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## Attitudes of Greek Health Care Professionals on Human Cloning

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# Attitudes of Greek Health Care Professionals on Human Cloning

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### Abstract

The aim of the study is to evaluate the attitudes and opinions of Greek health care professionals with regard to cloning. The sample included 303 individuals, medical and nursing personnel. An anonymous questionnaire was used and data analysis was performed using descriptive statistics,  $X^2$  (Chi Square) test and Mann-Whitney U test. More than 50% of the participants agree that cloning a) offends human dignity, b) devalues the role of the male in human reproduction and c) helps rescue endangered species. Eighty percent of the sample supports that cloning reduces the genetic diversity of humans and nature. Additionally, 71.2% of the sample stands against reproductive cloning, while 63.9% are in favor of therapeutic cloning. Independent variables that influence the attitudes towards cloning are: the importance of religion, the category of personnel (medical or nursing) and age. The majority of the participants do not consider reproductive cloning morally acceptable. Nevertheless, it is believed to help rescue endangered species. The participants consider therapeutic cloning important for the treatment of illnesses.

Keywords: Reproductive cloning, Therapeutic cloning, Bioethics.

## Attitudes of Greek Health Care Professionals on Human Cloning

### Introduction

An important step in the development of cloning was the announcement of the reproduction of an animal using somatic cells of an adult individual by embryologist Ian Wilmut and his collaborators (Wilmut et al, 1997).

There are two distinct types of human cloning using somatic cell nuclear transfer, namely reproductive and therapeutic. Human reproductive cloning aims to produce a human being genetically identical to another individual. Therapeutic cloning on the other hand, aims to provide compatible tissues and organs for replacement therapy. A distinction between reproductive and therapeutic cloning is necessary because each type may pose different moral, theological and philosophical issues related to their application.

Complex ethical and legal issues regarding assisted reproduction technologies (ART) have risen since the emergence of in vitro fertilisation (IVF) in 1978 (Dickens et al., 2002; Gamal et al., 2002). Thus, an ongoing debate and ethical controversy has evolved among specialized professionals, legislators, religious authorities and the general public on issues such as genetic material donation, embryo research and human cloning (Fasouliotis & Schenker, 2000). Many countries, realizing that limits should be set to the use of ART, have attempted to establish regulations regarding these types of applications (Schenker et al., 1997). In Greece, relevant legislation has been voted (3089/12-2002 and 3305/01-2005). However, there is limited published research regarding attitudes towards the use of such methods. Data only on public opinion regarding such technologies has been published in the past (Chliaoutakis et al., 2002; Tzamalouka et al., 2005).

### Arguments against reproductive cloning

The main argument against reproductive cloning is that it offends human dignity (Annas et al., 1998) based on the notion that it determines, to a great extent, the development

of the human personality. It has also been stressed that reproductive cloning reduces genetic variability, normally maintained by the natural reproductive process, and threatens genetic diversity (Vlachopoulos et al., 2000; Grieniedakis et al., 2005). Additionally, there are risks related to the physical health and integrity of the clone. It is argued that one third of the cloned mammals present abnormalities during their growth, having large internal bodies and respiratory and circulatory problems (Young et al., 1998). Furthermore, it has been reported that many surviving are overweight having big placenta (Hill et al., 1999).

Previous studies also report that the incidence of developmental abnormalities in cloned animals is around 30% (Byrne & Gurdon, 2002), while incidence of developmental abnormalities in the natural sexual reproduction is only 3%, which becomes considerably higher when the age of the mother is above 40 years (Waitzman et al., 1994). Furthermore, it is argued that human cloning sets a high risk for the mental health of the cloned child (Burley & Harris, 1999).

In addition to the above, reproductive cloning seems to influence social values, such as marriage, relations between parents and child, and the relations between spouses. At the same time, it is believed to devalue the role of men in human reproduction, thus affecting to a great extent the equality between men and women (Grieniedakis et al., 2005).

Finally there is a concern that future parents will seek donors of bodily cells with desirable characteristics and that the potential donors will sell themselves as high value sources of genomes. The search of individuals' genomes to identify those with rare genetic characteristics imports the element of eugenics and promotes genetic determinism (American Society for Reproductive Medicine, 2004).

### **Arguments in favor of reproductive cloning**

Reproductive cloning is considered most suitable and effective in cases where other alternative reproductive methods cannot be applied (Robertson et al., 2000). Such cases

include females who cannot produce ova, males that suffers from azoospermia, or when one or both parents carry a genetic disease (Harris et al., 1997).

Supporters of reproductive cloning also argue that human personality is not determined only by its genetic material, but it is also affected by environmental factors. Therefore, just because two persons may have common genetic material, does not mean that they also have the same personality (Harris et al., 1997).

### **Arguments in favor of therapeutic cloning**

The majority of the scientific community considers therapeutic cloning to be very important, particularly for tissue and/or organ transplantations. It is believed that through transplantations a big variety of diseases, such as hematological diseases (leukemia, sickle-cell anemia), pancreatic diseases (diabetes mellitus), respiratory diseases (cystic fibrosis, emphysema), hepatocirrhosis, and Parkinson disease, will become curable (Murray et al., 1992). It is, therefore, expected to offer great benefits which will help improve and save lives. This research study sought to investigate the opinion of Greek health care professionals regarding human reproductive and therapeutic cloning. Human cloning, as an experimental procedure, may be considered to be only related to the research community, with no direct health care involvement. However, human cloning is affecting every aspect of human life to the extent of meaning and value of life itself. Health care professionals all over the world are likely to encounter bioethical controversial issues and deal with problems arising from the relationship between humanistic values and human cloning. They are expected to provide patients with medical advice regarding this issue. For example, midwives in Greece provide support on family planning and gynecological care to women before, during and after a pregnancy in various health care centers, including fertility centers, thus making their opinion regarding ART very important (Papaharitou et al., 2007). However, there is little information on health care professionals' attitudes towards the application of ART (Fonnest et al.,

2000;Yogev et al., 2003). It is, therefore, important to investigate their opinion and the factors that affect their views regarding cloning.

Although many of the ethical questions related to ART are similar all over the world, individual attitudes are influenced by philosophical, economic, socio-cultural and religious differences. It is interesting to study which factors affect the views of health care professionals in Greece.

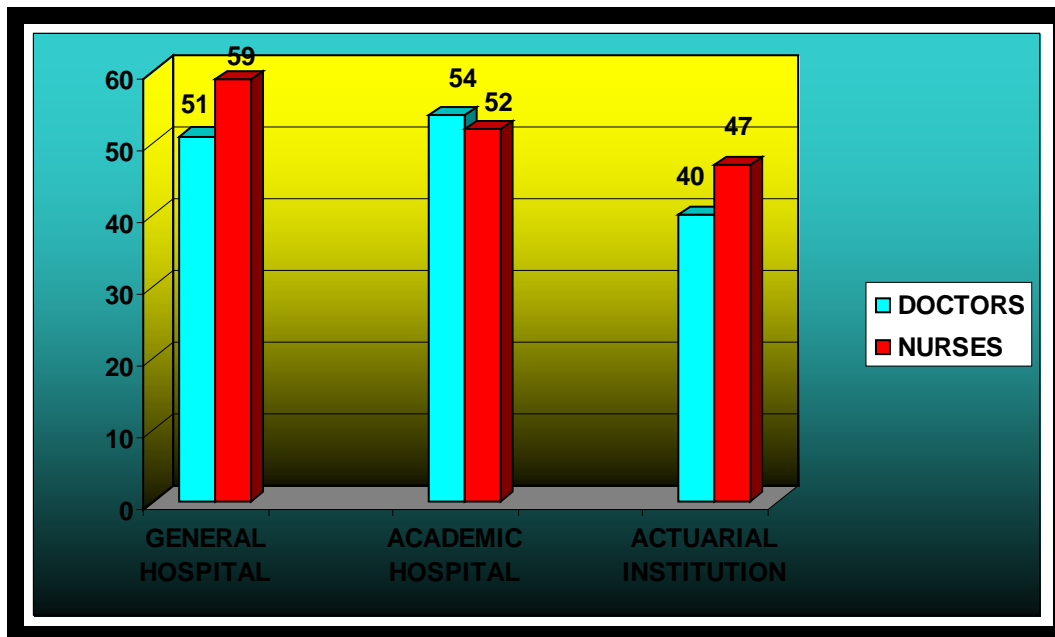
The aims of the present study are:

- To investigate the views and opinions of Greek health care professionals towards the applications of human cloning.
- To investigate the factors associated with attitudinal patterns.

The present study is a part of a broad research study on the investigation of attitudes and opinions of health care professionals for various subjects related to genetic engineering in humans.

### **Material and Methods**

The research was conducted between the 1<sup>st</sup> of October 2008 and the 31<sup>st</sup> of March 2009. The participants were 303 individuals from the medical (47.9%) and nursing (52.1%) personnel of three organizations: a public general hospital (N=110 – 36.3%), a university hospital (N=106 - 35%) and a social insurance institute (N=87 – 28.7%). In total, 400 questionnaires were given to the personnel (response rate/representativity indicator = 75.8%) (Picture 1).



Picture 1. Distribution of doctors and nurses per institution.

The questionnaire of Wertz and Fletcher, which was specially developed in order to investigate the geneticists' opinion on issues about genetics and ethics (Wertz & Fletcher, 1989; Wertz & Fletcher, 1998), was used as a basis for the development of the questionnaire used in the current study. The initial questionnaire was translated in Greek and modified according to the needs of the current research. Special attention was given to ensure the content validity during the process of translation (Burns & Grove, 1993).

The answers to the questions were given on a 5 point Likert scale (1= I strongly disagree and 5= I strongly agree). Four Greek experts, three university professors and one Technological Educational Institute (TEI) assistant professor, fully evaluated the questionnaire and proposed additional modifications. The final questionnaire included 32 questions which were divided in the following categories: 3 questions for genetic testing - prenatal testing, 8 questions regarding access to genetic information records, 11 questions on eugenics, 7 questions on cloning, 6 questions relevant to in vitro fertilization and 1 question on ethical dilemmas concerning genetic engineering in humans.

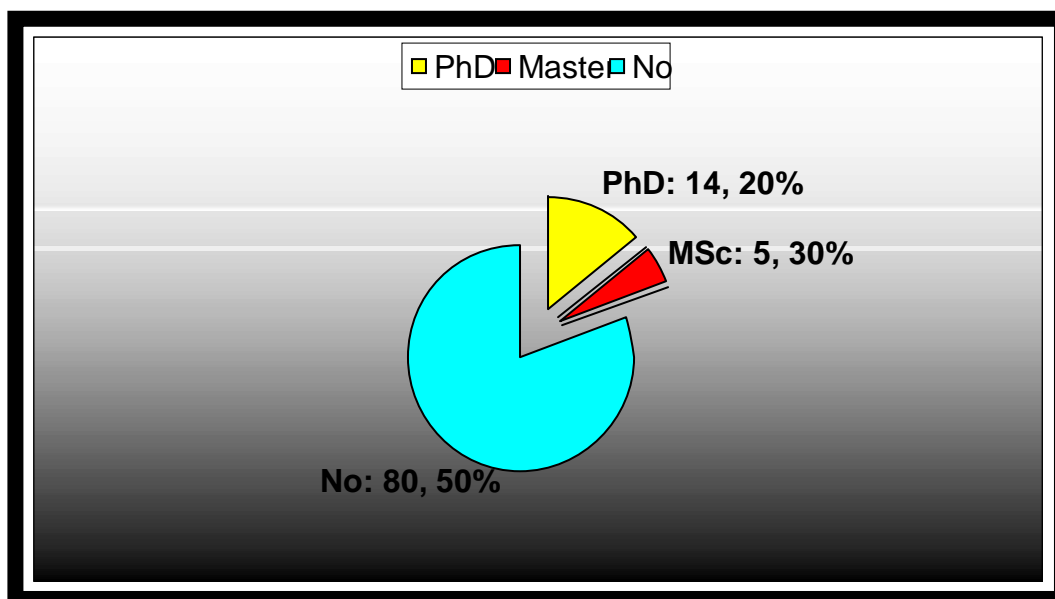


The control of reliability of internal cohesion was done with a pilot study in a sample of only 10 individuals. Factor  $\alpha$  (Cronbach's alpha coefficient) was 0.78 which is considered to be satisfactory given that the acceptable limit is within the range of 0.70-0.90. After the conclusion of the pilot study, no further modifications were performed on the questionnaire. The final questionnaire was also used to investigate opinions of volunteer blood-donors about the above issues (Katsimigas et al., 2008(1), Katsimigas et al., 2008(2), Katsimigas et al., 2009).

SPSS 13.0 (Statistical Package for Social Sciences) for Windows was used for data statistical analysis. Data were analyzed by descriptive statistics (frequency, percentage, means, standard deviation, standard error). The differences between qualitative (categorical) variables were checked using the  $X^2$  test (Chi Square). The difference between the two teams based on quantitative variables was checked using the Mann-Whitney U test.

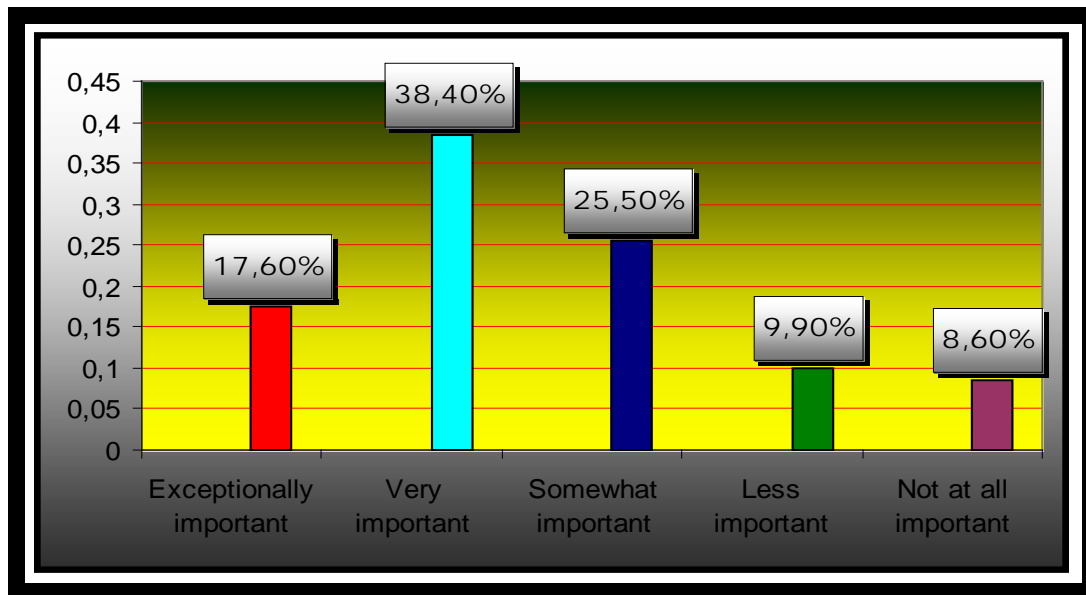
## **Results**

The majority of the sample were women (N=190 – 62.7%). Most of the participants were nurses, TEI graduates (N=135 – 85.4%), and specialized doctors (N= 63 – 44.4%). The age range varied from 22 to 65 years (Average= 37.70 – Standard Deviation (S.D) = 10.31). The participants' average working experience was 13.54 years (Standard Deviation = 10.85). One out of five participants had a postgraduate degree (Picture 2).



Picture 2. Sample population's level of education (percentage)

Also, the majority were married with no children. The majority agreed that being religious is very or exceptionally important (N=169 - 56%) (Picture 3) with a 3.46 (Standard Deviation (S.D) =1.15) on a Likert scale (1-by no means important, 5 exceptionally important). It was also found that there is association between sex and performing postgraduate studies or being religious. More specifically, more men than women have a postgraduate degree (N=32, 30.2% vs. N=23, 12.1%; Chi-Square P= 0.000; Mann-Whitney test P=0.000, respectively). On the contrary, women declare more often, that religion is very or exceptionally important in their life (Average = 3.66, (S.D) =1.10 vs. Average= 3.09, (S.D) = 1.17); (Chi-Square P= 0.000); (Mann-Whitney test, P=0.000, respectively).



Picture 3. Importance of religion.

The descriptive analysis of the study revealed that the majority of the participants agree that a) cloning abolishes the accidental element in the development of humans (83.1%, N = 245), b) cloning disturbs the genetic diversity of humans and nature (83.2% of N = 247), c) human cloning should not be allowed even in special cases (reproductive cloning) (71.2% of N = 213). (Table 1).

Number of Answers	Strongly disagree N + %	Disagree N + %	Neither Agree nor disagree N + %	Agree N + %	Strongly Totally Agree N + %
Cloning will help a lot in the treatment of many diseases, eg transplantations with the creation of human cells, tissues, organs.N=299	25=8.3%	40=13.4%	43=14.4%	139=46.5%	52=17.4%
Cloning will help in the rescue of rare species of the animal and plant kingdom that are endangered species N=300	27=9,0%	44=14,7%	61=20,3%	127=42.3%	41=13,7%
Cloning offends the human dignity because it determines to an important degree people's personality N=298	21=7,0%	45=15,1%	58=19,5%	120=40,3%	54=18,1%
Cloning abolishes the accidental element in the configuration of human genome N=295	10=3,4%	17=5,7%	23=7,8%	167=56,6%	78=26,5%
Cloning disturbs the genetic diversity of humans and nature N=297	9=3%	9=3%	32=10,8%	147=49,5%	100=33,7%
Cloning devalues the role of male in human reproduction N=297	19=6,5%	53=17,8%	69=23,2%	98=33,0%	58=19,5%
Cloning in humans should be allowed in certain special cases eg in the case where the only child of a very old couple dies in a ICU after a fatal car accident and just before he dies, the parents visit a genetic clinic asking for their already deceased child to be cloned. N=299	104=34,7%	109=36,5%	42=14,0%	22=7,4%	22=7,4%

**Table 1. Health care professional's answers to questions concerning cloning.**

Analysis of the questionnaire revealed that the majority of health care professionals agree, a) that cloning will help treat many diseases e.g. in transplantations of human cells, tissues, organs (63.9%, N = 191), b) cloning will help in the rescue of endangered species of the animal and plant kingdom (56%, N = 168), c) cloning offends the human dignity because

it determines to a great extent the personality of people (58.4% N= 174), and d) cloning will degrade the role of male in human reproduction (52.50% N= 156).

The statistical analysis, using  $X^2$  (Chi-Square) and the non-parametric test of Mann-Whitney U, revealed the existence of high cross-correlation between religiousness and the employment status of the personnel. More precisely, health care professionals who declare that religion is important are more negative towards cloning compared to those who declare that religion is less important (Average = 2.46 vs. 2.75,  $P = 0.0000$ )

Also, doctors were more positive towards cloning in comparison to nurses (Average = 2.72 vs. 2.48;  $P=0.001$ ;  $P = 0.0000$ ) (Picture 4).

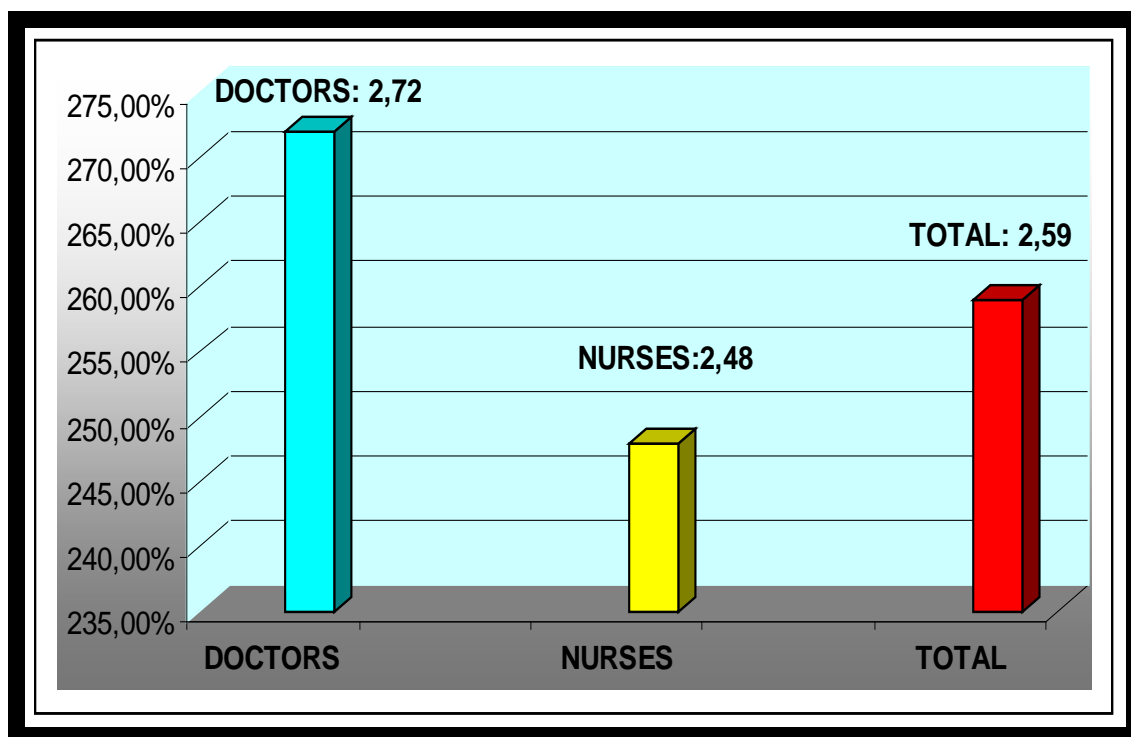


Figure 4. Degree of support for cloning  
Median value (higher values represent higher degree of support)

Other demographic data on the sample revealed certain cross-correlations related to sex, age, and previous work experience. In particular, men seem more positive towards cloning in questions that are related to a) the contribution of cloning to treatment of diseases (Average = 3.76 vs. 3.36, respectively, Mann-Whitney U test  $P = 0.004$ ), b) the contribution

of cloning to the rescue of rare types in the animal and plant kingdom that that are endangered species (Average = 3.51 vs. 3.28, respectively;  $P = 0.048$ ) and c) to the negative impact that cloning has on human dignity (Average = 2.77 vs. 2.40, respectively;  $P = 0.006$ ).

It was generally observed that older individuals (>35 years old) and those with prolonged work experience (>10 years) are more negative towards cloning. In particular, age and work experience seem to affect the participants' opinion towards the contribution of cloning to the treatment of illnesses; [Average = 3.74 (individuals with age of < 35 years) vs. 3.26 (individuals with age of >35 years);  $P=0.005$ ], [Average = 3.72 (individuals with previous work experience <10 years) vs. 3.28 (individuals with previous work experience > 10 years);  $P=0.005$ ]. The same pattern was observed on views regarding the diminishing effect of cloning on the role of the male in human reproduction [Average = 2.73 (individuals with age of < 35 years) vs. 2.41 (individuals with age of >35 years);  $P=0.005$ ], [Average = 2.72 (individuals with previous work experience <10 of years) vs. 2.37 (individuals with previous work experience > 10 years);  $P=0.012$ ].

## Discussion

Human cloning constitutes one of the greatest achievements in the development of medicine and biology, offering a great deal of impressive and promising applications for human life. Regardless of its promising applications, an uncertainty appears for this innovative process that raises a series of various ethical issues.

The ethical considerations on human cloning have been greatly discussed by scientists, physicians or the public of many societies. This study is the first effort to investigate the views of health care professionals in Greece on human cloning. Regarding moral dilemmas, the data showed that that the majority of the participants agree that a) cloning abolishes the accidental element in the development of humans, b) cloning disturbs the genetic diversity of humans and nature, c) human cloning should not be allowed

even in special cases. This is in line with studies conducted in the general population and health care professionals (Genuis et al., 1993; Fonnest et al., 2000; Dissanayake et al., 2002; Tzamalouka et al., 2005), reporting a strong opposition to reproductive cloning and sex selection. Both practices are considered to be unethical and raise concerns about physical and psychological harms (Sanchez-Sweatman, 2000; Pennings & de Wert, 2003).

According to Keye and Bradshaw 2004, 78% of the members of the American Community of Reproductive Medicine (ACRM) also are against reproductive cloning. Eighty percent of the 1291 participants were doctors, obstetricians and nurses.

Nevertheless, the majority of health care professionals in the study agree, a) that cloning will help treat many diseases e.g. in transplantations of human cells, tissues, organs, b) cloning will help in the rescue of endangered species of the animal and plant kingdom.

Similarly a study conducted in USA regarding opinions of doctors and lawyers about cloning showed that 75% of doctors believe that reproductive cloning is useful in certain cases, while only 22.5% believe it is never useful (Katayama, 2001). The hypothetical cases for the application of reproductive cloning that received more positive answers between the doctors were the following: “When reproductive cloning is the only option for a couple to have a child that will be genetically related to one of the parents, when one spouse has a serious genetic disorder or when both have a recessive hereditary disorder”. Participants of the same study were also asked for their concerns about reproductive cloning. The most common concern doctors had was the low rate of success in animals and the fear that the clones may have advanced genetic age (Katayama, 2001). The opinion of Islander doctors, lawyers and clergymen on therapeutic cloning has also been investigated. This study revealed that the 64% of the participants agreed in the utilization of cloning, if it is to cure a patient (Orkarsson et al., 2003).

This is in line with this study's results that revealed the existence of high cross-correlation between religiousness and the employment status of the personnel. Doctors for example were more positive towards cloning in comparison to nurses. Also other demographic data on the sample revealed certain cross-correlations related to sex, age, and previous work experience. In particular, age and work experience seem to affect the participants' opinion towards the contribution of cloning to the treatment of illnesses. It was generally observed that older individuals (>35 years old) and those with prolonged work experience (>10 years) are more negative towards cloning. Also men seem more positive towards cloning in questions that are related to a) the contribution of cloning to treatment of diseases, b) the contribution of cloning to the rescue of rare types the animal and plant kingdom that that are endangered species and c) to the negative impact that cloning has on human dignity.

A study conducted in Greece which investigated the acceptance of human cloning by the general public (sample of 1020 individuals, that lived in urban regions), revealed that the majority of the sample consider cloning as a method which will positively contribute towards transplantations and in developing treatment for incurable diseases (58.6% and 70.7%, respectively) (Tzamalouka et al., 2005). These findings are in agreement with the results of this study on Greek health care professionals. Furthermore, 63.9% of the health care professionals support that cloning will help decisively in the treatment of many diseases. According to Tzamalouka et al. 2005, a proportion of the sample supported reproductive cloning in order to "bring back" in life a beloved person or when reproductive disorders exist (35% and 32.5%, respectively).

In Germany, a research study performed in order to investigate attitude and opinions of the public (sample of 2110 individuals of age 18 to 50 years) on the new reproductive technologies (such as donation of ova, the reproductive cloning and the therapeutic choice of



maternity), revealed that 82.9% disagreed with reproductive cloning (Stobel – Richter et al., 2009).

Health care professionals, lawyers and clergymen in Taiwan were also investigated. The findings of this study revealed, that health care professionals were more positive toward cloning (Average = 2.1), in comparison to clergymen (Average = 1.58). In the same study, there was a high degree of cross-correlation with age and religion (Yang et al., 2005). In particular, the smaller the age of the participant, the more positive the attitude toward cloning. Also, clergymen were opposed to human cloning in comparison to health care professionals and lawyers (Yang et al., 2005). The influence of religion and age on the attitude toward cloning has also been observed in this study, as well.

### **Limitations of the study**

One of the limitations of the study is that no power analysis was performed for the sample size; however, the size was considered satisfactory based on the data of other studies in various demographic groups. More studies need to be performed using a larger and more representative sample of health care professionals. This study was the first effort to investigate this subject. Also, a longitudinal investigation needs to be performed particularly with regard to the attitude toward cloning and the tendencies that can be created in the next years. Taking into consideration the above limitations and the lack of relevant published data, interpretation of the research findings should be made with caution

### **Conclusions - Proposals**

According to the researchers' findings, the majority of Greek health care professionals judge reproductive cloning as a morally unacceptable process, considering that it offends human dignity and disturbs the genetic diversity of nature and humans. Also, the majority of the sample in this study believes that genetic variability is suppressed and the role of male in

the creation of humans is degraded. However, the majority of health care professionals have a positive opinion on therapeutic cloning (63.9% asked, were placed positively).

Many questions or concerns related to this matter are similar all over the world. However, individual attitudes depend on various factors such as philosophical views, economic or social status, culture and religion. The findings of this research are important since they illustrate how health care professionals in Greece view the complex issue of human cloning. It is important to investigate the views of health care professionals, as they need to become aware of their own values and how these might influence their clinical practice. Human cloning, if permitted, may cause new physiological conditions or psychological needs which may require different medical or nursing care. Health care professionals must, therefore, evaluate the ethical issues of human cloning and their evolving role.

Conclusively, it is made clear that although cloning is still at an extremely early and experimental stage of development, people seem to have already thought about all the related scientific, social, moral, religious issues and understand that new technology is associated with both benefits and risks. However, there is no doubt that there is a concern regarding the application of cloning to humans, which probably reflects the existing ambivalence over the relationship between technology and society. Serious efforts should be made to raise public awareness, so that individuals can balance benefits and risks and decide whether to personally use cloning. Unfortunately, there is lack of any specific governmental program aiming at informing and educating the public and total lack of specific biotechnological education—particularly in Greece. Additional research is needed on the knowledge, beliefs and attitudes among health care professionals who are likely to encounter ethical controversies.

**Please note that the opinions expressed by authors represent those of the authors and do not reflect the opinions of the editorial staff of The Online Journal of Health Ethics, Editors, and Reviewers.**

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