Effect of exposure to clinic-based health education interventions on behavioural intention to prevent mother-to-child transmission of HIV infection

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ABSTRACT

HIV and AIDS incidence among infants in South Africa is on the increase. The uptake of prevention of mother-to-child transmission (PMTCT) interventions is often said to be dependent on the beliefs and educational needs of those requiring PMTCT services. This study therefore sought to examine the effect of clinic-based health education interventions (HEI) on behavioural intention of PMTCT among 300 pregnant women from 4 primary health care clinics in Tshilidzini Hospital catchments area, South Africa. An interview schedule was used to obtain information regarding participants' demographic characteristics, level of exposure to clinic-based HEI, salient beliefs and behavioural intention on PMTCT. The major findings included that approximately 85% of the participants had heard of PMTCT. There was very little association between frequency of antenatal clinic (ANC) visits and level of exposure to PMTCT information. Condom use had the lowest set of salient belief scores. Control belief was the most common belief contributing to behavioural intention. Generally, the association between PMTCT salient beliefs and behavioural intention was weak. Clinic-based HEI had an impact on behavioural intention of HIV testing, normative belief of regular ANC visit and nevirapine use. The vital contribution of alternative PMTCT information sources such as the radio and television was observed. Enhancing initiatives that empower women, and a better coordination of the existing HEI through better implementation of health education strategy may strengthen the prevailing moderate PMTCT intention in the area investigated.

Keywords: PMTCT, HIV/AIDS, health education intervention, vertical transmission, nevirapine, behavioural intention, theory of planned behaviour.

RÉSUMÉ

Le cas de VIH/SIDA augmente parmi les bébés en Afrique du Sud. L'assimilation des interpositions de prévention de transmission mère á enfant (PMTCT) est souvent vu d'être dépendante de croyances et de besoins éducatifs de ceux qui ont besoin des services PMTCT. Cette étude a pour but de vérifier l'effet des interpositions de l'éducation sanitaire clinique-basées (HEI) sur l'intention comportementale de PMTCT auprès de 300 femmes enceintes originaires de 4 services de santé primaire dans les bassins de captation de l'hôpital Tshilidzini, en Afrique du Sud. Un barème d'entretien a été utilisé pour obtenir des informations concernant les caractéristiques démographiques des participants, le niveau d'être exposé aux HEI clinique-basées, les croyances principales et l'intention comportementale sur les PMTCT. Les résultats principaux ont démontré qu'approximativement 85% de participants avaient déjà entendu parlé de PMTCT. Il y a eu une association très étroite entre la fréquence de visites antenatales et le niveau d'être exposé à l'information de PMTCT. L'utilisation du préservatif avait les résultats de croyances principales les plus bas. La croyance de commande était la croyance la plus commune qui contribue à l'intention comportementale. En général, l'association entre les croyances principales des PMTCT et l'intention comportementale était faible. Les HEI clinique-basées avaient un impact sur l'intention comportementale du dépistage de VIH, la croyance normative des visites antenatales régulières et la prise du nevirapine. La contribution primordiale des sources alternatives d'informations sur les PMTCT comme la radio et la télévision a été observée. Rehausser les initiatives vers le développement des femmes et la coordination meilleure de HEI qui existent à travers une meilleure mise en œuvre de la stratégie de l'éducation sanitaire pourraient renforcer l'actuelle intention modérée des PMTCT dans le lieu en question.

Mots clés: PMTCT, VIH/SIDA, interposition de l'éducation sanitaire, infection verticale, nevirapine, intention comportementale, théorie d'un comportement prévu.

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BACKGROUND

Mother-to-child transmission (MTCT) of HIV is the primary mode of HIV infection in babies (UNAIDS, 2001). Globally, it is estimated that there is a 40% relative risk of transmission among the over 1.5 million HIV-positive pregnant women annually (Moore, 2003). In 2002, the rate of MTCT was quoted to be approximately 250 infections per day (UNAIDS, 2002). It was estimated that 2.3 million children were living with HIV at the end of 2005. This figure represents a considerable increase from less than 2.1 million by the end of 2003 (UNAIDS, 2005). HIV prevalence among pregnant women attending antenatal care (ANC) clinics in South Africa has also been on the increase. Nationally, HIV seroprevalence among this group increased from less than 1% in 1990 to over 29.5% in 2004 (Department of Health (DoH), 2004). Although Limpopo Province has a slightly lower prevalence than the national average, an increase of over 6% between 2000 and 2004 is cause for concern (DoH, 2004).

Even though an array of medically appropriate prevention of mother-to-child transmission (PMTCT) interventions are available, their uptake has been low. This is evidenced by the reported low uptake of voluntary HIV testing services, which is a prerequisite and indicator for PMTCT services (McCoy, Besser, Visser & Doherty, 2002). Factors such as lack of awareness, misconceptions about MTCT of HIV, fear of stigmatisation, traditional beliefs on breastfeeding, and the cultural role of men and other family members in decision-making on reproductive health issues have been implicated in the low uptake of PMTCT services (UNAIDS, 2000). These PMTCT conundrums can be summarised as issues of awareness and belief.

Effective health education approaches are known to be useful in health promotion and disease prevention (Nutbeam, 2000). This applies particularly in situations where it is critical to provide knowledge, correct misconceptions or raise level of awareness, as is the case with regard to PMTCT (Harrison, Smith & Myer, 2000). A number of studies have further demonstrated a positive shift in health status indicators following effective health education interventions (Mbizvo, Kasule & Gupta, 1997; NIMH, 1998).

Ensuring behaviour change through health education is predicated on its impact on highlighted beliefs surrounding the PMTCT programmes (Norman, Abraham & Conner, 2000). According to the theory of planned behaviour (TPB) three categories of beliefs, namely behavioural, normative and control beliefs, determine behavioural intention (Ajzen, 1985; Ajzen 1988). Behavioural belief is described as an individual's positive or negative belief about a particular behaviour; normative belief is an individual's belief about the opinion of others regarding a particular action or behaviour; while control belief is how much an individual believes that the performance of behaviour is within their volitional control.

The TPB further emphasises that intention is the precursor of and indeed a proxy for behaviour, by stressing that the intention to perform the behaviour is reflective of the individual's motivation towards the behaviour (Ajzen, 1988). The current study sought to examine the effect of routine clinic-based PMTCT health education interventions (such as radio jingles, community programmes, posters, pamphlets as well as group and personal education programmes in clinics) on the behavioural intentions of antenatal care attendees.

METHOD

Sample and procedure

This was an analytic cross-sectional study. The target population was women seeking antenatal care within the Tshilidzini Hospital catchments area at the time of the study. This encompassed a population distributed around 30 clinics, mobile clinics and community health centres. Only clinics that had readily available study participants, provided PMTCT health education interventions, voluntary counselling and testing services and antiretroviral therapy to HIV-positive mothers, and had a minimum of 500 annual antenatal bookings were included in the sample frame. The application of the above criteria to the 30 clinics in Tshilidzini Hospital catchments area led to the exclusion of 24 clinics from the study. Four of the six clinics were randomly selected to participate in the study while the remaining two served as the pilot sites.

A convenience sampling method was used to select the study participants, because the application of any of the probability sampling methods would have obstructed the flow of service in the clinic and drastically increased patients' waiting time. Furthermore,

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convenience sampling was adopted to avert the risk of Hawthorne effect that may arise from the participants' interaction with clinic nurses in the course of their registration or care provision. These presenting situations precluded opportunities for efficient probability sampling. Following this, 300 participants were selected from the four participating health facilities.

Measures

Data were collected by means of a structured interview schedule developed for the study. The components and variables of the interview schedules were selected from the framework of the TPB. The interview schedule (32 items) had four main sections: demographic characteristics; exposure to HEI; salient beliefs; and behavioural intention. Demographic characteristics solicited by this study included the participants' age, marital status, number of children, employment, average monthly household income and educational attainment. Participants' exposure to HEI covered the frequency of ANC visits, subjective levels of exposure to generic and specific PMTCT information, exposure to alternative sources of PMTCT information and participants' evaluation of HEI. Salient beliefs and behavioural intention measured by the instrument included the four expected PMTCT behaviours: regular use of ANC services; uptake of VCT; condom use; and use of ART (nevirapine). A 5-point Likert scale was used in all the sections. Responses were scored on a scale ranging from –2 to +2. Higher scores represented more positive salient belief or greater expressed behavioural intention towards performing the expected behaviour. Pre-testing and piloting was done. The overall Conbrach Alpha was .76.

The interview schedule was translated into the local language (TshiVenda) and back-translated according to scientific standard procedures. The support of nurses or lay counsellors with experience in PMTCT information dissemination was solicited for the translation of the original English questionnaire. This was to ensure that people who were conversant with acceptable lay health terminologies in PMTCT provided input in the English-TshiVenda translation.

The University Health, Safety Research Ethics Committee of the University of Venda for Sciences and Technology, and the Provincial Department of Health and Welfare of the Limpopo province approved the study. Participants' informed consent was solicited in writing, and confidentiality and anonymity were maintained by using code numbers to identify participants in place of their real names.

Data analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS version 12.0 for Windows) computer software programme. Multiple regression models using pair-wise deletion of missing data were used to establish the relationship between the salient beliefs and behavioural intention. One-way analysis of variance (ANOVA) was used to test the effect of level of exposure to HEI on respective behavioural intentions and salient beliefs. The ANOVA was complemented with multiple comparisons using the LSD Post Hoc test.

RESULTS

Demographic characteristics of respondents

The sample was predominantly composed of married women (57%), and the majority were aged 20 - 24 years. Approximately 78% of the women had fewer than two children. About 83% of the women were unemployed and over 90% of the women had attained a minimum of Grade 8 educational level. About 62% of the participants were living in households with monthly income of about US$ 160 or less (Table 1).

Characteristics of exposure to HEI on PMTCT

About a third of respondents (36.20%) had visited the clinic four times or more, while 25.20%, 22.80% and 15.4% had visited thrice, twice and once respectively. About 85%, 12% and 2% of all the study participants had heard, had not heard, or were not sure that they had heard of MTCT of HIV respectively. Approximately a third of the participants (33.60%) had received HEI on PMTCT information about four or more times, while 14.40%, 13.80%, 27.50% and 8.10% had been exposed to PMTCT information in the clinic thrice, twice, once and never respectively.

There was very little correlation between the frequency of ANC visit and the level of exposure to HEI ($r = .268$; $p = .000$; $r^2 = .07$). This means that frequency of visit contributed only about 7% of the variation of level of exposure to HEI. Health education on safe sex and regular ANC visit during pregnancy were most frequently provided (Fig. 1). With the

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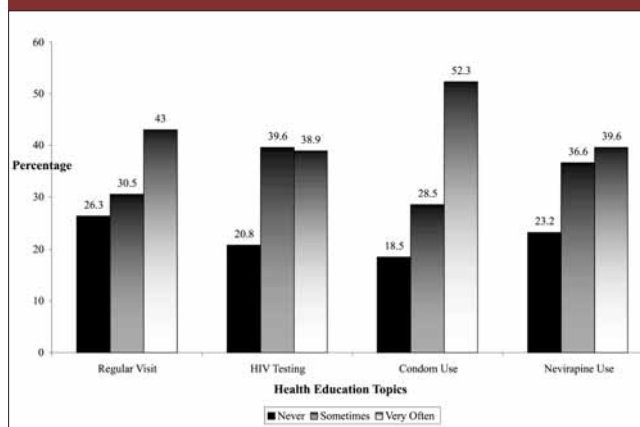
TABLE 1. FREQUENCIES AND PERCENTAGE OF PARTICIPANTS' DEMOGRAPHIC CHARACTERISTICS		
Demographic characteristic	Frequency	Percentage (%)
Age (years)		
15 - 19	54	18.1
20 - 24	112	37.6
25 - 29	84	28.2
30+	44	14.8
Marital status		
Single	115	38.6
Married	170	57.0
Divorced	11	3.7
Widowed	1	0.3
Number of children		
0 - 2	233	78.2
3 - 5	53	17.8
6+	2	0.7
Employment		
Yes	247	82.9
No	51	17.1
Education		
No education	5	1.7
Grade 1-7	17	5.7
Grade 8-12	199	66.8
Higher	74	24.8
Average monthly household income (US$)		
≤ 160	186	62.4
>160 ≤ 800	82	27.5
≥ 800	22	7.4

FIG. 2. FREQUENCY OF RECEIVING PMTCT INFORMATION FROM ALTERNATIVE SOURCES IN PERCENTAGE
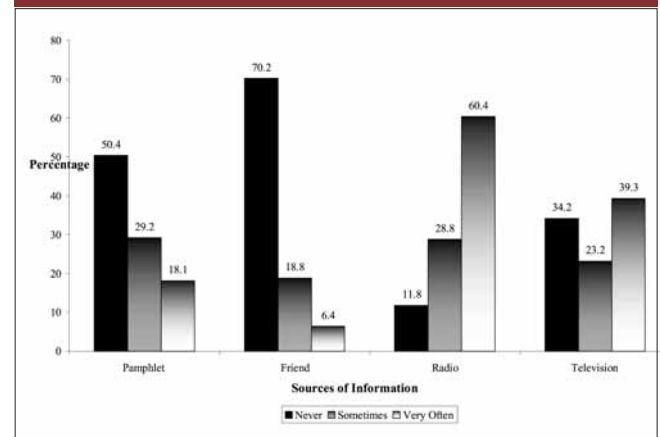

exception of health education on HIV testing, the participants who reported receiving information 'very often' were consistently higher across the other specific PMTCT information.

About two-thirds of the participants reported receiving PMTCT information most frequently through the radio, while friends were the least likely source of PMTCT information (Fig. 2).

PMTCT salient beliefs and behavioural intention
Salient beliefs and behavioural intention varied across the four expected PMTCT behaviours (regular use of ANC services, uptake of VCT, condom use, and use of nevirapine). On average, condom use ranked lowest compared with the regular use of ANC services, uptake of VCT and use of nevirapine. Conversely, the use of condoms accounted for the highest behavioural intention (Table 2).

FIG. 1. PERCENTAGES OF LEVELS OF EXPOSURE TO HEI IN SPECIFIC PMTCT INFORMATION TOPICS

TABLE 2. MEANS AND STANDARD DEVIATIONS OF THE SALIENT BELIEFS AND BEHAVIOURAL INTENTION SCORES (MINIMUM = -2; MAXIMUM = +2)				
PMTCT behaviour	Salient beliefs and behavioural intention	N	Mean	SD
Regular visits	Behavioural belief	298	.88	.992
	Normative belief	298	1.04	.740
	Control belief	297	1.071	.802
	Behavioural intention	296	.97	.903
HIV testing	Behavioural belief	295	1.18	.687
	Normative belief	297	.88	.932
	Control belief	297	.79	1.117
	Behavioural intention	297	.74	1.218
Condom use	Behavioural belief	297	.76	1.006
	Normative belief	296	.54	1.110
	Control belief	296	–.04	1.351
	Behavioural intention	206	1.31	.559
Use of nevirapine	Behavioural belief	296	1.14	.775
	Normative belief	294	.95	.974
	Control belief	295	.87	1.021
	Behavioural intention	297	1.07	.823

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Comparing the mean scores of the various beliefs and behavioural intention for the four expected PMTCT behaviours, the highest and the lowest were:
- HIV testing and condom use behavioural beliefs respectively
- regular visit and condom use normative beliefs respectively
- regular visit and condom use control beliefs respectively
- condom use and HIV testing intentions respectively.

The outcome of the multiple regressions of the salient beliefs on their respective behavioural intention varied across the behaviours:

- **Model 1: A regression of regular ANC visit salient beliefs on intention to visit regularly**. In model 1 of Tables 3 and 4, only behavioural and control belief reached significance. Using the beta values in Table 4 as a measure of relative importance, control belief contributed more to the prediction of intention.

- **Model 2: A regression of HIV testing salient beliefs on intention to take the HIV test**. In model 2 of Tables 3 and 4 only behavioural and

control belief reached significance. In similar fashion to the observation with regular visit, control belief weighed more in the prediction of intention to take the HIV test as suggested by the beta values in Table 4.

- **Model 3: A regression of condom use salient beliefs on intention to use condoms**. A multiple regression analysis of the beliefs on intention gave an r^2 of 0.128 but with only normative belief reaching significance as shown in model 3 of Tables 3 and 4.

TABLE 3. REGRESSION OF SALIENT BELIEFS AND BEHAVIOURAL INTENTION

Model	r	r^2	Adjusted r^2	Std. error of the estimate	F	Significance
1	.287	.082	.072	.073	8.706	.000[*]
2	.376	.142	.133	1.136	16.014	.000[*]
3	.358	.128	.115	.527	9.844	.000[*]
4	.684	.468	.463	.597	84.504	.000[*]

[*]Significant at p-value < .001
[†]Model 1: A regression of regular ANC visit salient beliefs on intention to visit regularly.
Model 2: A regression of HIV testing salient beliefs on intention to take the HIV test.
Model 3: A regression of condom use salient beliefs on intention to use condom.
Model 4: A regression of nevirapine use salient beliefs on intention to use nevirapine.

TABLE 4. REGRESSION COEFFICIENTS OF SALIENT BELIEFS ON BEHAVIOURAL INTENTION

Model[†]	Salient beliefs	Unstandardised coefficients		Standardised coefficients	t	Significance
		B	Std. error	Beta		
1	Behavioural belief	−.108	.051	−.119	−2.097	.037[*]
	Normative belief	.046	.069	.037	.662	.508
	Control belief	.273	.064	.243	4.287	.000[*]
2						
	Behavioural belief	.348	.106	.196	3.292	.001[*]
	Normative belief	.112	.077	.086	1.461	.145
	Control belief	.280	.060	.257	4.661	.000[*]
3						
	Behavioural belief	.058	.042	.097	1.366	.174
	Normative belief	.140	.037	.276	3.838	.000[*]
	Control belief	.040	.027	.100	1.478	.141
4						
	Behavioural belief	.514	.055	.485	9.393	.000[*]
	Normative belief	−.043	.042	−.052	−1.025	.306
	Control belief	.311	.036	.390	8.641	.000[*]

[*]Significant at p-value < .05
[†]Model 1: A regression of regular ANC visit salient beliefs on intention to visit regularly.
Model 2: A regression of HIV testing salient beliefs on intention to take the HIV test.
Model 3: A regression of condom use salient beliefs on intention to use condom.
Model 4: A regression of nevirapine use salient beliefs on intention to use nevirapine.

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TABLE 5. MEAN SALIENT BELIEF AND BEHAVIOURAL INTENTION SCORES ACROSS THE THREE LEVELS OF EXPOSURE TO HEI (ONE-WAY ANOVA)						
PMTCT behaviours	Salient beliefs and behavioural intention	Mean score at each level of HEI			F	
		Never	Sometimes	Very often	test	Significance
Regular ANC visit	Behavioural belief	1.00	0.85	0.82	.848	.429
	Normative belief	1.13	0.80	1.16	7.334	.001*
	Control belief	1.05	1.00	1.13	.770	.464
	Behavioural intention	0.88	0.99	1.00	.442	.643
HIV testing	Behavioural belief	1.13	1.20	1.18	.212	.809
	Normative belief	0.90	0.80	0.95	.784	.458
	Control belief	0.58	0.78	0.96	2.397	.093
	Behavioural intention	.0.37	0.70	0.96	4.964	.008*
Condom use	Behavioural belief	0.47	0.79	0.84	2.792	.063
	Normative belief	0.50	0.60	0.50	.232	.793
	Control belief	−0.31	−0.10	0.06	1.624	.199
	Behavioural intention	1.35	1.16	1.36	2.501	085
Nevirapine use	Behavioural belief	1.12	1.08	1.19	.556	.574
	Normative belief	0.72	0.89	1.13	4.135	.017*
	Control belief	0.70	0.85	1.00	1.976	.140
	Behavioural intention	1.09	1.04	1.07	086	918

*Significant at p-value < .05.

- **Model 4: A regression of nevirapine use salient beliefs on intention to use nevirapine**. In model 4, Table 3 showed a relationship between the salient beliefs and behavioural intention. Table 4 further showed that only behavioural and control beliefs contributed to the prediction of behavioural intention.

Effect of level of exposure to HEI in specific PMTCT information on salient beliefs and behavioural intention

The mean score of salient beliefs and behavioural intentions varied across the different levels of exposure to HEI, with no consistent pattern as exemplified by the variation in means scores (Table 5). The analysis of variance (ANOVA) compared mean scores of salient beliefs and behavioural intention with three levels of exposure to HEI. The results found that clinic-based HEI significantly impacted on the normative belief of regular visit (p =.001) and nevirapine use (p = .017), also impacted on behavioural intention of HIV testing (p = .008), but did not impact on condom use.

From Table 5, further investigation by multiple comparison used a LSD Post Hoc test method. The results found that the normative belief of women who had 'never' received information on regular visit had a significantly higher mean than those who 'sometimes' received information (p = .004). Those who received information 'very often' had a higher mean normative

belief than those who received it 'sometimes' (p =.000). For nevirapine use, those who 'never' received information had significant lower normative belief than those who received information 'very often' at p-value = .006 (Table 6). Exposure to clinic-based health education interventions significantly contributed to intention to HIV testing. Those who 'never' received information had significantly lower behavioural intention (p = .002) than those who received 'very often' (Table 6).

DISCUSSION
PMTCT salient beliefs and behavioural intention among ANC attendees

Significant associations between respective salient beliefs and the four behavioural intentions (regular use of ANC services, uptake of VCT, condom use, and use of nevirapine) were observed in this study. The observation varied in strength and combinations of contributing beliefs. It is however critical to review some of the basic postulations of the TPB before drawing any conclusions with regard to the observed associations. Firstly, the behavioural elements (attitude, subjective norm and perceived behavioural control) are the standard predictors of behavioural intention or action (Ajzen, 1988). Secondly, the behavioural elements are products of multiple combinations of respective salient beliefs with either outcome evaluation, motivation to comply or perceived power.

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TABLE 6. LSD POST HOC TEST ON DIFFERENCES MEAN SCORES OF NORMATIVE BELIEFS AND BEHAVIOURAL INTENTION AMONG 3 LEVEL OF EXPOSURE TO HEI					
Behaviour	Dependent variable	I (level of exposure to information)	J (level of exposure to)	Mean difference (I-J)	Significance
ANC visit	Normative belief	Never	Sometimes	.326	.004*
		Never	Very often	−.036	.731
		Sometimes	Very often	−.362	.000*
HIV testing	Behavioural intention				
		Never	Sometimes	−.332	.079
		Never	Very often	−.594	.002*
		Sometimes	Very often	−.262	.099
Nevirapine use	Normative belief				
		Never	Sometimes	−.169	.257
		Never	Very often	−.410	.006*
		Sometimes	Very often	−.241	.063

*The mean difference is significant at p-value $< .05$ level.

In this context, salient beliefs that contributed to the prediction of any of the behavioural intentions should be viewed as those which impact on the performance of the particular behavioural intention and with less emphasis on strength of association. Lastly, the relative importance or contributions of the behavioural elements in the prediction of an intention or action is known to vary with situation and behaviour.

With regard to normative belief, it has been repeatedly demonstrated that behaviours that are performed in the presence of a referent other are more subject to complying with socio-culturally acceptable norms (Mekonnen & Mekonnen, 2003; Ndhlovu, Searle, Miller, Fisher, Snyman & Sloan, 2003). Ajzen (1988) added that control belief can serve as a direct predictor of both intention and action. It is additionally known that when the behaviour or situation is in the complete volitional control of the performer, intention alone should suffice in behaviour prediction. This means that behaviours that pose few problems can be predicted with great accuracy from intention alone. On the other hand, the role of control beliefs in behaviour prediction increases with decrease in volitional control over the given behaviour (Moore, 2003).

The consistently low control belief reported in this study agrees with the literature acknowledging women's limited control over their sexual and reproductive health choices and practices (Fransman, 2004; Raghupathy, 1996). The implication of this is that reproductive health decisions and actions are often beyond the volitional control of women.

The patterns of association between salient beliefs and behavioural intention observed in this study are consistent with the above suppositions. Behavioural and control beliefs tended to predict the PMTCT behavioural intentions. The normative belief on the other hand independently determined the behavioural intention that required the direct involvement or physical presence of a referent other.

Relatively higher normative and control beliefs on regular ANC visits were observed when compared with the moderate level of behavioural belief reported. This finding suggests good family support and high personal control over regular ANC visits. This assertion is further supported by the observed weighty contribution of control belief to the prediction of regular visit intention. This finding corroborates the well-documented high usage of ANC services in South Africa (Meekers, 2000).

Similarly, HIV testing control and behavioural belief were the only contributors to the prediction of intention, where control belief was the major contributor to the model. Control belief and behavioural intention scores were noted to be relatively lower when compared with behavioural and normative beliefs. The later comparison draws on the reported mean scores and standard deviation. Going by the technical assumptions of both variables, control beliefs are driven by the availability of resources to perform behaviour, while behavioural intention is a reflection of the level of an individual's motivation to perform the behaviour. Similarly, issues such as accessibility and availability of service and fear of prejudice and stigma have been reported to influence the use of HIV testing services (McCoy et al., 2002; Varga, 2003).

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In the light of this, the relatively low control belief and behavioural intention scores could be a reflection of the prevailing situation in Limpopo Province (a predominantly rural province). This connection further draws on the poorly resourced nature and the low uptake of HIV testing services (+ 17%) in the province (McCoy *et al.*, 2002). Reference can also be made to the high HIV testing service uptake (+ 94%) in the highly resourced Western Cape province, offering better access and comprehensive HIV testing services (McCoy *et al.*, 2002). Technically, 100% of Western Cape fixed clinics offer HIV testing against the approximately 15% in the Limpopo Province.

This study found behavioural belief of condom use for PMTCT during pregnancy to be less than 1, normative belief about 0.5 and the control belief below zero (-0.04). Against the very low salient beliefs, the intention to use condoms for PMTCT if participant was HIV-positive, was very high (mean = 1.31; SD = .559). The normative belief was however the only belief that reached significance on regression with behavioural intention. The implication of this observation is that the normative belief about the importance and safety of condom use during pregnancy is the major determinant of behavioural intention and eventually condom use during pregnancy.

The high use of nevirapine reported possibly suggests the high level of public awareness about nevirapine for PMTCT. Varga (2003) reported that over 60% of women in the 25 - 39-year age group were aware of the full range of PMTCT services near them. When compared with the other behaviours, nevirapine use was highest. In line with the postulations of the TPB and HBM, the observed high perceived ease (control belief) of taking the single dose or self-administered nevirapine can be explained by two complementary factors. These include high knowledge of the benefits of nevirapine in PMTCT, and its mode of administration, which also provides the mother with autonomy and confidentiality (McCoy *et al.*, 2002; Varga, 2003).

Effect of exposure to clinic-based PMTCT health education intervention on salient beliefs and behavioural intention

In instances where significant differences in level of exposure were noted, the salient beliefs on regular ANC visit and nevirapine use tended to increase with increase in level of exposure to HEI. This finding agrees with previous studies that have demonstrated that appropriate health education should ideally yield conscious personal health actions which are predicated on the salient beliefs (Ajzen, 1988; Blair, 1993). Furthermore, a particular level of knowledge relevant for the recognition of need for change is required to excite the impulse to change (Blair, 1993). It should be noted that when sufficient level of awareness is reached, additional knowledge does not necessarily promote additional behaviour change (Ochola, 2002).

The HIV testing beliefs were not affected by the existing HEI. In terms of having adequate knowledge on HIV testing, this and preliminary studies highlighted that the radio is widely used and is a highly accessible alternative source of HIV and AIDS/PMTCT information (Coutsoudis, Goga, Rollins & Coovadia, 2002). Such an alternative information source could have provided just enough knowledge to initiate action before the women's exposure to information in the clinics. This suggestion agrees with reports that alternative information sources (such as the mass media) have contributed significantly to behaviour change in HIV mitigation (Coutsoudis *et al.*, 2002). The moderate levels of HIV testing beliefs recorded however point to room for improvement of HEI.

On the other hand, this study observed a significantly lower behavioural intention among women who have never received HIV testing information when compared with those who have received HIV testing information very often. The observed variation resulting from differences in level of exposure to HEI further unveils the potential of clinics in improving on the reported high demand for VCT information (McCoy *et al.*, 2002). This finding suggests the need for intensified social marketing of HIV testing if any meaningful impact is to be made on the prevailing HIV testing behavioural intention.

Beliefs and behavioural intention about condom use were not affected by the clinic-based HEI. Interestingly, the mean score of behavioural intention for condom used was the highest among the four of PMTCT behavioural intention. This suggests that behavioural intention may have been formed prior to exposure to the clinic-based HEI and further

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corroborates reports that condom use education programmes give less emphasis to other aspects of health education such as safety during pregnancy (Coutsoudis *et al.*, 2002). Condom use control belief recorded a markedly low mean score (-0.04) and was notably unaffected by health education interventions. This finding stresses the observations of previous studies suggesting that education on condom use in South Africa was lacking in content, especially information that could facilitate the negotiation of use and gaining partners' cooperation (Coutsoudis *et al.*, 2002).

The normative belief that referent others believed that nevirapine use in PMTCT was changed with increased exposure to information in the clinic. It is however not surprising that the mean behaviours belief score remained moderately high even without the influence of the clinic-based HEI. This observation can be explained by the wide social marketing nevirapine in PMTCT has received in the province (Varga, 2003).

CONCLUSIONS AND RECOMMENDATIONS

This study clearly highlighted the weak relationship between salient beliefs and behavioural intention of PMTCT behaviours. The fundamental role of HEI and social and health systems support in the formation of PMTCT behaviours was highlighted. Beyond the clinic-based HEI, this study observed the vital contribution of alternative PMTCT sources such as the radio and television. The clinic-based HEI had low effectiveness in changing salient beliefs and behavioural intention of PMTCT behaviours. A coordinated synergy of these information sources may offer an opportunity to meet the PMTCT health education needs of South Africans effectively and efficiently.

Given the findings of this study a better structuring of the existing clinic-based HEI on PMTCT is required. This may necessitate the proper implementation of the existing provincial health education strategy. An integrated information dissemination approach is recommended. Such integration should efficiently harness the unique opportunities of alternative information dissemination sources. An enhanced promotion of PMTCT mechanisms especially condom use is required. Areas for further research include:

- the need to investigate factors contributing to the inadequate implementation of health education interventions aimed at PMTCT in the clinics
- to determine best ways of coordinating the diverse information dissemination sources
- to explore PMTCT behaviours undertaken beyond the gestational stage
- prospective study to investigate the behavioural intention and actual behaviours.

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