

Does pregnancy/paternity intention predict contraception use? A study among US soldiers who have completed initial entry training

Kathleen O'Rourke, Alice Richman, Mary Roddy, Michael Custer

Abstract

Background and methodology The US Army represents a community of young adults at risk for unintended pregnancy/paternity. Our study evaluated the effect of pregnancy/paternity intention on contraceptive choice amongst new, sexually active and non-pregnant recruits. A total of 592 males and 503 females completed self-administered surveys asking about pregnancy/paternity intention, contraceptive use at last intercourse, and potential confounding factors. A multidimensional measurement of pregnancy intention was developed. Contraceptive efficacy was categorised as a four-level ordinal variable. Multivariate ordinal regression measured the association between pregnancy/paternity intention and the most efficacious birth control method used at last intercourse.

Results Only 7% of participants planned a pregnancy in

the next 6 months, but almost 33% of them used no birth control at last intercourse. Each unit increase in pregnancy avoidance scale was associated with a 14% increase in efficacy of birth control method used ($p < 0.0001$). Effectiveness of birth control method increased for age ($p = 0.0873$), post-secondary education ($p = 0.0142$) and male gender ($p = 0.0019$). Binge drinking reduced the likelihood of being in a higher category of birth control use ($p = 0.0258$).

Discussion and conclusions Intention to avoid pregnancy and being male was associated with use of higher-level birth control methods.

Keywords contraception use, family planning, unintended pregnancy/paternity, US Army

J Fam Plann Reprod Health Care 2008; **34**(3): 165–168
(Accepted 5 March 2008)

Introduction

Unintended pregnancy, defined as a pregnancy that occurs when a woman does not want to be pregnant and is characterised as mistimed, unwanted or ambivalent, is a negative but largely preventable outcome of unprotected sexual activity. The 50% prevalence of unintended pregnancy among women in the USA is the highest among all industrialised nations.¹ Pregnancy/paternity intention may be predictive of contraceptive usage but this relationship can be obscured by social, economic and demographic factors.

The US Armed Forces represents a large community of young adults at risk for unintended pregnancy, with women accounting for 13.8% of US Army soldiers. A study conducted with a military population found that the unintended pregnancy rate was in the upper range of civilian studies.² Few studies have evaluated the relationship between pregnancy intention and contraceptive use, particularly among male populations. In comparison to the civilian population, the military population is a young, racially diverse group generally meeting minimal educational standards of high school equivalency. The Army's policy to have all female soldiers fully evaluated as medically ready to deploy on arrival at

Key message points

- Intention to avoid pregnancy is positively associated with using more effective contraception.
- Pregnancy/paternity intention, age and education were found to be significantly associated with the choice of a more effective method of contraception at last sexual intercourse.
- While only 7.2% of women and men planned on becoming pregnant in the next 6 months, almost 33% of study participants used no method of birth control at their last sexual encounter.

first duty station ensures a higher access to health care than certain civilian populations enjoy.

Given this demographic profile and high risk for unintended pregnancy/paternity, the military population is an ideal group in which to evaluate the relationship of pregnancy/paternity intention on the choice of contraceptive methods.

Methods

A sample of 1095 Army recruits were given self-administered, gender-specific surveys asking about pregnancy/paternity intention, use of contraception during their most recent intercourse, and potentially confounding sociodemographic and behavioural factors. First-term soldiers, sexually active but not pregnant or an expectant father, were interviewed at in-processing and were recruited from Fort Bliss, TX and Fort Gordon, GA. These soldiers make up approximately 60–70% of the US Army.

Study variables

Independent variables

The major independent variable was a multidimensional measurement of pregnancy intention using a modification of the Pregnancy Risk Assessment Monitoring System (PRAMS) question plus additional questions appraising other facets of pregnancy/paternity intention: perceived problems, happiness, and financial cost if a pregnancy

Department of Epidemiology and Biostatistics, University of South Florida, Tampa, FL, USA

Kathleen O'Rourke, PhD, MPH, Professor
Mary Roddy, PhD, MPH, Professor

Department of Community and Family Health, University of South Florida, Tampa, FL, USA

Alice Richman, MPH, Doctoral Candidate

United States Army Center for Health Promotion & Preventive Medicine, Aberdeen Proving Ground, MD, USA

Michael Custer, DrPH, Director

Correspondence to: Ms Alice Richman, Department of Community and Family Health, University of South Florida, College of Public Health, 13201 Bruce B Downs Boulevard, MDC 56, Tampa, FL 33612, USA. E-mail: arichman@health.usf.edu

should occur within the next 6 months. These categories were each coded so that the highest number on the scale indicated the lowest intent to become pregnant.

The PRAMS pregnancy intent categories were coded as follows: planning to have a baby in the next 6 months was coded as 1, don't know (interpreted as ambivalent) was coded as 2, no intent in the next 6 months was coded as 3, and no intent ever was coded as 4. Perceived problems with a pregnancy within the next 6 months question was coded from no problems (1) to many problems (4). Happiness with a pregnancy ranged from very happy (1) to very unhappy (4). Anticipated cost of a baby was coded on three levels: a baby would improve finances (1), no change or don't know (2), and a baby would worsen the financial situation (3).

A scale of pregnancy intention was created using these four measures of pregnancy intention. These survey items were subjected to an exploratory factor analysis using squared multiple correlations as prior communality estimates. The principal factor method was used to extract the factors. All the above items were conceptually related and had factor loadings of 0.40 or greater and, thus, were retained and included in the composite indices.

Dependent variables

Contraceptive efficacy, the dependent variable, was categorised as a four-level ordinal variable and modelled using three categories as suggested by Steiner *et al.*³ In addition to the three tiers outlined in Steiner *et al.*, a fourth level was added to represent those individuals who used no birth control. Birth control method was measured as follows: 0 representing no birth control or postcoital actions; 1 indicating low effective barrier methods (condoms, foams, gels); 2 representing moderate effective choice of birth control pill or patch; and 3 signifying highly effective methods such as Depo-Provera®, intrauterine devices and sterilisation, which do not require regular user activities such as taking a daily pill or changing a patch weekly.

Confounding variables

Potentially confounding variables included: gender, age, education level, marital status, ethnicity, rank, history of a sexually transmitted infection (STI) in the past 5 years, number of sexual partners in the past year, and binge drinking defined as five or more drinks at one occasion in the past month.

Data analysis

Data analyses were conducted using SAS for Windows® version 9.1 (SAS Institute Inc., Cary, NC, USA, 2001). Descriptive statistics were used to describe the study population. The outcome variable, highest level of birth control used at last sexual intercourse, was modelled using the multivariate ordinal regression procedure described by Allison.⁴ The cumulative logit model allowed for three intercepts but only one odds ratio (OR) for each explanatory variable. Each OR estimates, while holding all confounding variables in the model constant, a weighted average of the corresponding coefficients and represents the change attributed to that independent variable for using:

- 1 A highly effective birth control method versus birth control pills/patch, barrier methods or no birth control/post-coital actions;
- 2 A highly effective birth control method or patch versus barrier methods or no birth control/postcoital actions; and
- 3 Any birth control method versus none or use of postcoital actions.

The interpretation of ORs in cumulative logistic regression in this study is the same as the interpretation for logistic regression, except there are four transitions instead of one as would be the case with a dichotomous dependent variable. For example, an OR of 1.2 for gender where female is the referent would indicate that males were 20% more likely to be using a higher-level birth control method than females. An OR of <1.0 reduces the likelihood a group has a higher-level birth control than the referent category and an OR of >1.0 increases the likelihood that a group use a higher level of birth control than the referent category.

We used a purposeful backwards elimination process to derive a final model that included variables with a value of $p < 0.15$. Given the fact that gender has been a strong predictor of contraceptive usage, we analysed potential interactions between gender and other covariates as well as conducted analysis stratified by gender. There was no evidence of interaction and the results were consistent so we chose to present the stratified model.

Ethical approval

The study was approved by the Medical University of South Carolina Institutional Review Board (IRB) in Charleston, SC, the University of South Florida IRB in Tampa, FL, the Eisenhower Army Medical Center IRB in Fort Gordon, GA, and the William Beaumont Army Medical Center IRB in El Paso, TX, USA.

Results

A total of 1095 soldiers (592 males and 503 females) completed surveys (Table 1). Most (93%) respondents were less than 25 years of age, single (72%), earned at least a high school diploma (91%), and were rank and file soldiers (92%) in the pay grades E-1 (Private) to E-4 (Specialist 4th class). These pay grades represent the Army's junior ranks and are soldiers with the least military experience. More than half of the respondents were Caucasian (54%), with Blacks and Hispanics representing 24% and 16%, respectively. Almost 60% of respondents had sexual intercourse with more than one partner in the past year.

Two-thirds (65%) of the respondents planned to have a baby sometime in the future, but only 7% were planning a pregnancy in the next 6 months. Nearly 17% were ambivalent about an impending pregnancy. Over 65% of participants perceived a pregnancy in the near future to be a problem, and only 35% stated they would be somewhat or very unhappy to be pregnant or father a child. Because the addition of a family member may raise housing and subsistence payments, under half (44.2%) of the participants believed their financial situation would worsen if a pregnancy occurred in the next 6 months.

Males and females differed significantly on all demographic, pregnancy intention and behavioural variables except age, perception of change in financial situation if pregnancy occurred in next 6 months, and condom use at last sexual intercourse (Table 1).

Nearly one-third (31%) of respondents reported no birth control use. Another 31% of respondents reported that they used barrier methods as their *highest* level of birth control at last sexual encounter, and 27% reported birth control pills or patch as their *highest* level of birth control. Only 11% of respondents reported using highly effective birth control methods like Norplant® or Depo-Provera at last sexual intercourse.

Table 2 presents the adjusted ORs for the categorisation of the highest level of birth control used at last sexual intercourse (0 = no birth control, 1 = barrier methods, 2 = birth control pills/patch, 3 = highly effective birth control methods). Male soldiers and their partners were 51% more

Table 1 Characteristics of new US Army soldiers who were sexually active and not pregnant (2003–2004) (*n* = 1095)

Variable	Total population (<i>n</i> = 1095)	Females (<i>n</i> = 503)	Males (<i>n</i> = 592)	<i>p</i>
Gender		NA	NA	
Male	592 (54.1)			
Female	503 (45.9)			
Age (years)				0.8020
<20	408 (37.3)	186 (37.0)	222 (37.5)	
21–24	612 (55.9)	285 (56.6)	327 (55.2)	
≥25	75 (6.9)	32 (6.4)	43 (7.3)	
Education (<i>n</i> = 1089)				<0.0001
<High school	104 (9.6)	26 (5.2)	78 (13.2)	
High school	630 (57.9)	274 (54.9)	356 (60.3)	
>High school	355 (32.6)	199 (38.9)	156 (26.4)	
Marital status (<i>n</i> = 1087)				0.0383
Married	304 (28.0)	124 (24.9)	180 (30.6)	
Single	783 (72.0)	374 (75.1)	409 (69.4)	
Ethnicity (<i>n</i> = 1085)				<0.0001
Black	255 (23.5)	158 (31.7)	97 (16.5)	
Hispanic	169 (15.6)	85 (17.1)	84 (14.3)	
Caucasian	588 (54.2)	221 (44.4)	367 (62.5)	
Other	73 (6.73)	34 (6.8)	39 (6.6)	
Rank				0.0085
≥Sergeant or above	79 (7.3)	25 (5.0)	54 (9.2)	
Private or Specialist 4th class	1007 (92.3)	473 (95.0)	534 (90.8)	
History of STI in past 5 years				0.0018
No	937 (87.1)	420 (83.7)	517 (90.1)	
Yes	139 (12.9)	82 (16.3)	57 (9.9)	
Total number of sexual encounters in past 1 year				0.0074
1	420 (40.8)	187 (40.0)	233 (41.4)	
2 or 3	307 (29.8)	160 (34.3)	147 (26.1)	
>3	303 (29.4)	120 (25.7)	183 (32.5)	
Binge drinking in past month				<0.0001
No	639 (58.4)	336 (66.8)	303 (51.2)	
Yes	456 (41.6)	167 (33.2)	289 (48.8)	
Pregnancy non-intent				<0.0001
Pregnancy planned in next 6 months	70 (7.2)	32 (7.6)	38 (6.9)	
Ambivalent (don't know)	163 (16.7)	44 (10.5)	119 (21.5)	
Pregnancy planned for sometime in future	631 (64.9)	303 (72.3)	328 (59.2)	
Never want to have a baby	109 (11.2)	40 (9.5)	69 (12.5)	
Level of problem if pregnancy occurred now				0.0331
No problem	160 (15.4)	74 (15.6)	86 (15.3)	
Not much of a problem	202 (19.5)	100 (21.1)	102 (18.1)	
A little bit of a problem	360 (34.7)	143 (30.1)	217 (38.6)	
Very much a problem	316 (30.4)	158 (33.3)	158 (28.1)	
Level of happiness if pregnancy occurred now				<0.0001
Very happy	286 (27.7)	98 (20.8)	188 (33.5)	
Somewhat happy	395 (38.3)	186 (39.5)	209 (37.3)	
Somewhat unhappy	169 (16.4)	90 (19.1)	79 (14.1)	
Very unhappy	182 (17.6)	97 (20.6)	85 (15.2)	
Change in financial situation if pregnancy occurred				0.2726
Better	95 (9.0)	38 (7.8)	57 (10.1)	
No change/don't know	492 (46.8)	223 (45.9)	269 (47.6)	
Worse	464 (44.2)	225 (46.3)	239 (42.3)	
Highest level birth control at last sexual intercourse				0.0094
Highly effective	118 (11.1)	60 (12.3)	58 (10.1)	
Birth control pills/patch	290 (27.4)	111 (22.8)	179 (31.2)	
Barrier methods	323 (30.5)	148 (30.4)	175 (30.5)	
No birth control	329 (31.0)	168 (34.5)	161 (28.1)	
Condom use				0.3024
No	578 (52.8)	274 (54.5)	304 (51.3)	
Yes	517 (47.2)	229 (45.5)	288 (48.7)	

NA, not applicable; STI, sexually transmitted infection.

likely than female soldiers to be classified in a higher level of birth control category (95% CI 1.16–1.96). Soldiers with at least some post-secondary education were 1.44 times more likely to use a more effective birth control method than their less educated counterparts (95% CI 1.08–1.93).

Categorisation of birth control method increased by a marginally significant 5% for each unit increase in age

(95% CI 0.99–1.12). Binge drinking in the past month reduced the likelihood of being classified in a higher category of birth control use (OR –0.74, 95% CI 0.57–0.97). Compared with Caucasians, the level of the dependent variable was lower for Black and soldiers of other ethnicities (OR 0.86, 95% CI 0.62–1.19 and OR 0.73, 95% CI 0.43–1.24) and higher for Hispanics (OR 1.32, 95% CI

Table 2 Adjusted odds ratios (ORs)^a for categorisation of highest level of birth control used at last sexual intercourse amongst new US Army recruits (2003–2004) (*n* = 845)

Variable	OR	95% CI	<i>p</i>
Gender			0.0019
Female	Referent		
Male	1.51	1.16, 1.96	
Age ^b	1.05	0.99, 1.12	0.0873
Education			0.0142
Less than some post-secondary	Referent		
Some post-secondary	1.44	1.08, 1.93	
Ethnicity			
Caucasian vs Hispanic	1.31	0.92, 1.86	0.1386
Caucasian vs Black	0.86	0.62, 1.19	0.3565
Caucasian vs other ethnicities	0.73	0.43, 1.24	0.2418
Binge drinking in past month			0.0258
No	Referent		
Yes	0.74	0.57, 0.97	
Pregnancy non-intention score ^c	1.14	1.09, 1.20	<0.0001

^aORs adjusted for all other variables in the model. ^bFor each unit increase in age. ^cFor each unit increase in pregnancy avoidance scale.

0.92–1.86), but the differences were not statistically significant. Each unit increase on the pregnancy avoidance scale was associated with a 14% increase in the level of birth control used (95% CI 1.09–1.20).

Discussion and conclusions

In this study of a military population, pregnancy/paternity intention, age and education were found to be significantly associated with the choice of efficacy of the contraceptive methodology. That is, as the desire not to become pregnant increased, the level of contraception use also increased. Likewise, as age and educational level increased so did the level of contraception use.

Although there was a slight decline in the level of birth control method when comparing African-American to Caucasian users, and a slight incline in the level of birth control used by Hispanic versus White users, these associations were not statistically significant.

Contraception use by participants in our study was similar to findings from the National Survey of Family Growth.⁵ Overall, people across the nation, as well as participants in this study, were using similar percentages of hormonal contraception: 30% use in the nation and 27% use in the study.⁵

Given the strong relationship between contraception use and pregnancy/paternity intention, it is interesting that contraception was inconsistently used despite a lack of pregnancy intention by both men and women. For example, while only 7.2% of women and men planned on becoming pregnant in the next 6 months, almost 33% used no method of birth control at their last sexual encounter.

Our study provides new information about paternity intention and contraceptive use. The military population in this study offers the opportunity to evaluate both pregnancy intention in women as well as paternity intention in men. In all analyses, males were more likely than females to use condoms and were more likely to report dual protection. Although a higher level of condom use was shown among all study participants who did not intend to become

pregnant or father a child, men reported higher condom use than women and married individuals reported less condom use than unmarried individuals. Black study participants were more likely to use condoms than their Caucasian counterparts. Also, the more partners a person reported having within the past year, the more likely they were to use condoms.

In summary, this study found that intention to avoid pregnancy was positively associated with using more effective contraception. Although it is important to uncover this relationship, it is disconcerting that almost one-third of the population attempting to avoid pregnancy used no birth control at last sexual intercourse. In addition, the gender and ethnic differences in contraceptive choices are not fully understood and warrant further study.

Statements on funding and competing interests

Funding This study was funded by a co-operative agreement through the American Association of Medical Colleges and Centers of Disease Control and Prevention, Grant #MM-0266-03/03.

Competing interests None identified.

Authors' note

The opinions expressed in this manuscript are those solely of the authors and do not represent the views or official policies of the United States Army or the Department of Defense.

References

- 1 Henshaw SK. Unintended pregnancy in the United States. *Fam Plann Perspect* 1998; **30**: 24–29, 46.
- 2 Custer M, Waller K, Vernon S, O'Rourke K. Unintended pregnancy rates among a US military population. *Paediatric Perinat Epidemiol* 2008; **22**: 195–200.
- 3 Steiner MJ, Dalebout S, Condon S, Dominik R, Trussell J. Understanding risk: a randomized controlled trial of communicating contraceptive effectiveness. *Obstet Gynecol* 2003; **102**: 709–717.
- 4 Allison P. *Applied Ordinal Regression*. Cary, NC: SAS Institute, 2003.
- 5 Mosher WD, Chandra A, Jones J. Sexual behavior and selected health measures: men and women 15–44 years of age, United States, 2002. *Advance Data from Vital and Health Statistics* 1995; **362**: 1–56. <http://www.cdc.gov/nchs/data/ad/ad362.pdf> [Accessed 19 January 2006].

NOTEWORTHY STATISTICS (NS)

Noteworthy Statistics (pp. 169–170) is a new journal initiative – a regular feature providing some extra explanation and reflection on a specific statistical method applied in an article in that issue. The aim is both to deepen readers' understanding of the article concerned, and to take the opportunity to offer some 'continuing professional education' in statistics. The first statistical method chosen for closer examination is ordinal logistic regression, which has been employed in the O'Rourke *et al.* article in this issue (pp. 165–168).