Knowledge of Termination of Pregnancy (TOP) Legislation and Attitudes toward TOP Clinical Training among Medical Students Attending Two South African Universities

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Abstract

Provision of safe, voluntary, termination of pregnancy (TOP) in South Africa is challenged by an insufficient number of TOP-trained clinicians. Medical students' understanding of TOP legality and their attitudes toward TOP training are indicators for future service provision. We administered a 63-item questionnaire to explore these issues at the University of Cape Town and Walter Sisulu University. Ordinary least squares regression assessed predictors of TOP legislation knowledge and training attitudes. Results: Of 1308 students, 95% knew that TOP was legal in South Africa, but few (27%) understood the specific provisions of the legislation beyond 13 weeks' gestation. Sixty-three percent

desired more information about TOP. In multivariate models, female, white and sexually experienced students and students more advanced in school had better legislation knowledge (all $p < .01$). Attending religious services regularly ($p < .01$) was associated with lack of support for TOP training, whereas being in a relationship ($p < .01$) was associated with support for TOP training.

Introduction

In the last century, voluntary termination of pregnancy (TOP) has emerged as a major public health and human rights issue, stimulating rigorous debate over the legality and morality of the practice worldwide (Dyer 2003; van Bogaert 2002). Despite statements issued by international health and development organizations affirming that safe, accessible TOP is a human right and must be legally addressed in developing nations, only a handful of African countries have made some form of voluntary abortion legal (van Bogaert 2002). During apartheid in South Africa, inequitable access to health services among non-white South Africans and coercive family planning practices led to significant morbidity and mortality from abortion-related injuries and adverse events (Ipas 2005; Rees et al. 1997). After the end of apartheid, however, South Africa produced a highly progressive democratic constitution that addressed equity and human rights issues related to women's sexual and reproductive health decision making (Althaus 2000). South African public health officials recognized the need to establish equitable practices in reproductive decision making, which resulted in the legalization of TOP in 1996. Non-governmental organizations including the Reproductive Rights Alliance (RRA) played an important role. The RRA consisted of a national alliance of 30 organizations committed to promoting women's rights, specifically the right for women to have freedom of reproductive choices. These groups had played an important advocacy role prior to the introduction of the *Choice on Termination of Pregnancy* (CTOP) *Act* and continued to assist with its implementation. Through the CTOP Act, access to safe, timely and free legal abortion became a reproductive health right for South African women (South African Government 1996).

The law allows voluntary TOP within the first 12 weeks of pregnancy. After 12 weeks and before 20 weeks, a woman can obtain TOP if continuing the pregnancy would pose a risk to her mental or physical health if there is significant risk that the fetus has a malformation, if rape or incest caused the pregnancy, or if the pregnancy would worsen the woman's economic condition (Lee 2003). Beyond 20 weeks, TOP is allowed only when the woman's life is endangered (South African Government 1996). The law was amended in 2008 to expedite facility-based approvals of TOP, requiring providers to collect and maintain TOP service data and to allow registered nurses to train and provide TOP services (South African Government 2008). The law states "any person who prevents the lawful termination of pregnancy shall be guilty of an offence and liable on conviction to a fine or imprisonment" (South African Government 2008). In addition, the CTOP Act promotes counseling, which is reinforced in the regulations to the CTOP Act that all women should be informed of their rights, and providers may not impede TOP service provision. Despite these provisions, the Constitution also upholds "freedom of conscience, religion, thought, belief and opinion"; thus, many health workers believe they are under no obligation to perform abortions, and this has led to an environment of inaction wherein TOP services are unavailable in many districts in South Africa.

Following implementation of the CTOP Act, deaths resulting from unsafe abortions dropped by 90%; however, in rural areas and in areas with no TOP providers, many women continued to obtain clandestine abortions (Jewkes et al. 2005; Moodley and Pattinson 1999). In fact, although an estimated 50,000 legal abortions were safely provided in the year following legalization of TOP, an equal number of unsafe abortions occurred (National Department of Health 1997), mostly due to lack of access to services. Recent estimates from South Africa suggest that 125,000 unsafe abortions, of approximately 200,000 total abortions, occur each year and 26% of all maternal deaths in South Africa are due to unsafe abortions (Aahman and Shah 2011; Blaauw and Penn-Kekana 2010; Daulaire et al. 2002; National Department of Health 2009; Statistics South Africa 2010). Finding, training and retaining sufficient staff to provide TOP services remain the most significant challenges to safe TOP provision in countries like South Africa, the United States (US) and Australia

(Adamo 2003; Australian Nursing Federation 1997; Dickson-Tetteh and Billings 2002; Edwards 2001; Ipas 2005; Joffe 2003; Wear and Keck-McNulty 2003). Studies in South Africa and the US have demonstrated that service provision is often dependent on a core of committed providers (Adamo 2003; Dickson et al. 2003; Foster et al. 2003; Joffe 2003). Lack of support for these providers, within both provincial and local administrations, and lack of available TOP training or rotation in medical education contributes to an environment of lethargy around the issue (Adamo 2003; Joffe 2003; van Bogaert 2002; Westhoff 1994).

A critical point for recruiting future TOP providers is to identify receptive individuals early in their medical training and direct them toward rotation or specialty programs addressing TOP. A supportive legislative environment around TOP does not necessarily imply inclusion of TOP training in the standard medical curriculum. Medical programs throughout the world offer few training opportunities in TOP-related services (Espey et al. 2004; Foster et al. 2003; Harper et al. 2005; Westhoff 1994; Williams 2002). Lack of specific requirements and the failure of governments to impose curriculum audits have meant that most advanced clinicians and medical doctors were never exposed to opportunities for TOP training (Westhoff 1994). In developing countries where TOP is legal, information is scarce regarding training programs and education in abortion care. Evidence from South Africa suggests more could be done to include abortion education in preclinical instruction and in rotation or residency programs (Ipas 2005; van der Westhuizen 2001). The eight medical schools operating in South Africa, four of which are located in metropolitan areas, have considerable latitude in designing curricula around TOP. South African medical schools currently offer a variety of TOP training opportunities ranging from singular lectures on TOP law or ethics discussions to complete clinical training in TOP provision and management, usually offered as part of obstetrics/gynecology (OBGYN) rotations. However, requiring values clarification sessions and more extensive training in TOP techniques in the general curriculum may make medical students feel more comfortable offering or referring patients for TOP because they feel appropriately qualified (Schwarz et al. 2005).

Future healthcare professionals are key to determining availability and coverage of future abortion services, but there is little literature documenting their TOP knowledge and attitudes toward abortion training, particularly in developing countries. Understanding medical students' knowledge and attitudes about TOP training may be crucial to overcoming challenges associated with ensuring a TOP workforce supply (Adamo 2003). Our study contributes to the scarce literature from Africa with regard to TOP training and curriculum development by examining medical students' knowledge about the legislative environment and attitudes toward TOP training in the context of the CTOP Act in South Africa.

Methods

Sampling and Data Collection

We designed a cross-sectional, quantitative survey assessing medical students' knowledge of current TOP legislation and attitudes toward inclusion of TOP training in medical school curricula in South Africa. The survey was administered to medical students enrolled at the University of Cape Town (UCT) and Walter Sisulu University (WSU) in 2005 and 2007, respectively, throughout the training trajectory (all years/cohorts in medical school were surveyed). UCT is located in an urban environment, whereas WSU is in a rural setting. Although they may not be fully representative of the entire student population attending all eight medical schools in South Africa, these two schools were specifically recruited for this study because of their geographic, socio-economic, racial/ethnic, religious and political diversity. The medical curriculum at UCT offers a lecture on TOP law in the third year, an ethics case study and discussion on TOP in the fourth year and two TOP observations in the fifth year. Students who conscientiously object to TOP can opt not to participate. The medical curriculum at WSU offers exposure to TOP case studies during the preclinical years and training in TOP management in the fourth and fifth years.

Medical faculty members were involved in designing the survey to ensure clarity of questions and to determine time required for completion. We conducted a pilot test of the instrument among

women's health faculty, health sciences students and other collaborators not directly involved in the survey's development. The instrument was revised in response to their feedback. The final anonymous survey was administered during a required course and took 15 to 20 minutes to complete. We surveyed all students present at the designated lecture. Students who were absent from class or were not enrolled in medical school (i.e., auditors) did not complete the survey. Medical faculty provided class rosters to determine what proportion of students responded.

The study instrument was structured with closed-ended questions. The questionnaire utilized true/false responses for knowledge questions and five-point Likert scale responses for curriculum/training questions (e.g., on a scale of "highly agree" to "highly disagree"). Respondents were asked to indicate "true," "false," or "don't know/uncertain" in response to a series of knowledge-based statements. Knowledge responses were recoded such that "1" indicated a correct response and "0" an incorrect response. For knowledge-based questions, responses of "don't know/uncertain" or missing responses were coded as incorrect. Curriculum questions were coded such that "5" indicated strong support of inclusion of TOP in the curriculum and "1" indicated strong lack of support.

We created two summary scales reflecting "Knowledge of current TOP legislation" and "Supportive attitudes for inclusion of TOP training in medical school curriculum" by summing item responses related to knowledge and averaging item responses related to curriculum. These scales were created based on theorized relationships among survey items (developed by S.B.W., L.L.Z. and R.J.) and consisted of multiple related items believed to represent each underlying construct (hereafter referred to separately as "Knowledge" and "Curriculum"). Nine survey items constitute the Knowledge scale; five constitute the Curriculum scale.

To confirm aggregation of items into Knowledge and Curriculum scales as indicators in the models, B.B.R. conducted confirmatory factor analyses using a structural equation-modelling framework within MPLUS software (Version 6.1; Muthén & Muthén, LosAngeles, CA). Both single factor models demonstrated relatively good fit to the observed data: Knowledge factor–Confirmatory Fit Index = .93, Tucker-Lewis Index = .91 (both should be ≥ .95 for good fit) and Root Mean Squared Error of Approximation = .06 (should be ≤ .06); Curriculum factor–Confirmatory Fit Index = .95, Tucker-Lewis Index = .91and Root Mean Squared Error of Approximation = .22. Reliability (internal consistency) for both scales were .64 and .83 for the Knowledge and Curriculum factors, respectively (where reliability > .70 is optimal for group comparisons).

Data Analysis

Descriptive analyses of respondents' socio-demographic characteristics were used to examine outliers, missing variables and data inconsistencies, as well as characteristics of students across medical schools and year of enrolment (e.g., first- through sixth-year students). One of the key characteristics described is whether respondents intended to specialize in OBGYN or another specialty; importantly, we also describe respondents' relationship history and sexual experience. We used ordinary least squares (OLS) regression to examine predictors of Knowledge scores and Curriculum scores. Independent variables included in the OLS regression were institution, gender, year in medical school (i.e., first-year student through sixth-year student), religious affiliation, religious attendance, relationship status, sexual history and racial/ethnic group (i.e., White, Black/African, Coloured/multiracial, Asian Indian or Other, consistent with the predominant racial/ethnic classification scheme currently used in South Africa to describe population demographics). P-values of .05 or lower were considered statistically significant. All analyses were performed in Stata (Version 11; Stata Corporation, College Station, TX).

Results

Socio-demographic Characteristics of Respondents

In total, 1308 students responded (UCT n = 882; WSU n = 426), for a response rate of 84%. Socio-demographic characteristics and relevant information describing UCT and WSU are presented in Tables 1 and 2. As expected, the student populations at UCT and WSU differed, with slightly more

female students at UCT (63% compared with 55% at WSU), a much higher proportion of Black/African students at WSU (84% compared with 34% at UCT) and more students reporting regular religious service attendance at UCT (44% compared with 36% at WSU). Most medical students surveyed had previously been or were currently involved in a romantic relationship. Approximately one fifth of all students reported never having been in any relationship. Students farther along in their training reported more relationship experience and higher rates of sexual intercourse than their more junior counterparts.

Table 1. Socio-demographics, sexual history, and plans for specialization among medical school students at the University of Cape Town, South Africa

Characteristic, % (n)	First year 21% (186)	Second year 20% (177)	Third year 13% (118)	Fourth year 17% (150)	Fifth year 19% (166)	Sixth year 10% (85)	Total 100% (882)
Sex							
Male	39%	40%	36%	33%	39%	28%	37%
Female	61%	60%	64%	67%	61%	72%	63%
Religious affiliation							
Catholic	12%	11%	9%	11%	11%	11%	11%
Christian, non-Catholic	63%	57%	53%	53%	52%	50%	56%
Muslim	11%	12%	16%	14%	16%	18%	14%
Hindu	3%	7%	11%	5%	8%	9%	7%
Jewish	4%	3%	2%	3%	1%	2%	3%
Other religion	3%	2%	5%	5%	4%	1%	3%
Agnostic/atheist	5%	7%	4%	8%	8%	9%	7%
Frequency of religious service attendance							
Regular	46%	42%	53%	43%	43%	35%	44%
Semi-regular	22%	21%	17%	16%	27%	31%	22%
Not often	23%	28%	19%	26%	19%	25%	23%
Never	10%	9%	11%	15%	10%	8%	11%
Relationship status							
Single, never with someone	36%	24%	20%	10%	13%	13%	21%
Single, not with anyone currently	39%	42%	37%	33%	34%	34%	37%
Single, in a relationship	24%	34%	40%	53%	45%	47%	39%
Other (including married)	1%	0%	4%	4%	9%	7%	4%
Population group							
White	29%	27%	23%	41%	29%	46%	31%
African	40%	40%	36%	27%	35%	19%	34%

Coloured	16%	15%	12%	16%	14%	12%	14%
Indian	11%	15%	27%	15%	17%	19%	17%
Other	5%	4%	2%	1%	5%	4%	3%
Ever had sexual intercourse	21%	34%	31%	50%	52%	62%	40%
Considering specializing in OBGYN							
Strongly agree/agree	27%	22%	27%	27%	25%	13%	24%
Neutral	30%	26%	26%	20%	19%	9%	23%
Strongly disagree/disagree	43%	52%	48%	53%	56%	78%	53%
Considering specializing in FamMed							
Strongly agree/agree	30%	20%	17%	17%	23%	35%	23%
Neutral	39%	33%	28%	30%	32%	17%	32%
Strongly disagree/disagree	31%	47%	54%	53%	45%	49%	45%

Note. As a result of rounding, columns may not sum to 100%.

Table 2. Socio-demographics, sexual history and plans for specialization among medical school students at Walter Sisulu University, South Africa

Characteristic, % (n)	First year 23% (96)	Second year 21% (89)	Third year 24% (104)	Fourth year 14% (60)	Fifth year 18% (77)	Total 100% (426)
Sex						
Male	45%	37%	48%	44%	53%	45%
Female	55%	63%	53%	56%	47%	55%
Religious affiliation						
Catholic	7%	18%	14%	17%	13%	14%
Christian, non-Catholic	82%	68%	75%	63%	68%	72%
Muslim	0%	1%	0%	2%	1%	1%
Hindu	4%	9%	8%	10%	11%	8%
Other religion	5%	3%	4%	9%	4%	5%
Agnostic/atheist	1%	0%	0%	0%	3%	1%
Frequency of religious service attendance						
Regular	43%	35%	34%	30%	34%	36%
Semi-regular	27%	38%	36%	43%	30%	35%
Not often	25%	23%	27%	23%	32%	26%
Never	4%	5%	2%	3%	4%	4%

Relationship status						
Single, never with someone	30%	24%	21%	21%	7%	21%
Single, not with anyone currently	33%	36%	27%	24%	28%	30%
Single, in a relationship	33%	33%	48%	43%	54%	42%
Other (including married)	4%	7%	5%	12%	11%	7%
Population group						
White	2%	2%	2%	0%	0%	1%
African	90%	82%	85%	80%	81%	84%
Coloured	1%	0%	2%	2%	3%	1%
Indian	7%	15%	12%	19%	15%	13%
Other	0%	1%	0%	0%	1%	1%
Ever had sexual intercourse	60%	65%	74%	63%	78%	68%
Considering specializing in OBGYN						
Strongly agree/agree	19%	26%	24%	37%	42%	29%
Neutral	39%	41%	35%	36%	38%	38%
Strongly disagree/disagree	42%	32%	41%	27%	20%	34%
Considering specializing in FamMed						
Strongly agree/agree	35%	25%	20%	26%	25%	26%
Neutral	35%	45%	55%	50%	42%	45%
Strongly disagree/disagree	30%	30%	26%	24%	34%	29%

Note. As a result of rounding, columns may not sum to 100%.

Knowledge of TOP Legislation

Table 3 presents knowledge about abortion, abortion legality and related topics. The overwhelming majority of students knew that legal abortion on request was available in South Africa (95%). Eighty-three percent of all respondents also correctly responded that in South Africa women could obtain an abortion for any reason up to 12 weeks' gestation. Respondents were less knowledgeable about specific circumstances for which TOP is sanctioned beyond 12 weeks' gestation and which types of medical providers could legally perform TOP. Over half of respondents correctly responded that abortion was provided free by the South African government.

Supportive Attitudes for of TOP Training in Medical School Curriculum

Table 3 also presents attitudes around TOP training. Nearly half (48%) of students agreed that, "Because it is a routine medical procedure, abortion should be incorporated into the medical curriculum." Almost one third (30%) disagreed, and the rest were uncertain. Sixty-nine percent of students indicated that they "would be willing to attend a workshop on abortion and related issues." Over half (57%) of medical students agreed with the statement, "I feel that issues related to abortion require more attention in the medical curriculum," and 63% agreed they "would like to receive more information about abortion and abortion-related health services."

Table 3. General knowledge and curriculum survey items about TOP services

General knowledge of TOP provision	Correct	Incorrect
Legal abortion on request is available in South Africa.	95%	5%
In South Africa, a woman can obtain an abortion for any reason until up through 12 weeks of pregnancy.	83%	17%
Between 13 and 20 weeks of pregnancy, the only circumstance for which abortion may be granted is if the pregnancy poses physical harm to the mother.	27%	73%
Abortion is illegal beyond 20 weeks of pregnancy.	34%	66%
Abortion is free in public health facilities in South Africa.	63%	37%
Only doctors can perform abortions in South Africa.	52%	48%
Under the apartheid government, abortion was officially illegal/against the law.	67%	33%
When performed by a trained medical professional, abortions are safe procedures with minimal risk to a woman's health.	78%	22%
When performed by an untrained person ("backstreet"), abortions are safe procedures with minimal risk to a woman's health.	89%	11%

Support for TOP curriculum/training	Strongly agree/ agree	Neutral	Strongly disagree/ disagree
Because it is a routine medical procedure, abortion should be incorporated into the medical curriculum.	48%	23%	30%
I would be willing to attend a workshop on abortion and related issues.	69%	16%	15%
I would be willing to take a class that involved training in performing voluntary abortions and related topics.	43%	19%	38%
I feel that issues related to abortion require more attention in the medical curriculum.	57%	25%	18%
I would like to receive more information about abortion and abortion-related health services.	63%	22%	15%
Additional survey items	**Strongly agree/ agree**	**Neutral**	**Strongly disagree/ disagree**
I believe that in addition to doctors, nurses should be trained to provide abortions.	51%	23%	26%
Do you think that your attitudes toward abortion have changed since you started medical school? (answered as "Yes," "Don't know" or "No")	41%	10%	50%

Notes. For regression analyses, all knowledge questions were coded on a binary correct/incorrect scale and curriculum/training questions were reverse coded. For descriptive purposes only, we collapsed "strongly agree" and "agree" responses and collapsed "strongly disagree" and "disagree" to reflect overall support or lack of support with each of the statements about TOP training and curriculum.

Table 4. OLS standardized regression coefficients for summary scores reflecting "Knowledge of TOP legislation" and "Support of TOP training in the medical curriculum"

Characteristic	Knowledge of TOP legislation	Support of TOP training
University of Cape Town	0.654*** (0.416, 0.891)	–0.195** (–0.358, –0.032)
Walter Sisulu University	Reference	Reference
Female	0.556*** (0.366, 0.746)	–0.056 (–0.188, 0.076)
Male	Reference	Reference
Year in medical school		
Sixth	2.524*** (2.084, 2.964)	–0.091 (–0.402, 0.219)
Fifth	2.049*** (1.751, 2.347)	–0.186* (–0.392, 0.020)
Fourth	1.586*** (1.281, 1.891)	–0.161 (–0.373, 0.051)
Third	2.137*** (1.837, 2.437)	–0.245** (–0.454, –0.037)
Second	0.261* (–0.013, 0.535)	–0.146 (–0.337, 0.046)
First	Reference	Reference
Population group/race		
White	0.411*** (0.140, 0.682)	–0.327*** (–0.515, –0.139)
Coloured	–0.111 (–0.467, 0.245)	–0.126 (–0.371, 0.119)
Indian	–0.029 (–0.453, 0.395)	–0.119 (–0.412, 0.173)
Other	–0.061 (–0.663, 0.541)	–0.064 (–0.484, 0.357)
African/Black	Reference	Reference
Religious service attendance (ordinal variable ranging from 0 to 3, where 0/Reference is "Never attend")	0.140*** (0.035, 0.245)	–0.327*** (–0.400, –0.255)
Religious affiliation		
Catholic	–0.025 (–0.319, 0.268)	0.047 (–0.155, 0.249)
Muslim	0.511** (0.102, 0.920)	–0.049 (–0.333, 0.236)
Hindu	0.498* (–0.021, 1.016)	0.657*** (0.299, 1.015)
Jewish	0.795** (0.091, 1.500)	0.973*** (0.480, 1.465)
Atheist/agnostic	0.233 (–0.237, 0.704)	0.346** (0.019, 0.672)
Other, including none	0.393 (–0.076, 0.861)	0.060 (–0.271, 0.391)
Non-Catholic Christian	Reference	Reference
In relationship now	0.120 (–0.134, 0.373)	0.297*** (0.122, 0.473)
Once in relationship but not now	0.044 (–0.199, 0.288)	0.039 (–0.130, 0.208)
Single, never in relationship	Reference	Reference
Ever had sexual intercourse	0.407*** (0.176, 0.638)	0.140* (–0.021, 0.300)

Never had intercourse	Reference	Reference
Intercept	3.158*** (2.758, 3.559)	4.421*** (4.145, 4.697)
Adjusted R2	0.348	0.174
Observations	1135	1157

Notes. Summary score for Knowledge is the total number of correct responses. Summary score for Curriculum is the simple average of survey item responses expressed on a scale of 1–5, where higher scores reflect more supportive views of TOP training; 95% confidence interval in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Additional Survey Items

Although not included in either the Knowledge or Curriculum factors, additional survey items collected are of interest. Medical students were asked to respond to the statement, "I believe that in addition to doctors, nurses should be trained to provide abortions." Slightly over half (51%) of students agreed; the remaining responses were divided between neutral (23%) and disagreement (26%). Forty-one percent of students indicated that their attitude toward TOP had changed since starting medical school, with more advanced students being much more likely to report that their attitude had changed since beginning medical school (results not shown).

Multivariate OLS Regression Analyses

Results for multivariate analyses are shown in Table 4. For the TOP Knowledge factor, controlling for other factors, being enrolled at UCT ($p < .01$), being female ($p < .01$) and being white ($p < .01$) were significantly positively associated with being more knowledgeable about TOP legislation. As expected, increasing year in medical school was also positively associated with increased knowledge. Being Muslim ($p = .01$) or Jewish ($p = .03$) (as compared to non-Catholic Christian) was associated with better knowledge. Additionally, having had sexual intercourse ($p < .01$) was positively associated with better knowledge of TOP legislation, controlling for other factors.

For the support of the TOP Curriculum factor, being enrolled at UCT ($p = .02$), attending religious services regularly ($p < .01$) and being white relative to African/Black ($p < .01$) were associated with lack of support of TOP training. Being Hindu ($p < .01$), Jewish ($p < .01$) or atheist/agnostic ($p = .04$) were positively associated with TOP training support. Being in a relationship currently ($p < .01$) also was positively associated with support for TOP training.

Discussion

This study described future healthcare professionals' knowledge about TOP legislation, curriculum exposure and demand for TOP training as well as socio-demographic and behavioural correlates. Overall, 95% of students knew that legal abortion was available in South African public health facilities. However, the details of legal provision of care were unknown to many students, especially first- and second-year students. Most students agreed that abortion training should be more widely incorporated in medical curricula, that the current medical curriculum lacked sufficient abortion training and that they would appreciate additional opportunities to learn about abortion. This is consistent with literature from around the world indicating that abortion training and discussion of abortion-related topics is lacking in routine preclinical curricula, in OBGYN rotations and in residency training (Espey et al. 2004; Foster et al. 2003; Goldman et al. 2005; Shotorbani et al. 2004; Visser et al. 1993; Wear and Keck-McNulty 2003; Westhoff 1994). Generally, age and medical socialization, religion and religious attendance, and sexual and relationship experience had the greatest impact on TOP knowledge and attitudes about incorporating TOP into the medical curriculum.

Older and more advanced medical students were more knowledgeable about TOP provisions under the 1996 law. First- and second-year students answered incorrectly more often to questions about knowledge and answered neutrally more often to questions about the curriculum, which may

be explained by their lack of exposure to the entire medical curriculum. Additionally, students in higher years reported a greater change in attitude as a result of their experiences in medical school than did first- and second-year students. Although students in higher years reported greater knowledge of the TOP legislation relative to first-year students, third-year students were less supportive of additional TOP training ($p < .05$), which may be a cohort effect. Alternatively, it may reflect the fact that both WSU and UCT offer discussions of TOP-specific case studies during the third year, which may have led students to disagree with certain curriculum-focused questions such as "I feel that issues related to abortion require more attention in the medical curriculum." This finding is in accordance with results from another study in a rural South African university that reported an increase in tolerance with time spent in medical school (Buga 2002) and may be explained by increased opportunity for educational influence with time spent in medical school. Studies from the US also report that attitudes become increasingly more tolerant of abortion with medical socialization (Leiblum and Williams 1993; Rosenblatt et al. 1999; Westfall et al. 1991). In a study conducted among Columbia University medical students, of the 20% of students reporting a change in attitude, the majority of the shift in opinion was attributed to training received during the clinical years, in particular, after exposure to the obstetrics and gynecology rotation and after observing abortion procedures during clinical rotation, indicating perhaps that students are more receptive to changing their opinions during clinical years (Stennett and Bongiovi 1991). In a study at the University of New Mexico, the majority of students participating in a voluntary half-day clinical experience in abortion care in the third year rated the experience as highly informative and reported they would recommend it to others (Espey et al. 2004). Moreover, 94% became more supportive of access to abortion services and over 80% reported that the experience would enable them to better counsel patients about abortion or to provide TOP in the future (Espey et al. 2004).

Consistent with other studies(Abdel-Aziz et al. 2004; Aiyer et al. 1999; Buga et al. 2002; Espey et al. 2004; Francome 1997; Stennett and Bongiovi 1991), religion was significantly associated with most responses to questions regarding attitudes and demand for TOP training in the curriculum. Students self-reporting as Hindu, Jewish, agnostic/atheist or "other" religion were significantly more interested in receiving training and seeking opportunities to learn about TOP. Personal religion was most commonly reported as an important external factor reported by students to influence the formation of their values and beliefs with respect to abortion, with 77% of all students indicating that religion had influenced them "very much" or to some extent (results not shown).

Sexual experience and relationship status/history also were significantly associated with TOP-related knowledge and training attitudes. Students who had previously engaged in sexual intercourse or students who had been involved in at least one romantic relationship were generally more knowledgeable about abortion and more interested in seeking opportunities to learn about abortion. These results were expected, since sexually active individuals may relate more easily to the risks of unintended pregnancies. In our study, sexual experience also was associated with knowledge of a facility where abortions were provided (results not shown), which is consistent with the notion that sexual activity leads to increased familiarity with reproductive health services. These findings align with literature from the US (Klamen et al. 1996), but diverge from results from a South African study reporting that sexual experience was not correlated with medical students' attitudes towards TOP (Buga 2002).

Most students in this study reported interest in learning about abortion and related health services. Over half of the students surveyed reported that TOP did not receive enough attention in the medical curriculum. Only 10% of students in the UCT program felt abortion was sufficiently covered in the current curriculum. These findings are generally consistent with literature from the US (Almeling et al. 2000; Dowling and Bates 2000; Edwards 2001; Espey 2004; Shotorbani et al. 2004; Wear and Keck-McNulty 2003). Although the US legalized abortion much earlier than South Africa – in the 1970s – providing American health providers and medical institutions more time to add TOP care to the formal medical curriculum, TOP training remains in high demand in both settings.

Based on these findings, several implications emerge. TOP is the second most commonly performed surgical procedure in women's health, after Caesarean section (Westhoff 1994); as such,

medical students should be trained in abortion care. Particularly, students should have the chance to explore the ethical, legal and human rights dimensions of TOP, including a provider's right to conscientious objection, a patient's right to make an informed choice and the intersection of these two rights. There are many opportunities to improve abortion education in the medical curriculum, both during basic sciences/preclinical instruction and in the clinical years. Training in certain key areas should be made compulsory in the general medical curriculum, including legal dimensions of care provision, basic clinical training in performing surgical and medical abortion, management of complications, observation of procedures and reproductive health rotations. Students who conscientiously object should have the option to forgo observations, but should be able to counsel or refer patients for TOP in an unbiased, informed manner that is consistent with patients' rights. Additionally, medical students should be trained to perform emergency abortions. Residency programs in OBGYN, internal medicine and family medicine should require TOP training in order to be considered comprehensive programs. The National Department of Health in South Africa should take an active role in ensuring that residents are adequately trained in TOP care. In the long term, implementing standardized medical education requirements and government curriculum audits may be effective approaches to address deficiencies in abortion training (Westhoff 1994).

To help address TOP workforce shortages, nurses and midwives also should have opportunities to receive TOP training. Approximately half of students in the current study supported TOP training for nurses, demonstrating little professional territoriality. Utilizing the skills of nurses and midwives has proven to be one effective solution to the provider shortage problem in South Africa and is supported by the CTOP amendment (Adamo 2003; van der Westhuizen 2001). Since nurses are often the sole health providers in underserved areas in South Africa, they are critical determinants of access to abortion care (Dickson et al. 2003; van der Westhuizen 2001). Additional research in this field should examine nurses in training to determine if their knowledge, attitudes, beliefs and intentions are similar to respondents in the current survey.

This research has several limitations worth consideration. First, responses to a sensitive topic via self-administered survey may be subject to social desirability bias. To limit such bias, we carefully designed an anonymous questionnaire based upon previous authors' experiences (Buga 2002; Cook et al. 1993; Rosenblatt et al. 1999; Shotorbani et al. 2004; Westfall et al. 1991), and we piloted and refined our questionnaire repeatedly to improve questionnaire specificity and minimize bias (Cook et al. 1993). Finally, because there appears to be no social consensus with respect to TOP in South Africa, it is unlikely that findings were biased in any particular direction. Second, as this questionnaire was administered among medical students at two universities in South Africa, the results may not be generalizable to other student populations. However, this study was specifically designed to address knowledge and attitudes about TOP training among South African medical students in the context of TOP workforce shortages. Nevertheless, the issues brought up by students in South Africa echo many other budding health providers' sentiments worldwide, and the applicability of the current research may be more far-reaching than was originally realized. Finally, because this study was cross-sectional, it does not describe changes in opinions over time. In the future, long-term cohort studies following medical students through their professional trajectories to clinical practice would be useful to describe changes in knowledge, attitudes, beliefs and practice behaviours over time.

Despite these limitations, to our knowledge, this study represents one of the first of its kind assessing students' views of the African medical curricula with respect to abortion training. Our 84% response rate indicates that the sample of students surveyed in this study is likely representative of medical school classes studying at UCT and WSU during this time period. Furthermore, comparative analyses demonstrated that gender and medical school class distribution of study participants accurately reflected that of the UCT and WSU medical programs and others in South Africa. Our study suggests that medical students in South Africa are receptive to inclusion of more TOP training in the medical curriculum and that knowledge of TOP legislation could be improved. Based on our findings, curriculum changes at African medical universities may be valuable to improve TOP knowledge, access, availability, equitability and quality of abortion care services in South Africa. By

introducing the TOP training initiatives students desire, the provider base for future abortions may be increased, a significant contribution to access/quality of care issues in TOP service provision. A coherent, widespread effort to improve TOP training, knowledge and service delivery must be identified, incorporating the views of all stakeholders. A multidisciplinary approach will likely be most effective in addressing deficiencies in professional training and ensuring that safe, accessible abortion care is available to all women.

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