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Mistakes in Patient Care

Social Support and Depression

Highlights

Depression in Cancer Patients

Algorithm in Early Postmortem

Discovering Thoughts, Inventing Future

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Contents of the Volume

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Social Support and Depression among the Cancer Patients

By Havva Tel, Ayse Sari & Hatice Tel Aydin
Cumhuriyet University, Turkey

Abstract - Cancer patients experience several stressors and emotional upheavals. Social supports are considered important psychological resources during stressful circums-tances such as a diagnosis of cancer. The aim of this research was to determine social support and depression status among the cancer patients. 90 patients who received treatment at an oncology center of a university hospital were included in the study. The data were gathered using personal information form, Beck's Depression Inventory and Multidimensional Scale of Perceived Social Support. It was found out that there was a significant correlation between patients' age and total social support, family support and significant other support; and between age and depression. It was seen that single patients had lower family support, lower significant others support and lower total social support; that patients who thought to recover from the disease had lower depression; and that those who got support from only health care personnel had lower family support but higher depression. There is a close correlation between the age and social support and depression of the patients. The effective use of social supports should be encouraged in preventing and treating depression, since it is an important coping method in the care of cancer patients.

Keywords : *cancer, cancer patient, social support, depression.*

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Social Support and Depression among the Cancer Patients

Havva Tel [α], Ayse Sari [σ] & Hatice Tel Aydin [ρ]

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I. Introduction

Today, cancer is regarded as a life threatening disease and continues to be the most frightening disease despite important advancements in its treatment (Elbi, 1991). Cancer patients are not only affected physically, socially, psychologically and economically but also undergo restrictions in their functional living. Cancer is also a disease in which psychiatric disorders are likely to occur (Dedeli et al., 2008). The commonly seen psychiatric disorder is depression. Depression is an important psychiatric disorder to be considered and affects not only the quality of life, self care, treatment adaptation, and treatment-response of the patient but also severity and course of cancer in the long run (Berard, 2001; Andrykowski and Manne, 2006; Manne and Andrykowski, 2006). People with illnesses have different coping responses and varied coping resources such as social support (Woods et al., 1989). Social support is an important aspect of modern cancer care. Social support is defined as all kinds of financial and spiritual support that an individual receives from one's close environment (Clark et al., 2006; Sorias, 1988). It is reported that social support provided by the families and friends of the cancer-diagnosed patients results in positive outcomes in the course of the disease by affecting general wellness of the cancer patients (Dedeli et al., 2008; Clark et al., 2006). Social support and assistance with daily life are important elements of the endeavor to reduce and compensate for the disadvantages that result from cancer and therapies (Ozkan and Ogce, 2008). This study was carried out in order to determine the social support and depression status of cancer patients.

Authors α σ ρ : Cumhuriyet University Health Sciences Faculty, Nursing Department, Sivas-Turkey. E-mail : havvatel@yahoo.com

II. Materials and Methods

a) Sample

In the study a cross-sectional design has been used. The study was conducted at the oncology center of Research and Application Hospital of Cumhuriyet University between the 1st of October and the 31st of December 2010. 90 patients who were diagnosed with cancer for ≥ 6 months, got cancer treatment, had no communicational problem, accepted to participate in the research, were aged over 20 were included in the study.

b) Instruments

The data of the research were gathered using a Personal Information Form (PIF), Beck Depression Inventory (BDI) and Multidimensional Scale of Perceived Social Support (MSPSS).

PIF: This form included questions about the patients' age, gender, marital status, educational level, occupation and disease-related-features of the patients.

BDI: The scale was developed by Beck et al. in 1961 and its Turkish validity and reliability tests were performed by Hisli et al. in 1988. The scale measures physical, emotional and cognitive symptoms seen during depression. It is a 4- point likert type inventory with 21 items. The coding of the scale is made with points ranging from 0 to 3. The scores to be obtained from the scale vary from 0 to 63. A higher score reflects a higher level of depression for that item (Beck et al 1961; Hisli, 1988).

MSPSS: The MSPSS validity and reliability study for the Turkish version of the instrument was conducted in 1995 by Eker and Arkar. The scale consists of 12 items, with 4 items assessing each source of perceived social support, generating the subscales of family, friends, and specific person support. A higher score reflects a higher level of perceived social support for that item (Eker and Arkar, 1995).

c) Data Collection

Written permissions from the institution were obtained and patients who accepted to participate were informed about the purpose of the study and their verbal consents were obtained. The data of the research were gathered using face to face interview technique.

III. Statistical Analyses

SPSS version 15.00 statistical package was used in data analysis. Descriptive analysis was used to present demographic data. Pearson correlation analysis was used to determine relationships between age, social support and depression. The t test and ANOVA were used in the evaluation of social support and depression according to sociodemographic characteristics.

IV. Results and Discussions

It was found out that age of the patients ranged between 20 and 78, mean age was 54.26 ± 11.12; depression scores ranged between 1 and 41 and mean depression score was 10.96 ± 5.73; family support scores ranged between 6 and 28 and mean family support score was 24.58 ± 5.06; friend support scores ranged between 4 and 28 and mean friend support score was 19.55 ± 7.30 and significant others support scores ranged between 4 and 28 and mean significant others support score was 22.88±6.51. Total social support scores were between 16 and 84 and mean social support score was 67.03 ± 15.57. 56.7 % of the participant patients were female, 82.2 % were married, 42.2 % had primary school graduate and 45.6 % were housewives. Disease length of the 70.0 % of the patients was between 0 and 1 year. 74.4 % of the patients thought that they would recover, 92.2 % received help from others, 53.3 % got support from their families and 81.1 % told that their support was enough. It was noted in the research that there was a significant and positive correlation between age and total social support (r=.270, p=0.010), family support (r=.305, p=.003), significant others support (r=.389, p=.000) and depression (r=.313, p=.003).

Table 1 : Social support scores and depression scores of the patients in terms of marital status

Marital status	Family support Mean ± SD	Friend support Mean± SD	Specific person support Mean ± SD	Total social support Mean± SD	Depression Mean ± SD
Married	24.9 ± 4.4	19.4 ± 7.2	23.7 ± 5.8	68.1 ± 14.3	19.6 ± 5.8
Single	19.1 ±10.3	15.0 ± 7.0	16.1 ± 8.6	50.3 ± 25.1	20.6 ± 4.1
t, p	t=2.734 p=.008	t=1.449 p=.151	t=2.937 p=.004	t=2.758 p=.007	t=-.424 p=.672

It was found that there was statistically significant difference between social support scores of the patients in terms of marital status (p<0.05). Family support scores, significant others scores and total social support scores of the single patients were lower. It was observed that there was not statistically significant difference between depression scores of the patients in terms of marital status (p>0.05).

Table 2 : Social support scores and depression scores of the patients in terms of their opinions about the future of the disease

Opinions about the future of the disease	Family support Mean ± SD	Friend support Mean ± SD	Specific person support Mean ± SD	Total social support Mean ± SD	Depression Mean ± SD
Recover	25.0 ± 4.2	20.4 ± 6.9	23.1 ± 6.5	68.5 ± 14.2	18.6 ± 3.8
Partly recover	22.7 ± 7.0	16.3 ± 7.6	21.9 ± 6.7	60.9 ± 18.8	23.9 ± 8.7
hopeless	26.3 ± 2.8	22.0 ± 10.3	24.6 ±3.0	73.0 ± 14.1	22.0 ± 5.5
F, p	F=1.918 p=.153	F=2.638 p=.077	F=.374 p=.689	F=2.130 p=.125	F=7.687 p=.001

It was found that there was not statistically significant difference between social support scores in terms of their opinions about the future of the disease (p>0.05). On the other hand, there was a statistically significant difference between depression scores of the patients in terms of their opinions about the future of the disease (p<0.05) and depression levels of those who thought that they would recover from the disease were lower.

Table 3 : Social support scores and depression scores of the patients in terms of help-source

Help-source	Family support Mean ± SD	Friend support Mean ± SD	Specific person support Mean ± SD	Total social support Mean ± SD	Depression Mean ± SD
Spouse	25.2 ± 4.1	19.0 ± 8.0	23.8 ± 5.6	68.1 ±14.3	17.1 ± 5.2
Family	24.9 ± 4.8	20.7 ± 7.0	22.5 ± 7.1	68.2 ±15.8	20.7 ± 5.1
Friend	27.0 ± 1.4	18.0 ± 9.8	24.5 ± .7	69.5 ± 9.1	17.0 ± 2.8
Treatment team	16.6 ±11.0	18.3 ±10.5	20.0 ± 9.8	55.0 ±31.1	27.0 ± 7.2
Other	22.8 ± 4.9	15.7 ± 4.1	22.5 ± 5.5	61.0 ±12.8	22.4 ± 6.5
F, p	F=2.633 p=.040	F=1.107 p=.359	F=.358 p=.838	F=.949 p=.440	F=3.968 p=.005

It was found that there was statistically significant difference between social support scores and depression scores of the patients in terms of help-source ($p<0.05$). Family support scores of those who received help from health care team alone were lower and their depression scores were higher.

Social support is a complex construct which has long been suggested to have direct and buffering effects on well-being and emotional adjustment in cancer (Akechi et al., 1998; Nausheen and Kamal, 2007; Walker et al., 2006). A number of studies have shown that social support can reduce or buffer the negative impact of the diagnosis and treatment of cancer and may have a positive influence on psychological well-being (Cohen and Wills, 1985; Ell et al., 1992). In the research, it was found out that there was a positive correlation between the age of the patients and their total social support, family support and significant other support. As the age of the patients increased so did the scores of total social support, family support and significant other support. In this result; we were of the opinion that close and continual sharing of relations increased with age. Support from the family can be importance in promotion of their physical and psychological health (Akechi et al., 1998). Family members offer emotional support like esteem, trust, concern, and listening (Gotay and Wilson, 1998). Single patients had lower family support scores, lower significant other support scores and lower total social support scores. The number of the family members with whom patients live together may be very important in points of social support. Since the size of social network has been positively correlated with perceived support (Schaefer et al., 1981).

A diagnosis of cancer may lead to a sense of personal inadequacy, and diminished feelings of control, increased feelings of vulnerability (Helgeson and Cohen, 1996). It was detected that there was a close correlation between age of the patients and depression and as age increased so did depression score. Alexopoulos (2005) established that depression increased with age; which was associated with one's depression inclination due to the increased age. Hann and et al. (1995) reported that social network of cancer patients aged ≥ 55 was smaller, their social support decreased and depression increased. The negative impact of depressive symptoms on cancer patients takes many forms, including reduced quality of life, and poorer medical outcomes and possibly reduced survival time (Hann et al., 2002). The links between social support, positive health outcomes, and well-being are well established, and individuals who have social and community ties have lower morbidity and mortality rates than those who lack social support (House et al., 1988).

Patients who thought that they would recover from the disease had lower depression levels. Cancer diagnosis and treatment brings changes in patients' personal paths of life, in their daily activities, work, relationships, and family roles, and it associated with depression (Zabalegul et al., 2005). Maintaining hope in the treatment of cancer is important. Maintaining hope plays a key role in lower level of depression among the patients who thought that they would recover from the disease. Patients who emphasized that they received help from health care personnel had lower social support scores but higher depression scores. During the treatment of cancer, social support of the individual and family increases and sometimes family support becomes insufficient for the patient or patient could not get enough support from the family. Lee et al. (2011) reported that social support of the patients declined one year after the diagnosis of breast cancer and depression occurred. In conclusion, there is a close correlation between the age and social support and depression of the patients. As the age of the cancer patients increased so did total social support, family support, significant other support and depression. Health care personnel are important in maintaining wellbeing of cancer patients and effective use of social support sources of the patients. Therefore, both family and patients should be supported altogether with a family-centered approach during the treatment of the cancer patients. It is necessary for cancer patients to know social support sources and initiatives that make these sources to be used effectively, prevent depression and provide an early treatment should be planned.

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The National Vaccination Programme in Greece: Factors Affecting Parents' Knowledge

By Anastasia Papazoglou, Konstantina Giamaiou, Stavroula Poulopoulou, Ioanna Pavlopoulou & Konstantinos Tsoumakas

Universityof Athens, Greece

Abstract - The National Vaccination Programme (NVP) is an exceptionally effective intervention in the field of public health, aiming at eliminating mortality caused by diseases for which there are available vaccines.

Background: The study aims at recording the factors that determine parents' level of knowledge about vaccines and their attitudes in Greece.

Methods: A total of 2995 parents were asked to fill in a specially structured questionnaire. The study was conducted in 107 Athens kindergartens.

Results: 58.8% of the parents demonstrated a satisfactory level of knowledge and alertness with respect to vaccination and NVP. Parents' age, educational level, professional status, nationality, religion and sources of information contribute to parental awareness over the importance of vaccination.

Conclusions: Knowledge and timely information constitute the most important factors that positively affect the attitudes of parents with regard to vaccines and NVP. In-school education of parents may ensure their consistency in NVP implementation.

Keywords : *vaccines, national vaccination programme, parents' knowledge, kindergartens.*

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The National Vaccination Programme in Greece: Factors Affecting Parents' Knowledge

Anastasia Papazoglou [α], Konstantina Giamaiou [σ], Stavroula Poulopoulou [ρ], Ioanna Pavlopoulou [ω] & Konstantinos Tsoumakas [¥]

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Keywords : vaccines, national vaccination programme, parents' knowledge, kindergartens.

I. Introduction

Massive vaccination programmes have contributed to the reduction or even elimination of severe diseases of the previous centuries and their active immunization is recorded as one of the greatest achievements of the 20th century.[1-3] This reduction, however, in the occurrence of infectious diseases, due to vaccines, has resulted in ignorance of those diseases' severity in part of the younger parents.[3] Ignorance combined with inadequate advertisement by the media as it regards the vaccines' safety, and the significant increase in the number of mandatory for infants and children vaccines have led to parents' questioning both the necessity and safety of vaccines.[1-3] The current study aims at recording the factors that influence parents' knowledge level concerning vaccination as well as their attitudes and aspects concerning the significance of vaccination during childhood. It also aims at recording the percentage of non-vaccinated children, investigating parents' knowledge level of NVP in Greece, and showing the level of their agreement with its general implementation. In fact, the study reveals the level of parental awareness, demonstrates the significance of parental education when performing an in-school educational intervention and highlights the responsibility of the health professionals in informing parents about the importance of the vaccination. Despite paediatric consensus in statements and recommendations regarding the importance of vaccination, health professionals in Greece often neglect to inform parents, whereas parents ascribe to lack of valid and timely information the fact that they have not taken any action in that direction.[3]

II. Methods

a) Participants and procedure

A cross-sectional, descriptive, 12-month study was carried out at 107 kindergartens of Athens and one kindergarten at a Hospital of Athens that was selected by draw. The choice of Municipalities was made using this method in order to ensure that the sample included parents from different socio-cultural background. The study began on September, 2009 and ended on July, 2010. A total of 2995 parents answered a specially structured anonymous questionnaire (one questionnaire for each child) concerning previous vaccinations of their children and their knowledge about the importance of vaccination during childhood. The respond rate was 36 %. In particular, 1077 questionnaires were filled in, and 1044 were used. 33 questionnaires were answered by parents that did not have children at pre-school age. A sample of 1044 parents was divided in two groups in order to investigate the factors defining parents' knowledge level on NVP. In particular, it was divided in those with a satisfactory knowledge level (knowledge level ≥50%) and those with a non-satisfactory knowledge level (knowledge level <50%). The independent variables assessed were: child's gender and age, parents' age, educational level, professional status, nationality, religion, and questions concerning parents' views and the previous vaccinations of their children. Specifically, the study examined the child's age, the frequency of vaccinations and the place where vaccinations were administered before the study. The study demonstrated the reasons why infants and children had not been vaccinated before. In addition, questions related to the vaccination establishment in kindergartens were also included. Parents' knowledge and views were assessed through questions related to the prevalence of paediatric

Authors α σ ω ¥ : Faculty of Nursing, National and Kapodistrian University of Athens, Athens, Greece. E-mail : k.giamaiou@hotmail.gr

Author ρ : Department of Statistics, Athens University of Economics and Business, Athens, Greece.

diseases that can be eliminated via vaccination, the importance of vaccination screening during childhood and the necessity of being consistent with NVP. All children's parents gave informed consent. The study protocol and the including questionnaire were approved by the Scientific Committee of the Department of Nursing of the National and Kapodistrian University of Athens and by the Directorates of five Municipalities of Athens.

b) Pilot Study

A pilot study was deemed necessary in order to verify the validity and reliability of the questionnaire. To control the conceptual validity, the questionnaire was given to competent researchers of the field in order to be evaluated. Its content was found to be coherent, precise, complete and clear. The difficulty level of the questionnaire that assesses parents' knowledge concerning NVP and vaccines was initially identified. The pilot study concerning knowledge had a difficulty average of 56.6% and acceptance criterion was higher than 10%. In order to assess the questionnaire's discriminating capacity, the discrimination index of each question was assessed at 0.65 and the acceptable value was above 0.20.[4] A reliability analysis of the questionnaire was held and the internal reliability index Kuder-Richardson 20 (KR 20) was assessed. KR 20 values ranged from 0 to 1 and values higher than 0.7 are generally acceptable.[5] KR 20 reliability index for the entire questionnaire during the pilot study was found to be 0.855.

c) Statistical Analysis

A "knowledge" score was established in order to investigate parents' knowledge level as regards NVP. Every correct answer was rated with 1, every wrong answer or non-answer with 0 and the percentage of correct answers was assessed against the total number of the questionnaire's questions. The range of the score was 0 (minimum) to 100 degrees (maximum). For the description of constant variables, mean values, medians and standard deviations were used and value range as well. Comparisons of quantity variables were done using the non-parametric Mann-Whitney Test as normality assumption was not met according to the Kolmogorov-Smirnov and Shapiro-Wilk Test. For the comparison of proportions, chi-square and Fisher's exact tests were used. Adjusted odds ratios (OR) with 95% confidence intervals (95% CI) were computed from the results of the logistic regression analyses. Statistical significance was set at 0.05 and analyses were conducted using SPSS statistical software (version 18.0).

III. Results

A sample of 1044 parents was divided in two groups in order to investigate the factors defining parents' knowledge level on NVP. In particular, it was divided in those with a satisfactory knowledge level (knowledge level higher or equal to 50%) and those with a non-satisfactory knowledge level (knowledge level less than 50%). 58.8% of parents (614 out of 1044) showed a satisfactory knowledge level. The association of parents' knowledge level with children's demographics is shown in **Table 1**. Children's demographics (gender and age) don't affect parents' knowledge level while parents' age affects their knowledge level as it regards NVP. Parents with a satisfactory knowledge level are of older age compared to parents with non-satisfactory knowledge level (**Table 2**) and the difference is statistically significant ($p<0.0001$ for the mothers and $p=0.003$ for the fathers). Parents of a higher educational level have a higher level of knowledge with respect to NVP ($p<0.0001$), (**Table 3**). The study showed that parents with a higher percentage of satisfactory knowledge are occupied in health professions (83.6%), followed by those in the teaching professions (75.8%) and civil servants (74.7%). The lowest percentage of satisfactory knowledge level is shown by workers (14.3%), working mothers (0%) and housewives (37.1%). Moreover, it has been found that parents' nationality ($p<0.0001$) and religion ($p<0.0001$) were associated with their level of knowledge. 2/3 of Greek parents have a satisfactory level of NVP knowledge, while only 1/4 of foreigners have a satisfactory knowledge level. As it regards religion, 62% (584/943) of the Christian orthodox population have a satisfactory knowledge level contrary to the Catholic population who have a satisfactory knowledge level of 28% (7/25) and the Muslims with a percentage of 12% (3/26). As far as it concerns the rest of religious denominations, it was observed that only 39% (13/33) have a satisfactory knowledge level as it regards vaccination and NVP. As it concerns the information sources and parents' knowledge level on vaccination and NVP, a statistically significant correlation has been observed as it regards the information received by parents with satisfactory knowledge level compared to those with non-satisfactory knowledge level (**Table 4**). The relation of the independent variables with parents' general level of knowledge concerning vaccination was further studied by applying logistic regression analysis. The estimated model is presented in **Table 5**. There is an indication of a positive relation between the total level of parents' knowledge on vaccination and mother's age. Specifically, the increase of mother's age by one year increases the relevant likelihood for parents to have a satisfactory knowledge level by 3.5%. Moreover, it was found a statistically significant positive relation between parents' level of knowledge on vaccines and mother's Greek nationality. The likelihood for the parents to have a satisfactory level of knowledge when the mother is Greek is higher than 47.9% compared to a foreign mother. On the contrary, a statistically significant negative relation is shown between the parents' total level of knowledge and the mother's engagement in household activities ($p=0.028$) or unemployment ($p=0.028$). Essentially, parents' likelihood of having a satisfactory knowledge level when the mother is occupied in household activities

is 62.5% lower compared to the ones with a profession, whereas if unemployed this reaches 79.5% lower. Finally, there are indications showing a positive relation between the general level of parents' knowledge on vaccination and NVP and the information received by Paediatricians, General Practitioners, Media and the Internet or other agent. Parents' likelihood of having a satisfactory level of knowledge when informed by Paediatricians is higher than 159.4% compared to the ones that do not get any information from Paediatricians. Parents' likelihood of having a satisfactory level of knowledge when informed by General Practitioners is higher than 212% compared to those that do not get any information from General Practitioners. The relevant likelihood of having a satisfactory level of knowledge when informed by the Media and the Internet is higher than 66.4% compared to the ones that do not have any information from the Media or the Internet. This study showed that NVP is implemented **(Charts 1-3)**. Nevertheless, it seems that some parents' concerns have begun, particularly with regard to new vaccines. Especially for the human papillomavirus vaccine (HPV) that has recently joined the National Immunization Programme, the study found that parents are skeptical in a high percentage about its safety and effectiveness.

IV. Discussion

Vaccination constitutes an important means of protection against infectious diseases.[6] What vaccines can achieve is to protect both the vaccinated person and the community.[6-7] A first reference to vaccines was made in the 18th century, as Jenner introduced the vaccine against smallpox.[8] At that time, scientists could not foresee that 180 years later this disease would have been eliminated.[6-8] Later on, in 1885, Pasteur attempted a successful anti-rabies vaccination using a vaccine made of dried rabbit spinal marrow, with the rabbits having been firstly contaminated with the rabies virus.[9] In 1923, Ramon discovered Diphtheria Toxoid and in 1927 the Tetanus Toxoid.[9,10] The first vaccinations, by Jenner and Pasteur, were administered without knowing the immunizing mechanisms involved in vaccination, a knowledge which is essential since it helps health professionals to use vaccines properly, achieving the best immunizing response.[11] Biotechnological development allowed the discovery and production of new vaccines that now have limited side-effects and high efficiency levels.[6,12,13] As an example of the optimized vaccines, the acellular pertussis vaccine (DTaP), the smallpox vaccine, and a vaccine against human papillomavirus (HPV) are mentioned.[14-16] Studies showed that parents are concerned about the vaccines' correlation with side-effects, such as autism, multiple sclerosis, peripheral polyneuropathy and allergies.[3,17] In particular, MMR (measles, mumps, and rubella) vaccine's correlation with the appearance of autism has been a serious concern for a number of years, although there are no indications to justify such a correlation.[17] The first correlations of MMR vaccine with autism were expressed about 12 years ago by A. Wakefield et al.[3,17,18] Their study was considered insufficient due to the small sample and the fact that it was based on parents' reports. Nevertheless, it was observed a significant reduction of vaccination.[2,3,17] Ever since, a number of studies have been conducted, which do not correlate vaccines with the occurrence of autism, while distinguished international organizations, such as Centers for Disease Control (CDC) and the National Health Service (NHS), have supported the use of the vaccines.[3,19,20] It has been shown that many factors influence, either positively or negatively, parents' opinion about vaccination. Knowledge and timely information constitute the most important factors that positively affect the attitudes of parents as it regards vaccines and NVP, while appeasing their concerns, so that the NVP be followed by everyone. In 2005, Paulussen et al. conducted a similar study aiming at recording the fundamental factors based on parents vaccinating their children in the respective NVPs.[21] By the current study it was found that parents wish their children to be vaccinated, believing that vaccination offers them a proper and safe immunization, hence protection, against severe diseases. However, parents' concern was that their children had to get too many vaccines simultaneously. Parents stated that the information they received by Paediatricians might not have been objective and only when vaccination advantages were previously presented it might led them to the Paediatrician office. The researchers deem that parents must be fully informed by Paediatricians in order to prevent information received from non-trusted sources that may discredit vaccines. Downs et al. had mental model interviews with parents, discussing issues pertaining to their children's vaccination and found out that even parents that were initially in favour of their children being vaccinated, expressed some concerns as to whether they had made the right decision or not.[22] Detailed information seems to be helpful and to appease parents' concerns on vaccination issues.[22] Finally, a qualitative study was conducted by Rachel K et al., aiming at researching the decision-making process of the parents who choose not to vaccinate their children, showed that most of the parents considered that their decision is based on valid information, while an equally large number of them did not consider that health professionals provided valid information.[23] It is hence concluded that it is necessary for parents to have access to correct information on vaccines.[23] In 2009 an anti-vaccine climate was created in Greece by the outbreak of influenza.[24-26] Data from the Greek Pandemic Committee report that, by the misinformation carried out for three months, saying that the vaccine is dangerous or should not be administered to children, damage was unavoidable. By the outbreak of influenza, different views were presented in scientific field on the safety and

necessity of the vaccine until they finally decided that the vaccine is blameless.[24-26] The controversies and tensions that occurred resulted in the parents' concerns about the safety of all vaccines and the risks posed to the occurrence of side effects. Data from the Greek Pandemic Committee show a decreased consumption of vaccines in the quarter December 2009 to February 2010, which indicates that parents have lost their trust in vaccines.[24] This study showed that NVP is implemented, but, nevertheless, it seems that some parents' concerns have begun, particularly with regard to new vaccines. [27-29] Especially for the human papillomavirus vaccine (HPV) that has recently joined the National Immunization Programme, the study found that parents are skeptical in a high percentage about its safety and effectiveness. However, parents who had satisfactory knowledge level in matters concerning vaccines and are aware of HPV vaccine, would administer the vaccine to their children. In similar studies performed abroad on the acceptance of new vaccine in the mandatory vaccination of each country, it was found that parents, who were informed about the risks their children were running after infection with HPV and the cervical cancer as well, accepted vaccination at higher rates.[27-29] Through recording and studying the factors that act on parents' opinion about vaccines it seems that knowledge and timely information positively affect parental attitude as it regards the implementation of the NVP. This is the role that scientific community and health professionals are obliged to assume, that is, to respect the concerns expressed by parents, deal with their questions and convince them on the necessity as well as on the safety of vaccines. Before the problem gets worse, it would be good to begin organized programmes of parents' information, either through the primary centers for counseling young parents, or in kindergartens through scheduled meetings and parents' information by health professionals. Health professionals need to be constantly updated on new developments in the vaccine field and convince skeptical parents with scientific criteria for the necessity of vaccinations, stating in any case that the unvaccinated children are at increased risk of developing serious diseases with incalculable consequences for their health.

a) Limitations

The study had several limitations. The main limitation was that the dispensation of the matter to conduct the study was based on researchers' disposition in each kindergarten to distribute questionnaires diligently. Another limitation was the lack of uniformity of the sample as far as nationality is concerned. Probably some parents did not answer the questionnaire because they could not understand the questions (foreigners), affecting the sample in this way. Nevertheless, this epidemiological study aimed at finding out whether the NVP is implemented as it concerns the residing paediatric population in Greece or not, and recognising the significance of educating the parents about the NVP implementation.

V. Conclusions

NVP and promoting awareness constitute important means of protection against infectious diseases. [6] What vaccines can achieve is to protect both the vaccinated person and the community. [6-7] When comparing knowledge level of parents who agree and those who disagree with the observance of National Immunization Programme, it was found that most of those who agree (60%) have a satisfactory knowledge level, as opposed to those who disagree. It was found that parents who have followed and completed the National Immunization Programme have a satisfactory knowledge level ($p = 0{,}004$) compared with those who have not completed this programme. A 96.1% of the parents' state that they keep abreast of new developments in vaccines by Paediatricians, while a second important source of information are the Media and the Internet (33.6%). It was shown that the majority of parents (81.7%) are skeptical as to the safety and effectiveness of new vaccines, such as the vaccine against HPV and Rota. The parents' intention to vaccinate their children with new vaccines depends on whether they know or not the side effects of these vaccines, e.g. for HPV, Rota ($p = 0.001$). Even though the NVP is mandatory, some parents question both the necessity and the safety of vaccines, which furthermore endangers a child's life. In-school education seems to be of vital importance in the parents' compliance with NVP. However, more studies are needed to ensure that there is evidence of the incorporation of the recommendations concerning the importance of NVP during childhood. It is essential to inform parents with respect to the significance of vaccination, and the consequences of their ignorance. It is also necessary that medical personnel should take action with respect to its implementation and thus contribute to public awareness. Health professionals are a catalyst for community awareness, screening and prevention with respect to elimination of infectious diseases.

VI. Acknowledgement

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Table 1 : Association of the general level of parental knowledge about NVP with child's gender and age

	General level of parental knowledge		
	Non-satisfactory	Satisfactory	p-value
Child's gender	N (%)	N (%)	
Male	206 (40.1)	308 (59.9)	0,658[a]
Female	216 (41.5)	304 (58.5)	
Child's age (months)			
Average±Standard deviation	46 ± 12	45 ± 11	
Median (Range)	48 (14 - 84)	48 (4 - 72)	0,240[b]

[a] Fisher's Exact Test

[b] Mann-Whitney Test

Table 2 : Association of the general level of parental knowledge about NVP with parents' age

	General level of parental knowledge		
Parents' age	Non-satisfactory	Satisfactory	p-value[b]
Mother's age (years)			
Average±SD	35 ± 5	36 ± 4	
Median (Range)	35 (22 - 53)	36 (22 - 52)	**<0,0001**
Father's age (years)			
Average±SD	39 ± 6	40 ± 6	
Median (Range)	38 (26 - 79)	39 (24 - 73)	**0,003**

[b] Mann-Whitney Test

Table 3 : Association of the general level of parental knowledge about NVP with parental educational level

	General level of parental knowledge		
Parental educational level	Non-satisfactory	Satisfactory	p-value[c]
Mother's education	**N (%)**	**N (%)**	
Grammar School	3 (75)	1 (25)	
Primary School	12 (70.6)	5 (29.4)	
Primary Junior High School	10 (62.5)	6 (37.5)	
Junior High School	49 (68.1)	23 (31.9)	
Vocational, Technical School	50 (56.8)	38 (43.2)	
Senior High-School	9 (75)	3 (25)	
High-School	149 (42.3)	203 (57.7)	**<0,0001**
Higher Technical Educational Institute	39 (26.2)	110 (73.8)	
University	72 (33.6)	142 (66.4)	
Post-graduate studies	25 (24.3)	78 (75.7)	
Father's education	**N (%)**	**N (%)**	
Grammar School	1 (25)	3 (75)	
Primary School	8 (66.7)	4 (33.3)	
Primary Junior High School	15 (65.2)	8 (34.8)	
Junior High School	24 (41.4)	34 (58.6)	
Vocational, Technical School	48 (47.5)	53 (52.5)	
Senior High-School	18 (75)	6 (25)	
High- School	160 (43.5)	208 (56.5)	
Higher Technical Educational Institute	51 (37)	87 (63)	**<0,0001**
University	58 (32.2)	122 (67.8)	
Post-graduate studies	22 (22.2)	77 (77.8)	

[c] Pearson Chi-Square

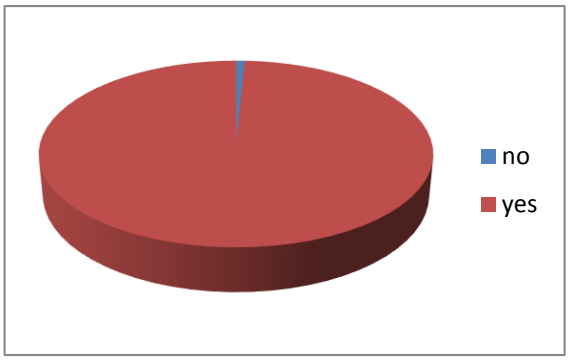
Table 4 : Association of the general level of parental knowledge about NVP with information sources

Information sources		General level of parental knowledge: Non-satisfactory N (%)	Satisfactory N (%)	p-value [a]
Paediatrician	No	26 (6.1)	15 (2.4)	**0,005**
	Yes	403 (93.9)	599 (97.6)	
General Practitioner	No	418 (97.4)	552 (89.9)	**<0,001**
	Yes	11 (2.6)	62 (10.1)	
School	No	406 (94.6)	571 (93)	0,304
	Yes	23 (5.4)	43 (7)	
Media , Internet	No	327 (76.2)	366 (59.6)	**<0,001**
	Yes	102 (23.8)	248 (40.4)	
Family	No	403 (93.9)	577 (94)	1,000
	Yes	26 (6.1)	37 (6)	
Other	No	421 (98.1)	569 (92.7)	**<0,001**
	Yes	8 (1.9)	45 (7.3)	

[a] Fisher's Exact Test

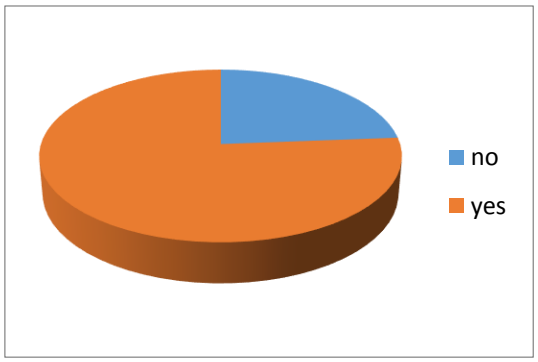
Table 5 : Odds Ratios (OR) and 95% Confidence Intervals (95% CI) derived from multiple logistic regression analysis with dependent the variable presented if the level of parental knowledge is satisfactory or not

	B	(OR) e^B	95% CI for e^B		p-value
Mother's age (years)	0.035	1.035	1.001	1.071	**0.045**
Parents' education					**0.043**
Grammar School	0.132	1.141	0.099	13.096	0.916
Primary School	-0.701	0.496	0.107	2.304	0.371
Primary Junior High School	-1.359	0.257	0.082	0.804	**0.020**
Junior High School	0.238	1.269	0.546	2.948	0.580
Vocational, technical school	-0.783	0.457	0.229	0.913	**0.027**
Senior High School	-1.499	0.223	0.070	0.717	**0.012**
Mother's Nationality (Greek)	1.479	4.390	2.793	6.901	**0.000**
Mother's professional status					**0.002**
Civil Servant	-0.181	0.834	0.385	1.810	0.647
Private Employee	-0.637	0.529	0.263	1.063	0.074
Teacher, Professor	0.003	1.003	0.430	2.337	0.995
Health professional	0.503	1.654	0.609	4.494	0.324
Housework	-0.980	0.375	0.157	0.899	**0.028**
Unemployed	-1.583	0.205	0.064	0.659	**0.008**
Information sources					
Paediatrician	0.953	2.594	1.076	6.256	**0.034**
General Practitioner	1.138	3.120	1.508	6.458	**0.002**
Media , Internet	0.509	1.664	1.204	2.300	**0.002**
Other	1.551	4.717	1.837	12.112	**0.001**



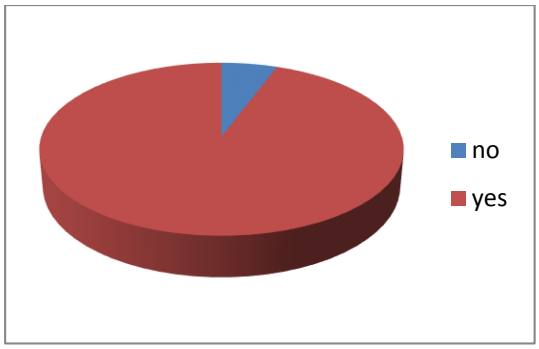
Yes: 99.23% No: 0.77%

Pie chart 1 : Parent's compliance rate with the NVP



Yes: 76.21% No: 23.79%

Pie chart 2 : NVP's completion rate



Yes: 94.31% No: 5.69%

Pie chart 3 : Parents' agreement rate with the NVP

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Smokefree Movies in India- Converting Evidence into Action

By Dr. Jagdish Kaur & Dr. Vinayak M Prasad
Government of India, India

Abstract - Prevalence of tobacco use is high among adults and youth in India, resulting in high mortality from diseases associated with it. Studies in different countries have established the consistency of the association between movie smoking and adolescent smoking. Besides having the largest population of adolescents in the world, India also is one of the major movies producing countries. Moreover a large number of Indian films have been found to display tobacco branding. Indian movies have large viewership not only in the country, but all over the world, making youth vulnerable to exposure to smoking scenes. The Indian anti tobacco law provides for ban on all forms of advertisements, promotion and sponsorship of tobacco products. The Indian Government tried to regulate smoking scenes in movies as per the provisions under the law way back in the year 2005. This was met with strong resistance by the film industry arguing inference in the freedom of expression by these provisions which were challenged in the court of law. Subsequent to support from the judiciary and positive rulings from the court of law, the Government went ahead and implemented regulation on scenes showing smoking and other tobacco use in movies and television programmes in October 2012. The law is under implementation For desirable and effective impact of the legislative provisions for regulating scenes depicting smoking and tobacco use in the movies, it is imperative to ensure that the motion pictures no longer serve as a source of tobacco promotion aimed at adolescents and youth.

Keywords : *tobacco, smokefree movies, anti-tobacco law, India.*

GJMR-K Classification : *NLMC Code: WM 290*

Strictly as per the compliance and regulations of:

Smokefree Movies in India- Converting Evidence into Action

Dr. Jagdish Kaur [α] & Dr. Vinayak M Prasad [σ]

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I. Introduction

India is the second largest consumer of Tobacco products in the world with 35% of adults (15 years and above) consuming tobacco.[1] Overall tobacco use among males is 48% and among females is 20%. As per GYTS (2006), 14.1% 13-15 years school going children in India use tobacco products. It is interesting to note that the tobacco products use by the youth is also predominantly smokeless tobacco products, as is amongst the adults.[2] In the age group, 30 years and above, the proportion of deaths attributable to tobacco is almost 24% for men and 12% for females. Among those who die prematurely, almost one in every 8 deaths among those aged 30-44 years and one in 5 among those aged 45-59 years is attributable to tobacco use.[3]

Author α : Chief Medical Officer (NCD), Ministry of Health & Family Welfare, Government of India, India. E-mail : jagdish.kaur@nic.in
Author σ : Project Manager, Tobacco Control, Prevention of Non Communicable Diseases, World health Organization, Geneva, Switzerland.

The next section of this article briefly introduces the literature review using pubmed, internet, published reports, and perspectives relating to evidence of association between smoking scenes in films and imagery and smoking by adolescents and youth.

There is growing evidence that an adolescent's decision to try cigarettes is influenced by level of exposure to movies in which smoking is portrayed. Many studies in United States have indicated that higher exposure to smoking in entertainment programming leads to greater initiation among youth possibly through social modeling and by reducing resistance to counter-arguments.[4-7] Some other studies linked smoking status of an adolescent's favorite movie star to attitudes and smoking behaviour.[8-10] The effect of exposure to movie smoking on behavior has also been shown to be mediated through attitudes towards smoking[11] and smoking status of peers.[12-13] A cross cultural study involving six European countries established the consistency of the association between movie smoking and adolescent smoking, despite their substantial differences in culture and tobacco policy, and after covariate control for the number of movies seen, adds further weight to the argument that smoking in movies is an independent risk factor for smoking uptake in youth.[14]

Evidence from India has found that specific media content such as media advertising is associated with higher smoking rates[15], and exposure to cigarette brand names or actors smoking on television have been found to be related to increased youth smoking in India.[16] One study provided evidence that exposure to pro-tobacco content in television and cinema may promote tobacco use among men and women in India.[17] Another Indian study found a strong association of tobacco use by the adolescents with having seen various role models ever smoking.[18] It is noteworthy that India has the largest population of adolescents in the world, being home to 243 million individuals aged 10-19 years. The country's adolescent constituted 20 percent of the world's 1.2 billion adolescents.[19]

India is one of the major film producing countries in the world. There has been a steady increase in production of films over the years. While 764 Indian feature films were certified in the year 1999, the number increased to 1325 in 2008. In 2011, a total of 814 films were produced during the period ranging from April to November.[20] Moreover Indian films are viewed in over one hundred countries worldwide, attracting 25 million

Indians working abroad and building a fan base in industrialized countries. Entry into the Indian film market is also a potential growth area for the United States film industry. For these reasons, national interventions in India can have a global impact on reducing youth exposure to tobacco imagery.[21]

The Indian anti tobacco law provides for ban on all forms of advertisements, promotion and sponsorship of tobacco products.[22] The law also provides for regulating smoking scenes in movies. A few years ago the Indian government tried unsuccessfully to ban all smoking scenes in movies, as the provision was legally challenged.[23] A study of India's indigenous cinema industry conducted by WHO and the Ministry of Health and Family Welfare in 2003 (before the anti tobacco law was enacted) revealed that 76% of top-grossing films during 1990-2002 depicted tobacco use, tobacco incidents attributed to the lead actors growing from 22 % in 1991 to 54% in 2002.[24] Another study which was conducted after the anti tobacco law banned all tobacco advertisements revealed that 89% Hindi -language films produced in 2004-05 depicted tobacco use and smoking scenes were attributed to lead actor in 76% of the films. Interestingly 46% films, mostly large-budget films, displayed tobacco branding.[25]

II. Discussion

The tobacco industry has long recognized the value of smoking in movies to promote cigarettes and developed extensive programs to promote smoking in the movies.[26] The images of smoking in movies both normalize the behavior and downplay the negative health effects associated with smoking, encouraging more tolerant, neutral, or nonchalant attitudes about smoking. Although teens generally acknowledge the long-term health risks associated with smoking, they immediately experience the perceived short-term benefits of smoking, such as looking tough or sexy or fitting in with their peers, which reinforces and motivates adolescent smoking.[27] Movies are such a powerful influence on adolescents that they can negate the effects of positive parental role modeling on smoking.[28]

Looking at the strong empirical evidence indicating increased adolescent smoking initiation associated with smoking scenes in movies, amending the movie rating system to rate movies containing smoking as "R" should reduce adolescent exposure to smoking and subsequent smoking. It is further established that viewing antismoking advertisements before viewing movie smoking seemed to blunt the stimulating effects of movie smoking on adolescent smoking.[29]

Concern about the impact of exposure to tobacco imagery in movies on youth smoking led the World Health Organization (WHO) to recommend that all future movies with scenes of smoking should be given an adult rating, with the possible exception of movies that reflect the dangers of tobacco use or that depict smoking by a historical figure who actually smoked.[30] Implementing this policy would substantially reduce the dose of onscreen smoking delivered to children and adolescents and the corresponding response of smoking initiation.[31]

The efforts of Ministry of Health in India to provide for adult rating to the movies with smoking scenes were countered by the Ministry of Information and Broadcasting, citing practical difficulties faced by the film industry in implementing the same. Although it directed the Central Board of Film Certification (CBFC) in May 2012 to ensure featuring a twenty second anti smoking message approved by Ministry of Health with voiceover of one of the actors who is seen smoking in the film at the beginning and middle (after interval) of the film and display of a static anti smoking message for the duration of smoking scene in the film.[32] There was further resistance to these provisions by the film industry arguing inference in the freedom of expression by such provisions. Finally the new law was notified and come into effect from 2nd October, 2012 after a long legal battle and intense deliberations with the Ministry of Information and Broadcasting.[33] The law has the following provisions:

1. All new Indian and foreign films and television programmes displaying tobacco products or their use shall have to submit a strong editorial justification explaining the necessity of the display of the tobacco products or their use in the film, to the CBFC.
2. Screening of anti tobacco health spots of minimum thirty seconds duration at the beginning and middle of the films. This also applies to old Indian and foreign films and old television programmes displaying tobacco products or their use.
3. Display of anti tobacco health warning as a prominent static message at the bottom of the screen during the period of display of the tobacco products or their use in the film and television programme.
4. Screening of an audio-visual disclaimer on the ill effects of tobacco use, of minimum twenty seconds duration each, in the beginning and middle of the film and television programme.
5. The health spots and disclaimer will be made available to the CBFC by the Ministry of Health & Family Welfare, Government of India.
6. The failure to comply with the aforesaid provisions by the owner or manager of the cinema hall or theatre or the broadcaster of the television programme will lead to cancellation or suspension of the licence.

As the provisions are quite stringent, the film industry was much reluctant to implement the same initially. The film industry also tried to influence the Ministry of Information & Broadcasting and the media and tried to gain public sympathy by pleading that the law was a direct interference with their freedom of expression. However the Hindi-language and regional-language films and television programmes have now started following and implementing the provisions under the law. How much impact this regulation ultimately has on prevention of adolescent smoking and tobacco use needs further research.

III. Conclusion

At least 7300 feature length movies were produced and released in 2009 (many directly to video) in fifty nations worldwide, including 1341 (18%) in the European Union, 1288 (17%) in India, 677 (9%) 56 (6%) in China and 448 (6%) in Japan.[34] The tobacco industry knows that motion pictures are one of humanity's most common entertainment experiences. The world spends approximately US $ 120 billion a year to view films through legitimate distribution channels.[21] India leads the world with highest actual admissions into movie theatres (2.7 billion in 2010).[35] The depiction of tobacco use in the movies in India, which has one of the most active film industry globally, remains an active vehicle for promoting smoking and other tobacco products use, including in films rated as suitable for children and adolescents. A recent study finding suggested that scenes depicting tobacco use are shown in Bollywood movies even after the enactment of COTPA in 2004, Section 5, which prohibits direct and indirect forms of tobacco advertising and further provides evidence of association between seeing tobacco use in movies and youth tobacco use in India.[36]

Hence it becomes imperative that the legislative provisions for regulating scenes depicting smoking and tobacco use in the movies are implemented in letter and spirit to ensure that the motion pictures no longer serve as a source of tobacco promotion aimed at young people. This along with the other provisions in the Indian anti tobacco law which aim at reducing access of minors (below 18 years of age) to all tobacco products, if strongly enforced will go a long way in preventing the youth from taking up tobacco use in India.

IV. Acknowledgements

The views expressed in the article are of the authors and not necessarily of their respective organizations.

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Estimation of Time Since Death by using Algorithm in Early Postmortem Period

By Poposka V., Gutevska A., Stankov A., Pavlovski G., Jakovski Z. & Janeska B.

University "Ss. Cyril and Methodius", R. Macedonia

Abstract - Estimation of the time since death in the early post mortem period is performed by analysis of the supravital signs and the early signs of death. Using several methods for determining the time since death increases significantly the preciseness and reliability upon estimation of the time since death.

The objective of this paper is to find a way for faster and more simple estimation of the time since death by using several parameters.

At the Institute of Forensic Medicine and Criminology an analysis of five parameters for estimation of time since death was performed: supravital reactions (electrical excitability of muscles, chemical excitability of muscles) and early signs of death (cooling of the body, post mortem lividity and rigor mortis) at 120 cases with known time of death. Obtained results have been used for preparation of a special table-algorithm, which contains the limit minimum and maximum values of the post mortem period for each tested parameter.

Keywords : *time of death, electric and chemical excitability, cooling of the body, postmortem lividity, rigor mortis.*

GJMR-K Classification : *NLMC Code: QZ 35*

Strictly as per the compliance and regulations of:

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Poposka V. [α], Gutevska A. [σ], Stankov A. [ρ], Pavlovski G. [ω], Jakovski Z. [¥] & Janeska B. [§]

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The algorithm makes the work easier for the person doing the autopsy, enabling easy and fast estimation of the probable post mortem period.

Keywords : time of death, electric and chemical excitability, cooling of the body, postmortem lividity, rigor mortis.

I. Introduction

The estimate of the time since death, after the first 48 hours (the so called early postmortem period) is determined by routine appliance of conventional methods of corpse examination and detecting the development of postmortem changes. Due to the big variations in time of occurrence and duration of such corpse changes, influenced by many endogenous and exogenous factors, it allows only approximate determination of the time of death in a few hours interval after death.

Using several methods for estimation of time since death (the supravital signs and the early signs of death) has significantly increased the preciseness and certainty in estimation of the time of death.

Electric excitability and chemical excitability of muscles present highly important supravital reactions in achieving higher level of precision in estimating the time since death. Most appropriate and accessible muscles for testing by electric stimulation are the muscles around the eyes (m.orbicularis oculi) and the muscles around the mouth (m.orbicularis oris). While the flat muscles of the iris in the eye react to chemical stimulation in a longer post-mortem period. (4,6,7)

The postmortem cooling of the body (algor mortis) is one of the significant parameters in estimating the time since death. After death the body temperature regulation is stopped, the corpse becomes poikilothermic resulting in drop of body temperature in order to adjust to the environmental temperature.(1,4)

Postmortem lividity starts to manifest and develop immediately after cardiac arrest, i.e. stoppage of blood circulation; it can also start developing before death, during a long comatose period due to disrupted circulation. From the moment of death blood remains fluid and is liable to physical laws moving as influenced by gravity; thus the blood in the blood vessels flows passively towards the distal parts of the body (depending on its position). The time of appearing of postmortem lividity and manifestation extent depends on many reasons among which the most important are the cases of a long comatose agony and massive blood loss.(4,5)

Rigor mortis is a specific type of muscle contraction which mainly does not decline from physiological contraction, appears within 1-3 hours after the moment of death. All body muscles contract and stay rigid, without activity potential. This contraction is caused by loosing of the total ATP which is necessary for separation of cross bridges from the actin filaments in the process of relaxation. Muscle stays in rigor until muscle proteins disintegrate which usually occurs by autolysis with enzymes released from lysosomes, 15 to 24 hours after death, depending on external temperature.(4,5)

II. Purpose

Purpose of this paper is to find a way for faster and more simple determination of the time since death by using several parameters.

III. Material and Methods

120 cases of death with known time of death, autopsied at the Institute of Forensic Medicine and Criminology, Faculty of Medicine, Skopje, in a period of 2 years have been analyzed. All these cases are:

- of quick death / short agony period;

Authors α σ ρ ω ¥ § : Institute of Forensic Medicine and Criminology, Faculty of Medicine Skopje, University "Ss. Cyril and Methodius", R. Macedonia. E-mail : drverce@yahoo.com

- with postmortem period of 2 to 24–25 hours;
- analyzed at ambient temperature of 17 to 25°C.

a) Electrical Excitation

Testing is carried out with a device for electrical muscle stimulation which supplies a direct current, of 50 *mA*, frequency 50 *Hz*. (8)

Fig. 1 : Testing of m.orbicularis oculi

I degree – contraction of facial muscles from the same side
II degree – contraction of the lower and upper eyelid
III degree – contraction of the upper eyelid
IV degree – contraction of the medial part of the upper eyelid

Fig. 2 : Testing of m.orbicularis oris

I degree – contraction of the whole musculature around the mouth
II degree – contraction of the *musculus orbicularis oris*
III degree – excitation in a form of muscle quivering

b) Chemical Excitation

Testing is performed by injecting of the miotic *Carbahol* and mydriatic *Adrenalin HCl* either in the front eye chamber or sub-conjunctively.(8)

Fig. 3 : Chemical excitability by miotic

Fig. 4 : Chemical excitability by mydriatic

Reaction of the pupil after injecting the miotic (*Carbachol)* and mydriatic (*Adrenalin HCl)*

c) Algor Mortis

Measuring of the rectal and ambient temperatures of all the analyzed cases with digital thermometer which consists of a probe and monitor, the latter displaying the measured temperature.

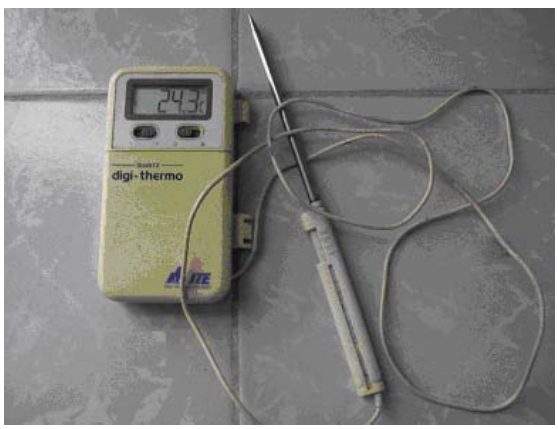


Fig. 4 : Digital Thermometer

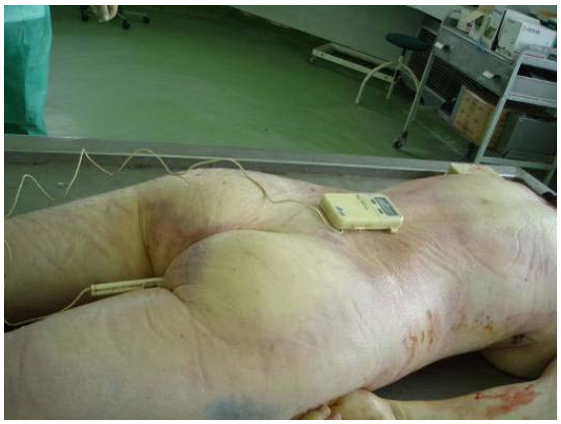


Fig. 5 : Measuring the rectal temperature

d) Henssge Nomogram

The Nomogram method is based on a formula which follows the sigmoid shape of the cooling curve.

This formula contains two exponential parts. The first represents the post mortem plateau and the second constant shows the exponential drop of t° after the plateau, according to Newton's law on cooling.(2,3)

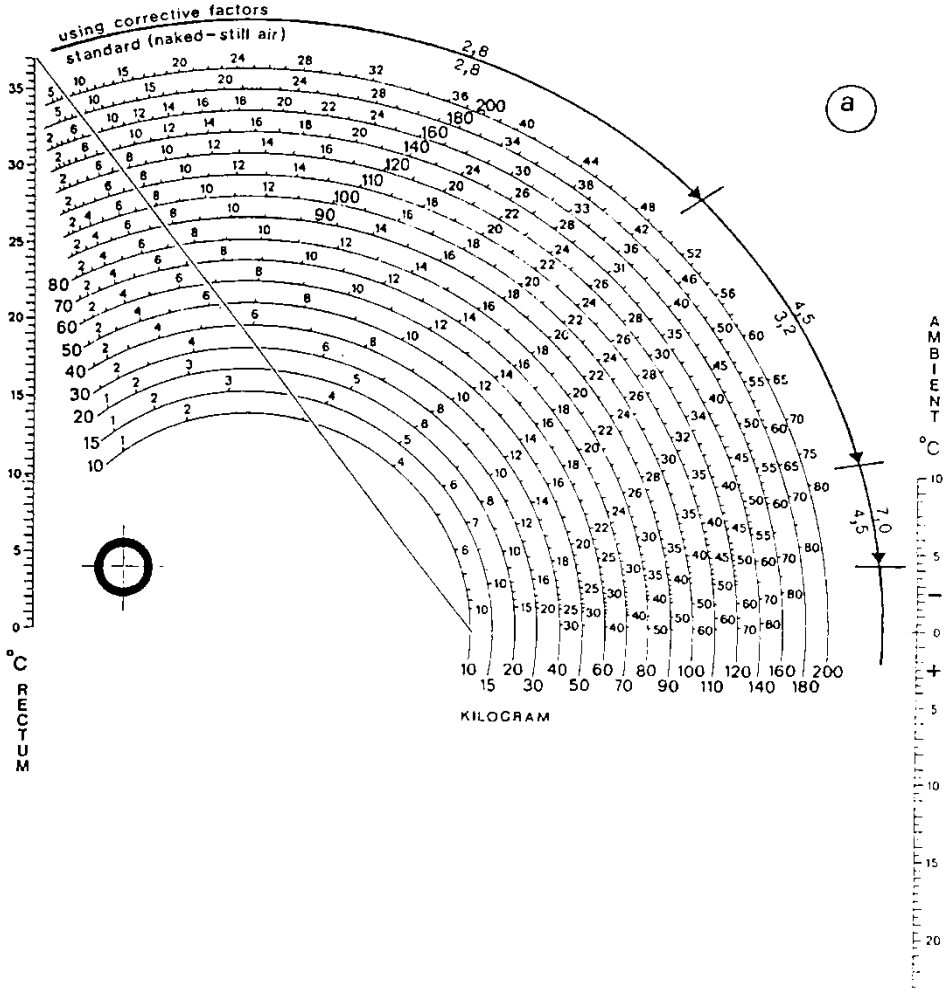


Fig. 6 : Nomogram for ambient temperature below 23°C (4)

e) Post mortem lividity

Examination – visual inspection in relation to the occurrence and intensity and by turning the body to the side, inspecting the shifting ability.

Fig. 7 : Poorly shown post mortem lividity

Fig. 8 : Fixed post mortem lividity

Fig. 9 : Examination of rigor mortis of the elbow

Fig. 10 : Examination of rigor mortis of the knee

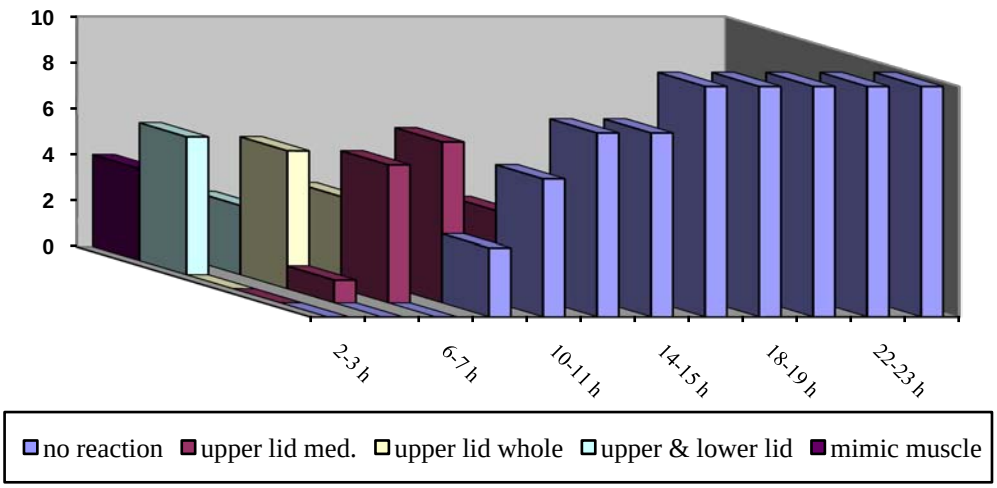
f) Rigor Mortis

Examination – analyzing by manual inspection of the stiffness of all joints.

IV. Results

a) Electrical Excitability

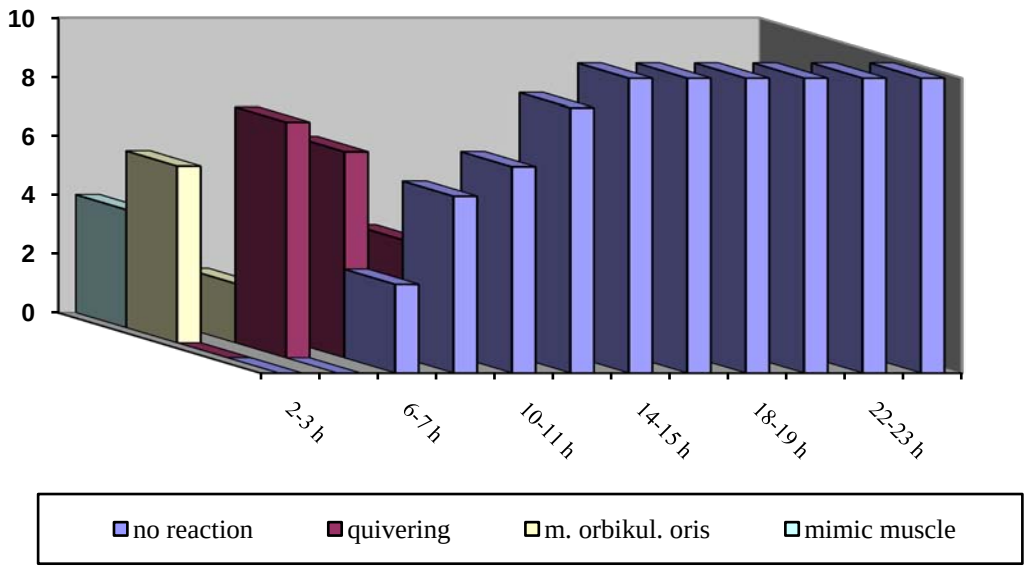
Chart 1 : Reaction upon electrical excitation of the ocular musculature per hours PM



Electrical excitation of the *m. orbicularis oculi:*

- reaction of any degree - post mortem period shorter than 8 hours.
- uncertain reaction – post mortem period 8-15 hours
- no reaction at all - post mortem period of 16 and more hours.

Chart 2 : Reaction upon electrical excitation of the mouth musculature per hours PM

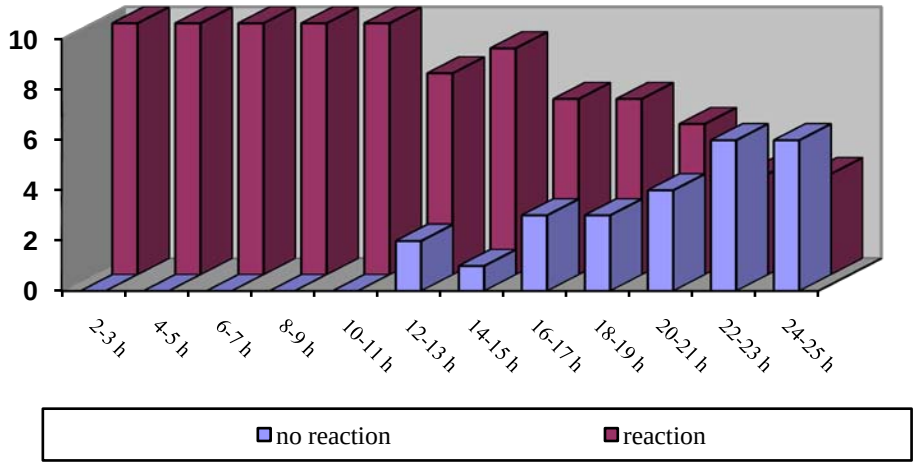


Electrical excitation of the *m.orbicularis oris*:

- reaction of any degree - post mortem period up to 6 hours
- uncertain reaction - post mortem period 6 to 13 hours
- no reaction at all - post mortem period of 14 and more hours.

b) Chemical Excitability

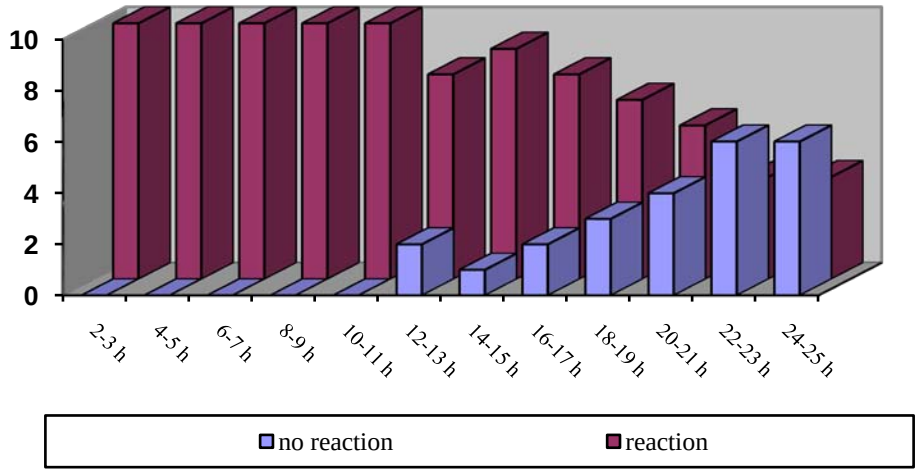
Chart 3 : Reaction upon chemical excitation with mydriatic per hours PM



Chemical excitation with mydriatic *Adrenalin HCl:*

- certain positive reaction - post mortem period up to 12 hours
- uncertain reaction - post mortem period of 12 to 25 hours

Chart 4 : Reaction upon chemical excitation with miotic per hours PM

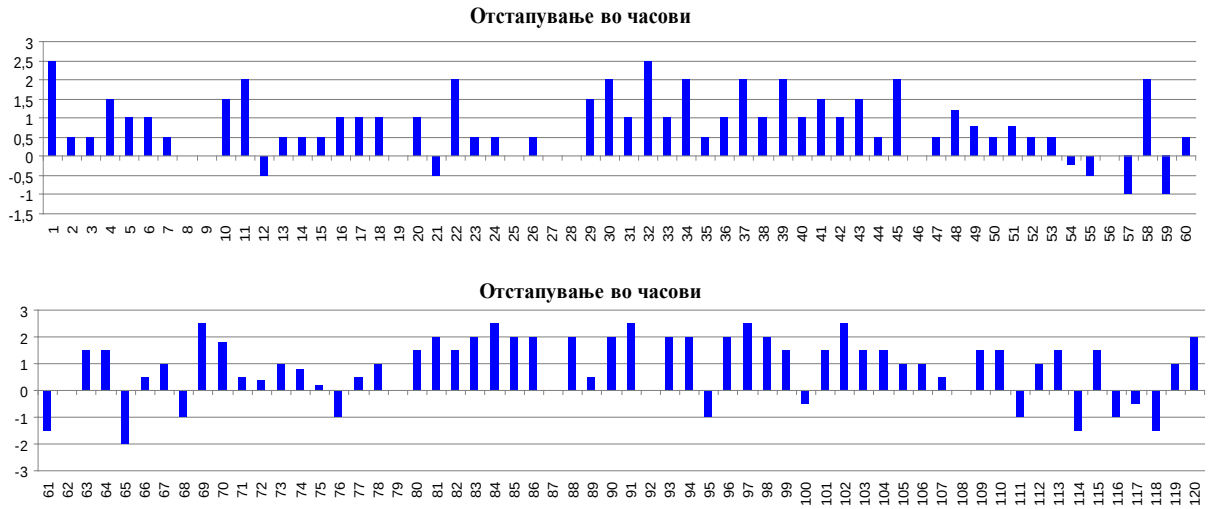


Chemical excitation with miotic *Carbachol:*

- certain positive reaction - post mortem period of 2 to 11 hours
- uncertain reaction - post mortem period of 12 to 25 hours

c) Algor Mortis

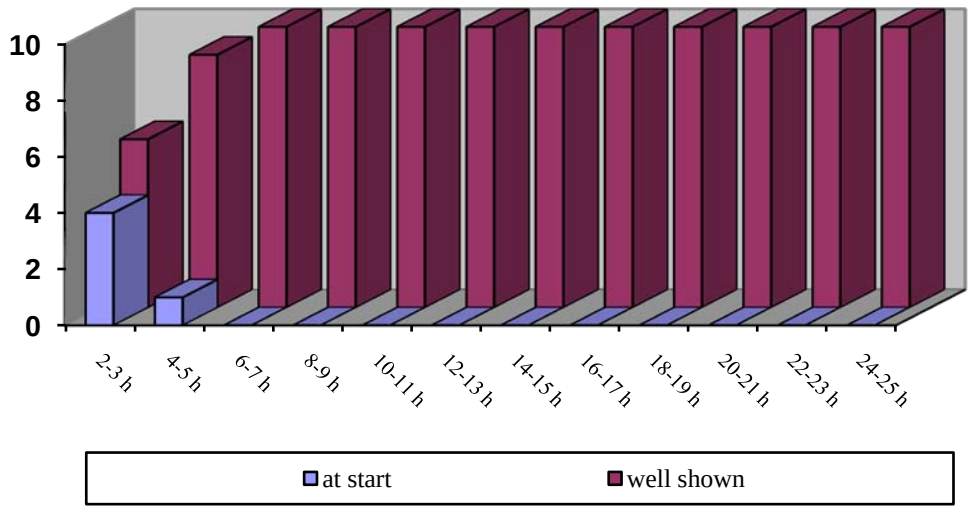
Chart 5 : Discrepancy of probable time of death obtained by the ***Henssge*** Nomogram from the actual time of death in hours



- discrepancy within limits from –2 to +2,5 hours.

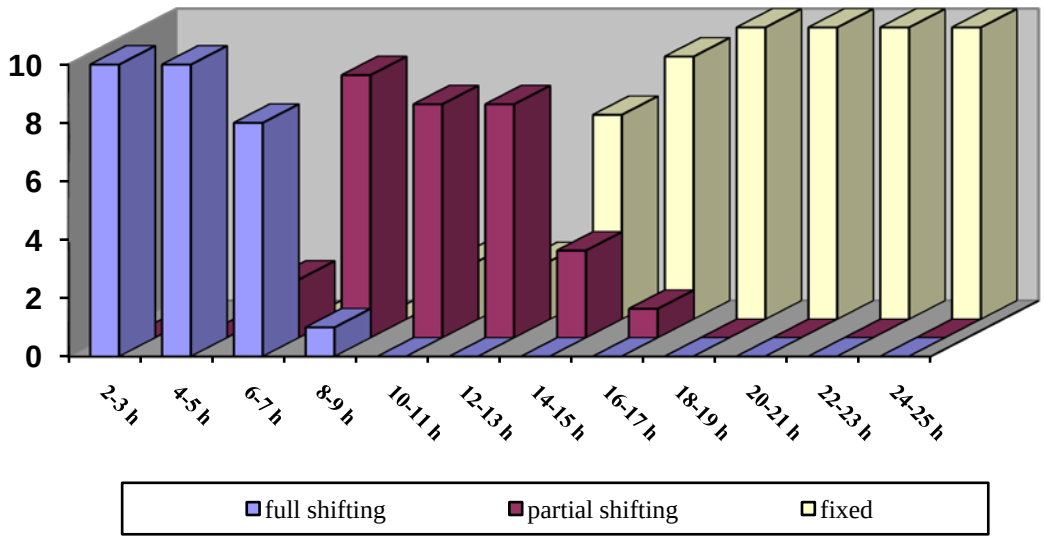
d) Post mortem lividity – livores mortis

Chart 6 : Intensity of the lividity per hours PM



- start of post mortem lividity - post mortem period of 2-5 hours
- well shown post mortem lividity – post mortem period up to 24-25 hours

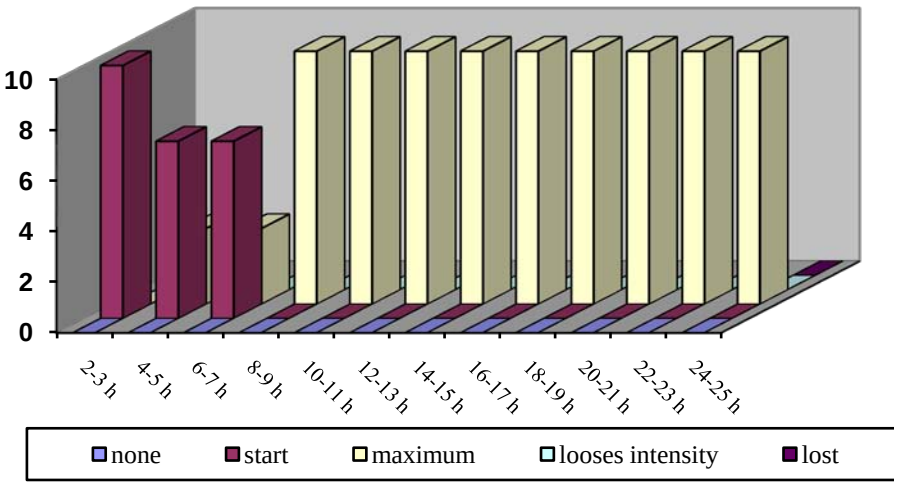
Chart 7 : Shifting ability of PM lividity per hours PM



- full shifting - up to 10 hours; partial shifting - from 6 to 17 hours;
- fixing - from at least 10 hours after death onwards
- at all cases with post mortem period of 18 hours and more, PM lividity is fixed.

e) Rigor Mortis

Chart 8 : Intensity of rigor mortis per hours PM



- start of rigor mortis - post mortem period of 2 to 7 hours
- maximal rigor for post mortem period of 8 hours and onwards.

f) Estimation of time since death by using Algorithm

An example of estimation of time since death with Algorithm

Case Protocol. No.	13952		Date	29.03.2008	Time 13,30 h
Age	44	Sex F	Body Weight/ *kg*	80	Height/ *cm* 164	Constitution overweight
Causa mortis	Canalis sclopetarium cerebri				

Livores mortis:
☐ poorly shown – post mortem period up to 5 hours
☐ well shown, shifting complete – post mortem period up to 10 hours
☐ well shown, shifting partial – post mortem period 6–17 hours
☒ well shown, fixed – post mortem period over 10–18 hours

Rigor mortis:
☐ start: post mortem period 2–7 hours
☒ maximum intensity: post mortem period over 4–8 hours

Electrical excitability of m.orbicularis oculi:
☐ positive reaction I degree – post mortem period 2–3 hours
☐ positive reaction II degree – post mortem period 2–5 hours
☐ positive reaction III degree – post mortem period 4–7 hours
☐ positive reaction IV degree – post mortem period do 15 hours
☒ negative reaction – post mortem period over 8–16 hours

Electrical excitability of m. orbicularis oris:
☐ positive reaction I degree – post mortem period 2–3 hours
☐ positive reaction II degree – post mortem period 2–5 hours
☐ positive reaction III degree – post mortem period do 6–14 hours
☒ negative reaction – post mortem period over 6–14 hours

Chemical excitability
☐ positive reaction with *Adrenalin HCl* – post mortem period up to 12–25 hours
☐ positive reaction with *Carbahol* – post mortem period up to 12–25 hours

Rectal T/°C	28,5°C	Ambient T/°C	23,5°C
Clothes	jacket, blouse, jeans	Base	floor

Nomogram – Henssge – post mortem period 20 ± 2,8 hours

The results obtained by analysis of the early signs of death and supravital reactions are marked and they point out to a post mortem period longer than 16-18 hours.

With the *Henssge* Nomogram the probable post mortem period is 20±2,8 hours. Possible time of death is the previous day at 17,30±2,8 hours.

Additional data have been obtained by investigation and enquiry of the witnesses, that the murdered person has been at work by 17,00 hours (video surveillance camera).

V. Conclusion

The algorithm we prepared also contains the limit values, minimum and maximum values for the post mortem period for each of the tested parameters, allowing an easy and quick estimation of the possible post mortem period.

Supravital reactions and the early signs of death are important parameters in estimating the time since death in the early post mortem period, especially during the first 24 hours after death, but only in case they have been analyzed together as a whole and provided that the influence of endogenous and exogenous factors has been taken into consideration.

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Does Social Class Influence Learner Reasoning in Geometry?

By Dr. Jayaluxmi Naidoo
University of Kwa Zulu-Natal, South Africa

Abstract - The purpose of this study was to explore the influence of social class on learners' reasoning in geometry in South Africa. The fieldwork for this study was conducted in two schools in KwaZulu-Natal (KZN), South Africa. The schools will be referred to as Green Park High and Bleak Stone High. Green Park High was a predominantly middle-class school whilst Bleak Stone High was a predominantly working-class school. Data from 160 Grade 12 mathematics learners was collected through a questionnaire, and 24 of these learners completed a geometry evaluation worksheet. The 24 learners were interviewed using a semi-structured interview schedule. Themes and patterns were identified and linked to the conceptual framework of the study. The findings of the study demonstrate that while the learners from both working-class and middle-class backgrounds employed similar techniques when solving geometry problems, their methods, logic and geometric reasoning differed considerably. It was also found that learners in this study conformed to the majority social class group with which they associated.

Keywords : *geometry, mathematics education, reasoning, social class.*

GJMR-K Classification : *NLMC Code: QT 34-37*

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Keywords : geometry, mathematics education, reasoning, social class.

I. Introduction

South Africa came last out of 62 countries! This was reported about the quality of mathematics education in South Africa in the 2012 World Economic Forum's 5th Financial Development Report. This result is disturbing since mathematics is compulsory for learners at school; in addition mathematics is one of the key areas of study in formal educational institutions in South Africa (Adolphus, 2011). Mathematics serves as a gatekeeper to top earning careers and hence serves as a prerequisite to becoming economically successful (Iannelli & Paterson, 2005). Research (Noyes, 2009) has indicated that learners' success or failure in mathematics is a key factor in the determination of their subsequent life chances.

In general, the quality of education in a majority of disadvantaged schools in South Africa has been questioned in the light of apartheid education which denied the majority of South Africans access to adequate education (Mji & Makgato, 2006). This denial of access to information was one of the cornerstones of apartheid in South Africa, with an attempt to disallow those disadvantaged communities information that could be used to better themselves socially, politically and economically.

Author : Mathematics Education Discipline. School of Education. University of Kwa Zulu-Natal, South Africa.
E-mail : naidooj2@ukzn.ac.za

There have been many changes to the mathematics curriculum; from anecdotal experience the most disrupting was the move for mathematics to have an optional Paper 3 in 2006. The contents of Paper 3 included geometry, probability and statistics. These are key sections for learners if they intend pursuing mathematics in higher education institutions. Learners could choose whether or not they wanted to write the Paper 3 examination. The result of this change in the curriculum had a negative impact on the pass rate in mathematics for schools in rural areas and schools in lower socio-economic contexts (Gardiner, 2008). Many teachers did not teach these sections and hence learners were not adequately prepared to write the optional Paper 3. This in turn disadvantaged the learners. Learners could not cope with the content of first-year university mathematics due to their lack of knowledge in mathematics sections that were consigned to Paper 3. Thus instead of bridging the gap between the different socio economic classes and allowing more access for learners from different socio-economic backgrounds this entrenched them in the cycle of economic stagnation.

From studies conducted within the scope of mathematics education in South Africa, it appears as if there is a silence around issues surrounding the effect of the social class structure on the learning of geometry in mathematics. Research focusing on whether or not the social class structure of South African schools has an effect on learners' reasoning in geometry is therefore warranted.

In this article I discuss data collected through the use of a questionnaire, geometry evaluation worksheets and semi-structured interviews. The theoretical lens of the Van Hiele and social development theory was used to explore the learners' reasoning in geometry within this study. While the study was part of a larger study, this article aims at answering the following question: Does social class influence learner reasoning in geometry?

The article commences with a literature review of key issues; this section is followed by the research methodology, findings and discussion. The article concludes with the conclusion.

II. Literature Review

a) Social class and mathematics education

Class in this article conforms to Weber's definition, "a group of people with similar status or

occupying the same situation" as cited in Berberoglu (1994, p. 5). Berberoglu (1994) proposed that social class and the class structure are forces that affect an individual in every aspect of life. Education is frequently related to social class (Iannelli & Paterson, 2005), schools are implicated in producing and reproducing inequalities related to social class and language by favouring knowledge and pedagogical practices that privilege the skills and experiences of the middle and upper middle-class learners (Zevenbergen, 2001).

To be successful in school, learners are required to access the opportunity structures made available by the school. For disadvantaged learners this may present a problem because of their limited opportunity structure (Smyth, 2004). Social class and success in mathematics are interlinked (Lubienski, 2000) since it is the educational system that trains young people to live in society when they are adult. As a result each individual is being groomed to carry out the social role expected of the class to which they belong. Mathematics has traditionally been viewed as a discipline where success is limited to a minority as opposed to a majority of children. By being associated with this notion, mathematics is seen as a subject that preserves the divide between social classes by limiting the participation of the less privileged rather than being used as an instrument of empowerment (Stinson, 2004).

b) The social class structure in South Africa

Social class provides an important framework for understanding how integration is being conceptualised and effected in South Africa. When the apartheid system began breaking down, the flow of children within the system took place in a fairly predictable way; children 'of colour' moved into what was once called 'white' schools (Van der Berg, 1999). This movement was about class following its own interest.

The class structure of post-apartheid South Africa was largely informed by the model developed using the SALDRU (Southern Africa Labour and Development Research Unit) survey that was compiled in 1993 on the post-apartheid class structure. This model was later updated in 2002 (Seekings & Nattrass, 2002). Data from this survey defined the upper class as those households headed by people in managerial, technical or professional occupations, or with substantial income from assets or entrepreneurial activities. The middle-class was comprised of households that were headed by educators, nurses, white collar workers, as well as skilled or supervisory workers. The working-class was comprised of households headed by semi-skilled or unskilled workers; and finally the underclass was comprised of households with no members in employment and negligible income from entrepreneurial activities or assets (Seekings & Nattrass, 2002).

Race, ethnic and gender relations are essential components of class structure and therefore have a major impact on class relations and class struggles (Barbeau, Krieger, & Soobader, 2004). Due to the circumstances of South Africa, race and class intersect (Seekings, 2003); hence various other factors like family size, educational level of parents, occupational status of parents, housing status, types of home, number of vehicles and tuition received were also taken into account before allocating a learner in this study to a specific social class background.

c) Mathematics education and geometry in South Africa

With democracy in South Africa came many new curricula for mathematics. The intention of the new curriculum was rooted in building a democratic South Africa (Department of Education, 2003b) to ensure that the divisions of the past were healed and to establish a critical society that is based on democratic values, social justice and fundamental human rights (Department of Education, 2003a).

This was one of the reasons why two major changes in mathematics occurred in 2006: firstly, mathematics or mathematics literacy was made compulsory for all learners in South Africa and secondly, Paper 3 became optional. As discussed earlier, Paper 3 comprised the sections geometry, statistics and probability.

Geometry, which is frequently referred to as the mathematics of space, involves the properties of space in which bodies are situated, and in which they move (Bursill-Hall, 2002). Learning the names and dimensions of shapes prepares learners for the real world, as well as for more advanced mathematical concepts. Learning how three-dimensional shapes and objects operate helps one understand how a football is thrown, how cars move and how buildings are constructed. .

In geometry the learner can search for patterns and use these to generalise, experiment, analyse, visualise, describe and provide proofs for their conjectures. Unfortunately geometry is a neglected field (Olkun, Sinoplu, & Deryakulu, 2005). Moreover, research indicates that learners perform badly in geometry because of the disjointed and abstract way in which geometry is taught (Mogari, 2004). In addition, learners appear to believe that geometry is abstract in nature and that it is a difficult subject in which to succeed (Barrantes & Blanco, 2006).

Geometry provides a rich context for the development of reasoning, including making conjectures and validating them. In addition, visualisation and spatial reasoning are used to solve problems both within and outside mathematics (Van der Sandt, 2003). This implies that studying geometry also provides opportunities for divergent thinking and creative problem solving which in turn helps develop learners' logical thinking abilities (Nakin, 2003). Apart from knowing how

learners develop logical thinking skills we also need to know how they develop thinking skills in geometry.

III. Theoretical Framework

a) The Van Hiele Theory

The Van Hiele theory describes the different levels of thinking that learners pass through as they learn geometry in mathematics (Mistretta, 2000). Two mathematics educators in the Netherlands, Pierre van Hiele and Dina van Hiele-Geldorf, noticed the difficulties that learners were having in the learning of geometry. Their observations led them to develop a theory involving levels of thinking in geometry that learners pass through as they progress from recognising a figure to being able to write a formal geometrical proof. Their theory explains why many learners encounter difficulties in geometry especially with formal proofs.

The Van Hieles identified five levels of understanding: visualisation, analysis, informal deduction, formal deduction and rigour (Ryan & Williams, 2007). The first three levels relate to thinking within the capability of elementary school learning while the next two involve thinking needed in high school and university level geometry (Mistretta, 2000). The levels are sequential and hierarchical with each having its own language. This implies that the educator must identify the level on which the learner is operating or else both the educator and the learner may be on different levels during instruction. Thus for effective teaching and learning to occur in the geometry classroom the educator must be mindful that learners differ in capabilities and in social development.

b) Social Development Theory

Becoming socialised involves the process of learning to behave in socially approved ways, playing approved social roles and developing social attitudes. Social development is defined as acquiring the ability to behave according to social expectations (Hurlock, 1978).

In terms of cognitive development, Vygotsky's theory of social development supports the notion that learning precedes development. Vygotsky's social development theory rests on two main principles: the More Knowledgeable Other (MKO) and the Zone of Proximal Development (ZPD). The MKO refers to anyone who has a better understanding than the learner, with respect to a particular task, process or concept. The MKO could refer to an educator, older adult, a peer or even computers (Mace, 2005). The ZPD occurs when learner development proceeds through a learner's participation in activities slightly beyond their competence. With the assistance of adults or more skilled children, the cognitive processes are internalised and transformed to form the individual plane. This occurs when a child's development proceeds through their participation in activities slightly beyond their competence. With the assistance of more highly skilled individuals, cognitive processes are internalised and transformed to ensure that the child learns how to do the activity independently.

Social development theory supports the notion of the educator working in partnership and collaboration with learners in order for the learners to discover and create their own meaning and understanding (Woolcock & Narayan, 2000). Social development theory favours teaching strategies like scaffolding, reciprocal teaching and guided instruction. Scaffolding refers to a temporary support structure that an educator creates to assist learners in completing a task that they would not be able to complete on their own. It is in this fashion that the classroom becomes a community of acquisition (Mace, 2005) – acquisition by the learner.

IV. Methodology

In this qualitative, interpretive study, data was collected from schools in KZN, South Africa. Access to schools was granted by the KZN Department of Education, school principals and parents of the learners in the Grade 12 classes. Of the 12 schools that were approached only five responded positively. Three of the five schools were selected based on convenience; one of the three schools was used for the pilot study. A total of 160 Grade 12 mathematics learners participated in the pilot and main study. The pilot study was used to ensure the reliability and validity of the research instruments.

The schools in the main study were called Green Park High and Bleak Stone High. Both schools catered for more than one socio-economic group and more than one race group. Green Park High catered for the predominantly middle class learner and the school had a higher population of Indian learners. Bleak Stone High catered for the predominantly working-class learner and the school had a higher population of black learners.

The learners in the main study were selected using purposive sampling. The research study necessitated two sets of learners belonging to specific socio-economic backgrounds within each school, i.e. one set from a working-class background and the other set from a middle class background. The main study involved 24 Grade 12 participants who came from different social backgrounds and race groups. The participants were comprised of 11 boys and 13 girls. The learners were between 16 and 18 years old. Data was collected by using a questionnaire, a geometry evaluation worksheet and a semi-structured interview schedule.

a) The questionnaire

The questionnaire constituted two sections comprising 16 questions in total. The first section focused on the learner's background in terms of

personal and family background. This section of the instrument focused on sensitive questions about matters such as parents' occupation, family's financial background and type of housing; therefore confidentiality and the learner's right to withdraw from the study were stressed both verbally and in writing.

The second section of the questionnaire was based on the learner's mathematical background. This section was designed to locate the learner within a mathematics context in terms of the learner's views on the different sections in mathematics as well as to gain an understanding of the learner's mathematical ability in geometry. This information was further supplemented by data collected from the school principals as well from the head of department of mathematics at each school.

V. The Geometry Evaluation Worksheet

The learner questionnaire was followed by a geometry evaluation worksheet. The geometry evaluation worksheet consisted of two geometry questions and eight sub-questions. The questions were randomly constructed based on different aspects of Euclidean geometry as shown in Figure 1 and 2 below.

Answer the following questions in the spaces provided and please remember that the diagrams are NOT drawn to scale.

1. AB is the diameter of circle centre O and AC is a chord. Chord AD bisects angle BAC and E lies on AC produced, such that DA = DE. DO, BD, BC and DC are drawn. Prove that:
   1.1. OD is parallel to AC.
   1.2. Angle BDC = Angle ADE.

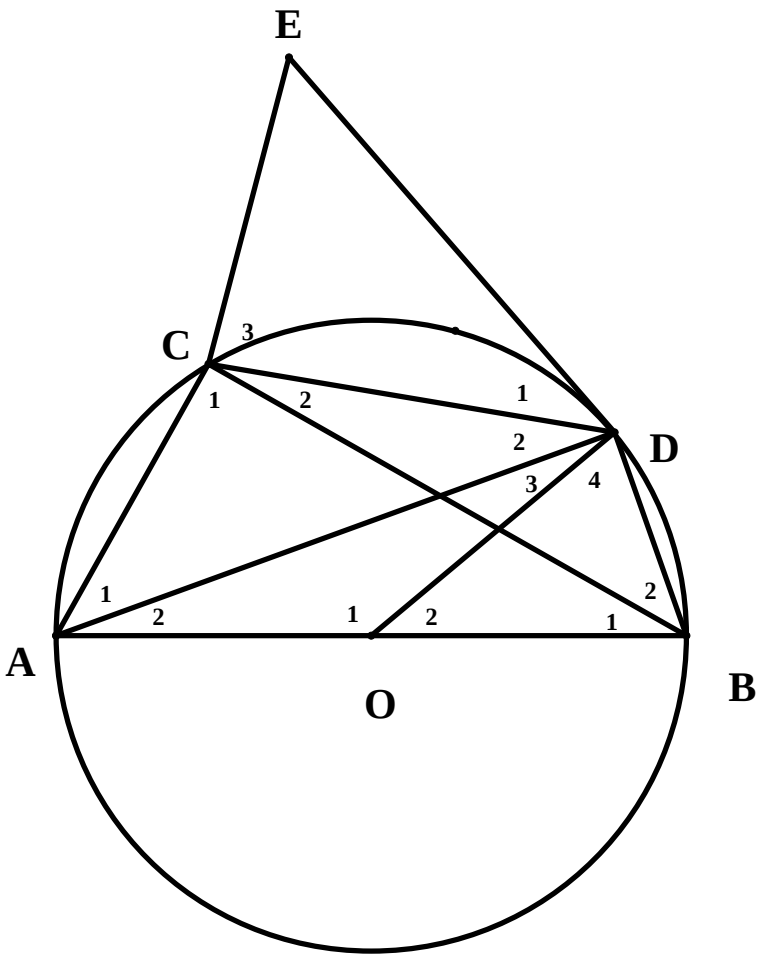

Figure 1 : Geometry evaluation worksheet: Question 1

1. In the diagram below, M is the centre of the circle which passes through A, B, C and D. BCDM is a parallelogram and BD is drawn. It is also given that angle MBD = x.

1.1. Express with reasons, each of the following angles in terms of x:

1.1.1. Angle D_2
1.1.2. Angle M_1
1.1.3. Angle A
1.1.4. Angle C by using the properties of the quadrilateral BCDM
1.1.5. Angle C by using the properties of quadrilateral ABCD

1.2. Hence calculate the value of x.

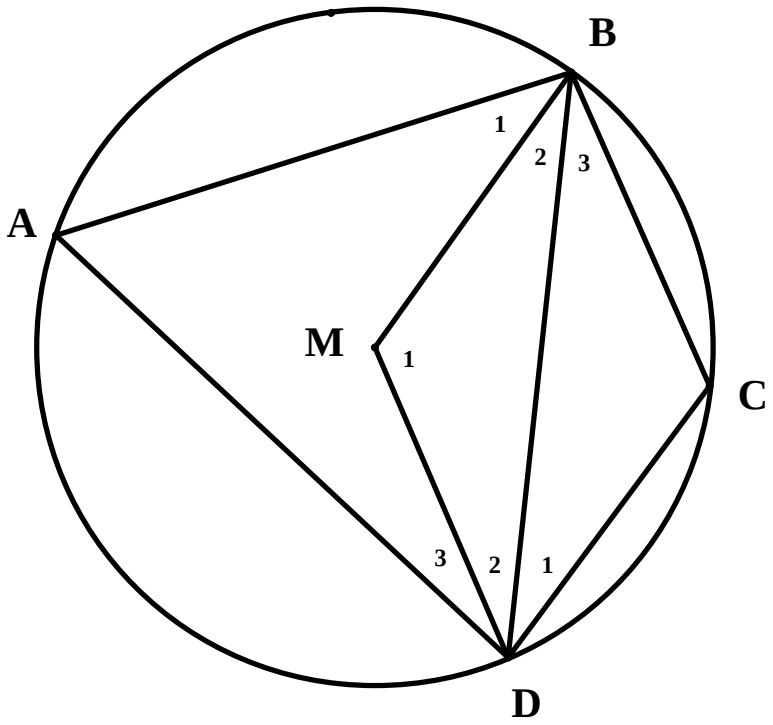

Figure 2 : Geometry evaluation worksheet: Question 2

The primary aim of the geometry evaluation worksheet was to provide the learners with an opportunity to demonstrate their techniques implemented during the geometry solution process. This was also an opportunity to investigate these techniques as well as to compare the geometric reasoning with respect to the different social class groups at the different schools. This strategy was followed by a semi-structured interview schedule.

a) The semi-structured interview schedule

The semi-structured interview schedule was comprised of a set of standard questions that each learner was asked. In addition, responses were probed to ensure that there were no misunderstandings. Learners were also probed with respect to their individual attempts on the geometry evaluation worksheet. In addition, the interview provided an idea as to what the learner understood while answering the questions; the interview provided insight into the thought processes and reasoning the learner followed when answering the geometry evaluation worksheet. These interviews were audio-recorded with the permission of the learner. This was done to ensure there were no misinterpretations and misquotes.

VI. Findings and Discussion

a) Performance in the geometry evaluation worksheet

The social class groups differed considerably with respect to their geometric reasoning, their logic as well as the type of language used to express their reasoning. Learners were inclined to answer questions in a similar manner to their peers at the school. This is in agreement with social development theory which suggests that to be socialised, children must know what approved behaviour is, and they need to model their behaviour along the approved lines. In this study it was evident that in order to gain their peers' approval, the learners had to identify with the majority class group at each school.

Green Park High had a predominantly middle-class learner population and the working-class learners in this school had similar ideas and reasoned in a similar manner as the middle-class learners of the school. In addition, the visual markings made on their

(the working class learners') diagrams were similar to the ones made by the middle-class learners.

On the other hand, in Bleak Stone High, which catered mainly for working-class learners, the middle-class learners worked in a similar way to the working-class learners. These learners also spoke in the same manner, they reasoned in a similar manner and they used the same types of visual techniques on their diagrams.

It could therefore be inferred that the learners in each of the above-mentioned schools were conforming to the majority class group in their school.

b) Learners' reasoning in geometry

While analysing the geometry evaluation worksheet the learners' geometrical reasoning was examined. The results obtained showed that learners from Green Park High reasoned more logically and sequentially than the learners from Bleak Stone High. This was evident from each learner's step-by-step interpretation of how they had gone about solving the questions in the geometry evaluation worksheet. Some of the participants' responses follow:

"I found that there was a diameter, from the diameter I worked with the semi-circle… I took it further to see what other angles I could find …"

"I look at the statements … and then I look at the diagram …"

"I analysed the diagram to see what I could find out and then … I read the question, I looked at the diagram again, matched the question to the diagram to find out the … common points … I looked at the question again and started answering the question."

"I approached it the similar way I looked at the diagram first and identify what I could … and then I looked at my question and … I come back to that diagram and apply my question to my diagram … then answer the question."

In addition, the learners at Green Park High used more imaginative metaphoric language and referred to what they were 'seeing' in their minds:

"I can see the solution in my mind."

"I can mentally picture the diagram".

Usually what they said they were 'seeing' was three-dimensional, when in fact what was on paper was illustrated in two dimensions. Based on the manner in which these learners approached the geometry problems it is also evident that learners at both schools needed to visualise the problems in order to complete them as can be deduced from the Green Park High interview transcript:

"First I read the question and then … I used my colours and … I put … all different colours … it looked complicated but once you put the colours in you try and figure it out, it was alright ..."

The learners at Green Park High demonstrated that they were aware of what they were seeing and what they were not seeing. In some instances learners had to mentally or physically manipulate the evaluation worksheet in order to complete the various questions.

"I turned the page around … so that I can see things."

"I will turn this page (proceeds to turn the page around) and using my knowledge I learnt in Grade 11 … see whether I can find angles …"

These visual images of what the learners were seeing helped them to explain how they were seeing things and to convince me why their solutions were correct. This step-by-step method also proved to be beneficial in that when the responses to the geometry evaluation worksheet were compared it was evident that a greater percentage of the learners from Green Park High had attempted or completed the questions correctly as compared to the learners in Bleak Stone High.

Learners' responses to the geometry evaluation task were analysed. The results indicated that 50% of learners at Green Park High had either attempted or completed the questions on the geometry evaluation worksheet correctly. In contrast, only 29% of learners at Bleak Stone achieved the same result. Moreover, learners from Bleak Stone High, who were from predominantly working-class backgrounds, did not demonstrate well-defined logic in their geometry reasoning. This could have been as a result of the learners not knowing the work, being at a different Van Hiele level to that of the question, or not having access to the language to express themselves adequately within the formal context of a school, as can be seen from the following examples:

"Whatever came to mind I just wrote it down."

"I tried to work backwards."

"… I know I wrote it there I probably just wrote it there, I don't know why."

The interview schedules for learners from Bleak Stone High indicated that the majority of the learners were going through a process; it appeared as if they were grasping at straws when attempting these questions.

"… I don't know and I know that x always stands for something so that's why I use x." "For the first question I couldn't find OD parallel to AC, so I assumed it was parallel … so I put OD is parallel to AC. I knew it was linked so I used it for the second one too."

Their focus was on finding the answer and the majority of the learners failed to follow a sequential step-by-step process. The process used was one that accidentally led to the correct answers in some instances. It was evident that the learners were at a different Van Hiele level than at which the question was pitched. The majority of the learners made assumptions and worked from there as can be seen in the following excerpt taken from the interview transcript:

"It looked confusing at first, whatever came to mind I just started writing, writing and eventually I ended up with the answer."

"I guess I want to solve for something … so I assumed it was parallel."

"I must have assumed it was straight."

As is shown above, the learners' geometrical reasoning was affected by a variety of factors. Mathematical language is crucial to reasoning because it provides the medium, in which claims are developed, made, justified and verified (Ball Loewenberg & Bass, 2000). Learners who are proficient in the language of the school are more likely to understand the messages and content being conveyed by the educator than learners who are less familiar with the language and hence unable to "crack the code" of school language (Zevenbergen, 2001).

VII. Conclusion

Researchers (Howie, 2003; Legotlo, Maaga, & Sebego, 2002; Setati & Adler, 2001) have commented on the poor mathematics results obtained by learners in South Africa. This is distressing since mathematics acts as a gatekeeper to higher paying careers and an improvement of social status in society. A clear example of this is the section geometry; this is a much-needed section in mathematics and would assist learners in moving beyond their existing social class boundaries. Thus, when in 2006 geometry in mathematics was relegated to an optional paper the exclusion problem was exacerbated.

Based on evidence obtained in this research it was ascertained that middle-class and working-class learners reasoned in geometry in different ways with regard to their schools and their social class backgrounds. The learners in Green Park High, who were predominantly middle-class, reasoned in geometry by presenting evidence of a sequential thought process which was further justified by logical explanations for their thought processes. These learners used language that was appropriate in the geometry classroom in order to verbalise their thought processes. They used language that was within the mathematics context; more specifically the geometry context. The learners made satisfactory attempts at interpreting the geometry questions and went about their solution process using the appropriate geometry theorems and definitions.

In contrast, the learners in Bleak Stone High, who were predominantly working-class, had a tendency to reason in geometry in a manner that demonstrated a different logic. The same learners also did not demonstrate a sequential systematic process in their thinking. It would appear that the manner in which the learners went about attempting their geometry questions was an attempt at finding an answer regardless of whether or not the answer was realistic. These learners exhibited difficulty with the interpretation and solution of the questions. Based on evidence obtained in this study I would argue there is evidence to claim this difficulty is due to at least one of four reasons:

- The learners were not familiar with the language used in the geometry evaluation worksheet.
- The learners were not exposed to similar types of geometry questions on a regular basis.
- The geometry questions were on a different level to that of the learners' ability level.
- The learners were performing at a lower Van Hiele level to that at which the questions were targeted.

The learners did not apply the appropriate geometry theorems and definitions; they very often mixed up definitions as well as theorems. This demonstrated that the learners did not have a firm foundation in terms of mathematics syllabus requirements for circle geometry, which forms a large part of a geometry examination paper.

The root of the differences and segregation in the study occurred outside the classroom. It lay with the social class system of South Africa where it is inevitable that class and race intersect. It was evident that mathematics was not neutral, mathematics played a part in the perpetuation of power (Gates, 2001) – mathematics as used and applied in society and mathematics education as carried out in many classrooms oppose democratic values. Along similar lines, some researchers (Khuzwayo, 2005; Zevenbergen, 2001) maintain that mathematics education has established a systematic access denial on the grounds of a person's race, language, and social class. This situation could be alleviated if educators complete short courses in geometry to assist their learners with understanding this abstract section in mathematics, and if schools are equipped with both human and material resources equitably, regardless of the social milieu in which the school is situated.

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Classification of Mistakes in Patient Care in a Nigerian Hospital

By Omole O. Iyayi, Rawlings O. Igbinomwanhia & Festus Iyayi
University of Benin, Benin City, Edo State, Nigeria

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Classification of Mistakes in Patient Care in a Nigerian Hospital

Omole O. Iyayi [α], Rawlings O. Igbinomwanhia [σ] & Festus Iyayi [ρ]

Summary - Recent discussions on improving health outcomes in the hospital setting have emphasized the importance of classification of mistakes in health care institutions These discussions indicate that the existence of a shared classificatory scheme among members of the health team indicates that errors in patient care are recognised as significant events that require systematic action as opposed to defensive, one-dimensional behaviours within the health institution. In Nigeria, discussions of errors in patient care are rare in the literature. Discussions of the classification of errors in patient care are even rarer. This study represents a first attempt to deal with this significant problem and examines whether and how mistakes in patient care are classified across five professional health groups in one of Nigeria's largest tertiary health care institutions. The study shows that there are wide variations within and between professional health groups in the classification of errors in patient care. The implications of the absence of a classificatory scheme for errors in patient care for service improvement and organisational learning in the hospital environment are discussed.

I. Introduction

Recent discussions on improving health outcomes in the hospital setting have emphasized the importance of classification of mistakes in health care institutions.[17,24,32,36,37,39] These discussions indicate that whether and how mistakes and errors in patient care are classified have major implications for the way in which mistakes are managed and the degree to which the management of such errors leads to learning for the individuals and groups in the health institution. More specifically, the existence of a classificatory scheme for errors in patient care can serve as 'an important first step in improving patient care' and help clinicians 'diagnose and prevent patient harm from medical care'[8]. It also indicates the degree to which there is a 'common language' for reporting, discussing and acting on errors[4], and whether members of health groups recognise errors as opportunities for learning and improvement[3,7]. It enables the differentiation between different types of errors that require different approaches for their resolution[2,16] and provides opportunities for comparisons between time frames and national as well as international contexts[22,25] have also reported from a study of patients in intensive care that, 'the application of a causal classification model for patient safety event coding … facilitates local communication of important event-related information'. All these demonstrate the significance of the existence of a classificatory scheme for mistakes in patient care.

In spite of the significance of discussions of errors in patient care for producing and improving desired health outcomes, there have been little or no discussions of mistakes and errors in patient care in the Nigerian setting. The only exception 'is Dede[6] who focused on the interpersonal processes involved in the management of mistakes in a private hospital setting'. In particular, there has been no discussion of the classification of errors in patient care in Nigerian hospitals. While several factors may account for this very audible silence on the subject in Nigeria, one major implication has been the potential of such silence to limit learning from mistakes and reducing the incidence of errors in Nigerian hospitals. It is therefore no surprise to find a lot of dissatisfaction with the quality of care provided by health care institutions in Nigeria [9,13,14,26].

This study is one of the first attempts to deal with the problem. The study examines the classification of mistakes in patient care across five professional health groups in one of Nigeria's largest tertiary health care institutions. The study shows that there are wide variations within and between professional health groups in the definition and classification of errors in patient care; in effect, there is no system of classifying errors in patient care. The implications of the absence of a classificatory scheme for errors in patient care for service improvement and organisational learning in the hospital environment are discussed.

II. Mistakes in Patient Care

A mistake has been defined as 'an action or opinion that is not correct, or that produces a result that you did not want' [28]. Mistakes have also been defined as a type of failure, while failure has been conceptualized as a deviation from expected and desired results, to include both avoidable errors and unavoidable negative outcomes of experiments or uncertain actions[7,12,29]. As such, failure encompasses both mistakes (human errors) and problems (obstacles and other deviations that thwart expected work outcomes). This suggests that although mistakes are a type of failure and while failure

Authors α σ ρ : Department of Business Administration, Faculty of Management Sciences, University of Benin, Benin City, Edo State, Nigeria. E-mail : festusiyayi@yahoo.com

can be caused by mistakes, not all failure is caused by mistakes or errors. Failure may be caused, for example, by the inability to predict future outcomes from current behaviour and decisions[5]. This means that while all mistakes are failures, not all failures are mistakes. A mistake can therefore be understood as wrong action on the part of individuals within the context of existing knowledge. A mistake or an error indicates that although possessing the knowledge and skills to do the right thing, the individual failed as a result of various factors other than strategic intent, to do the right thing in the given situation. This suggests that intentional acts to commit error cannot fall into the category of mistakes as they are deliberate and the individual is conscious of what he / she was doing at the time. It therefore appears to be superfluous to speak of 'deliberate mistakes'. Rather, that category of action belongs to 'willful or criminal conduct' for which the individual may be subject to a different class of sanctions.

III. Classifying Mistakes

Mistakes have been classified in different areas of patient care, for example, in intensive care[25,27], transfusion medicine[17], general practice[20], primary health care[8,19]; near misses and adverse events [7], ambulatory services (Pace et al, 2004), optometric practice Steele[35], and other areas[11,15,29,33]. These studies indicate that several classificatory systems are possible. Thus Elder and Dovey classified mistakes in primary care into preventable adverse errors and process errors where preventable errors include diagnostic, treatment and preventive care incidents and process errors include clinician factors (judgment, decision making and skill execution), communication factors (between health care providers and between health care providers and patients), administration factors (office and personnel issues) and blunt end factors (with origins or prescribed in insurance policies and government regulations).[31] classified errors in patient care within general practice into six categories as prescriptions, communication, appointments, equipment, clinical and other errors.[22] also using data from general practice provided a three level system of classification. The first level differentiated between errors that arise as a result of processes of healthcare and those caused by deficiencies in the skills and knowledge of health care providers. The second level of errors identified two further categories of errors: type 1 and type 2 errors. Type 1 errors included: healthcare system errors, investigation errors, medication errors, other treatment errors and communication errors. Type 2 errors were identified as diagnostic errors and management errors. The third level provided various descriptions of the errors. Using observational techniques of 78 events relating to patient safety,[19] identified cognitive types of error as yet another important category of errors that are implicated in several other types of errors.[27] classified errors experienced in intensive care into errors involving patient care givers working directly in the area of care, those requiring additional life-sustaining interventions and those that resulted in death. In optometric practice, errors were classified in one study into optical prescriptions, communication, administrative, appointments, equipment, clinical, and other [27].

A number of conclusions could be drawn from these and other studies of classification of errors in patient care. The first conclusion that can be drawn is that irrespective of the area of care, certain types of errors are common. For example, administration, equipment, communication and cognitive errors appear common to all areas of care. However, it would also be correct to suggest that certain types of errors are common to all health professionals who have to diagnose the medical condition of patients before the commencement of any regime of treatment. These errors include those of diagnosis, prescription/ medication and treatment.

A second, and for us the most important conclusion that emerges from these studies is that a classification scheme for mistakes in patient care must formally exist and be shared by members of a health group for members of that group to be able to meaningfully address and learn from the mistakes. Thus while different areas of care may require different ways of classifying errors, it is important that members of the same community of practice develop and have in place a common language or system of classification for the errors that occur in their area of practice. For example, a study of pharmacists revealed that the pharmacists not only had a classificatory scheme for mistakes but also that scheme used had important implications for the way in which the mistakes were managed and the degree of learning that occurred [7]. Mistakes that were classified as external were treated very differently from those that were classified as internal. Moreover, all the pharmacists were aware of and used the classificatory scheme. The important point then is not that individual members of a health team have ways of classifying errors but that they jointly use a scheme that they have developed as a result of knowledge and experience. As organisational sociologists have also shown, formalization in classification is important for developing standard operating routines in the treatment of similar cases. In the absence of a formal system of classification, similar cases may be treated differently, depending upon who is involved and where it occurs. In effect, what would be encouraged would be a particularistic as opposed to a universalistic culture [10] in the management of mistakes with the attendant negative implications for the safety of patients and the motivation and morale of health personnel.

Thirdly, the studies suggest that the existence and use of a system of classification actually leads to a

reduction of errors as well as better management of the errors that occur. One pragmatic implication of this is that it makes sense for health care professionals involved in patient care to consciously develop and use a classification scheme. Given the fact that 'to err is human' and humans are at the centre of health care both as objects and subjects, there is need as [27] emphasize, for health care professionals and institutions to develop formalized systems for reporting and analysing medical errors if significant improvements in patient care are to occur. We can also add that the existence of a shared system for categorizing errors within a team of health professionals can facilitate communication not only between members of the health team but with members of health teams in other areas of care. The elements in each system can be shared with or provided to other health teams so that individuals for the purpose of gaining a better understanding of the dynamics of errors in each area. It might even become possible as with the learning of the languages of peoples other than our own for members of different health teams to learn these schemes and thus increase the level of communication and collaboration over mistakes across different areas of patient care.

IV. Subjects and Methods

The research site is one of the largest tertiary health care institutions in Nigeria and indeed hopes to be the largest hospital of its kind in Nigeria by the end of 2008. It currently has over 500 bed spaces that are distributed between the various areas of care. The health professionals in the hospital include doctors, pharmacists, nurses, radiologists, and laboratory scientists. Each professional group is further made up of a number of sub specialisations. The head and five other members of each of the professional groups were selected for participation in the study. This study focused on physicians, surgeons, pharmacists, nurses and haematologists.

A sample size of 30 was decided upon for this study, consisting of 6 individuals from 5 sub specialization fields. Simple random sampling and convenience sampling methods were both utilized in the selection of participants. Participants chosen from among the physicians and the surgeons were chosen through simple random sampling, lists of all staff in both areas were obtained then 5 names were randomly selected. Lists of all staff in the haematology, nursing and pharmacy departments could not be obtained so a convenience sampling method was utilized where participants were chosen based on their availability.

To obtain the needed information on whether a system for classifying errors existed and whether if one existed it was shared and used by members of the health team we asked the following questions:

i. Is there a way in which you classify/categorize mistakes / errors that occur in patient care?
ii. Do all your professional colleagues in your department use this same categorization/ classification?
iii. How did this categorization scheme arise? Was it ever discussed formally at a meeting or did it just evolve from experience?
iv. What are the typical mistakes that occur in patient care?

The study utilized in-depth interviews as the main data gathering instrument. The interviews were tape recorded and then later transcribed. Each interviewee was also given a copy of the interview schedule to enable him or her make additional written responses to some of the questions asked during the interview. Some of the respondents refused to have their interviews tape recorded because of what they termed its sensitive nature. One head of department flatly refused to allow members of her department participate in the study declaring that, "We do not tolerate errors in our work and when they occur, they are kept inside the department." The mass of data was then content analysed. The results of the analysis of each of the questions are presented for each of the professional groups involved in the study.

Permission was obtained from the authorities of the research site before this study was carried out. Conditions met before permission was granted included the submission of an application letter, submission of the research instrument for approval and anonymity for the research site.

V. The Data

a) Ways in which mistakes/errors are classified

Analysis of the data shows that the members of the different professional groups disagree considerably on whether they have formal systems for the classification of errors in patient care (Table 1). The analysis of the data with respect to the department of **pharmacy** showed that there is no formal system in place for the classification of mistakes or errors. Each respondent had a different way of classifying errors/ mistakes. Some respondents differentiated between "major mistakes (wrong drugs) and minor mistakes (being rude to customers); others classified them as "dispensing errors, counseling errors and assessment errors". Yet other respondents differentiated between "drug related errors and information, communication and education errors". Finally a respondent classified them into "human mistakes and deliberate mistakes".

In the department of **haematology** analysis of data gathered showed that there is no particular way of classifying mistakes. Some respondents even stated that there was no particular way of classifying mistakes

in the department. However two respondents did give classifications used in the department namely; "qualitative and quantitative errors" by one respondent and "observer errors and errors of competence" by the other. One respondent stated that "Morbidity usually determines how the mistakes are classified".

In the area of **nursing**, the majority of the nurses responded affirmatively to the question of whether a classification system existed. However the classification differed from nurse to nurse. For example one respondent listed them as "medical, social, cultural and public". Another respondent grouped them as "mistakes that are life threatening and mistakes that cause discomfort to the patient". Two respondents gave the classification as "major mistakes and minor mistakes" while yet another respondent classified them as "patient errors, theatre errors and equipment errors. This shows that though the majority agrees that there exists a classification system there is no consensus as to what this classification is.

Among the **physicians** the answers are split with half of the respondents indicating that there was no classification system in place and the other half stating there was a classification system. The classifications given by those who stated that a classification system existed include: "mild errors that you can correct and grievous errors that you cannot correct"; "errors due to low clinical acumen, errors due to negligence, errors due to unavailability or inadequacy of materials; errors due to inadequacy of information from patients or their relatives"; and "clinical errors due to lack of facilities and clinical errors due to poor knowledge".

Analysis of the data from **surgeons** shows that although all the respondents indicated that there was a classification system in place, only one was able to describe it as "human, judgmental and instrumental errors". It can thus be concluded that the classification scheme used depends upon each surgeon and is therefore personal in nature.

Overall, the results across the different professional health groups indicate that there are no classificatory schemes used by members of the groups to type errors. There are thus different ways in which professionals within each group and between groups categorise errors. Obviously this will have major implications for the management of the errors that occur and are acknowledged.

Table 1 : Is there a way in which you clarify errors that occur in patient care?

Professional Group	*Yes (%)*	No (%)
Pharmacists	00.0	100.0
Haematologists	33.3	66.7
Nurses	66.7	33.3
Physicians	50.0	50.0
Surgeons	100.0	00.0
Average	50.0	50.0

b) Extent to which all members use the same categorization/classification system for mistakes in patient care

The data shows considerable lack of agreement across the different professional health groups as to whether all members use the same classification system in recognising errors in patient care (Table 2). In response to this question, three **pharmacists** answered that members did not use the same system for classifying errors while another three respondents answered that they did. Going back to our earlier analysis and the varying answers obtained, it is clear that pharmacists do not use the same system for classifying mistakes. In the department of **haematology** only one respondent indicated that members of the group used the same system for categorizing mistakes in patient care. All other respondents answered that they did not. This position validates the results obtained earlier with respect to this health professional group which indicated that they did not have a system for classifying errors.

The majority **nurses** (5), answered that all nurses use the same system for classifying errors. This position is not supported by the different answers that were given in the preceding section. Only one nurse answered 'No' to this question, which would support the different answers that were given by the various nurses, even among those in the same wards. Answers from the **physicians** seem to support their responses in the preceding section, with four (4) of them answering that they did not all use the same classification system. Indeed two of the respondents indicated that they "did not know" whether or not their professional colleagues used the classification system that they used. Surprisingly, all the **surgeons** were in agreement that they all used one classification system. The fact that most of them could not provide describe the one system that they used contradicts this claim.

Table 2 : Extent to which all members use classification scheme

Professional Group	*Same classification scheme used by all members (%)*	Same classification scheme not used by all members (%)
Pharmacists	50.0	50.0
Haematologists	16.7	83.3
Nurses	83.3	16.7
Physicians	33.3	66.7
Surgeons	100.0	00.0
Average	56.7	43.3

c) How did this categorization arise? Was it ever discussed formally at a meeting or did it just evolve from experience?

All respondents in all the departments were in agreement as to the origins of their classification

systems. The majority indicated that the system evolved from experience or informally and not formally through some meetings or some other form. The agreement by all the respondents contradicts some of their earlier responses. It explains the differences in the classification systems put forward by the respondents and also why they believed that their professional colleagues did not share this classification system. It also contradicts views held by some respondents that their classification systems were shared by all their professional colleagues because if it did arise informally through work experience then the chances of every one having the same work experiences and thus arriving at the same classification systems are very slim.

d) Typical mistakes/errors that tend to occur in patient care

In spite of the fact that no formal classification system existed that was common to members of the same health teams, we asked respondents to identify 'typical mistakes /errors that tended to occur in patient care' (Table3). It was felt that this question would elicit responses that could provide a basis for the classification of errors in patient care, at least, for the purposes of the study.

Table 3 : Typical Errors in Patient Care across Professional Areas

Area of Practice	Typical Errors
Pharmacy	Dispensing errors Assessment errors Counseling errors
Haematology	Misdiagnosis Communication errors Administration errors
Nursing	Wrong handling of patients Wrong administration of drugs Administration errors
Physicians	Wrong diagnosis Wrong treatment Follow-up errors
Surgery	Wrong diagnosis Operation errors Administration errors

The results of the analysis of the data for **Pharmacists** shows that mistakes that occur in the course of their work can be grouped into three categories, namely: (i) Dispensing errors (ii) Assessment errors and (iii) Counseling errors. In **Hematology** the different mistakes that occur included such things as "misinterpretation", "miscalculation", "laboratory scientists mislabeling slides", "clerical errors", "extortion", "wrong diagnosis and wrong treatment", "misdiagnosing a slide", and "patients not giving correct information". Obviously misdiagnosing a slide falls under the category of wrong diagnosis as do errors of misinterpretation. It might therefore make sense to classify errors in this area as those of (i) misdiagnosis (misinterpretation, miscalculation, misdiagnosing a slide, wrong diagnosis), (ii) communication errors (wrong information from patients), (iii) and administration errors (clerical errors, mislabeling slides, miscalculation) and (iv) wrong treatment. Also, 'extortion' of patients cannot be mistakes; rather they may be causes of errors in laboratory analysis. In this case, mistakes arising from it can be assigned to the category of criminal behaviour.

Analysis of responses from the group of **Nurses** shows that there are several types of mistakes. These include; (i) patients falling from beds (ii) improper positioning of patients in bed (iii) wrong infusion (iv) giving wrong drugs (v) giving wrong dosage of drug (vi) accepting the wrong patients and (vi) wrong site of operation. These errors might be better understood as those arising from (i) wrong handling of patients (patients falling from beds, improper positioning of patients in bed), (ii) wrong administration of drugs to patients (giving wrong drugs, giving wrong dosage of drug), and (iii) administration errors (accepting wrong patients, wrong site of operation).

Among the **Physicians** the mistakes identified include: (i) wrong diagnosis (ii) medication errors (iii) prescription errors (iv) inability to identify emergency situations and (v) delay in treatment. Others were identified as (i) requesting for irrelevant investigations (ii) doctors abandoning patients after administering treatment and (iv) patients' location not known. Again these mistakes might be more usefully classified as those of (i) diagnosis (wrong diagnosis, inability to identify emergency situations, requesting for irrelevant investigation), (ii) treatment (prescription errors, medication errors, delay in treatment) and (iii) follow-up errors (doctors abandoning patients after administering treatment, patients' location not known)

Mistakes/errors mentioned by **Surgeons** included (i) misdiagnosis (ii) delayed intervention (iii) human errors (wrong insertion of tracheotomy) (iv) judgmental errors (v) instrument errors (wrong readings as a result of faulty equipment) (vi) not taking consent from the patient before surgery (vii) major vascular injuries and (vii) improper suturing. As in the case of the Physicians, the mistakes that occur among the Surgeons can be usefully classified as those of (i) diagnosis (misdiagnosis, judgmental errors, instrument errors or making a wrong reading as a result of faulty equipment), (ii) operation errors (major vascular injuries, improper suturing) and (iii) administration errors (not taking consent from the patient before surgery).

V. Discussion

The existence of a classificatory scheme between and within members of health teams in the hospital setting for discussing errors in patient care is indicative that the members recognise mistakes as serious adverse events and have developed a common

language and system for dealing with them when they occur. It also indicates that much as members may be characterised by defensive behaviours, there is the implicit awareness that errors will be analysed and discussed using the framework of the common language. As[7] shows in a study of pharmacists, the ability by a professional health group to share a common understanding of the essence of errors is important in the amount of learning that occurs for members of the group and their capacity to manage errors when they occur. In the case of the pharmacists, Edmondson demonstrated that the availability of a common scheme for classifying mistakes and its use by members of professional groups in discussing and dealing with mistakes were crucial to the process of reducing the number of mistakes in patient care. A reduction in mistakes occurs because classification helps learning. First, it facilitates memory of previous situations in which similar mistakes occurred and were resolved. Secondly it facilitates analyzable search for solutions that worked in the past[5,37]. Thirdly, it aids the routinisation of procedures required for handling mistakes; thus programmes can be developed that indicate what should happen when a particular type of mistake occurs.

The results of the analysis of our data indicate that while there is some shared idea that mistakes are wrong acts on the part of the health professional, the interpretation of the essence of a mistake varies both within and between members of the professional groups. The situation is certainly more contentious when it comes to the classification of mistakes. There is general acceptance of the range of mistakes that do occur. However, both within and between professional groups, the classifications vary widely with each member classifying errors in patient care differently. In essence, the only reasonable conclusion that can be arrived at is that there is no system of classification in place for apprehending, discussing and acting on mistakes. Another conclusion that can be derived from this is that while members of the various health teams may be implicitly aware of the consequences of mistakes, they are however, unwilling admit they exist or take the needed steps to provide a formal system that enables mistakes to be dealt with openly and systematically. This conclusion can be justified from the attitude of a head of department who refused access to members of her professional group on the grounds as reported earlier that: "We do not tolerate errors in our work and when they occur, they are kept inside the department." The conclusion can be further justified on the basis of the serious difficulty that the researchers encountered in obtaining approval form the management of the hospital to conduct the study. The management of the health institution required the researchers to submit a detailed proposal of the aims and objectives of the study including the full research instrument that was to be used insisting that the subject was of a 'highly sensitive nature.' The management of the health institution constantly expressed fears about possible litigation even after various assurances were given that the study was not focused on investigating particular errors. Eventually, however, when approval for the study was granted, the researchers had to sign a written undertaking to provide complete anonymity for the hospital.

Members of health teams who are unwilling to discuss mistakes in their work are likely to be characterised by defensive behaviours of the kind that lead only to single loop learning[1]. This unwillingness can be interpreted as part of a culture that deals with mistakes by denying that the exist, covering them up, by refusing to acknowledge them or by adopting 'socially upbeat behaviours' and defensive reasoning that enable individuals save face, 'avoid vulnerability, risk, embarrassment, and the appearance of incompetence'[1]. However, as Argyris shows, this culture produces serious negative consequences for the organisation; in the final analysis, it undermines morale and the effectiveness of the organisation. In the case of the hospital, these would include giving an inaccurate picture of the state of affairs in the hospital, inability of the hospital to engage in double loop learning and perhaps most importantly, the adverse consequences for patients who are then forced to live with or die as a result of the mistakes.

A specific challenge that also needs to be addressed is isolating one or a small number of factors for the purpose of developing a taxonomy of errors that allows some comparability between the different groups of care providers. The literature shows that several factors exist that can provide the basis for such a taxonomy of errors. For example, errors may be classified according to the area of practice in which they occur (general practice, optometric, pharmacy, etc.). They may also be classified in terms what caused them (human errors, equipment failure) or according to particular themes (diagnostic, communication, administration, medication, dispensing, etc). They may, in addition be classified in terms of the stage in the process of providing care at which they occur (diagnostic, treatment, after care, etc.). While classification on the basis of any of these and other factors is not mutually exclusive, we would like to propose an approach that is based on the identification of the stages that are involved in the provision of care within each professional health team. Errors could then be classified on the basis of the stage in the process in which they occur. Given the fact that many treatment procedures share a number of common stages, it would then be possible to compare errors within and between different groups of care providers on the stages that are common.

VI. Conclusions

Overall, professional groups that address mistakes continuously, systematically and seriously are bound to develop a language for discussing and managing mistakes in patient care. Such a language will include a system of classification that enables members to assign mistakes to designated categories so that similar mistakes can be treated using an established set of solutions. In our case study, we found that there is no common language for discussing and managing mistakes. This suggests that members of the various health teams may be characterised by defensive behaviours that lead to only single loop learning in the hospital. It also suggests the urgent need for hospitals and other institutions of care in Nigeria to take measures to ensure that their professional health teams develop systems of classifying medical errors that are appropriate for their areas of practice and enable reductions as well as better management of mistakes.

While this study has looked at the classification of mistakes in patient care in one large hospital, the question needs to be asked the degree to which our observations can be generalised to other hospitals in Nigeria. We would like to suggest, even in the face of the absence of empirical evidence that the situation is very much likely to be the same in other hospitals as the hospital investigated here prides itself as being the foremost tertiary hospital in Nigeria. This suggestion also raises the immediate need to investigate the issues across a larger sample of hospitals to establish the degree to which our suggestion, which can only be a hypothesis, is true. In addition, studies in other contexts show that mistakes can be analysed for the purposes of classification in different areas and levels of patient care. This further indicates the need for both intensive and extensive studies of mistakes in patient care in Nigeria. It is our hope that future studies will seek to meet these challenges.

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6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

10. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right! It is a good habit, which helps to not to lose your continuity. You should always use bookmarks while searching on Internet also, which will make your search easier.

11. Revise what you wrote: When you write anything, always read it, summarize it and then finalize it.

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. Pick a good study spot: To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

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Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation)
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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

INDEX

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