

DETERMINING THE KNOWLEDGE OF GRADUATE ASSISTANTS ON RESEARCH ETHICS

Araştırma Görevlilerinin Araştırma Etiği Hakkındaki Bilgilerinin Belirlenmesi

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Abstract

Aim: Nursing research and investigation is an essential activity for nursing professionals. But in Turkey Most, carried out by nursing schools, has unfortunately raised various ethical concerns. Therefore, this descriptive study was implemented to evaluate the knowledge of graduate assistants, who completed or were still following a MSc (Master of Science) or PhD (Philosophy of Doctorate) degree in nursing schools.

Method: The researchers visited nursing schools at 8 universities and surveyed 191 graduate assistants. Graduate assistants in the Turkish higher education system either have a MSc's or PhD's or follow them. The questionnaire was about demographic backgrounds and research ethics. A convenience sample of graduate assistants from nursing schools in Turkey was selected and a 100 % response rate was accomplished.

Results: The graduate assistants had articles in internationally cited journals (15.7%) and replied to the questions on research ethics (86.4%) correctly. Researchers asked graduate assistants to explain how they viewed "...science is not the highest value to which all other orders of values... should be subordinated" and 66.5% (n=127) expressed their views while 33.5% (n=64) did not.

Conclusions: Relatively moderate education on ethics and research ethics in nursing schools still calls for a re-evaluation and an examination of the methodology and appropriateness for refinement.

Keywords: research ethics, graduate assistants, right evaluation, nursing school

ARAŞTIRMA GÖREVLİLERİNİN ARAŞTIRMA ETİĞİ HAKKINDAKİ BİLGİLERİNİN BELİRLENMESİ

Özet

Amaç: Hemşirelik araştırmaları hemşireler için zorunlu bir çalışma alanıdır. Türkiye’de bu çalışmalar çoğunlukla hemşirelik yüksekokullarında yapılmakta, ancak etik sorunlar yaşanabilmektedir. Bu nedenle, hemşirelik yüksek okullarından doktora ve yüksek lisans eğitimlerini yapan ya da tamamlamış olan araştırma görevlilerinin araştırma etiğine ilişkin bilgilerini belirlemek amacı ile bu tanımlayıcı çalışma yapılmıştır.

Yöntem: Araştırmacılar sekiz üniversitedeki hemşirelik yüksek okullarını ziyaret ederek 191 araştırma görevlisi ile anket yapmışlardır. Türk yüksek öğretiminde yer alan araştırma görevlileri ya yüksek lisans ve doktora öğrencileri ya da bu derecelerini almış kişilerden oluşurlar. Hem demografik hem de araştırma etiğine ilişkin sorulardan oluşan anket formu Türkiye’deki hemşirelik yüksek okullarındaki ulaşılabilir araştırma görevlilerine uygulanarak % 100 bir yanıt oranı elde edilmiştir.

Bulgular: Araştırma görevlilerinin %15,7’sinin uluslararası hakemli dergilerde yayını olduğu ve araştırma etiğine ilişkin soruları doğru yanıtladıkları belirlenmiştir (%86,4 %). Araştırma görevlilerine “Bilim bütün değerlerin üstünde olan tek değer değildir. Her şey bilimin emrinde olamaz.” söylemi konusundaki görüşleri sorulduğunda, % 66,5 (n = 127)’i görüş bildirirken %33,5 (n = 64)’i görüş belirtmemiştir.

Sonuç: Hemşirelik yüksek okullarındaki eğitim ve araştırma etiği üzerindeki ortalama düzey, kullanılan yöntemlerin ve bunların uygunluklarının yeniden gözden geçirilmesini ve değerlendirilmesini gerektirmektedir.

Anahtar sözcükler: Araştırma etiği, araştırma görevlileri, doğru değerlendirme, hemşirelik yüksek okulu.

INTRODUCTION

Nursing research and investigation has increasingly been expected to address clinical topics and patient rights. These trends, along with the need to increase nursing knowledge, have resulted in the role of the nursing research scientists becoming more important. Academic criteria set by the Higher Education Council of Turkey (September 1st, 2000) has additionally applied increasing pressure on the nursing research scientist to publish in internationally respected and academically-cited journals.

In this context, the role of the nursing researcher has become clearly established alongside that of health-care provision, administration and teaching. Most nursing research is carried out by staff members at nursing schools, but with many ethical issues. A study by Ulusoy and Uçar (2000) highlighted some. They investigated 235 Master of Science and Philosophy of Doctorate theses written by nursing students during 1972-1998. They found that human subjects:

- were harmed in 6.8% of studies;
- were not informed about the research carried out in 72.7% of studies;
- did not give consent in 73.6% of studies, and
- were not assured of confidentiality in 8.5% of studies.

Since graduate assistants either provide care in the hospitals or educate nurses of the future, how nurses practice could result from what graduate students teach or apply. After reviewing nursing studies carried out over the last 10 years, the following conclusions were reached (Woods 2005):

1. Nurses find themselves confronting a great deal of dilemmas and moral problems in clinical situations, including some situations definitely imposed by clinicians.
2. Nurses either defend patients secretly or become isolated.
3. This is especially true of recent nursing graduates, who either avoid (insofar as they can) any situations which might give rise to ethical dilemmas, or behave passively and do whatever they are told.

Legal safeguards for experiments on human subjects in Turkey are relatively new. Some of these regulations establish basic guidelines for experiments. "Regulations for Pharmaceutical Research" (1993), approved by the Ministry of Health, proposes that all research carried out should follow ethical standards. "Patients' Rights Regulations" (1998) establishes legal guidelines regarding patient rights. The increase in the number of ethics committees in universities indicate that patients rights and ethical concerns are currently given a higher emphasis (Ersoy 2003).

Background

In response to unethical practices in a number of biomedical research studies conducted between 1930 and 1970 (Beecher 1966, Berg & Tranøy 1983, Tschudin 2001), many international and local regulations were enacted to protect the rights of research subjects (Olsen 2000, World Medical Association 2002). The most important one of these regulations is the Declaration of Helsinki, which has been internationally accepted as a cornerstone for research ethics since 1964 (Tadd 2000). In addition to such regulations, there are world-wide associations dealing with ethical issues in nursing research, one of which is the International Centre for Nursing Ethics (Olsen 2003).

Ethical problems were of far less concern than political and economic issues in the first half of the twentieth century. However, developments in science and technology over the last quarter of the century have brought the subject of ethics firmly into the forefront of concern. Although technology has made many aspects of everyday life easier, it has also raised serious issues regarding living organisms as well as humankind. Just because something "can be done", does it mean it "should be", or even be "taken as a starting point for action"? (Pieper 1999, Tepe 2000). Such questions are rigorously and frequently scrutinized and evaluated at present, thereby raising ethical concerns at every stage of the research process.

Research ethics has been defined by Berg and Tranøy as "the moral problems encountered by scientific or other academic research, by researchers, by their subjects or by their social environment" (Berg and Tranøy 1983).

Ethical issues in international nursing research had been identified and the perspectives of the International Centre for Nursing Ethics were internationally distributed in order to develop an international consensus regarding ethical behaviour in nursing research. These broad guiding

principles for designing and reviewing research are: (1) respect for persons, (2) beneficence, (3) justice, (4) respect for community, and (5) contextual caring (Olsen 2003).

There are other scientists who have asserted four rules to guide decisions: (1) do no harm, (2) do well, (3) patients' health is the highest goal, and (4) patients' consent, for treatment and other medical intervention is essential. These underlying principles give a basis for determining what "doing well" is in individual circumstances, whether researchers are ethically evaluating treatment, the use of equipment, and other parameters (Beauchamp & Childress 1994, Koslowski 2000). These rules are, of course, relevant in many circumstances, both in the clinical area and in research. Koslowski (2000) referred to these rules as "the constitution" of a specialism. Tepe (2000), on the other hand, added that "constitution" alone can not guarantee right decisions, rather that decisions to take any particular action should be dependent upon a detailed evaluation of the action as a whole, and its predicted results. Taking responsibility for predicting the consequences of an action, and indeed for the action itself, makes it impossible for the person who instigates the action to transfer responsibility to someone else. The necessity of taking responsibility for decision-making, however, leads to ethical dilemmas (Tepe 2000). As a result of this need for accountability, all stages of any research project, from planning to publication, bring with them ethical concerns and dilemmas (Beauchamp & Childress 1994).

Academic nurses are likely to have a particular interest in research ethics, since research is one of their main areas of activity. Additionally, many clinical nurses work under conditions where medical experiments are being carried out, and observe experiments practiced on human subjects. They may find themselves, sometimes willingly, sometimes under pressure, and sometimes without even realizing it, taking part in carrying out these experiments (Benhamou-Jantelet 2001, Ulusoy 2002). The guide, "Ethical Guidelines in the Conduct, Dissemination, and Implementation of Nursing Research" (Silva 1995) and the "ICN (International Council of Nurses), 2000, code of ethics for nurses" establishes ethical guidelines for researcher nurses.

Inexperienced nursing researchers do not necessarily appreciate the ethical discrepancies contained in their studies. This is why it is so important to educate junior researchers to recognize ethical issues. Although there are some studies on research ethics, none have yet investigated the extent of researchers' knowledge about the ethical issues that permeate research. Such lack of knowledge could lead to violation of human rights. Correct behaviour must be guided by an appropriate knowledge base.

The purpose of this study was to describe nursing graduate assistants' knowledge about research ethics.

Methods

Design and settings

This descriptive study was carried out in 8 out of 9 nursing schools of Turkey from March 28th to April 28th, 2005. The schools are located in 5 cities. The ninth school was used to pilot test the study procedures for the current study.

Sample studied and response rates

A convenience sample of graduate assistants was made from schools of nursing in Turkey. One hundred and ninety-one graduate assistants, all who worked at university nursing schools during the study-period, were interviewed (graduate assistants in the Turkish higher education system either completed or were following MSc or PhD). Graduate assistants were included in the study on a voluntary basis. Any graduate assistant, who was absent due to annual or sick leave, was excluded from the study. The number of graduate assistants in each School of Nursing was as follows: A (N=46), B (N=40), C (N=31), D (N=25), E (N=18), F (N=14), G (N=11), and H (N=6) – for the total of 191. No graduate assistants in the 8 nursing schools declined to participate in the study. Among graduate assistants, 6.8% (n=13) just completed PhD and 7.9% (n=15) master of science while 64.9% (n=124) were still following PhD and 20.4% (n=39). 20.4% (n=39) was following a Master of Science.

Data collection

Data were collected by using a questionnaire following literature. The form consisted of 2 sections, of which the first one covered demographic data such as age, marital status, education, working years as a graduate assistant, research experience and number of research publications, type(s) of research undertaken, and the number of times respondents had participated in research ethics congresses and/or symposiums. The second part of the form included 19 multiple-choice questions on research ethics, and one open-ended question. Most questions, of which some were compiled from the World Medical Association Declaration of Helsinki, 2000 (World Medical Association 2002), surveyed the history of research ethics, the legal and ethical regulations and protocols, the autonomy of patients, the rules of non-maleficence / beneficence, the justice, and the publication ethics.

If a multiple-choice question was not answered, the respondent was assumed not to know the answer. Each correct answer was given one point, and further calculations were made. The twentieth question in this section was open-ended, attempting to evaluate how graduate assistants understood Pope Pius XII's statement, that "... science is not the highest value to which all other orders of values... should be subordinated" (Beecher 1966, p. 1354). Answers to that question were grouped without judging them right or wrong and without grading.

In the nursing school not included in this part of the study, 28 graduate assistants were interviewed (14.65% of the population) in a pilot study to evaluate the questionnaire for comprehensibility and

clarity. Based on the findings, the form of the questionnaire was finalized. Graduate assistants, who participated in the pilot trial, were not included in the study.

Research Questions

The study-authors attempted to determine:

- What graduate assistants know about research ethics?
- How graduate assistants understood "... science is not the highest value to which all other orders of values should be subordinated"?

The authors first informed the graduate assistants about the study, obtained their verbal consents for participation. They then distributed the questionnaires and collected the following day.

Ethical considerations

There were no ethics or research committees in the schools where the study was conducted. Therefore, written permission from school administrations and informed verbal consent from all anonymous participants beforehand were obtained after informing all parties about the purpose and the method of the study. In addition, the first page of questionnaire had clearly noted the purpose and the population of the study while assuring of voluntary participation and anonymity.

Data analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS for Windows 11.5) after it had been coded for statistical analyses. Responses to the 19 questions on research ethics were divided arbitrarily into two groups, 1-9 and 10-19. Answers to the open-ended question were evaluated separately without any grading. Authors, before data collection, planned to group answers to the 20th question as those that agreed and did not agree with the Pope's saying. They had to include a group for 33.5 % "blank" answers after data collection. Student t-test was performed.

Results

Sample

The research sample was a total of 191 graduate assistants who worked at nursing schools (with baccalaureate degrees). Their mean age was 29.3 (SD = 3.4), and 91 (47.6%) of them were married. Among the graduate assistant participants, 39 followed up with a Master of Science degree (20.4%) and 124 with a Doctor of Philosophy degree (64.9%). One-hundred and fourteen (59.7%) of them had taken research ethics courses at the undergraduate level and 167 (85.9%) in graduate programs. However, there was no difference in grades between those who took research ethics courses at the undergraduate level ($p=0.74$, $t=0.33$, $n=191$) or at the graduate level, 1 ($p=0.06$, $t=1.90$, $n=191$).

Only (15.7%) of graduate assistants had published articles in internationally cited journals.

Evaluation of graduate assistants regarding their knowledge of research ethics

Graduate assistants had the 4 lowest and the 18 highest correct answers out of 19 questions (mean \pm SD=11.85 \pm 2.35) based on the World Medical Association Declaration of Helsinki.¹⁰ Frequency distribution of answers by graduate assistants was the following: 13.6% graduate assistants with 1-9 points, 77% with 10-14 points, and 9.4% with 15-19 points (Table 1).

Table 1: Frequency distribution of graduate assistants into score groups

Score groups	n	%
1-9	26	13.6
10-14	147	77.0
15-18	18	9.4
<i>Total</i>	<i>191</i>	<i>100.0</i>

How graduate assistants view science and other values

Researchers asked graduate assistants to explain how they viewed the following statement: “...science is not the highest value to which all other orders of values... should be subordinated”. While 66.5% (n=127) of the graduate assistants expressed their views, 33.5% (n=64) did not.

Out of 127 respondents, 61.8% (n=118) of them responded that “science is not the ultimate goal, but rather a vehicle at the service of humankind” and 4.7% (n=9) said that “natural sciences can not explain everything humankind faces, but religion and culture can”. , Relatively high number of graduate assistants (33.5%, n=64) left the question unanswered –blank (Table 2).

Table 2: Frequency distribution regarding the statement “... science is not the highest value to which all other orders of values should be subordinated”

Replies*	n	%
Science is not the ultimate goal, but rather a vehicle at the service of humankind	118	61.8
Natural sciences can not explain everything humankind faces but religion and culture can	9	4.7
Blank	64	33.5
<i>Total</i>	<i>191</i>	<i>100.0</i>

* More than one answer to each question.

Discussion

Of the graduate assistants who participated in this study, only 15.7 % had published internationally cited articles. This lower number was because 6.8% of graduate assistants had a PhD degree.

The Health Council of Turkey decided in 1995 to ensure the provision of nursing and midwifery education at the undergraduate level in universities. This was, among other issues, induced by Turkey’s desire to enter European Union. As a result, Vocational Health High Schools were closed in 1996, and 79 Schools of Health and 66 Nursing Departments within Schools of Health were established (Programs and Quotations for Undergraduate Student Placement Center 2005). Meanwhile,

9 Turkish Schools of Nursing, which had been established for some time (one as long ago as 1955) were still functioning (Ulusoy 1998) and offering programs at both undergraduate and graduate levels. In addition, Ülker et al. reported that 179 of 646 lecturers were faculty staff members and 457 were 4-year nursing faculty graduate nurses – of some were following MSc or PhD degrees (Ülker et al. 2001).

Despite their limited human resources, established schools of nursing also manage to educate academic staff. Whenever new schools of nursing are opened, the workload of older schools increases greatly since there is no academic staff-plan for new institutions. In this context, graduate assistants (who are supposed to be responsible only for their graduate studies, laboratory and clinical placements for undergraduate courses) find themselves teaching extensively at the undergraduate level, although that is illegal. This has a negative effect both upon the quality of the education offered, and on the numbers of articles that graduate assistants are expected to publish.

Evaluation of graduate assistants for knowledge of research ethics

Most of the graduate assistants (77%) in this study scored 10-14 points. These points indicated that education on research ethics was moderate, since their study-subjects were considered to be humans. Therefore, they were supposed to have earned better points than they did. It is also clear that, in addition to higher points expected for graduate assistants, a more detailed curriculum on research ethics at both undergraduate and graduate levels is also needed.

However, no Turkish studies were found supporting these results, although there are several from other countries which could be compared to those in this study. Szirony et al. (2004) noted that almost half of the nursing students in universities were below average or incompetent in their grasp of research ethics and lecturers simply did not have enough of a knowledge-base to be taught ethics themselves. Hundley et al. (2000) reported that midwives' and nurses' knowledge and abilities to utilize research resources could be raised. Woods called attention to the fact that curriculum education programs were unsatisfactory for addressing problems which nurses confront on the ward on a regular basis (Wodds 2005).

How graduate assistants view science and other values

In this study, among those participants who commented on the statement by Pope Pius XII, most agreed that “Science is not the ultimate goal, but rather a vehicle at the service of humankind”, and perceived “ethical principles and human rights ought to be taken into account” well, but not “decisions for the course of ethical activities, when possible, ought to be carried out after a *right evaluation*”. In other words, participants did not see *right evaluation* as a priority if ethical relations are person-to-person, and behavior in accordance to codes of ethics and human rights if ethical relations are between an individual and a person. By human rights, we mean here those especially relevant to humans, human beings as a genus, and including rights pertinent to the special place of humans among other humans: i.e. in as much as every human has those of a birthright to life, food,

education and safety – which are classified as “human rights” and violated many times every day the world over” (Kuçuradi 1998).

A few participants, however, did not consider the human values as a fundamental and a priority since they believed “Natural sciences can not explain everything humankind faces but religion and culture can”. Graduate assistants who thought that “religion and culture are more important than science” showed that they were seriously misguided since religion, in most situations in every culture, is a group-specific and non-knowledge-based value. Religion and culture “seduce” people into a condition, where they fail to evaluate phenomena in detail and consist as they mostly do, of ready-made values and norms - which mostly lead people to accept *imputed values*, which are not based on knowledge, but rather on beliefs, causing people not to evaluate activities (Kaygı 2001). Codes of ethics and human rights also are norms, which should be applied at the point where people fail to evaluate any act or behavior - except as based only on “the best of the worst” - since these codes are universal, knowledge-based norms (Kuçuradi 1999, Kaygı 2001).

Every health professional, regardless of his or her area of expertise, is responsible to conduct ethical research; since, ultimately, all human behavior is based on ethics. Ethics, in this context, is a scientific research-area mainly grounded in values (Leino-Kilpi 2004).

Right evaluation are those providing knowledge of an object’s value; that is, the value of something defined according to its special place among others of the same kind (Kuçuradi 1999, Kaygı 2001). The efficiency of right evaluation, when considered in this context, ought to be rooted in ethical activity (Kaygı 2001). Instead of nursing students being instructed to learn to carry out *right evaluations* in ethics courses, they are exposed either to the phenomena of events broadcast by the media or scenarios in ethics textbooks are used.

The exact definition of that is *to impute value* (Kuçuradi 1999). All evaluations carried out by way of value-imputation mean a failure to evaluate all the things correctly, resulting in it being possible to arrive at value-determinations only as “the best of the worst” (Kaygı 2001). While ethical behavior is attempted to be taught through *imputed value*, it is our estimation that students fail to successfully navigate “selection paradoxes” arising from ethical dilemmas and conflicts (Kuçuradi 1999). Moreover, health and social care students need a formal knowledge of the meaning values, need to understand the genesis of their own value systems, and need to recognize the gap which inevitably develops between the values of the professional and of the society within where a professional may function (Glen 1999).

Limitations

It was impossible to compare the results in this study with the results of others since no study on these research topics has been conducted. One limitation of this study was the use of a convenience sample.

Conclusions

The study showed that education on research ethics in nursing schools was moderate. Education on ethics and research ethics, particularly that given to graduate students, should still be re-evaluated and examined for both its methodology and appropriateness in order to have a refinement in it.

The importance of understanding ethical principles and how to apply them to human individuals and situations can not better be overestimated. For this reason, it is recommended that such understanding should underpin everything a researcher does during the various stages of a research project, from drawing up proposals, to selecting the subjects and defining research question. It is important to apply the principles of judgment and *right evaluation*. Taking responsibility for *right evaluation* is the researcher's duty.

Recommendation

Teaching nursing ethics courses across the world, running in parallel with discussions about scenarios containing ethical dilemmas, has always tended to result in students making assessments based upon *imputed values*. But since most ethical actions must be founded upon *right evaluation*, lecturers of ethics in nursing schools have to develop a stronger theoretical curricula based on ethical theory.

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Contributions

Calisma tasarimi: H DK, MF U

Veri toplama ve/veya analiz: H DK, A DZ, MF U

Makalenin hazirlanmasi: A DZ, MF U, H DK

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APPENDIX

QUESTIONNAIRE

1. What is the main text, up to now, prepared to guide experiments on human subjects?
 - a) Helsinki Declaration by World Medical Union
 - b) Nuremberg Code
 - c) Hippocrat Oath
 - d) İmhotep Oath
2. What is the name of historically recorded unethical study which tried to determine patients’ rejection cases by giving a suspension including living cancerogen cells to patients ?
 - a) Nazi Medical Experiments
 - b) Tuskegee Syphilis Study
 - c) Jewish Chronic Diseases Hospital Study
 - d) Willowbrook Study
3. Which one of those below is not contained in Nuremberg Codes?
 - a) Voluntary consent of the subject
 - b) Subject’s denying to participate any time of the study

- c) Mentioning whether study is therapeutic or not
 - d) Arrangement of a balance between harm and benefit
4. Which is not a condition that researcher has to know about the researches on human subjects?
- a) Legal arrangements in the country
 - b) Legal arrangements in some important countries
 - c) Arrangements of international arrangements
 - d) Ethics arrangements in the country
5. Which one below does not serve the selection of research topics ?
- a) How much the research contribute to science
 - b) Up to what level the research meet social needs
 - c) Up to what level the research serve priorities of the country
 - d) What contribution the research brings to the scientist
6. Which committee decides on whether scientists do have knowledge accumulated and experience by investigating scientists' CV?
- a) Scientific committee / research committee
 - b) Ethics committee
 - c) Governing committee of the organisation where study will be carried out
 - d) Governing committee of the organisation which provides financial support
7. Who should decide on participation of people with lower decision abilities ?
- a) Legal guards with scientist
 - b) Legal guards with participating subject
 - c) Scientist with participating subject
 - d) Scientist, guard and participating subject together
8. Which one of these explanations below to subject patient is misleading during stage of taking "informed consent" for a research planned only for scientific information?
- a) This is an option for patient's therapy
 - b) Patient could reach scientist any time
 - c) The type of therapy for patient
 - d) Time period for participating to the study
9. Who has to sign Consent?
- a) Scientist and subject
 - b) Scientist and witness
 - c) Scientist, subject, and !witness
 - d) Subject and witness
10. Under which conditions no consent is needed from the patient?
- a) In experiments do not lead any therapy

- b) In experiments applied by questionnaires
- c) In experimental studies for some therapy
- d) In experiments for diagnostic research

11. Which one of those below does not require special attention when they are going to be utilised as subjects of an experiment?

- a) Neediests
- b) Pregnants
- c) Prisoners
- d) Women

12. Which one of those below does not affect voluntary participation in social sciences when applied via questionnaires?

- a) If scientist is the administrator of subjects
- b) If subject pushed to reply the questions, which subject do not want to reply
- c) Informing subject by scientist
- d) If scientist is teacher of subjects

13. Which one of these principles below is violated at first, during one way mirror or secret camera utilisation, if secret tape record is made?

- a) Beneficiary principle
- b) No harm principle
- c) Autonomy respect principle
- d) Fair principle

14. What is the drawback of giving, as a separate list, initials, protocol numbers, diagnosis, surgery and gender?

- a) Readers could easily trace subjects
- b) Contribute reader's easily planning of a study similar to that one
- c) Increase faith of reader to the study
- d) Let reader understand that scientist studied in detail

15. What a scientist should do when s/he felt that study negatively affected the subject?

- a) continues working if feels a benefit to the subject in the future
- b) decides on whether continue or not depending on the desire of subject
- c) cross out subject immediately from the experiment
- d) both scientist and subject decide together on continuing of the experiment

16. What is not needed when a subject participated to a study aimed at only a contribution to scientific knowledge?

- a) If study does not harm the subject
- b) If the subject knows the purpose of the experiment
- c) If the subject is voluntary

d) If the experiment provides a benefit to the subject

17. Which one of these below is not a scientific trick?

- a) A no discipline study
- b) Falcification
- c) Fabrication
- d) Plajerizm

18. Which one of these sentences on publishing of a study is wrong ?

- a) Unpublished studies soon become no use
- b) Scientist are responsible to share the information they produced with scientific world
- c) A scientist has the right not to publish any study s/he produced independently
- d) Research results should be submitted to critics of scientific world

19. Which one of these is appropriate to be named in author list during publication of a study ?

- a) One who approved and finalised the paper after reviewing it
- b) One who translated the paper
- c) One who provided financial support to the research
- d) One who allowed the research carried out in her/his clinic

20. Explain, what “science is not the value over all other values. Everything could not be at the service of science” means?