AN EVALUATION OF CARDIOVASCULAR RISK IN EARLY BEREAVEMENT

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A thesis submitted in accordance with the total requirements for admission to the degree of Doctor of Philosophy

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CERTIFICATE OF AUTHORSHIP/ORIGINALITY

I certify that the work in this thesis has not been previously submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help I have received in my research work and in the preparation of this thesis itself has been acknowledged. In addition, I certify that all the information sources and literature used are indicated in the thesis.

Signature of candidate

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ABSTRACT

Although bereavement is associated with adverse health, the mechanism is not well understood, in part because early psychological, behavioural and physiological changes remain incompletely characterised. In this thesis, the results of a prospective evaluation of cardiac risk factors in early bereavement are reported. Psychological, behavioural and physical changes associated with cardiac risk are documented with the main focus on physiological changes in the early acute bereavement period. The relationships between physiological risk factor changes observed and psychological state and social support in the early acute bereavement period are also explored.

Bereaved (n=62) spouses and parents were evaluated within two weeks and at six months following loss using the Centre for Epidemiologic Studies-Depression (CES-D), Spielberger State Anxiety and Anger, Social Support Questionnaire (SSQ-6) and a behavioural questionnaire documenting changes in sleep behaviours, appetite, cigarette and alcohol consumption. Evaluation of cortisol, lipids, inflammatory and prothrombotic changes, 24-hour heart rate and blood pressure were also conducted. Bereaved participants were compared to a sample of non-bereaved individuals (n=50).

Compared to non-bereaved, acutely bereaved participants had elevated symptoms of depression (mean 26.7 ±1.7 vs 5.9 ±0.7, $p<0.001$), anxiety (mean 47.4 ±2.0 vs 28.2 ±1.4, $p<0.001$) and anger (median 16.0 vs 15.0, $p<0.001$). Acutely, bereaved participants slept less than non-bereaved (mean 5.9 ±0.2 vs 7.2 ±0.2 hours,

p<0.001) and were more likely to report reduced appetite (p<0.001) and changes to alcohol consumption (p<0.001).

Compared to the non-bereaved, acutely bereaved participants had higher cortisol levels (median 306 vs 266, p=0.003), lower total cholesterol (median 4.9 vs 5.4, p=0.006), lower LDL (median 2.4 vs 2.9, p<0.001), higher neutrophils (median 4.0 vs 3.3, p=0.002), a trend towards higher vWF-ag (127 vs 114, p=0.055), higher 24-hour heart rate (mean 75.5 ± 1.9 vs 70.6 ± 1.2, p=0.008), lower SDNN (median 116 vs 129, p=0.04), and higher daytime blood pressure load (systolic mean load: 39.7 ± 0.03 vs 25.8 ± 0.02, p=0.005 and diastolic mean load 20.1 ± 0.02 vs 13.5 ± 0.02, p=0.008).

At six months, in the bereaved participants, depression, anxiety and anger had reduced significantly (all p<0.001). Appetite had returned to normal and sleep time had increased (p<0.001). Heart rate (p=0.03), diastolic blood pressure load (p=0.03), VWF-ag (p=0.008) and neutrophil (p=0.001) levels were all lower compared to the initial acute assessment. Total cholesterol (p=0.01) and LDL (P=0.003) increased while HDL levels decreased (p=0.04) from the acute assessment to six months. Cortisol, SDNN and systolic blood pressure remained unchanged.

At the acute initial assessment, no significant associations between symptoms of depression and physiological changes acutely were observed. Increased symptoms of anxiety were associated with higher heart rate (r=0.27, p=0.04), total cholesterol (r=0.29, p=0.02) and LDL (r=0.29, p=0.03) levels. Increased anger symptoms were

associated with higher heart rate ($r=0.27$, $p=0.04$), daytime systolic blood pressure ($r=0.28$, $p=0.04$) and LDL levels ($r=0.35$, $p=0.008$).

To determine if levels of social support were associated with lower cardiovascular risk, the relationships between levels of social support and physiological changes observed were described. No significant relationships between social support (availability or satisfaction) and physiological changes acutely were observed.

In conclusion, the results offer insight into the psychological, behavioural and physiological changes that may contribute to health risk in the surviving spouse or parent in early bereavement. The recognition that bereavement is associated with increased cardiac risk should provide an impetus for individuals to act on cardiac symptoms by seeking medical advice and for health care providers to monitor such individuals more closely.