ABSTRACT
OF THE THESIS FOR PH D DEGREE
DISSERTATION

Depressive phenomena in the communities of medical students – epidemiology, attributes and risk factors
(Craiova 2008-2010)

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Key words

• depression,
• students,
• medical students,
• Zung Depression Scale (ZDS),
• depression epidemiology,
• risk behaviors,
• depressive profile
Depression and anxiety are a common presence in the academic life, as shown in numerous studies and reports from all over the world. The medical students have an increased vulnerability associated with various stress factors acting most often combined in a competitive and evaluative but at the same time traditionalist, restrictive and with limited flexibility environment. (ACHA, 2008, Arslan, G., 2009, Heiligenstein, E., 1996, Honney, K., 2010, Mackenzie, S., 2011, Peng, M., 2010).

Loaded curriculum, frequent assessments and examinations, limitation of social activities, abuse and cynical behavior of some faculties, the gap between formal and informal curriculum, financial difficulties and long periods of time involved in building the medical career, problems of adaptation to academic environment (and often to the customs and rules of the new location), and in the context of globalization of education, to the local national culture distinct from her/his origin, are just some of the stress factors confronting a student in medicine. (Goebert, D. 2009, Guthrie, E., 1998, Moffat, KJ., 2004., Vitaliano, PP., 1988).

It reaches, as Isaias Arriola Quiroz (2010) noted, to frustration, guilt, reduced self-esteem with negative effects on academic outcomes (with the emergence of vicious circles linking these factors) and social functioning links, hostile attitude towards patients, drug addiction and even suppression of his own being rumination.

Because in the available databases I didn’t find domestic solid studies on the issue, I considered that the approach to the phenomenon of depression in medical students in Romania, in addition to its current size foreshadowing, could allow the academic leaders and managers to develop the objectives, strategies and tactics dedicated to the identification and control of the problem.

I. The objectives and organization of the study:
1. identification of the epidemiological characteristics of the depression phenomena in medical students;
2. dynamic analysis of the aggregation of the depressive attributes (symptoms) in more complex clusters inside this community
3. identification of the depressive profiles of the medical students communities and their characterization based on the presence and mode of aggregation of symptoms at macro-social level
4. correlation between the risk variables and individual vulnerabilities and the amplitude of the clusters of the depressive attributes in these communities as well as the role of external over-community factors.
II. Study design - The study was based on the results of measurable and easily manipulated psychometric instruments administration in the community of medical students from the Faculty of Medicine of Craiova, fully anonymous and voluntary, in order to identify elements of depression and depressive clusters of symptoms with scores compatible with the clinical expression of a depressive disorder. A MCQ was administered concurrently focused on a number of risk factors and individual vulnerabilities, recognized in the literature as being commonly associated with depressive disorders. The same procedure was performed in control groups. Representative samples were reevaluated in the same way after a minimum of one year, the data being processed in the dynamics of evolution.

III. Material and methods - The prospective, randomized, group controlled study was carried out between 2008/09 and 2009/10 academic years and included 655 responders, students at the Faculty of Medicine and Pharmacy of Craiova. The control groups (310 responders) were made of students from the University of Craiova and a group of workers in an enterprise in the local clothing industry. From the randomized series there were selected university students from the Faculty of Philology for the predominantly female structure (comparable with the increasingly feminization of medical education) and technical colleges (generally named in the study as "Polytechnic"), with an important percentage of male students. The control group from the factory workforce was predominantly made of females like the medical students but with different schooling, environment and work conditions.

In all the institutions, for the first assessment (2008/2009), questionnaires were distributed to a number of 1075 potential responders (representing approx. 25 to 30% of the respective community) with an average response rate of 89.7%. In the reevaluation, 525 questionnaires were distributed to medical students belonging to 2nd and 6th academic years, to the philology and polytechnics students belonging to 2nd and 6th academic years and to a working group, the average overall rate of responders being 87.6%.

III.1. Zung Depression Scale (ZDS) was chosen and adapted in Romanian due to its multiple advantages, including: relatively simple design and accessible preconditions for the responders with different backgrounds, high levels of sensitivity and specificity, a good correlation with clinical expression intensity of depressive disorders and comparability with other
psychometric instruments in the field, lack of intellectual property right limitations. It should be noted that SDZ is above all a screening tool and not a diagnosis one. Test results require further confirmation by interviews and examinations of a specialist. Therefore, during the trial, for the ZDS responders with scores over the cut-off for depression (i.e. ≥ 50 points) the term "subject with depression" was substitute with "subject with cluster of depressive attributes with numerical value of clinical significance (S-CADS).

III.2. Multi choice questionnaire - For correlative study of the individual risk factors and vulnerabilities with SCADS I designed a MCQ with approximately 40 variables subsequent grouped thematically for analysis and interpretation. In the reevaluation the students were given a short MCQ, which drew about one third of the original items.

III.3. Basically, the thesis is based on a construct consisting in four sub-studies phased and structured to support the internal logic of the scientific enterprise:

III.3.1. - prevalence study of the depression attributes (symptoms), standardized according to ZDS, in medical students and control groups.

III.3.2. - identification of the modes of structuring the depressive symptoms in students’ communities (factor analysis of the target and witnesses groups)

III.3.3. - analysis of the relationship between standardized depressive symptoms and individual risk and vulnerabilities, age and environmental specific

III.3.4. - evaluation of the effects of the (over-) community depressive risk factors on medical students.

The conclusions of thesis and some practical recommendations to approach the phenomenon of depression in medical higher education institutions (non-medical also), are based on the results of the studies and preliminary discussions.

III.4. Database and statistical processing

The data once collected were summarized in a database carried out in Excel Office 2003 and statistically processed. The used statistical methods: descriptive analysis methods (mean, median, standard error, standard deviation variance, kurtosis, skewness, confidence intervals); analysis of the relationship between variables (dependence)-Person correlation matrix; analysis of the significance: t test for comparing the averages of two groups (Fisher's exact test for small groups), chi² and p-value of significance, one-way ANOVA test, for comparing multiple media groups;
ROC curves (Receiver Operating Characteristic curve, the program MedCalc) were used for the relationship between individual risk variables, binary converted, and ZDS scores for discriminating the groups of variables with significant influence on the values of the scale batches of medical students.

The factor analysis was used in the attempt to identify the depressive community profiles through the development of simplified constructs based on fundamental depressive attributes. We used the FACTOR program developed by Urbano Lorenzo-Seva and Pere J. Ferrando (2006), which incorporates traditional indicators together with modern acquisitions unfound in other marketed programs of the same kind. The program is offered free to use by Spanish authors.

IV. Results and discussion

Study I – The Epidemiology of depressive phenomena - from the depression attribute to depressive aggregations with clinical significance

It was intended to establish the balance between the depression attributes (symptoms), the ZDS structural groups proposed by W.W. Zung and the aggregations (clusters) of attributes with values higher than the cutoff of depression in medical students compared with control groups. General scores and pro-depressive scores were tracked along with their distribution by sex, years of study and institutions, as well as associated attributes scores included in the ZDS.

In the group of medical students, 30 male subjects (21% of the boys) and 153 female subjects (29.9% of the girls) achieved ZDS scores above the cutoff. The graphic representation of the prevalence of SCADS according to academic years conducted, in both sexes, to a chart with a “V” shaped curve with maximum values during the initial and final academic years, and minimum during the transition to clinical rotations.

In both genders, ZDS scores ≥ 50 are more frequent to medicine vs. University, the differences being significant (females: OR 0.62 95% CI 0.39 to 0.97, chi² = 4.4 p = 0.021, males: OR 0.38 95% CI 0.16 to 0.93, chi² = 4.73, p = 0.020).

According to the weight of the subjects matched by slight depression ZDS score (50-60 points), the medical students group is significantly different from the University (OR 0.42, chi² = 12.4, p <0.0001), industry responders (OR 0.19, chi² = 12.51, p <0.0001) and general control group (OR = 0.35, chi² = 21.67, p <0.0001) responders.
In high scores, consistent with the forms of medium and severe clinical depression among the study group and general control group there are no significant differences in prevalence (U.M.F., 53/602 vs. 34/276 the general control group; OR 1.32 95% CI 0.88 to 2.2, chi² = 2.12, p = 0.145).

For the girls from medicine, the following attributes have a higher prevalence than those of the University students: diurnal variation (chi² = 6.27, p = 0.012), reduced appetite (chi² = 5.35, p = 0.015), decreased libido (chi² = 9.68, p = 0.0018), indecisiveness (chi² = 6.2, p = 0.011) and irritability (chi² = 7.84, p = 0.005).

The University female students, compared with the situation recorded for medicine students, there were noted statistically significant differences for the following depression attributes: sleep disorder (chi²15.56, p <0.0001), weight loss (chi² = 12.19; p = 0.005), constipation (chi² = 7.02, p = 0.008), tachycardia (chi² = 18.89, p<0.001), anxiety (chi² = 10.21, p = 0.001) and psychomotor slowness (chi² = 6.57, p = 0.01).

In male medical students vs. University students with ZDS general scores ≥ 50, statistical analysis shows the presence of depressive symptoms comparable to most attributes of the scale.

Study II - From the unique depressive attribute to the community depressive profile in medical students groups

The working hypothesis was that depressive profile of the groups is not a simple consequence of aggregation of subjects with symptoms of clinical depression consistent with standard definition, but also the "non-cases" with minor forms, sub-clinical depressions, and the sub-syndromes included in DSM-IV. One must not ignore the possible concomitant presence in the community, on other individuals, of the short-term feelings of depression, a mood disorder as a temporary state of illnesses or the depression-emotion as a subjective feeling with objective evidence, etc.

Thus, applying a self-assessment test for the presence and persistence of depressive attributes in a limited period of time (e.g. for ZDS, two weeks) at a psychologically heterogeneous group of subjects may allow not only the identification of those with scores compatible with the clinical diagnosis but also defining the depressive characteristics of the group.

We developed and analyzed the correlation matrices (Pearson) of ZDS depression attributes (in dyadic presentation) on groups of subjects, the study population and the witnesses. A simple view of the significance of the matrices in each group shows that there is a multitude of correlations between dyadic depressive attributes, but the complexity of variants do not allow the construct of a depressive profile with a high degree of specificity.
The data suggest that within a group (community), the depression attributes (20 in the case of ZDS) is a constant presence and relate extremely varied quantitatively and qualitatively, under the pressure of factors, identifiable or not, and simple summary aggregate symptoms SCAD valued for a short period of time - as happens with ZDS administration - does not provide a basic profile of the depressed group and eventually may lead to neglect of important practical implications for community.

Factorial analysis of ZDS applied to medical students compared with control groups provided a better understanding of depressive profile groups. The depressive profile of medical students groups emerged from the analysis and comparison of factorial construct was characterized by the presence of four factors:

- Core depression - even if it doesn’t consist of exactly the same attributes it is present in all the medical students groups, but subtly expressed in some of the academic years.
- Depression-activism: activism disorder encountered in all groups, but expressed relatively low factors (factor is more strongly expressed in years III-IV).
- Depression-somatic: a relatively strong factor expressed in 3/4 groups, but absent in the group of V-VI academic years.
- Depression-anxiety: a clear manifestation is not present in students belonging to the 1st and 2nd academic year, although in other groupings of years of study the factor is relatively strong.

The general medical students group expressed a strong core depression, depression-somatic has a relatively strong appearance and the depression-activism is a weak factor.

**Study III - Individual non-clinical variables associated with depressive phenomena in the collectivity of medical students**

Life as a medical student, with overloaded programs and prolonged confrontation at a young age with morbid-mortality specific environment, doubled with lack of capacity to deal effectively with challenges, insufficient levels of relationships, excessive use of surrogate solutions to overcome difficulties, lack of social, family and / or institutional support has been associated with the development of burning syndromes, anxiety and depression.

For the development of depressive disorders generally compete, concurrently or sequentially, acute or chronic, several non-clinical variables (not always easily identified and interpreted). The MCQ has included, in addition to some demographic items, issues of socio-economic status,
relationships, habits, physical and mental health, self-esteem and self-image, overall conditions for learning and living; there were also included a few questions about the depression attributes of I rank (for comparison with the response to the administered ZDS), and especially II, indirect, but for periods of 1-12 months (vs. 2 weeks ZDS).

The data, grouped into ten major categories were statistically analyzed at category level and according to gender and ZDS values in medical students and those of the University, and at the macro level, at the general medicine group vs. general control group.

To identify non-clinical variables (converted to binary form) with significant influence over ZDS score ≥ 50 points was used ROC curves analysis. Analysis showed that for the medical students, not all non-clinical variables had equal influence on the phenomenon of depression. Aggregate score variables: housing, monthly income sources, the relationship with the family and contacts with friends, weight changes, sleep disturbances, type of relationship with teachers / supervisors, considerations on the type of assessment of their performance and the convergence with their own opinion correlated the best with ZDS scores over the cut-off values. From a value ≥ 6, simplified aggregate score is correlated with indexed Zung score (sensitivity 53%, specificity 84.7%, and ROC AUC = 0.763).

In the community of medical students, the development of vicious circles among different types of pro-depressive vulnerabilities, can amplify and self-support in the absence of appropriate interventions.

**Study IV - Influence of exogenous, over-community risk factors, on the depression phenomenon of medical students**

The study followed the reality and the way of change, after a period of time, of the depression profile drawn after the initial ZDS administration in medical students (I) and their links with the intervention of individual risk factors or exogenous over-community (II). At 12-14 months from the first evaluation, the ZDS was once again administrated together with a mini-MCQ on risk factors and vulnerabilities, extracted from the original site (about one third of non-clinical variables associated with depression scores). It contained a direct question on personal perception of financial and economic crisis.

Comparative analysis of the scores for the four ZDS structural subcategories revealed:
- in the second year students in 2009/2010, only physiological disorders have significant differences from that of the previous test ($\chi^2 = 6.69, p = 0.009$);
by comparison with the homonym academic year tested in 2008/2009, although it highlights the positive changes in all sub-categories, they were not statistically significant;

- for reevaluated medical students in the last academic year, the scores of all structural subcategories of depression attributes were higher than the previous year, but the differences were significant only for physiological and psychological disorders ($\chi^2 = 4.57 \ p = 0.03$, respectively $\chi^2 = 4.88 \ p = 0.02$).

- comparison of the scores obtained by structural subcategories by the students in the sixth academic year in 2009/2010 with the results from 2008/2009 showed no significant differences. ($\chi^2 = 4.57 \ p = 0.03$, respectively $\chi^2 = 4.88 \ p = 0.02$).

In all groups we have seen a growing reassessed - statistically-insignificant, ZDS of subjects with scores $\geq 50$, while increasing the average of depressive subgroups of attributes, from which some symptoms might aggregate in a "core-type anxiety." The average value of the latter is significantly higher in subjects with scores below the general clinical depression.

But one could not identify individual non-clinical risk factors in all groups to act simultaneously over them, and so the attention was drawn to a possible intervention of an external, over community pressure factor, anxiety and depression inductor. As the study was conducted during the start of the Global financial and economic crisis in Romania when its effects just began to be felt mainly as an inevitable threat, and ended soon after initiation of anti-crisis measures by the authorities, connection between the phenomena could not be ignored. In these circumstances, during the focused time period, the student community was not directly affected, but primarily was put under media pressure and saw other people in the entourage getting problems (e.g. unemployment among family members). So, between the two assessments, under the pressure of negative information about economic, financial and social future and with more visible events converging towards the same direction, the students achieved a complex cluster of depression and anxiety, but most remained below the ZDS depression threshold.

V. Conclusions

The thesis, based on the results of psychometric screening tests of representative samples for local students’ communities, revealed the existence of a depressive phenomenon, on a large scale, i.e. about a third of medical students presented scores consistent with clinical depression,
over the identified levels of prevalence in academic or urban population young people.

• The female medical students appear more often than males with ZDS scores compatible with the clinic expression of depression
• The prevalence of Zung scores $\geq 50$ points by academic years achieved maximum symmetrical values during the pre-clinical and final clinical years (the graphics of the prevalence curve is "V" shaped with a basic level during the transition years III-IV);

In the community of medical students, compared with control groups, the Zung scores compatible with mild / moderate depression dominate.
• In the medical students’ community there can be identified the continuous presence of varying depressive attributes, feelings and experiences from simple individual reversible short term (low scores with Lickert type R1 and R2 dominant responses) to the of more complex and persistent aggregations of symptoms (R3 and R4 responses dominant type), compatible with various forms of clinical and underscore depression.
• The so different and various presence of depression symptoms in a community contribute to create its own depressive profile, and even within a such evaluated community as that of local medical students we could identify depressive features of the groups of academic years. These profiles are not a mere summary of the symptoms of the individuals with ZDS scores compatible with clinical presentation, but they include the various depressive attributes circulating among the community members and the links between them and risk factors, individuals or over-community, also. Sometimes depressed community profile is dominated by certain clinical attributes (e.g. somatic, cognitive, anxiety, etc.), sometimes is a mix of symptoms difficult to define in a single feature. In these cases, Factorial Analysis allows shaping more specific community profiles, which is important for defining monitoring strategies, more appropriate prevention and intervention and specific for the target groups.
• Although at the community level one can identify a wide variety of non-clinical factors associated with depression, such as risk behaviors or individual vulnerabilities, not all of them have equal effects / influences to the intensity of depressive manifestations. (e.g. Zung score size)
• We found that the depressive profile of the community suffers in time, quantitative and qualitative changes due to the internal dynamics of the depression attributes, their relationship and individual vulnerabilities.
• Community depressive profile may change under the influence of over-community factors (natural or man-made) also, the additional pressure exerted by it enhances the individual bio-psychosocial existing processes.
In our study, such a factor has proven to be the economic and social crisis, which - in the followed time being in the first stages of development, emphasized the prevalence of anxiety attributes at community level and the anxious component in individuals with significant ZDS depressive scores, as proven after one year reassessment of target and control groups. Thus there were created the premises for the development of new cases with depressive symptoms or for the amplification of the co morbidities, the effects of such broad phenomena extending long after their termination.

VI. Lines of action and postdoctoral activities
Due to the significant size of the phenomenon of depression in the communities of students and its negative consequences, the following are necessary:

- The information of the managers of medical academic institutions on the alarming dimensions of the phenomenon of depression and the risk factors existing in medical student community.
- Extending the methodology of exploring the phenomenon of students’ depression (e.g. co-administration of several psychometric instruments for depression and anxiety, combined with specialized individual direct observation and interviews) and its duration (multi-annual, medium term 3-5 years), with the involvement of local specialists, but some specially trained students also.
- Creating in the universities/faculties of internal structures of active information on the various manifestations of depression and risk factors in young people, through combined actions of professionals and student associations.
- Implement for the students programs of de-stigmatization of mental disorders by concerted action of all the faculties and young physicians regardless of specialty, based on a methodology developed by specialists.
- Developing among future physicians the teamwork spirit and good relationships with the family, academic environment ant the community, encouraging the hobbies and organized cultural and sports activities, deterring outward cultural rupture at the expense of traditional domestic values.
- Teaching medical students through conducted extracurricular activities, techniques for increasing the resilience and ability to overcome stressful professional situations, extremely important for their daily existence and for subsequent work.
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Management professional certificate - Open University Business School, 2001-2005

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**Computer skills**  
PC operating - very well

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Clean driving license since 1999

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