Treatment Adherence: The role of Behavioral Mechanisms and some Implications for Health Care Interventions[1]

Adherencia terapéutica: El papel de los mecanismos conductuales y algunas implicaciones para las intervenciones en salud

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Resumen: En el mundo se continúa dando una transición epidemiológica de padecimientos infecciosos a padecimientos crónico-degenerativos. Dado que la recuperación de la salud de sus beneficiarios es un objetivo central de los sistemas de salud, éstos invierten muchos de sus recursos para tal fin. Esta recuperación depende mucho de cuan eficazmente se sigan las indicaciones del equipo de salud. Aunque esto se aplica a todo tipo de enfermedad, los pacientes de padecimientos crónicos suelen adherirse a su tratamiento mucho menos que los de padecimientos con síntomas más agudos. Esta baja adherencia conduce a baja calidad de vida para los pacientes y su familia y, si se prolonga, a malestar extremo, dolor y muerte prematura. Otro resultado de esto es una pobrísima relación costo-beneficio de los recursos de los sistemas de salud, problema especialmente dañino en países en desarrollo. Dado que el comportamiento humano es el ingrediente central de la adherencia terapéutica, el presente trabajo examina la interfaz entre algunos principios regulatorios del comportamiento y la adherencia terapéutica a tratamientos prolongados.
Palabras clave: estrés, emociones, cogniciones, requisito de respuesta, relación terapeuta-paciente

Abstract: The epidemiological transition from infectious diseases to chronic ones continues to develop worldwide. Since one key purpose of health systems is the delivery of services aimed at their patients' health recovery, both public and private health organizations devote a great portion of their resources to this end. Health recovery, however, depends greatly on how effectively patients follow their health team's prescriptions and recommendations. Although this holds true for all diseases, chronic disease patients tend to adhere to their treatments much less than patients of diseases with more acute symptomatology. Such low rate of therapeutic adherence results in deteriorated quality of life, reduced well being for both patients and their families and, if sustained, extreme discomfort, pain, and premature death. Another outcome of deficient adherence is an extremely poor cost-benefit ratio for the resources used by health systems, a particularly damaging effect for developing countries. Since human behavior is the main ingredient of treatment adherence, the purpose of the present paper is to discuss the interface between some behavioral principles and therapeutic compliance with long-term treatments.
Key words: stress, emotions, cognitions, response-requirement, therapist-patient relations

Treatment adherence has been, for at least two decades, a relevant object of study for the behavioral sciences in general and health psychology in particular. Research conducted to appraise adherence contribution to therapeutic effectiveness has documented the importance of

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promoting therapeutic regimens for improving both health recovery and cost-effective health service ratios (Dunbar-Jacob & Schlenk, 1996; Johnston, Weinman & Marteau, 1990; Meichenbaum & Turk, 1987).

On the other hand, interventions based on behavioral principles aimed at establishing adherence behaviors have shown effective improvement of treatment exposure in diseases including hypertension (Burnier & Brunner, 2001), headache (Scopp, 2000, Spierings & Miree, 1993), AIDS (Gonzalez, 2001); cancer (Wright, 1998); heart transplantation (Dew, 1994; Harper, Chacko, Kotik-Harper, Young & Gotto, 1998); chronic asthma (Godding, Kruth & Jamart, 1997; Wamboldt, Wamboldt, Gavin & Roesler, 1995); diabetes (Romero, Portilla & Martin, 1992); high cholesterol (Wilson & Edmunson, 1993); obesity (Burnett, Taylor & Agras, 1992), and sun protection behaviors (Cockburn, Thompson, Marks, Jolley, Schofield & Hill, 1997) among others.

Another area showing the benefits of interventions aimed at improving adherence is that of the addictions. Recent research has evaluated interventions aimed at maintaining adherence in problems such as substance abuse in pregnancy (Clark, 2001); alcohol abuse (Mattson, Del Boca, Carroll, Cooney, DiClemente, Donovan, Kadden, Mcree, Rice, Rycharik & Zweben, 1998); opioid addictions and methadone maintenance (Abbott, Moore, Delaney & Weller, 1999; Griffith, Knight, Joe & Simpson, 1998); substance dependence (Grella, Hser, Joshi & Anglin, 1999; Kelly, Myers & Brown, 2000); cocaine abuse (Hoffman, Caudill, Koman & Luckey, 1996), and tobacco smoking (Whitlock, Vogt, Hollis & Lichtenstein, 1997).

From the behavioral standpoint, both research conducted in the last decade and some clinical experiences seem to point toward relatively specific factors influencing the likelihood that a prescribed treatment regimen will be implemented. These factors are linked to regulatory mechanisms involving instrumental, cognitive and emotional dimensions (Sanchez-Sosa, 2002). Treatment adherence shows a multifactorial nature in the sense of receiving the influence of variables operating from diverse domains. Such factors pertain to some major sources affecting the health-disease continuum namely: factors stemming from general macrologic conditions related to socioeconomic, geographical and cultural features of a given country, the health team, the patient, and the disease itself (Brewer, Cornelius, van Raalte, Petitpas, Sklar, Pohlman, Krushell & Ditmar, 2000; Sabaté, 2001).

Macrologic factors affecting adherence

Among others, four main factors will probably surround large scale social aspects influencing adherence: *a)* general poverty level mediating difficult access to medications/treatments, *b)* low educational levels in the general population, *c)* uneven geographical distribution of healthcare facilities, and *d)* cultural factors promoting conformity or dysfunctional beliefs through social pressure. Macrologic factors are particularly pervasive since they permeate all aspects and layers of a society. The most influential such factors are likely to involve the amount and distribution of resources or wealth in society (economic equality) on the one hand and deeply rooted beliefs and cultural customs affecting large proportions of everyday living on the other.

Macrologic factors involve a general background context to promote changes from the standpoint of high government officials, policymakers and legislatures. When the general aspects of research-based recommendations pass legislative levels, new normative conditions begin setting the tone for relatively quick large-scale changes expected to produce long term effects. Other social institutions can help bring about this type of change; two of the most relevant are the media and culturally rooted institutions such as religious, sports and community organizations. In general, one priority in the health area should include promoting the understanding that therapeutic adherence is a key component of health recovery, which deserves the contribution of society's most diverse components.

It should be clear, however, that no single source of factors is ever likely to act in isolation. It is only natural to expect that factors belonging to different sources interact to produce varying degrees of treatment adherence and may in fact

actually affect each other. Some analyses in the area of alcohol use suggest, for instance, that macrologic variables may work as key modulators acting through cultural factors (Sanchez-Sosa & Poldrugo, 2001). Their effect is likely to become especially relevant in the context of diverse levels of poverty prevalent in different countries. Thus, policymakers, researchers and clinicians should probably be expected to assess the combined effect of these sets of factors on a group of health-related dependent variables for purposes congruent with their respective responsibilities. The degree of knowledge on the relative contribution of behavioral factors to adherence ranges widely as a function of the progress of research in such areas as health psychology, behavioral medicine and healthcare evaluation.

Health team-related factors affecting adherence

Once the contact between professional caregivers and the patient gets established in a relatively steady fashion, additional influences come into effect. Although such influences may vary as widely as those related to the patient, some are notably prone to affect adherence, specially in the context of scarce resources. Some such factors include: a) lack of behavioral experts in health care facilities, b) caregivers overloaded schedules, c) adherence promotion absent from the job descriptions-policies of the health team, d) little or no training of physicians, nurses, social workers, etc. concerning treatment adherence, f) distorted beliefs of caregivers concerning adherence, and g) caregivers negative attitudes fostering rudeness while tending patients.

The effect of these first four factors ("a" to "d"), although relatively self evident, is likely to require closer scrutiny. A predominant portion of them probably requires major policy changes all the way from national ministries of health to university curricula in health care careers. It should be clear, however, that policy change in the absence of sustained work to modify ingrained customs constituting near sub-cultures in many health care settings is not likely to end in success regarding the promotion of adherence. One example includes a frequent wide gap between formal declarations to praise or promote interdisciplinary work and actual everyday practices in healthcare facilities which seem to do little more than preserve professional hierarchies. Hiring professionals outside medicine, nursing or social work is frequently taken as a luxury which can be done without. Without the concourse of behavioral experts little can be expected on systematically and effectively promoting adherence (Godding, Kruth & Jamart, 1997).

Sometimes the combination of heavy workloads of the health team and scarcity of resources frequently prevalent in public hospitals (specially in developing countries) can make health professionals be rude to patients. One possible natural consequence can be diminished patient adherence (Velázquez, Sánchez-Sosa, Lara & Sentíes, 2000; Wright, 1998). Basic knowledge and procedures aimed at promoting adherence in the education of physicians and nurses should prove useful. Some recent studies suggest, for example, that interventions designed on the basis of behavioral principles can successfully be implemented by social workers or nurses to promote health recovery behaviors (Rock & Cooper, 2000; De los Ríos & Sánchez-Sosa, 2002).

The last two sets of factors affecting adherence: those related to the patient and those related to the chronic condition itself probably keep the closest relationship to health psychology and therefore deserve closer scrutiny in the sense of requiring some background and examples from this specialty. In this context, the term human behavior is meant to include all aspects of psychological functioning: attitudes and emotional reactions (including their physiological components) cognitions, (ideas, convictions, beliefs, conceptions) and instrumental activity (everything human beings actually do and say). Human behavior can be modulated to establish habits and lifestyles aimed at adhering to long-term treatments. Behaviors may include, for example, complying with a prescribed medication regime, modulating harmful emotions, abiding by a specific diet, or increasing physical activity, among many others.

Emotions, beliefs and behaviors

Health psychology interventions act through modifying one or more aspects of human conduct.

The three most important and best researched such aspects include emotions, cognitions and instrumental behavior. Although each of these components may contribute relatively specific changes in the context of therapeutic adherence, they actually work together and affect each other at all times during our whole life span.

Emotions involve well-known physiological changes and reactions. For example, fear and anxiety have long been associated with, among others, increased heart rate and systolic blood pressure. It also involves increased blood circulation in muscles, and decreased blood circulation in the skin and the bowels. Anger tends to be associated with the opposite changes as described above although there may be some variations.

There are at least two ways in which emotions play an important role in health recovery. On the one hand, long, sustained, frequent or intense episodes of some emotions may interact with our physiology and lead to debilitating states. Thus, sustained stress or anxiety, for example, may either make our body dump nutrients needed to protect it or modify hormone secretions affecting our body's ability to fend with disease (Cohen, 1982, Feuerstein, Labbé & Kuczmierczyk, 1986). On the other hand, emotions can influence our instrumental behavior by interfering with actions we might otherwise undertake to follow the health team instructions. For example, a depressed state may decrease motivation to implement treatment-related activities. Additionally, emotions tend to play an especially important role in health recovery when we get stressed. A chronic condition confronts the patients with situations that demand adaptation. Patients are likely to get stressed and therefore experience emotions, such as fear or anxiety, which would not be prevalent under normal conditions. In this sense adaptation to long-term treatments may mean changing the way we think or feel about a prescribed treatment or adapting to the new situation by modulating harmful emotions arising from it.

Beliefs and health

Cognitions comprise another key element contributing to adhere to long term treatments. Here too, there seem to be at least two ways in which ideas, beliefs and personal convictions can affect recovering from or controlling a chronic disease. One occurs when cognitions affect instrumental behavior. Thus, when chronic patients hold a belief concerning —say— some component of their treatment, they will tend to behave accordingly and therefore either place themselves at further risk or engage in adhering behaviors. When a diabetic believes, for instance, that proper dieting and moderate exercising are not important once insulin treatment is under way, he/she will be less likely to engage in such critical behaviors.

A second way involves the effect of ideas, beliefs and convictions on the regulation of emotions. When patients appraise their health-related life transition as terrible or catastrophic, they may feel unfit to solve it or experience the problem as so overwhelming that they lack personal resources to solve it. Such ideas are likely to elicit feelings and emotions linked to physiological reactions. If these become too intense or persistent, they may turn into additional harmful effects. Thus, for example, a catastrophic belief concerning his/her condition may lead a hypertense patient to experience sustained anxiety or other emotions linked to increased cardio-vascular risk.

Behavior and health

The third fundamental psychological factor contributing to determine patients' treatment adherence is instrumental behavior. Instrumental behavior comprises all activity serving as instrument to affect the patient's environment (internal or external) leading to relatively specific consequences. Thus, instrumental (operant) behavior is said to operate on the environment and produce outcomes that will, in turn, affect the chances patients will act in the same way in the future. Chronic patients may simply lack the specific skills and behaviors to adhere to long term treatments. Taking proper self-measurements of urine glucose, for instance, requires the display of a specific sequence of particular behaviors. Other chronic conditions also require relatively complex sets of instrumental behaviors to comply with their treatment. If patients do not learn such skills, appropriate

beliefs, convictions or emotional control will do little to have them perform the routines and activities pertinent to their treatment.

Patient-related factors affecting adherence

Some relatively well documented factors influencing the degree of adherence include: a) little or no education (knowledge) concerning the disease and its treatment; b) dysfunctional beliefs related to the disease or its treatment; c) negative attitudes toward the treatment or caregivers; d) little or no specific training (instrumental) on administering the treatment, and e) little or no family support to facilitate the treatment. Interestingly, except for this last one, the first four factors probably result from a joint influence of the general degree of education of the population to which the patient belongs, and a defective or absent communication with the professional health team concerning the medical condition. Indeed, the quality and pertinence of patient-caregiver communication frequently emerges as a key element affecting adherence (Abbott, Moore, Delaney & Weller, 1999; Brown, 1994; Horne, 1999; Scopp, 2000; Wright, 1998).

A still unsettled point concerns the relative responsibility of the patient and his/her immediate family or significant other, and that of the health team in implementing adherence strategies. Although research suggests that family and immediate community support is essential for the successful administration of treatments (Romero, Portilla & Martin, 1992; Velazquez, Sanchez-Sosa, Lara & Sentíes, 2000; Wamboldt, Wamboldt, Gavin & Roesler, 1995), it can hardly be expected that the necessary skills be acquired outside the influence area of the health team. On the other hand, whatever portion of the implementation of therapeutic instructions turns out to be the patient's responsibility, it will not only involve the patient's direct instrumental behaviors aimed at adhering to a prescribed regimen but also involve cognitive and emotional components. These components, which require the concourse of a behavioral expert, are frequently responsible for the persistence of behavioral commitment as well as for the inclusion of key emotional effects on both behavior and psychophysiological functioning (Grella, Hser, Joshi & Anglin, 1999; Griffith, Knight, Joe & Simpson, 1998; Horne, 1999; Sanchez-Sosa, 2002).

Another aspect of adherence from the standpoint of the patient and his/her immediate family concerns the influence of factors that can either enhance or limit the effectiveness of adequate adherence actions implemented by the patient him/herself. Some such factors may involve conditions affecting the amount of effort required to comply with treatment requirements specially in developing countries. Examples include access to healthcare facilities, to medications and to general life conditions in the patient's immediate home community. Although these factors may be perceived as stemming from more macrologic social conditions, they will exert an intimate effect on the patients' adhering behaviors. One such key effect includes retaining the patient within a scheduled series of contacts with the health team (Kelly, Myers & Brown, 2000; McIntire, 2000; Morral, Belding & Iguchi, 1999;).

Disease-related factors affecting adherence

Some characteristics of the natural history or evolution of some medical conditions are likely to influence treatment adherence. Some such features may include *a)* disease-induced emotional states incompatible with treatment adherence (such as depressive-like reactions), *b)* co-morbidity with psychiatric disorders, *c)* diseases bearing treatment side-effects, and *d)* diseases requiring complex and demanding (high response requirement) treatments. In general, research should probably include examining the effects of specifically designed behavioral interventions aimed a decreasing the influence of these factors. Three examples involve decreasing sensitivity to medication side effects, chronic pain management and re-arranging the patient's environment so as to reduce the response requirement of self-administered health care strategies (Sánchez-Sosa, 2002). A seemingly natural recommendation for the health team, including researchers, might well be to conduct further research on these options as well as to design and evaluate outcome-based procedures.

In conclusion, the behavioral sciences in general, and psychology in particular have shown that there are effective ways to apply natural principles to contribute to the solution of socially relevant problems, and health recovery is no exception. This is achieved by designing and implementing useful behavioral strategies affecting cognitive, emotional and instrumental behaviors of all concerned: patients, health team members and even administrators and policymakers. Indeed, the research literature contains systematic demonstrations that procedures implemented by health psychologists to promote therapeutic adherence actually assist health recovery. The success of such interventions greatly depends on having their foundation on solid and reliable research findings. The logic of experimental methodology seems to be a pervasive feature of most effective interventions and their systematic implementation by health psychologists has proven a natural way to incorporate them into health care. This assumes that there are sufficient numbers of these specialists in hospitals and other health care facilities, which is almost never the case, specially in developing countries.

Increasing numbers of health psychologists in hospitals and other health management organizations should prove that real interdisciplinary work will both increase well-being and survival, and will increase the efficiency with which resources are used in the quest for health recovery. The beginning of the 21st Century sets viable conditions for the addition of treatment adherence to most national and international public and private healthcare formulas. The technological knowledge is already available from the standpoint of the behavioral sciences and almost every day a new intervention awaits field test evaluation.

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