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POST-CIVIL WAR ADAPTATION AND NEED IN MANAGUA, NICARAGUA

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Summary. Within seven years after the end of the Nicaraguan civil war in 1990, forced migrants, whose lives had been most disrupted by the conflict, were self-settled in a squatter community in the capital city of Managua and lived in extreme poverty with minimal health, education, security and social service supports. Compared with voluntary migrant neighbours, whose lives had been less affected by the conflict, forced migrants exhibited equal clinically significant symptoms of physical and mental health and psychosocial maladaptation. These findings run counter to generally held theory and assumptions about the negative long-lasting effects of the trauma and stress of war, forced migration and resettlement. Explanations are offered to explain the discrepancies between theory and the study findings as well as the dominance of poverty and socioeconomic status. Implications are also drawn for increasing social support and other durable forms of assistance that emerge from the study as important to meeting the needs of equally poor and unhealthy forced and voluntary migrants in proliferating squatter communities throughout the Third World.

Introduction

In 1979, after almost a half century of dictatorial rule, the Nicaraguan people rose up in rebellion against the Somoza family and their supporters and won a surprising victory led by the Sandinista National Liberation Front. As the new government took power, there was wide popular support for the radical changes that were proposed in education, health care and land reform. However, it soon became clear that the Sandinistas were following the Cuban model for social and economic development as their leaders declared themselves as communists. With the support of the Reagan Administration, a counter-revolutionary movement known as the Contras was organized. A protracted and bloody civil war ensued from 1981 to 1990 that claimed the lives of 60,000 persons or 1·5% of the population – a fatality rate ten times greater than what the United States experienced during the Vietnam War. Those directly affected by the conflict were 650,000 inhabitants, 15% of the population, leading to

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the internal displacement of 350,000 and an external exodus of 250,000 refugees (Cordero, 1996).

Before the war, Nicaragua, with the largest geographical area in Central America that is rich in natural resources, had been able to provide food and health care to most of its citizens. As a consequence of the war and the subsequent process of resettlement, those displaced by the war suffered in multiple ways: loss of their homes, loss of loved ones who died in the war and loss of employment, income and status. These losses were compounded by the need to resettle in a country devastated by the war, with an unemployment rate above 60%, and where former animosities still existed. Today, one notch above Haiti, Nicaragua has the second lowest *per capita* income, second highest infant mortality rate and second lowest level of educational attainment in Central America and the Caribbean. Thus, the country's displaced populations have faced severe challenges in their efforts to resettle and reintegrate themselves within the society. Among them were repatriated refugees and demobilized soldiers, many of whom began seizing and exercising squatter rights over land when it became clear that the government could not or would not resettle them (Centro de Estudios Internacionales, 1995).

Allen & Turton (1996) note that reconstructing a community in the aftermath of civil conflict is often seen as one of healing and accountability. They wonder whether psychoanalytic and psychiatric approaches to study trauma will shed light on the problems faced by refugees and returnees. In the West, investigations of resettled refugees reveal a great deal of impaired functioning as a consequence of migration trauma, but there is little research that identifies the mental health effects of forced migration in the non-Western world. Some say that it is reasonable to think that these areas are equally impacted (Parker, 1996).

The goal of this study is to explore how groups of migrants, forced and voluntary, have experienced the effects of the civil war in Nicaragua, and how these experiences and the effects of resettlement may have impacted their physical and mental health. First, accumulated losses and stresses during the war and in the resettlement period are expected to predict the current state of wellness. Second, the effects of past losses and stresses associated with the war and resettlement are expected to have a greater and more negative impact on the wellness of forced migrants as compared with voluntary migrants. Finally, the predictors of physical and mental health status are systematically examined in order to test a generally held model of refugee adaptation or wellness.

War, migration and health status

Migration itself does not always lead directly to poor health or psychological problems. But, indirectly, according to Desjarlais *et al.* (1995), a number of forces, from unemployment status to housing conditions, to traumatic events before, during, or after dislocation, can lead to psychological distress. Refugees and displaced persons in flight and in exile commonly experience violence, impoverishment, dependency, breakdown of community norms and social supports, as well as insecurity, poor water, unsanitary living conditions, inadequate housing and the lack of adequate food. More recently, the direct relationship of war with decreased health has been seen:

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> Denial of access to food, water, adequate shelter, and appropriate health care severely affected the well-being of Sarajevo populations (and that of other towns), and had an especially serious impact on the health of pregnant women and their offspring. (Carballo & Simic, 1996)

In Nicaragua, the 72,000 refugees, the 350,000 displaced persons, and the demobilized soldiers are singled out as the population most affected by the war since most lack employment, access to health services, education, security, community organizations and protection of their human rights (Cordero, 1996). They are overly represented in the 50% of the population living under the poverty line (US$35·75 per month per person) and in the 40% who are classified as living in extreme poverty (US$16·83 per month per person) (INEC, 1995). With respect to demobilized soldiers, their condition continues to be problematic:

> The situation of the demobilized soldiers may seem similar to the rest of an impoverished population, but it is particularly marked by traumas provoked by war, by disorderly demobilization, by unfulfilled assistance expectations, and all too often, by a sense of social rejection ... . (Centro de Estudios Internacionales, 1995)

Few have documented the suffering of Nicaraguans during and after the civil conflict. Summerfield & Toser (1991) studied the effects of low intensity warfare on the psychological adjustment of former refugees. They found that 62% of the men and 91% of the women showed signs of mental disturbance as measured by the General Health Questionnaire (Goldberg & Williams, 1988). Of these, 25% of the men and 50% of the women merited a diagnosis of post-traumatic stress disorder (PTSD). In another study, Hume & Summerfield (1994) discovered that ex-combatants who had been wounded in the Nicaraguan civil conflict were significantly more likely to exhibit psychiatric symptoms as measured by the General Health Questionnaire (GHQ) than the control group of ex-combatants who were not wounded. Eighteen per cent of the study cohort presented a clinical picture of PTSD. In contrast, studies of PTSD among Vietnam veterans revealed a rate of 3·5% among non-wounded soldiers, 40% among wounded soldiers and 50% among veterans who were prisoners of war as compared with a 1% rate in the general population (Kinzie *et al.*, 1990). In a more recent investigation using the GHQ-28 in the Balkans, both Serbian and Kosovar Albanians populations revealed greater somatic and anxiety symptoms than social dysfunction or depression (Salama *et al.*, 2000).

Other literature posits that the mental health of refugees, war-exposed civilians, demobilized soldiers and displaced persons is associated with traumatic life events, stress and loss: circumstances that are often mediated by social supports and coping ability. One investigation of Yugoslavia refugees and non-refugees found that the psychological outcomes for refugees were more serious and associated with chronic stressors such as the place of displacement and the type of accommodation. Hermansson and colleagues (2002) reported that war-wounded refugees suffered long-term psychological symptoms. A lower level of psychosocial wellness was related to higher education, lack of work and poor health. Similar findings are also noted in Miller *et al.* (2002). They found that refugees exposed to war-related violence suffered higher rates of PTSD than refugees not exposed to the violence of war. Several authors examined the expression of war-related trauma in two generations of Cambodian refugees and found that both the parents and children suffered from PTSD. However, war trauma,

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loss, living arrangements and socioeconomic status were *not* correlated with the findings (Sack *et al*., 1995). Loughry & Nghia (2000) discovered that the emotional adjustment of Vietnamese youths who returned home after internment in a Hong Kong refugee camp was no different from that of youths who had not left their village. A key factor in the adjustment of the returnees was the support of family. Similarly, researchers discovered that 52% of Central Americans who immigrated to the United States as a result of war or political unrest reported symptoms of PTSD, while immigrants from Mexico showed a rate of 25% (Cervantes *et al*., 1989).

However, Hollifield and colleagues (2002) maintain that most studies of refugee trauma or health are descriptive or utilize instruments that have questionable validity and reliability. They further state that the main limitation to solid refugee research is a sound theoretical basis that employs appropriate, valid and reliable measurements. Keyes (2000) concurs. She examined twelve studies, all demonstrating negative psychological outcomes in refugee samples that revealed a lack of focus on the cultural context of the refugees' lives.

In the study of refugees and other displaced groups, it has been generally assumed that the trauma and stress of war, migration and resettlement contribute to the level of psychosocial adaptation. As discussed above, this relationship may be mediated by social and personal supports. An explanatory model proposed by Beiser *et al.* (1995) envisions current psychosocial wellness as an outcome of prior physical health status, school or employment success, self-esteem, personal characteristics, degree of pre- and post-migration stress and personal and social resources acting as mediating variables. In the context of forced and voluntary immigration in post-civil war Nicaragua, this study provides a partial test of the explanatory power of the Beiser *et al.* model outlined in Table 1.

In this model, one would expect poor physical and mental health to be associated with the stresses of migration, relocation and the everyday struggle of living in poverty. Furthermore, one would predict that forced migrants would show poorer health compared with voluntary migrants. In all cases, the Beiser *et al*. model assumes that better health outcomes are associated with a more ample *life-long* network of social supports. Last, data for testing the predicted influence of prior health history on current health status contain two short-term indicators: report within the year prior to interview of a pregnancy and report of an accident or serious illness. It was not possible to collect a lengthier health history in face of the usual constraints of time, money and accuracy of respondent recall.

Subjects and methods

Null hypothesis

No statistically significant differences exist between forced and voluntary migrants on any of the study's dependent and independent variables.

Sample

After five months of qualitative investigation, a total of 235 self-defined heads of household from the Barrio census of 528 household were selected for interview in the

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Table 1. Beiser *et al.* (1995) model of migrant stress, mediators and wellness

Precursor variables	Mediating variables	Dependent variables
Personal characteristics	**Personal resources**	**Wellness**
–Age	–Self-esteem	–Physical health
–Gender	–Education	–Mental health
–Type of migrant	–Income	
–Year moved into Barrio		
Pre-migration stress	**Social resources**	
–Has household partner	–Religion[a]	
–War participant	–Size household	
–War victim	–Size social support network	
–Extent of war losses	–Extent of material support	
–Number changes in residence	–Extent of emotional support	
–Forced migrant		
Post-migration stress		
–Past year pregnancy, illness or accident		
–Life events		
–General stress		
–Relationship stress		
–Economic stress		
–Environmental safety stress		

[a]Religion probably serves as both a social and personal resource, although sporadic church attendance in Central American culture for such major events as christenings, first communions, funerals and certain feast days has a strong element of social prescription. However, the emergence and rapid growth in recent years of many evangelical sects as an alternative to Roman Catholicism in Central America may bespeak a shift in use of religion from social to personal resource.

summer of 1997. All lived in a marginal neighbourhood, called 'Barrio 3–80', located in Managua, Nicaragua. The unequal probability sample was randomly drawn from five household strata consisting of: (1) 41 repatriated refugee families; (2) 69 families of demobilized soldiers; (3) 21 families who were uprooted by the war; (4) 153 families who had voluntarily moved from the countryside for economic reasons; and (5) 244 families who had voluntarily moved from another location in Managua. The first three groups are deemed forced migrants because they experienced substantial duress and coercion during the civil war which, by their own accounts, motivated their eventual move into Barrio 3–80. Soldiers often ended up as members of the Sandinista or Contra forces on the basis of which faction entered their village first and offered the choice of joining them or being shot. See-sawing battles across the countryside caused many people to flee for their lives to other locations in Nicaragua or to escape across the border into Honduras for the duration of the war. Voluntary migrants were the lucky ones whose lives were less affected by the war. They chose to move from

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the countryside to Barrio 3–80 to improve their economic circumstances or to move from another location in Managua for the free-rent status of squatters.

The sample's most frequent household configurations – female heads with a partner (44·2%) and male heads with a partner (31·9%) – cared for an average of four other household members, including the partner, children and sometimes members of an extended family. The less frequent household configurations – female heads without a partner (15·3%) and male heads without a partner (8·7%) – cared for an average of five other household members.

Instrumentation

The study's dependent variable, wellness, was measured by the 28-item version of the General Health Questionnaire (GHQ) (Goldberg & Williams, 1988), used by Summerfield & Toser (1991) in their investigation of a sample of rural Nicaraguans who were exposed to the war. The GHQ-28, standardized earlier for Latino populations, achieved high internal consistency reliability, as measured by Cronbach's alpha (0·91) in both the Managuan pre-test and final samples. The GHQ-28 contains four subscales, which measure, respectively, somatic health, anxiety, depression and social dysfunction.

Predictor variables that were included in the study included: (1) a chronic stress scale, developed from participant observation and qualitative interviews ($\alpha = 0{\cdot}69 - 0{\cdot}85$); (2) Holmes & Rahe (1967) social readjustment rating (life events) scale, normed on a pre-test random sample of 50 respondents drawn from the same Managuan neighbourhood as the final sample of 235 ($\alpha = 0{\cdot}55$); (3) Rosenberg's (1965) self-esteem scale ($\alpha = 0{\cdot}78 - 0{\cdot}85$); and (4) Strober's (1994) adaptation of Flaherty *et al.*'s (1983) social support scale ($\alpha = 0{\cdot}72$) that contains the dimensions of frequency of help, emotional or material help, or both. In addition to the demographics of age, gender, religion, income and the like, items were employed to capture war-related experiences, such as participation in the war as well as witnessing the death, wounding or handicapping of family members or friends.

All instruments that lacked a Spanish version underwent a standardized process of translation, back-translation, discussion, critique and final adjustment by the Nicaraguan staff before and after pre-test.

Data collection

Seven staff members with degrees in sociology or social work were recruited both to maintain a presence in the neighbourhood and to collect qualitative data for five months prior to the design, testing and implementation of the study questionnaire. Each received a week of orientation, intensive practice and daily supervision in the field. After an interview, a supervisor returned to each respondent's home to inquire about his/her satisfaction with the interview. Clerical staff keyed collected data into an Excel spreadsheet, which was then checked for accuracy by another clerical worker and one of the authors.

Analysis

Weighted descriptive statistics were calculated to determine the central tendencies and distributional properties of all study variables. Where feasible, variables whose

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distributions deviated substantially from the normal curve were transformed via natural log transformation to better approximate the shape of the normal curve. Regression trees (available from the authors) were computed to explain the structure and strength of relationships among postulated predictor variables in the Beiser *et al.* (1995) model, including identification of possible interactions among the predictor variables.

Findings

Differences between forced and voluntary migrants

Differences among forced and voluntary migrants on each of the study variables were tested by means of the separate variance *t*-test for independent groups. As indicated in a previous paper (Noble & Ahearn, 2001), there were very few statistically significant differences. By definition, the substantial overlapping variability that existed within the two groups precluded finding statistically significant differences. Compared with voluntary migrants, the forced migrants were, on average, almost seven years older and, as expected, participated more frequently in the war as combatants, serving in the army or the militia. Because forced migrants served less frequently in the Sandinista army or militia than the voluntary migrants, it can be inferred that they were members of the Contra forces. They changed residence two-thirds more frequently than voluntary migrants before moving into Barrio 3–80.

There were no statistically significant group differences relative to the other study variables, including gender, presence of a household partner, education and literacy, work status, victimization, war wounds, disability, witnessing death, family *per capita* monthly income, life events, self-esteem, physical or mental health status as measured by the GHQ-28 somatic, anxiety, depression and psychosocial dysfunction subscales, or reported change in health status during the year prior to interview resulting from pregnancy, accident or serious illness. The lack of statistically significant differences between forced and voluntary migrants demonstrate that, contrary to expectations, self-settled forced migrants appear no worse off seven years later than their poor neighbours who share squatter rights in Barrio 3–80.

Physical and mental health

As shown by Fig. 1, the study population as a whole displayed a very high incidence of clinically significant symptoms of ill health, as measured by the composite GHQ-28 scale (Goldberg & Williams, 1988), with virtually the same profile exhibited by forced and voluntary migrants. A score of four or five on the GHQ-28 is the modal threshold value reported by sixteen validity studies as indicative of sufficient symptomatology to warrant medical attention (Goldberg & Williams, 1988, p. 64).

During the year prior to interview, 11·1% of all respondents reported having had an accident or serious illness, and 15·3% reported a pregnancy. Having an accident or serious illness correlated positively with the GHQ-28 composite health assessment ($r = 0{\cdot}20$; $p < 0{\cdot}002$) as well as with its somatic ($r = 0{\cdot}26$; $p < 0{\cdot}000$) and anxiety ($r = 0{\cdot}15$; $p < 0{\cdot}02$) subscales. Pregnancy was negatively correlated with the anxiety subscale ($r = -0{\cdot}12$; $p < 0{\cdot}06$).

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Fig. 1. Illness severity in the study population.

In line with the adopted theoretical perspective (Table 1), it was hypothesized that physical and mental health statuses, as measured by the GHQ-28 subscales for somatic, anxiety, depression and psychosocial dysfunction, would be predicted by certain precursor personal characteristics and pre- and post-migration stressors, including change in health status during the past year, and the mediating influences of personal and social resources available to the individual. Regression tree analysis discloses interactions among subsets of predictor variables and provides the counts and percentages of cases that occupy various places on the trees. Such knowledge about the relative size and characteristics of relevant risk or target groups is useful when planning programmes or analysing intervention policies.

Somatic health

The interactions between self-esteem, age, number of changes in residence before moving into Barrio 3–80, and level of emotional support explained almost 90% of variance in physical health. In rank ascending order of reported somatic illness symptoms, the lowest average number of symptoms (1·16) was exhibited by the 41·9% of the population who manifested higher self-esteem, were younger, had changed residence less frequently before moving into Barrio 3–80, and received less emotional support. Second ranking with 1·83 somatic symptoms were the 32·8% who, in the same range of self-esteem, age and residential change, received more frequent emotional support. Third ranking with an average of 2·59 somatic symptoms were the 11·1% who, in the same range of self-esteem and age, had changed residence more often. Fourth ranking with 4·05 somatic symptoms were the 10·1% with low self-esteem. Those with the largest average number of symptoms (5·0) were the older population with higher self-esteem.

The substantial number of Barrio 3–80 residents (41·4%) who are younger, have experienced fewer disrupting moves in their lives, and enjoy higher self-esteem, manifest very few physical symptoms (1·16) on average and apparently have less need of emotional support, while a somewhat smaller number (32·8%) with the very same attributes except for slightly more somatic symptoms (1·83) on average, are recipients of more frequent emotional support. One-quarter (25·3%) of the population manifests

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about 3–5 somatic symptoms. This heterogeneous group is variously composed of older people, people with low self-esteem, and those who have experienced more disrupting moves in their lives.

Anxiety

The interactions between self-esteem, *per capita* family income, and support network size explained more than 80% of variance in anxiety. In rank ascending order of manifested anxiety symptoms, the lowest average number of symptoms (1·19) was exhibited by the 55·0% of the population who enjoyed higher self-esteem and larger *per capita* family income and had a smaller size support network. Second ranking with 2·77 anxiety symptoms on average were the 8·6% who, in the same range of self-esteem and *per capita* family income, had a larger size support network. Third ranking with 3·8 anxiety symptoms were the 28·3% who exhibited lower self-esteem. Fourth ranking with an average of 4·13 anxiety symptoms were the 8·1% who enjoyed higher self-esteem but had lower *per capita* family income.

The substantial number of Barrio 3–80 residents (55·0%) who enjoyed higher self-esteem and had higher *per capita* household income manifested very few anxiety symptoms (1·19) on average and lived within smaller size support networks, while a very small number (8·6%) with the very same attributes except for more anxiety symptoms (2·77), live within a larger size support network. This finding is puzzling insofar as the Beiser *et al.* (1995) theory posits support network size as a mediating variable that should serve to reduce anxiety, not increase it. The single-point-in-time survey data do not permit causal inference in this regard.

Depression

Interactions between self-esteem, *per capita* household income and year of move into Barrio 3–80 explained 100% of variance in depression. In rank ascending order of manifested depression symptoms, the lowest average number of symptoms (1·0) was exhibited by the 81·8% of the population who enjoyed both higher *per capita* household income and self-esteem. Second ranking with 2·0 average depression symptoms were the 5·1% with lower self-esteem who moved later (1992 or after) into Barrio 3–80. Third ranking with an average of 3·0 depression symptoms were the 8·1% who enjoyed higher self-esteem but low *per capita* household income. Fourth ranking with 4·0 depression symptoms were the 4·5% who had moved into Barrio 3–80 before 1992 and manifested lower self-esteem.

The majority of Barrio 3–80 residents (81·8%), who enjoyed both higher *per capita* household income and higher self-esteem, manifested very few depression symptoms (1·0). The rest were divided among those averaging many such symptoms (3·0), who exhibited higher self-esteem but lower *per capita* household income; those with fewer depression symptoms (2·0), who had moved into Barrio 3–80 more recently (1992 or after) and manifested lower self-esteem; and those with the largest average number of depression symptoms (4·0), who had moved into Barrio 3–80 before 1992 and exhibited lower self-esteem. It could be asked whether the passage of years living in Barrio 3–80 causes its residents to lose self-esteem and become more depressed about

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the desperate circumstances of their life. Lower *per capita* household income is also associated with more symptoms of depression among even those who manifest higher self-esteem. The single-point-in-time survey data do not permit causal inference in this regard, but direct observation of daily life in Barrio 3–80 suggests a relationship between cumulative years of life in crushing poverty and depression.

Social dysfunction

Interactions between self-esteem and work status explained more than 75% of variance in social dysfunction. In rank ascending order of manifested social dysfunction symptoms, the lowest average incidence of symptoms (1·0) occurred among the 4·6% of the population who were working but exhibited lower self-esteem. Inexplicably, second ranking in average social dysfunction symptoms (2·01) were the large majority (89·9%) who enjoyed higher self-esteem. Third ranking with the highest average of 4·0 symptoms were the 5·6% who were not working and exhibited lower self-esteem. Except for people who are out of work and suffer lower self-esteem, there is no ready explanation for the pattern of social dysfunction that is manifested among the rest of the population.

Not working and lower self-esteem appear to interact in fomenting the highest level of social dysfunction (4·0), and the combination of lower self-esteem and years of exposure to the hardship of living in Barrio 3–80 connects with the highest level of depression (4·0). On the other hand, the interaction of older age and higher self-esteem is associated with the highest level of physical health symptoms (5·0), and the interaction of higher self-esteem and lower *per capita* household income is related to the highest level of anxiety symptoms (4·13). The unanswerable question here – given data limitations – is what role, if any, does self-esteem play in moderating the risk of becoming symptomatic? Or is it instead that illness impacts negatively on self-esteem? The findings in this regard are hopelessly ambiguous. Depending on the specific type of symptoms, the data indicate that both higher and lower self-esteem in combination with other predictor variables is associated with the highest symptom levels. Clarifying the causal directionality between illness symptoms and self-esteem must await future research that amasses longitudinal data covering substantial time periods.

The Beiser *et al.* (1995) theory posits self-esteem as a mediating personal resource that should in the long-term have a moderating effect on illness symptoms. In this regard, it is possible to argue that poor health affects the ability to work and produce income and the concomitant sense of self-worth based on working and making money (Nagi, 1969; Buss & Redburn, 1983). Similarly, sick and disabled people in the community typically attract the care-giving attention and social and material support of family, kin and neighbours (Hamburg *et al.*, 1982; Bradley *et al.*, 1992). The theory is silent about these possible near-term effects of illness symptoms.

The regression trees for somatic and anxiety symptoms provide some clue that the near-term effects of illness symptoms may attract care-giving attention or help, including the provision of material and social support. As indicated earlier, individuals exhibiting more somatic symptoms received more ample emotional help from family, kin and neighbours. Also, it was found that more anxious individuals were bolstered by larger size social networks.

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It makes sense, therefore, to explore theory and data to determine the importance of the connection. Beiser *et al.* (1995) as well as other theorists (McCubbin & Patterson, 1983; Lavee *et al.*, 1985; McCubbin & Thompson, 1987; and McHenry & Price, 1994) postulate that social support acts as a coping mechanism or mediator which reduces the stress that ultimately results in ill health and maladaptation. Do study data indicate that social support acts as a coping mechanism by mitigating stress and increasing the frequency of help? The succeeding paragraphs document the extent to which social support appears to do so.

Frequency of help

The interactions between physical health and social network size explained 51% of variance in the frequency of receiving help. In rank ascending order of reported help frequency, the lowest average help (1·91 natural log) was received by the 3·5% of the population who manifested larger number of somatic illness symptoms and had the smallest size social network. Second ranking with 2·38 average help frequency were the 27·3% who exhibited the smallest number of somatic illness symptoms. Third ranking with 3·12 average help frequency were the 54·6% who had moderate size social networks. Fourth ranking with 3·88 average help frequency were the 14·7% who had the largest size social networks. Clearly, the amount of help received by the sickest is determined by the size of the individual's social network. Of the 51% variance explained, social network size accounts for 24·6% of it.

Economic stress

Interactions between social network size, education, the pile-up of prior stressful life events, and receipt of material help explained 39·3% of variance in indicators of economic stress. The least economic stress (1·79 natural log) was reported by the 4% who lived in larger social networks and reported smaller numbers of prior stressful life events. The second lowest economic stress (1·97) was experienced by the 3·5% who lived in smaller social networks but had the benefit of a more ample education and receipt of more material help. Third ranking (2·26) were the 7·2% who lived in smaller social networks, enjoyed more ample education but received less material help. Those reporting the highest economic stress (2·31) were the 59·6% who lived in smaller social networks and had the least amount of education. Of the 39·3% variance explained, social network size accounted for 15·7% of it; the remainder by prior stressful life events (6·1%), education (8·4%) and receipt of material help (9·0%).

Interpersonal relationship stress

It was found that social network size, interacting with the amount of material help received, the number of prior dislocations or moves, and *per capita* annual family income explained 33·3% of variance in relationship stress. The 22·2% who received the most material help reported the smallest amount (2·34 natural log) of relationship stress. Second ranking (2·46) were the 43·9% who received less material help, reported fewer prior moves, and had lower *per capita* annual family incomes. Inexplicably, the

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highest ranking in relationship stress (2·69) were the 5·1% who received less material help, reported fewer prior moves, but had higher *per capita* annual family incomes. Of the 33·3% of variance explained, receipt of material help accounted for 18·9% of it; the remainder by the number of prior moves (6·9%) and *per capita* annual family income (7·4%). Higher income and fewer prior dislocations apparently do not offset the receipt of less material help as far as interpersonal relationship stress is concerned.

Discussion and conclusions

The extremely poor residents of Barrio 3–80 struggle to eke out a living with minimal material resources. As indicated by Fig. 1, 49·8% of them exhibit clinically significant symptoms of ill health. The combination of poor nutrition, living in an unsanitary and dangerous physical environment, and the lack of access to needed health care assures progressively deteriorating health status and probably premature death.

Barrio 3–80 residents have few opportunities to better their lives. There are fewer jobs available as the governmental sector shrinks and the private sector, while growing, has not replaced the jobs of the thousands who have lost their employment. Many, especially women, enter the informal sector attempting to earn some money by making and selling tortillas, fruit juices or cookies, sewing or caring for the children of others. In Barrio 3–80, others have turned to establishing their own businesses, as seen by the eleven small stores or *pulperias,* two bakeries, several hair dressers, two shoe repair businesses, four small eating establishments and businesses that repair air-conditioning units and cars or re-tread tires. It is not unusual for children of Barrio 3–80 to quit school at an early age to work with their parents. They are often the ones that you meet selling assorted things at most major intersections in Managua.

The health of the community is poor and beset with such maladies as malaria, dengue, parasites, yellow fever and respiratory and gastrointestinal problems. In some ways, inhabitants of Barrio 3–80 are lucky because they have access to two health clinics: one a general health clinic supported by Doctors without Borders, a French non-governmental organization (NGO), and the other, a gynaecological clinic operated by the ruling Liberal Party. Nonetheless, a major barrier to the use of these health resources is the unavailability and cost of needed medicines.

There is a woman in the neighbourhood who works as a maternal health promoter. Before there were several, but they left because of budget cutbacks. There are also two women who work as midwives, one of whom is a local *curandera* or medicine woman.

The community is proud of its school, which has morning, afternoon and evening classes for pre-school, primary and secondary students. However, the community and students deplore the poor physical condition of the school, the lack of money for books, supplies and other teaching materials, and the lack of security in the surrounding area of the school.

SOYNICA, another NGO, for a time provided nutritious meals to more than 150 children, ages 3–7 years. The programme was terminated when the NGO had to reduce its operations in Nicaragua because of budget constraints.

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It is the authors' contention that macro-level economic policies influence local resource availability and shape decisions in every sphere, including the choice of interventions relating to health, education, employment and social services. Given sufficiency of resources, a number of practice interventions could and should be undertaken that have potential for improving the well-being of the residents of Barrio 3–80. To address the lack of access to health care, the number of health promoters should be expanded to assess community health needs and to link these needs with services at the two local clinics with emphasis on health education to foster preventive practices and early identification of health problems for treatment. The key to effective prevention will be pre- and postnatal care, nutrition and sex education: a very sensitive matter in conservative Roman Catholic Nicaragua.

Priority should be given to neighbourhood public health. Unsanitary conditions breed malaria, dengue fever and rampant infestations of parasites. A mosquito eradication programme is needed that starts with community education about the conditions that breed mosquitoes. Health promotion is needed to secure the safety of the community supply of drinking water and to deal with the effects of water-borne contaminants. One of the major causes of infant death is gastrointestinal illness from contaminated drinking water accompanied by parental ignorance about how to recognize and treat children with gastrointestinal symptoms.

The poor nutrition of everybody living in Barrio 3–80 needs to be addressed. Poor health is intricately associated with poor nutrition. At a minimum, one nutritious meal per day should be provided to each school-aged child. Infants and pre-school children will need more adequate provision than this if they are to grow strong enough to live on one nutritious meal per day later in life.

The residents of Barrio 3–80 have built a local school to serve also as a place of worship and as a community meeting place. It can serve as the infrastructure for a community centre. With adequate financing, community workers could organize the neighbourhood to recognize its social, economic and cultural needs and, building on this knowledge, to design a variety of community programmes to meet them. Women's groups, recreational and exercise programmes for all ages, adult education, job training and perhaps a credit union would go far in providing needed community supports for all residents of Barrio 3–80.

A critical element in confronting the poor health of Barrio 3–80 residents is economic development. Development projects and employment are needed that address the community's inadequate housing, unsafe drinking water, and lack of basic public health and individual health care provisions. Development projects employing local residents would pump much needed income into the neighbourhood. Another proven approach fosters micro-enterprises by granting small loans for activities such as sewing, making tortillas or producing local arts and crafts, while emphasizing at the same time community participation, empowerment, self-help and leadership development (Midgley, 1997).

In essence, it is argued that the best way to address the documented poor health of the residents of Barrio 3–80 is to supply the basics of health, education, employment and community services. At the same time, it is recognized that needed action will not take place unless the current social and economic policies of Nicaragua are changed for the better with help from the international financial institutions,

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NGOs and the wealthier nations of the world. Relief through immigration and capital flows may be part of the equation as the new global economy promotes optimized use of capital and labour. To avoid civil unrest and war and resulting human suffering in the process, the challenge facing national and international leadership is to define, negotiate and apply the appropriate mix of macro and micro social and economic policies to satisfy local needs in places like Barrio 3–80.

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