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Psychosocial aspects of chronic daily headache

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Abstract The objective was to investigate possible psychosocial factors in chronic daily headache (HA) by comparing those with chronic daily HA to matched patients with chronic episodic HA and to matched non-HA controls. Although there is some research on psychosocial factors in chronic daily HA, it is conflicting and none to date has compared such patients to both an episodic HA control and a non-HA control. Nineteen patients with chronic daily HA (less than 2% of 4-times-per-day HA ratings were zero) were compared to 19 HA patients matched on age, gender and nominal IHS diagnoses, and to 16 similarly matched non-HA controls on measures of psychological distress (MMPI, BDI, STAI), measures of life stress (major past events, hassles, prospective daily stress) and quality of life (SF-36). Those with chronic daily HA were significantly more distressed and had significantly poorer function on most measures relative to non-HA controls. Although there were many arithmetic trends for chronic daily HA to be more distressed and to function less well than those with episodic HA, only on the depression and social introversion scales of the MMPI and the overall vitality rating of the SF-36 were the differences significant. All three groups had comparable levels of life stress regardless of how it was measured. Those with chronic daily HA have greater levels of psychological distress and poorer quality of life than those with episodic HA or non-HA controls, despite comparable levels of life stress.

Key words Chronic daily headache • Psychological distress • Quality of life

Introduction

Although chronic daily headache (HA) is not officially recognised in the IHS Diagnostic Criteria [1], it is well recognised that this group of chronic HA patients may represent up to 40% of HA populations seeking treatment. Many different definitions have been published for this population (for a comprehensive review see Barton [2]). Because of the heterogeneity in definitions of this group of patients, research on them has lagged behind that of IHS-defined populations such as tension-type HA and migraine HA. For example, whereas there have been many studies of the psychological characteristics and degree of psychological distress among those with tension-type HA and migraine HA (for a somewhat dated

comprehensive review see [3]; for an update see Holroyd [4]), the literature on the psychological characteristics of those with chronic daily HA is scant and not as methodologically strong.

A summary of the literature on the psychological factors and psychosocial impact of chronic daily HA is shown in Table 1.

Psychological factors

There is a notion that chronic HA sufferers experience more negative psychological factors than non-HA sufferers. Whether such factors play a role in precipitating HA activity or whether they are consequences of HA activity has yet to be determined by the appropriate longitudinal

Table 1 Associated psychological and social factors in chronic daily HA groups

Chronic daily HA type/study	Comparison group	Psychological factors	Social impact
Hart, 1985 [9]	Chronic daily HA *vs*. episodic HA	Chronic daily HA scored significantly higher on BDI	Not assessed
Mathew et al., 1987 [5]	Chronic daily HA *vs*. episodic migraine (EM)	All chronic daily HA groups show significant elevation on Zung and Beck depression scales. 61% chronic daily HAs had abnormal MMPI *vs*. 12.2% EM group	Not assessed
Solomon and Cappa, 1987 [11]	None	~33% with depression, anxiety and/or irritability ~50% with fatigue and/or difficulty concentrating	Not assessed
Blanchard et al., 1989 [7]	Chronic daily high intensity HA *vs*. HA controls	No significant elevation on depression, anxiety or life events scales. Significantly higher psychosomatic distress *vs*. controls. Significant elevations on MMPI scales (1, 7 and 8) *vs*. controls but not in clinical range (T score <70)	No significant differences
Solomon et al., 1992 [12]	None	47% impaired concentration, 42% irritability, 39% depression, 36% anxiety, 35% nervousness	Not assessed
Cavallini et al., 1994 [14]	Episodic HA (EHA) *vs*. chronic daily HA	During HA attack: Significantly more chronic daily HA report irritability, frustration and feeling "fed up". Interictal period: Significantly more chronic daily HA report irritability, frustration and feeling "fed up". Chronic daily HA group with significantly more worry about future attacks, fear of HAs getting worse, feeling cheated out of time, feeling like a burden to others, and feeling afraid of letting others down	During HA attack: EHA more likely to lie down with HA. Interictal period: Chronic daily HA more likely to experience interference in social plans and family relationships
Rothrock et al., 1996 [10]	Chronic tension type HA *vs*. EM. New daily persistent HA + transformational migraine *vs*. EM Chronic tension type HA *vs*. new daily persistent HA + transformational migraine	No differences in current/past depression, stress or sleep disturbances between any groups	Not assessed
Srikiatkhachorn and Phanthumchinda, 1997 [13]	None	61.7% irritability, 58.3% initial insomnia, 33.3% sleep fragmentation	Not assessed

study. Very few studies examining chronic daily HA have information about psychological impact and the results have conflicted (see Table 1). For example, Mathew et al. [5] observed that 61% of chronic daily HA sufferers had abnormal MMPI profiles as compared to 12.2% of the episodic migraine group. Fifty-six percent showed elevations on scales 1, 2 and 3 (the chronic illness triad). This is in line with Burg's [6] notion that chronic intractable HA sufferers may have some variant of a somatoform disorder. While Blanchard et al. [7] observed significant differences on three MMPI subscale scores (scales 3 – Hysteria, 7 – Psychasthenia, and 8 – Schizophrenia) between a chronic daily high intensity HA group and non-daily HA controls, these group differences were small and elevations on the subscales were not in the clinical range (thus not "abnormal"). No other studies of chronic daily HA have implemented the MMPI. Mathew et al. [5] also noted that the transformational migraine group scored significantly higher than the episodic HA control group on a measure of Type A behaviour.

Mathew et al. [5] found that, as a group, chronic daily HA sufferers scored significantly higher than episodic HA patients on depression indices (Zung and Beck Depression Inventory [8] [BDI]) and that these scores were in the clinical range. Depression scores for all three subtypes of chronic daily HA (chronic tension type HA, new daily persistent HA and transformational migraine) were significantly higher than controls. Hart [9] observed that chronic HA sufferers scored significantly higher on the BDI than did episodic tension sufferers. Conversely, Blanchard et al. [7] found no differences between their chronic daily high intensity HA group and non-daily HA controls on measures of depression, anxiety or life events. Similarly, Rothrock et al. [10] did not observe any differences in depression or stress indices between chronic daily HA versus non-daily HA sufferers. However, Blanchard et al. [7] did observe significantly higher levels of psychosomatic distress relative to controls. They concluded that their chronic daily high intensity HA group may be more psychologically distressed yet not experience greater psychopathology than episodic HA controls. Several other studies [11–13] report that psychological symptoms, such as irritability, impaired concentration, depression and anxiety, are present in a large number of chronic daily HA samples. However, these studies did not use standardised measures of these psychological symptoms and had no control groups, so the meaning of these findings is difficult to ascertain.

Using an episodic HA control group, Cavallini et al. [14] observed that chronic daily HA sufferers experienced significantly higher levels of emotional disturbance during HA attacks, with higher percentages endorsing irritability, frustration and feeling fed up. Similarly, chronic daily HA sufferers experienced more negative emotions during the interictal period, relative to the episodic group. In addition to frustration, irritability and feeling fed up, they were more likely to feel like a burden to others, feel like they let others down, and were more likely to worry about others worrying about them. Further, chronic daily HA sufferers had significantly more negative health perceptions, including fear that their HA problem would become worse and feeling cheated out of time. This study suggests that while few difference in psychological distress may exist between HA groups *during* HA attacks, chronic daily HA sufferers may be significantly more distressed than those with episodic HA *between* HA attacks. In summary, it seems that chronic daily HA sufferers experience more psychological distress relative to non-daily HA sufferers. However, strong conclusions about psychopathology among chronic daily HA sufferers cannot yet be drawn, given the few studies that examine this and the conflicting findings.

Some research suggests that there may be more psychopathology in chronic daily HA patients who are intractable to treatment. Mathew et al. [15] observed significant "behavioural abnormalities" in the 31% of chronic daily HA patients who showed no improvement in HA activity over a 42-month follow-up period as compared to those who did improve. All (100%) had abnormal MMPI profiles. Fifty-eight percent reported alcoholism among their parents and 52% reported a history of physical/sexual/emotional abuse. More research is needed to clarify whether chronic daily HA patients who are psychologically distressed are less likely to respond to treatment intended to suppress HA or whether non responders are a more psychologically distressed group.

Sleep disturbance is common among chronic daily HA sufferers. Between 58% and 71% report difficulties with sleep [5, 13]. This is interesting, as sleep disturbance has been noted as an aggravating factor for HAs [12, 13]. Rothrock et al. [10] observed that 57% of chronic daily HA sufferers experienced insomnia; however, they did not observe any significant differences in sleep disturbance between chronic daily HA patients as compared to those with episodic HAs. Thus, sleep disturbance may be common among HA sufferers in general.

Social impact and quality of life

Quality of life (QOL) involves many aspects of an individual's functioning. Frequently included in assessments of QOL are ratings of physical functioning, role functioning, social functioning, mental health and health perceptions. Blanchard et al. [7] examined the social impact of HAs

among a chronic daily HA sample. No differences in social functioning (i.e., leaving work, lying down, forgoing activities) were observed between their chronic daily high intensity HA group as compared to a non-daily HA group. Similarly, Cavallini et al. [14] observed no differences in role functioning or social functioning during HA attacks between an episodic HA group and a chronic daily HA group. However, both groups showed high levels of interference. For instance, over 90% in both groups reported that HAs made it difficult to carry on normal daily activities, over 65% reported interference with work and over 50% reported interference with social activities. Chronic daily HA patients showed significantly more impairment in QOL measures for the interictal period (between HA attacks). Specifically, they were more likely to worry about the occurrence of HA attacks and were more likely to experience interference with planning social activities and in family relationships due to this worry of experiencing HAs. In addition, mental health was also more compromised in the chronic daily HA group (see previous section), which should be taken into consideration when assessing QOL. The Cavallini et al. [14] research highlights the importance of how quality of life is measured. While chronic daily HA sufferers do not significantly differ from other HA groups during HA attacks, their QOL is markedly different in the periods between HA attacks. What is lacking from this research is an indication of the degree of interference experienced in each of the QOL domains. Regarding occupational functioning, 20% of intractable chronic daily HA patients (those who showed no improvement at 42-month follow up) reported being unable to work and the rest were unproductive and had high rates of absenteeism [15]. Thus, in more severe chronic daily HA cases, more impairment in functioning may be present.

Other studies with chronic daily HA samples have not assessed QOL. Future research with this group of HA sufferers should employ QOL measures to further clarify the impact that this HA problem can have on individuals. Given the chronicity of chronic daily HA, the tendency to strike in the early, productive years of life (20s–30s), and its intractable nature, it is likely that QOL is compromised among this group.

Summarising the material above and the studies in Table 1, it is clear that no study has compared chronic daily HA to both episodic HA *and* non-HA controls in the same study. Moreover, only 3 studies [5, 7, 9] have used well validated psychological tests and the results of these studies are in conflict. Finally, the two studies [7, 14] that examined the psychosocial impact, or QOL, of chronic daily HA did not use standardised measures. Moreover, the results of the two studies were contradictory.

This high level of inconsistency in results and use of poor quality measures has led to the present study that sought to compare a sample with chronic daily HA to a sample, matched on age, gender and nominal IHS diagnosis, of individuals suffering from episodic HA, and very importantly, to a sample of non-HA sufferers also matched for gender and age, using well validated measures of both psychological distress and QOL.

Methods

Overview

All participants in this research were drawn from a larger assessment study examining the interrelations of HA, daily stressful events, mood and HA medication consumption. Participants monitored HA, perceived stress and mood four times per day with handheld computers and recorded HA medication consumption daily for 6 weeks. They were paid $120 for their successful completion of the monitoring. Non-HA controls completed the same monitoring for 6 weeks and were paid $150. All gave informed consent.

Participants

Chronic daily HA

Nineteen individuals who met our somewhat liberal definition of chronic daily HA, no more than one HA-free day per week, were used. In fact, there were only 12 out of 672 days (1.8%) on which no HA occurred in this sample.

Episodic HA

These 19 individuals were selected from the larger sample to match the chronic daily HA sample on nominal IHS diagnosis, gender and age within 4 years.

Non-HA

These 16 individuals at a telephone screen claimed not to be bothered by HAs and to suffer no more than one mild HA per month. They were also selected to match the chronic daily HA population on gender and age within 4 years.

Demographic characteristics of the 3 samples, as well as distribution of nominal IHS diagnoses are in Table 2. The only difference among the groups was on education level with slightly over 80% of the HA control and non-HA control participants being college graduates (Associates degree or higher) versus only 47% of those with chronic daily HA (χ^2[2, n=54]=7.41, p<0.01, effect size=0.37).

Procedures

All HA sufferers underwent an extensive structured interview [16] to arrive at an IHS HA diagnosis and gather extensive information

Table 2 Demographic and HA variables of chronic daily HA, HA control and non-HA control groups

Measure	Chronic daily HA (n=19)	HA control (n=19)	Non-HA control (n=16)	Statistical test	Effect size[a]
Age	36.3	42.1	36.4	F=1.13	
Gender, % female	63.2	63.2	62.5	χ^2=0.002	0.006
Family income, US dollars	51 900	62 700	60 200	F=0.45	
Ethnicity, % Caucasian	100	100	100		
Education, % college graduate	47.4	84.2	81.3	χ^2=7.41*	0.37
Childhood physical and/or sexual abuse, %	31.3	21.1	18.8	χ^2=0.80	0.67
Family history of alcohol/substance abuse, %	31.3	21.1	18.8	χ^2=0.80	0.67
HA index	9.15	4.49		t=5.07**	1.61
HA free days, %	1.80	30.1		t=-3.68*	1.12
Medication score	38.2	28.7		t=-0.70	0.22
HA diagnosis					
Tension-type	11	11			
Tension-type+migraine without aura	8	8			

[a]For t-tests, effect size used was d statistic; for chi-square tests, effect size used was Phi coefficient, *p<0.01, **p<0.001
HA index, average daily HA score for the baseline period; *% HA free days*, percentage of days with no HA during the baseline period; *medication score*, average weekly medication score for the baseline period

on the background of their HA problem. A detailed psychosocial history and mental status examination were also performed. Individuals with a diagnosis of current major depression, or alcohol or substance dependence were excluded, as were individuals with a history of schizophrenia or other psychotic disorder or bipolar disorder. Also excluded were individuals whose HAs began following a physical trauma or whiplash injury.

As part of the larger research study, participants were instructed in the use of a handheld computer [17] with which they monitored levels of HA, perceived stress and mood 4 times per day at approximately meal times and bedtime. HA ratings ranged from 0 (no HA) to 5 (intense incapacitating HA) on a scale that has been shown to be reliable [18]. They also recorded all medications taken for their HA on a daily basis and filled out the Daily Stress Inventory on a daily basis.

The Daily Stress Inventory [19] consists of a list of 58 potentially stressful events that are scored from 1 (occurred but was not stressful) to 7 (caused me to panic). The scale has well established reliability and validity. It yields 3 scores, number of events that occurred, intensity (sum of intensity ratings for all scored events) and impact/event ratio (the sum of intensity ratings divided by number of events. Participants also completed a number of standardised psychological tests measuring three broad domains, (a) psychological distress, (b) quality of life and (c) level of life stress.

Psychological distress

We administered the BDI [8], a 21-item scale that is one of the most widely used self-report measures of depressive symptoms [20], and the State-Trait Anxiety Inventory [21] scored for both current state anxiety and the overall trait of anxiety, each with 20-item scales. It has well established reliability and validity. We also administered the MMPI scored for the 9 clinical scales.

Quality of life

For a measure of QOL we used the SF-36 [22]. It provides scores on 8 subscales of psychosocial functioning.

Life stress

In addition to the measure of daily stressful events described above, the Daily Stress Inventory, participants also completed the Hassles Scale [23], which assesses frequency and severity of 64 low-level stressful events that have occurred over the past 30 days. Participants also completed a survey of major life events occurring over the preceding 12 months, the Social Readjustment Rating Scale [24].

Results

Comparisons of HA samples

The two HA samples were each comprised of 11 individuals with IHS diagnoses of chronic tension-type HA and 8 individuals with IHS diagnoses of both tension-type HA and migraine HA without aura. Comparisons on HA diary data revealed significant differences in HA index (the daily average sum of the 4 HA ratings) (chronic daily HA – 9.2, HA control – 4.5, t[36]=5.07, p<0.001, effect size 1.61) and percent of HA free days (chronic daily HA – 1.8%, HA control=30.1%), t[36]=3.68, p<0.001, effect size 1.12). On medication index the two groups did not differ (chronic daily HA – 38.2, HA control – 28.7, t[36]=0.70, effect size=0.22).

Thus, the chronic daily HA group had HA almost all of the time at a moderate to severe level; however, their analgesic medication consumption was only moderate and below the levels we have seen for "rebound HA" [25].

Primary comparisons

In Tables 3, 4 and 5 are the mean values for the three groups on measures of psychological distress, measures of quality of life and measures of life stress, respectively. The data in each table were subjected to a series of one-way ANOVAs on each measure. When the overall *F* test was significant, follow-up comparisons using the very conservative Tukey's HSD test were performed at the 0.05 level. In order to give a clear sense of differences between pairs of groups, the effect size for the pairwise comparison and the percent of the chronic daily HA sample scoring above the mean of the comparison sample, either episodic HA control or non-HA control, is presented.

Psychological distress

There were significant between-group differences on 10 of the 12 psychological distress measures with only scales PD and MA of the MMPI not yielding significance. The chronic daily HA group was significantly more distressed than the non-HA control group on all of the significant measures with 80% or more of the HA group's scores falling above the mean of the control group.

On the more important comparisons between chronic daily HA and episodic HA, there were only two differences which reached significance using the conservative Tukey HSD test, scale D (depression) of the MMPI and scale SI (social introversion). On all of the other measures, there were arithmetic differences between the two HA groups but the differences did not reach the stringent level used in the analyses.

Quality of life

On 7 of the 8 subscales of the SF-36, there were significant differences among the three groups; the sole exception was

Table 3 Values for psychological distress measures for three groups

Variable	Experimental groups						Overall comparison		Chronic daily HA *vs*. HA control		Chronic daily HA *vs*. non-HA control	
	Chronic daily HA		HA control		Non-HA control							
	M	SD	M	SD	M	SD	*F*	*p*	Effect size *d*	Percent of chronic daily HA above mean (below mean) of comparison group	Effect size *d*	Percent of chronic daily HA above mean (below mean) of comparison group
BDI	10.4[a]	5.7	8.1[a]	5.1	2.9[b]	3.2	10.4	<0.001	0.42	66.2	1.60	94.5
STAI-State	42.4[a]	10.2	37.9[a]	10.9	27.6[b]	6.1	11.1	<0.001	0.42	66.2	1.70	95.5
STAI-Trait	44.4[a]	10.9	38.0[a,b]	11.0	33.0[b]	5.1	6.27	0.004	0.57	71.5	1.30	90.3
MMPI												
HS	70.5[a]	13.5	68.2[a]	10.3	51.0[b]	8.0	15.9	<0.001	0.19	57.5	1.69	95.4
D	75.2[a]	12.9	63.4[b]	11.1	55.1[b]	8.7	14.3	<0.001	0.95	82.8	1.74	95.4
HY	70.5[a]	10.2	67.1[a]	9.2	56.4[b]	7.4	11.1	<0.001	0.34	63.3	1.51	93.4
PD	63.1	9.0	59.9	9.9	58.6	9.0	1.09	ns	0.33	62.9	0.49	68.8
PA	62.5[a]	9.8	57.7[a,b]	8.9	54.6[b]	6.7	3.72	0.031	0.50	69.0	0.90	81.5
PT	66.3[a]	11.6	60.8[a,b]	9.5	54.7[b]	5.6	6.56	0.003	0.50	69.0	1.20	88.4
SC	64.3[a]	13.2	60.3[a,b]	10.3	54.9[b]	7.6	3.26	0.047	0.33	62.9	0.83	79.6
MA	51.1	11.7	55.1	12.7	56.4	11.8	0.93	ns	0.32	(62.6)	0.44	(67.0)
SI	63.1[a]	12.7	51.2[b]	10.3	48.4[b]	9.1	9.21	<0.001	1.00	84.0	1.30	90.3

Means that share a superscript are not different at the 0.05 level by Tukey's HSD test

Table 4 Values for quality of life measures (SF-36) for three groups

Variable	Experimental groups						Overall comparison		Chronic daily HA *vs*. HA control		Chronic daily HA *vs*. non-HA control	
	Chronic daily HA		HA control		Non-HA control							
	M	SD	M	SD	M	SD	*F*	*p*	Effect size *d*	Percent of chronic daily HA above mean (below mean) of comparison group	Effect size *d*	Percent of chronic daily HA above mean (below mean) of comparison group
Physical functioning	82.4	18.1	89.7	19.6	92.8	14.3	1.66	ns	0.38	(64.8)	0.62	(73.2)
Role-physical	38.2[a]	39.4	61.8[a,b]	46.7	87.5[b]	28.9	6.77	0.002	0.53	(70.0)	1.38	(91.6)
Bodily pain	50.6[a]	22.2	54.5[a]	21.1	83.6[b]	14.6	13.9	<0.001	0.18	(57.1)	1.70	(95.5)
General health	59.7[a]	20.0	74.2[a,b]	23.7	83.9[b]	12.3	6.76	0.002	0.65	(74.2)	1.40	(91.1)
Vitality	39.7[a]	21.9	57.1[b]	16.6	67.8[b]	12.6	11.3	<0.001	0.88	(81.0)	1.50	(93.3)
Social functioning	75.6[a]	22.6	77.7[a]	24.8	94.6[b]	10.2	4.26	0.020	0.08	(53.2)	1.02	(84.6)
Role-emotional	64.8[a]	39.2	78.9[a,b]	35.5	97.9[b]	8.3	4.73	0.013	0.37	(64.4)	1.10	(86.4)
Mental health	64.4[a]	14.4	70.2[a,b]	17.5	78.8[b]	14.3	3.73	0.031	0.35	(63.7)	0.98	(83.6)

Means that share a superscript are not different at the 0.05 level by Tukey's HSD test

on physical functioning. As with the measures of psychological distress described above, the chronic daily HA group was significantly lower (again by Tukey's HSD test) than the non-HA controls on all seven subscales. Again, 80 to above 90% of those with chronic daily HA scored below the mean of the control group.

When the two HA groups were compared, however, the chronic daily HA group was significantly lower only on the subscale measuring reported vitality. There were again arithmetic differences for the chronic daily HA group to score lower than the episodic HA group with noticeable discrepancies on physical role performance and rating of general health.

Measures of life stress

By way of contrast there was only a single between-group difference on the measures of life stress that reached significance, the intensity to frequency ratio of the DSI. On this measure, which essentially yields a measure of current life stressor intensity corrected for how frequently stresses occur, the two HA groups were higher than the non-HA control. Moreover, the comparison of the chronic daily HA group to the non-HA controls shows that over 90% of the HA sufferers are higher than the mean of the controls. The two HA groups did not differ.

Discussion

The primary aim of this study was to clarify the psychosocial functioning of chronic daily HA relative to other episodic HA sufferers and relative to normal, healthy controls. This study is the first to use both a HA and non-HA control group, to use standardised, reliable measures of psychosocial functioning, and to incorporate a measure of role functioning impairment/quality of life. As predicted, chronic daily HA subjects were clearly more psychologically distressed than normal healthy matched subjects. Indices of depression, anxiety and stress impact are elevated in the majority (greater than 70%) of chronic daily HA sufferers relative to

Table 5 Values of life stress measures for three groups

Variable	Experimental groups						Overall comparison		Chronic daily HA *vs*. HA control		Chronic daily HA *vs*. non-HA control	
	Chronic daily HA		HA control		Non-HA control							
	M	SD	M	SD	M	SD	*F*	*p*	Effect size *d*	Percent of chronic daily HA above mean (below mean) of comparison group	Effect size *d*	Percent of chronic daily HA above mean (below mean) of comparison group
Life events weighted average	315.3	224.1	246.9	171.4	265.6	154.5	0.67	ns	0.34	63.3	0.25	59.9
Hassles												
Frequency	38.4	14.6	37.9	21.2	30.1	14.6	1.24	ns	0.02	50.8	0.56	71.2
Intensity	55.3	22.2	54.5	35.8	40.9	23.6	1.41	ns	0.03	51.7	0.62	73.2
Daily Stress Inventory												
Frequency	54.3	38.1	51.6	32.4	46.4	27.0	0.25	ns	0.07	52.8	0.33	59.1
Intensity	165.4	128.0	142.9	90.8	96.1	59.2	2.19	ns	0.20	57.9	0.66	74.5
Int/Freq.	2.97[a]	0.60	2.74[a]	0.62	2.05[b]	0.48	11.8	<0.001	0.48	68.4	1.50	93.3

Means that share a superscript are not different at the 0.05 level by Tukey's HSD test

the average scores of normal healthy subjects. These elevations are also clinically meaningful. Mean scores for three MMPI subscales (scales HS, D and HY) are in the clinical range. This finding contrasts with those of Blanchard et al. [7], in which elevations on the MMPI subscales for chronic daily HAs were not in the clinical range (thus not "abnormal") and agrees with Mathew et al. [5]. Chronic daily HA sufferers also score significantly higher (but not in the clinical range) on scales PT and SI. Mean scores for State anxiety are above the 70th percentile range and for Trait anxiety are just above the 80th percentile rank, indicating high levels of anxiety.

Very little data exist on role functioning and other aspects of QOL among those with chronic daily HAs. As predicted, chronic daily HA sufferers also experience much more impairment in multiple areas of their lives as indicated by lower scores on 5 of the 8 subscales of the SF-36 relative to non-HA sufferers. Chronic daily HA sufferers are significantly more likely to experience problems with work or other daily activities as a result of HAs. Emotionally they are significantly more depressed and more likely to experience interference with role functioning as a result of emotional distress. They also experience more bodily pain, have poorer evaluations of their current overall health and future health, and feel tired most of the time. The effect sizes associated with these findings indicate strong differences. In fact, more than 90% of chronic daily HAs scored below the mean (indicating poorer functioning) of healthy controls on 4 of the 5 statistically significant SF-36 subscales, and more than 85% scored below the mean of controls on the fifth subscale (Role-emotional).

While it seems logical that chronic daily HA sufferers manifest more psychological distress than healthy populations, also of interest is whether chronic daily HAs may also experience more psychosocial distress and impairment than chronic HA sufferers. While many statistical tests were not significant, examination of the effect sizes suggest strong differences may exist. Future studies should recruit larger sample sizes to test these findings. Two reliable measures of depression (BDI, MMPI Depression scale) are elevated in chronic daily HA sufferers relative to the episodic HA sample. On the MMPI-D scale, 82.80% of those with chronic daily HAs score above the mean score of HA controls. Again, the mean scores for those with chronic daily HAs on these depression measures are in the clinical range while mean scores for the episodic HA controls are not. Chronic daily HA sufferers may be more socially isolated/inhibited as indicated by the MMPI SI scale; 84% of the former score above the mean of episodic HA controls on this scale. Chronic daily HA sufferers may be more anxious than non-

daily HA sufferers; over 70% of chronic daily HA sufferers score above the mean of the episodic HA sufferers on trait anxiety. Chronic daily HA sufferers may also experience more functional impairment than chronic episodic HA sufferers. SF-36 scores indicate that those with chronic daily HA tend to have less energy, view their general health as poorer and experience more impairment in physical activities than non-daily episodic HA sufferers. This conflicts with previous findings [7] in which chronic daily HAs did not suffer more impairment in role functioning than episodic HA sufferers.

Thus, on a number of reliable, valid measures, those with chronic daily HAs show poorer functioning and more distress than chronic episodic HA sufferers. Previous studies (e.g., [7]) had shown that, while there were differences between chronic daily HAs and HA controls, these differences were not clinically significant (i.e., test scores were not in the clinical range). However, in this study, indices tend to fall in the clinical range for those with chronic daily HAs. These findings also highlight the need to consider psychological outcomes in HA treatment.

No differences were found among the three groups in levels of previous stressful events, either major life events over the previous year, minor hassles over the previous month, or daily stressors during the HA monitoring period. There was a difference on the DSI measure of rated intensity per event with those suffering from chronic daily HA rating the intensity per event higher than the non-HA controls.

Previous research [5, 26, 27] has indicated that chronic daily HA sufferers tend to use symptomatic medications excessively, typically classifying 50–73% as high medicators. No studies have compared medication use among those with chronic daily HAs and chronic episodic HA sufferers. Two interesting findings emerged in this study. First, chronic daily HAs did not tend to use more medication than the episodic HA sufferers matched for IHS diagnosis, HA duration, gender and age. Second, no patient with chronic daily HA met criteria for "excessive use" in this study. While the criteria used were less restrictive (i.e., required higher levels of medication to qualify as high medicators) than some studies [26, 27] with high rates, they were more restrictive (i.e., required lower levels of medication to qualify as a high medicator) than those used in studies [25, 26] that reported excessive use in 12–17% of chronic daily HA sufferers.

Data from the HA interview indicated that chronic daily HA sufferers feel HAs result in significant social interference. A large number of chronic daily HA sufferers reported that HAs cause them to go to bed, forgo social activities, cause them to be less effective/slow down, and interfere with sexual functioning. However, the amount of interference reported was not any greater than that reported by those with chronic episodic HA. Also, the familial response to HA did not differ between the two groups. Chronic daily HA and HA control groups reported similar familial response (some secondary gains such as reduced household responsibility) to HA complaints, making it seem unlikely that chronic daily HAs had more secondary gain issues related to their HA complaints.

There are limitations to this study, primarily in terms of sample size. Given some of the effect sizes shown in Table 3, larger samples would probably have led to more significant differences between those with chronic daily HA and chronic episodic HA. Also, the sample was not explicitly seeking treatment; instead they had volunteered for research where treatment was a possible option. Lastly, this was a cross-sectional study measuring participants at a single point in their HA career. Thus we cannot tell whether having chronic daily HA causes the increased level of psychological distress and poorer role functioning or whether psychological characteristics (such as depression) predisposes to developing chronic daily HA.

Regardless, we believe we have contributed to a fuller understanding of these very troubled HA populations.

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