Ethical Attitudes on Human Cloning Among Professionals in Taiwan and the Policy Implications for Regulation

Che-Ming Yang, M.D., J.D., Ph.D.,*
Chun-Chih Chung,** Meei-Shiow Lu,***
Chiou-Fen Lin,**** and Jiun-Shyan Chen*****

Abstract: This research focused on understanding the attitudes toward human cloning in Taiwan among professionals in healthcare, law, and religion.
Design: The study was conducted utilizing a structured questionnaire.
Participants: 220 healthcare professionals from two regional hospitals located in Taipei, 351 religious professionals in the northern Taiwan and 711 legal professionals were selected by to receive questionnaires. The valid response rate is 42.1%
Main measurements: The questions were generated by an expert panel and represented major arguments in the human cloning debate. There were a total of six Likert scaled questions in the questionnaire. The responses were coded from 1 to 5 with 1 representing strong opposition to human cloning, 3 representing a neutral attitude; and 5 representing a strong favorable attitude toward human cloning.

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* School of Healthcare Administration, Taipei Medical University, and Taipei Municipal Wan Fang Hospital, Taiwan. M.D., Taipei Medical College, 1990; J.D., Indiana University School of Law-Indianapolis, 1996; Ph.D., Johns Hopkins University School of Public Health, 2003.

** Department of Nursing, Taipei Medical University Hospital, Taiwan. Correspondence to: Chun-Chih Chung, R.N., M.H.A., Taipei Medical University Hospital Department of Nursing, No. 252, Wu-Hsing Street, Taipei 110, Taiwan, ROC. Tel. No. (886) -2-7372181 ext. 3315; Fax No. (886)-2-27385343; e-mail address: chung@mail.tmch.org.tw.

*** College of Nursing, Taipei Medical University, Taiwan.

**** College of Nursing, Taipei Medical University, Taiwan.

***** School of Healthcare Administration, Taipei Medical University, Taiwan.

Results: Healthcare professionals had the highest overall average score of 2.14 and the religious professionals had the lowest average at 1.58. All three categories of respondents' attitude toward cloning ranged from mild opposition to strong opposition to human cloning. The religious professionals were more strongly opposed to cloning. Age, education, and religion significantly influenced attitudes toward cloning. Professionals between fifty-one and sixty years old, those with less education, and Roman Catholic professionals were more strongly opposed to cloning.
Conclusions: Religious professionals were more strongly opposed to human cloning than professionals in healthcare or law. Younger professionals as an age group demonstrated less opposition to human cloning. Regulation of human cloning will be influenced by professionals in healthcare, law, and religion, and the regulatory environment chosen now will play a pivotal role in influencing the acceptance of human cloning in the future.

Background and Objectives

Since the cloning of Dolly the sheep, people have been inundated with reports of the cloning of all sorts of life forms, such as cows, monkeys, etc. Cloning animals may not sound as frightening as cloning humans, but the concept of cloning is still confusing for many people.

Although human cloning has become a widely discussed ethical issue, people can easily lose their focus among various perspectives on human cloning. In order to clarify our discussion, we will use vocabulary consistent with the definitions given by the U.S. President's Council on Bioethics (hereinafter "President's Council"). Human cloning was defined by the President's Council as "asexual production of a new human organism that is, at all stages of development, genetically virtually identical to a currently existing or previously existing human being."[1] Thus, human cloning is "accomplished by introducing the nuclear material of a human somatic cell (donor) into an oocyte (egg) whose own nucleus has been removed or inactivated, yielding a product that has a human genetic constitution virtually identical to the donor of the somatic cell."[2]

The President's Council separated human cloning into two categories in view of their purposes: (1) cloning to produce children and (2) cloning for biomedical research.[3] Cloning to produce children is also popularly known as reproductive

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[1] The President's Council on Bioethics, Human Cloning and Human Dignity: An Ethical Inquiry xxi-xxxviii (2002) (hereinafter "President's Council").

[2] *Id.*

[3] *Id.*

cloning and cloning for biomedical research is also known as therapeutic cloning.[4] This dichotomy sharply demarcates the boundaries of two groups of thought and has divided opinions in the U.S. Congress as well.[5]

Most countries still ban all human cloning; while some allow research for therapeutic cloning to a limited extent. There is little international consensus on the regulatory framework for human cloning.[6] Taiwan is no different from other nations. According to Taiwan's fetal stem cell research ethical guidelines, fetal stem cells may only be harvested from dead fetuses from abortion or failed assisted reproductive attempts, and a moratorium on cloning fetuses remains in effect.[7] On the other hand, reproductive cloning is also banned under the assisted reproduction rules of Department of Health of Taiwan.[8]

This study focuses on the attitudes on human cloning in Taiwan among professionals in healthcare, law, and religion. People of these professions are more likely to be the opinion leaders on whether human cloning should be legalized. Further understanding of their preferences will provide a unique perspective of how this ethical dilemma is likely to resolve. In the conclusion, the study results will be interpreted to answer two questions: (1) whether there are differences in attitude toward human cloning among these professions; and (2) whether personal characteristics influence attitudes toward human cloning.

Study Descriptions

There have been numerous surveys worldwide on this issue. Most of them are popular surveys. This study focuses on the attitudes of professionals, specifically those in healthcare, law and religion. This study was conducted utilizing a structured questionnaire. The questions were generated by an expert panel and presented major arguments in the human cloning debate. The content validity index (CVI) of each question has to reach 0.86 in order to stay in the questionnaire. After validity and reliability tests, a total of six Likert scaled questions remained in the questionnaire. The value of Cronbach's alpha is at 0.8046.

The six questions are as follows:

1. Human cloning should be banned because it is unnatural and a derogation of human dignity.
2. Human cloning should be banned because cloning technique is still not perfect, will produce a lot of congenital anomalies, and is too risky for life.
3. Human cloning is only beneficial to very few people and therefore is not worthy of investment of our limited resources.

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[4] *Id.*

[5] George J. Annas, *Cloning and the U.S. Congress*, 346 New Eng. J. Med. 1599 (2002).

[6] S.D. Pattinson & T. Caulfield, *Variations and Voids: The Regulation of Human Cloning Around the World,* 5(1) BMC Med. Ethics E9 (2004).

[7] Fetal Stem Cell Research Ethical Guidelines of 2002 (Taiwan).

[8] Assisted Reproduction Rules of 1999 (Taiwan).

4. Human cloning should be developed because its potential benefits outweigh other concerns.
5. Human cloning should be allowed because it will provide cures for many diseases, and does not cause conflicts between genders and single parent problems.
6. Couples who wish to have offspring, cannot reproduce by other means, and do not want donated sperm or ova, should be able to clone babies using the somatic cell of one spouse and the sperm or ova of the other spouse.

The first and sixth questions were written to reflect the teleological perspective in that they pertain to human dignity and fundamental right to reproduce; whereas the other questions are more deontologically oriented. The first four questions deal with human cloning as a whole; whereas the fifth question was specifically directed to therapeutic cloning and the sixth to reproductive cloning.

According the pretest data, 150 valid responses were required in each category.[9] As a result, we selected 220 healthcare professionals from two regional hospitals located in Taipei, 351 religious professionals in the northern Taiwan, and 711 legal professionals. Selection was based on convenience and ease of access, and therefore, was not a completely random sampling.

Study Results

The descriptive analyses of the study sample

A total 1,282 questionnaires were sent to our study sample in 2001. There were a total of 540 valid responses. The valid response rate is 42.1% (Table 1). Of the whole study sample, the average age was 37.46 years old and 54.1% are females; 65.8% have at least bachelor level education; and 50.4% are single (Table 2). In regard to religious preference, Buddhists make up the major proportion at 34.1%, followed by atheists at 28.9%, and Christians at 18.9% (Table 2). As to profession, 38.1% were healthcare professionals, 33.9% were religious professionals, and 28% were legal professionals (Table 1). Most of them, 35.4%, had service seniority of less than 5 years and 27% had served in their professions for 6 to 10 years (Table 2).

The healthcare sub-sample included more females (67.5%) that were younger (average at 30.69 years old) than the whole sample (Table 2). Among the healthcare professionals, most of them were nurses (64.6%) and 35.4% were physicians (Table 1). In the religious sub-sample, more persons (61.2%) were single in comparison with the general sample due to the celibacy requirement (Table 2). Among them, protestant Christians accounted for 38.3%, Buddhists 33.3%, and Roman Catholics 28.4% (Table 2). They also have more service seniorities than the others; only 16.9% had worked in their profession for less than 5 years (Table 2). As to the legal sub-sample, there are slightly more males, 59.6% (Table 2), and most of them were lawyers.

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[9] W.W. Daniel, Biostatistics 181 (7th ed. 1999).

Table 1. The results of survey responses

Profession	Profession subcategory	Subtotal	Total	Subtotal responses	Total responses	Subtotal Valid responses	Total Valid responses	Total Valid response rate
Healthcare	Nurses	140	220	135	210	133	206	93.6%
	Physicians	80		75		73		
Religion	Buddhism and Taoism	118	351	76	220	61	183	52.1%
	Protestant	123		89		70		
	Catholic	110		55		52		
Law	Lawyers	300	711	84	152	84	151	21.2%
	Law School Faculty	61		20		19		
	Judges and Prosecutors	350		48		48		
	Total	-	1282	-	582	-	540	42.1%

Table 2. The personal characteristics of respondents*

Variables		Total (n=540)	Healthcare professionals (n=206)	Religious professionals (n=183)	Legal Professionals (n=151)
		number (%)	number (%)	number (%)	number (%)
Gender	Male	248(45.9)	67(32.5)	91(49.7)	90(59.6)
	Female	292(54.1)	139(67.5)	92(50.3)	61(40.4)
Age (y/o)+		(37.46±12.37)+	(30.69±6.87)+	(45.32±14.16)+	(37.15±10.15)+
<30		185(34.3)	121(58.7)	21(11.5)	43(28.5)
31-40		193(35.7)	68(33.0)	57(31.1)	68(45.0)
41-50		93(17.2)	14(6.8)	55(30.1)	24(15.9)
51-60		35(6.5)	3(1.5)	23(12.6)	9(6.0)
>61		33(6.1)	-	27(14.8)	6(4.0)
Education					
Master or doctoral		133(24.7)	9(4.4)	59(32.3)	65(43.0)
Bachelor		222(41.1)	95(46.1)	42(23.0)	85(56.3)
Junior college		132(24.4)	100(48.5)	32(17.5)	-
High school		35(6.5)	2(1.0)	33(18.0)	-
Junior high, elementary school and the others		11(2.0)	-	11(6.0)	-
Marriage					
Single		272(50.4)	106(51.5)	112(61.2)	54(35.8)
Married		250(46.3)	100(48.5)	57(31.1)	93(61.6)
Divorced, widow or widower		12(2.3)	-	8(4.4)	4(2.6)
Religion					
Buddhism		184(34.1)	71(34.5)	61(33.3)	52(34.4)
Protestant		102(18.9)	22(10.7)	70(38.3)	10(6.6)
Catholic		61(11.3)	4(1.9)	52(28.4)	5(3.3)
Taoism		22(3.1)	17(8.3)	-	5(3.3)
Others (including traditional worship)		7(1.3)	4(1.9)	-	3(2.0)
Atheists		156(28.9)	86(41.7)	-	70(46.4)
Service seniority (years)					
<5		191(35.4)	100(48.5)	31(16.9)	60(39.7)
6 –10		146(27.0)	66(32.0)	42(23.0)	38(25.2)
11-15		73(13.5)	25(12.1)	27(14.8)	21(13.9)
16-20		34(6.3)	8(3.9)	17(9.3)	9(6.0)
21-25		24(4.4)	5(2.4)	15(8.2)	4(2.6)
26-30		11(2.0)	1(0.5)	9(4.9)	1(0.7)
>31		35(6.5)	1(0.5)	26(14.2)	8(5.3)

* Missing value not listed; +(mean±S.D.).

The survey results

The responses are coded from 1 to 5 in order. A neutral answer scored 3 points. The higher the score above 3 points, the more the respondent favored cloning, at least as to that particular question. The lower the score below 3 points, the more the respondent was opposed to cloning, at least as to that particular question.

The healthcare professionals had the highest overall average score of 2.14 and the religious professionals had the lowest average at 1.58 (Table 3). The results indicated that the attitude of all three categories of respondents' toward cloning fell between mild opposition (>2.00) to cloning and strong opposition (<2.00) to cloning. The religious professionals were most strongly opposed to cloning.

The over all attitude toward cloning

The overall average score was 1.94 (Table 3), indicating significant opposition to human cloning among all three professions. Question 2 had the lowest average of score of 1.64 (Table 3), which means that our respondents more enthusiastically embraced the statement that "cloning should be banned because cloning technique is still not perfect, will produce a lot of congenital anomalies, and is too risky for life." Question 6 had the highest average score of 2.16 (Table 3), which means our respondents oppose the concept that infertile couples can reproduce by cloning, yet the degree of opposition is not as strong as their opposition to other statements.

Healthcare professionals' attitude

The overall score for healthcare profession was 2.14 (Table 3), which was the highest score and signified that they were less opposed to human cloning than professionals in law or religion. For healthcare professionals, question 2 had the lowest average score of 1.73 and question 4 has the highest average score of 2.48 (Table 3). The healthcare professionals were apparently more concerned that cloning technology is still not perfect; on the other hand, they appear to believe that human cloning research would have benefits.

Legal professionals' attitude

The overall score for legal professionals was 2.11 (Table 3). Similar to the healthcare professionals, the legal professionals were more concerned that cloning technology is still not perfect; while they appeared to believe that human cloning does have benefits.

Religious professionals' attitude

The overall score for religious professionals was 1.58 (Table 3), which is the lowest as compared with the other two groups and signifies that they are most opposed to cloning. Question 1 scored the lowest at 1.41; while question 6 scored the highest at 1.73 (Table 3). Religious professionals most strongly opposed cloning because it is unnatural and a derogation of human dignity. However, there was less opposition to the fundamental right to reproduction.

Table 3. The survey scoring results

Question Number	Total n=540		Healthcare professionals n=206		Religious professionals n=183		Legal professionals n=151	
	M	SD	M	SD	M	SD	M	SD
*1	1.71	0.96	1.82	1.04	1.41	0.71	1.91	1.02
*2	1.64	0.91	1.73	1.04	1.43	0.73	1.77	0.88
*3	1.97	1.13	2.12	1.22	1.65	0.97	2.13	1.10
4	2.15	1.13	2.48	1.23	1.66	0.81	2.29	1.13
5	2.04	1.05	2.23	1.14	1.64	0.84	2.26	1.02
6	2.16	1.12	2.43	1.19	1.73	0.93	2.30	1.10
Average	1.94	0.78	2.14	0.82	1.58	0.56	2.11	0.81

* on reverse scale

The results of hypotheses testing

Hypothesis A: There are varying attitudes toward human cloning among professionals in healthcare, law, and religion. Although most of the respondents did not approve of cloning humans, there were significant differences in attitude toward human cloning among the three professions. According to Mann-Whitney U test, there is no significant difference between healthcare professionals and legal professionals, both of which were opposed to human cloning; whereas religious professionals were more strongly opposed to human cloning (Table 4).

Table 4. The attitude differences among three professions

Variables	1=Healthcare professionals		2=Religious professionals		3=Legal professionals		Kruskal-Wallis Test		Mann-Whitney Test
	M	SD	M	SD	M	SD	x^2	P	
*No. 1	1.82	1.04	1.41	0.71	1.90	1.03	129.726**	0.000	(1>2) (2<3)
*No. 2	1.73	1.04	1.43	0.73	1.78	0.88	18.229**	0.000	(1>2) (2<3)
*No. 3	2.12	1.22	1.65	0.97	2.14	1.10	23.239**	0.000	(1>2) (2<3)
No. 4	2.48	1.23	1.66	0.81	2.29	1.13	57.066**	0.000	(1>2) (2<3)
No. 5	2.23	1.14	1.64	0.84	2.27	1.03	46.765**	0.000	(1>2) (2<3)
No. 6	2.43	1.19	1.73	0.93	2.30	1.11	46.273**	0.000	(1>2) (2<3)

*on reverse scale, *p<0.05, **p<0.01

Hypothesis B: Personal characteristics will influence attitudes toward human cloning. There is no significant difference between genders and marital status. There are significant differences among different ages. Those younger than 30 years old have the highest score, while those ages 51-60 years old have the lowest score. This finding indicated that younger people oppose human cloning less.

There are significant differences among educational levels. Respondents who have below high school education are more opposed to human cloning than those with college or graduate level education. This finding indicated that more educated people tend to oppose human cloning less.

There are significant differences among religions. According to Scheffe post hoc test, Romans Catholics are most strongly opposed to human cloning; Taoists are least opposed to human cloning.

Professionals who were between 51 and 60 years old, those with high school education, and Roman Catholics were most opposed to human cloning (Table 5).

Professionals under 30 years of age, those with undergraduate education, and those identifying themselves as atheists, Buddhists, or Taoists, were least opposed to cloning. Professionals ages 30 to 51, and over 60 years of age, those with graduate degrees, and those who identified themselves as protestant Christians or traditional worship, fell in between. In summary, age, education, and religion significantly influenced attitudes toward cloning.

Table 5. The matched analyses of personal characteristics influences

Variable	N	M	SD	T/F	P	Scheffe's
Gender						
1=Male	248	1.995	0.834	1.477	0.140	
2=Female	292	1.896	0.733			
Age (y/o)						
1=<30	185	2.080	0.800	3.855**	0.004	(1>4)
2=31-40	193	1.938	0.749			
3=41-50	93	1.822	0.853			
4=51-60	35	1.590	0.555			
5=>61	33	1.912	0.726			
Marriage						
1=Single	272	1.931	0.796	-0.272	0.785	
2=Married	262	1.950	0.771			
Education						
1=Master or doctoral	133	1.870	0.852	3.054*	0.017	(2>4)(3>4)a
2=Bachelor	222	2.012	0.791			
3=Junior college	132	2.030	0.742			
4=High school and below	40	1.620	0.493			
5=Others		6	1.667	0.816		
Religion						
1=Buddhism	184	1.979	0.758	10.658**	0.000	(1>3)(4>2)
2=Protestant	102	1.724	0.689			(4>3)(6>2)
3=Catholic	61	1.481	0.610			(6>3)
4=Taoism	22	2.311	0.926			
5=Traditional worship	7	1.610	0.702			
6=Atheists	156	2.163	0.777			
Services seniority (years)						
1=<5	191	2.093	0.812	2.132*	0.048	
2=6 –10	146	1.945	0.755			
3=11-15	73	1.890	0.857			
4=16-20	34	1.706	0.687			
5=21-25	24	1.924	0.676			
6=26-30	11	1.667	0.695			
7=>31	35	1.808	0.679			

*p<0.05, **p<0.01, a= Tukey test

Discussions and Conclusions

Most of the surveys reveal opposition to cloning. This study indicated that up to 88.8% of professional respondents agreed that human cloning should be banned because it is unnatural, a derogation of human dignity, and too risky. This finding is similar to the *Time* magazine survey in 1997 in which 74% thought cloning is against the will of God.[10] It is therefore understandable that religious professionals

[10] J. Kluger, *Will We Follow the Sheep?* TIME, Mar. 1997, at 37.

and Roman Catholics are firmly opposed to cloning. Forty-two percent of healthcare professionals and 46% of legal professionals are atheists and as a result are less opposed to human cloning.

As our results indicated, the religious professionals favored the argument that cloning is against human dignity; while the other two professions appeared to be more risk adverse. Under the teleological reasoning, the regulatory policy will have to be a total ban on human cloning regardless of it purposes. Nonetheless, this contention has been criticized on the ground that "human dignity" lacks an operational definition. Without a clear understanding of what human dignity means, the policy debate on this issue may be hindered.[11] That also explains why the other professionals find this argument less convincing. Therefore, the human dignity argument against cloning may be less persuasive for healthcare and legal professionals.

From a utilitarian perspective, 75.9% agreed that human cloning is only beneficial to very few people and not worthy of investment of our resources. Only 23.9% of respondents thought human cloning should be allowed because it may provide cures for many diseases. Nonetheless, people who favor risk benefit analyses tend to oppose a complete ban on human cloning and prefer to focus on how to ensure the technique is used responsibly for the common good.[12]

Therefore, the preferred regulatory framework might be the establishment of a regulatory agency to oversee limited experimentation in human cloning. The agency should be composed primarily of non-researchers and non-physicians so as to reflect public values.[13] Since our results indicated that healthcare professionals are the least opposed to human cloning, healthcare scientists have the greatest potential to become cloning advocates contrary to societal values.

The study demonstrates that most people, regardless of their occupations are opposed to human cloning primarily because it is still considered too risky. Young professionals and college educated people may be more optimistic about potential benefits to be derived from cloning research, especially in the area of therapeutic cloning. Similar results were observed in a 2000 Canadian survey, in which 90% of Canadian respondents were against reproductive cloning, and yet 80% approved of therapeutic cloning.[14] However, for average people, therapeutic cloning sounds merely like cloning tissues or organs. The reality that stem cells must be harvested

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[11] T. Caulfield, *Human Cloning Laws, Human Dignity and the Poverty of the Policy Making Dialogue,* 4(1) BMC Med. Ethics E3 (2003).

[12] J.A. Robertson, *Human Cloning and the Challenge of Regulation*, 339 New Eng. J. Med. 119 (1998).

[13] G.J. Annas, *Why Should We Ban Human Cloning?* 339 New Eng. J. Med. 122 (1998).

[14] H. Scoffield, *Canadians Favor Limited Use of Clones for Emergencies Only, Survey Finds,* CNN, June 19, 2000, at http://edition.cnn.com/2000/LOCAL/westcenteral/06/19/tgm.cloning.poll/index.html (accessed Mar. 9, 2005).

from cloned embryos may not be common knowledge to them. This is an often neglected fact in the utilitarian perspective and has been sharply criticized.[15]

In the U.S. President's Council on Bioethics' 2002 report,[16] the minority recommendation was to ban reproductive cloning, yet regulate the use of cloned embryos for biomedical research. On the other hand, the majority recommended a ban on reproductive cloning combined with a four-year moratorium on therapeutic cloning for research in order to initiate a federal review of related matters in current and projected practices of human cloning. In contrast, progress has been made in therapeutic cloning in Europe. In March 2005, the creator of Dolly the sheep was granted a license to clone embryos to study motor neuron disease by Britain's Human Fertilization and Embryology Authority (HFEA), which is the second such license granted by HFEA.[17]

Cloning technology is probably still too risky. But will the advance of technology make it an acceptable risk in the future? With the passing of time, the sympathy for human cloning may grow. From a regulatory point of view, if current regulations broadly banning cloning research continue, the day human cloning becomes an acceptable risk may never come. But if the research into perfecting cloning continues to progress, mankind may face a slippery slope in that the benefits of human cloning are viewed as outweighing the risks, and the fundamental respect for human life is further diminished. Therefore, the debate about whether we should ban the cloning of human beings is important because it is a debate about fundamental societal values. We must be certain not just that human cloning, though technically possible, is unsafe at this point in time, but that even with improvements in cloning technology, the technology will not dominate moral and ethical concerns in the future. Can religion stand fast as the final barrier to human cloning? Will moral and ethical concerns diminish as the younger generation grows accustomed to the concept of human cloning? The regulatory environment chosen now will definitely play a pivotal role in influencing the acceptance of human cloning in the future. Professionals in healthcare, law and religion, as societal leaders and opinion-makers, may hold the key to the future of human cloning.

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[15] E.D. Pellegrino et al., *Therapeutic Cloning*, 347 New Eng. J. Med. 1619 (2002).

[16] President's Council, *supra* note 1.

[17] *Dolly Creator Gets Cloning License,* CNN, Feb. 8, 2005, at http://edition.cnn.com/2005/HEALTH/02/08/uk.cloning/index.html (accessed Mar. 9, 2005).