STRESS AND DISEASE: A REVIEW OF PRINCIPLES

BY

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Definitions

The term "stress" is here taken to mean the internal or resisting force brought into being in the human organism by interaction with the environment (Wolff, 1952). In Western society one of the most important forms of such interaction in the production of illness is that between man and his fellow-beings. The stresses arising from this source are manifested in disturbances of thought, feeling and behaviour, and in disturbances of bodily function and structure. These may be brief and insignificant, or so persistent and troublesome as to constitute an illness. The group of illnesses in which stress is a principal factor in aetiology may be collectively termed the stress disorders.

It will be taken as an axiom that the aetiology of every illness is complex, and that many agents in both the mental and physical spheres enter into the causation of each disorder. In no case of illness are all these variables known, and the best that can be hoped for is an approximation to the truth. For instance, it may be difficult or impossible to appraise the causal influence of genetic endowment in the production of a particular disorder. It is fair to say that there are as many gaps in our understanding of the "organic" aspect of human reactions as in our insight into the emotional aspect. For instance, there is no general agreement about the physiology of the normal menstrual cycle. In the life history of a patient, one of whose bodily responses to stress is menorrhagia, the chain of events *situation—stress—symptom* may stand out so clearly as a recurring pattern as to leave no doubt about the linkage, yet the neural or endocrine mechanism of the response is still obscure. The "pathology of the whole person," in Balint's (1957) phrase, has still to be written.

A stress disorder may be defined as an illness which (1) begins at a time of crisis in the patient's life, (2) shows a time correlation with situations provoking stress in the patient, and (3) clears up when the situation changes or the patient learns to adapt to it better. To include under this heading a disorder such as urticaria is not to imply that urticaria is always and in every individual a stress disorder; in some individuals it certainly is, and thorough study of even a few of these should remind us that any investigation of urticaria which omits an appraisal of the stress factor is necessarily incomplete.

A Biological View of Illness

The biological view may be contrasted with the mechanistic (Halliday, 1948). According to the latter view, the human organism is a machine composed of mutually adjusted parts working together. Illness results from a breakdown in the machine, and the cause of illness must lie in a fault, disease, or imbalance in one or more of the parts. A list of the causes of illness is thus a list of faulty parts or local lesions. The doctor's task, in this view, is to discover and remedy the fault, and the more he knows about mechanism the more effective he will be.

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The mechanistic view has in its time provided the framework for most of our present knowledge of the physics and chemistry of the body, and for understanding the processes of certain sorts of illness—for example, the infections. Its conceptual structure does not, however, enable the observer to comprehend in full the meaning of events occurring in a disorder such as recurrent vomiting in children associated with a rage reaction. Here there is no bodily fault or lesion; the machine is working well enough, but the person is in trouble.

On the biological view, illness can occur when the individual, predisposed to react in certain ways by his life experiences, encounters a situation to which he cannot readily adapt. The situation itself may not be especially dangerous or stimulating, but if the individual sees it as such and cannot take appropriate action stress is aroused in him; the form of mental and bodily response which he then shows will be determined by his physical constitution, his personality pattern, and the nature of the situation.

Stress responses, then, appear in the organism when circumstances urge to action, but no action is taken. The discharge of anger in words or behaviour, the working-through of grief by an explicit mourning, seeking of an appropriate outlet in states of sexual tension, reduction of anxiety by internal or external changes—these are examples of "resolution by action." When the source of stress is outside conscious awareness (as it so often is) or when action is blocked by inner censorship or outward restraints, there follows disharmony in the organism which may issue in symptoms of illness. There seems to be some variation from one person to another, and from one culture to another, regarding the degree of tolerance of this disharmony; this may perhaps be explained by differences in individual experience.

Common Stress Disorders

A provisional list of the disorders commonly met with in practice is as follows:

Group 1: Simple anxiety states, acute and chronic. Reactive depression. Simple hypochondriasis.

Group 2: "Effort syndrome." Palpitation. Dyspnoea out of proportion to degree of fitness. Left inframammary pain.

Group 3: Over-eating. Under-eating. Anorexia nervosa. Recurrent vomiting. Nervous diarrhoea. Constipation. Ulcerative colitis. Duodenal ulcer. "Abdominal discontent"—fullness, discomfort, wind. Recurrent abdominal pain.

Group 4: Giddiness, tremor, faintness, fatigue. Vascular headache. Insomnia. Malaise—feeling unwell, run-down.

Group 5: Urticaria. Neurodermatitis. "Eczema." Pruritus. Hyperhidrosis. Rosacea. Alopecia. Cheilopompholyx.

Group 6: Tension pain, in its various forms.

Group 7: Amenorrhoea. Menorrhagia. Period pain. Dyspareunia. Frigidity. Vomiting in pregnancy, after three months. Post-partum depression.

Group 8: Asthma. Vasomotor rhinitis. "Spots before the eyes." Amblyopia.

Stress may of course act as a contributory cause in other forms of illness besides these. For example, there are some people who become afflicted with a crop of boils when their resistance is low during a time of crisis. Indeed, for all we know, stress in some form may contribute to the causation of every illness. For practical purposes, however, it is convenient to bring together into one group the disorders listed above, since, in these, emotional tension is the principal determinant of symptoms.

Incidence

There have been few surveys of incidence of stress disorder in this country. Two of these are: (1) the study by Watts and Watts (1951), based on the examination of a year's work in general practice; the practice is one of 8,000 in a small country town (of 2,828 patients seen during the year, 316 (11.2%) were classed as "psychosomatic disorder"); and (2) Finlay and his colleagues (1954) reported a survey of incidence over one year by six general practi-

tioners, two working in the country, two in an inner metropolitan area, and two in an outer metropolitan area. Their results showed that, by and large, one-fifth of the patients seen on any day in an urban practice suffer from a stress disorder; in the country, the proportion will be 10-15%. Mestitz (1957), reviewing a series of 1,817 patients seen in a casualty department, commented that no "organic" cause could be found for 27% of the symptoms. His paper emphasizes the prime importance of pain as a presenting symptom. In 26% of those patients who gave pain as the main symptom, no physical basis for the illness could be traced; the treatment of these patients, the author says, was difficult and unsatisfactory. This is a usual finding among those who have to deal with tension pain.

Time Relations in Illness

In the recognition and understanding of a stress disorder one essential aspect for study is the relation of the illness to time.

First Appearance of Illness.—The time of first appearance of a stress disorder is never a matter of chance, and there is always a correlation between the point of emergence of the illness and the patient's emotional experience. This correlation may be quite manifest, as in the sequence *threat—fear—diarrhoea*, or it may be more obscure. The nature of the causal stress may be at first unknown to both doctor and patient, but in general the better the doctor knows his patient, and the longer the period of observation, the less likely is it that an attack of illness will remain unexplained.

Latent Period.—One difficulty in discerning the meaning of an attack of illness is that experience and attack may be separated by a latent period as long as 24 hours, or even more. For example, a patient prone to vascular headache commonly has his attack on Saturday or Sunday morning, when he is ostensibly at peace, the stress-provoking experience being an event on Thursday or Friday, or perhaps the accumulation of a week of heavy burdens.

Tempo of Illness.—Responses to stress may be divided into categories according to the rate of reaction. In skin disorder, for example, itching is a "fast reactor"—during a spell of rage the skin can begin to itch directly; whereas psoriasis is a "slow reactor"—changes in the size and colour of psoriatic patches follow the course of life-experiences, but in a leisurely way.

Time Correlation of Attacks.—The "Meyerian chart" is a simple device for recording the history of a stress disorder. It has three columns—one for the date, one for the attack, and one for the events surrounding the attack. The patient fills in the chart at his leisure, perhaps with the assistance of his wife, recalling as much as he can of the circumstances of each attack. A glance at the third column will then often show at once that there is a single thread connecting all the events associated with illness—for example, the patient takes ill only when some event occurs that provokes a particular reaction of guilt.

Curve of Recovery.—The course of recovery in stress disorder is seldom a straight line. Much more often it is of wave form, with remissions and relapses, the direction of the wave being towards normality. This curve is, of course, also much influenced by biological rhythms, such as the menstrual cycle in women, with its recurrent peaks of tension.

Mechanism of Symptom Production

The reactions of the body under stress are very diverse indeed, and there is scarcely any organ or system whose function may not be hastened or slowed or arrested or changed in some way. Wittkower (1928) showed that both joy and sorrow could increase the flow of bile from the liver, whereas annoyance stopped it altogether. The filtering function of the kidneys is impaired by prolonged anxiety. The working of the heart and blood vessels, and the gut, and in short all the internal organs, may be affected when the organism is exposed to stress. A formidable literature now

exists in the field of psychophysical relations; some of the publications are summarized in each issue of the bimonthly American journal *Psychosomatic Medicine*.

The physical reactions in stress disorder are all produced through the agency of the central nervous system, but there are several possible mechanisms: (1) a direct nervous effect upon the organ or tissue, as when increased stimulation causes muscle tension and pain; (2) the glandular system acts as an intermediary agent; (3) bodily changes are produced indirectly, as when emotional tension provokes itching, the patient scratches and injures the skin, and a rash appears; (4) action by the patient, as when the diabetic omits his dose of insulin and goes into a coma; such action may of course be unconsciously motivated and purposive. These mechanisms may overlap or combine.

The response of the organism under stress, in an individual patient, may shift from one system to another. For instance, a woman with menorrhagia of emotional origin undergoes hysterectomy, since the bleeding cannot be controlled; during convalescence after the operation she begins to suffer from dyspepsia. This "switch of focus" is not uncommon, and it indicates that the underlying tensions have not been dealt with.

"Choice of Illness"

When the patient meets a situation which produces sustained anxiety in him, will this be manifested mainly by changes in mood and feeling, or mainly by physical symptoms, or both? And why one symptom or illness rather than another? These are questions which we cannot answer completely at the present time, though there are some indications where the answers may lie.

The factor of inheritance has always to be appraised. A particular illness often seems to "run in families." It is usually difficult, however, to separate the influence of inheritance from that of family environment.

The second factor is that of identification. The patient may take over from another person, especially someone to whom he is much attached, a bodily symptom or reaction-pattern. This process of "taking into oneself" the illness of another with whom we feel identified very commonly operates within a family.

A third factor is the presence of a vulnerable point. Suppose a man to have muscle tension higher than normal, but not enough to cause much pain; if he then slips on the stairs and "ricks" his back, and tension continues, the pain may thereafter centre on his back.

Structure and Function

Stress responses begin by being transient and reversible alterations in function, but, if they continue, changes in the structure of organs may follow. The classical example of this is bronchial asthma. The illness, which starts as a bronchial spasm in the anxious, over-protected child, may end with bronchitis, emphysema, and gross changes in bodily form. Asthma is one of the small group of stress disorders which are potentially lethal; another is ulcerative colitis.

Meaning and Purpose of Illness

One of the principal tasks of the doctor is to get hold of what is essential about the nature of an illness. The orientation of medical education in this country has been almost entirely towards the search for a physical pathology to "explain" the occurrence of disease. The doctor, faced with a situation of illness in an individual or a family group, may tend to look for events or data which can be understood in physical terms, since these are more tangible and have more meaning for him. Yet there may be an essential feature in the pathogenesis of an illness which is not in the physical field at all, and therefore is missed. Thus, a man has degenerative joint disease which gives him no trouble and is symptomless; then one day he reaches the limit of endurance with his wife, muscle tension rises and the joints become painful. This interpersonal event is highly meaning-

ful in relation to the onset of pain. There is a whole class of determinants of illness in stress disorder which belong not to the field of physical pathology but to the field of human passion and suffering.

A further consequence of mechanistic thinking in medicine is concentration on causes to the exclusion of purpose. In one sense all human behaviour, including illness, is purposive and directed at a goal. It is reasonable to ask, of any disorder, What is the biological purpose of this? We may take it that conscious malingering is very rare, and the answer to our question will not be found by inquiry from the patient, but only by an examination of the illness in its personal and social setting. Illness may be directed at protection of the patient from domestic chores, from sexual intercourse, from unwelcome duty; at competition with other ill people in the household; it may be used to appeal for help, to wield power over a superior, for blackmail or revenge, and for many other purposes. Where the purpose of illness is important in the patient's life-scheme, attempts to remove it will be vain and even hazardous.

Management of the Stress Disorders

With certain exceptions, one of which is tension pain, the results of skilled handling of stress disorders are good. In general, patients with these disorders want to get well. They will work with the doctor, and will tolerate the spells of anxiety that often accompany successful therapy. Low intelligence, gross emotional disharmony, and a life situation which is very unfavourable and cannot be altered—these count against improvement. The outcome of treatment will be much influenced by the meaning and purpose of the illness for the patient, and by the doctor's insight and patience.

Simple reassurance and emotional support are seldom enough, save in the simplest illnesses. The goals are ventilation of feeling and attainment of understanding of the illness and its causes; with these comes a renewed capacity for adaptation. Changes in the environment, occurring independently or brought about by the patient, may be essential to complete recovery. The choice of method—repeated interviews, emotional "abreaction" with the aid of drugs, hypnotherapy—will depend on the doctor's disposition and experience. Each of these methods allows the building up of that close contact between doctor and patient within which a new and better solution of life's difficulties can be worked out.

Treatment of the common stress disorders is within the compass of any doctor who is prepared to devote time and sympathy to it. In their second paper, Finlay and his colleagues (1956) showed that about half of a random series of patients with these disorders may be expected to show much improvement, or recover altogether, under the kind of treatment which a general practitioner can himself give; about half of the remainder will show some improvement. As only two of the entire series of more than a hundred were shown as "worse," deterioration of a stress disorder under general-practitioner care does not seem to be much of a risk. The medical student, working under supervision, is capable of undertaking effective treatment, and can learn a great deal from this experience (Goldman, 1955).

The Future

The proportion of stress disorder, relative to the other common illnesses, is unlikely to diminish as time goes on; on the contrary, it will probably increase. The following three fields need further exploration.

1. *Field of Investigation.*—For example, the incidence of stress disorder in various social groups, in hospital practice, and in industry; the physiological mechanisms of stress responses; experimental studies of organ reactions. A number of admirable and well-controlled studies have appeared in the *Journal of Psychosomatic Research*. The experienced general practitioner is in an especially strong position to carry out clinical inquiries into the natural

history of stress disorder; his attitude will be that "blend of the human approach and the scientific outlook" which is so necessary in this kind of work (*Brit. med. J.*, 1957).

2. *Field of Management.*—The efficacy of various treatment methods needs to be tested out in practice on a larger scale than heretofore. The cost to the nation of the stress disorders, in terms of medical services, on the one hand, and reduced productivity in industry, on the other, must be very high indeed, to say nothing of the cost in human suffering.

3. *Field of Education.*—How best to prepare the medical student and the newly qualified doctor for the understanding and treatment of the stress disorders he will meet in his work—this is a crucial question which is occupying the thoughts of many educators both in this country and in America. My own view, for what it is worth, is that nothing can take the place of case-work in the teaching of psychotherapy. The handling of patients gives the student confidence and insight that are not easy to acquire in other ways.

In the words of Dr. Charles Newman (1957), it may be that the direction of evolution of medicine is towards "the understanding and control of the mind, and of the mental aspect of all diseases. . . . The safeguard of the future lies in medical education, provided that the one thing which is essential is maintained, the old professional spirit which has always underlain the practice of medicine in England, the spirit of putting the interest of the individual patient above the claims of gain, of fame, of research, and of the State."

Summary

A general review of the relationship between stress and disease is given. The terms employed are defined, and a list of the common stress disorders is proposed. An outline is suggested for these themes: time relations in illness, mechanisms of symptom production, "choice of disorder," and the concepts of meaning and purpose in illness. A note on therapy of the stress disorders and on the prospect for the future in medicine is added in conclusion.

REFERENCES

- Ballint, M. (1957). *The Doctor, His Patient, and the Illness*. Pitman.
Brit. med. J., 1957, 2, 633.
 Finlay, B., Gillison, K., Hart, D., Mason, R. W., Mond, N. C., Page, L., and O'Neill, D. (1954). *Practitioner*, 172, 183.
 — Hart, D., Hopkins, F., Horder, J., Malleon, N., Watts, A., and O'Neill, D. (1956). *Ibid.*, 177, 729.
 Goldman, K. (1955). *St. Mary's Hosp. Gaz.*, 61, 111.
 Halliday, J. L. (1948). *Psychosocial Medicine*. Heinemann.
 Mestitz, P. (1957). *Brit. med. J.*, 2, 1108.
 Newman, C. (1957). *The Evolution of Medical Education in the 19th Century*. Oxford Univ. Press.
 Watts, C. A. H., and Watts, B. M. (1951). Quoted by Finlay et al. (1954).
 Wittkower, E. (1928). *Klin. Wschr.*, 7, 2193.
 Wolff, H. G. (1952). *Stress and Disease*. Thomas, Springfield.

At a recent meeting at Strasbourg convened by the Council of Europe, public health experts adopted the text of a draft European agreement designed to facilitate the exchange between member countries of human blood and its derivatives (whole human blood, dried human plasma, human albumin, human gamma globulin, human fibrinogen). Under the terms of this agreement the contracting parties undertake to make therapeutic substances of human origin available to other participating countries who are in urgent need of them, subject, however, to the express condition that no profit is made of them, that they are used solely for medical purposes, that they shall be delivered only to bodies designated by the Governments concerned, and that they conform to the specifications laid down in an additional protocol to the agreement. It is further stipulated that the contracting parties shall take all the necessary measures to exempt from import duties the therapeutic substances placed at their disposal. Although the agreement is primarily concerned with the supply of blood and blood products, its provisions may be extended to cover other therapeutic substances of human origin. The draft instrument prepared by the public health experts now goes to the Committee of Ministers for approval.