



اتحاد الاطباء النفسيين العرب  
ARAB FEDERATION OF PSYCHIATRISTS

# The Arab Journal of Psychiatry المجلة العربية للطب النفسي

Vol.25, No.2, Nov. 2014  
المجلد ٢٥، العدد الثاني، نوفمبر ٢٠١٤



الجزائر العاصمة، مقام الشهيد  
Shrine of the martyr, Algeria

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- Mosey AC. Occupational therapy. Configuration of a profession. New York: Raven Press, 1981.

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## رسالة المحرر

اعزائي الأطباء النفسيين العرب

أما وقد بدأت المجلة العام السادس والعشرين واقترب موعد انعقاد المؤتمر العربي الثالث عشر للطب النفسي في بيروت، أعرب عن أمني أن يتم نقل المجلة وتحريرها لمؤسسة قادرة على ضمان الإستمرارية، وبالتأكيد مع بقائي جاهز لمساعدة المحرر الجديد.

اعزائي

المجلة العربية للطب النفسي هي مجلتكم ولا بد أن تأخذ نصيباً كبيراً مما تنشرون، وأن يكون لكم مساهمات كمحكمين ومعلقين ومشاركين في كل ما ينشر.

ولا بد لي أن أشكر كل من نشر في المجلة وساهم في التحكيم والدعم على مدى السنوات.

متمنياً أن تستمر هذه المجلة ويزداد معدل إصدارها ويتم إضافتها لكافة قواعد البيانات العالمية.

وليد سرحان

عمان

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## Serum Ferritin is Negatively Correlated with Inattention in a Sample of Egyptian Children with Attention Deficit Hyperactivity Disorder

Mohammad A. Seleem, Tarek M. El-Gohary, Manal A. Eid, Esraa A. Sroor

يتناسب مستوى الفيريتين بالدم عكسياً مع قلة الانتباه في عينة من الأطفال المصريين المصابين بفرط الحركة و قلة الانتباه

محمد عبد الحكيم سليم ، طارق محمد الجوهري، منال عبد الواحد عيد ، إسراء عبد الفتاح سرور

### Abstract

**O**bjective: Iron deficiency was suggested to play a role in the pathophysiology of attention deficit hyperactivity disorder (ADHD) due to the role of iron in the production of dopamine and noradrenaline. The aim of the present study was to assess iron status in a sample of Egyptian children with ADHD. **Methods:** Thirty children with ADHD (6-12 years old) and 15 age and gender matched controls were recruited. Subjects were evaluated using the Mini International Neuropsychiatric Interview for kids (mini-kid) and Conner's Parent Rating Scale - Revised (CPRS-R). Laboratory measures were also carried out to investigate iron status in all subjects including: complete blood count, serum iron, total iron binding capacity, and serum ferritin. **Results:** Children with ADHD showed significantly lower levels of hemoglobin and serum ferritin as compared to control groups. A strong negative correlation was found between serum ferritin and ADHD total score and cognitive sub score, but not with hyperactivity sub score. No significant differences were found between the two groups as regards other hematological data. **Conclusions:** Iron deficiency, with or without anemia, might play a role in pathogenesis of ADHD. Further work is needed to confirm the clinical utility of iron supplementation in the treatment of ADHD, especially in developing countries.

**Key Words:** ADHD, Attention, iron, hemoglobin, ferritin.

**Declaration of interest:** None

### Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the most common psychiatric disorders in children<sup>1</sup>. ADHD affects 5-10% of school-aged children and may persist throughout adolescence and adulthood in 30-50% of the patients<sup>2</sup>. The worldwide pooled prevalence of the disorder was estimated to be 5.29%<sup>3</sup>. ADHD rates in Arab populations were estimated to be similar to those in other cultures<sup>4</sup> and even higher prevalence was reported in Egyptian children<sup>5</sup>.

ADHD is defined as a persistent, pervasive, and age-inappropriate pattern of inattention, hyperactivity-impulsivity and altered executive functions that impair one's functioning<sup>6</sup>. Although genetic factors are known

to be the dominant cause of ADHD, current advances in cognitive neuroscience and neuroimaging provide evidence that ADHD is a result of a complex interplay between multiple genetic and environmental factors<sup>7,8</sup>. It has been suggested that the symptoms of ADHD may be caused by dopamine dysfunction. Most of ADHD symptoms are possibly modulated by the dopaminergic mesocortical pathways. Patients with ADHD have increased dopamine transporter-binding potential and clinically benefit from dopamine stimulants<sup>9</sup>. Iron is a coenzyme of dopamine synthesis. Iron deficiency alters dopamine receptor density and activity in animals<sup>10</sup> and hence may influence dopamine-dependent functions.

The brain has a higher concentration of iron than any other metal<sup>11</sup>. In the brain, iron is bound to ferritin, the levels of which are decreased by iron deficiency and increased by iron supplementation<sup>12</sup>. When the body is short of iron, it is preferentially directed away from the brain to make red blood cells. It is therefore possible that the levels of iron in an individual's brain will become depleted when the intake is marginal, although the individual may not be as yet anemic<sup>13</sup>. Serum ferritin is the best laboratory test for the diagnosis of iron deficiency as it may decrease before a decrease in serum iron level is detected<sup>14,15</sup>. In a recent evaluation of a sample of children visiting the mental health clinic, they showed less stable iron status, as shown by lower serum ferritin levels, as compared to a community sample of children<sup>16</sup>. Attention, concentration, verbal memory and recognition together with overall scholastic performance were all reported to be decreased in Indian girls with low ferritin levels, whether anemic or non-anemic, as compared to girls with normal ferritin levels<sup>17</sup>.

Several studies investigated the association of iron metabolism with ADHD. A number of those studies showed that children with ADHD had lower mean ferritin levels when compared to normal controls and that low serum ferritin levels were related to more severe symptoms reported by teachers and/or parents<sup>2,18,19</sup>. While the first study reported an inverse relationship between serum ferritin and both general and cognitive symptoms of ADHD, the latter two studies failed to replicate this finding and instead reported a similar relationship between ferritin and hyperactivity levels in children with ADHD. A significant negative correlation between serum ferritin levels and oppositional sub score on Conner's Rating Scale was also reported in an Indian sample<sup>20</sup>. Another study reported significantly lower levels of serum ferritin in children with ADHD compared to healthy controls as well as children with other psychiatric disorders<sup>21</sup>. A recent Egyptian study

reported low serum ferritin level among Egyptian children with ADHD<sup>22</sup>.

On the other hand, other studies failed to report any significant relationship between serum ferritin and ADHD symptoms. For example, a relatively large (N = 204) controlled study that assessed ferritin levels in stimulant-naïve ADHD children did not support a significant relationship between serum ferritin levels and ADHD<sup>23</sup>. Another Brazilian study also failed to find any significant correlation between dimensional measures of attention-deficit/ hyperactivity disorder symptoms and ferritin levels<sup>24</sup>. A recent German study failed to report any cross-sectional or longitudinal association of ferritin with symptoms of ADHD in a large population-based sample of children<sup>25</sup>. However, these results based on peripheral measures of iron do not rule out a possible implication of brain iron deficiency in ADHD, grounded on neurobiological hypotheses and preliminary empirical evidence. A recent study used MRI to report significantly lower brain iron in right and left thalamus in children with ADHD compared to healthy controls<sup>21</sup>.

The study of iron status in children with ADHD has several potential therapeutic implications. Some studies suggested a role for iron supplementation in improving the clinical symptoms of ADHD, especially inattention<sup>26</sup>. The possible, widely-debated, risk of severe cardiovascular events during treatment with ADHD drugs, especially with stimulants<sup>27,29</sup>, adds up to the importance of regular estimation of iron status in children diagnosed with ADHD<sup>30</sup>. The aim of the present study was to assess the clinical significance of estimating the possible causal relationship between serum ferritin levels and symptoms of ADHD in Egyptian children.

## **Methods**

### ***Subjects***

The current paper is adapted from a thesis titled "Study of Iron Status in Children with Attention Deficit

Hyperactivity Disorders” which was submitted by the last author to the Faculty of Medicine - Tanta University in the partial fulfillment of a Master Degree in Pediatrics. Thirty children with ADHD (age 6 to 12 years old) were recruited from the Child and Adolescent Psychiatry Unit in Tanta Psychiatry and Neurology Center - Tanta University, in the time period between 1<sup>st</sup> April 2012 to 1<sup>st</sup> April 2013. A further 15 age and gender matched normal children who came to the general outpatient clinic of pediatric department - Tanta University Hospital for routine checkup, were recruited in the same period to serve as a control group. Exclusion criteria for both groups were intellectual disability (IQ <70), medical conditions that might affect cognitive functions, e.g. renal, hepatic, thyroid, connective tissue diseases, neurological diseases, diabetes mellitus, etc. and use of medications, e.g. major tranquilizer that may alter cognitive functions. Children who received iron therapy in the last three months were also excluded. The control group had an additional exclusion criterion of having the diagnosis of ADHD. Full informed consent was taken from the parents. Any unexpected risks during the course of the research were cleared to the participants and to the ethical committee of the Faculty of Medicine – Tanta University on time.

### **Assessment**

Comprehensive general and psychiatric evaluation was performed. The Fahmy and El-Sherbini scale<sup>31</sup> was used to collect demographic and socioeconomic data. Obstetric, developmental, and psychiatric history were all taken in detail. Thorough physical and neurological examinations were performed by a trained pediatrician with special attention to signs of iron deficiency anemia. A validated Arabic version of the Mini International Neuropsychiatric Interview for kids (mini-kid)<sup>32</sup> was used to assess psychiatric disorders in all participants. The mini-kid was designed as a brief structured interview for the major Axis I psychiatric disorders in DSM-IV and ICD-10. It has acceptably high validation

and reliability scores<sup>32, 33</sup>. The diagnosis and severity of ADHD were further confirmed by using the cognitive, hyperactivity, and ADHD indices of the validated Arabic version of Conner's Parent Rating Scale-Revised (CPRS-R)<sup>34</sup> completed by the parents of participant children. The Arabic translation of the Third Edition of Wechsler Intelligence Scale for Children (WISC-III)<sup>35</sup> was used to assess the IQ of the children to determine the general level of intelligence and to exclude intellectual disability in both patients and controls.

Additionally, laboratory evaluation of the children was performed, including the following measures: a blood sample of 2 milliliters was withdrawn from each child by venipuncture after cleaning the skin by 70% alcohol and placed in to EDTA vacuotainer for complete blood count (CBC) using automated hematology analyzer (ERMA). CBC includes several indices for deficient iron status such as mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC). Furthermore, widened red cell distribution width (RDW), one of the best screening tests for iron deficiency, was also estimated<sup>36, 37</sup>. Another 3 milliliters of blood were withdrawn and centrifuged for serum separation and stored at -20 degrees for other bio elements assay including: serum iron, total iron binding capacity (TIBC) and serum ferritin.

### **Statistical Analyses**

Between-group demographic and clinical characteristics were compared using chi-squares and non-parametric tests as appropriate. Pearson correlation coefficient was used to assess correlations. All p-values were based on two-tailed tests with  $\alpha = 0.05$ . IBM SPSS (Statistical Package for the Social Sciences) - version 19, was used to carry out all analyses.

## **Results**

*Serum Ferritin is Negatively Correlated with Inattention*

Of the total sample of children with ADHD (N = 30), 24 (80%) were boys and 6 (20%) were girls. The age of children ranged from 6 to 12 years with a mean of 8.6 and SD of  $\pm 2.5$  years. Regarding control children (N=15), 11 (73.3%) were boys and 4 (26.7%) were girls. No significant difference between both groups (p value = 0.7). The ages of the children in control group also ranged from 6-12 years with a mean age of 9.7 and SD of 2.8 years, which was not statistically different from those of the ADHD group (t = 1.3; p value = 0.2). Similarly, no

significant differences were noted between patients and controls regarding urban versus rural residence ( $\chi^2 = 0.8$ , p value = 0.4), family troubles (p value = 0.3), or socioeconomic status (t = 0.6; p value = 0.6) (Table 1). The comparison between the two groups regarding poor obstetric history, delayed developmental history, and poor dietetic history also yielded non-significant differences (all p values > 0.05) (Table 1).

**Table 1:** Comparison between cases and controls as regards demographic data

Parameter	ADHD (N=30)	Control (N=15)	Statistics	p value
Age: mean (SD) (years)	8.6 (2.5)	9.7 (2.8)	t = 1.3	0.2
Gender (female %)	20	26.7	FET	0.7
Residence (Rural %)	40	26.7	$\chi^2 = 0.8$	0.4
Family troubles (+ve %)	13.3	0	FET	0.3
Socioeconomic status (score)	21.6	20.6	t = 0.6	0.6
Obstetric history (Bad %)	20	0	FET	0.2
Delayed milestones (%)	13.4	0	FET	0.4
Dietetic history (Bad %)	53.4	14.7	$\chi^2 = 0.2$	0.6

With the exception of current low body weight and signs and symptoms of iron deficiency, which were both significantly more prevalent among ADHD children (p values = 0.02; 0.01 respectively), no other clinical variables showed any significant differences between patients and controls (Table 2). Mood disorders, anxiety

disorders and disruptive disorders showed comparable rates in both groups (all p values > 0.05) (Table 2). Approximately one third of ADHD patients had inattentive type, 3% had hyperactive type, and 67% had combined type.

**Table 2:** Comparison between cases and control as regards clinical and psychiatric evaluation

Parameter	ADHD (N=30)	Control (N=15)	Statistic	p value
<b>Physical examination:</b>				
Weight (underweight %)	43.3	6.7	FET	0.02
Symptoms and signs of iron deficiency (positive %)	56.7	13.3	$\chi^2=7.7$	0.006
<b>Psychiatric evaluation:</b>				
Affective disorder (+ve %)	10	0	FET	0.6
Anxiety disorder (+ve %)	30	20	FET	0.7

<b>Disruptive behavior disorder (+ve %)</b>	<b>36.7</b>	<b>13.3</b>	<b>FET</b>	<b>0.2</b>
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As regards laboratory findings, hemoglobin ( $t = 2.7$ ;  $p$  value = 0.009) and serum ferritin levels ( $t = 2.6$ ;  $p$  value = 0.01) were both significantly lower in ADHD subjects than in controls (table 3). No other significant differences

were found as regards other CBC parameters (MCV, MCH, and RDW), TIBC or serum iron (all  $p$  values > 0.05) (Table 3).

**Table 3:** Comparison between cases and control as regards iron status

Parameter	ADHD (N=30)	Control (N=15)	Statistic	$p$ value
Hb (g/dl)	10.8 ± 1.1	11.7 ± 0.8	$t = 2.7$	0.009
MCV(fl)	75.9 ± 7.5	76.6 ± 4.8	$t = 0.34$	0.73
MCH (pg)	26.1 ± 2.5	25.2 ± 2.2	$t = 1.1$	0.27
RDW(fl)	14.1 ± 1.6	13.4 ± 1.3	$t = 1.3$	0.18
TIBC (µg/dl)	327.2 ± 112.7	228.2 ± 99.7	$t = 1.1$	0.26
Serum iron (µg/dl)	61.3 ± 94.6	103.7 ± 122.7	$t = 1.2$	0.2
Serum ferritin (ng/dl)	16.4 ± 15	30.7 ± 21.7	$t = 2.58$	0.013

A significant negative correlation was reported only between serum ferritin and both total and cognitive (inattentive) indices of the CPRS-R ( $r = -0.4$ ,  $p$  value < 0.05 in both correlations) (Table 4; Figures 1 and 2). Hyperactivity sub score was also negatively correlated

with ferritin level, although this correlation did not reach statistical significance ( $r = -0.3$ ;  $p$  value > 0.05). No significant correlations were found between other laboratory parameters and any of the psychiatric scales.

**Table 4:** Correlation between laboratory finding and psychiatric scales among children with ADHD according to Conner Parents Rating Scales (CPRS)

Parameter	ADHD index	Hyper activity index	Cognitive index (inattention)
Hb	$r = - 0.3$	$r = - 0.2$	$r = - 0.1$
MCV	$r = - 0.3$	$r = - 0.2$	$r = - 0.01$
MCH	$r = - 0.3$	$r = - 0.2$	$r = - 0.06$
RDW	$r = - 0.3$	$r = 0.1$	$r = 0.2$
TIBC	$r = 0.3$	$r = - 0.2$	$r = 0.3$
Serum iron	$r = - 0.1$	$r = - 0.1$	$r = - 0.2$
Serum ferritin	$r = - 0.4^*$	$r = - 0.3$	$r = - 0.4^*$

\*Correlation is significant at the 0.05 level

\*\* Correlation is significant at the 0.01 level

Figure 1. Negative correlation between serum ferritin and ADHD index

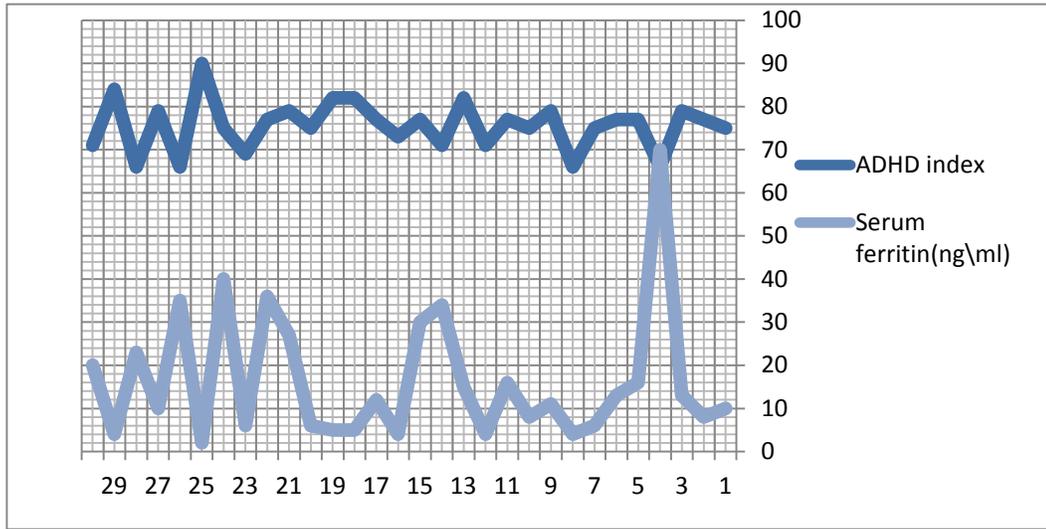
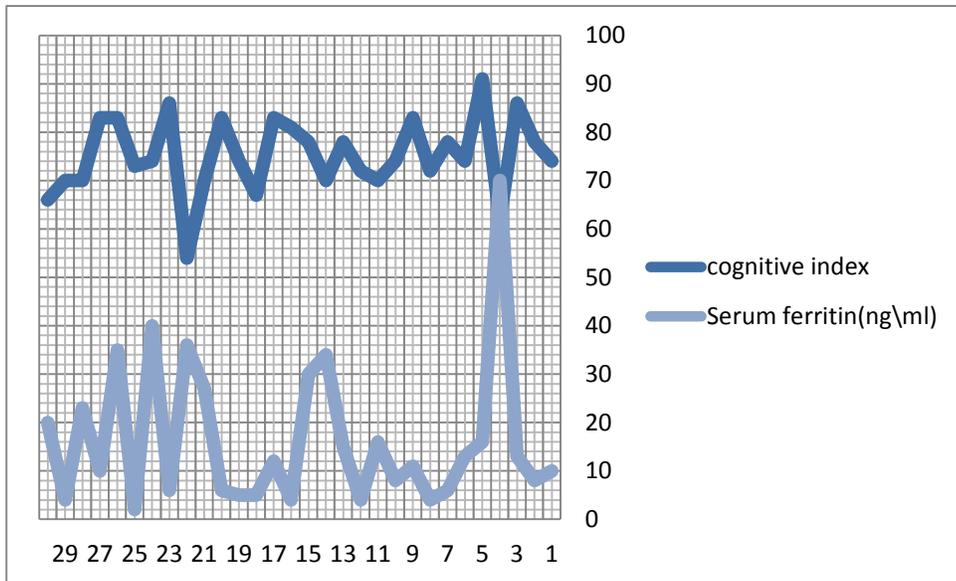


Figure 2. Negative correlation between serum ferritin and cognitive index



## Discussion

In the current study, we conclude that HB levels and mean serum ferritin levels were both significantly lower in our sample of Egyptian children with ADHD than in the control group. No significant differences were found in other tested parameters of iron status that include MCV, MCH, RDW, serum iron, and TIBC between patients and controls. Serum ferritin levels were significantly correlated with the severity of ADHD symptoms, especially inattentive symptoms.

The relationship of iron deficiency, with and without anemia, to developmental delay and cognitive deficits has been a focus of many studies in both developed and developing countries<sup>38</sup>. Several studies were performed in recent years to define the role of serum ferritin levels as a reliable measure of iron stores in body tissues, including the brain, in children with ADHD<sup>38, 39</sup>. The results of most these studies<sup>2, 40</sup>, including the current one, support the hypothesis that the depletion of iron

stores, although not enough to cause anemia, may be related to the pathophysiological process underlying the development of ADHD symptoms. Negative correlations between ferritin levels and symptomatic components or comorbidities associated with ADHD, such as cognitive deficits<sup>2</sup> and oppositional behavior<sup>41</sup>, were also reported. Other studies<sup>18,19</sup> have suggested that lower ferritin levels were associated with higher rates of behavioral problems and that the presence of comorbid conditions might increase the effect of lower iron stores on behavioral dimensions of ADHD.

Our results may be considered as a replication of the low serum ferritin previously reported in Egyptian children with ADHD<sup>22</sup>. However, the study, performed in Upper Egypt, reported significantly lower ferritin levels in both inattentive and hyperactive types, a result that was only partially replicated in the current study in inattentive dimension of ADHD. Lower levels of zinc and magnesium were also reported in that study in children with ADHD compared to healthy controls suggesting that malnutrition might play a role in such multiple deficiencies and might explain the ferritin deficiency in both inattentive and hyperactive types. Furthermore, the cited study did not include dimensional correlation between serum ferritin levels and symptoms of ADHD. Another subsequent Egyptian study failed to replicate the relationship between serum ferritin and severity of ADHD symptoms<sup>42</sup>. This latter study, which did not primarily aim at examining the relationship between serum ferritin and the severity of ADHD symptoms, adopted a different approach with a dichotomy between children with serum ferritin more than 30 ng/ml and those with levels less than 30 ng/ml and then compared the two group regarding ADHD symptoms. This arbitrary dichotomy might explain the negative result reported in that study.

On the other hand, our results disagreed with several other studies<sup>24,38,39</sup> who all reported no statistically

significant correlation between ferritin levels and symptoms of ADHD. However, most of these studies did show other subtle signs of disturbed iron metabolism.

For example, a significant difference in RDW was found between drug naïve ADHD and both medicated ADHD and control subjects in the first study<sup>24</sup>. The literature indicates that the RDW should be considered for the diagnosis of iron deficiency with MCV and ferritin<sup>18,24,43</sup>. In the latter study<sup>39</sup>, however, 74% of the patients had serum ferritin levels below 50 ng/ml, 44% had levels below 30ng/ml, and 18% had serum ferritin levels below 20ng/ml. Another Korean study<sup>44</sup> found no significant differences between children with ADHD and control children regarding iron, ferritin, TIBC, hemoglobin, MCV, MCH, or MCHC but did report low transferrin levels in children with ADHD diagnosis.

As briefed above, most studies which did not report significantly low ferritin levels in children with ADHD did report deficiencies in other iron related biomarkers, such as RDW and transferrin. This might be a sign of subtle abnormality in children with ADHD that manifest in different forms in different samples of children. The variability of the results in different studies may also reflect differences in age, gender, race/ethnicity and nutritional status due to variable socioeconomic conditions as well as the contribution of other confounding factors, such as type of symptoms and associated comorbidity that may have some influence on ADHD features<sup>38</sup>. Other explanations for the inconsistent results regarding the relationship between serum iron and the symptoms of ADHD include different methods and thresholds for diagnosis of ADHD in different cultures<sup>45</sup> and different studies. Most of the studies showing a positive relationship between iron, and other mineral deficiencies and poor cognitive and behavioral problems in general in school age children, were conducted in developing countries, raising the question whether these findings represent an overall tendency towards nutritional deficiencies in those countries as compared to

developed ones<sup>17, 22</sup>. The possibly heterogeneous nature of the very diagnosis of ADHD is another potential explanation for the conflicting results. ADHD is known to be highly heterogeneous in various aspects, such as symptom profiles, cognitive impairments, and neurobiological and genetic features<sup>46</sup>.

Finally, it is important to highlight the limitations of this study. First, the small size of the sample might limit the generalization of the results on Egyptian children or children with ADHD in general. Second, the information collected in this study about the severity of symptoms was obtained only from parent-reports; no teacher reports were obtained. Thus, inaccurate reporting due to parents' under- or overestimation of the symptoms might have been occurred. The possible effect of medications, especially stimulants commonly used for treatment of ADHD, was not explored. The well-known side effect of the stimulant drugs in decreasing the appetite of children treated by these agents might play a role in possible nutritional deficiencies and hence low iron stores in children with ADHD<sup>2, 49</sup>. Additionally, children with ADHD, whether they are taking medications or not, might have reduced ability to sit still for a meal and therefore decreased nutritional intake of iron<sup>49</sup>.

We conclude that our sample of children with ADHD have significantly lower hemoglobin and serum ferritin than healthy children. The current report also replicates previous findings of an inverse correlation between serum ferritin concentration and ADHD symptom severity especially inattentive components of the disorder. These findings are suggestive, but not conclusive, for an etiological role of iron deficiency, with or without anemia, in the pathogenesis of ADHD. Large scale and multicenter trials are needed to evaluate the therapeutic role of iron supplementation in improving the symptoms of ADHD, especially inattention in non-anemic children. As serum ferritin decrease in early stage of iron deficiency, patients with ADHD may be

adversely affected by early iron deficiency even before the development of the full blown anemic syndrome. Few studies were performed to demonstrate role of iron supplementation in improving symptoms of ADHD with promising results<sup>47, 48</sup>.

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## المخلص

**الموضوع:** يعد الدور الذي يلعبه نقص الحديد في التسبب في اضطراب فرط الحركة وقلة الانتباه أحد العوامل المطروحة للبحث في هذا المجال. وذلك نظراً للدور الذي يلعبه الحديد في إنتاج مادتي الدوبامين والنورأدرينالين. وتهدف الدراسة الراهنة إلى تقييم حالة الحديد في دماء عينة من الأطفال المصريين المصابين باضطراب فرط الحركة وقلة الانتباه. **طرائق البحث:** تم اختيار ثلاثين طفلاً مصاباً باضطراب فرط الحركة وقلة الانتباه (بين عمر السادسة والاثني عشر عاماً) بالإضافة إلى خمسة عشر طفلاً صحيحاً كمجموعة ضابطة. وقد تم تقييم الأطفال عن طريق المقياس العالمي المصغر النفسي العصبي للأطفال (ميني كيد) - النسخة العربية، ومقياس كونر المعدل للوالدين. كما تم تقييم حالة الحديد في دماء الأطفال عن طريق تحليل صورة الدم الكاملة، وتقدير مستوى الحديد، والقدرة الإجمالية على استيعاب الحديد، ومستوى مادة الفيريتين بالدم. **النتائج:** سجل الأطفال المصابون باضطراب فرط الحركة وقلة الانتباه مستويات أقل - بنسبة دالة إحصائية - من الأطفال الأصحاء فيما يختص بمستوى مادتي الهيموجلوبين والفيريتين بالدم. كما تم تسجيل تناسب عكسي قوي الدلالة بين مستوى مادة الفيريتين والمقياس الكلي لفرط الحركة وقلة الانتباه بالإضافة إلى المقياس المعرفي الجزئي المعبر عن قلة الانتباه، بينما لم يتم تسجيل تناسب مشابه مع مقياس فرط الحركة كما لم يتم تسجيل أي فروق دالة بين المجموعتين في بقية المؤشرات المعملية التي تم قياسها. **خلاصة البحث:** هناك مؤشرات تدل على أن نقص الحديد يلعب دوراً هاماً في التسبب في اضطراب فرط الحركة وقلة الانتباه سواء في وجود علامات الأنيميا أم في غيابها. وهناك حاجة إلى المزيد من البحث - خاصة في الدول النامية - لتقييم المدى الذي يمكن أن يلعبه العلاج التعويضي للحديد في علاج اضطراب فرط الحركة وقلة الانتباه.

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## Effect of Trauma Due to War on Dissociative Symptoms and Resilience among Palestinian Adolescents in the Gaza Strip

Reem Taisir Ghannam, Abdelaziz Thabet

تأثير الصدمة جراء الحروب على حدوث الأعراض التفككية والصمود لدى المراهقين الفلسطينيين في قطاع غزة

ريم غنام، عبد العزيز ثابت

### Abstract

**A**im: The present study examined the effect of war trauma on occurrence of dissociative symptoms and the role of resilience among Palestinian adolescents in the Gaza Strip. **Method:** N=400 adolescents (179 boys, 221 girls) were randomly selected from 10 schools in five areas in the Gaza Strip. The Gaza Traumatic Checklist, Dissociative Symptoms Scale for Adolescents, and Resilience Scale for Adolescents were used for assessment and socio-demographic data collected. **Result:** Regardless of gender, all participants reported an average of nine traumatic events regardless of family income, number of siblings, parent education and work status. The mean score for dissociative symptoms in girls was 75.67 vs. 73.65 in boys. No statistically significant differences in dissociative symptoms according to gender, age, place of residence, parent education and work status. Mean resilience was 112.18, individual resources, e.g. personal skills, social skills, and peer support was 44.06; physical and psychological caregiving by primary caregivers was 27.42, and contextual resources including spiritual, cultural and educational resources mean was 37.42. No statistically significant differences in the total resilience and subscales according to socio-demographic factors of gender, age, type of residence and parents work, whereas, resilience was higher in those with fewer siblings. There was a statistically significant negative relationship between dissociative symptoms and total resilience, individual resources, physical and psychological caregiving, and contextual resources. There was a statistically significant positive relationship between traumatic events and total trauma and total resilience, individual resources, and contextual resources. **Clinical implications:** Palestinian adolescents have been victims of continuous trauma with increased risk of psychopathology such as dissociative symptoms. Such symptoms negatively impacted upon adolescent resilience when handling adversity. Findings suggest the need for psychosocial interventions that reflect public health and child developmental requirements. Engaging children in interventions that are community-based recreational and cultural activities in war-affected populations have been found useful to heal.

**Key words:** Trauma, war, adolescents, dissociation, resilience, Gaza Strip

**Declaration of interest:** None

### Introduction

Most people are exposed to at least one violent or life-threatening situation during the course of their lives. As they progress through the life cycle, they are increasingly confronted with the deaths of close friends and relatives. Everyone copes differently with these potentially disturbing. Some will experience acute distress from which they are unable to recover; others suffer less

intensely and for a much shorter period of time; some people seem to recover quickly, but then begin to experience unexpected health problems or difficulties concentrating or enjoying life the way they used to<sup>1</sup>. Children of Gaza have been subject to a wide range of traumatic and violent events over the last few decades, which, when considered alongside other risk factors such as gender, socio-economic status and previous mental

health history, have led to significant psychosocial problems<sup>2,3,4</sup>.

Dissociation is defined as the individual's lack of ability to integrate a potentially traumatizing event, implying that he or she avoids painful memories<sup>5</sup>. Dissociation can be divided into psychoform and somatoform types. Psychoform dissociation involves disruptions in the integration and perception of cognition, affect, memory, identity, and behavior. Somatoform dissociation involves disruptions in the integration and perception of bodily functions, sensations, and movement. Trauma has been linked to both forms of dissociation<sup>6,7</sup>. Dissociation is a complex psycho physiological process that alters the accessibility of memory and knowledge, integration of behavior, and sense of self<sup>8</sup>. Dissociation reflects the disruptions in the normal flow of information processing and in functions that are usually integrated: consciousness, memory, identity or perception of the environment<sup>9</sup>. Many studies tried to assess the dissociation as response to traumatic events, one of these studies demonstrated that dissociative symptoms were widespread among homeless young as a way to handle their situations<sup>10</sup>. Childhood trauma has been associated with increased risk for both panic disorder and dissociative symptoms in adulthood<sup>11</sup>. Another study on the relationship between different types of childhood trauma and the degree of dissociative experiences among adolescent psychiatric patients showed an increase in the degree of dissociative symptoms in patients with a history of sexual abuse, physical abuse, neglect and stressful life events<sup>12</sup>. Others showed that symptoms of posttraumatic stress and impaired capacity to regulate negative emotional states significantly increased the likelihood that dissociative symptoms would develop. The study found that the variables seemed to interact independently of each other, in such a way that there was no statistical interaction between the two. Instead the two variables seemed to be independent, both acting as additive moderators of trauma related dissociation<sup>13</sup>. Recent research on adolescents has also pointed to the

cumulative effect of traumas and adverse life experiences on the occurrence and intensity of posttraumatic and dissociative symptoms<sup>14,15</sup>.

Resilience is broadly understood to mean "positive adaptation in the face of adversity"<sup>16</sup>. This definition highlights the two criteria that are crucial to a description of a young person as resilient. First, a context of adversity, including psychosocial threat, experiences of trauma, and/or biological risk, must be identifiable; and second, a young person must adjust well to this context of risk. While others defined resilience as 'both the capacity of individuals to navigate their way to health-sustaining resources, including opportunities to experience feelings of well-being, and a condition of the individual's family, community and culture to provide these health resources and experiences in culturally meaningful ways'. From this, it is clear that an outcome of resilience is contingent on a process that involves reciprocal transactions between children, who 'navigate' and/or 'negotiate,' and their ecologies, which 'provide'<sup>17</sup>.

Researchers and practitioners working within a resilience framework recognize that many adolescents growing up in poverty exhibit positive outcomes; they may possess any number of promoted factors, such as high levels of self-esteem or the presences of an adult mentor all of which helps them avoid the negative outcomes associated with poverty. Researchers have also described resilience as an outcome when they identify as resilient an adolescent who has successfully overcome exposure to a risk<sup>18</sup>. Many studies tried to connect trauma and resilience; by this resilience will be a form of behavioral adaptation to situational stress and a style of personality functioning. Resilience and mental health are interlinked, overlapping, and bi-directional such that a young person with a mental health problem can be resilient or a resilient child or youth can develop a mental health problem<sup>19</sup>.

The present study aimed to examine the effect of trauma on dissociative symptoms and resilience among Palestinian adolescents in the Gaza Strip.

### Method

The Gaza Strip is a narrow elongated piece of land, bordering the Mediterranean Sea between Israel and Egypt, which covers 360 km<sup>2</sup>. It has a high population density. About 17% of the population lives in the north of the Gaza Strip, 51% in the middle, and 32% in the south area. There is high unemployment, socioeconomic deprivation, family overcrowding, and short life expectancy. Nearly two-thirds of the population are refugees with approximately 55% living in eight crowded refugee camps. The remainder live in villages and towns<sup>20</sup>.

### Sample

The target population consisted of 430 children, between 15 to 18 years old, who were exposed to the war on the Gaza Strip on November 2012, and who lived in five localities of the Gaza Strip (North, Gaza, Middle, Khan Younis, and Rafah). The sample was selected randomly according to a prepared list of boys and girls from each of the 10 schools from the five areas. Of the total 430 who were contacted, 400 agreed to participate in the present study, following informed consent from their parents, with a response rate of 93%. Two hundred and twenty one (55.2 %) were girls and 179 (44.8%) were boys (Figure 1).

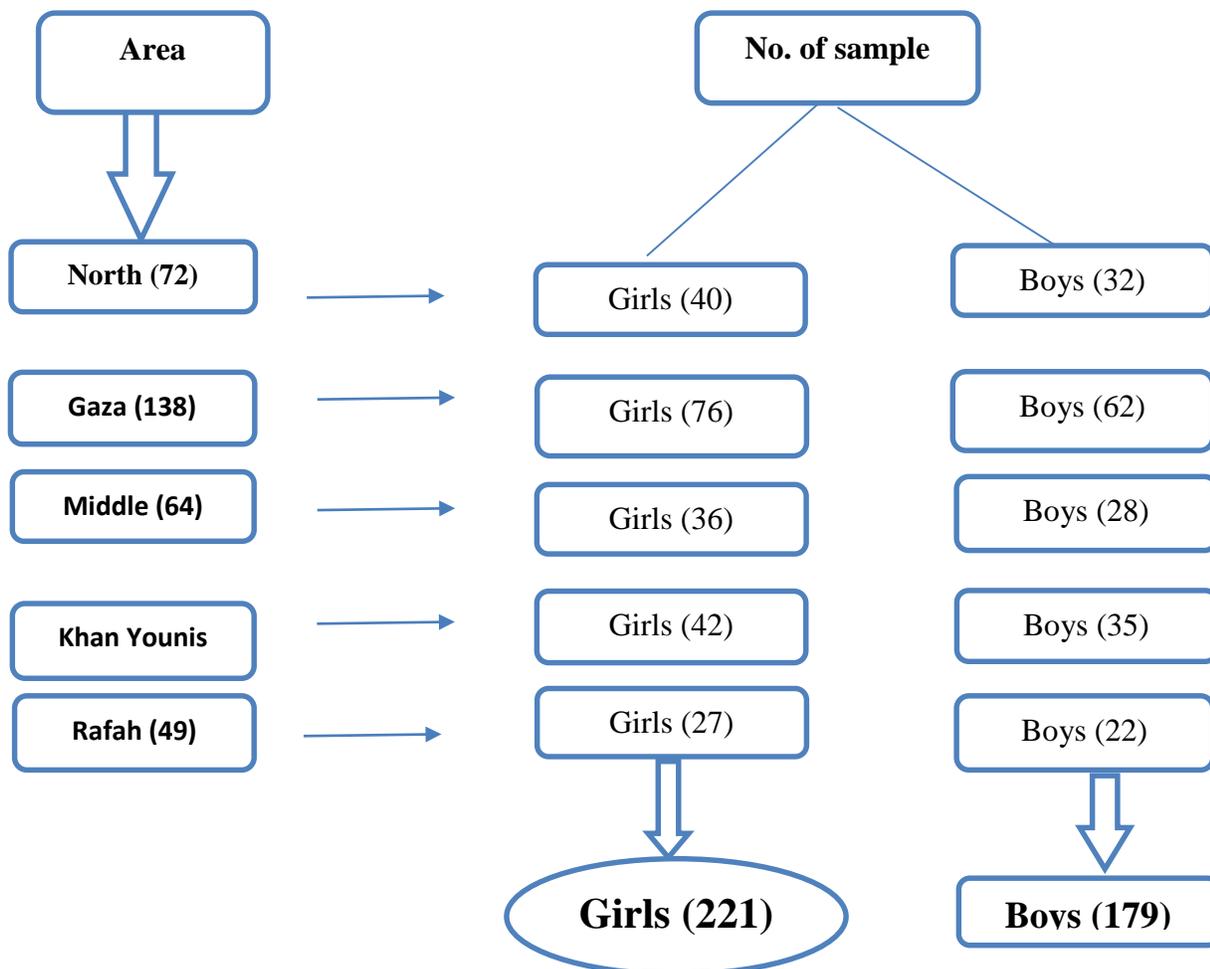


Figure 1: distribution of the sample according to gender and area

## **Procedure**

Data collection was carried out by four trained psychologists and social workers, under the supervision of the first author. They were trained for six hours in data collection and interviewing techniques. The data was collected during March 2013. The completion of the self-administrative measures took at least one hour for each child. Sociodemographic information, exposure to traumatic events, dissociative symptoms, and resilience were completed by the adolescents.

## **Measures**

The data was collected using the following:

### *Demographic questionnaire*

A demographic questionnaire, developed for the present study, was completed by all participants. The questionnaire asked participants to answer questions regarding their gender, age, type of residence, number of sibling, parent's education, family income and parents' work.

### *Gaza Traumatic Events Checklist for 8 days war on Gaza<sup>21</sup>*

The Gaza Traumatic Checklist was originally developed by the Gaza Community Mental Health Program to assess level of trauma exposure typical for the Palestinian population in Gaza. This version of the Gaza Traumatic Event Checklist was updated after the most recent war on Gaza in 2012. The checklist consisting of 18 items covering three domains of events typical for the war on Gaza: (1) Witnessing acts of violence, e.g., killing of relatives, home demolition, bombardment, and injuries; (2) Having experiences of loss, injury and destruction in family and other close persons; and (3) Being the target of violence, e.g., being shot, injured, or beaten by the soldiers. Respondents were asked whether they had been exposed to each of these events: (0) no (1) yes. The internal consistency of the scale was calculated using Chronbach's alpha ( $\alpha = .64$ ).

### *Adolescents Dissociative Experiences Scale (A-DES)<sup>6</sup>*

The A-DES is a 30-item self-report questionnaire that measures the presence and frequency of normal and pathological dissociative experiences in adolescents (12–18 years old). For each item, participants are asked to indicate how often each experience happens to them on an 11-point Likert scale ranging from 0 (never) to 10 (always). The A-DES is scored by dividing the participant's total score by 30 to give a mean score ranging from 0 to 10. Higher mean scores on the A-DES are indicative of higher levels of psychoform dissociation. The scale was translated to Arabic and back translated and reviewed by the relevant experts for validity of the items and feedback was considered with minor changes. For the present study the adolescents indicated how much each experience happens to them on a 1 to 5 scale ("never" to "always"). Internal consistency was validity using Chronbach's alpha ( $\alpha = 0.91$ ).

### *Resilience Scale for Adolescents<sup>22, 23, 24</sup>*

The scale is a 28-item self-report scale using a 5-point Likert scale, with all items positively phrased. Items are rated on a five-point scale from 1=does not describe me at all to 5=describes me a lot. The three subscales are: Individual resources (11) such as personal skills, social skills, and peer support; physical and psychological caregiving by primary caregivers (7 items); and contextual resources that facilitate a sense of belonging (10 items) including spiritual, cultural and educational resources. Higher scores reflect a higher degree of resilience. The scale was translated to Arabic and back translated and reviewed by relevant experts for validity of the items and feedback was considered with minor changes. Internal consistency was validated using Chronbach's alpha ( $\alpha = 0.93$ ).

### **Statistical analysis**

SPSS Version 20.0 for Windows was used for assumption testing, transformations, and statistical analyses (Pearson correlations, t tests, and analyses of

variance). Frequency tables that showed sample characteristics were done. Moreover, independent T test was conducted to find differences between two groups. One way ANOVA using the Schaffer Test was conducted to compare means of more than two groups. For association between different variables, Pearson correlation test was conducted. Linear Logistic regression was conducted to find the prediction of dissociative symptoms and resilience by each traumatic event.

## Result

The study consisted of 400 adolescents (179 boys which represented 44.8%) and 221 girls representing 55.2%) aged ranged from 15-18 years ( $M = 16.7$ ,  $SD = 0.85$ ). Regarding place of residence, 72 of adolescents lived in North of Gaza (18 %), 138 in Gaza city (34.5 %), 64 in middle area (16%), 77 in Khan Younis (19.2 %) and 49 in Rafah (12.2 %). Regarding number of siblings, 54 had three or fewer (13.5%), 167 had 4-6 siblings (41.8%) and 179 had seven or more (44.8%). Regarding monthly family income, 146 had less than \$250 US (36.5%), 90 had from \$250 to \$500 US (22.5%), 75 had from \$501 to \$750 US (18.8%), and 89 had more than \$751 US (22.3%). Eleven fathers were not educated (2.8%), 30 were educated to the elementary level (7.5%), 49 were educated to preparatory level (12.3%), 99 were educated to secondary level (24.8%), 77 educated to diploma level (19.3%), 105 educated to university level (26.3%), and 29 finished post graduate education (7.3%). Regarding mothers' education, 10 mothers were not educated (2.5%), 19 educated to the elementary level (4%), 53 educated to preparatory level (13.3%), 158 educated to secondary level (39.5%), 73 educated to diploma level (18.3%), 75 educated to university (18.3%) level, and 15 finished post graduate education (3.8%). Sixty seven fathers were civil workers (16.8%),<sup>37</sup> 30 were skilled workers (9.3%), 105 were civil employers working and getting salary (26.3%), 44 were civil employers not working and getting salary (11%), 50

were merchants (12.5%), 5 were fishermen (1.3%), 2 were farmers (5%), 65 were unemployed (16.3%) , and 25 had other jobs (6.3%). Regarding mothers, 353 were house wives (88.3%), 12 were workers (3%), 32 were employer working and getting salary (8%), 1 was employer with salary, but did not at work (0.3%), 2 were merchants (0.5%).

### *Frequency and severity of trauma due to 8 days war on Gaza*

The most common traumatic events were: hearing shelling of the area by artillery (96.3%), watching Palestinian mutilated bodies on TV (95.3%), witnessing the signs of shelling on the ground (95%), hearing the sonic sounds of the jetfighters (93.25%), and hearing the loud voice of pilotless plans (92%). The average experience demonstrated that every adolescent was subjected to nine traumatic events ( $SD= 2.46$ ). Results showed that mean traumatic experiences of boys was 9.2 vs. 9.54 for girls. No statistically significant differences in traumatic experiences due to war on Gaza according to gender, family income, number of siblings, and parent's education and work.

### *Level of traumatic events*

In order to find the level of traumatic events, we recoded trauma as mild (less than 4 events), moderate (5-10 events), and severe (more than 11 trauma). Out of the total sample, 8 reported mild (2%), 258 reported moderate (64.5%) and 134 reported severe traumatic experiences (33.5%).

### *Frequencies of dissociative experiences symptoms*

The current sample experienced many dissociative symptoms. The highest was "when being in an unwanted place I can escape through my thoughts" (33.25 %), and I feel like, there are many people inside me (20.50 %). Whereas, the lowest item was "I forget doing my homework when teachers ask me to do" (2.75%), "I get involved in playing with my toys, like cars, animals and

dolls as if they were alive” (3.0 %). Dissociative symptoms ranged from 1 to 4.4 with mean 2.49 (*SD* = .61).

**Sociodemographic variables and dissociative symptoms**

In order to find the differences in dissociative symptoms according to sociodemographic variables, independent t test was conducted if the variables were two and less

while One Way ANOVA was conducted for more than two variables.

The results showed that mean dissociative symptoms in girls was 75.67 (*SD* = 18.25) vs. 73.65 (*SD*= 18.49) in boys. No statistically significant differences in dissociative symptoms according to gender, age, place of residence, parent's jobs and education.

**Table 1:** Sociodemographic characteristics of the study population (N = 400)

	No.	%
<b>Gender</b>		
Male	179	44.8
Female	221	55.2
<b>Mean age= 16.7 y, SD = 0.85</b>		
<b>Place of residence</b>		
North of Gaza	72	18
Gaza	138	34.5
Middle area	64	16
Khan Younis	77	19.3
Rafah	49	12.3
<b>Sibling number</b>		
3 or fewer	54	13.5
4-6 siblings	167	41.8
7 or mores siblings	179	44.8
<b>Family monthly income</b>		
Less than \$250 US	146	36.5
\$251- \$500 US	90	22.5
\$501 - \$750 US	75	18.8
More than \$751 US	89	22.3
<b>Father education</b>		
Not educated	11	2.8
Elementary	30	7.5
Preparatory	49	12.3
Secondary	99	24.8
Diploma	77	19.3
University	105	26.3
Post graduate	29	7.3
<b>Mother education</b>		
Not educated	10	2.5
Elementary	16	4.0
Preparatory	53	13.3
Secondary	158	39.5
Diploma	73	18.3
University	75	18.8
Post graduate	15	3.8
<b>Father work</b>		
Unemployed	65	16.3
Simple worker	67	16.8
Skilled worker	37	9.3
Civil employer working and getting salary	105	26.3

Civil employer not working and getting salary	44	11.0
Merchant	50	12.5
Other	32	8.1
<b>Mother work</b>		
House wife	353	88.3
Simple worker	12	3.0
Civil employer working and getting salary	32	8.0
Civil employer not working and getting salary	1	0.3
Merchant	2	0.5

**Frequency of resilience items**

The most common resilience items were: "Completion of my education is important to me" and "I am proud of my citizenship" (96.25%), "Faith in God and being religious are the source of my strength" (95%).

Mean resilience was 112.18 (SD= 13.03), for individual resources, such as personal skills, social skills, and peer

support, the mean was 44.06 (SD= 5.57), physical and psychological caregiving by primary caregivers mean was 27.42 (SD = 5.1), and contextual resources including spiritual, cultural and educational resources mean was 37.42 (SD= 4.76).

**Table 2:** Frequencies of traumatic experiences after the 8 days war on Gaza Strip

	Yes		No	
	No.	%	No.	%
Hearing shelling of the area by artillery	385	96.3	15	3.8
Watching mutilated bodies on TV	381	95.3	19	4.8
Witnessing firing by tanks and heavy artillery at own home	380	95.0	20	5.0
Hearing the loud voice of robot plans	374	93.5	26	6.5
Hearing the sonic sounds of the jetfighters	368	92.0	32	8.0
Hearing about the killing of a friend	264	66.0	136	34.0
Witnessing assassination of people by rockets	233	58.3	167	41.8
Receiving threatening letters by the Israeli army through local television or radio	183	45.8	217	54.3
Unable to leave your home with family members due to fears of shelling in the street	179	44.8	221	55.3
Forced to leave your home with family members due to shelling	173	43.3	227	56.8
Physical injury due to bombardment of your home	163	40.8	237	59.3
Receiving pamphlets from airplanes to leave your home at the border and to move to the city centers	157	39.3	243	60.8
Threatened by telephone to evacuate your home before bombardment	90	22.5	310	77.5
Hearing about the killing of a close relative	49	12.3	351	87.8
Witnessing injury of a brother or a sister due to shelling	44	11.0	356	89.0
Witnessing injury of father or mother due to shelling	43	10.8	357	89.3
Witnessing firing by tanks and heavy artillery at neighbors' homes	43	10.8	357	89.3
Witnessing injury of a neighbor or a friend due to shelling	40	10.0	360	90.0

In order to find the differences in resilience factors according to sociodemographic variables, independent t test was conducted if the variables were two and less,

**Sociodemographic variables and resilience**

while One Way ANOVA was conducted if the variables were more than two.

The results showed no statistically significant differences in the total resilience and subscales according to the

socio-demographic factors of gender, age, type of residence and parents work whereas resilience was higher in adolescents with fewer siblings.

**Table 3:** Resilience in children

	Number items	Mean	SD
<b>Resilience</b>	28	112.18	13.03
<b>Individual resources</b>	11	44.07	5.57
<b>Physical and psychological caregiving</b>	7	27.43	5.11
<b>Contextual resources</b>	10	37.24	4.76

***Relationships between traumatic experiences, dissociative symptoms and resilience***

Pearson correlation coefficients test was conducted to find relationships between traumatic events, dissociative symptoms and resilience. There was a statistically significant negative relationship between dissociative symptoms and total resilience ( $r = -0.26, p = 0.001$ ),

individual resources ( $r = -0.18, p = 0.001$ ), physical and psychological caregiving ( $r = -0.27, p = 0.01$ ), and contextual resources ( $r = -0.13, p = 0.001$ ). There was a statistically significant positive relationship between traumatic events and total trauma and total resilience ( $r = 0.23, p = 0.001$ ), individual resources ( $r = 0.14, p = 0.01$ ) and contextual resources ( $r = 0.10, p = 0.01$ ).

**Table 4:** Pearsons correlation factor between trauma, dissociative symptoms and resilience

	Total trauma	Total dissociative symptoms
1. Total trauma	1	
2. Total dissociative symptoms	.23 **	1
3. Resilience	.10 *	-.26 **
4. Individual resources	.14 *	-.18**
5. Physical and psychological caregiving	.01	-.27 **
6. Contextual resources	0.10*	-.13 **

\* $P < 0.05$ , \*\* $P < 0.01$

***Prediction of dissociative symptoms by types of traumatic events***

In a multivariate regression model, each traumatic event was entered as an independent variable, with total dissociative scores as the dependent variable. Six traumatic events were significantly predicted dissociative symptoms: witnessing firing by tanks and heavy artillery at neighbors' homes: ( $B = 0.17, p = 0.001$ ); witnessing assassination of people by rockets: ( $B = 0.13, p = 0.01$ ); hearing about the killing of a close relative ( $B = 0.11, p = 0.03$ ); forced to leave you home with family members due to shelling ( $B = 0.10, p = 0.04$ ); watching mutilated bodies on TV: ( $B = 0.10, p = 0.006$ ) and shot by bullets, rockets, or bombs, and unable to leave you home with

family members due to fears of shelling in the street ( $B = 0.10, p = 0.04$ ). ( $R^2 = 0.10, SE = 17.52$ )

***Prediction of resilience by types of traumatic events***

In a multivariate regression with each traumatic event entered as an independent variable, and total resilience scores as the dependent variable, two traumatic events were significantly associated with total resilience: hearing shelling of the area by artillery ( $B = 0.23, p = 0.001$ ); witnessing shooting of sister or brother ( $B = 0.14, p = 0.01$ ) ( $R^2 = 0.05, SE = 12.6$ ).

**Discussion**

The study found that the highest traumatic event was hearing shelling of the area by artillery, watching mutilated bodies on TV, witnessing the signs of shelling on the ground; whereas; the least traumatic events were physical injury due to bombardment of your home and then witnessing shooting of a close relative. Our study showed mean traumatic experiences due to war on adolescents was nine events. This was higher than previous studies of war on 2008-2009<sup>2, 3, 4</sup>. Our study showed no significant differences according to adolescent gender which was inconsistent with most studies in the area which showed that boys were traumatized than girls<sup>4, 21, 2, 3</sup>. Also, in other studies boys were more traumatized than girls<sup>25</sup>. Such findings in the present study could be due to cultural factors in which boys move more freely outside the home and are more exposed to all manner of violence and trauma while girls are kept safe at home and not allowed to join boys in their activities outside the homes.

The present study showed that mean dissociation symptoms was 2.6. Results were consistent with previous research on adolescent psychoform dissociation from non-clinical populations, which had reported A-DES scores ranging from 1.27 and 2.66<sup>26, 27, 28</sup>. The present study showed no significant differences in dissociative symptoms according to gender. This finding was inconsistent with studies which reported that girls had higher level of peritraumatic dissociative symptoms more than boys<sup>29,30</sup>. Findings in the current study showed that there were statistically significant differences in dissociative symptoms in adolescents whose fathers had been educated to the primary level. There were differences in prevalence of dissociative symptoms according to family size in favor of adolescents with 8 or more siblings. Our findings were consistent with the study of 71 adolescents (12–18 years old) attending Australian community mental health and counseling services. The mean A-DES score was 3.37 (SD=2.12) and there were no differences in psychoform dissociative experiences by gender<sup>32</sup>. The study showed there were

positive relationships between traumatic experiences and dissociative symptoms among adolescents<sup>33</sup>. This was consistent with studies that demonstrated a significant positive relationship between the existence of dissociative symptoms and traumatic events<sup>13, 32</sup>. While others demonstrated that childhood trauma has been associated with increased risk for both panic disorder and dissociative symptoms in adulthood<sup>11</sup>. In another study among adolescents' psychiatric patients, results showed an increase in the degree of dissociative symptoms in patients with a history of sexual abuse, physical abuse, neglect and stressful life events<sup>12</sup>. Researchers found that exposure to any type of maltreatment was associated with greater dissociation and posttraumatic symptomatology in preschool-age children with documented sexual abuse displayed high levels of posttraumatic symptoms, whereas children with documented physical abuse tended to use dissociation as a primary coping mechanism<sup>34</sup>.

Mean resilience was 112.18, personal competence was 27.14, social competence was 16.92, structured style was 7.61, family cohesion was 19.82, and social resources mean was 40.69. The results showed no statistically significance differences in the total resilience and subscales according to the socio-demographic factors as gender, age, type of residence and parents work, whereas, resilience was higher in adolescents with fewer siblings.

This study showed there was a positive relationship between traumatic events and total resilience, personal and social competence. Such findings suggest that experiencing traumatic events can lead to more effort in adolescents to have more personal and social competence. There is enough evidence to assert that processes associated with resilience protect against the traumatic effects associated with acute and chronic stressors, but the mechanisms are complex and contextually and culturally dependent. There is evidence that aspects of positive psychological functioning like social bonding, a capacity for empathy, and a sense of

coherence can co-occur with trauma-related symptoms typically associated with posttraumatic stress disorder<sup>35,36</sup>. Similarly, others postulated that resilience occurs when there is significant exposure to adversity, such that protective processes interact with the stressors a child experiences. In these contexts of stress, resilience is the capacity of children to navigate to the psychological, social, cultural, and physical resources that help them nurture and sustain well-being, and their capacity on their own and with others to negotiate for what they need to be provided in culturally meaningful ways<sup>37</sup>. Our findings were consistent with our previous study after the 2008-2009 war which showed that resilience was positively increased by exposure to traumatic events due to war<sup>38</sup>.

### **Clinical implications**

The present study showed that Palestinian adolescents had been victims of continuous trauma which increased risk of psychopathology such as dissociative symptoms. Such symptoms had a negative impact on adolescent resilience when faced with adversity. Such reactions require psychosocial interventions based on a public health and developmental process, which usually include engaging children in community-based recreational and cultural activities in the war-affected populations. Art and games that form part of these interventions have been found useful for healing psychological wounds. Therapeutic activities, such as role-play and drama, puppet shows, and so forth, increase children's sense of control and self-protection and can be utilized to teach the skills that may protect them against abuse. It is imperative that the role of parents is enhanced through parental education and awareness-raising regarding the impact of displacement on family, and especially children's development. Specific parental skills can be developed to increase the child's sense of security and decreased sense of vulnerability and uncertainty.

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## ملخص

**الهدف:** هدفت هذه الدراسة إلى معرفة تأثير الخبرات النفسية الصادمة الناتجة عن حرب الايام الثمانية على الاعراض الانشقاقية وعلاقتها بالصمود النفسي لدى المراهقين الفلسطينيين في قطاع غزة. **الطريقة:** تم اختيار عينة عشوائية من 400 طالب وطالبة من 10 مدارس منتشرة في خمس مناطق من قطاع غزة. حيث بلغ عدد الاولاد 179 ولداً و عدد البنات 221 بنتاً. أجريت معهم مقابلات و باستخدام استبيانات تحتمل على الحالة الاقتصادية و الديموغرافية ، و مقياس الخبرات الصادمة الناتجة عن حرب الايام الثمانية على قطاع غزة سنة 2012، مقياس الاعراض الانشقاقية، و مقياس الصمود النفسي. **النتيجة:** أظهرت الدراسة أن متوسط الخبرات الصادمة التي تعرض لها كل مراهق 9 خبرات صادمة. و لا توجد فروق ذات دلالة إحصائية في عدد الخبرات الصادمة بسبب الحرب على غزة حسب الجنس و كذلك لم تكن هناك فروق حسب عدد الأخوة، و دخل الأسرة، و تعليم و عمل الوالدين. أظهرت النتائج من متوسط الاعراض الانشقاقية لدى الفتيات كان 75.67 مقابل 73.65 في الأولاد. لا توجد فروق ذات دلالة إحصائية في الاعراض الانشقاقية و باقي العوامل الديموغرافية مثل الجنس، و العمر، و مكان الإقامة، و عدد الأخوة، و دخل الأسرة، و تعليم و عمل الوالدين .

كان متوسط الصمود النفسي في المراهقين 112.18، و متوسط الموارد الفردية 44.06، و متوسط العناية الجسدية، و النفسية من الأهل كان 27.42، و متوسط المصادر المجتمعية (الدينية، و الثقافية، و التعليمية) كان 37.42. لا توجد فروق ذات دلالة إحصائية في الصمود النفسي و باقي العوامل الديموغرافية مثل عدد الأخوة، و دخل الأسرة، و تعليم و عمل الوالدين. بينما كان هناك صمود نفسي أكثر لدى المراهقين الذين لديهم أخوة أقل من 4 أخوة. أظهرت النتائج أن هناك علاقة سلبية ذات دلالة إحصائية بين الاعراض الانشقاقية و الصمود النفسي، و الموارد الفردية، و العناية الجسدية و النفسية من الأهل ، و المصادر المجتمعية (الدينية، و الثقافية، و التعليمية). بينما كانت هناك علاقة إيجابية ذات دلالة إحصائية بين الخبرات الصادمة الناتجة عن حرب الايام الثمانية على قطاع غزة و الصمود النفسي الكلي، و الموارد الفردية، و المصادر المجتمعية. **التطبيقات العملية:** أظهرت هذه الدراسة أن المراهقين الفلسطينيين كانوا ضحايا الصدمات النفسية المستمرة التي زادت مخاطر التعرض للأصابة بالأمراض النفسية مثل الاعراض الانشقاقية . كان لمثل هذه الاعراض التأثير السلبي على الصمود النفسي لدى المراهقين في مواجهة المحن اليومية. مثل هذه الاعراض تحتاج للتدخلات النفسية و الاجتماعية على أسس تنموية و صحية، و عادة ما تشمل إشراك الأطفال في الأنشطة المجتمعية الترفيهية و الثقافية مثل الفن و الألعاب، و وجد بأنها مفيدة للشفاء من تأثيرات الصدمات النفسية.

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## Prevalence of Attention Deficit Hyperactivity Disorder and Conduct Disorder among a School-based Sample of Palestinian Children in the Gaza Strip

Ikram Elumour and Abdelaziz Thabet

مدى انتشار اضطرابات تشتت الانتباه و فرط الحركة، والمسلك في عينة من طلاب المدارس الفلسطينيين في قطاع غزة

إكرام العمور ، عبد العزيز ثابت

### Abstract

**Aim:** The present study investigated prevalence of attention deficit hyperactivity disorder (ADHD) and conduct disorders among Palestinian children in the south Gaza Strip. **Methods:** Three hundred and eighty eight participants (194 boys, 194 girls), aged 12 to 15 years ( $M=13.5$  years), were selected from eight governmental and United Nations Relief and Works Agency (UNRWA) preparatory schools. A self-report questionnaire, including socio-demographic scale, was completed. Teachers and parents completed the Structured Clinical Interview for DSM-IV diagnosis of ADHD while parents and their children completed a conduct disorder scale. **Results:** Parents reported 4.4% of children fulfilled the full criteria of ADHD combined type. According to teachers, 9.8% fulfilled the full criteria of ADHD combined type. ADHD combined type symptoms were higher in boys than girls. Children in governmental schools had more ADHD combined type than in UNRWA schools according to teachers who also rated children living in families with low family monthly income as having more ADHD. Parents reported 15.7% of children had conduct disorder while 17.5% of children self-reported the condition. Boys self-reported had higher levels of conduct disorder than girls, which supported parent ratings. Regarding comorbidity, 6.7% of children rated by parents had inattentive disorder and conduct; 5.2% of children had both conduct and hyperactivity-impulsivity disorder; and, 3.4% had both combined ADHD and conduct disorder. **Conclusion:** Findings confirmed a strong relationship between ADHD and conduct disorder and provided specific data on the prevalence in Palestinian children in the Gaza Strip. Such findings highlight the need to establish psychosocial rehabilitation programs in schools and community-based centers so children and their families can learn to overcome the adverse impact of such disorders on psychosocial development and academic achievement. Psychoeducation for parents and teachers should focus on early detection of behavioral problems and of alternatives approaches such as behavior modification to deal with such problems.

**Key words:** ADHD, Children, Conduct disorder, south Gaza Strip

**Declaration of interest:** None

### Introduction

Children and adolescents face a variety of life challenges, which may place them at risk of developing emotional and behavioral problems. In some cases, behavioral or emotional problems may be triggered by the stress or difficulties in schools or they may be a contributing factor to poor achievement in school or to learning difficulties<sup>1</sup>. Attention deficit hyperactivity disorder (ADHD) is one of the most investigated and

controversial disorders in children. ADHD is characterized by pervasive and impairing symptoms of inattention, hyperactivity, and impulsivity according to the Diagnostic and Statistical Manual of Mental Disorders<sup>2,3</sup>.

Generally, the prevalence of ADHD has been reported as ranging from 2.2% to 17.8%, with higher rates in boy

than girls and younger children having higher rates than older children and adolescents<sup>4</sup>.

The Arab world has only recently begun to conduct ADHD prevalence studies on children and adolescents.

A study of 1,350 primary schoolchildren aged 8 to 13 years, conducted in Egypt, used the Conners' Rating Scale completed by teachers and parents (no cutoff reported). Results revealed prevalence rates for ADHD symptoms averaged 7.48% (11.67% for boys and 3.58% for girls)<sup>5</sup>. A cross-sectional study in Qatar of 1,541 primary schoolchildren aged 6 to 12 years<sup>6</sup> demonstrated that 14.1% of boys and 4.4% of girls scored more than the cutoff for ADHD symptoms, giving an overall prevalence of 9.4% for ADHD in the school setting. A further two cross-sectional studies were conducted in the Sultanate of Oman: one with elementary school girls aged 6 to 13 years (n= 708)<sup>7</sup> and another with elementary school boys aged 6 to 14 years (n= 1,502)<sup>8</sup>. Both studies yielded a prevalence of ADHD symptoms among Omani schoolgirls and schoolboys of 5.1% and 7.8%, respectively. In another study of 1,502 Omani schoolboys screened for ADHD, 7.8 % exhibited hyperactivity, which was strongly associated with indices of conduct disorder, poor school performance, and behavioral disorders, such as aggression, stealing, and lying<sup>9</sup>.

Several studies in the Palestinian territories assessed ADHD prevalence rates. A random sample of 200 children, aged between 6 – 15 years, from 15 United Nations Refugee and Work Agencies (UNRWA) schools in Gaza and 150 children from eight schools in Bethlehem and East Jerusalem (West Bank) were selected. According to parents, 8.4% of children from Gaza fulfilled the full criteria for ADHD combined type compared with 2.7% from the West Bank. According to teachers, 5.2% of children from Gaza fulfilled the full criteria for combined ADHD type compared with 3.3% of children from West Bank<sup>10</sup>. A recent review of all ADHD epidemiological studies conducted in the Arab

world found rates ranging from 5.1% to 14.9% in the school setting among Arab students<sup>11</sup>.

A study of 410 children, aged 6 to 17 years, showed 31.3% met the criteria for inattentive type, 36.3% were impulsive, and 29% met criteria for combined type, according to parent reports. Child self-reports showed 28.8% met the criteria for inattentive type, 37.3% were impulsive, and 28.3 % met criteria for combined type<sup>12</sup>.

A study in Lebanon of 1,000 children, aged between 6 and 10 years, found prevalence of ADHD Inattentive subtype of approximately 0.3%, Hyperactive-Impulsive subtype of 1.2%, and ADHD Combined subtype of 1.7%. ADHD was significantly more prevalent in boys (4.5%) than in girls (1.8%)<sup>13</sup>.

Conduct disorder involves a repetitive, persistent pattern of antisocial behavior in which the basic rights of others or major age-appropriate societal norms or rules are violated<sup>2</sup>. As in the DSM-IV-TR (APA 2000)<sup>2</sup>, in the DSM-5<sup>3</sup>, conduct disorder will be defined on the basis of the presence of three of 15 criteria, present in the last 12 months, of which one must have been present in the past six months. These 15 behavioral criteria can be categorized into four generalized behavioral subtypes: (1) aggression towards people and animals, (2) destruction of property, (3) deceitfulness or theft and (4) serious violations of rules<sup>3</sup>. With respect to comorbidity, ADHD is a complex and heterogeneous disease. ADHD is frequently accompanied by oppositional defiant (ODD) and conduct disorder (CD). About 50% of children with ADHD also show ODD or CD<sup>14</sup>.

The most recent Global Burden of Disease Study (GBD 2010) included attention-deficit/hyperactivity disorder (ADHD) and conduct disorder (CD) for burden quantification. The epidemiological profiles of ADHD and CD across three time periods for 21 world regions showed that male prevalence of CD in 2010 was 3.6% (3.3–4.0) while female prevalence was 1.5% (1.4–1.7)<sup>15</sup>.

The aim of the present study was to assess the prevalence of attention deficit hyperactivity and conduct disorders among Palestinian children in in south of Gaza Strip.

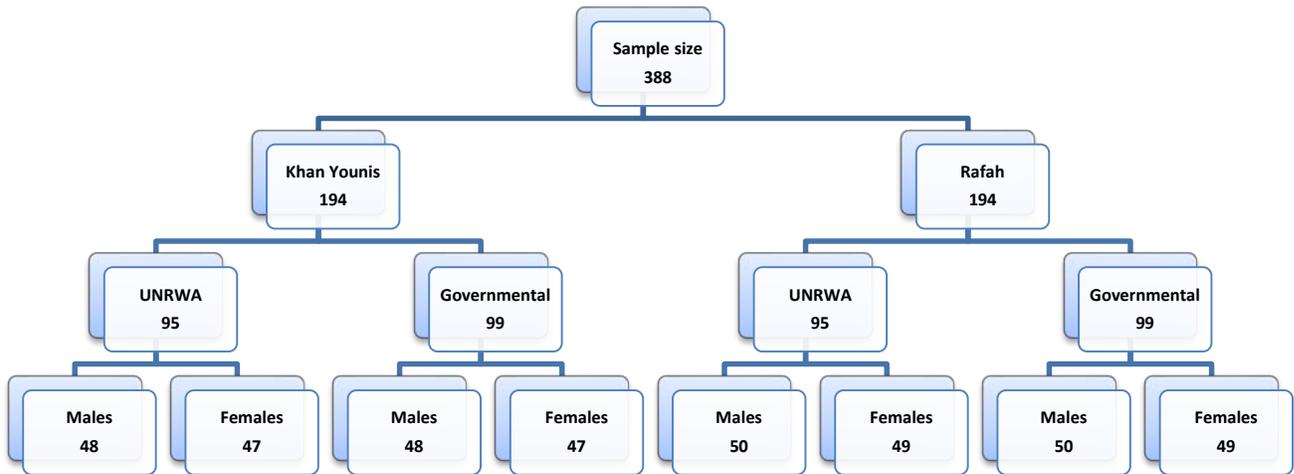
## Methodology

### Subjects

A random cluster sampling was used to select 388 children aged between 12 to 15 years, admitted in

governmental and UNRWA schools in two districts south of Gaza Strip (Khan Younis and Rafah area) by random draw. In each district, four schools (two boys and girls schools) were selected by random draw and three classrooms within each school were randomly selected. From each class, 16 children were selected randomly from the class registration book.

**Diagram "1" Sampling process**



## Instruments

### Sociodemographic questionnaire

A parent questionnaire was devised specifically for the present study in order to obtain information about the participants, including gender, age, number of siblings, birth order, health problems, area of residence, family income, maternal age, maternal education, and maternal occupation.

### ADHD-Rating Scale–IV 2 Arabic version – Parents and Teachers forms<sup>10</sup>

ADHD-RS-IV is a questionnaire originally based on DSM-IV criteria and frequently used in epidemiological studies. It contains questions that correspond to nine symptoms of inattention and nine symptoms of hyperactivity/impulsivity in the DSM-IV. The ADHD-RS-IV was designed for parents or teachers to rate the

frequency of a child’s symptoms on a scale of 0 to 3 with 0 = never or rarely, 1 = sometimes, 2 = often, 3 = very often. Children scoring six and above in inattentive nine items are considered inattentive; children reporting 6 or more in hyperactivity-impulsive 9 items are considered hyperactive-impulsive. Children were classified as ADHD Combined subtype if they met the criteria for inattention and hyperactivity, e.g. six or more in both, on both versions. The Arabic version of this scale was before in the same area for parents scale, the internal consistency of the scale, calculated using Cronbach’s Alpha was (0.84); the split half reliability of the scale was (0.79). While, for teachers, internal consistency of the scale, calculated using Cronbach’s Alpha was (0.87); the split half reliability of the scale was (0.84).

*Conduct Disorder Rating Scale (CDRS) for parents and self<sup>2,3</sup>*

The CDRS items consist of symptoms of CD and are evaluated using Likert-type scales that range from 0 (never) to 4 (daily). Separate versions of the CDRS were used for parents and self. The parent and self-versions lists all 15 symptoms of CD described in the DSM-IV. Children scoring three or more symptoms are considered to have conduct disorder. The Arabic version of the scale was translated and back translated and sent to the relevant experts for validity. All items were agreed without amendment; only the item "Has forced someone into sexual activity" was omitted. In the present study for parents scale, internal consistency of the scale, calculated using Cronbach's Alpha was high (0.70); the split half reliability of the scale was (0.73). While, for children, internal consistency of the scale, calculated using Cronbach's Alpha was (0.71); the split half reliability of the scale was (0.68).

***Study procedure***

An approval letter allowing the researchers to conduct the present study was obtained from an ethics committee within the Ministry of Health. The researchers trained a team of four mental health professionals to help in data collection. Data collection was carried out by four trained psychologists and social workers under the supervision of the second author. They were trained for six hours in data collection and interviewing techniques. The purpose of the study was explained after which school headmasters were invited to select randomly from the registration book the number of children already prepared in a list for sampling. Children and teachers completed self-administered questionnaires at schools with assistance from the researchers. Following written parent consent, children were invited to participate in the

present study. Questionnaire were completed at home and returned to school the next day. Completion of self-report measures took at least 20 minutes for each child. Sociodemographic information was collected from the children and their parents. Of the total children of 416 who were contacted, 388 agreed to participate in the study, following informed consent from their parents, with a response rate of 93%.

***Data analysis***

Data was entered using the statistical Package for Social Sciences (SPSS) version 18. Descriptive statistics including frequencies for socio-demographic variables, including gender, age, place of residence. Independent T test was used to find differences in ADHD or CD and two groups such as gender. One way ANOVA test was used to evaluate the statistical differences between the mean of total scores of ADHD or CD and its subscales according to more than two independent variables, such as type of residence, number of siblings, family income, parent education and work status. Pearson correlation test was used to demonstrate the relationship between ADHD and conduct disorder.

**Results**

***Socio-demographic results of the study sample***

As shown in Table 1, the total number of children selected for the current study was 388 children. The total numbers of boys was 194 (50.0%); and 194 were girls (50.0%). The age ranged from 12 - 15 years ( $M = 13.72$ ,  $SD = 0.90$ ). According to school, 198 participants were enrolled in governmental schools (51.0%) with 190 enrolled in UNRWA schools (49.0%).

**Table 1:** Sociodemographic characteristics of the sample (N= 388)

Variable	N	%
<b>1. Gender</b>		
Males	194	50
Females	194	50
<b>2. Type of school</b>		
Governmental schools	198	51
UNRWA schools	190	49
<b>3. Class</b>		
7th Class	127	32.7
8th Class	129	33.2
9th Class	132	34
<b>4. Type of residence</b>		
City	104	26.8
Camp	250	64.4
Village	34	8.8
<b>5. Number of siblings</b>		
4 or fewer	29	7.5
5-7 siblings	141	36.3
8 and above	218	56.2
<b>6. Family monthly income</b>		
600 and less NIS	196	50.5
601-1000 NIS	51	13.1
1001-1500 NIS	59	15.2
1501 NIS and above	82	21.1
<b>7. Paternal education</b>		
Less than secondary school	224	62.9
Diploma	47	12.1
University	75	19.3
Postgraduate	22	5.7
<b>8. Maternal education</b>		
Not educated	315	81.2
Diploma	38	9.8
University	33	8.5
<b>9. Father's work</b>		
Unemployed	185	47.7
Employee	116	29.9
Worker	53	13.7
Skilled worker	14	3.6
Others	20	5.2
<b>10. Mother's work</b>		
House wife	344	88.7
Civil employee	44	11.3

**Prevalence of ADHD according to parents and teachers**

As shown in Table 2, 66 participants were rated by parents as inattentive (17.0%), 32 were hyperactive-impulsive (8.2%), and 17 were combined type (4.4%). While, 109 participants were inattentive (28.1%) by

teachers, 71 were hyperactive-impulsive (18.3%), and 38 were combined type (9.8%). Chi square test showed that teachers significantly rated children in all ADHD scales more than parents ( $\chi^2 = 6.7$ ,  $df = 1$ ,  $p = 0.01$ ).

**Table 2:** Prevalence of ADHD according to parents and teachers

Variable	Parents report		Teachers report	
	N	%	N	%
Inattentive	66	17.0	109	28.1
Hyperactive-impulsive	32	8.2	71	18.3
ADHD combined	17	4.4	38	9.8

$\chi^2 = 6.7, df = 1, p = 0.01$

**Differences in ADHD rated by parents, teachers, and other sociodemographic variables**

To differentiate differences in the means of ADHD, an independent t-test was used; gender of the children was the dependent variable and ADHD rated by parents and teachers as independent variables. There were statistically significant differences between boys and girls for inattention, boys had higher rates of inattention compared with girls ( $t=2.52, p=0.012$ ), boys were more

hyperactive-impulsive than girls ( $t=2.98, p=0.003$ ) and boys had higher combined ADHD rates than girls when rated by parents ( $t=3.53, p=0.001$ ). When rated by teachers, there were also statistically significant differences between boys and girls for inattention, boys were more inattentive than girls ( $t=2.71, p=0.007$ ), boys were more hyperactive-impulsive than girls ( $t=3.98, p=0.001$ ), and boys had were more combined ADHD than girls ( $t=3.24, p=0.001$ ).

**Table 3:** Independent t-test comparing ADHD and gender

Dependent variables	Gender	Mean	SD	t-test	P
Inattention by parents	Boys	3.67	3.25	3.06	0.002
	Girls	2.73	2.79		
Hyperactivity-Impulsivity by parents	Boys	2.71	2.17	3.53	0.001
	Girls	1.95	2.02		
Combined ADHD by parents	Boys	5.59	4.32	3.38	0.001
	Girls	4.19	3.83		
Inattention by teacher	Boys	4.75	3.62	2.71	0.007
	Girls	3.74	3.67		
Hyperactivity-Impulsivity by teacher	Boys	3.23	2.82	3.98	0.001
	Girls	2.14	2.55		
Combined ADHD by teacher	Boys	6.96	5.14	3.24	0.001
	Girls	5.29	5.04		

There were statistically significant differences in total ADHD depending upon schools; children enrolled in governmental schools had more combined ADHD than those enrolled in UNRWA schools when rated by teachers ( $t=2.07, p=0.113$ ) and not by parents. Children enrolled in governmental schools were rated higher for hyperactive-impulsive than children enrolled in UNRWA schools when rated by parents ( $t=2.08, p=0.038$ ) and by teachers ( $t=2.09, p=0.036$ ). Children enrolled in governmental schools were more hyperactive-impulsive

than in UNRWA schools when rated by teachers ( $t=2.07, p=0.039$ ) and not by parents.

One way ANOVA was used to estimate the differences between children’s ADHD and age. There was significant statistical difference in combined ADHD by patents according to the age of children. Post hoc test using Bonferroni statistical test indicated that children aged 13 years were significantly reported to have combined ADHD than at age of 14 and 15 years ( $F=5.17, p=0.006$ ).

One way ANOVA was used to estimate the differences between children's ADHD and family income. There were significant statistical differences in combined ADHD disorders as rated by teachers ( $F=4.25, p=0.006$ ), according to the family income. Bonferroni statistical test showed that children who had family income less than \$150 US had significantly more combined ADHD than children with family income more than \$351 US or more.

***Prevalence of conduct disorder***

Using DSM-IV criteria for diagnosing conduct disorder, 61 children rated by parents (15.7%) had conduct disorder and 68 rated by students themselves had conduct disorder (17.5%).

***Differences in conduct disorder rated by parents and children themselves with other sociodemographic variables***

There were statistically significant differences toward boys in conduct disorder both rated by parents ( $t=4.11, p=0.001$ ) and rated by children themselves ( $t=4.40, p=0.001$ ).

One way ANOVA was used to estimate the differences between children's conduct disorder and age (13, 14, 15 years). Post hoc test showed no significant statistical differences in reporting conduct disorder rated by parents and students according to age of children and family monthly income.

***Relationships between ADHD and CD among the study sample***

Pearson correlation test was conducted. There were positive significant relationships between total scores of conduct disorder rated by parents and inattention by parents ( $r = 0.43, p = 0.001$ ), hyperactivity impulsivity ( $r = 0.45, p = 0.001$ ), and combined ADHD by parents ( $r = 0.45, p = 0.001$ ).

**Table 4:** Correlations between ADHD and CD among the study sample by parents

	Conduct disorder by parents
Inattention by parents	0.43 **
Hyperactivity-Impulsivity by parents	0.45 **
Combined ADHD by parents	0.47 **

\* $p<0.05$ , \*\* $p<0.01$

***Co-morbidity of ADHD cases and conduct disorder among the study sample***

The study showed that 6.7% of children rated by parents were inattentive and had symptoms of conduct disorder, 5.2% of children had both conduct and hyperactivity impulsivity disorder, and 3.4% had both combined ADHD and conduct disorder.

**Discussion**

The aim of the present study was to explore the prevalence of ADHD and conduct disorder symptoms in

a school-base sample of Palestinian children. Findings showed that 4.4% of children were rated by parents as having combined ADHD while 9.8% were rated by teachers. The fact that teachers significantly rated children in all ADHD scales more than parents may be explained by the difference in observer context for teachers versus parents. In the present sample, all children attended schools with more demanding environment than homes, including more rules and structure in classes. In structured activities, attention problems, hyperactivity, and conduct problems may be concealed or more easily interpreted as merely abnormal

variations of school aged children inattentiveness, activity levels, or impulsive aggressiveness. Our results were consistent with study of schoolboys and girls in Oman<sup>7,8</sup>. Similarly, a study of school-aged Palestinian children in the Gaza Strip measuring mental health outcomes found the prevalence rate of ADHD symptoms was 10% for children ages 6 to 11 years (11.9% boys, 8.5% girls), and 11.8% among adolescents (16.7% boys and 7.3% girls)<sup>16</sup>. The overall prevalence rate in the West Bank and Gaza showed 8.4% of children from Gaza fulfilled the full criteria for ADHD combined type compared to 2.7% from the West Bank, according to parents. According to teacher reports, 5.2% from the Gaza children fulfilled the criteria of ADHD compared with 3.3% from the West Bank<sup>10</sup>. Results were consistent with other findings that demonstrated ADHD prevalence rates of 9.4%<sup>6</sup>. Findings from the present study were consistent with a review of all ADHD epidemiological studies conducted in the Arab world that yielded rates ranging from 5.1% to 14.9% in school settings<sup>11</sup>. In the United Kingdom, a study of 964 10 year olds attending mainstream schools found ADHD rates of 8%<sup>17</sup>.

The present study found statistically significant differences between boys and girls in total ADHD; boys had more ADHD symptoms than girls. This was consistent with findings which showed that ADHD symptoms were higher in boys (14.1%) than girls (4.4%)<sup>6</sup>. In Canadian study, ADHD prevalence rates were 10.1% in boys and 3.3% in girls aged 4–11 years<sup>18</sup>. Other findings suggest ADHD prevalence ranging from 2.2% to 17.8%, with boys having higher rates than girls and younger children having higher rates than older children and adolescents<sup>19</sup>. Results in all Arab studies reporting on gender differences showed ADHD prevalence to be higher in boys than girls with ratios varying from 2:1 to 3:1<sup>11</sup>. ADHD was significantly more prevalent in boys (4.5%) than girls (1.8%) in a study of 1,000 children aged between 6 and 10 years attending schools in Lebanon<sup>13</sup>.

Our study showed that children enrolled in governmental schools presented with more ADHD symptoms than in UNRWA schools as rated by teachers while parents reported no differences. This may be due to UNRWA schools reporting more strategies to manage such behavior and having clear instructions for teachers on how to handle behavioral problems when compared with governmental schools. There was significant statistical difference in ADHD rated by parents according to age, where 13 year olds had significantly higher ADHD levels than 15 year olds. This was consistent with findings that suggest hyperactivity-impulsivity symptoms decline as children become older<sup>20</sup>. Child developmental stages may explain this; for example, older children tend to be better able to stabilize their behavior within family environments than younger age children.

There were significant statistical differences in total ADHD disorders rated by teachers according to the family income. Children from families reporting income less than \$150 US had significantly higher ADHD levels than those with family incomes of \$351 US or above. Studies have shown that parents with low socioeconomic status (SES) may emphasize the need to teach their children survival skills rather than focus on encouraging quiet behaviors. Such an emphasis typically conflicts with those of most school systems; this difference in priorities may be why children of lower SES are labeled or referred first and more often<sup>21</sup>. Additionally, lower SES may be associated with other ADHD risk factors, such as poor prenatal care, severe marital discord, large family size, or foster care placement. Low status also may expose children to environmental or psychosocial stressors, thus, posing a risk factor for presentation of ADHD associated behaviors<sup>22</sup>. A study in Egypt revealed significant correlation between low SES and ADHD ( $p < .05$ ) whereby 18.9% of children with ADHD were from low income families and very low

socioeconomic classes compared with 5.7% from families with high socioeconomic class<sup>5</sup>.

#### *Prevalence of conduct disorder*

Using DSM-IV criteria for diagnosing conduct disorder, 15.7% of children were rated by parents as having conduct disorder compared with 17.5% of children who self-reported. There were statistically significant differences for boys rated as having conduct disorder by parents when compared with self-ratings. The current findings identified higher rates than other studies; for example, a study of 240 students identified conduct disorder in 4.58%; prevalence among boys being 6.81% and girls being 1.85%; the ratio of boys to girls being 4.5:1. Childhood onset was found in 73% and adolescent onset in 27%<sup>23</sup>. Such high levels of conduct disorder in Palestinian adolescents could be due to other risk factors, such as the current high rate of unemployment among parents due to continuous conflict and war in the area and siege of the Gaza Strip; living in overcrowded areas with high population density, which increase family stressors; repeated traumatic experiences; and, lack of intervention programs in early childhood to address behavioral problems. The current findings were consistent with a study on the prevalence of mental health problems among children and adolescents in Germany. A representative sub-sample of 2,863 families with children aged 7–17 from the National Health Interview and Examination Survey among Children and Adolescents showed that 15.5% were diagnosed as having conduct disorder<sup>24</sup>. In the current study, findings were inconsistent and higher than that of the 2004 Pelotas Birth Cohort study, which assessed 4,231 live births in Pelotas, Brazil. From that number, a total of 3,585 (84.7%) were assessed at age 6 years and found to have a higher prevalence of ADHD and hyperkinetic disorders, according to DSM-IV (2.6%) compared to ICD-10 (2.2%), with predominance of ADHD combined type (DSM-IV) and hyperkinetic disorder type (ICD-10). Oppositional defiant disorder (2%) was more prevalent

than conduct disorder (0.6%) according to both DSM-IV and ICD-10 criteria. There were statistically significant differences between boys and girls in CD; boys had more CD than girls, according to parent ratings and child self-reports<sup>25</sup>. Boys are more likely than girls to be diagnosed with CD; a common conception is that the prevalence of CD is approximately 6–16% of adolescent boys and 2–9% of adolescent girls<sup>18</sup>. The current study found no significant statistical differences in reporting conduct disorder rated by parents and students according to age of children and family monthly income.

#### *Comorbidity of ADHD and conduct disorder*

The current study showed that 6.7% of children rated by parents were inattentive and presented with conduct problems; 5.2% of children had both conduct and hyperactivity impulsivity disorder, and 3.4% had both combined ADHD and conduct disorder. Findings were consistent with a study in France of 1,012 children, ages 6–12 years<sup>26</sup>. The prevalence of conduct disorder was 7.1%, and the prevalence of oppositional defiant disorder was 3.1%. Children with ADHD had a significantly higher prevalence of conduct disorder compared to children without ADHD (18.2% vs. 6.7%). The same was true for oppositional defiant disorder (29.9% vs. 2.0%)<sup>26</sup>.

#### *Clinical implication and recommendations*

The current study applied an epidemiologic approach to the evaluation of the prevalence of coexisting ADHD and conduct disorder, which may be suitable for other pathologic conditions as well. Findings confirmed a strong relationship between ADHD and conduct disorder and provided specific data on the prevalence. The possibility that ADHD and conduct disorder may share an underlying genetic, biochemical, or even organic factor is intriguing and warrants further in-depth study. Results were also congruent with other studies in the region and in Western countries, which highlights the need to establish psychosocial rehabilitation programs with high adequacy that allows children to become more

integrated in society through counseling programs inside specialized institutions. It would also be important to provide significant focus on the role of family "fathers and mothers" in psychological intervention through awareness raising activities such as lectures, meeting and symposiums. Also, psychosocial counseling programs must reach low income families in a way that addresses the possibility of ADHD symptoms among their children. A further benefit would be for teachers to learn behavior modification for better classroom management that reflects the needs of children with ADHD. Difficulty completing tasks, following directions and rules, staying seated, raising their hand and waiting to be called on, getting along with peers and adults, and transitioning to the next activity by cleaning up and getting out required materials are skills that need to be taught and reinforced for children with ADHD.

### **Study limitations**

In light of several study limitations, the current findings should be interpreted with caution. The study population was restricted to south of the Gaza Strip and private schools were not included. Furthermore, data are not generalizable to the larger population of children in the Gaza Strip because the current study was restricted to students in schools rather than community. In addition, high school students were not included, which limits any conclusions about the relationship between the role of age on ADHD and conduct disorder.

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## المخلص

هدفت هذه الدراسة إلى معرفة مدى شيوع اضطراب تشتت الانتباه و فرط الحركة، واضطراب المسلك لدى الأطفال الفلسطينيين في جنوب قطاع غزة. لتحقيق هذا الهدف تم إختيار عينة طبقية عشوائية تم اختيارها من الصفوف الثلاث السابع والثامن والتاسع من ثمان مدارس إعدادية موزعة بالتساوي بين مدارس الوكالة والحكومة في محافظتي خان يونس ورفح. و بلغت عينة الدراسة 388 طفلاً من الجنسين منهم 194 من الأولاد بنسبة 50%، و 194 من البنات بنسبة 50 % . وقد أستخدمت مقاييس قائمة العوامل الديمغرافية والاقتصادية-الاجتماعية، و المقابلة الإكلينيكية لاضطراب تشتت الانتباه و فرط الحركة – نموذج الوالدين و المعلمين حسب معايير الدليل التشخيصي والإحصائي الرابع ، ومقياس اضطرابات المسلك نموذج الوالدين و الطفل حسب نفس المعيار. **النتائج:** توصلت الدراسة إلى أن نسبة انتشار اضطراب تشتت الانتباه و فرط الحركة المشترك هو 4.4 % بتقدير الأباء و9.8 % بتقدير المعلمين . وكشفت النتائج عن وجود فروق بين الجنسين في اضطرابات نقص الانتباه والحركة الزائدة وكانت الفروق لصالح الذكور بتقدير الأباء والمعلمين. وكانت الفروق دالة إحصائياً في نقص الانتباه والحركة الزائدة لصالح الطلبة الذين يدرسون في المدارس الحكومية بتقدير المعلمين . وكشفت النتائج عن وجود فروق دالة إحصائياً في اضطرابات نقص الانتباه والحركة الزائدة لدى أطفال العينة بتقديرات المعلمين تبعاً لمتغيرات: الدخل الشهري للأسرة لصالح من تقل دخول أسرهم عن 150 أمريكي شهرياً . في

## *Prevalence of Attention Deficit Hyperactivity Disorder and Conduct Disorder in the Gaza Strip*

حين تبين أن 15.7 % من الأطفال بتقدير الآباء و17.5 % بتقدير الأطفال أنفسهم، بأنهم حالات اضطراب المسلك. و وجدت الدراسة فروق بين الجنسين في اضطرابات المسلك بتقديرات الآباء والأطفال وكانت الفروق لصالح الذكور من الأطفال. أما بالنسبة لتراffic المراضة فقد بينت النتائج حسب تقديرات الآباء أن 6.7% من أفراد العينة ممن لديهم اضطراب نقص الانتباه و5.2% ممن لديهم الحركة الزائدة والانفعالية، و3.4% من مضطربي نقص الانتباه والحركة الزائدة لديهم تراffic مراضة مع اضطرابات المسلك. كما كشفت النتائج عن وجود علاقة موجبة دالة إحصائياً بين الدرجة الكلية لإضطرابات نقص الانتباه والحركة الزائدة وبين اضطرابات المسلك بتقدير الآباء. كما وجدت علاقة موجبة دالة إحصائياً بين الدرجة الكلية لاضطرابات المسلك وبين الدرجة الكلية لنقص الانتباه بتقديرات الآباء. **الخلاصة:** النتائج التي توصلت إليها الدراسة بينت وجود علاقة قوية بين اضطراب نقص الانتباه والحركة الزائدة واضطراب المسلك، وهذه الدراسة وفرت بيانات محددة عن مدى انتشار مثل هذه الاضطرابات في المجتمع الفلسطيني. أظهرت نتائج الدراسة أن معدل انتشار اضطراب نقص الانتباه وفرط النشاط واضطرابات المسلك عند الأطفال الفلسطينيين متطابقة مع دراسات أخرى في المنطقة وفي الدول الغربية مما يسلط الضوء على الحاجة لوضع برامج إعادة التأهيل النفسي التي تسمح للأطفال بأن يصبحوا أكثر تكاملاً في مجتمعهم من خلال برامج الإرشاد داخل المدارس والمؤسسات المتخصصة. وإعطاء تركيز كبير على دور الأسرة والمدرسة في مساعدة أطفالهم .

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## Quality of Life for Parents with Children who have Autism in Erbil Iraq

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جودة الحياة للأباء اللذين لديهم اطفال مصابين بداء التوحد في مدينة اربيل/ العراق

مصلح كريم، سروان علي

### Abstract

**B**ackground and objectives: Autistic Spectrum Disorder (ASD) is a complex neurobiological and developmental disability that typically appears during a child's first three years of life. It is characterized by qualitative deficits in reciprocal social interaction, communication skills, and restricted patterns of behavior. The present study assessed quality of life of parents with children who have autism and its association with some related variables. **Methods:** A descriptive correlation study was conducted in Hawler Teaching Hospital in Erbil, Iraq from February 2012 to February 2013. A non-probability purposive sample of 115 parents was selected according to the study criteria. Data were collected by direct interview. Quality of life was measured by a standardized questionnaire of the World Health Organization (WHOQOL-BREF). **Results:** For fathers of children with autism there was a significant association between age and physical domains, level of education and environmental domain and also general health, occupational status and environmental domain. Highly significant associations were observed between fathers' socio-economic status and all other domains and items except social relationship domain. Conversely, mothers of children with autism demonstrated a highly significant difference between occupational status and environmental domain, a highly significant relationship between socio-economic status and environmental domains and overall quality of life. **Conclusion:** Findings from the present study suggest that the quality of life is adversely impacted for parents of children with autism. Health care professionals should integrate quality of life into general care plans and enhance provision of holistic care, e.g. physical, psychological, social relationship and environmental aspects for parents of children with the condition.

**Keyword:** Autism, children, parents, environmental domain and quality of life.

**Declaration of Interest:** None declared.

### Introduction

Autistic Spectrum Disorder (ASD) is a complex neurobiological and developmental disability that typically appears during a child's first three years of life. It is characterized by qualitative deficits in reciprocal social interaction, communication skills, and restricted patterns of behavior<sup>1</sup>. Autism affects between 2 and 20 people per 10,000 in general populations, it occurs in boys more than girls, with the ratio ranging from 2:1 to 5:1. However, when girls are affected, they tend to be more severely impaired and have poorer outcomes<sup>2</sup>.

About half of children with autism also have intellectual disabilities and about 25% have seizure disorders<sup>3</sup>. Parents of children with Pervasive Developmental

Disorders (PDDs) seem to display a higher burden. These findings must be taken into account in policy making to provide better and more specific supports and interventions for this group of disorders. Parents of children with severe mental disorder and intellectual disability showed increased rates of physical health problems with low-income PDDs reporting higher levels of stress and demoralization for mothers when compared with fathers<sup>3</sup>. These families have a high level of family distress and much more problems than families with children with other cognitive or medical disorders<sup>4</sup>. Moreover the families of children with ASD usually have a lower level of income. Couples with children suffering from ASD report more conflicts and also report somewhat lower marital happiness and family cohesion<sup>5</sup>.

It has been suggested that children with autism can create a greater burden on parents. The condition is characterized by three main domains: social skills dysfunction, language and communication impairment, and repetitive behaviors. We hypothesized that parents of children with autism might display a higher impairment of quality of life (QOL) as compared to the other groups because parents with children who have autism usually display more and/or more severe maladaptive behaviors and have a lower chance of achieving better psychological adjustment.

The overall objective of the present study was to describe quality of life domains of the parents of children who have autism in Erbil and compare the QOL domains and items between parents.

**Methods:** A descriptive correlation design was used to assess the quality of life of parents who have children with autism. The current study was conducted in Erbil, Iraq from 5<sup>th</sup> February 2012 to 4<sup>th</sup> February 2013. A non-probability purposive sample was selected consisting of 115 parents of children with ASD. The sample was selected according to the following inclusion and exclusion criteria:

Inclusion criteria: Parents of children with autism ranging in ages 3-20 years old from both genders. Diagnosis was by a multidisciplinary committee consisting of a psychiatrist, pediatrician, psychologist and social worker, among others; and, for the purpose of diagnosis the committee used the DSM -IV- TR criteria.

### Exclusion criteria

- Children and parents with chronic disease.
- Families with more than one child having autism (as having more than one child with the condition may risk biasing any findings).
- Other types of pervasive developmental disorders.
- Orphaned children.

Data were collected via questionnaire designed by the investigator through a direct 1:1 interview method with parents of children who have ASD who agreed to

participate in the study. Each interview session took approximately 35-45 minutes.

### Description of the tool

1. Parent socio-demographic data were collected using a questionnaire designed for the current study.
2. The Kurdish version of the World Health Organization Quality of Life - BREF (WHOQOL - BREF) was used to measure parents' quality of life. Interviewers were parents of children with autism. None were trained to conduct interviews, but questionnaires were reviewed and discussed before the start of interviews. The scale used to measure the quality of life of parents was a shortened version of WHOQOL-100, developed by WHOQOL group. The (WHOQOL-BREF) questionnaire is a 26-item scale including four domains and two items as follows:

- i. Physical domain
- ii. Psychological domain
- iii. Social relationship domain
- iv. Environment domain

Item 1: self-perceived overall quality of life

Item 2: self-perceived overall health

These four domains were shown to be valid measures of overall QOL and health. The questionnaire was cross-culturally sensitive with good reliability and validity<sup>6</sup>. The WHOQOL-BREF questionnaire consists of four domains and 24 facets<sup>7</sup>. Each of the 24 facets comprises one item scored on a 5-point scale. The possible score for each is 1-5. Higher scores indicate better quality of life. The four domain scores denote an individual's perception of quality of life in each particular domain. Raw domain scores are calculated by straightforward summative scaling of constituent items. Three negatively-worded items need to be reverse-scored (Q3, Q4 and Q26), as shown in the formulae<sup>7</sup>.

**Ethical considerations:** Ethical approval for conducting the present study and sample selection was obtained from the ethical committee of research in

College of Nursing at Hawler Medical University. The purpose of the study was explained to parents and their consent to participate obtained prior to interview. Confidentiality was assured. The content validity of the study questionnaire was determined initially through a panel of 25 experts from different related specialties. Minor amendments were required.

The WHOQOL-BREF was piloted with 10 parents who were then excluded from the main study. No further amendments to the questionnaire were required. The questionnaire was clear and understandable despite concerns raised in other studies<sup>7</sup>. Completion time was approximately 35-45 minutes. Determination of reliability of the total QOL was based on the test-retest method, alpha correlation coefficient was computed and indicated that the correlation coefficient was 0.913. The estimates were statistically adequate<sup>8</sup>.

**Statistical analysis**

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 11.5). Percentage and frequencies were used for categorical variables, and non-parametric test was used to indicate the association between parents QOL and the socio-demographic characteristics of parents and children.

**Results**

*Background characteristics of children with autism*

Table 3 shows that the highest percentage of children with autism (47.8%) were within the age group 3-7 years old while the lowest percentage (9.6%) were within the age group ( $\geq 12$ ) years old. The mean age was 9.37 years (SD=3.55). Regarding the age group at diagnosis, the highest percentage (71.3%) was within the age group 3-6 years old while the lowest percentage (3.5%) were  $\geq 11$  years old. The mean age was 6.97 years (SD=3.37).

**Table 1:** Background characteristics of children with autism

Age / years	No	%
3-7	55	47.8
8-11	49	42.6
$\geq 12$	11	9.6
<b>Mean age 9.37 years (SD=3.55).</b>		
Gender	No	%
Male	96	83.5
Female	19	16.5
Age group at diagnosis/ years	No	%
3-6	82	71.3
7-10	29	25.2
$\geq 11$	4	3.5
<b>Mean age at diagnosis 6.97 years (SD=3.37).</b>		
<b>Total</b>	<b>115</b>	<b>100</b>

**Socio-demographic characteristics of autistic fathers:**

The majority of the current sample ranged in ages 30-39 years obtaining higher education and of low socioeconomic status.

**Table 2:** Socio-demographic characteristics of fathers of children with autism

Age of father / years	No	%
20-29	1	0.9
30-39	56	48.7
40-49	39	33.9
50-59	13	11.3
60-69	6	5.2
<b>Mean age 41.08 years (8.37=SD)</b>		
Level of education	No	%
Illiterate	13	11.3
Able to read and write	7	6.1

Graduate of primary school	22	<b>19.1</b>
Graduate of intermediate school	21	<b>18.3</b>
Graduate of secondary school	16	<b>13.9</b>
Graduate of high education (college, institute)	36	<b>31.3</b>

**Socio-demographic characteristics of autistic mothers:**

The majority of the current sample ranged in ages 30-39 years old, graduated from primary school, unskilled worker, and of low economic status.

**Table 3:** Socio-demographic characteristics of mothers of the autistic children:

<b>Age of mother / years</b>	<b>No</b>	<b>%</b>
20-29	15	13
30-39	66	57.4
40-49	27	23.5
50-59	6	5.2
60-69	1	0.9
<b>Mean age 36.43 years (SD = 6.81).</b>		
<b>Level of education</b>	<b>No</b>	<b>%</b>
Illiterate	23	20
Able to read and write	17	14.8
Graduate of primary school	28	24.3
Graduate of intermediate school	13	11.3
Graduate of secondary school	11	9.6
Graduate of high education	23	20
<b>Occupation</b>	<b>No</b>	<b>%</b>
High professional job	9	7.8
Low professional job	24	20.9
Unskilled workers	82	71.3
<b>Socio-economic status</b>	<b>No</b>	<b>%</b>
Low	67	58.3
Middle	22	19.1
High	26	22.6
<b>Total</b>	<b>115</b>	<b>100</b>

**The pattern of parent domains and items of quality of life (WHOQOL-BREF):**

Table 4 shows that the mean and standard deviation of social relationship domain of fathers (mean=58.62, SD=21.99) was higher than all domains of fathers (Physical, Psychological, Environmental domain).

The same table shows that the mean and standard deviation of social relationship domain of mothers

(mean=53.62, SD=23.70) was higher than all domains (Physical, Psychological, Environmental domain).

In addition, the mean and standard deviation of second item (Item 2: General Health) of fathers and mothers (mean=3.13, SD=1.09), (mean=2.55, SD =1.17), (was higher than first item (Item 1: Overall QOL) of fathers and mothers (mean=2.5, SD=1.08), (mean=2.33, SD =1.15) respectively.

The description of the pattern of parent's domains and items of quality of life are shown in (Table 4).

**Table 4:** Pattern of parent domains and items of quality of life (QOL): (WHOQOL-BREF) Parents

Parents	Father =115		Mother =115	
	Mean	SD	Mean	SD
<b>QOL Domains*</b>				
<b>Physical domain</b>	43.16	15	41.55	13
<b>Psychological domain</b>	51.81	15.43	47.5	17.86
<b>Social relationship domain</b>	58.62	21.99	53.62	23.70
<b>Environmental domain</b>	37.74	17.02	34.73	16.91
<b>Items**</b>				
<b>Item 1: Overall QOL</b>	2.5	1.08	2.33	1.15
<b>Item 2: General health</b>	3.13	1.09	2.55	1.17

\*The measures of the domains transformed to (0-100) scale.

\*\*The measures of the Items are of (1-5) scale.

Higher scores represented better QOL. Comparison between mother and father with QoL domains and items: Table (5) shows that the mean ranks of item 2 (Item 2: General Health) of fathers (131.43) was significantly higher than mean ranks (99.57) of mothers ( $P < 0.001$ ). The same table shows that the mean ranks of other domains and item 1 (Item 1: Overall QOL) of

fathers were higher than mean ranks of mothers, although the differences were not statistically significant.

The comparison between mother and father with QOL domains and items are shown in (Table 5).

**Table 5:** Comparison between mothers and fathers QOL:

Domains and Items of parents	Father =115 Mother =115	Mean Rank	p-value
<b>Item 1: Overall QOL</b>	F	120.30	0.258
	M	110.70	
<b>Item 2: General health</b>	F	131.43	< 0.001
	M	99.57	
<b>Physical domain</b>	F	119.91	0.314
	M	111.09	
<b>Psychological domain</b>	F	123.10	0.082
	M	107.90	
<b>Social relationship domain</b>	F	122.80	0.093
	M	108.20	
<b>Environmental domain</b>	F	120.97	0.211
	M	110.03	

## Discussion

The present study results were similar to those reached in a study conducted in Japan<sup>9</sup> whereby the mean age of fathers was 41.0 years (SD = 5.7), which is similar to the present study findings. In another study<sup>10</sup> the mean age of the fathers was 42.0 years (SD=7.8), which is also in line with societal expectations in Iraq about child bearing age. The finding agrees with another study,<sup>11</sup> which indicates that most (51.5%) of the sample held

low socio-economic status despite a significant proportion of cases attaining a high educational status. This finding is also consistent with another study,<sup>12</sup> which demonstrated how families use their personal savings or take out loans to cover the costs of caring for children with autism. Health care expenditure exceeds the household income in many families causing them to fall below the poverty level. We believe that taking care of children with autism in the absence of good support

from the health system creates an undue economic burden on families. It follows that opportunities for additional work are reduced due to the level of direct care a parent must provide to a child with the condition. As a genetically determined condition, autism is prevalent in different socio-economic and educational status. This point is also supported in the present study. Most of the sample in the present study was represented by unskilled workers. A significant proportion of those found to hold higher educational status demonstrated a tendency to respond better to receiving care and requested help more readily from the health sector.

In terms of gender, the present study demonstrated that most (83.5%) children with autism were boys. This finding is comparable to a study on 290 children with autism in China, which found the majority of those interviewed were boys (85.5%)<sup>12</sup>.

Table 6 shows that the mean 58.62 (SD=21.99) within the social relationship domain for fathers was higher than for the physical, psychological and environmental domains; however, the mean and (SD) for the environmental domain was 37.74, (SD=17.02), which was lower than all other domains for fathers.

In addition, the mean 3.13 (SD=1.09) of general health items for fathers was higher than the mean 2.5 (SD=1.08) for the overall QOL item. Table 3 also shows that the mean 53.62 (SD=23.70) within the social relationship domain for mothers was higher than for the physical, psychological and environmental domains; however, the mean 34.73 (SD=16.91) within the environmental domain for mothers was lower than all other domains. Furthermore, the mean 2.55 (SD=1.17) of general health item for mothers was higher than the mean 2.33 (SD=1.15) of the overall QOL item.

These findings were partially supported by a study in Brazil<sup>13</sup> that found the physical domain (mean=69.4) was perceived as the best and environment domain as the worst (mean=60.8). The latter is nearly consistent with the present study. These findings may be explained by a range of factors, including the fact that the studies were from different socio-cultural, religious and mental health services with different sample sizes and methodologies. It is our opinion that in Iraqi society, the social bond remains stronger than other societies due to cultural and religious issues. However, many psychosocial factors arising from chronic experiences of war, poverty and environmental degradation have negatively impacted upon the society as a whole.

The main findings in the present study are supported by other studies<sup>10,14</sup> which found that the majority of those interviewed were boys. Regarding the age group at diagnosis, the highest percentage of the present sample (71.3%) was within the age range of 3-6 years. The mean age of children was 6.97 years (SD=3.37). This result is supported by a study conducted on 140 children

with ASD which showed the majority (49.3%) were within the age range of 3-6 years<sup>15</sup>. Another study<sup>10</sup> also found the mean age of diagnosis to be 3.7 years (SD=2.7). This may be explained, according to the DSM-IV criteria, since diagnosis is generally possible when a child reaches 3 years and above. We noticed that in the studied sample there were some delays in diagnosis possibly due to limitations of the respective mental health services, poor knowledge of parents about their child's disorder and late establishment of the specialized autism committee for diagnosis in the Kurdistan Region.

In Table 5, it is seen that the mean of general health items for fathers was significantly higher than the mean for mothers ( $p < 0.001$ ). However, the mean of other domains and the overall QOL item for fathers were higher than for mothers although the differences were not statistically significant. In the present study, we observed that mothers had a lower mean for all domains and items of QOL in comparison to their partners. This possibility likely reflects the general self-esteem of women and their position and responsibility in our society. There is also the risk that staying at home most of the time to support a child who has autism can increase the psychological pressure experienced by mothers due to possible job loss and limited support from the community and health sectors, which would likely result in a lower mean in the QOL. These findings generally correspond with a study that found the experience of parenting a child with autism resulted in impaired health and poorer quality of life for mothers, but not for fathers<sup>16</sup>. This is also supported in a study of 212 parents in Italy which found that mothers of children with autism tended to have a lower QOL compared to fathers<sup>3</sup>. These findings are in accordance with another study<sup>17</sup> that observed highly significant differences in all the four domains (physical, psychological, social relationship and environmental).

In addition, the mean and SD scores for mothers were lower than for fathers suggesting the QOL for mothers was worse. In Japan, research has demonstrated that there is a tendency for mothers to suffer greater impairment than fathers in terms of the QOL<sup>9</sup>. Our results are in clear agreement with these findings. It is likely that child rearing responsibilities in the Iraqi community are well observed among mothers rather than fathers while earning money and working outside the home is almost always the responsibility of fathers. This likelihood may explain why mothers in our study reported a poorer QOL.

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## المخلص

اضطراب التوحد هو عبارة عن اضطرابات وقصور في النمو والتطور في الخلايا العصبية والبيولوجية، والذي يظهر عادة خلال ثلاث سنوات الاولى من عمر الطفل، ويتميز بنقص نوعي في العلاقات الاجتماعية المتبادلة ومهارات الاتصال وبمحدودية انماط السلوك. تهدف هذه الدراسة الى تقييم جودة الحياة للأباء الذين لديهم اطفال توحد وعلاقته مع بعض المتغيرات. **طرق اجراء البحث:** تم اجراء دراسة وصفية في مستشفى اربيل التعليمي وجمعية الأوتيزم في كردستان العراق / مدينة اربيل، للفترة من شباط 2012 ولغاية شباط 2013. وتم اختيار عينة عرضية مكونة من 115 من الآباء ممن لديهم طفل توحد وحسب شروط الدراسة. ولقد تم جمع المعلومات بطريقة المحاوره وقياس جودة الحياة باستخدام مقياس عالمي مصمم لهذا الغرض من قبل منظمة الصحة العالمية. وتم استخدام برنامج تحليل إحصائي مناسب لتفسير وتحليل النتائج. **النتائج:** اظهرت نتائج الدراسة بأن غالبية الآباء كان متوسط اعمارهم هو (41.08) سنة، من خريجي الجامعات أو المعاهد، وكانوا غير ذوي مهارة في العمل، وبمستوى معاشي منخفض. بينما كانت متوسط اعمار الامهات هو (36.43) سنة، ولديهن شهادة الدراسة الابتدائية في الغالب، وكن ربوات بيوت، وبمستوى معاشي منخفض. أما فيما يخص الاطفال المصابين بداء التوحد كان متوسط اعمارهم (9.37) سنة، ومعظمهم من الذكور، متوسط اعمارهم عند تشخيص الحالة (6.97) سنة، ومعظمهم يسكنون في المدن. تم ايجاد علاقة ذات دلالة احصائية بين عمر الآباء والصحة البدنية، والمستوى الثقافي مع الظروف البيئية والبند الثاني (صحة عامة)، وهناك أيضاً علاقة احصائية بين الحالة المهنية والظروف البيئية حسب المقياس المستخدم في الدراسة. **الاستنتاج:** نتائج هذه الدراسة اثبتت بأن الأطفال التوحدين يؤثر على نوعية الحياة للآباء بشكل عام لذلك على الاطباء والكادر التمريضي والمختصين في المجالات الصحية أن يضعوا بنظر الاعتبار للعائلة خطة العناية العامة وان يشاركون في تزويد العناية الشمولية (جسدياً، نفسياً، اجتماعياً وبينياً) للآباء اصحاب الاطفال المصابون بالتوحد. بالإضافة الى ضرورة تأسيس مركز متخصص ومتطور للأطفال التوحدين وبمواصفات عالية للعمل على التشخيص المبكر، والمعالجة واعادة التأهيل للطفل وتقليل نسبة عجزه وكذلك تقليل العبء الملقاة على العائلة. للمساهمة في تحسين جودة الحياة لديهم على المدى البعيد.

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## Suicidal Thought and Its Demographic and Psychological Correlates In a Sample of Poly-drug Users

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الأفكار الانتحارية والعوامل النفسية والديموجرافية المرتبطة به في عينة من مستخدمي المخدرات المتنوعة

أمانى احمد عثمان، اسماعيل محمد يوسف، ماجدة طه فهمي، وفاء الليثي حجاج، خالد عبد المعز محمد

### Abstract

**B** **ackground:** Uncovering and understanding the risk factors and predictors of suicidal thoughts will help in developing suitable prevention and treatment strategies. **Methods:** A cross-sectional case control descriptive study was carried out to describe socio-demographic and other factors in participants in Al-Baha psychiatric hospital, Saudi Arabia. Participants were in two groups: patients (poly-substance abusers) group (n=122) and control group (n=117). Participants were given psychiatric interview, full physical and neurological examination, routine laboratory test, modified semi-structured questionnaire for the detection of drug intake and an assessment of socio-demographic data. The Arabic version of the Suicidal Probability Scale (SPS) was prepared and standardized for assessment of suicidal probability. **Objective:** The main objective of the current study was to determine the link between substance abuse and associative factors for suicidal thoughts. **Results:** Suicidality was highly presented among substance abusers (64.75%) with 22.13% of cases having at least one suicide attempt. The mean difference in age between control, non-suicidal abuser, and suicidal abuser was significantly high ( $P > 0.01$ ). Most suicidal abusers were single (41.77%) and there was a highly significant difference between groups ( $P > 0.01$ ). A statistically significant difference was found between groups in relation to deterioration of academic or occupational functioning. Family history of suicidal attempt found was greater among suicidal abusers than non-suicidal abusers and control group (30.4%, 23.3%, and 8.5% respectively). The SPS and its four factors: hopelessness, hostility, negative self-concept, and suicidal ideation, were significantly present among substance abusers as compared to the control group. A highly significant difference was also found for the same items in relation to suicide among the three groups. **Conclusion:** Statistically positive significant correlation was found in relation to age, high altitude residence, academic or occupational deterioration, presence of co-morbid psychiatric diagnosis, positive family history of suicidal attempt, suicidal probability scale and sub-scales of hopelessness and hostility.

**Keywords:** suicide, demographic factors, psychological factors, substance user.

**Declaration of interest:** None

### Introduction

Substance abuse refers to use of any drug, usually by self-administration in a manner, that deviates from approved social or medical patterns.<sup>1</sup> Prevalence of actual substance abuse among youths has nearly doubled over the past decade.<sup>2</sup> It has proved to be a difficult problem for medical and psychiatric practice over the last century.<sup>3</sup>

Substance abuse is associated with suicidal ideation. This is attributed to the intoxicating and disinhibiting effects of many psychoactive substances. When combined with personal grief such as bereavement; the risk of suicide is greatly increased.<sup>4</sup>

The term "suicide" stems from the Latin word "sui" meaning the one-self, and "cida" from caedera, which means to kill.<sup>5</sup>

Suicide is a significant social problem and, theoretically, a preventable cause of death.<sup>6</sup> It is the third leading cause of death among juveniles and young adults, and ranks eighth for all ages.<sup>7</sup>

Suicide as a concept and as an act evokes very strong feelings in many people. However, suicide rates usually increase throughout the world.<sup>8</sup> It occurs in every country in the world<sup>9</sup> accounting for nearly 1% of all deaths.<sup>10</sup> For example, suicide rates are increasing from one year to the next in Saudi Arabia. The main reasons, according to social workers in Jeddah, that lead to suicide are weak faith and a sense of overwhelming pressure where a person cannot cope and thus sinks into a deep depression, which leads to suicide or attempts at it. Suicide also stems from social, psychological and economic reasons and many drug addicts commit suicide.<sup>11</sup>

Beck (1967) defined suicide as a willful, self-inflicted, life-threatening act which has resulted into death.<sup>12</sup> In a previous study (Okasha et al.), a crude rate of suicide attempts in Cairo was 38.5/100,000. Overdose by tablet ingestion was the most common method used (80 %).<sup>13</sup>

Attempted suicide defined by Wexler et al. (1978) is “any intentionally, self-inflicted injury unless there is strong evidence both in circumstances and in the patient's statements, that there was not the slightest ambiguous self-destructive intent.”<sup>14</sup>

Beck (1986) defined suicidal ideation as the presence of thoughts or contemplation about suicide or a wish by an individual to terminate his or her life, but there is no self-destructive action related to these thoughts.<sup>10</sup> Suicidal ideation is a common medical term for thoughts about suicide, which may be as detailed as a formulated plan, without the suicidal act itself. Although most people who undergo suicidal ideation do not commit suicide, some go on to make suicide attempts or take their own lives.

The range of suicidal ideation varies greatly from fleeting to detailed planning, role playing and unsuccessful attempts, which may be deliberately constructed to fail or be discovered, or may be fully intended to succeed.<sup>14</sup>

Agosti V, et al. stated that the two populations with the highest rates of suicide are people who are depressed and people with a substance abuse diagnosis.<sup>15</sup> Findings of studies from the United States and Europe consistently indicate that more than 90% of completed suicides in all age groups are associated with mental or addictive disorders.<sup>16</sup>

Danielson CK, et al. demonstrated a positive association between depression levels and problems with substance abuse in adolescents, indicating that youth who suffer from both depression and abuse may be at high risk for suicide attempt.<sup>17</sup> While Walaa H. considered drug addiction as a symptom of depression and self-destructive behavior.<sup>18</sup>

Drug and alcohol problems generate other circumstances in a person's life, which may worsen depression or produce mental agitation.

Divorce, loss of job, legal trouble, and financial difficulties often grow from a dependence on alcohol or drugs and can bring about thoughts of suicide.<sup>19</sup> High rates of suicidal ideation were found by Cottier Linda et al in a research on a group of substance abuse patients.<sup>20</sup>

Suicidal thoughts and behaviors are a significant indicator of other co-occurring disorders; such as major depression, bipolar disorder, PTSD, schizophrenia, and some personality disorders in substance abusers.<sup>21</sup> So psychiatric co-morbidity with substance use increase the risk for suicidal behavior.<sup>22</sup>

The inverse relationship between religious involvement and suicide was proved by a number of studies.<sup>23, 24</sup> so there is a possible protective role of moral or religious objections to suicide.<sup>25</sup> Suicide is considered a sin

against God among monotheistic religions, including Judaism, Christianity, and Islam. <sup>26</sup>

Prevention of suicide depends on the timely assessment of suicide risk. Shea says that timely assessment depends on clinicians' overcoming their own fixed ideas and basing their assessment on three pillars: Analyzing the risk factors and predictors, uncovering and understanding suicidal ideation, and developing prevention strategies. <sup>27</sup>

The main objective of this study is to determine the link between substance abuse and associative factors for suicidal ideation. Assessment of this link is important to identify predictors for suicide in substance abusers to develop specific interventions for persons in substance abuse treatment.

## Subject and Methods

### *Study design:*

A cross sectional case control descriptive study was carried out, to describe socio -demographic and other factors characterize participants.

### *Setting of the study:*

Study was carried out in Al-Baha psychiatric hospital located in south area in Saudi Arabia.

### *Inclusion criteria:*

Cases are males In-patients admitted to Al-Baha psychiatric hospital, aged 18 - 45 years, who met Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria for psychiatric diagnosis of substance abuse.

Patients were investigated and assessed 10 days after admission, following detoxification and withdrawal periods

### *Exclusion criteria:*

- Patients who refuse to participate in the study were excluded.

- Cases who give positive results by Toxicology screen test.
- Having gross medical problems for example uremia, heart failure liver failure etc.
- Suffering mental sub-normality.

### *Sample size:*

The prevalence of substance abuse in Saudi Arabia was 7.8 % <sup>28</sup>. The presumptive prevalence of substance abuse among this study population will be similar to it.

Accordingly, the following equation was used:

$$n = (z/e)^2 (p) (1 - p)$$

Where,

**n:** the sample size per group

**p:** the expected prevalence = 7.8%

**z:** the critical value which determine the area underlying the 95% of population on the normal distribution curve = 1.96

**e:** the margin of sample error tolerated = 0.05

$$n = (1.96/0.05)^2 \times (0.078) \times (1 - 0.078) = 111$$

The expected drop-out was 10%, so the total sample size will be 122.

So, the calculated sample size per group will be around 122.

### *Sample design*

Sample selected by systematic random sampling. There is about 225-273 cases suffer poly-substance abuse admitted to the hospital yearly, while our sample size is 122, so our interval =  $273/122 = 2$ . Calculated as:

$$K=N/n$$

Where "K" is the interval, "n" IS the sample size, and "N" IS the population size.

The first case was chosen randomly then every z = case was selected to fulfill the sample size required that is about 122 cases.

### *Procedure*

Participants were organized into two major groups, patients (poly-substance abusers), and control group; represented by 122 and 117 individuals. The study was carried out for both groups:

Consecutive participant was assessed for eligibility in the study. Information from family members was gathered in some cases.

***Participants were subjected to***

1. Psychiatric history and mental state examination was performed by the researcher, and patients were diagnosed according to Diagnostic and Statistical Manual of Mental Disorders, Text Revision, fourth edition (DSM- IV - TR).
2. Full physical and neurological examination, routine laboratory tests (CSC, blood chemistry, thyroid function, liver function and urine analysis) and ECG are done in order to exclude serious organic pathology. Urine and blood toxicology screen for substance abuse to detect (paracetamol, ASA, benzodiazepine, alcohol, amphetamine and amphetamine derivatives, phenothiazine derivatives, barbiturate, tricyclic antidepressants, ethyl alcohol, organic phosphorus compound, cannabis).
3. Modified Semi-structured Questionnaire for the detection of drug intake and the assessment of socio-demographic data in which we will use the original sheet constructed <sup>29</sup> plus a suitable semi-constructed interview by using modified Ain Shams University case sheet <sup>30</sup>.

The former questionnaire was developed and standardized by Soueif et, at. (1986) and it has been used in the research done by the National Center for Social and Criminological Research for the detection of substance use. This questionnaire was found to have acceptable validity, inter-rater reliability and test retest reliability. It has two main parts: one dealing with a demographic data of the subjects and the

The later interview was planned to gather any possible information from the interviewees i.e. either cases or controls. Method used for the construction of this semi-structured interview took account of available previous work. The main topics covered were the following:

Personal data (age, education, religion, residence ..., etc.).

1. Family background.
2. Pattern of relation within the family.
3. History of substance use in the family.
4. Academic achievement.
5. Early use of cigarettes and illicit substances.
6. Religious involvement.
7. Suicidal ideation and attempts.
8. Relation between onset of substance use and suicidal thoughts.
9. Family history of suicidal attempts.

The Arabic version of Suicidal probability scale (SPS) <sup>31</sup>:

It is prepared and standardized <sup>32</sup>, for assessment of suicidal probability.

The Suicidal Probability Scale (SPS) IS 36-items; self-report measure designed to aid in the assessment of suicide risk in adolescents and adults ages 13 and older. Individuals are asked to rate the frequency of their subjective experience and past behaviors using a 4-point Likert scale format ranging from "None, or a little of the time" to "Most, or all of the time." The responses are then hand scored to evaluate suicide risk. The maximum and minimum scores are 146 and 30, respectively. The greater the score, the higher is the probability of suicide. In order to have more detailed clinical interpretation, the suicidal probability scale was reinforced with 4 clinical subscales (hopelessness [12 items], suicide ideation [8 items], negative self-evaluation [9 items], and hostility [7 items]).

## **(SPS) properties**

### *Reliability*

The SPS has been studied regarding internal consistency and test-retest reliability of composite scores with generally excellent results. In a study of 941 individuals, internal consistency for (early teenagers) ranged from 0.66 for males and 0.77 for females and for (late teenagers) were 0.64 for males and 0.70 for females and for (adults) were 0.71 for males and 0.64 for females all were statistically significant at p value 0.10<sup>32</sup>.

Test-retest reliability calculated in a sample of 69 individuals in the early teen agers<sup>32</sup> showed reliability coefficient of 0.89 for males and 0.64 for females and all are were statistically significant at p value 0.01.

### *Validity*

Estimate of criterion-related, concurrent and construct validity of SPS have been obtained from a number of empirical studies. By comparison of SPS to other tests designed to measure similar constructs, such as Beck depression Inventory, it was done on a sample of 65 individuals and all were statistically significant at p value 0.01.

### *Data analysis*

Data were collected, revised, verified then edited on P.C. All the data will be recorded on investigative report form. These data will be analyzed statistically using compatible computer program (Statistical package for Social Sciences): SPSS for windows release 8.00 to obtain:

#### *(1) Descriptive statistics*

- A. Frequencies were used to describe both quantitative and qualitative variables.
- B. Mean and standard deviation ( $\pm$  SO) were used to describe quantitative variables only.

#### *(2) Analytic statistics*

- The student t-test to compare between two means.
- Chi-square test to examine the difference among many proportions at the level 95%.
- p value indicates level of significance:

$P > 0.05$  = non-significant.

$P < 0.05$  = significant.

$P < 0.01$  = highly significant

$P < 0.001$  = very highly significant

The results were tabulated, graphed and discussed on the basis of current related literature Conclusion and recommendations were derived from the discussed items.

#### *Ethical considerations*

- Obtaining an informed consent from the patients after explaining to them the aim of the study and the importance of data they are going to offer.
- A brief explanation of the aim of the study to the participants stressing the importance of data they are going to offer.
- Data collected were confidential.

## **Results**

On reviewing this present study, it was found that suicidal cases were highly present among the substance abusers 64.75%, and there were 22.13% of cases have history of at least one suicide attempt. The mean ages of cases and control group were 31.35 ( $\pm$  6.25) and 31.7 ( $\pm$  7.84) respectively. So their ages were almost identical ( $p > 0.05$ ). While the difference of mean ages between the three groups (control, non-suicidal cases and suicidal cases) was highly significant ( $p < 0.01$ ), suicidal group recorded the highest mean age 32.92 ( $\pm$  5.95).

Cases living in low altitudes 34.43% were significantly more than controls 20.51%. It was found that 83.54% of suicidal cases live at high altitude, while only 32.56% of

non-suicidal cases live there, and the difference was very highly significant.

The results of this study indicated that highest percentage 46.72% of cases were single, followed by 29.51 % were married and others 23.77% were divorced, separated and widowed. Most of suicidal cases were found to be single 41.77% followed by married 34.18%, but more than half of non-suicidal cases were single, while most of control group 74.36% were married, and the difference between the three groups were very highly significant.

Our study showed very high significant difference between cases and control groups and among the three groups in religiosity. It was found that 77.04% of cases were believer not practicing. While all in control group reported that they are religious practicing. And cases who do not care were more among suicidal cases 6.33% in comparison to 4.65% of non-suicidal cases

Educational level was assessed among both groups and the highest percentage among cases (53.28%) was found to have drop-out. While the majority of control group (29.1 %) went as far as the secondary school. Control group showed significantly higher educational level. Studying educational level among the three groups was also found to have a very high significant difference. The highest percentage of suicidal cases 63.3% were found to have drop-out, while the highest among non-suicidal cases and control groups were found to be secondary school graduated.

Seventy nine percent of cases in the present study were unemployed. Suicidal cases found to be composed of 77.22% unemployed while they were more in non-suicidal cases 83.72%.

Very high significant difference was found between the three groups as regard deterioration of academic or occupational functioning. Almost half 50.6% of suicidal

cases in our study showed deterioration of academic or occupational functioning, while about one third 30.2% of non-suicidal cases showed that deterioration. Controlled group showed no deterioration in educational or occupational functioning.

Among the twenty seven attempters, 40.74% had attempted suicide 3 times before. Jumping from height 1 in well 44.4% and overdose 40.7% were the most commonly used methods. Violent methods were used by 59.3% of the patients. Impulsive manner in previous suicide attempts were recorded in 70.4% of attempters in the present study. Almost half of suicide attempts 51.9% (14/27) caused by drug related causes (financial, social, legal). In our study; almost half of the suicidal cases 55.7% (44/79) admitted presence of suicidal thoughts or attempts after recovery from the effect of the drugs.

Co morbidity of substance abuse problem with another mental illness (Dual diagnosis) was well established in 101 cases (82.79%)

Diagnosed as (schizophrenia 16.39%, schizoaffective disorder 2.46%, bipolar I disorder 16.39% , major depressive disorder 18.03%, anxiety disorders 3.28% , adjustment disorders 2.46%, personality disorder 23.77%). Our study showed that substance induced mood disorder; Major depressive disorder and borderline personality disorder were found to have a significant relation with suicide.

About fourteen percent of the cases suffer current medical disorder in this study. The difference among the three groups in the present study as regard the comorbid physical illness, showed no significant difference.

Family size showed no significant difference between cases and control in the present study. Mean family size in our study is highest among suicidal group but the difference is non-significant among the three groups.

No significant relation was found in our study between age of bereavement and substance abuse. However, significantly, most of suicidal cases experienced separation from one or both of their parents before age of 18.

Very high significant difference of home atmosphere and family support were found between cases and control. Most of our cases described their home atmosphere by average 38.52% or disturbed 34.43%, and family support found to be poor in 47.54% of cases; in comparison to 87.18% of control group live in a good home atmosphere, and the family support is good in 89.74% of them. There is very high significant difference among the three groups as regard home atmosphere and family support. Among suicidal cases there were 45.57% described their home atmosphere by average and 36.71 % described it as disturbed, and most of them 54.43% have no family support. While in the group of non-suicidal cases, 44.19% described their home atmosphere by good, and 30.23% described it by disturbed. Most of the control group 87.18% described it as good.

Very high significant relation was found between substance abuse and family history of using illicit substances. In our study 46.72% of cases have family

history of substance use. While 8.5% persons in control group mentioned family history of substance abuse. A very high significant difference in the three groups was observed in our study as regard the family history of using substances. More than one half of suicidal cases have drug abuser family member, while only 27.9% of non-suicidal cases and 8.5% of control group have family history of substance use.

In our study 27.87% of cases have family history of suicidal behavior, while among control group it was found that 8.5% persons have family history of suicidal behavior. This difference was noticed to be of very high significant. Very highly significant relation was revealed between family history of suicidal behavior and suicide. Family history of suicidal attempt found to be more (30.4%) among suicidal substance abusers than non-suicidal substance abusers (23.3%) or control group (8.5%).

SPS and its four factors (hopelessness, hostility, negative self-concept, and suicidal ideation) are very high significantly present among substance abusers as compared to the control group. Very high significant difference was also found for the same items in relation to suicide among the three groups.

**Table 1. Prevalence of suicidal thoughts and behavior in participants**

Lifetime suicidal thought or attempt			Controls (117)		Cases (122)	
			No	%	No	%
<b>Suicidal participants</b>	Suicidal thought	Present	0	0	79	64.75
		Absent	117	100	43	35.25
	Suicidal attempt	Present	0	0	27	22.13
		Absent	117	100	95	77.87
<b>non-suicidal participants</b>			117	100	43	35.25

**Table 2. Socio-demographic data and its relation to substance abuse**

Items	Controls (117)		Cases (122)		X <sup>2</sup>	P	Sign
	No	%	No	%			
Residence							

*Suicidal Thought and Its Demographic and Psychological Correlates*

<b>High</b>	93	79.48	80	65.57	5.78	0.016	Sig
<b>Low</b>	24	20.51	42	34.43			
Marital status							
<b>Married</b>	87	74.36	36	29.51	51.6	0.000	Very high sig
<b>Single</b>	26	22.22	57	46.72			
<b>Div/widow/sep</b>	4	3.42	29	23.77			
Employment							
<b>Professional</b>	30	25.64	0	0	118	0.000	Very high sig
<b>Tradesman</b>	51	43.59	4	3.28			
<b>Semi/unskilled</b>	13	11.11	21	17.21			
<b>Unemployed</b>	23	19.66	97	79.51			
Religiosity							
<b>Believer not practicing</b>	0	0	94	77.04	195	0.000	Very high sig
<b>Religious practicing</b>	117	100	12	9.84			
<b>Agnostic</b>	0	0	9	7.38			
<b>Doesn't care</b>	0	0	7	5.74			

**Table 3. Socio-demographic data and its relation to suicidality**

Items	Controls (117)		Cases (122)				X <sup>2</sup>	P	Significance
			Non-suicidal (43)		Suicidal (79)				
	No	%	No	%	No	%			
Residency									
<b>High</b>	93	79.48	14	32.56	66	83.54	42	0.000	Very high Sig.
<b>Low</b>	24	20.51	29	67.44	13	16.46			
Marital status									
<b>Married</b>	87	74.36	9	20.93	27	34.18	54.1	0.000	Very high Sig.
<b>Single</b>	26	22.22	24	55.81	33	41.77			
<b>D/W/S</b>	4	3.42	10	23.26	19	24.05			
Employment									
<b>Professional</b>	51	43.59	0	0	0	0	92.9	0.000	Very high Sig.
<b>Tradesman</b>	13	11.11	3	6.97	2	2.53			
<b>Semi/unskilled</b>	23	19.66	4	9.3	16	20.25			
<b>Unemployed</b>	30	25.64	36	83.72	61	77.22			
Religiosity									
<b>Believer not practicing</b>	0	0	32	74.42	62	78.48	197	0.000	Very high Sig.
<b>Religious practicing</b>	117	100	5	11.63	7	8.86			
<b>Agnostic</b>	0	0	4	9.3	5	6.33			
<b>Doesn't care</b>	0	0	2	4.65	5	6.33			

**Table 4. Circumstances of attempted suicide**

Circumstances of attempted suicide	Suicide attempters (27)	
	No	%
<b>Violence</b>		

Violent	16	59.3
Nonviolent	11	40.7
<b>Lethality (Medical seriousness)</b>		
Low	7	25.9
Intermediate	10	37.05
<b>High</b>	10	37.05
<b>Methods</b>		
<b>Overdose</b>	11	40.7
<b>Jumping from height/in well</b>	12	44.4
<b>Hanging</b>	1	3.7
<b>Gun shooting</b>	1	3.7
<b>Stamping</b>	2	7.4
Impulsive	19	70.4
Planned	8	29.6

**Causes of previous suicidal attempt among suicide attempters**

Causes of suicidal attempt	Cases attempted suicide (27)	
	No	%
<b>Financial</b>	1	3.7
<b>Family &amp; social troubles</b>	8	29.6
<b>Related to drug</b>	14	51.9
<b>Related to psychiatric illness</b>	4	14.8
Total No of cases with suicide attempts	<b>27</b>	<b>100</b>

**Diagnosis according to revised fourth edition of Diagnostic and statistical manual of mental disorders (DSM IV) and its relation to suicidality**

Psychiatric diagnosis	Cases				X <sup>2</sup>	P	Sig.
	Non-suicidal (43)		Suicidal (79)				
	No	%	No	%			
Substance induced disorders:							
<b>*Substance induced mood disorder</b>	5	11.63	32	40.51	11	0.001	H. Sig.
<b>*Substance induced psychosis with onset during intoxication</b>	19	44.19	34	43.04	0.149	0.903	Non sig
Schizophrenia	10	23.26	10	12.66	2.28	0.131	Non sig
Schizoaffective	3	6.98	0	0	5.65	0.017	Sig.
Bipolar	7	16.28	13	16.46	0.63	0.98	Non sig
Depression	1	2.33	21	26.58	11.1	0.001	H. Sig.
Anxiety	1	2.33	3	3.79	0.19	0.663	Non sig
Adjustment	0	0	3	3.79	1.67	0.196	Non sig
Personality disorder							

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<b>1- Antisocial</b>	9	20.93	5	6.33	5.84	0.016	Sig.
<b>2-Borderline</b>	0	0	13	16.46	7.92	0.005	H. Sig.
<b>3-Avoidant</b>	1	2.33	1	1.27	0.19	0.66	Non sig
Physical disorders	5	11.63	12	15.19	0.29	0.59	Non sig
Psychosocial stress:							
<b>Educational</b>	7	16.28	3	3.79	5.76	0.016	Sig.
<b>Occupational</b>	15	34.88	33	41.77	0.55	0.457	Non sig
<b>Financial</b>	15	34.88	5	6.33	16.6	0.000	V.H. Sig
<b>Relational</b>	11	25.58	20	25.32	0.10	0.97	Non sig

**Home atmosphere**

Home atmosphere	Controls (117)		Substance Abuser (122)			
			Non-suicidal (43)		Suicidal (79)	
	No	%	No	%	No	%
<b>Good</b>	102	87.18	19	44.19	14	17.72
<b>Average</b>	11	9.4	11	25.58	36	45.57
<b>Disturbed</b>	4	3.42	13	30.23	29	36.71
Total	<b>117</b>	<b>100</b>	<b>43</b>	<b>100</b>	<b>79</b>	<b>100</b>

X<sup>2</sup> = 97.6

P= 0.000

P< 0.001 (Very highly sig.)

**Suicide probability scale and subscale**

Item	Controls (117)		Cases (122)				f	P	Sig.
			Non-suicidal (43)		Suicidal (79)				
	Mean	± SD	Mean	± SD	Mean	± SD			
<b>SPS Total</b>	41.44	6.27	58.33	11.76	88.82	22.66	182.15	0.000	Very high Sig
<b>Hopelessness</b>	10.58	2.12	17.19	6.57	26.14	9.84	98.21	0.000	Very high Sig
<b>Suicidal ideation</b>	11.62	7.48	11.35	2.09	23.34	9.53	54.24	0.000	Very high Sig
<b>Negative self-evaluation</b>	10.18	2.34	15.37	3.82	17.47	5.19	66.99	0.000	Very high Sig
<b>Hostility</b>	9.74	1.57	14.07	5.45	21.87	5.66	149.43	0.000	Very high Sig

**Discussion**

**Age:**

Mean ages of participants showed no significant difference (p> 0.05) between cases 31.35 (± 6.25) and control 31.7 (± 7.84) group but it was highly significant (p<0.01) between the three groups; suicidal group recorded higher mean age 32.92 (± 5.95) than non-suicidal patients. Whereas other study on substance users found that current age and age at onset of regular

substance use were lower in group with history of suicidal attempt.<sup>33</sup>

In addition, another study found that patients who had attempted suicide were significantly younger than patients who had never attempted suicide among group of drug users.<sup>34, 35</sup>

It was also reported in previous studies that older age was protective against suicidal ideation.<sup>36</sup>

This difference in our study can be explained by the fact that older age individuals may have longer duration of drug use, more physical illness and more accumulated social and financial troubles that can contribute in provocation of suicidal thoughts among them.

### ***Residence***

This study examined the demographic data of the participants. As regard residence, cases living in low altitudes 34.43% were significantly more than controls 20.51 %, the thing which can be explained by their needs for medical services provided by AI-Baha psychiatric hospital which attracted them and consequently they participated in our study by more numbers than in the control group.

It is noticed that 83.54% of suicidal cases live at high altitude, while only 32.56% of non-suicidal cases live there, and the difference was very highly significant. Our results are consistent with previous reports about increased suicide rates among high altitude residents.<sup>37</sup>

### ***Marital status***

The results of this study indicated that highest percentage 46.72% of cases were single, followed by 29.51 % were married and others 23.77% were divorced, separated and widowed. The last group seems to be higher in our study than that found by H.B. Hafeiz in his study on drug abusers in Eastern Saudi Arabia; he found that 51.7% were single, 34.8% were married and others were divorced, separated and widowed.<sup>38,39</sup>

But the results are still compatible regarding that majority of drug abusers is single.

This was also confirmed by another study who reported that 54% of drug users participated in the study were never married.<sup>20</sup>

Most of suicidal cases were found to be single 41.77% followed by married 34.18%, but more than half of non-suicidal cases were single, while most of control group 74.36% were married, and the difference between the three groups were very highly significant.

However, other studies found higher risk for future suicide attempts in substance-users persons who were not married.<sup>35</sup>

Another study also documented that Suicide rates are substantially lower among married persons than among persons who are single, separated, divorced, or widowed.<sup>40</sup>

### ***Religiosity***

Our study showed that 77.04% of cases were believer not practicing. While all in control group reported that they are religious practicing, and the difference was very highly significant.

This is supported by what was found from reports by patients with substance use disorders admitted at two hospitals in Saudi Arabia (n=423) and were interviewed using the Brief Psychiatric Scale, showed that a majority of the patients (74.2%) stated that their prayers were irregular, 6.4% were not praying at all, with a small percentage (19.4%) praying regularly.<sup>41</sup>

Religious Involvement Questionnaire (RIQ), a self-report instrument containing validated measures of intrinsic and extrinsic religiosity used in previous study. Measures of alcohol, hallucinogen, and prescription drug consumption had significant negative correlations with religiosity scores.<sup>42</sup>

The present study showed that religious practicing form 100% of control group. Cases that do not care were more among suicidal cases 6.33% in comparison to 4.65% of non-suicidal cases. The difference in religiosity was very

highly significant. In a study conducted at AI-Amal mental health hospitals in three major cities in Saudi Arabia on 736 patients identified with alcohol or drug abuse, spirituality was largely endorsed as a protective factor to any suicidal and self-injurious behavior and any suicidal ideation.<sup>43</sup>

These findings may give us hope that possible increased religious education and awareness among individuals could be beneficial in protecting them from substance use and suicidal behavior.

### *Educational level*

Educational level was assessed among both groups and the highest percentage among cases (53.28%) was found to have drop-out. While the majority of control group was (29.1 %) had gone as far as the secondary school. Control group showed significantly higher educational level.

This was supported by a study carried out on first admissions to specialized addiction treatment AI-Amal Hospital of Dammam; low educated individuals (level of education is below secondary school graduation) formed 81 % of the group<sup>44</sup>.

Highest percentage 37.2% among Egyptian heroin abusers was recorded to be graduated from university in a study in Egypt, while 28.2% recorded drop out. However, highest percentage (60.3%) of control group was graduated from university.<sup>30</sup>

Studying educational level among the three groups was found to have a very high significant difference. The highest percentage of suicidal cases 63.3% were found to have drop-out, while the highest among non-suicidal cases and control groups were found to be secondary school graduated. The findings in this research is consistent with previous studies which found that Higher academic and school competence was associated with

lower occurrence of suicidal behaviors, and that higher levels of academic and school performance are significantly predicted lower levels of suicidal behavior.<sup>45</sup>

Studies of Turkish suicide attempters have revealed that lower educational level is a risk factor for suicide. Nevertheless, in another study from China with a greater sample size, the education variable was not found to be related to suicidal thoughts.<sup>46</sup>

### *Employment*

Seventy nine percent of cases in the present study were unemployed. This seems to be higher than that 52.6% in Dammam study and 18.33% in AI-Qassim study. This suggests an increase in unemployment problem in Saudi Arabia as a part of the global problem.<sup>39,38</sup>

In previous study in Egypt on heroin abusers she observed that social class 2 which include lesser profession and business (e.g teacher, shopkeeper, nurses, and officer in police, army or prison services) formed the majority (58.8%) of users.<sup>30</sup>

### *Current suicidal thoughts*

The present study shows that 36.07% (44/122) of cases experience current suicidal thoughts during assessment, which is near to the different levels revealed by other studies.

Lower rates of Suicidal Ideation (31 %) were found in male drug users group in other study.<sup>20</sup>

One-year study that recruited a convenience sample of 736 outpatients and inpatients identified with alcohol or drug abuse, and was conducted at AI-Amal mental health hospitals in three major cities in Saudi Arabia, revealed that 50.7% of respondents reported suicidal ideation.<sup>43, 47</sup>, a sample of 3,064 high school students, found that

substance use is associated with suicide ideation and attempts. Substance use and abuse are considered to be a causal factor for suicidal behaviors. Substance use tends to increase impulsivity and decrease inhibitions, making one more likely to act on suicidal tendencies. Additionally, substance use can lead to personal crises, such as expulsion from school or a relationship conflict, which could precipitate suicidal behaviors<sup>48</sup>.

### *Previous suicide attempt*

Relatively few researches indicate that differences may exist between those who die by different methods of suicide when categorized as violent and nonviolent suicide<sup>49</sup>. Violent suicide methods include the use of firearms, hanging, cutting, other forms as strangulation, jumping from a height or into traffic, motor vehicle accidents, drowning, and electrocution. Nonviolent methods include ingestion of a lethal dose of drugs (most common in the United States), ingestion of poison, and asphyxiation by gases. Lethality - or the medical seriousness- of the previous suicide attempt was classified following the same classification used in previous research.<sup>50</sup>

- Low lethality: The physical condition of the attempters wouldn't have necessitated admission in a hospital.
- Intermediate lethality: The physical condition of the attempters warranted some cautionary or admission to a hospital but not Intensive Care Unit.
- High lethality: The subjects were admitted to Intensive Care Unit.

Among the twenty seven attempters, 40.74% had attempted suicide 3 times before. Jumping from height I in well 44.4% and overdose 40.7% were the most commonly used methods. Violent methods were used by 59.3% of the patients. Lethality were found to be

intermediate in 37.05%, and equal percentage was found in the sample described their previous suicide attempt by high lethality.

It was recorded in previous studies that 20% of Egyptian heroin dependent patients attempted suicide, 50% of them had attempted suicide by overdose, and 20% used violent methods for their attempts. While 60% of the attempters recorded high lethality of the previous attempts<sup>50</sup>, which indicate higher lethality of heroin than that of poly drug used in our study, when we notice that high percentage in both studies used overdose as a method of previous suicide attempts.

This difference between the results may also suggest that violence and frequency of attempting suicide among poly-drug abusers are higher than in case of using one drug, the thing which was confirmed also by another study carried out when he studied the clinical characteristics of attempters among poly-substance abusers and alcoholics, then he found that almost half (47%) of the sample reported lifetime suicide attempts.<sup>51</sup>

Prior researches had put another explanation for this difference and differentiated between violent and non-violent suicide attempters, indicating that patients who die by violent means are more likely to be male, be younger, display more trait of aggression,<sup>49</sup> be less likely to have prior suicide attempts, and have certain genetic factors, such as genes related to dopamine synthesis and serotonin transmission,<sup>52</sup> than those who die by nonviolent means.

Forty percent of suicide attempters in our study used method of overdose. Attempted suicide by intentional drug overdose is an understudied subject in Saudi Arabia. Saudi Arabia is an Islamic country where suicide or attempted suicide is strictly prohibited. Despite the strong religious and constitutional sanctions against

suicide, cases of intentional drug overdose occasionally occur.

As many as 63 percent of people ended their lives by hanging while 12 percent jumped from a high place according to the report of Saudi Ministry of Health on 2006. The similar results had been found in a study by El fawal 1999, undertaken in the Medico-legal Center, Dammam, Saudi Arabia; he mentioned that The most common means of suicide chosen was hanging (63%), followed by jumping from heights (12%) and gunshot injuries (9%); death from poisoning accounted for only 6% of cases. the difference detected between this report and our study can be attributed to the nature of the region of AI-Baha which is mountainous.

Suicide attempts were considered impulsive if the respondent reported spending less than 5 minutes between the decision to attempt suicide and the actual attempt.<sup>53</sup>

Impulsive manner in previous suicide attempts were recorded in 70.4% of attempters in the present study, this was supported, and who reported that, drug abusing suicide attempters exhibited higher levels of impulsive attempts than attempters who were not substance abusers.<sup>54</sup>

#### *Cause of previous suicidal attempt*

Almost half of suicide attempts 51.9% (14/27) caused by drug related causes (financial, social, legal) during which the substance abusers might suffer from situational depression which might lead to his suicidal attempt, this opinion is in accordance with other studies as that who added that impetus toward both drug abuse and suicidal behavior comes from underlying painful tensions and suicidal behavior could be manifestation of depression.<sup>55</sup>

A Finnish study by Dawson found that family discord (38%), financial problems (28%), and marital separations

were the chief precipitants of suicides among alcoholics.<sup>56</sup>

#### *Time relation between substance abuse and suicidal behavior*

In our study; almost half of the suicidal cases 55.7% (44/79). Admitted presence of suicidal thoughts or attempts after recovery from the effect of the drugs. (i.e., during abstinence.)

Consistent with our study, close to 40% of drug users with history of suicidal attempt were not intoxicated with any substance when they attempted suicide in a study.<sup>33</sup>

#### *Comorbid mental disorder*

Comorbidity of substance abuse problem with another mental illness (Dual diagnosis) was well established in 101 cases (82.79%) diagnosed as (schizophrenia 16.39%, schizoaffective disorder 2.46%, bipolar I disorder 16.39%, major depressive disorder 18.03%, anxiety disorders 3.28% , adjustment disorders 2.46%, personality disorder 23.77%).

Our findings seems to be higher than that in a study by Nayyer I. 2000 which examined the comorbidity of substance use and other psychiatric disorders in drug abusers at a voluntary detoxification unit in AI-Amal Hospital in Jeddah, Saudi Arabia, 9% were found to have mental disorders, such as personality disorders (4%) (Especially antisocial personality disorder 3.5%), mood disorders (0.37%), anxiety disorders (0.37%), and other disorders like schizophrenia (1 %). The difference in the results can be explained by the restricted role of AI-Amal Hospitals to provide services for drug users only.

But our results were less than that revealed by Linda B. Cottier 2005 who found that twenty four percent of male drug users reported. Depression and forty two percent of

drug users were diagnosed as antisocial personality disorder.<sup>20</sup>

Previous study by Marta Torrens (2011) showed that lifetime prevalence of Axis I disorders other than substance use disorder, was 41.8%, which seems to be less than that in the present study, with independent major depression being the most prevalent (17%). Prevalence of personality disorders was 22.9% and both are similar to the present study's findings.

Another study on sample of French drug-users prisoners showed different results. Mood and anxiety disorders were the most frequent disorders found in the dual diagnosis group (73.9% and 79.7%); nevertheless, psychotic disorders accounted for nearly a third of all dual diagnosis (30.9%). This difference in results can be attributed to the sources from which samples were taken.<sup>57</sup>

The National Comorbidity Study (NCS) reported that most of mental disorders were more common among persons with a current or lifetime substance use disorder than among those who had never experienced such a problem. Furthermore, most disorders had their onset prior to the onset of the substance use disorder, with the exception of mood disorders among male alcoholics, which usually developed after the onset of alcoholism.<sup>58</sup>

Results of the NCS and the ECA Survey indicate high prevalence rates for co-occurring substance abuse disorders and mental disorders, as well as the increased risk for people with either a substance abuse disorder or mental disorder for developing a co-occurring disorder.<sup>59</sup>

Our study showed that substance induced mood disorder; major depressive disorder and borderline personality disorder were found to have a high significant relation with suicidality.

These findings were supported by Lukasiewicz et.al. 2009 who recorded that Dual Diagnosis showed strong association with suicide risk among sample of French prisoners. And that the majorities of them associate a substance use disorders with a mood disorder. He also found that the drug users who had attempted suicide had a lifetime history of major depressive disorder<sup>34,57</sup>. In addition, reported in his study that higher risk for future suicide attempts in substance users found to be in those with mood disorders and personality disorders.<sup>35</sup>

In consistent with our study; borderline personality disorder was still a predictor of suicide attempts among drug users in a study<sup>60</sup>. And, it was also recorded in' another study that there is an increased risk of suicide associated with comorbid substance use disorders and borderline personality disorder.<sup>61</sup>

In addition, a study revealed that the rates of drug dependency and borderline personality disorder were higher among substance-dependent group with history of suicidal attempt.<sup>33</sup>

Furthermore, in the Finnish study, almost all the alcoholics who commit suicide also suffer from severe mental health problems. Half of them had a depressive disorder and almost as many had a personality disorder that entailed difficulty in controlling impulsive behavior.<sup>61</sup>

This was confirmed also by other researchers who used "impulsivity interdependence factor" by which 80% of all patients reported suicide attempts showed predicted impulsivity. Researchers concluded that impulsivity might be the underlying factor for suicide.<sup>61</sup> Thus, it suggests that impulsivity, as a main feature of borderline personality disorder, can be the underlining cause of high significant relation to suicidality among cases in our study.

### *Separation from parent*

No significant relation was found in our study between age of bereavement and substance abuse. However, significantly, most of suicidal cases experienced separation from one or both of their parents before age of 18, confirming another previous study which found that Adults who were children when their parents divorced are more likely to seriously consider suicide than adults who grew up in intact families, according to a new study in University of Toronto, 2011. <sup>62</sup>

### *Home atmosphere and family support*

Very high significant difference of home atmosphere and family support were found between cases and control. Most of our cases described their home atmosphere by average 38.52% or disturbed 34.43%, and family support found to be poor in 47.54% of cases; in comparison to 87.18% of control group live in a good home atmosphere, and the family support is good in 89.74% of them.

The thing which is found that there was high significant difference of home atmosphere between users and control in a study on heroin abusers in Egypt, 43.6% of users was complaining of disturbed home atmosphere. <sup>30</sup>

Other study also agreed with our results, She recorded that family problems were highly associated with using substances. <sup>63</sup>

There is very high significant difference among the three groups as regard home atmosphere and family support. Among suicidal cases there were 45.57% described their home atmosphere by average and 36.71 % described it as disturbed, and most of them 54.43% have no family support. While in the group non-suicidal cases, 44.19% described their home atmosphere by good, and 30.23% described it by disturbed. Most of the control group 87.18% described it as good.

Our findings were consistent with many other previous researches. It was recorded that suicidal subjects who abuse drugs, scored lower on both the parental and maternal care scores of the Parental Bonding Instrument (PBI). <sup>64</sup>

It was clarified that social support IS related to healthier functioning. Support, as a construct, has been defined as a sense of belonging, specifically among peers, teammates, community, or family members (Grholt et, aI. 2000). Individuals reporting strong social support (low isolation) exhibit lower levels of suicide risk. While those who feel supported by others exhibit healthier coping mechanisms and maintain a more positive outlook about their future. In contrast, individuals who lack social support and experience isolation may behave in self-injurious ways. <sup>65, 66</sup>

### *Family history of suicidal behavior*

In our study, 27.87% of cases have family history of suicidal behavior, while among control group it was found that 8.5% persons have family history of suicidal behavior. This difference was noticed to be of very high significant.

Our results are consistent with that of Alec Roy who reported (22.9%) of drug addicts with history of attempted suicide had a family history of suicidal behavior compared with (9.1 %) of patients who had never attempted suicide (P<0.0001). <sup>34</sup>

Very highly significant relation was revealed between family history of suicidal behavior and suicidality. Family history of suicidal attempt found to be more (30.4%) among suicidal substance abusers than non-suicidal substance abusers (23.3%) or control group (8.5%). The thing that match with Alec Roy's research on drug users who found that Significantly most of the patients who had attempted suicide had a family history of suicide. <sup>34</sup>

While Kuramoto et.al. (2010) specified that maternal (not paternal) suicide is associated with increased risk of suicide-attempt hospitalization for offspring.<sup>67</sup>

### *Suicide Probability scale (SPS)*

Suicide Probability scale with its four factors (subscales) were assessed for cases and control groups. What emerges from the data in the present study is that SPS and these four factors (hopelessness, hostility, negative self-concept, and suicidal ideation) are very high significantly present among substance abusers as compared to the control group. Very high significant difference was also found for the same items in relation to suicidality among the three groups.

Our results were matching with Philip's study on drug users. Who also recorded that SPS and four subscales had a correlation with suicidality.<sup>65</sup>

In addition, comparison between heroin dependent and control in previous study by Walaa M. Sabry 2004 revealed high significant difference as regard the suicidal and hostility. Cases had significant higher means.<sup>50</sup>

### *Hopelessness*

In a study conducted at AI-Amal mental health hospitals in three major cities in Saudi Arabia on 736 patients identified with alcohol or drug abuse, one of the most important observed correlates to any suicidal and self-injurious behavior and any suicidal ideation was hopelessness.<sup>43</sup>

Hopelessness is a significant indicator of depression and potential for suicide. Hopelessness and its clinical manifestations can be situational or transient. Accurate assessment of suicide risk should include an indication of current levels of hopelessness.<sup>65</sup>

Kwok and Shek reported that suicidal ideation was positively related to hopelessness but negatively related

to emotional competence and social problem solving in Hong Kong adolescents.<sup>68</sup>

### *Suicidal ideation*

Suicidal ideation is a subscale which gives information about the client's suicidal thoughts and behaviors. Individual items within this subscale can provide information regarding the frequency of suicide ideation, the reason for contemplating suicide, or whether suicide attempt is likely to be impulsive or carefully planned.<sup>69</sup>

### *Negative self evaluation*

Researchers in the previous studies explored that poor self-evaluation can lead to self-loathing and to consideration of suicide.<sup>65</sup>

### *Hostility*

Hostility has long been associated with suicide. Schneidman (1969) defined self-injury as hostility turned inward. More recently, hostility among adolescents has been associated with punitive self-injury.<sup>65</sup>

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## المخلص

تهدف هذه الدراسة الوصفية المقطعية لفحص ما إذا كانت الافكار الانتحارية في متعاطي المخدرات المتعددة ترتبط مع بعض العوامل النفسية والديموغرافية. وأيضاً ما إذا كان الاكتئاب وبعض سمات الشخصية يمكن أن تفيد في التنبؤ بالأفكار الانتحارية في متعاطي المخدرات. هدفنا في هذا العمل أيضاً هو تقييم احتمال الافكار الانتحارية بين متعاطي المخدرات. وللتحقيق في تأثير التشخيص المزدوج والدين والروحانية على الافكار الانتحارية بين هذه المجموعة . ولتحقيق هدفنا، قامت هذه الدراسة على مجموعتين: ضمت المجموعة الأولى (الحالات) 122 وهم من مستخدمي المخدرات المتعددة التي تم جمعهم من المرضى المنومين في مستشفى الأمراض النفسية في الباحة في المملكة العربية السعودية على أن يستوفي المريض خصائص التشخيص المدرجة في الدليل التشخيصي والإحصائي للإضطرابات العقلية، الطبعة الرابعة لمعايير تشخيص الأمراض النفسية من سوء استخدام المواد المحظورة. تم فحص الحالات وتقييمها بعد 10 أيام من التتويج، وبعد فترة الإنسحاب، والتأكد من النتائج السلبية للاختبارات الخاصة بهم لفحص السموم. ثم تم تصنيفها إلى مجموعتين: انتحارية وغير انتحارية، اعتماداً على مدى التفكير في الانتحار وقت الفحص .

المجموعة الثانية شملت 117 فرداً تم جمعهم من العاملين والأصدقاء والموظفين والتجار وهذه المجموعة مطابقة للعمر والجنس والطبقة الاجتماعية، ولا يعانون من أي اعتلال جسدي خطي أو اضطراب نفسي .

تم أولاً تقييم المشتركين في الدراسة وفحصهم نفسياً وبدنياً، وعمل التحاليل الروتينية وتحليل السموم في الدم والبول. كما تم تطبيق الاستبيان شبة المعدل، ومقياس احتمالية الانتحار، مقياس هاملتون للقلق، ومقياس بيك للإكتئاب، واستبيان ايزنك للشخصية .

على ضوء هذه الدراسة، وجد أن: نسبة الحالات الانتحارية كانت مرتفعة بين متعاطي المخدرات 64,75 % وكانت هناك 22,13 % من الحالات لديهم تاريخ سابق لمحاولة انتحار واحدة على الأقل. وكان متوسط الأعمار في مجموعة الحالات، والمجموعة الضابطة كانت متطابقة. في حين أن الاختلاف في متوسط الأعمار بين المجموعات الثلاث (الضابطة، الحالات الانتحارية، الحالات غير الانتحارية) كان عالي المعنوية، وسجلت المجموعة الانتحارية أعلى متوسط للعمر . الحالات الذين يعيشون في ارتفاعات منخفضة 34,43 % أكثر بكثير ممن هم في المجموعة الضابطة 20,51 % وقد تبين أن 83,54 % من الحالات الانتحارية يعيشون على علو مرتفع .

كما أشارت نتائج هذه الدراسة أن أعلى نسبة من الحالات كانت الغير متزوجين 46,72 % تليها المتزوجون 29,51 % ثم المطلقون والمنفصلون والأرامل 23,77 % وتبين أن معظم الحالات الانتحارية كانت بين غير المتزوجين 41,77 تليها المتزوجون 34,18 %، والفرق بين المجموعات الثلاث (الضابطة، الحالات الانتحارية، الحالات غير الانتحارية) كان ذا دلالة معنوية مرتفعة جداً .

وأظهرت دراستنا فرق كبير بدلالة معنوية مرتفعة جداً بين الحالات والمجموعة الضابطة وبين المجموعات الثلاث في التدين. فقد تبين أن 77,04 % من الحالات هم مؤمنون لا يصلون. في حين ذكر جميع أفراد المجموعة الضابطة أنهم من المؤمنين المصلين. وكان الذين لا يهتمون بالدين في المجموعة الانتحارية 6,33 % أكثر منهم بين الحالات الغير انتحارية 4,65 %.

تم تقييم المستوى التعليمي بين المجموعتين وأعلى نسبة بين الحالات (53,28 %) كانت لديهم تسرب من التعليم. في حين أن 29,1 % من المجموعة الضابطة ذهبت إلى حد المدرسة الثانوية. وأظهرت الدراسة أن المجموعة الضابطة ذات مستوى تعليمي أعلى بكثير، وأن الفرق في المستوى التعليمي بين المجموعات الثلاث ذو دلالة إحصائية كبير جداً. كما أن أعلى نسبة من حالات الانتحار وجدت في مجموعة المنقطعين عن الدراسة 63,3 %، في حين أن أعلى نسبة بين الحالات غير الانتحارية والمجموعة الضابطة قد تخرّجوا من المدرسة الثانوية .

وكانت تسعة وسبعين في المائة من الحالات في الدراسة الحالية من العاطلين عن العمل . وقد كان الاختلاف بين المجموعات الثلاث ذا دلالة إحصائية كبيرة جداً من حيث التدهور في الأداء الأكاديمي والمهني. وأظهرت الدراسة أن ما يقرب من نصف 50,6 % الحالات الانتحارية في دراستنا قد عانت من تدهور الأداء الأكاديمي أو المهني .

بين محاولي الانتحار وجد أن سبعة وعشرون 40,74 % قد حاولوا الانتحار 3 مرات من قبل. وكانت الأساليب الأكثر شيوعاً هي القفز من ارتفاع / في بئر حيث شكلوا 44,4 %، وكان 40,7 % من محاولي الانتحار قد استخدموا جرعة زائدة من أي نوع من الأدوية أو المخدرات بنية الانتحار. واستخدمت اساليب عنيفة من قبل 59,3 % من المرضى الذين حاولوا الانتحار. واتصفت محاولة الانتحار لديهم بالتدهور في 70,4 % منهم هذه الدراسة. وأرجع ما يقرب من نصف محاولي الانتحار 51,9 % (27/14) أسبابه إلى مشاكل متعلقة بالمخدرات (مالية واجتماعية وقانونية). وأفاد ما يقرب من نصف الحالات الانتحارية 55,7 % (79/44) بوجود أفكار انتحارية أو محاولات بعد التعافي من تأثير المخدرات .

وأظهرت الدراسة الحالية أن الاضطرابات النفسية المشتركة مع تعاطي المخدرات (التشخيص المزدوج) قد وجدت في 101 حالة (82,79 %) يتم تشخيصها على أنها (الفصام 16,39 %، اضطراب فصام وجداني 2,46 %، اضطراب ثنائي القطب الأول 16,39 %، اضطراب الاكتئاب 18,03 %، واضطرابات القلق 3,28 %، واضطرابات التكيف 2,46 %، اضطراب في الشخصية 23,77 %). وأوضحت دراستنا علاقة معنوية عالية بين السلوك الانتحاري وكل من اضطراب المزاج الناجم عن تعاطي المخدرات، اضطراب الإكتئاب واضطراب في الشخصية حدي النوع .

## *Suicidal Thought and Its Demographic and Psychological Correlates*

من المجموعة الضابطة الذين أفادوا أنهم يعيشون جواً عائلياً جيداً. وأن الدعم الأسري لديهم جيد في 89,74 % منهم. وهناك فرق ذو دلالة إحصائية عالية جداً بين المجموعات الثلاث من حيث الجو العائلي، والدعم الأسري. فبين الحالات الانتحارية كانت هناك 45,57% وصفوا الجو العائلي لديهم بالمتوسط، 36,71 % منهم وصفوه بالسوء، ومعظمهم 54,43% ليس لديهم دعم أسري. بينما في مجموعة الحالات غير الانتحارية، 44,19% وصفوا الجو العائلي بال جيد، و30,23% وصفوه بالسوء. معظم المجموعة الضابطة 87,18% كان الجو العائلي لديهم جيداً .

تم العثور على علاقة ذات دلالة إحصائية عالية جداً بين تعاطي المخدرات والتاريخ العائلي من استخدام المواد غير المشروعة. في دراستنا 46,72 % من الحالات لهم تاريخ عائلي من تعاطي المخدرات. بينما ذكر 8,5 % من أفراد المجموعة الضابطة أن لديهم تاريخ عائلي من تعاطي المخدرات. ولوحظ وجود فرق كبير بمعنوية عالية جداً في المجموعات الثلاث في دراستنا من حيث وجود تاريخ عائلي لاستخدام المخدرات. حيث أن أكثر من نصف الحالات الانتحارية ذكر وجود عضو في الأسرة يستخدم المخدرات، في حين 27,9% فقط من الحالات غير الانتحارية و8,5 % من المجموعة الضابطة لديهم تاريخ عائلي من تعاطي المخدرات .

أظهرت الدراسة الحالية أن التاريخ العائلي للسلوك الانتحاري موجود في 27,87 % من الحالات و8,5 % بين المجموعة الضابطة. وقد لوحظ هذا الاختلاف ذو دلالة إحصائية عالية جداً. وتم الكشف عن علاقة معنوية عالية جداً بين تاريخ عائلي من السلوك الانتحاري والانتحار بين المجموعات الثلاثة . تم تطبيق مقياس احتمالية الانتحار على المشتركين في الدراسة وقد وجد أن العوامل الأربعة (اليأس، والعداء، مفهوم الذات السلبي، والتفكير في الانتحار) مرتفعة جداً بين متعاطي المخدرات مقارنة مع المجموعة الضابطة. وقد وجد أيضاً فرق كبير ذو دلالة إحصائية عالية جداً لنفس العناصر بين المجموعات الثلاث.

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## Types of Depression among Iraqi Alcoholics

Abbas FM Alrubayee

أنواع الكآبه لدى مدمني الكحول العراقيين -العراق

عباس فاضل مهدي الربيعي

### Abstract

**O**bjective: Evidence suggests that there is a close association between alcohol dependence and depression. The researcher sought to identify the nature of this association and to demonstrate the clinical variables of such patients that may have therapeutic effects. **Method:** Samples of 50 alcoholics who met DSM -IV criteria and who were admitted to Ibn Rushd and Al-Rashad psychiatric hospitals in Baghdad during the period from 1<sup>st</sup> Jan to 1<sup>st</sup> Sep 2006 were assessed by DSM-IV based clinical interviews on three occasions for the presence of major depression. **Results:** Sixty percent of patients had concurrent depression on admission, 30% had depression two weeks later, and 10% remained depressed after one month. High statistically significant association was observed between primary depressed alcoholics firstly with family history of depression and secondly with lower duration of alcohol intake in contrast to non-depressed and secondary depressed alcoholics who showed significant association with family history of alcoholism and longer duration of alcohol intake. **Conclusions:** High association exists between alcohol dependence and depression during the course of illness, during intake (concurrent depression), after detoxification (secondary depression) and during sobriety; after achieving abstinence, primary depression appear in those patients who used alcohol to medicate themselves leading ultimately to secondary alcoholism. These findings suggest variable multiple associations that require a different psychotherapeutic intervention for each. The current study failed to find the prevalence of comorbid depression and alcoholism because of sampling method.

**Key words:** Depression, Iraqi alcoholics

**Declaration of interest:** None

### Introduction

Alcohol dependence and major depression are among the most prevalent disorders in the general population, each having a risk of approximately 10%<sup>1</sup>. One out of every two Americans report drinking on a routine basis, making excessive consumption of alcohol the third leading cause of preventable death in USA. Its comorbidity with depression occurs in all age groups, but in older adults may occur in more than 8%.<sup>2</sup> This finding appears to justify the need to systematically identify depression among alcohol dependent patients and to achieve the best patient outcomes. Alcoholism should be addressed first because enhancing abstinence will often involve remission of depressive disorder.<sup>2, 3</sup> Such a view

necessitates that emergency department providers be fully attentive to all mental health needs of their patients for early detection of depression and or alcohol misuse for potential intervention.<sup>4</sup> The Collaborative Study on the Genetics of Alcoholism (COGA) found among alcoholics an increased prevalence of depression and that this combination tends to run in families more often in the first-degree relatives of alcoholics than in the relatives of controls, and a significant evidence for a genetic linkage to an area on chromosome 1 that may predispose some people to alcoholism and others to depression.<sup>5</sup> Some heavy drinkers may have genetic vulnerability to depression and treatment of depressed alcoholic patients with antidepressants generally has had

beneficial effects on the depression and sometimes on drinking as well.<sup>6</sup> Depression and alcoholism are associated with a considerable morbidity and mortality and co-occur more commonly than can be expected by chance.<sup>7</sup> The extent of comorbidity between depression and alcoholism was demonstrated by the results of large epidemiological studies.<sup>8, 9</sup> The diagnostic criteria of both disorders involve certain constellation of symptoms and their time course. Problems arise when a single patient presented with two or more clinical syndromes. One way to understand the relationship between them is to distinguish between primary and secondary illness, and, this is commonly done by focusing on the temporal sequence of symptoms development or giving “primary” label to the most severe disorder and “secondary” label to the other. This applies to the confusion between primary alcoholism with secondary depression and the primary depression with secondary alcoholism<sup>1</sup>. At least 5 reasons contribute to this confusion<sup>1</sup>:

1. Ethanol is likely to have a biphasic effects on mood, giving pleasurable feelings on rising blood concentration and sadness and irritability when its level declines that might be carried over the next day. The degree of sadness varies with the blood alcohol level and duration of alcohol intake. This type of depression is called concurrent depression, which tends to be evanescent and disappear within two days to a week after discontinuation of intake<sup>11,12</sup>.
2. Signs of temporary serious depression can follow prolonged drinking (secondary depression) is estimated to occur in 30%-40% of alcoholics<sup>11</sup>. Clinically, it has a similar symptomatology to that of primary affective disorder<sup>13,14,15</sup>. Although it can be very severe, the affective disturbances are likely to be transient showing great improvement within several days or weeks of abstinence<sup>1,11,16,17</sup>.

3. Drinking escalates during primary affective episode, about 5% of manic patients and 5%-10% of primary depressed patients have secondary alcoholism<sup>1</sup>.
4. Depressive symptoms and alcohol problems occur together in 60%-80% of patients with antisocial personality disorder, 15% of Briquette Syndrome<sup>1</sup>.
5. A small proportion of patients have independent alcoholism and depression that is roughly equal to 1% of the general population<sup>18</sup>.

However, the frequency of alcohol dependence varies in different cultures according to the effectiveness of various control measures, both formal and informal ones, while depression occurs with similar frequency in most races and cultures<sup>19</sup>.

Aims:

1. To demonstrate the nature of association between depression and alcoholism.
2. To demonstrate the psychosocial variables of this association.

## **Method**

An inpatient sample of 50 males who were admitted consecutively to Ibn Rushd and Al Rashad psychiatric hospitals in Baghdad and who also met DSM-IV diagnostic criteria for alcohol dependence during the period from the 1<sup>st</sup> of January - 1<sup>st</sup> of September 2006 were enrolled after taking their permission to participate in this study, excluding those patients with comorbid physical illnesses.

Three DSM-IV-based interviews were done with each patient for the presence of major depressive disorder; the first one on admission to hospital to detect concurrent depression (CD), which is probably due to the direct pharmacological effects of heavy prolonged alcohol intake; the second one was done two weeks later, one

week after detoxification, to ascertain the presence of major depression and secondly whether its onset before or after heavy alcohol intake to be labeled as primary or secondary depression respectively; the third interview was done after one month from their admission to hospital to verify the existence of primary depression and its onset long before the indulgence with heavy alcohol consumption. A large number of cases who were initially enrolled in the study left hospital prematurely either because they were non-compliant or not fully motivated to seek abstinence so limiting the sample size to 50 patients. The absence of female participants is related to obvious socio-cultural taboos against the confession of having alcohol related problems in females in our community. The data were analyzed by descriptive statistics.

*Ethical approval:*

The study was approved by the Iraqi Mental Health Ethical Committee.

**Results**

The age range of patients was from 23 to 65 years(M=43), 52% were married patients, 66% held jobs, 60% had a primary level of education,76% lived in urban areas,78% had no private house, 92% were Muslims, 50% had family history of alcoholism in their 1<sup>st</sup> degree relatives,14% had family history of depression,46% had previous psychiatric hospitalization, 52% had more than 20 years of alcohol intake,74% started their intake in

their late teens and early twenties, 62% had a motive for abstinence and 60% referred themselves for seeking treatment, 60% had concurrent depression (CD) on admission and 40% not depressed (ND), 30% had secondary depression (SD) two weeks later and 70% not depressed,10% had primary depression (PD) one month later and 90% became depression free, 54% of the ND group and 20% of the PD group and 50% of the SD group had positive family of alcoholism, 60% of PD group and 5% of ND group and 20% of SD group had positive family history of depression, 80% of the PD group and 5% of the ND group and none of the SD group had less than 9 years of alcohol intake while the mean duration of intake was 23 years for the ND group and 4.8 years for the PD group and 20.7years for the SD group. Seventy seven percent of the ND group and 100% of the SD group and none of the PD group started their drinking prior to the age 25 years while 100% of the PD group and 23% of the SD group started drinking after that age. The mean age of drinking onset for the SD group was 20.5 years, 37.6 years for the PD group and 19.9 years for the SD group.

**Table 1:** Distribution of patients by diagnosis and time

Time	Patient No	Diagnosis			
		CD	SD	PD	ND
On admission	50	30			20
Two weeks	50		10	5	35
One month	50			5	45

**Table2:** Family history of alcoholism p=0.36

Family history of alcoholism	ND patients		PD Patients		SD patients		Total	
	No.	%	No.	%	No.	%	No.	%
<b>+ve</b>	19	54.3	1	20	5	50	25	50
<b>-ve</b>	16	45.7	4	80	5	50	25	50
<b>Total</b>	35	100	5	100	10	100	50	100

**Table 3:** Family history of depression p=0.004

Family history of depression	ND		PD		SD		Total	
	No.	%	No.	%	No.	%	No.	%
+ve	2	5.7	3	60	2	20	7	14
-ve	33	94.3	2	40	8	80	43	86
<b>Total</b>	35	100	5	100	10	100	50	100

**Table 4:** Duration of alcohol intake (years) p=0.001

Duration of alcohol intake	ND		PD		SD		Total	
	No.	%	No.	%	No.	%	No.	%
=<9	2	5.7	4	80	0	00	6	12
10-19	12	34.3	1	20	5	50	18	36
>=20	21	60	0	00	5	50	26	52
<b>Total</b>	35	100	5	100	10	100	50	100

**Table 5:** Age of drinking onset (years) p=0.001

Age of drinking Onset	ND		PD		SD		Total	
	No.	%	No.	%	No.	%	No.	%
=<19	14	40	0	00	5	50	19	38
20-24	13	37.1	0	00	5	50	18	36
=>25	8	22.9	5	100	0	00	13	26
<b>Total</b>	35	100	5	100	10	100	50	100

**Table 6:** The prevalence of secondary depression in alcoholics by other studies

Study	Prevalence rate	Tool used
Lesch1985	31%	DSMIIIR diagnostic criteria
Kielholz1973	15%	Diagnostic criteria
Winokur1971	3%	Diagnostic criteria
Weingold1968	72%	Zung Depression scale
Shaw1975	98%	Zung depression scale
Pottenger1978	59%	Depression scale
Schukit1982,1985	30%	DSMIII diagnostic criteria

## Discussion

The present study proved that high frequency of depression occurs during alcohol dependence state and during abstinence. The high rate (60%) of concurrent depression found in the present study seems very close to those reported by Davidson<sup>20</sup>. This type of depression is

attributed to the pharmacological effects induced by heavy alcohol intake and tend to be evanescent and disappear within two days to a week of abstinence. The finding that 10% of this study sample had primary depression seems consistent with those reported by O Sullivan,<sup>21</sup> Lewis et al.<sup>22</sup> and Keller et al.<sup>23</sup>. This type of depression has been linked with an episodic, periodic

pattern of drinking and it is possible that such patients use alcohol to “self-medicate their symptoms”<sup>24,25,26</sup>, or they may engage in problematic drinking behavior in part because negative affect is detrimental to their short-term impulse control and decision making independent of maladaptive attempts to regulate affect through drinking to cope,<sup>27</sup> or that the aversive visceral states increase the reward value of alcohol and explain the association between negative affect and problematic drinking patterns,<sup>28</sup> and such depression requires appropriate antidepressants for treatment that also halts alcohol intake<sup>29</sup>. Table 6 shows a wide variation in the reported prevalence of secondary depression among different studies, high rates were observed when using symptom check list or scales as tools of assessment in comparison with lower rates when diagnostic criteria were used. This secondary affective disorder likely reflects the combination of life stresses, symptoms of withdrawal and or the pharmacological effects of alcohol on the brain that tend to resolve with optimal detoxification measures<sup>1</sup>. The majority of patients in the three groups had no private houses and are compatible with the socio-economic disadvantages of alcoholism<sup>29</sup>. Table 3 demonstrates that there is a statistical significance between PD patients and family history of depression, which is sensible with the fact that affective disorders are familial disorders and genetically determined. Table 4 shows that the PD group had a lower duration of alcohol intake that may reflect the fact that unipolar depression usually starts in late thirties and possibly they use alcohol at a later age than the majority of ND and SD groups who started drinking prior to the age of 25 years (Table 5) and this is also consistent with the findings of Alec Roy et al<sup>30</sup>. Table 2 shows the close resemblance of ND and SD groups in relation to family history of alcoholism, findings that are in accordance with those of Woodruff et al.<sup>15</sup>.

## Conclusions

High association exists between alcohol dependence and depression during the course of illness, during intake (concurrent depression), after detoxification (secondary depression) and during sobriety. After achieving abstinence, primary depression appears in those patients who used alcohol to medicate themselves leading ultimately to be inflicted with secondary alcoholism. This means that a bidirectional link could exist between alcoholism and depression.

The current findings suggest that variable multiple associations require a different psychotherapeutic intervention for each. However, the current study failed to find the prevalence of comorbid depression and alcoholism because of sampling method.

## Limitations

1. Small sample size
2. Alcohol dependence and major depression are among the most prevalent disorders in the general population, each having a risk of approximately 10%<sup>1</sup> and the expected comorbidity is 1% among the general population. The current study failed to find the prevalence of this comorbid depression and alcoholism because of sampling method

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## الملخص

**الغاية:** الأدلة تشير إلى وجود علاقة وطيدة بين الإدمان الكحولي والكآبة. الباحث سعى إلى التعرف على طبيعة هذه العلاقة وإلى توضيح المتغيرات السريرية لهؤلاء المرضى التي قد تكون لها تأثيرات علاجية. **الطريقة:** تم أخذ عينه مكونه من 50 مريضاً من المدمنين على الكحول الذين تنطبق عليهم المعايير التشخيصية للدليل التشخيصي الإحصائي-الرابع والراقدين في مستشفى ابن رشد ومستشفى الرشاد للأمراض النفسية في بغداد للفترة من 2006/9/1-2006/1/1 والذين جرى تقييمهم وفق معايير الدليل أعلاه عن وجود الكآبة الكبرى من خلال 3 مقابلات سريرية عند دخولهم المستشفى وبعد أسبوعين وثالثاً بعد شهر من الدخول. تم تطبيق الإجراءات الإحصائية الوصفية مع مربع كاي وقيمة بي (chi-square and p value) على البيانات التي ظهرت. **النتائج:** 60 % من المرضى لديهم كآبة عند دخولهم المستشفى، تراجعت إلى 30% بعد أسبوعين بعد اطفاء التسمم وإلى 10% بعد شهر، وتبين وجود علاقة إحصائية مهمة بين المدمنين ذو الإكتئاب الأولي والتاريخ العائلي لمرض الكآبة وثانياً مع قصر مدة تناول الكحول، يعكس المدمنين غير المكتئبين والمدمنين ذوي الكآبة الثانوية للذين لديهم علاقة إحصائية مهمة مع التاريخ العائلي للإدمان الكحولي وطول مدة استهلاك الكحول. **الاستنتاج:** هناك علاقة وثيقة بين الإدمان الكحولي والكآبة خلال جميع مراحل المرض-إثناء التعاطي (كآبه متزامنه) وبعد اطفاء التسمم الكحولي (الكآبه الثانويه) وبعد الإنقطاع عن الشرب (كآبه أوليه) تظهر لدى المرضى الذين استخدموا الكحول لتطبيب أنفسهم والذي يؤدي بالنهايه إلى الاصابة بالإدمان الكحولي الثانوي. لكن الدراسة لم تستطع إيجاد إنتشار الكآبة المصاحبة لإسباب تتعلق بأسلوب اخذ العينه. هذه النتائج تشير إلى تعدد شكل العلاقة بينهم والتي تتطلب الى وسائل علاجية نفسيه مختلفه لكل واحده منهم.

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## Comparison of Burnout Pattern between Hospital Physicians and Family Physicians Working in Suez Canal University Hospitals

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مقارنة شكل الاحتراق المهني بين اطباء المستشفى وأطباء الأسرة العاملين بمستشفيات جامعة قناة السويس

أمانى قطب ، خالد عبد المعز ، محمد هانى ، مصلح عبد الرحمن ، عبد المجيد أحمد

### Abstract

**B**ackground: Burnout syndrome is characterized by emotional exhaustion, depersonalization, and low personal accomplishment. It is associated with impaired job performance. **Methods:** This descriptive study examined 171 physicians for the presence of burnout and its related risk factors. The evaluation of burnout was through the Maslach Burnout Inventory (MBI). Participants were considered to meet the study criteria for burnout if they obtained a "high" score on at least two of the three dimensions of MBI. **Results:** In the current study, the prevalence of burnout in hospital physicians (53.9%) was significantly higher than family physicians (41.94%) with ( $p=0.001$ ). Participants who worked in the internal medicine department scored the highest prevalence (69.64%) followed by surgeons (56.50%) and emergency doctors (39.39%). On the other hand, pediatricians had the lowest prevalence (18.75%). Working in the teaching hospital and being married were strong predictors for occurrence of burnout. **Conclusion:** There is a significant difference of burnout between hospital physicians and family physicians among the study subjects. Working in the teaching hospital and being married are strong predictors for occurrence of burnout.

**Keywords:** Burnout, risk factors, family physicians

**Declaration of interest:** None

### Background

The burnout syndrome is characterized by losing enthusiasm for work (emotional exhaustion), treating people as if they were objects (depersonalization), and having a sense that work is no longer meaningful (low personal accomplishment) and it refers to a negative consequence of chronic work stress<sup>1</sup>. Burnout as a syndrome is present in many individuals under constant pressure. Physicians in particular are frequently overloaded with the demands of caring for sick patients<sup>2</sup>. Previous studies showed that primary care physician reported alarming levels of professional and personal distress with up to 60% of practicing physicians reported symptoms of burnout<sup>3</sup>.

Burnout appears to be quite prevalent in both developing and developed countries and likely represents considerable economic, social and psychological costs to employees and employers in these countries. It is remarkably stable when studied across time on the same individuals and this chronic nature of burnout is probably not due to its genetic or personality origins, but rather to work-related characteristics<sup>4</sup>. Several studies were conducted to study burnout in the Eastern Mediterranean region. In Yemen it was (11.7%)<sup>5</sup> while among Tunisian primary care doctors 33% suffered from burnout with 35% having had a high score of emotional exhaustion; 21% had high depersonalization and 40% had a low score of personal accomplishment<sup>6</sup>. In Saudi Arabia, Al-Saiari found the prevalence rate of burnout syndrome

among Saudi female physicians working in the ministry of health hospitals in Jeddah city 2008 was 7.3 %<sup>7</sup>.

It is documented that physician burnout has been associated with impaired job performance, poor health and leads to physician error, these errors can in turn contribute to burnout. Dissatisfaction and distress have significant costs not only for physicians and their families but for patients and health care organizations as well<sup>2</sup>. Physical symptoms of burnout may take many different forms, including insomnia, appetite changes, fatigue, colds or flu, headaches, and gastrointestinal distress. Physical symptoms alone may interfere with well-being and ability to function fully at work<sup>8</sup>. Psychological symptoms such as low or irritable mood, cynicism, and decreased concentration can negatively affect productivity and rapport<sup>9</sup>.

Additional components of burnout may include daydreaming while with patients, excessive cancellations, procrastination, and delaying paperwork and vocational tasks<sup>10</sup>. Burnout may also lead to increased alcohol or drug use, which can also impact patient care<sup>11</sup>. The consequences of burnout among practicing physicians include not only poorer quality of life and lower quality of patient care but also a decline in the stability of the physician workforce. It is reported that there has been a major decrease in the percentage of graduates entering careers in primary care in the last 20 years, with reasons related to burnout and poor quality of life<sup>12</sup>. This trend coupled with attrition among currently practicing physicians has a significant effect on patient access to primary care services<sup>13</sup>. On the other side, there is evidence that physician well-being is related to patient satisfaction, a key outcome variable tracked by most organizations.

The satisfaction of physicians in an organization will enhance recruitment and retention of staff, saving the enormous cost of staff and physician turnover<sup>14</sup>.

Physician well-being prevents burnout and the less frequent but significant problem of physician impairment<sup>15</sup>. Furthermore, attention to well-being promotes patient safety and reduces the probability of errors thereby diminishing the threat of malpractice litigation<sup>16</sup>.

## **Methods**

The current study is a descriptive cross-sectional study conducted on physicians working in Suez Canal University Hospital (SCUH) in Ismailia and family practice centers affiliated to Faculty of Medicine-Suez Canal University (FOM/SCU).

### *Sampling*

A comprehensive sample consisted of family physicians (n=31) and physicians working in the other clinical departments within SCUH (n=140). Following this, a stratified random sample was conducted to include physicians from four major categories: 56 internal medicine physicians (25 residents and 31 assistant lecturers), 40 surgeons (18 residents and 22 assistant lecturers), 16 pediatricians (10 residents and 6 assistant lecturers), and 28 physicians from emergency and anesthesiology departments (17 residents and 11 assistant lecturers).

### *Procedure*

Selected physicians were invited to participate in the study through a series of mailed and electronic communications in addition to personal interviews with follow-up telephone calls from the researcher. All participants were then interviewed using a semi-structured questionnaire which included: (1) Demographic data and some work characteristics, including age, gender, marital status, number of years in practice, educational qualification, history of smoking, presence of financial or social problems, suffering from chronic diseases, number of patients per day, practice type most of time, type of employment and hours of

work per week within the University Hospitals; (2) Measuring burnout by using the Maslach Burnout Inventory (MBI), which is a self-administered, 22-item questionnaire developed to measure burnout in human services workers. It is regarded as the “gold standard” for measuring burnout. The MBI items are rated on a scale

from 0 to 6. It is designed to assess the three primary dimensions of burnout: losing enthusiasm for work (emotional exhaustion), having a sense that work is no longer meaningful (low personal accomplishment), and (depersonalization)<sup>12</sup>.

**Burnout dimensions were categorized as follows**

<b>Level of burnout</b>	<b>Emotional exhaustion</b>	<b>Depersonalization</b>	<b>Low Personal accomplishment</b>
<b>Low</b>	≤ 16	≤ 6	≤ 31
<b>Moderate</b>	17-26	7-12	32-38
<b>High</b>	≥27	≥ 13	≥ 39

A participant was considered to meet the study criteria for burnout if he or she obtained a "high" score on at least two of the three dimensions of MBI<sup>12</sup>.

*Statistical analysis*

The obtained data were coded, entered and processed on a personal computer using Statistical Package of Social Science (SPSS, version 20) for analysis of the results. Level of significance selected for this study was 95% (p<0.05), (a confidence level of 95%). Tests of significance included: unpaired Student t-test for continuous data, Chi-square test for categorical data, Fisher's exact test was carried out when the cells expected counts of <5, multiple logistic regression was used to identify predictors of burnout. Data was presented in tables and graphs according to the type of variables.

**Results**

The present study included 31 family physicians and 140 hospital practitioners under four main categories. There was a statistically significant difference between family physicians and hospital physicians regarding gender as more than 80% of family physicians were females compared to less than 36.4% of hospital physicians being female.

Table 1 demonstrates a statistically significant difference between family physicians and hospital physicians regarding type of practice (alone or within a group) (P=<0.0001), type of employment (P=0.001) and work hours/week for the government (P=<0.0001). The workload was higher in hospital physicians as 50% consulted more than 20 patients/day while more than one third of the family physicians (38.7%) consulted 10-20 patients/day.

**Table 1:** Work characteristics of studied physicians

Work characteristics	Family Physicians (n = 31)		Hospital Physicians (n =140)		Significance test (p-value)
	No.	%	No.	%	
<b>Number of patients/day</b>					
• <10	9	29.0	34	24.3	X <sup>2</sup> =3.5 (0.17)
• 10-20	12	38.7	36	25.7	
• >20	10	32.3	70	50.0	
<b>Type of practice most of time</b>					
Practice alone	12	38.7	106	75.7	X <sup>2</sup> =16.25 (<0.0001)*
Group practice	19	61.3	34	24.3	
<b>Type of employment</b>					
Government only	28	90.3	83	59.3	X <sup>2</sup> =10.73 (0.001)*
Government & private	3	9.7	57	40.7	
<b>Work hours/week with government</b>					
Mean ± SD	33.6 ± 12.9		67.8 ± 33.7		t-test = -5.55 (<0.0001)*
Range	8 – 78		18 – 174		

\*Statistically significant at p < 0.05

Hospital physicians were more liable to burnout than family physicians as shown in Table 2 where the percentage of hospital physicians (53.9%) who met study criteria for burnout (a "high" score on at least two of the

three dimensions of MBI) was higher than family physicians who met the same criteria (41.94%) with a statistical significant difference (p=0.001)

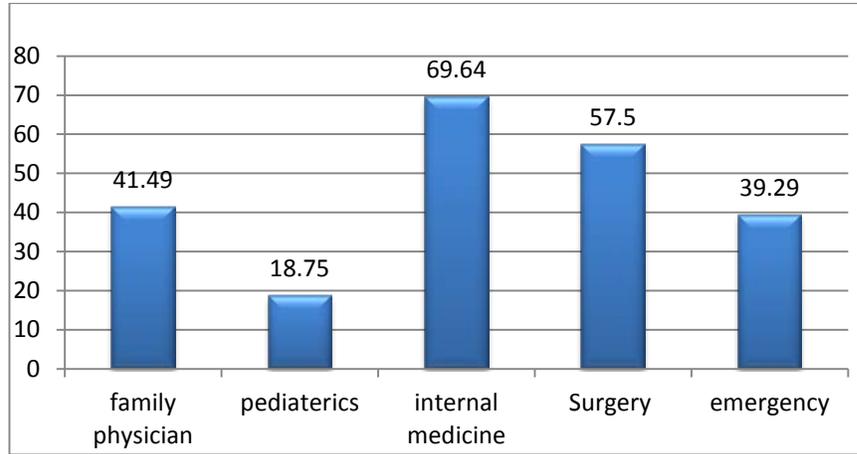
**Table 2:** Comparison of burnout distribution among hospital and family physicians

Physician specialty	Burnout					Significance test (p-value)
	NO		YES		Total	
	No.	%	No.	%		
Family Physicians	18	58.06	13	41.94	31	X <sup>2</sup> = 17.63 (0.001)*
Hospital Physicians	64	45.71	76	53.90	140	

Statistically significant at p < 0.05

Figure 1 represents that among study participants; the highest prevalence of burnout was found among internal

medicine physicians (69.64%) followed by surgeons (56.50%) and family physicians (41.49%).



**Figure1.** Percentage of burnout among the studied physicians in different specialties

Senior physicians suffered from burn out at higher rates when compared to their juniors. Table 3 shows that burnout among assistant lecturers was 63.6% while for

Residents/demonstrators it was only 42.6% with a statistically significant difference between the two groups ( $p=0.006$ ).

**Table 3:** Burnout among studied physicians according to their qualification

	Burnout					Significance test (p-value)
	NO (n = 82)		YES (n = 89)		Total	
	No.	%	No.	%		
<b>Residents</b>	54	57.4	40	42.6	94	$X^2 = 7.54$ <b>(0.006)*</b>
<b>Assistant lecturers</b>	28	36.4	49	63.6	77	

\*Statistically significant at  $p < 0.05$ .

Table 4 illustrates the relationship between burnout and some independent variables (gender and marital status) of the studied physicians. There was no statistically significant difference between male and female participants in the prevalence of burnout. On the other

hand, there was a statistically significant difference regarding marital status and lack of personal accomplishment as married participants were more at the "high" range of this domain (66 %) than their single colleagues (33.9 %).

**Table 4:** Relationship between burnout categories and independent variables in the studied physicians

Burnout Domains	Gender				Significance test (p-value)	Marital Status				Significance test (p-value)
	Female		Male			Unmarried		Married		
	No.	%	No.	%		No.	%	No.	%	
<b>Emotional exhaustion</b>										
Low/Moderate (74)	33	45.8	39	54.2	X <sup>2</sup> =0.038 (0.877)	30	41.7	42	58.3	X <sup>2</sup> =0.003 (0.955)
High (97)	43	44.3	54	55.7		40	41.2	57	58.8	
<b>Depersonalization</b>										
Low/Moderate (120)	48	40.0	72	60.0	X <sup>2</sup> =3.22 (0.073)	51	42.5	69	57.5	X <sup>2</sup> =0.03 (0.873)
High (51)	28	54.9	23	45.1		21	41.2	30	58.8	
<b>Low personal accomplishment</b>										
Low/Moderate (59)	26	44.1	33	55.9	X <sup>2</sup> =0.005 (0.943)	34	57.6	25	42.4	X <sup>2</sup> =8.90 (0.003)*
High (112)	50	44.6	62	55.4		38	33.9	74	66.1	

\*Statistically significant at p < 0.05

Table 5 represents the relationship between burnout and sociodemographic characteristics of the studied physicians. There was a statistically significant relationship between burnout and both of marital status and qualification of the studied physician as burnout was higher in married physicians (59.6%) than singles ones (39.7%); also, the prevalence of burnout was higher in assistant lecturers (63.3%) compared to (42.6%) in

residents/demonstrators. There was an inverse statistically significant relationship between burnout and both of practicing exercise and smoking in the studied physicians as the prevalence of burnout was lower in physicians practicing exercise (22%) compared to (61.5%) in those who did not practice exercise while burnout was more prevalent in non-smokers (60.1%) compared to (18.2%) in smokers.

**Table 5:** Relationship between burnout and sociodemographic characteristics of the studied physicians

Sociodemographic characteristics	Burnout						Significance test (p-value)
	NO (n = 82)		YES (n = 89)		Total		
	No.	%	No.	%			
<b>Age group</b>							
▪ <30	66	50.4	65	49.6	131	Fisher's exact (0.054)	
▪ 30-	16	47.1	15	44.1	34		
▪ ≥35	0	0.0	6	100.0	6		
<b>Gender</b>							
▪ Male	32	42.1	44	57.9	76	X <sup>2</sup> =1.87 (0.171)	
▪ Female	50	52.6	45	47.4	95		
<b>Marital status</b>							
▪ Married	40	40.4	59	59.6	99	Fisher's exact (0.007)*	
▪ widow /Divorced	1	100.0	3	100.0	3		

▪ Single	41	60.3	27	39.7	68	
<b>Number of children</b>						
▪ 1-2	35	43.8	45	56.3	80	Fisher's exact (0.092)
▪ 3-5	3	100.0	0	0.0	3	
<b>Smoking</b>						
▪ Yes	27	81.8	6	18.2	33	X <sup>2</sup> = 18.79 ( <b>&lt;0.001</b> )*
▪ No	55	39.9	83	60.1	138	
<b>Highest level of education</b>						
▪ Bachelor's degree	54	57.4	40	42.6	94	X <sup>2</sup> = 7.54 ( <b>0.006</b> )*
▪ Master degree	28	36.4	49	63.6	77	
<b>Practice exercise</b>						
▪ Yes	32	78.0	9	22.0	41	X <sup>2</sup> = 19.57 ( <b>&lt;0.001</b> )*
▪ No	50	38.5	80	61.5	130	
<b>Having definite chronic diseases</b>						
▪ Yes	4	66.7	2	33.3	6	Fisher's exact (0.428)
▪ No	78	47.3	87	52.7	165	
<b>Having perceived financial problem</b>						
▪ Yes	10	35.7	18	64.3	28	X <sup>2</sup> = 2.01 (0.156)
▪ No	72	50.3	71	49.7	143	
<b>Having social problem</b>						
▪ Yes	28	56.0	22	44.0	50	X <sup>2</sup> = 1.83 (0.176)
▪ No	54	44.6	67	55.4	121	

\*Statistically significant at p < 0.05

Table 6 illustrates the relationship between burnout and work characteristics as there was a statistically

significant relationship between fewer numbers of patients/day and burnout (p= 0.001).

**Table 6:** Relationship between burnout and work characteristics of the studied physicians

Work characteristics	Burnout					Significance test (p-value)
	NO (n = 82)		YES (n = 89)		Total	
	No.	%	No.	%		
<b>Number of patients/day</b>						
▪ <10	10	23.3	33	76.7	43	X <sup>2</sup> = 14.04 ( <b>0.001</b> )*
▪ 10-20	27	56.3	21	43.8	48	
▪ >20	45	56.3	35	43.8	80	
<b>Type of practice most of time</b>						
Practice alone	59	50.0	59	50.0	118	X <sup>2</sup> = 0.64

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<b>Group practice</b>	23	43.4	30	56.6	53	(0.424)
<b>Type of employment</b>						
<b>Government only</b>	53	47.7	58	52.3	111	X <sup>2</sup> =0.01
<b>Government &amp; private</b>	29	48.3	31	51.7	60	(0.942)
<b>Work hours/week with government</b>						
<b>Mean ± SD</b>	60.2 ± 29.2		62.89 ± 37.5		t-test =0.51 (0.608)	

\*Statistically significant at p < 0.05

Table 7 demonstrates the predictors of burnout from sociodemographic and work characteristics in the studied physicians. The risk of developing burnout increases to nearly 11 times more among hospital physicians compared to family physicians; married physicians have

five times more risk compared to their single counterparts. While practicing exercise and being equal to or over 30 years of age are considered protective factors from developing burnout.

**Table 7:** Multiple logistic regression analysis for predictors of burnout among studied physicians

<b>Predictors</b>	<b>Coefficient</b>	<b>SE</b>	<b>p-value</b>	<b>Adjusted OR</b>	<b>95% CI</b>	
<b>Hospital doctors</b>	2.394	0.839	<b>0.004*</b>	10.96	2.119	56.703
<b>Assistant lecturers</b>	1.804	0.986	0.067	6.071	0.878	41.968
<b>Number of patients</b>	1.340	0.621	<b>0.031*</b>	3.818	1.129	12.905
<b>Married</b>	1.709	0.867	<b>0.049*</b>	5.524	1.011	30.194
<b>Smoker</b>	-1.844	0.957	0.054	0.158	0.024	1.032
<b>Practice exercise</b>	-3.872	0.901	<b>&lt;0.001*</b>	0.021	0.004	0.122
<b>Age ≥ 30 years</b>	-2.767	1.140	<b>0.015*</b>	0.063	0.007	0.587
<b>Constant</b>	-1.208	1.151	0.294	0.299		

\*Statistically significant at p < 0.05

**Reference categories:**

Family physicians, residents, number of patients >10, unmarried, non-smoker, no exercise and age <30 years

**Discussion**

Burnout syndrome is characterized by losing enthusiasm for work (emotional exhaustion), treating people as if they were objects (depersonalization), and having a sense that work is no longer meaningful (low personal accomplishment). The condition is well associated with

negative physiological, cognitive, psychological and behavioral manifestations. However, burnout syndrome is not a sign of weakness, mental illness or inability to cope with life therefore; burnout can be treated, overcome, and prevented<sup>1</sup>.

The present study was conducted to determine the prevalence of burnout and its related risk factors from sociodemographic and work characteristics in physicians working in Suez Canal University Hospitals. A total of

171 participants were evaluated for the presence of burnout and its associated risk factors using the Maslach Burnout Inventory (MBI) and according to the three primary dimensions of burnout: emotional exhaustion, depersonalization and low personal accomplishment, the score was divided into low, moderate and high.

Results demonstrated that the prevalence of burnout in hospital physicians was higher than family physicians (53.9% versus 41.94%) with statistically significant differences between the two groups ( $p=0.001$ ). Among hospital physicians the highest prevalence was found among the internal medicine physicians (69.64%). The prevalence rate of burnout among study participants was higher than what was found by others in the region; in Yemen it was 11.7%<sup>5</sup> whereas among Tunisia primary care doctors the rate was 33%<sup>6</sup>, and in Saudi Arabia the prevalence rate of burnout syndrome among female physicians working in Ministry of Health hospitals in Jeddah city was 7.3 %<sup>7</sup>. In other areas of the world, several studies also showed that burnout was less prevalent than our study; Linzer et al. (2001) and Bergner (2004), estimated that 22% of physicians in the USA, 27% of physicians in Great Britain<sup>17</sup>, and 20% of physicians in Germany suffered from burnout<sup>18</sup>. In another study conducted by Linzer et al. (2009) involving 422 United States family practitioners and general internists in ambulatory clinics noted that 26.5% reported burnout<sup>19</sup>. In Switzerland, Goebring et al. (2005) added a new aspect by looking at psychosocial and professional characteristics of burnout among 1,755 Swiss primary care practitioners. Results showed that 32% of the physicians had a high score on either the emotional exhaustion or the depersonalization subscales and were considered as having a moderate degree of burnout<sup>20</sup>. The differences in burnout rates across countries can be accounted by the job-demands-resources model, which conceptualizes burnout as a consequence of the imbalance between job pressure and available resources. Healthcare professionals working in

areas known for low burnout rates have lower occupational pressure and more resources; also, the difference in economic and political circumstances among countries may play a major role. The previously mentioned view is supported by results of other studies.<sup>21, 22, 23</sup>

Regarding the risk factors of burnout among physicians, the results of the current study revealed that being a hospital physician presents 11 times more risk of developing burnout than being a family physician (OR=10.96). The result was expected due to the more complex, stressful and irregular pattern of life led by hospital physicians as described by (Balch et al. 2009)<sup>24</sup>. The physician has to work for long hours dealing with life-and-death situations; and, carry out a high volume of procedures and contract with multiple simultaneous deadlines without complaining along with keeping emotions or personal problems from interfering with work. The current also evaluated burnout distribution according to qualification with results showing that prevalence of burnout among assistant lecturers (63.6%) was significantly higher than in the residents/demonstrators (42.6%). This result was not supported in other studies, which concluded individuals relatively new to their jobs scored higher on measures of burnout<sup>25,26</sup>. On the other hand Gaines and Jermier (1983) did not find any differences in the prevalence of burnout according to length of work experience<sup>27</sup>.

As for the sociodemographic variables, being 30 or older was considered a weak protective factor against developing burnout (OR = 0.063), this result was consistent with other studies<sup>28, 29</sup>. According to current study findings, there was no statistically significant difference between male and female participants in the prevalence of burnout. This result parallels studies concluding that gender does not influence burnout development, such as that previously done in (SCUH)<sup>30</sup>, and the survey that was conducted in the Netherlands on

1,426 physicians in primary care and specialties which found no significant gender difference in burnout rates<sup>19</sup>. Findings of the Physician Work life Study did not concur with the current study results. The nationally representative random stratified sample of nearly 6,000 physicians in primary care specialty, which assessed burnout among US physician, concluded that female physicians were 60% more likely than male physicians to report signs or symptoms of burnout<sup>31</sup>.

The present study showed that women tend to report higher depersonalization scores while men tend to report higher emotional exhaustion and low personal accomplishment scores. This result was inconsistent with the results of multiple studies<sup>32</sup>. This may be attributed to differences in how female physicians in our culture try to accommodate workloads in addition to management of family responsibilities.

In the present study, there was a statistically significant relationship between burnout and marital status especially in the low personal accomplishment domain, the prevalence of burnout is higher in married physicians (59.6%) than in unmarried (39.7%) and the risk of developing burnout is five times more among married women. This result differs from studies that found no differences in burnout scores based on the marital status of participants<sup>33</sup> and that considered marital status as protective factor from burnout<sup>34</sup>. This might be explained in light of the limited time available for married female physicians to spend at work. Physicians appear to gain their sense of personal accomplishment from the number of hours they work. Such an attitude can reflect the way in which physicians are being evaluated and the major aim they seek.

The current study findings showed presence of inverse statistically significant relationship between prevalence of burnout and exercise; also, exercise was found as a protective factor against burnout (OR=0.021). This

relationship was expected from literature as it is known that one of the strategies proposed to prevent burnout is physical activity, which is a method used to diminish daily stress and increase psychological well-being. Several studies support this view. In some populations physical exercise correlates with small to moderate decreases in depression<sup>35</sup>. Exercise can reduce anxiety and improve psychological well-being<sup>36</sup>. Depending on the facts of burnout being related to depression, anxiety, and psychological well-being and that physical activity has a positive influence on these factors, these results can be explained.

The results of the current study showed that non-smokers were at risk of developing burnout more than smokers. The explanation of this relationship can be obtained from (Cleveland Clinic, 2008) that mentioned; stressors have two categories: one resides outside the person including economic pressures, difficult work environments, and interpersonal conflicts; and, the second resides within the person including personality patterns, patterns of thinking and acting, unrealistic expectations, unmet needs, and genetics. Individuals, who face stress, also feel emotional exhaustion besides other stress symptoms and they seek help by smoking to cope with stress<sup>37</sup>. From a scientific basis, such finding could be explained since cigarettes contain nicotine, which is an important element for mood altering. Tobacco users feel satisfaction and they possess a false sensation of escaping from stress; in fact, smoking is actually a cruel illusion. Smoking also may enhance the tendency for raised blood pressure, muscle stretching, blood vessels constricting and less availability of oxygen to the brain and body<sup>37</sup>.

Workload was one of the most studied occupational factors in relation to burnout defined either as quantitative demands (number of working hours or number of attended patients) or as perceived workload. The results of the current study showed presence of a

statistically significant relationship between number of patients seen by the physician per day and burnout as the percent of burnout increased from 43.8% to 76.7% with the decrease in number of consulted patients to less than ten per day. This result supported the results of a large number of studies that have considered subjective job experience as a strong burnout antecedent<sup>38,39</sup>. It contradicts other studies that considered number of patients per day a strong predictor for all burnout dimensions<sup>40</sup>. The rationale within the current study result is clarified in the conclusion reached by Shirom (2010): “In burnout development perceived workload is the main determinant while case load and work times contribute indirectly to burnout through perceived workload”<sup>41</sup>.

The present study reported that there was no statistically significant relationship between burnout and work hours/week which come in controversy with the literature that had systematically linked workload to burnout<sup>38</sup>. At the same time, many studies highlighted that extended work shifts expose medical professionals to burnout and serious medical errors<sup>42</sup>. In a desire to reduce medical errors, the Accreditation Council for Graduate Medical Education (ACGME, 2003) limited the working hours for American junior doctors to 80 hours a week<sup>43</sup>. Studies confirm the positive impact of these regulations. Residents were more likely to be involved in serious medical errors when they worked 24-hour shifts while the number of errors was reduced by 36% under the new regulations<sup>44</sup>. Although the authors believe the results regarding the association between burnout and work-induced stress should be viewed with cautious and used primarily to generate hypotheses for future research, the authors doubt that these findings solely reflect biased reporting. Finally, the present study is limited by its cross-sectional design. Future longitudinal studies are required to evaluate the possibility of a causal relationship between work-induced stress and burnout.

## Conclusion

There was a considerable prevalence of burnout among physicians working in clinical departments of SCUH and in family physicians working in family practice centers affiliated to FM/SCU. Practicing exercise is a cheap and effective method that reduces burnout. Smoking is an illusion that gives a false sensation of escaping stress. Perceived work load has significant relation to burnout while being a hospital physician or married are considered strong predictors for the occurrence of burnout.

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## المخلص

تمت الدراسة الحالية على عدد (171) من الأطباء بهدف تحديد الاحتراق المهني والعوامل المرتبطة بحدوثه. أظهرت الدراسة وجود فارق ذو دلالة احصائية في الاحتراق المهني بين اطباء المستشفى واطباء الاسرة. تبين أن نسبة الاحتراق المهني لدى أطباء المستشفى (53,9%) ولدى أطباء الاسرة (41,94%). وكانت أكبر النسب بين أطباء المستشفى لدى اطباء الباطنة والاطباء الجراحين واطباء الطوارئ. كما تبين ان معدل توقع الاحتراق أعلى بين المتزوجين .

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## Methylenetetrahydrofolate Reductase Gene Polymorphisms

### In Saudi Patients with Schizophrenia

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تنوع جينات انزيم المثيلين رباعي الهيدروفولات المختزل لدى السعوديين المصابين بالفصام

أشرف طنطاوي، عبد الحميد اليحيى، ياسر ريا، عبد الرحمن المحاميد، احمد ستين

#### Abstract

**B** **ackground:** Schizophrenia is an often debilitating mental illness that affects approximately 1% of the population. Like most psychiatric disorders, it is a complex disorder that cannot be explained by a single genetic or environmental factor. **Subjects and Methods:** The present study is a case controlled study involving 79 patients fulfilling the ICD-10 criteria of schizophrenia and 82 healthy controls. Patients were interviewed by Diagnostic Interview for Genetic Studies (DIGS/V4.0), Positive and Negative Symptoms Scale (PANSS) and World Health Organization Disability Assessment Schedule (version 2.0) (WHO/ DAS II). All patients and controls were screened for MTHFR 677C>T, 1982A>C gene polymorphisms using the Real-Time PCR technique. **Results:** Frequencies of all genetic variants of MTHFR 677 C>T and MTHFR 677 A>C did not show a significant difference comparing cases to controls ( $p > 0.05$ ). Comparing the frequencies of genetic variants in cases having positive parental consanguinity, family history of schizophrenia or other mental illnesses to negative ones showed also non-significant results ( $p > 0.05$ ). Stratified analysis related to severity scores and associated clinical illnesses showed that cases having the MTHFR 677CC genotype had a higher frequency of severe dysfunction of DAS domain 1 and 6 ( $p = 0.002$  and  $p = 0.0$  respectively), while cases having the MTHFR 1982 AA genotype showed a higher frequency of severe dysfunction of the DAS domain 1 ( $p = 0.04$ ). **Conclusion:** Polymorphisms related to MTHFR 677C>T, 1982A>C were not associated with the susceptibility to schizophrenia among Saudi cases. However, MTHFR 677CC and MTHFR 1982 AA were associated with severe dysfunction of the cognitive function and social interaction.

**Key Words:** Methylenetetrahydrofolate reductase (MTHFR), Schizophrenia, Gene Polymorphism, Saudi Arabia.

**Declaration:** None

#### Introduction

Schizophrenia is a psychiatric disorder, which affects approximately 1% of the world population, usually begins before 25 years of age, and persists throughout life and affects persons of all social classes<sup>1,2</sup>. Schizophrenia, like most psychiatric disorders, is a complex disorder that cannot be explained by a single genetic or environmental factor<sup>1</sup>. The heritability of schizophrenia is estimated to be around 80%, with around 10-fold risk increase in first-degree relatives<sup>3</sup>. Association studies, mainly with candidate genes, have also not provided consistent results<sup>4,5</sup>.

Methylenetetrahydrofolate reductase (MTHFR) is a key regulatory enzyme in folate and homocysteine metabolism. Severe MTHFR deficiency due to the 677C > T and 1298 A>C mutations of the MTHFR gene, has been associated with psychosis, developmental delay, other neuropsychiatric sequelae and the susceptibility for schizophrenia,<sup>6,7,8,9,10,11,12,13,14,15,16,17</sup> and specifically with executive dysfunction severity<sup>18</sup>. The previous finding that the MTHFR 677T allele was protective against positive symptoms was surprising given the lack of association between folate level and positive symptoms<sup>19,20</sup>. The reasons for a selective effect of folate-

related genes on negative symptoms remain unknown and merit further examination. It also remains possible that other genes that regulate methylation could contribute to heterogeneity of positive symptoms in schizophrenia<sup>19</sup>.

Several aspects of COMT function, including its transcription, and its inactivation of dopamine via transmethylation, depend on the availability of one-carbon moieties, which in turn is strongly influenced by the activity of Methylenetetrahydrofolate reductase (MTHFR)<sup>21</sup>. Therefore, it was suggested that MTHFR 677C > T genotype disrupts prefrontal function in schizophrenia through an interaction with COMT 158Val > Met<sup>22</sup>.

This work has been done in order to check for the association of polymorphic variants of MTHFR 677C>T and 1982 A>C with the susceptibility and clinical pattern of schizophrenia among Saudi subjects.

## **Subjects and Methods**

The present study is a randomized case controlled study involving 79 patients with schizophrenia and 82 healthy unrelated controls. Cases were selected by systemic random sample from the mental health hospital in Al-Qassim region, Saudi Arabia. They included 57 males (72.2%) and 22 (27.8%) females. Their mean  $\pm$  SD age of onset of the disease was  $24.3 \pm 7.6$  years. Diagnostic tools were based on a semi-structured psychiatric interview involving the Diagnostic Interview for Genetic Studies Version 4.0<sup>23,24</sup> in addition to the International Classification of Mental and Behavioral Disorders (ICD-10)<sup>25</sup>. Exclusion criteria included cases with intellectual disability, chronic debilitating illness; organic brain disease; substance abuse disorder or psychiatric comorbidities. The controls were selected from blood donors who were absolutely free and with a negative family history of any psychiatric illness. They included 49 (56.1 %) males and 36 (43.9%) females with a mean age  $\pm$  SD of  $27.2 \pm 11.1$  years. Ethical approval was taken from all participants before the start of the study as well as an

approval from the Research and Ethical committees of Qassim University, Saudi Arabia.

### *Measurement of Disability and Severity*

The assessment of severity of schizophrenia was done by the application of a commonly used rating scale: Positive and Negative Symptoms Scale (PANSS) for schizophrenia. To assess a patient using PANSS, an approximately 45-minute clinical interview is conducted. The patient is rated from 1 to 7 (1= absent, 2= minimal, 3= mild, 4= moderate, 5= moderate severe, 6= severe and 7= extreme) on 30 different symptoms based on the interview as well as reports of family members or primary care hospital workers<sup>26</sup>. On the other hand, disability was measured with the World Health Organization Disability Assessment Schedule (version 2.0) (WHO/ DAS II). This interview measures self-reported difficulty of functioning in six major domains that are considered important in most cultures: D1: Understanding and communicating; D2: Getting around; D3: Self-care; D4: Getting along with people; D5: Life activities and D6: Participation in society<sup>27</sup>.

### *DNA Extraction and Real time PCR*

The isolation of DNA was done on a MagNA Pure LC instrument (Roche Molecular Biochemicals, Mannheim, Germany). Real time PCR was done using the light cyclers instrument (Roche Diagnostics, Mannheim, Germany). Oligonucleotide primers and fluorescence-labeled hybridization probes were designed for amplification and sequence-specific detection of both MTHFR gene polymorphisms. The primers and probes were obtained from TIB MolBiol (Berlin, Germany). The master mixture contained 2  $\mu$ l of a 10 $\times$  mixture of Light Cycler FastStart DNA master hybridization probes (Roche Diagnostics), 5 mM MgCl<sub>2</sub> (final concentration), a 1  $\mu$ M final concentration of primers, and a 0.2  $\mu$ M final concentration of hybridization probes. Fluorescence curves were analyzed with the LightCycler software (version 3.5.3). Each run contained the wild type, mutant and

heterozygous standard control DNA in addition to a negative control (blank reagent and water). Each result was confirmed by the specific peak in the corresponding melting curve.

*Statistical Analysis*

Data were processed and analyzed using the Statistical Package of Social Science (SPSS, version 13.0). The frequency of studied genotypic and allelic polymorphisms among cases was compared to that of controls and tested for positive association using Chi square test, Fisher’s exact test and odds ratio (OR) with the 95% confidence interval considering a minimum level of significance of  $P < 0.05^{28}$ .

**Results**

The frequency of genetic variants related to MTHFR 677 C>T and MTHFR 677 A>C polymorphisms among schizophrenic patients compared to controls showed no statistical significant difference trying different models of inheritance as the recessive (homozygosity of rare allele vs. others), codominant (homozygosity or heterozygosity of rare allele vs. homozygosity of wild type allele) and overdominant (heterozygosity v. others) patterns (Table 1). Hardy-Weinberg equilibrium showed also no significant deviation of the observed frequencies from that of the expected ones, both among cases and controls

indicating a fairly selected population sample with no particular differences of cases and controls (Table 1). Evaluation of the subtypes of schizophrenic patients revealed that out of them, the undifferentiated schizophrenia was the most common subtype (31, 39.24%), followed by the paranoid (25, 31.65%), then the residual (18, 22.78%) and the hebephrenic (5, 6.33%) subtype. Genetic predisposition of the disease was shown by the fact that 21 (26.58%) cases had a positive family history of schizophrenia, while 18 (22.78%) cases had a family history of other mental disorder while only 7 (8.86%) cases had positive parental consanguinity. Hypertension and diabetes were found among 12 (15.19%) and 16 (20.25%) cases respectively. Comparing genetic variants in subgroups of cases regarding their gender, positive family history of schizophrenia or other mental disorders and consanguinity showed also non-significant statistical difference (Table 2, 3). Evaluation of severity and disability scores through calculation of their mean  $\pm$  SD (Table 4) related to their individual genetic background showed a significant dysfunction of the domain 6 (participation in society) was observed among cases having the MTHFR 677TT and 1982CC genotypes while a dysfunction of the domain 1 (Understanding and communication) was only associated with the MTHFR1982CC genotype (Table 4).

**Table 1:** Gene polymorphic variants related to MTHFR 677 C>T and MTHFR 677 A>C among Cases of schizophrenia compared to controls

	Cases n (%)	Controls n (%)
Total	76 (100.0)	82 (100.0)
<b>MTHFR 677 C&gt;T</b>		
CC	56 (73.7)	58 (70.7)
CT	16 (21.1)	20 (24.4)
TT	4 (5.3)	4 (4.9)
Recessive (TT vs. CC+CT)	$p = 1.0$	OR (95% CI) = 1.0 (0.3-4.3)
Codominant (TT vs. CC)	$p = 0.75$	OR (95% CI) = 1.0 (0.2-4.3)
Codominant (TC vs. CC)	$p = 0.77$	OR (95% CI) = 0.83 (0.4-1.8)
Overdominant (TC vs. CC+TT)	$p = 0.8$	OR (95% CI) = 0.8 (0.4-1.7)
HWE	$\chi^2 = 3.2, p = 0.07$	$\chi^2 = 1.6, p = 0.2$
<b>MTHFR 1298 A&gt;C</b>		
AA	30 (44.1)	43 (53.8)

Methylenetetrahydrofolate Reductase Gene Polymorphisms

<b>AC</b>	33 (48.5)	34 (42.5)
<b>CC</b>	5 (7.4)	3 (3.8)
<i>Recessive (CC vs. AA+AC)</i>	$p = 0.5$	$OR (95\% CI) = 1.8 (0.4-7.7)$
<i>Codominant (CC vs. AA)</i>	$p = 0.4$	$OR (95\% CI) = 2.4 (0.5-10.4)$
<i>Codominant (AC vs. AA)</i>	$p = 0.4$	$OR (95\% CI) = 1.4 (0.7-2.7)$
<i>Overdominant (AC vs. CC+AA)</i>	$p = 0.6$	$OR (95\% CI) = 1.3 (0.7-2.4)$
<b>HWE</b>	$\chi^2 = 1.0, p = 0.2$	$\chi^2 = 1.4, p = 0.2$

**Table 2:** Gene polymorphic variants related to *MTHFR* 677 C>T and *MTHFR* 677 A>C among cases of schizophrenia in relation to their demographic parameters.

	<b><i>MTHFR</i> 677C&gt;T</b>			<b><i>MTHFR</i> 1982A&gt;C</b>		
	<b>CC n (%)</b>	<b>CT n (%)</b>	<b>TT n (%)</b>	<b>CC n (%)</b>	<b>CT n (%)</b>	<b>CC n (%)</b>
<b>Gender</b>						
Males	43 (78.2)	10 (18.2)	2 (3.6)	22 (43.1)	25 (49.0)	4 (7.8)
Females	13 (61.9)	6 (28.6)	2 (9.5)	8 (47.1)	8 (47.1)	1 (5.9)
<i>P</i>	0.3			0.9		
<b>Consanguinity</b>						
Negative	51 (73.9)	14 (20.3)	4 (5.8)	29 (46.0)	29 (46.0)	5 (7.9)
Positive	5 (71.4)	2 (28.6)	0 (.0)	1 (20.0)	4 (80.0)	0 (.0)
<i>P</i>	0.7			0.3		
<b>Family history of schizophrenia</b>						
Negative	40 (72.7)	12 (21.8)	3 (5.5)	23 (45.1)	23 (45.1)	5 (9.8)
Positive	16 (76.2)	4 (19.0)	1 (4.8)	7 (41.2)	10 (58.8)	0 (.0)
<i>P</i>	0.9			0.3		
<b>Family history of mental illness</b>						
Negative	44 (74.6)	12 (20.3)	3 (5.1)	24 (43.6)	26 (47.3)	5 (9.1)
Positive	12 (70.6)	4 (23.5)	1 (5.9)	6 (46.2)	7 (53.8)	0 (.0)
<i>P</i>	0.9			0.5		

**Table 3:** Gene polymorphic variants related to *MTHFR* 677 C>T and *MTHFR* 677 A>C among cases of schizophrenia in relation to their clinical parameters.

	<b><i>MTHFR</i> 677C&gt;T</b>			<b><i>MTHFR</i> 1982A&gt;C</b>		
	<b>CC n (%)</b>	<b>CT n (%)</b>	<b>TT n (%)</b>	<b>AA n (%)</b>	<b>AC n (%)</b>	<b>CC n (%)</b>
<b>Subtypes</b>						
paranoid	19 (79.2)	3 (12.5)	2 (8.3)	8 (40.0)	9 (45.0)	3 (15.0)
Hebephrenic	4(80.0)	1(20.0)	00.0	1(20.0)	4(80.0)	00.0
residual	15 (65.2)	6 (26.1)	2 (8.7)	11 (52.4)	10 (47.6)	0 (.0)
undifferentiated	22 (75.9)	7 (24.1)	0 (.0)	11 (40.7)	14 (51.9)	2 (7.4)
<i>p</i>	0.4			0.4		
<b>Diabetes</b>						
Negative	42 (70.0)	14 (23.3)	4 (6.7)	25 (44.6)	27 (48.2)	4 (7.1)
Positive	14 (87.5)	2 (12.5)	0 (.0)	5 (41.7)	6 (50.0)	1 (8.3)
<i>P</i>	0.3			0.98		
<b>Hypertension</b>						
Negative	47 (72.3)	14 (21.5)	4 (6.2)	25 (41.7)	31 (51.7)	4 (6.7)
Positive	9 (81.8)	2 (18.2)	0 (.0)	5 (62.5)	2 (25.0)	1 (12.5)
<i>P</i>	0.7			0.4		
<b>Metabolic syndrome</b>						
Negative	51 (71.8)	16 (22.5)	4 (5.6)	28 (43.8)	32 (50.0)	4 (6.3)
Positive	5 (100.0)	0 (.0)	0 (.0)	2 (50.0)	1 (25.0)	1 (25.0)
<i>P</i>	0.4			0.3		

**Table 4:** Gene Polymorphic Variants Related to *MTHFR* among Schizophrenic Patients In Relation to Severity of Illness and Disability Scores.

Scores	<i>MTHFR 677 C&gt;T</i>		
	<i>CC</i>	<i>CT</i>	<i>TT</i>
PANSS P	3.68 ± 1.36	3.75 ± 1.48	4.00 ± 2.31
PANSS N	3.69 ± 1.55	3.69 ± 1.74	3.50 ± 1.92
PANSS GP	4.23 ± 1.27	4.69 ± 0.87	4.50 ± 1.00
DAS-II D1	3.23 ± 0.69	3.06 ± 0.77	2.75 ± 1.50
DAS-II D2	3.14 ± 0.70	3.31 ± 0.60	3.00 ± 0.82
DAS-II D3	3.27 ± 0.84	3.19 ± 0.83	2.75 ± 1.50
DAS-II D4	3.32 ± 0.79	3.50 ± 0.82	4.00 ± 0.82
DAS-II D5	3.32 ± 0.72	3.56 ± 0.73	3.50 ± 0.58
DAS-II D6	3.21 ± 0.85	3.69 ± 0.60	4.00 ± 1.16*
	<i>MTHFR 1982 A&gt;C</i>		
	<i>AA</i>	<i>AC</i>	<i>CC</i>
PANSS P	3.70 ± 1.26	3.48 ± 1.33	4.00 ± 1.87
PANSS N	3.70 ± 1.60	3.73 ± 1.40	2.80 ± 1.92
PANSS GP	4.33 ± 1.21	4.09 ± 1.18	5.20 ± 0.84
DAS-II D1	3.10 ± 0.85	3.09 ± 0.63	4.00 ± 0.50*
DAS-II D2	3.13 ± 0.68	3.06 ± 0.70	3.60 ± 0.55
DAS-II D3	3.20 ± 1.03	3.21 ± 0.78	3.20 ± 0.84
DAS-II D4	3.47 ± 0.82	3.24 ± 0.66	3.60 ± 1.14
DAS-II D5	3.30 ± 0.75	3.48 ± 0.76	3.40 ± 0.55
DAS-II D6	3.57 ± 0.82	3.13 ± 0.80	3.80 ± 0.84*

PANSS P= Positive & Negative Symptoms Scale Positive Score, PANSS N= Positive & Negative Symptoms Scale Negative Score, PANSS GP= Positive & Negative Symptoms Scale General Psychopathology Score, DAS-II = Disability Assessment Schedule V 2, D1= Understanding and communicating, D2= Getting around, D3= Self-care, D4= Getting along with people, D5= Life activities, D6= Participation in society and \* = Statistically significant as (p<0.05).

## Discussion

The present study was done in order to check for the association of genetic polymorphisms of two important gene polymorphisms of *MTHFR* gene in schizophrenia among Saudi affected cases. Although, a number of studies including a meta-analysis have suggested an association between schizophrenia and *MTHFR* polymorphism in several populations 7,8,9,10,11,12,13,14,15,16,17,18,19, the present study failed to demonstrate any significant association between these polymorphisms and the susceptibility to schizophrenia among Saudi subjects. Nonetheless, this negative association was also reported in other studies and meta-analyses among several other populations 29,30,31,32,33,34,35,36,37,38,39,40,41,42. Such inconsistent and controversial results might be confirmatory of the complex nature of the disease being presumably having polygenic or multifactorial basis. It might also be

explained by the ethnic diversity and differing environmental factors. Technical errors might also warrant further research work with more precise methodologies and larger population samples.

Schizophrenia among Saudi cases of this study had some issues pointing to its genetic background like the positive family history of schizophrenia among more than one fourth of the cases, and positive family history of mental disorders among more than one fifth of them, and a positive parental consanguinity in approximately 9% of them. However, these subgroups did not show an association with the genetic variants of *MTHFR* gene. Also, these genetic variants were not associated with schizophrenia subtypes, other clinical disorders like diabetes and hypertension. These results are consistent with prior reports on the negative genetic association with subtypes of schizophrenia<sup>41,42,43,44</sup>, although some linkage

and association studies had suggested that some susceptibility genes are etiologic factors for more or less specific subtypes of schizophrenia<sup>45</sup>.

This study showed also a negative association between positive and negative disease manifestations. These results are inconsistent with some other studies that showed some association<sup>21,43,44,46,47,48</sup> and also are in agreement with other studies that failed to show any association<sup>20,41,42,49,50</sup>. On the other hand, the present study showed a particular pattern of association with genetic background as seen among cases with moderate and severe dysfunction of the DAS domain 1 (Cognitive function) who had a higher frequency of the MTHFR 677TT or the 1982CC genotypes and cases with the moderate and severe dysfunction of the DAS domain 6 (participation in society) had a higher frequency of the MTHFR 677CC homozygous polymorphism. These findings are inconsistent with most of the previous studies<sup>5,40,51</sup>. The majority of the individuals with schizophrenia were treated with antipsychotic medication and most of these individuals were treated with atypical drugs. Medication status could have interacted with the influences of MTHFR genotypes in our study. Our findings demonstrate that MTHFR genotype influences DLPFC function in schizophrenia. Moreover, they support the hypothesis that MTHFR genotype augments prefrontal dopamine, but whether this has beneficial or detrimental effects on DLPFC function may depend on several other factors influencing prefrontal dopamine signaling. Additional work examining the effects of MTHFR genotype on COMT promoter methylation profiles and on more direct measures of dopamine signaling could further illuminate the interactive contributions of MTHFR and COMT genotype to prefrontally mediated cognitive dysfunction in schizophrenia and suggest targets for treatment. The difference can be explained by the relatively small sample size, which might have limited detecting associations between MTHFR gene and subtypes of schizophrenia.

Larger studies that are powered to interrogate broader systems of epigenetic control might help clarify how methylation status influences positive vs. negative symptoms.

We can come to the conclusion that polymorphisms related to MTHFR 677C>T, 1982A>C were not associated with the susceptibility to schizophrenia among Saudi cases. However, MTHFR 677CC and MTHFR1982AA genotypes might be associated with some clinical pattern of the disease like cognitive function and social interaction.

### **Acknowledgement**

Authors are grateful to King AbdulAziz City for Science and Technology for totally sponsoring this scientific work. Authors also show their appreciation and gratitude for the staff of The Ministry of Health, Buraydah Mental Health Hospital, Al-Qassim- KSA for their help and cooperation.

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## المخلص

**المقدمة:** الفصام هو مرض من أغلب الأمراض العقلية المنهكة والتي تؤثر على ما يقرب من 1% من السكان. الفصام مثل معظم الاضطرابات النفسية فهو اضطراب معقد لا يمكن تفسيره بعامل وراثي أو بيئي واحد. **حالات وطرق البحث:** تعتبر هذه الدراسة دراسة محكمة شملت 79 مريض فصام مشخصين طبقاً لمعايير التصنيف الدولي العاشر و82 شخص سليم كمجموعة حاكمة. وأجريت مقابلات مع مرضى الفصام بأدوات مختلفة والتي تشمل المقابلة التشخيصية للدراسات الجينية الطبعة الرابعة، مقياس الأعراض الإيجابية والسلبية لشدة المرض وجدول تقييم العجز لمنظمة الصحة العالمية الإصدار الثاني. تم فحص عينات الدم لجميع المرضى والمجموعة الحاكمة بتحليل الحمض النووي لبدائل جين انزيم المثيلين رباعي الهيدروفولات المختزل لتحديد نوعية الأشكال الجينات عن طريق جهاز الريال تايم ب س آر. **النتائج:** لم تظهر تعدد جميع الاختلافات الوراثية لبدائل جين انزيم المثيلين رباعي الهيدروفولات المختزل اختلاف ذات دلالة احصائية بمقارنة مرضى الفصام بالضوابط، سواء كانت في نماذج وراثية متتالية أو سائدة أو مضافة. ( $P > 0.05$ ) وبينت مقارنة تعدد الاختلافات الجينية بين الحالات التي يوجد قرابة بين الأبوين والحالات التي لديها تاريخ عائلي بالفصام أو الاضطرابات النفسية الأخرى والحالات الأخرى عدم وجود نتائج ذات دلالة احصائية. ( $P > 0.05$ ) بينما أظهر التحليل الطبقي علاقة ذات دلالة احصائية بين نمط الجين السائد سى سى وبين شدة التدهور نتيجة المرض وذلك الوظائف المجموعة 1 والمجموعة 6 من جدول تقييم العجز لمنظمة الصحة العالمية الإصدار الثاني ( $p=0.002$ ) و ( $p=0.0$  بالترتيب). كما أظهر التحليل الطبقي علاقة ذات دلالة احصائية بين نمط الجين السائد او بين شدة التدهور نتيجة المرض وذلك الوظائف المجموعة 1 من جدول تقييم العجز لمنظمة الصحة العالمية الإصدار الثاني ( $p=0.04$ ). **التوصيات:** تعدد الاشكال تشير لبدائل جين انزيم المثيلين رباعي الهيدروفولات المختزل لم يكن مصاحب للاستعداد للاضطراب بين مرضى الفصام السعوديين. بينما بدائل الجين السائدة سى سى واه اه كانت مصاحبة لشدة التدهور فى الوظائف المعرفية والتفاعل الاجتماعي .

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## The Disability Profile of Individuals with Schizophrenia in Bahrain Using the Life Skills Profile 39

أوجه الإعاقة لدى الأشخاص المصابين بالفصام في مملكة البحرين باستخدام مقياس المهارات الحياتية 39

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### Abstract

**Aim:** The primary objective of the present study is to describe the disability profile of individuals with schizophrenia in the Psychiatric Hospital Bahrain as measured by the Life Skills Profile 39 (LSP 39). Secondary objective to this research is to compare the disability profile of individuals with schizophrenia in Bahrain with other countries as measured by LSP 39. **Method:** The LSP 39 was administered to a convenient sample of those individuals with schizophrenia who were admitted to the Psychiatric Hospital, Bahrain during the period 2009-2012. Three registered occupational therapists completed all questionnaires with the patients. Overall, N= 279 participants were considered for the research. **Results:** N=247 participants with schizophrenia were recruited to the study. Total mean score of LSP 39 for the entire subjects 110.59 (*SD*= 13.19). Maximum subscales scores were for communication; minimum subscales scores were for social contact. Women generally functioned better than men; differences however were not statistically significant. Bahrain scores were higher than Singapore and India but lower than Australian, American and United Kingdom. **Conclusion:** Findings suggest the general disability profile of all subjects at inclusion showed that a moderate level of functioning is maintained. Gender differences in term of life skills functioning seem to be non-significant. Regional differences in the disability profile of individuals with schizophrenia are influenced by the manner in which health and social services are delivered through a complex network of organizations and people.

**Keywords:** Life Skills Profile 39, Bahrain, schizophrenia, disability, function

**Declaration of interest:** None

### Introduction

Schizophrenia is viewed as one of the most debilitating and disabling illness in psychiatry<sup>1</sup>. Schizophrenia affects both men and women equally, with men having a greater precedence and at earlier ages than women<sup>2, 3</sup>. The illness is characterized by a breakdown of thought processes commonly manifested as auditory hallucinations, paranoid or bizarre delusions, disorganized speech and thoughts<sup>3</sup>.

The disability level of a person increases when the disease is present at young age<sup>1,3</sup>. It has been estimated that more than 60% of people with schizophrenia have

severe disability, which usually appears in the first five years after onset<sup>1</sup>.

Relapses, poor functioning and social dysfunction are therefore key features in schizophrenia<sup>3</sup>. Poor functioning has been attributed to four elements: (1) acute positive symptoms, (2) negative symptoms, (3) secondary handicaps, e.g. institutionalization, stigma and discrimination, and (4) extrinsic disadvantages, e.g. lack of social support and unemployment<sup>4</sup>.

Although the negative symptoms of schizophrenia are considered to be one of the prominent factors affecting functioning, it has been found that cognitive functioning has the most significant correlation with functional state and adaptive functioning namely amongst chronically

hospitalized patients with poor outcomes<sup>5,1</sup>. This supports the view that cognitive functioning is a determinant of life skills and that real world disability is the product of a complex array of ability, deficits and symptoms<sup>1</sup>.

Life skills are the set of human skills acquired via learning or direct experiences that are used to handle problems and questions commonly incorporated in daily life. The World Health Organization (WHO, 1997) has defined life skills as “the abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life”<sup>6</sup>. Individuals with schizophrenia have shown relatively lower competence and are dependent on their daily living skills because of their prolonged illness and most of them experience detachment from their reality living<sup>7</sup>.

Life skills training is a common intervention used in psychosocial rehabilitation with persons with schizophrenia<sup>8</sup>. Occupational therapists mainly interested in the assessment of daily living skills, leisure activities, and work related tasks<sup>9</sup>.

In the late 1980’s, Alan Rosen and his colleagues studied and developed the Life Skills Profile (LSP 39) as a measure for schizophrenia and initially focused on different aspects of the functions that affect survival and adaptation in the community<sup>4</sup>. Later, it was been applied in hospital-based setup to study the level of disability. The LSP provides greatly improved coverage of especially psychotic problems, which contribute significantly to disability<sup>10</sup>. The LSP has high inter-rater reliability and high test-retest reliability among the individuals with schizophrenia and it has been applied with both hospital-based and community settings<sup>11,12</sup>.

The five dimensions assessed by the LSP 39, which are: (1) self-care, (2) non-turbulence behavior, (3) social contact, (4) communication, and (5) responsibility for disease management correspond very well to the three activities domains emphasized by occupational therapists (1) self-care, (2) leisure and (3) work related activities<sup>13</sup>.

The primary objective of the present study was to examine the disability profile of individuals with schizophrenia in Bahrain using the LSP 39. The secondary objective was to compare the disability profile of individuals with schizophrenia in Bahrain with other countries using the LSP 39.

The authors performed an electronic search using several databases (Google Scholar, PsycINFO, OT Seeker, Cochrane Database, PubMed, CINAHL, and ProQuest medical) about the disability profile of persons with schizophrenia in Bahrain. On careful review, it was found that there were no studies related to this subject, thereby adding strength to the need for this particular research.

## **Methodology**

The main purpose of the present study was to examine the disability profile of individuals with schizophrenia using the LSP 39. The research had two formal objectives as below:

### **Study objectives:**

- To examine the disability profile of people diagnosed with schizophrenia using the LSP 39
- Compare the disability profile of individuals with schizophrenia in Bahrain based on participants gender
- Compare the disability profile of individuals with schizophrenia in Bahrain with other countries using the LSP 39

Participants were chosen by convenience sampling method by three qualified occupational therapists responsible for the administration of the tool. The three therapists were informed about the aim of the research because they were on the research team.

Participants were selected among the in-patients of the acute and sub-acute men and women wards of The Psychiatric Hospital, Bahrain. All patients admitted to hospital from 2009-2012 with schizophrenia were included along with patients attending occupational

therapy services on the outpatient basis who had the life skills assessment specified in their doctor referrals.

Participants also had to satisfy the inclusion criteria:

- Willingness to participate in the research.
- Adults aged between 18 years to 65 years.
- Persons with a diagnosis of schizophrenia of any type.
- No intellectual disabilities.
- No co-existing alcohol or drug abuse or psychosis due to alcohol or drug abuse.
- No physical disability.

### **Setting**

This present study was conducted at the Occupational Therapy Department, Psychiatric Hospital, Bahrain over the period of three years (2009 – 2012).

Bahrain is a small island state near the western shores of the Arabian Gulf. The Psychiatric Hospital was established in the capital Manama in 1948. The Psychiatric Hospital is the only public center specialized for providing mental health services on the island. There is an outpatient department, 13 inpatient wards, community psychiatric services, child and adolescent psychiatry, a day care unit, long-stay wards, two psycho-geriatric wards and a rehabilitation department.

A mental health act is still under study by the Ministry of Health, Bahrain. Patients are admitted to the Psychiatric Hospital mainly on voluntary basis or at the request of their families and relatives. Fewer cases are admitted at the request of court or police for assessment and report.

### **Instrument**

The measurement scale used in the present study was the Life Skill Profile 39 developed by Rosen and colleagues (1989). The scale was developed mainly for individuals with schizophrenia and is valuable for assessing their function and disability<sup>14</sup>. It focuses on different aspect of functions that affect survival and adaptation in the community and thereby of considerable use when

assessing functional status of the patients. This enables the therapists to assess the areas of disability and plan treatment strategies.

The LSP 39 is a 39-item scale with five subscales/domains. The five subscales/domains of LSP are self-care, non-turbulence, social contact, communication and responsibility.

Each item is scored on a four point ordinal rating and the anchor points added to each item are: “four” (4) no difficulty; “three” (3) slight difficulty; “two” (2) moderate difficulty and “one” (1) extreme difficulty. Higher score means lesser the disability and greater functioning and vice versa. Potential total scores range from 39 to 156 and in which lower scores suggests lower function and higher score for better function<sup>14</sup>.

Below is the presentation of number of total items, and two sample items for each domain:

Self-care (10 items): “Is this person generally well groomed, e.g., neatly dressed, hair combed?” and “Does this person wash himself or herself without reminding?”

Non-turbulence (12 items): “Is this person generally angry or prickly towards others?” and “Does this person generally take offence readily?”

Social contact (6 items): “Does this person generally withdraw from social contact?” and “Does this person generally show warmth to others?”

Communication (6 items): “Does this person generally have any difficulty with initiating and responding to conversation?” and “Does this person generally intrude or burst in on others’ conversation, e.g. interrupts you when you are talking?”

Responsibility (5 items): “Does this person generally look after and take her or his own prescribed medication (or attend for prescribed injections on time) without reminding?” and “Is this person willing to take psychiatric medication when prescribed by a doctor?”

Brief versions of the Life Skills Profile (20-items) and (16-items) were available, but a decision was taken to proceed with the LSP 39 because it is more comprehensive as an outcome measure. The LSP 39 has

been closely studied and the instrument has been used in several studies around the world allowing comparison later on<sup>15,16,17,18</sup>.

The LSP 39 items are framed with examples and are free from jargon and hence can be administered by either professionals or non-professionals with equal ease. The scale has to be completed by an objective rater who has close association with the client and has observed his or her behavior for at least three months. The scale was administered to the participants by his/her respective occupational therapist after developing rapport and trust. The LSP 39 takes 20-25 minutes to administer.

Three therapists who spoke Arabic and English fluently were involved in the data collection process. The English language version of the LSP 39 was administered for English language speakers. For the Arabic language speakers, the therapists used a standard translation version from English to Arabic of the LSP 39 items. The researchers used the standard protocol of translation and back translation in developing the Arabic translations of the original LSP 39 questions. The Arabic translation was tested on a small number of patients before using it in the research. For all of the patients, the therapists completed the LSP 39 when evaluating the patient's life skills.

### ***Ethical Approval***

Ethical approval was sought and granted from the appropriate authorities (Research Committee, Ministry of Health, and Bahrain) on 15 July 2009. The relevant consultants were informed about the research and verbal consent obtained from the patients to use their information.

Anonymity of the patients was safeguarded during the study by the following mechanisms:

- Each subject was coded and there were no names or identification information attached to the survey.

- Demographic data included only the age and gender details and these were used only for the purposes of research.

### ***Data Analysis***

The collected data was analyzed using the Statistical Package for Social Science version 18 for windows (PASW/SPSS 18.0) and the demographic data analysis was completed on the following variables: age and gender and it was subjected to the following analysis: mean standard deviation, maximum, and minimum. Inferential statistics in the form of independent samples t-test was used to test statistical differences between men and women.

### **Results**

Overall, 279 potential participants were considered for the research. Six patients were excluded because of significant physical disability, e.g. amputation and 26 persons with schizophrenia did not wish to participate in the research; of the 26 persons who did not wish to participate 24 were women.

For the current study, N=247 participants with schizophrenia were recruited of which 61.1% were men and 38.9% were women (n=151 men, n=96 women). It was found that 89 36% patients were between the ages of 20 to 30 years, 79 32% were between the ages of 31 to 40 years,  $M= 34.6$  years ( $SD= 11.1$ ).

Approximately 40% were diagnosed with paranoid subtype of schizophrenia; approximately 10% were diagnosed with hebephrenic subtype of schizophrenia and the 50% remaining cases were undifferentiated subtype of schizophrenia. Diagnoses were made in accordance to the ICD-10 criteria.

Item responses were checked for normality by analyzing the skewness and kurtosis for each item in the LSP 39. Scores were within the  $\pm 1$  acceptable range; therefore no items were eliminated from the analysis due to distribution normality.

Procedure Cronbach alpha, a measure of internal consistency, was used to test the reliability of the obtained data. Cronbach alpha measures how well a set of items or variables measures a single construct. Alpha statistic for the entire 39 items was above 0.90 indicating an excellent level of internal consistency. For the five subscales an alpha measure greater than 0.75 was obtained for all of the five subscales indicating an acceptable-good level of internal consistency. Statistic “scale if item deleted” was computed during the Cronbach alpha procedure, no critical change in alpha was achieved if items were removed.

Reporting reliability is very important in any research, reliability is defined simply as the instrument ability to be coherent with itself. Several approaches are usually used in reliability measurement. First, internal consistency, which is defined as the degree to which responses to individual items in a multiple-item measure are consistent with each other. Second, test-retest reliability, which is defined as the measurement ability to produce same results over time under the same conditions. Third inter-rater reliability, which is inter-rater agreement or concordance, is the degree of agreement among raters. In the present research study internal consistency approach was used by computing the coefficients of items defining on single domain in the

LSP 39. The test-retest reliability and the inter-rater reliability were not computed because they were beyond the original aims of the research. Nonetheless, the authors acknowledge other papers focusing on the psychometric properties of the LSP 39 should focus on the test-retest reliability and the inter-rater reliability.

Gaski approach to construct validity was followed in this research. Convergent validity was judged by correlating all of the items under each domain of the LSP 39, e.g. under the domain responsibility we correlated the items “Does this person generally look after and take her or his own prescribed medication (or attend for prescribed injections on time) without reminding?”, “Is this person willing to take psychiatric medication when prescribed by a doctor?”, “Does this person co-operate with health services (e.g. doctors and/or other health workers)?”, “Does this person lose personal property?” and “Does this person take things which are not his or hers?..”. Correlation coefficients provided evidence that the items all converged on the same domain with different correlation strengths and significance for the five domains.

The five domains were also correlated to judge their convergent validity of the LSP 39 as an instrument. The results were generally positive significant relationships. See Table 1.

**Table 1:** Correlations between the domains to verify construct validity

		Self-care	Non-Turbulence	Social Contact	Communication	Responsibility
<b>Self-care</b>	<b>r</b>	1				
	<b>Sig.</b>					
<b>Non-Turbulence</b>	<b>r</b>	0.233**	1			
	<b>Sig.</b>	0.000				
<b>Social Contact</b>	<b>r</b>	0.577**	0.247**	1		
	<b>Sig.</b>	0.000	0.000			
<b>Communication</b>	<b>r</b>	0.525**	0.272**	0.353**	1	
	<b>Sig.</b>	0.000	0.000	0.000		
<b>Responsibility</b>	<b>r</b>	0.444**	0.472**	0.397**	0.395**	1
	<b>Sig.</b>	0.000	0.000	0.000	0.000	

The total mean score of LSP 39 for the entire subjects  $M=110.59$  ( $SD=13.19$ ), minimum score 81 and maximum score 149.

Overall, LSP 39 scores of entire subjects demonstrated an above average function in all the five subscales: (1) self-care (27.04 out of a maximum possible of 40.00), (2) non-turbulence (35.79 out of a maximum possible of

48.00), (3) social contact (12.85 out of a maximum possible of 24.00), (4) communication (19.25 out of a maximum possible of 24.00), and (5) responsibility (15.38 out of a maximum possible of 20.00). See Table 2.

The total mean score of men LSP 39 were slightly higher than women  $M=111.00$  ( $SD=13.94$ ),  $M=109.94$ , ( $SD=11.98$ ), respectively. Men had greater dispersion of values than women as shown by the larger standard deviations. Nonetheless, differences between men and women on the entire LSP 39 scores were statistically non-significant. See Table 2.

**Table 2:** Life Skills Profile 39 for the entire sample

Life Skill Profile 39	Entire Sample n=247				
	M	SD	Min	Max	CI 95% (Low, High)
Self-care	27.04	4.82	13.00	39.00	26.44, 27.65
Non-turbulence	35.79	5.73	16.00	48.00	35.06, 36.51
Social Contact	12.85	3.20	7.00	24.00	12.45, 13.73
Communication	19.25	2.77	11.00	24.00	18.90, 19.60
Responsibility	15.38	2.12	11.00	20.00	15.12, 15.65
Overall LSP 39	110.59	13.19	81.00	149.00	108.66, 112.02

On a detailed comparison of the mean scores between men and women diagnosed with schizophrenia, using procedure independent samples t-test, it was found that women had higher LSP 39 score on four sub scales out of the five; these were self-care, non-turbulence, social contact, and responsibility. The difference between

women and men on the above four subscales were however not statistically significant at the 0.05 level. For the subscale “communication” men had higher scores. Independent samples t-test showed that the differences between men and women on this domain were significant. See Table 2.

**Table 3:** Significant differences between men and women

Life Skill Profile-39 Components	Men (n=151)				Women (n=96)				Independent Samples t-test
	M	SD	Min	Max	M	SD	Min	Max	
Self-care	26.99	5.01	13.00	39.00	27.13	4.55	14.00	37.00	0.82
Non-turbulence	35.56	6.47	16.00	48.00	36.14	4.36	26.00	47.00	0.44
Social contact	12.64	3.27	7.00	24.00	13.17	3.07	7.00	21.00	0.20
Communication	19.87	2.54	14.00	24.00	18.30	2.84	11.00	24.00	*0.001
Responsibility	15.42	1.98	11.00	20.00	15.33	2.32	12.00	20.00	0.74
Overall LSP 39	111.00	13.94	81.00	149.00	109.94	11.98	84.00	140.00	0.81

\*P<0.05

## Discussion

Our findings for the sample of 247 individuals with schizophrenia shows that the total percentage of male participants (61%) was higher compared to women 39%.

More than two-third of our participants were below the age of 40 years, with one-third of them below the age of 30 years. This shows that our participants were having an early age of schizophrenia onset<sup>1</sup>. In the context of Arab region people have stigma of going to a psychiatric hospital in the early stage of any mental illness,<sup>19</sup> but our sample suggests that there are an increasing number of patients seeking earlier treatment and rehabilitation. The majority of our samples were diagnosed to have paranoid type of schizophrenia, with 40% of them having this diagnosis<sup>20</sup>. For rehabilitation therapists this can be important data because the prognosis for paranoid type is the best. These individuals have impaired thoughts and atypical thinking; they are however better able to function in life than other subtypes of schizophrenia<sup>21</sup>. Paranoid schizophrenia generally tends to have more of the positive rather than the negative symptoms. Therefore, therapists should intervene with this subtype as soon as they are admitted to prevent disability and improve rehabilitation outcomes.

The present research aimed to study the level of disability of individuals with schizophrenia; for all 247 participants LSP 39 mean scores were  $M=110.59$  ( $SD=13.19$ ), (Confidence Interval 95%, lower limit 108.66, upper limit 112.02). Potential total scores range from 39 to 156 and in which lower scores suggests lower function and higher scores for better function. Our results were higher than a Singapore study  $M=108.8$ <sup>25</sup> and an Indian study  $M=101.69$  ( $SD=23.04$ ) for men and  $M=95.74$  ( $SD=16.53$ ) for women<sup>11</sup>. Our mean scores for all participants was shown to be lower than that reported in an Australian study  $M=118$  ( $SD=17.7$ )<sup>4</sup>, an American study sample  $M=124.41$  ( $SD=14.97$ )<sup>22</sup> and a United Kingdom study  $M=128$  ( $SD=18$ )<sup>23</sup>.

The researchers infer that regional differences in the disability profile of individuals with schizophrenia is influenced by the manner in which health and social services are delivered through a complex network of organizations and people. Developed countries appear to

have the advantage as shown clearly in UK and US studies having the best functioning profile for schizophrenia. In rehabilitation practice planning an individually tailored program of therapeutic activities and validation of treatment modality being adopted is essential. It attains prioritizing of goals concerning performance.

The LSP 39 score would serve as a guide for goal setting and helps justifying the choice of interventions by focusing directly on areas of insufficient skills. Skills' training is a commonly used occupational therapy intervention in the rehabilitation of people with schizophrenia that has proven to be associated with statistically significant improvement in the living skills of adults with persistent schizophrenia<sup>24</sup>. The life skills profile can form the basis for planning skills training programs for patients within the hospital setting to facilitate their reintegration into the community and it can act as a predictor of their readiness to be discharged. Detailed examination of the five subscales that make up the LSP 39, for the entire Bahrain sample ( $N=247$ ) reveals that our sample has a "moderate" level of functioning in all five subscales (self-care, non-turbulence, social contact, communication, and responsibility).

The total mean score of non-turbulence, social contact, and communication skills was lower when compared with the Indian and Singapore study results, but the overall results of the LSP 39 subscale is close to similar value of Australian results except non-turbulence (35.79).

The present study suggests that men  $M=111.0$  ( $SD=13.94$ ) are slightly better in life skills than women  $M=109.94$  ( $SD=11.98$ ). The finding concur previous findings from India, Singapore, Australia, UK and USA. For example, Eu and colleagues concluded that men have lower disability profiles than women<sup>25</sup>.

The use of LSP 39 as an outcome measure would contribute to demonstrating therapeutic outcomes gained post-intervention and it can be considered as an indicator

of the effectiveness of therapeutic interventions that have been offered, hence ensuring the credibility of psychosocial rehabilitation as an intervention. It has been found that basal level of functioning seems to be a reliable predictor of later functioning. Besides, a higher level of functioning at follow up was predicted by decrease in the severity of acute symptoms at baseline<sup>26</sup>. Additionally, the life skills profile scores can indicate the likelihood of re-hospitalization and indicate their patient's level of reintegration within the community. According to Granholm and colleagues, it has been found that social dysfunction is closely related to relapse and re-hospitalization and been reported as important factors affecting prognosis<sup>27</sup>.

The rationale behind the current study is not only about focusing on the psychiatric disability in persons with schizophrenia as measured by competence in life skills. The authors acknowledge that the philosophy and goals of psychiatric rehabilitation goes far beyond independent living assistance. True, psychosocial rehabilitation is all about recovery and leading successful and satisfactory life<sup>13</sup>. Thus, rehabilitation program of independent living, supported education program and supported employment need to be collated together to drive rehabilitation efforts<sup>28</sup>.

Most of our understanding about the disability profile of persons with schizophrenia and their rehabilitation needs comes from developed countries particularly North American and Western Europe where the concept of psychosocial rehabilitation is well applied and well researched.

In developing countries, the emphasis on extended psychosocial rehabilitation as an important component of managing severe and persistent mental illnesses is often overlooked in favor of instituting expensive newer generations of anti-psychotics with the premise that these medicines will produce dramatic improvements in symptoms and function<sup>29</sup>. Therefore, in developing countries rehabilitation is focused mostly on

interventions in the hospital's services with very few programs in the community.

To use imported literature from developed countries and cultures to make decisions or recommendations for designing modern psychosocial rehabilitation programs in developing countries one needs to be cautious in making conclusions and generalizations. For example, the Australian second national survey concluded that up to 60% of people with schizophrenia have employment goals and another substantial proportion want help with mainstream education. These findings, while very much helpful in designing a rehabilitation program in Bahrain, evidence that more basic rehabilitation needs for persons with schizophrenia is warranted to make an evidence-based conclusion. Obtaining data about the present situation of the disability level and rehabilitation needs for persons with schizophrenia can be used as a tool to persuade policymakers to raise the bar and move to more advanced rehabilitation interventions and programs.

On a comparison of the mean scores between the two genders on the five subscales comprising the LSP 39, women appeared to score higher in four subscales (self-care, non-turbulence, social contact, and responsibility) than men.

Results of independent samples t-test between men and women for the LSP 39 subscales show a single significance on communication skills. Men subjects had better functioning compared to women on communication possibly because in general men are better able to become task-oriented than women. The international studies show similar results<sup>25,11</sup>.

Ocha and colleagues, and Dickinson and associates suggest that early onset of illness negatively influences psychosocial function especially in the areas of communication skills<sup>1,30</sup> and their influence on the general quality of life experience<sup>31</sup>. Although it is clear that real time of social interaction or communication among the acute schizophrenics needs three stages of sensory perceptions (receiving, processing, and information). It has been well documented by the other

studies and Erikson's theory of psychosocial development that individuals with early onset of schizophrenia have a greater disability in language abilities<sup>30</sup>.

Findings from our study have implications for rehabilitation therapists at psychiatric hospitals with regard to further development of therapeutic interventions and strategies in dealing with communication skills. Although the current research was carefully prepared, the researchers would like to highlight some limitations and shortcomings.

First, the research was conducted in one setting only that is a 'hospital' setting and did not include 'community' or 'aftercare' settings for example. Unfortunately, this limitation was beyond the researchers' control because the Psychiatric Hospital is the only center in Bahrain for providing professional mental health services.

Second, evaluation of the disability using LSP 39 was not done through independent blind examiners; rather the therapists themselves who were researching the topic did it.

Third, translation of the LPS 39 to Arabic might have some influence on the reliability and validity of the original scale. Having said that, the authors have followed standard protocols of translating the LSP 39 and demonstrated its psychometrics by reporting Cronbach alpha coefficients and commenting on its construct validity.

Fourth, few questions from the LSP 39 cannot be assessed in hospital based setup and it is due to community restriction, but the researchers have taken valid information based on participants' past three months of overall functioning. Eu and colleagues established that some LSP items could not be validly rated in hospitalized patients<sup>25</sup>.

Fifth, the life-skills measures were not correlated with the symptom profile of the patients. Correlating the scores of LSP with the measures of Positive and Negative Syndrome Scale (PANSS) or Psychotic Symptoms Rating Scale (PSYRATS) would have yielded

more meaningful data since negative symptoms in schizophrenia are likely to influence the LSP. Future studies may be conducted taking this into account so that it could help rehabilitate people with schizophrenia.

## Conclusion

The current study suggests the general disability profile of all participants at inclusion showed that a moderate level of functioning was maintained. Women generally functioned better than men; nonetheless, differences appeared to be non-significant. The disability level for individuals with schizophrenia in Bahrain is higher than the disability profile reported in India and Singapore, but lower than the disability profile reported in Australia, United States and United Kingdom. It appears that regional differences in the disability profile of individuals with schizophrenia are influenced by the manner in which health and social services are delivered through a complex network of organizations and people.

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## الملخص

**الهدف:** الهدف الرئيسي من هذه الدراسة هو وصف لمحات الإعاقة للأفراد المصابين بالفصام في مستشفى الطب النفسي بمملكة البحرين حسب مقياس المهارات الحياتية (LSP 39) Life Skills Profile الهدف الثانوي لهذا البحث هو مقارنة خصائص الإعاقة للأفراد المصابين بالفصام في مملكة البحرين مع الدول الأخرى حسب المقياس نفسه. **الطريقة:** تم تطبيق استمارة مقياس المهارات الحياتية (LSP 39) مع الأفراد الذين يعانون من الفصام وتم إدخالهم مستشفى الطب النفسي في مملكة البحرين خلال الفترة 2009-2012. تم جمع المعلومات من قبل ثلاث أخصائيين علاج مهني متمرسين على استخدام الاستمارة. تم رصد 279 حالة خلال الثلاث سنوات. **النتائج:** تم اعتماد نتائج 247 حالة وذلك حسب شروط البحث. تشير النتائج إلى أن متوسط مقياس المهارات الحياتية هو 110.59 نقطة بانحراف معياري 13.19، أفضل النتائج كانت لصالح مهارات الاتصال وأقل النتائج لمهارات المشاركة الاجتماعية. كان أداء النساء بشكل عام أفضل من أداء الرجال، ولكن لم يكن الفارق بدلالة احصائية. اشارت نتائج مملكة البحرين لأداء أعلى من سنغافورة والهند ولكن أقل من استراليا وأمريكا والمملكة المتحدة. **استنتاج:** تشير دراستنا إلى أن أداء المهارات الحياتية بشكل عام متوسط في العينة التي تم دراستها بدون فرق يذكر بين الجنسين. وتتأثر الاختلافات الإقليمية في خصائص الإعاقة للأفراد المصابين بالفصام من الطريقة التي يتم بها تقديم الخدمات الصحية والاجتماعية في الدول المختلفة .

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## Religiosity, Subjective Well-Being, and Anxiety in a Sample of Indian University Students

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التدين والرفاه والقلق لدى عينة من طلاب الجامعة الهندية

أحمد محمد عبد الخالق، أجاي براتاب سنغ

### Abstract

**I**ntroduction: The present study sought to explore the associations of religiosity with subjective well-being and anxiety among an Indian sample of young adults. **Method:** A sample of 400 (200 men and 200 women) students enrolled in different colleges and universities of Uttar Pradesh Province in India was recruited. Responses were in English to the following six self-rating scales: religiosity, religious belief, physical health, mental health, happiness, and satisfaction with life, as well as to self-esteem, mental health, and anxiety, optimism, and pessimism questionnaires. **Results:** Women obtained significantly higher mean scores on religiosity, religious belief, physical health, mental health, and satisfaction with life than did their male counterparts. Religiosity was significantly correlated with scales of religious belief, physical health, mental health, happiness, satisfaction with life (men) religious belief, satisfaction with life, self-esteem, optimism (positively), and anxiety (negatively) in women. Three components were retained for men and labelled 'Mental health versus anxiety', 'Religiosity and happiness' and 'physical and mental health'. Among women, four components were extracted and labelled 'Mental health and optimism', 'Happiness', 'Anxiety and pessimism', and 'Religiosity'. Predictors of religiosity were religious belief and satisfaction with life (men), and religious belief, self-esteem, mental health, and optimism (women). **Conclusion:** Participants who consider themselves as religious experienced greater well-being. Religious beliefs and practices may have the potential to be integrated in the psychotherapeutic procedures in Hindu clients.

**Keywords:** Religiosity, subjective well-being, anxiety, Indian young adults

**Declaration of Interest:** None

### Introduction

One of the main trends in contemporary psychology is the great investment in matters of religion and spirituality. The last two decades have witnessed a resurgence of interest in religion and spirituality and their effects on, and correlates of different variables, especially in the domains of positive psychology and psychiatry.<sup>1,2,3,4,5</sup> A considerable amount of research has been conducted on this endeavour in several disciplines including psychology, psychiatry, medicine, epidemiology, anthropology, gerontology, and geriatrics, among others.

Religion and spirituality are exceedingly important to the vast majority of humans. Novak stated that the 21<sup>st</sup> Century would be "the most religious century".<sup>6</sup> For example, in the United States, surveys confirm a remarkable rise of interest in spiritual aspects across the decades. In 2012, seven in 10 Americans were very or moderately religious, and religiosity increased with age.<sup>7</sup>

Psychologists and psychiatrists have become increasingly interested in studying the influence of religiosity on behaviour, personality, physical and mental health and disorders, psychological functions, and psychotherapy. The revised Ethical Principles of Psychologists and Code of Conduct (American Psychological Association, 1992) included religion as a human difference<sup>8</sup>. In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, the "religious or spiritual problem" is included as a diagnosis in DSM-5.<sup>9</sup> Similarly, Tarakeshwar, Stanton, and Pargament argued that religion should be fully integrated in cross-cultural psychology research for different reasons: religion, by itself, occupies a substantial role in people's lives across different

cultures; religion has been found to be a strong predictor of important life domains among individuals; religion has a strong influence in cross-cultural dimension; and, culture also influences and shapes religious beliefs and practices.<sup>10</sup> Yet, there is a plethora of published articles dealing with the positive effects of religiosity on several aspects of human life including physical and mental health. Religiosity and spirituality are among the main positive correlates of subjective well-being (SWB).

SWB and mental health are highly correlated. SWB is the positive side of mental health.<sup>11</sup> Koenig, King, and Carson state that health is one of the strongest predictors of SWB in both younger and older populations particularly among women.<sup>12</sup> Evidence from epidemiological and clinical studies and medical research supports the impact of religious affiliation and involvement on a diverse array of mental and physical health indicators and disease states. Furthermore, religious involvement is associated with better outcomes for persons who are recovering from physical and mental illness. A large body of research indicates that religion is beneficial to a sense of personal well-being (WB) and overall adjustment.<sup>13</sup> Several studies have documented positive association of religiosity and SWB, including health.<sup>14, 15</sup>

In an important article connecting religion and spirituality to medicine, Koenig stated that religious beliefs and practices associated with significantly less depression and faster recovery from depression, lower suicide rates, less anxiety, less substance abuse, greater well-being, hope and optimism, more purpose and meaning in life, greater marital satisfaction and stability, and higher social support. Religious beliefs and activities have been associated with better immune

function, lower death rates from cancer, less heart disease or better cardiac outcomes, lower blood pressure, lower cholesterol, better health behaviour (less cigarette smoking, more exercise, and better sleep), and longevity.<sup>16</sup>

Numerous empirical studies have demonstrated a significant positive correlation between religiosity and SWB as both a Meta construct and its sub-components.<sup>13, 17, 18, 19,20,21,22</sup> similarly; the few Arabic studies have reached the same conclusion. That is, a significant association between religiosity and SWB (positive) and psychopathology (negative). These studies recruited different samples drawn from Algeria, Kuwait, Saudi Arabia, Egypt, Lebanon, Qatar, and Palestine.<sup>23, 24,25,26,27</sup>

It is worth mentioning, however, that some studies have failed to find an association between religiosity and SWB.<sup>28, 29</sup> Nevertheless, the number of studies yielding positive relationships between religiosity and both health and SWB exceed those with negative relationships.

The four-fold objectives of the present study were (1) to explore the gender-related differences in the study variables, (2) to examine the correlations between the study scales, (3) to analyze the correlation matrix to extract the main components, and (4) to explore the predictors of religiosity. It was hypothesized that (1) there will be significant differences between men and women, (2) there will be significant correlations between religiosity and SWB, (3) several factors could be extracted from the correlations, and (4) some SWB scales would predict religiosity. The general hypothesis was that the religion of participants in the current would yield the same profiles as the international findings.

## Method

### Participants

A convenience sample of 400 (200 men and 200 women) volunteer Indian Hindu (n=362; 90.5%) and Muslim (n=38; 9.5%) students enrolled in different colleges and Universities in Uttar Pradesh Province in India was recruited. Their mean age was 21.50 years (SD = 3.2). They represented different socio-economic status.

### Scales and questionnaires

- Self-rating scales

Six separate self-rating scales, in the form of questions, were used to assess, religiosity, religious belief, physical health, mental health, happiness, and satisfaction with life. These scales are as follows:

- What is your level of religiosity in general?
- What is the strength of your religious belief when compared to others?
- What is your estimation of your physical health in general?
- What is your estimation of your mental health in general?
- To what degree do you feel happy in general?
- To what degree do you feel satisfied with your life in general?

A scale of numbers followed each question from 0 to 10. Research participants were requested (a) to respond according to his or her global estimation and general feeling (not their present states); (b) to know that 0 is the minimum and 10 the maximum score; and (c) to circle a number which seems to him or her to describe their actual feelings accurately. A high score indicates the rating of the trait or the attribute at a high level. The one-week test-retest reliabilities of the six self-rating scales ranged between 0.76 and 0.88, indicating high temporal stability and corroborating the trait-like nature of the scores. Criterion-related validity of these scales has been adequately demonstrated.<sup>22,24</sup> The test-retest reliabilities of these scales with an Indian sample (N=40) ranged between 0.60 and 0.82 (see Table 1 below). However, single item self-rating scales have specific limitations. Foremost is the limited range of scores, the complexity of these constructs, and the influence of social desirability.<sup>30</sup>

### II. Questionnaires

1. *The Self-Esteem Scale (S-ES; Rosenberg, 1989).*<sup>31</sup>

Rosenberg defined self-esteem as a favourable or unfavourable attitude toward oneself. Originally designed to measure adolescents' global feelings of self-worth or self-acceptance, it also has been used widely with adults. The scale consists of 10 items requiring the respondent to report feelings about the self directly. The S-ES has good psychometric properties in its original English version.<sup>32</sup>

The five-point Likert-style response format was adopted in this version, anchored by 1=No and 5=Very much. The total score can range from a low of 10 to a high of 50, with higher scores representing higher self-esteem. Cronbach's alpha reliability of the English S-ES with an Indian sample reached 0.67 indicating good internal consistency.

2. *The Arabic Scale of Mental Health (ASMH; Abdel-Khalek, 2011).*<sup>33</sup>

The ASMH was developed as a trait measure for adults and adolescents. It has two equivalent versions: Arabic and English. It is comprised of 40 brief statements (e.g., "I am successful in my life", "I feel safe", and "I feel that my life has meaning") plus 10 filler items. Each item answered on a five-point intensity scale, anchored by 1: Not at all and 5: Very highly. The total score can range from a low of 40 to a high of 200, with higher scores representing higher mental health. Principal components analysis yielded six high-loaded factors labelled: self-confidence, satisfaction, meaningful life, enjoyment, optimism, and stability. Item-remainder correlations ranged between 0.31 and 0.79. Reliabilities ranged from 0.94 to 0.96 (Cronbach alpha) and between 0.84 and 0.94

(test-retest), indicating good internal consistency and temporal stability. Convergent, divergent, and factorial validities were adequately demonstrated. The ASMH was significantly correlated, in the predicted directions, with scales of happiness, satisfaction with life, optimism, love of life, self-actualization, the big five factor personality model, the Eysenck Personality Questionnaire (PENL), the Beck Depression Inventory, the Symptom Check List-90-R and the General Health Questionnaire. Male undergraduates obtained a higher mean score on the ASMH than did their female counterparts.

3. *The Kuwait University Anxiety Scale (KUAS; Abdel-Khalek, 2000, 2003).*<sup>34,35</sup>

The KUAS has four comparable Arabic, English, German, and Spanish versions. It consists of 20 brief statements, each answered on a four-point intensity scale, anchored by: 1: Rarely, and 4: Always. In previous studies on Kuwaiti samples, reliabilities of the scale ranged from 0.88 to 0.92 (Cronbach's alpha), and between 0.70 and 0.93 (test-retest), indicating good internal consistency and temporal stability. The criterion-related validity of the scale ranged between 0.70 and 0.88 (five criteria), while the loadings of the scale on a general factor of anxiety were 0.93 and 0.95 in two factor analyses, demonstrating the scale's criterion-related and construct validity. Discriminant validity of the scale has also been demonstrated. Factor analysis of the scale items yielded three factors labelled 'Cognitive/Affective', 'Subjective', and 'Somatic anxiety'. The scale has displayed good psychometric properties in different Arabic and Western samples of college students.<sup>36</sup>

4. *The Arabic Scale of Optimism and Pessimism (ASOP; Abdel-Khalek, 1996).*<sup>37</sup>

The ASOP consists of two subscales in comparable Arabic and English forms to assess optimism and pessimism. Each subscale contains 15 statements to be answered on a five-point Likert-type intensity scale as follows: 1: No, 2: A little, 3: Moderate, 4: Much and 5: Very much. The total score can range from 15 to 75 for each subscale, with high scores indicating high optimism or pessimism. Cronbach's alpha reliabilities were 0.92, 0.93, and 0.93 for optimism, and they were 0.91, 0.95, and 0.94

for pessimism among male, female, and the combined sample of Kuwaiti undergraduates, respectively. Criterion-related validity against scores on the Life Orientation Test by Scheier and Carver (1985) for the total scores on the two scales of optimism and pessimism were + 0.78, and - 0.69 (df=110,  $p < .0001$ ), respectively, indicating good convergent and divergent validity of the two subscales.<sup>38</sup> The English version of the ASOP displayed good internal consistency, convergent and divergent validity, a meaningful factorial structure, and interpretable factors among American college students.<sup>39,40</sup> The psychometric parameters of the study scales and questionnaires with Indian participants were between acceptable and good.<sup>41</sup>

### **Procedure**

The six self-rating scales along with the four questionnaires in English were administered anonymously to students during small group sessions in their classrooms during scheduled university hours. The second author carried out the administration of the study scales. All participants volunteered for the study after the researcher explained its purpose and assured them that anonymity would be maintained. If any student did not want to participate, he or she could leave. The reliability of the scales were computed using Indian young adults (see Table 1)

### **Statistical analysis**

Descriptive statistics, t-test, effect size (Cohen's d) were used to examine gender differences. Pearson correlation coefficient was used to test the associations between the study variables. A principal components analysis (PCA) was used to estimate the factorial structure and to analyze the correlation matrices of the study variables. As for the PCA, the Kaiser unity test (eigen value  $\geq 1.0$ ) was followed to determine the number of factors (components) to be retained. Then, the unrotated components were rotated to a simple structure, using the orthogonal direct varimax method. Multiple stepwise regression was used to explore the predictors of religiosity<sup>42</sup>.

### **Results**

Table 1 sets out the test retest and Cronbach's alpha reliabilities, the descriptive statistics, the t values, and Cohen's d for effect size of the rating scales and questionnaires among men and women. Reference to this table indicates that women obtained a significantly higher mean score on the self-rating scales of religiosity, religious belief, physical health, mental health, and satisfaction with life than their male counterparts. The effect size was small in all scales.

**Table 1:** Reliability ( $r_{11}$ ), mean ( $M$ ), standard deviation ( $SD$ ),  $t$  value, and effect size ( $d$ ) among men ( $n=200$ ) and women ( $n=200$ )

Scales	Possible range of scores	$r_{11}$	Men		Women		$t$	$p$	$d$
			$M$	$SD$	$M$	$SD$			
Religiosity	0-10	.82	5.67	2.05	6.02	1.70	1.86	-	-
Religious belief	0-10	.81	5.57	2.30	6.30	1.88	3.50	.001	.35†
Physical health	0-10	.82	5.33	2.14	5.87	2.11	2.54	.01	.25†
Mental health	0-10	.64	5.82	1.90	6.31	1.87	2.61	.01	.26†
Happiness	0-10	.65	5.86	2.05	6.08	2.08	1.06	-	-
Satisfaction	0-10	.60	5.23	2.50	5.75	2.46	2.10	.04	.21†
Self-esteem	0-50	.67	28.60	3.88	28.36	3.78	0.63	-	-
Mental health scale	40-200	.92	162.17	19.30	162.30	17.98	0.70	-	-
Anxiety	20-80	.91	40.12	12.51	39.95	11.23	0.14	-	-
Optimism	15-75	.87	45.23	10.02	45.68	9.54	0.46	-	-
Pessimism	15-75	.88	29.68	9.90	29.44	9.35	0.25	-	-

† Small effect size.

Note – The first six variables are self-rating scales and their reliabilities were test-retest after 7 days, whereas the last five are questionnaires and their reliabilities were Cronbach’s alphas.

Table 2 presents the Pearson correlation coefficients between the scales and questionnaires among men and women. Inspection of this table indicates that the self-rating scale of religiosity was significantly correlated with the scales of religious belief, physical health,

mental health, happiness, and satisfaction with life among men. In women, religiosity was significantly correlated with religious belief, satisfaction with life, self-esteem, optimism (positively), and anxiety (negatively).

**Table 2:** Pearson correlation coefficients between the study scales for men ( $n=200$ ; above diagonal) and women ( $n=200$ ; below diagonal)

	1	2	3	4	5	6	7	8	9	10	11
<b>1. Religiosity</b>	-	.468**	.199**	.241**	.259**	.289**	.112	.056	-.128	.067	.031
<b>2. Religious belief</b>	.468**	-	.212**	.223**	.210**	.263**	.054	.194**	-.166*	.114	-.092
<b>3. Physical health</b>	.073	.166*	-	.371**	.236**	.293**	.073	.212**	-.044	.095	-.003
<b>4. Mental health</b>	.088	.082	.302**	-	.242**	.227**	.140*	.232**	-.139	.171*	.000
<b>5. Happiness</b>	.076	.121	.209**	.192**	-	.415**	.179*	.316**	-.258**	.097	-.151*
<b>6. Satisfaction</b>	.186**	.223**	.308**	.182*	.468**	-	.117	.237**	-.241**	.059	-.045
<b>7. Self-esteem</b>	.271**	.236**	.186**	.228**	.148*	.159*	-	.435**	-.421**	.367**	-.266**
<b>8. Mental health scale</b>	.038	.180*	.204**	.205**	.305**	.250**	.445**	-	-.480**	.566**	-.309**
<b>9. Anxiety</b>	-.204**	-.169*	-.010	-.021	-.181*	-.160*	-.346**	-.304**	-	-.331**	.561**
<b>10. Optimism</b>	.237**	.198**	.185**	.213**	.192**	.135	.352**	.542**	-.279**	-	-.396**
<b>11. Pessimism</b>	-.040	-.141*	.014	.041	-.126	-.170	-.138	-.209**	.459**	-.219**	-

\*  $p < .05$  (2-tailed);

\*\*  $p < .01$  (2-tailed)

The two correlation matrices reported in Table 2 for men and women were subjected, separately, to a PCA (SPSS, 2009).<sup>42</sup> Based on Kaiser Criterion, three components were retained for men. Table 3 reports the

results. The three factors accounted for 56.1% of the common variance. These factors could be labelled ‘Mental health versus anxiety’, ‘Religiosity and happiness’, and ‘Physical and mental health’.

**Table 3:** Orthogonal (Varimax) three factor solution for the scales among men ( $n=200$ )

Scales	Factor 1	Factor 2	Factor 3	$h^2$
Religiosity	-.042	.785	.082	.625
Religious belief	.066	.750	.050	.569
Physical health	.012	.185	.761	.613
Mental health	.105	.192	.722	.569
Happiness	.242	.500	.299	.398
Satisfaction	.115	.575	.324	.449
Self-esteem	.652	.036	.134	.444
Mental health scale	.735	.078	.350	.669
Anxiety	-.759	-.287	.104	.670
Optimism	.718	-.072	.204	.562
Pessimism	-.726	-.098	.254	.601

<b>Eigenvalue</b>	2.67	1.94	1.56	
<b>% variance</b>	24.30	17.60	14.19	
<b>Total Variance</b>				56.08

Reference to Table 4 among women indicates that four components were retained, and accounted for 63.1 % of the common variance. These factors could be

labelled ‘Mental health and optimism’, ‘Happiness’, ‘Anxiety and pessimism’, and ‘Religiosity’.

**Table 4:** Orthogonal (Varimax) four factor solution for the scales among women ( $n=200$ )

Scales	Factor 1	Factor 2	Factor 3	Factor 4	$h^2$
Religiosity	.101	.022	-.032	.867	.763
Religious belief	.112	.151	-.084	.791	.668
Physical health	.389	.463	.318	.086	.475
Mental health	.564	.241	.368	.010	.512
Happiness	.115	.804	-.189	-.036	.697
Satisfaction	.057	.824	-.021	.205	.726
Self-esteem	.674	-.004	-.158	.282	.559
Mental health scale	.732	.223	-.277	-.066	.667
Anxiety	-.259	-.109	.732	-.176	.645
Optimism	.726	.030	-.230	.135	.600
Pessimism	-.114	-.050	.784	-.005	.630
<b>Eigenvalue</b>	2.11	1.69	1.59	1.56	
<b>% variance</b>	19.16	15.34	14.41	14.18	
<b>Total Variance</b>					63.09

Table 5 sets out the results of the multiple stepwise regression. As can be seen in this table, the predictors of religiosity were religious belief and satisfaction with

life (men), and religious belief, self-esteem, mental health, and optimism (women).

**Table 5:** Stepwise regression for predicting religiosity in men and women

Scale	$B$	$\beta$	$t$	$R^2$	$F$ -ratio
<b>Men</b>					
Religious belief	0.376	0.422	6.59**	.219	32.64**
Satisfaction w/life	0.146	0.178	2.78*	.029	
Constant	2.813		7.36**		
<b>Women</b>					
Religious belief	0.381	0.420	6.71**	.218	20.08**
Self-esteem	0.092	0.203	2.95*	.027	
Mental health	0.023	0.245	3.24*	.016	
Optimism	0.38	0.215	2.94*	.032	
Constant	3.039		2.95		

\*  $p < 0.01$

\*\*  $p < 0.001$

## Discussion

The interest in the psychology of religion dates back more than a century.<sup>43,44</sup> However, research on religion and spirituality disappeared from the psychological literature for nearly a century.<sup>45</sup> The topics of religion and spirituality have become important to the vast majority of the world’s population today and for countless millennia.<sup>40</sup> Albright and Ashbrook suggested that humans be thought of as ‘Homo religiosus’ because religion has been present as long as there have been Homo sapiens.<sup>46</sup> The present investigation used an under-studied sample and under-represented in the psychological literature, i.e., Indian

participants, mainly Hindus. The four-fold objectives of this study have been successfully fulfilled. Women obtained significantly higher mean scores on the self-rating scales of religiosity and religious belief than their male counterparts. This result is consistent with previous findings on Western samples.<sup>3,47,48</sup> However, some Arabic results yielded no significant gender-related differences in religiosity.<sup>23,24</sup> Likewise, the women’s higher mean scores on the self-rating of physical health and satisfaction with life than their male counterparts were consistent with the results from a Kuwaiti study.<sup>49</sup> Notwithstanding these significant differences, their effect sizes were small. Thus the first hypothesis was partially verified.

As for the second hypothesis, religiosity was significantly associated with some self-rating scales and questionnaires, such as physical health, mental health, satisfaction with life, self-esteem, optimism (positively), and anxiety (negatively). This result is congruent with numerous studies carried out on different cultural groups and religions. Koenig et al. stated that certain religious beliefs and activities appear to be related to fewer somatic symptoms, and the relation between religiosity and SWB is present in studies of Christians, Hindus, and Muslims.<sup>12,16</sup> More recently, Merrill, Read, and Le Cheminant found that religiosity had a beneficial influence on both negative outcome, such as lowering feelings of anger, and positive outcomes (e.g., promoting feelings of confidence in one's ability to handle personal problems) associated with stress in college students.<sup>50</sup> Thus, the second hypothesis was partially verified.

In applying the PCA, three factors among men and four in women were retained. One of the factors in men was labelled 'Religiosity and happiness', whereas a separate factor of religiosity among women was retained. Both solutions based on the technique of factor analysis were consistent with previous findings using American, Kuwaiti, and Qatari, college students.<sup>24,51</sup> Therefore, the third hypothesis was verified.

As for the regression results, some SWB scales and questionnaires were predictors of religiosity such as satisfaction with life in men, and self-esteem, mental health, and optimism among women. This result is congruent with a plethora of results.<sup>14-18</sup> and verifies the fourth hypothesis.

### Limitations

Despite some strengths of the present study, i.e., using a sample from an under-represented population in the psychological literature, from the Indian context, and mainly Hindus, specific limitations are acknowledged. Foremost among them is the use of a convenience sample. Further, student samples mainly consist of healthy, young, and intelligent samples who only represent a small sector of any population. Thus, it would be important to either use a probability sample of college students or extend the present study using older groups. Moreover, it is important to assess demographic and social variables as probable correlates of religiosity and SWB. Self-rating scales were used in the assessment of the present variables. It would be useful in future research to obtain observer reports from persons who are very closely acquainted with the target person.

### Conclusion

On the basis of the special characteristics of the present participants of Indian nationality, Hindus religion, and young adults, as well as the properties of the current scales and questionnaires, its salient results were the higher mean scores on religiosity, religious belief, physical health, mental health, and satisfaction with life in women than did their male counterparts.

Religiosity significantly correlated with scales of religious belief, physical health, mental health, happiness, and satisfaction with life in men. Among women, religiosity was significantly correlated with religious belief, satisfaction with life, self-esteem, optimism (positively), and anxiety (negatively). Despite using a sample of special characteristics in culture and religion, this investigation replicated previous results. Thus, the generalizability of religiosity and SWB associations has been verified. It could be concluded that participants with high scores on religiosity saw themselves as having a higher SWB. Thus, there is a possibility to use religious involvement in psychotherapy to assist in reducing pathological symptoms and complaints, and in raising the sense of well-being. Many psychotherapists have incorporated religiosity or spirituality into psychotherapy<sup>2</sup> and the current findings support empirically this trend especially in Indian participants as it was shown among Arabic groups and Western samples.<sup>4,5,47,52</sup>

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هدفت هذه الدراسة إلى: (أ) بحث الارتباط بين التدين، والعافية، والقلق، (ب) واستكشاف الفروق بين الجنسين في متغيرات الدراسة، (ج) وتحليل المصفوفة الارتباطية بين متغيرات الدراسة لاستخراج المكونات الأساسية لها، (د) والتوصل إلى منبئات التدين. واستخدمت عينة قوامها 400 طالباً جامعياً وطالبة من جامعات مختلفة في الهند، أجابوا – باللغة الإنجليزية – عن ستة مقاييس تقدير للتدين، وقوة الاعتقاد الديني، والصحة الجسمية، والصحة النفسية، والسعادة، والرضا عن الحياة، بالإضافة إلى خمسة استخبارات لتقدير الذات، والصحة النفسية، والقلق، والتفاؤل، والتشاؤم. وارتبط التدين ارتباطاً دالاً إحصائياً بقوة الاعتقاد الديني، والصحة الجسمية، والصحة النفسية، والسعادة، والرضا لدى الرجال، في حين ارتبط التدين لدى النساء بقوة الاعتقاد الديني، والرضا، وتقدير الذات، والتفاؤل (إيجابياً)، وبالقلق (سلبياً). واستخرجت ثلاثة مكونات عاملية لدى الرجال وأربعة عند النساء، وكانت منبئات التدين: قوة الاعتقاد الديني، والرضا عن الحياة (للرجال)، والاعتقاد الديني، وتقدير الذات، والصحة النفسية، والتفاؤل (للنساء). وقد خلصت الدراسة إلى أن الأشخاص المتدينين لديهم صحة نفسية أفضل، ويمكن استخدام الاعتقادات والممارسات الدينية في الطرائق العلاجية النفسية.

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