to this relative under-utilization (Taylor, 1998). Newer technologies such as personalization with artificial intelligence programs which can evaluate learner behavior and adjust accordingly (Heetebry, Hatcher, & Tabriziani, 2005), multimedia packaged distance training (Li, Runderson, Burnham, Staggs, Robertson, & Williams, 2005), social networking services, collaborative filtering, social bookmarking, folksonomies, social search engines, file sharing and tagging, mashups, instant messaging, and on-line multi-player games utilizing web applications such as wikis, blogs, and podcasts are but the tip of the iceberg in emerging technologies which could be utilized for distance learning (Kamel & Wheeler, 2007).

The instrument designed and evaluated in this study, the *Student Survey*, has adequate psychometric properties and appears to assess four different and important constituents of *context*: interventionist leadership characteristics, interventionist warmth, group connection, and program clarity. Although this study did not confirm our hypotheses that DIT will increase access to the intervention and will be equally accepted compared to a FTF format, we remain optimistic that DIT offers the potential to reach geographically isolated populations within and outside of the United States. However, future efforts should attend to and assess these contextual issues through the use of an instrument such as the *Student Survey*.

Potential Limitations of the Study

Only tentative results can be drawn from this study. Our first limitation was that we encountered many logistic difficulties with DIT, which may not be inherent to a DIT format but did interfere with acceptance in the present study. The lower participation rate by youth assigned to the DIT format and the lower return of completed *Student Surveys*, while informative, left many questions unanswered. Why did fewer students attend DIT sessions? Was it the increased distance to DIT compared to FTF sites, was it the location of the DIT site in hospital settings (while the FTF sites were in more familiar school and recreation settings), was it the frequent scheduling difficulties around the use of DIT, or was it a disaffection with the format itself? If it were the DIT format itself, could a different and more gradual introduction to the Lead Interventionist and the other group members initially in a FTF format overcome this problem? Likewise, although the low return rate of the *Student Surveys* is consistent with our subjective impression and the *Student Survey* results (Factor 1) that in the DIT format the Lead Interventionist did not appear to be in control relative the FTF format, it would be useful to understand where the system broke down. Given that it is likely that students who did not complete the Surveys may have been even more disaffected by the DIT format that those who did complete them, the overall acceptance of DIT may be even lower than reflected in this study.

Our second limitation was the slight differences in content and format by site. While these slight differences were necessary to be sensitive to the local culture, they may have influenced results. However, these differences affected both FTF and DIT similarly. Additionally, geographic constraints drove differences in format of time from hourly

sessions to 4-hour blocks. These differences may have also affected differences between groups.

Our third limitation was we were unable to assess the literacy level of participants due to it being part of an overall study of FOK. While our student survey tested at the fifth grade level on the Flesh Kincaid rating, some single items may have been difficult to understand. Future studies should consider testing the literacy levels of subjects. Finally, we did not measure motivation to attend and reasons for attendance which may have affected outcomes. Future studies should also consider also evaluation motivation and reasons for attending.

Future Implications

Despite these findings, we believe in the potential usefulness of DIT and hope this study will improve acceptability and effectiveness of future DIT interventions. Although some factors are inherent in DIT and therefore immutable, future research should differentiate logistic factors, such as those addressed in Factor 4, Programmatic Assessment/Clarity and implementation issues, which can be addressed through changes in technology, format, or training. Future studies could also investigate ways to improve Connectivity and Warmth in DIT. For example, the Lead Interventionists could meet FTF at least once with the group. Alternatively, collaborations with other professionals, such as actors or video makers, could instruct interventionists in methods to increase their perceived warmth and caring. Exciting new technologies provide promise to overcome these important issues (Kamel & Wheeler, 2007). Finally, while this study provides information regarding acceptance of DIT compared to FTF, clearly it is important for future studies to examine differences in resulting risk perceptions and behaviors between DIT and FTF intervention groups. Future DIT interventions can be enhanced by addressing the issues raised by this study.

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