Proposing categories for retrospective secondary research on treatment adherence*

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Abstract: psychological studies of treatment adherence have established: 1) indicator models—frequency of consultation, the prevalence of medication intake over any other treatment, attendance at therapeutic and rehabilitation sessions—; 2) determining models—sex, age, income, level of education, reading comprehension, interpersonal relationships—; 3) mediating models—beliefs, attitudes, knowledge, intentions, and strategies—. *Objective*: to establish categories for the study of treatment adherence in literature published between 2015–2019, considering the occupational health climate. *Method*: secondary research using a selection of 38 indexed sources in Latin American repositories—Dialnet, Latindex, Publindex, Redalyc, and Scielo—and the variables reported in the state of the art. *Results*: the model specification included four explanatory hypotheses of dependence relationship trajectories of six variables—demands, social support, control, effort, reward, and adherence—taken from the literature review. *Discussion*: regarding the indicator, determining, and mediating models,

we recommend including the work culture, quality of life, and subjective well-being variables in the specified model to examine the process that goes from the workplace culture to reinserting workers after accidents and diseases. *Conclusion*: the new model specification would include explanatory hypotheses of variable correlation trajectories to establish differences between organizations that provide social security and companies with workplace flexibility and their effects on their workers' occupational health.

Propuesta de categorías para la investigación documental retrospectiva sobre la adherencia al tratamiento

Resumen: los estudios psicológicos sobre la adherencia al tratamiento han establecido: 1) modelos indicadores (frecuencia de consulta, prevalencia de ingesta de medicamentos sobre cualquier otro tratamiento, asistencia a sesiones terapéuticas y de rehabilitación); 2) modelos determinantes (sexo, edad, ingresos, nivel educativo, comprensión lectora, relaciones interpersonales); y 3) modelos mediadores (creencias, actitudes, conocimientos, intenciones y estrategias). *Objetivo:* establecer categorías para el estudio de la adherencia al tratamiento en la literatura publicada entre 2015 y 2019, teniendo en cuenta el clima de salud ocupacional. *Método*: investigación documental a través de una selección de 38 fuentes indexadas en repositorios latinoamericanos (Dialnet, Latindex, Publindex, Redalyc y Scielo) y las variables enumeradas en el estado del arte. *Resultados:* la especificación del modelo incluyó cuatro hipótesis explicativas de las trayectorias de las relaciones de dependencia de seis variables (demandas, apoyo social, control, esfuerzo, recompensa y adherencia) extraídas de la revisión de la literatura. *Discusión:* en cuanto al modelo indicador, determinante y mediador, se recomienda incluir las variables cultura laboral, calidad de vida y bienestar subjetivo en el modelo especificado con el fin de examinar el proceso que abarca desde la cultura laboral hasta la reinserción de los trabajadores tras accidentes y enfermedades. *Conclusión:* la especificación del nuevo modelo incluiría hipótesis explicativas de trayectorias de correlación de variables para establecer diferencias entre organizaciones que brindan seguridad social y empresas con flexibilidad laboral y sus efectos en la salud ocupacional de sus trabajadores.

Palabras clave: cultura laboral; salud ocupacional; autocontrol; estrés; adherencia al tratamiento

Proposta de categorias para a pesquisa documental retrospectiva sobre a adesão ao tratamento

Resumo: os estudos psicológicos sobre a adesão ao tratamento vêm estabelecendo que: 1) modelos indicadores (frequência de consulta, prevalência de ingesta de medicamentos sobre qualquer outro tratamento, assistência a sessões terapêuticas e de reabilitação); 2) modelos determinantes (sexo, idade, renda, escolaridade, compreensão leitora, relações interpessoais); e 3) modelos mediadores (crenças, atitudes, conhecimentos, intenções e estratégias). *Objetivo*: estabelecer categorias para o estudo da adesão ao tratamento na literatura publicada entre 2015 e 2019, considerando o ambiente de saúde ocupacional. *Método*: pesquisa documental por meio de uma seleção de 38 fontes indexadas em repositórios latino-americanos (Dialnet, Latindex, Publindex, Redalyc e SciELO) e as variáveis enumeradas no estado da arte. *Resultados*: a especificação do modelo incluiu quatro hipóteses explicativas das trajetórias das relações de dependência de seis variáveis (demandas, apoio social, controle, esforço, recompensa e adesão) extraídas da revisão da literatura. *Discussão*: quanto ao modelo indicador, determinante e mediador, é recomendado incluir as variáveis cultura profissional, qualidade de vida e bem-estar subjetivo no modelo especificado a fim de examinar o processo que abrange desde a cultura profissional até a reinserção dos trabalhadores após acidentes e doenças. *Conclusão*: a especificação do novo modelo incluiria hipóteses explicativas de trajetórias de correlação de variáveis para estabelecer diferenças entre organizações que oferecem seguridade social e empresas com flexibilidade trabalhista e seus efeitos na saúde ocupacional de seus trabalhadores.

Palavras-chave: cultura profissional; saúde ocupacional; autocontrole; estresse; adesão ao tratamento

Introduction

Psychological studies of occupational health have noted: a) the preponderance of the Job Demands-Control-Support (DCS) Model and Effort-Reward Imbalance (ERI) Model; b) the prevalence of stress due to asymmetries between demands and self-control, as well as an imbalance between efforts and rewards; c) once the worker has become ill because of work stress, treatment adherence emerges as a factor of quality of life and subjective well-being (1).

Occupational health models warn that stress can affect biomedical factors; cardiovascular, cerebrovascular, and ischemic heart disease can lead to musculoskeletal disorders, absenteeism, accidents, conflicts, insomnia, depression, and anxiety (2). Both DCS and ERI have shown that the type of employment determines occupational health and self-care. An increase in risk factors exacerbates the likelihood of work-related illnesses, accidents, or disorders (3).

However, occupational health studies have focused on prevention rather than on adherence to the treatment of diseases, accidents, or disorders since workers can rehabilitate and become productive again. It is necessary to explore treatment adherence as a determining factor in the quality of life of workers with some disease, especially the elderly or those terminally ill or in the case of the imminent loss of a limb or even life (4).

In this sense, the study of treatment adherence also involves researching grief factors in the face of an imminent loss of a limb or a life in organizations that operate at high risk with adverse health effects (5). Models that analyze grief as an expectation of the imminent loss of life, limbs, or sanity comprise phases ranging from denial to acceptance, rehabilitation, and reconstruction of the meaning of existence (6).

Treatment adherence, unlike the process of mourning, implies a hope for the preservation of the quality of life, an expectation of well-being, and indicates the restoration of occupational health (7). Its study links an accident, illness, or disorder to the convalescent reinsertion into a climate of tasks and relationships based on trust, commitment, satisfaction, entrepreneurship, innovation, and competitiveness. However, treatment adherence involves an internal negotiation of the employee with the demands that organizations will endorse; establishing agreements and responsibilities between workers and leaders is not always feasible in traditional organizational cultures, but in adhocracies (8). Therefore, this paper aims to establish the categories for the study of treatment adherence from the literature indexed to international repositories and published between 2015–2019.

This paper presents secondary research conducted using a selection of indexed sources in Latin American repositories—Dialnet, Latindex, Publindex, Redalyc, and Scielo—, considering the keywords "model," "demands," "control," "social support," "imbalance," "effort," and "reward." The information was processed in matrices of content analysis to extract the explanatory variables of treatment adherence. Then, the model was specified based on assumed variable dependence relationship trajectories. The model will allow for the empirical contrast of hypotheses and a new specification of variable correlation trajectories to incorporate literature findings and questions of state of the art.

Job Demands-Control-Support (DCS) Model

Treatment adherence, from the DCS, results from the asymmetries between work demands and subjective capacity control (9), *i.e.*, it responds to the external demands of treating a disease and personal resources. Thus, treatment adherence refers to tangible and intangible opportunities for rehabilitation or healing that can also trigger conflicts of relationships, disinterest, frustration, exhaustion, depersonalization, or neglect (10).

If significant differences prevail between treatment adherence decision-makers and those who execute them (11), treatment idealization will produce more inspiration and satisfaction (12). Commitment, as an indicator of self-control, increases treatment adherence. Therefore, the demands external to treatment are created by the patient's degree of commitment and self-regulated control

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regarding the idealization of their work, leaders, and organization (13).

The DCS warns that the organization can motivate the employee in a climate of trust-based relationships and innovative tasks, but the employee's work history will determine their degree of self-control reflected in their commitment and satisfaction with their work environment (14). Then, the DCS does not explain the work culture's effect on the weighted worker's performance and effort for and commitment to treatment adherence.

Effort-Reward Imbalance (ERI) Model

Both models explain social and organizational support as a predictor of treatment adherence. Unlike the DCS that emphasizes the importance of regulating demands and fostering personal control, the ERI maintains that reward, coupled with effort, will create a climate of transparent and reliable relationships, fostering the task climate, reducing conflicts to the minimum, and encouraging treatment adherence (15).

In the DCS, increased demand affects self-control, and such asymmetry favors the diseases, accidents, conflicts, and disorders that the ERI intends to solve with incentives of more significant effort since it implies a constant increase in demands. However, occupational health studies warn that extrinsic causes these emerge even in stressful work climates since the lack of personal satisfaction is a risk factor for employees with expectations and transcendent abilities (16).

Emotional exhaustion is caused by excessive work demand and the routine or simplicity of the task climate. Also associated with depersonalization, emotional exhaustion is a process that begins with fatigue and culminates with indifference to the workplace. It can even result in frustration, an inhibitor of organizational social support for adherence to occupational disease treatment (17). Therefore, the organizational social support, flexibility, trust, and diversity necessary to relieve stress and exhaustion are reduced by the conflict of relationships and tasks (18).

The climate of relationships determines collaborative performance (19). This organizational social support predictor of adherence to occupational disease treatment is a function of knowledge dissemination (20). Therefore, the effectiveness of expected results (21) affects the quality of work relations and the avoidance of stress and exhaustion (22).

Treatment adherence studies on work demands and self-control

This section presents the studies that report correlation or regression coefficients in the relationship between work demands and treatment adherence through self-control. In these models, various variables interact, but a linear relationship prevails among them.

Self-control, defined as inconsistency in medication intake, determined treatment adherence because patients suffered psychological burdens that affected their treatment and influenced the deterioration of their quality of life (23). The determining factor of adherence was self-management ($\beta = 0.15$, $p = 0.002$). Organizations that do not monitor the psychological burdens of employees with high-risk functions, nor promote relationships of collaboration, support, and solidarity, seem to reduce the management of their health, causing non-adherence to the treatment of a disease or accident.

Treatment adherence determines rehabilitation. In contrasting the model, the effect of treatment cost on adherence was demonstrated ($\beta = 0.610$, $p = 0.0791$, OR $= 0.54$ (0.21–1.40)) (24). Simply put, self-management related to labor, financial, and family support reflects effective human capital against health risks and threats in the environment. Therefore, training in occupational health for human capital entails accident and disease prevention and health promotion through self-care. Rehabilitation as a quality indicator of health care would be associated with treatment adherence as an indicator of self-care.

The concept of treatment adherence as a factor determined by medication financing complements training in self-care for human capital (25). Treatment adherence seems to derive from a structure

that favors a sector formed as human capital with high self-control, compared to other sectors formed as social capital with strong solidarity and collaboration ties.

The studies described above reveal that the structure of public health services and the structure of academic, professional, and work training to favor a civil sector determine adherence to the treatment of diseases and the prevention of risks by promoting healthy lifestyles (26). This self-control training policy strategy complements treatment adherence with psychological variables such as beliefs or information processing capacity, perceptions or biases, knowledge or logic of verifiability, and intentions or probabilities of deciding.

Through such a process, the DCS and ERI turn out to be palliative institutional strategies for illnesses and accidents. Collective self-control in the first model and personal self-control in the second model are insufficient to reduce the mediation of a public health system favorable to a sector with high incomes and quality of life estimated based on urban services (27).

For self-control, a treatment adherence model proposal would be based on public management and social and family support. It would include self-care-oriented health prevention and promotion strategies (28). The purpose of this new model would be to establish a balance between the demands of the environment and institutional and personal resources. The psychological variables of beliefs, attitudes, knowledge, and intentions would be influenced by environmental demands or health risks, such as occupational diseases and accidents. The emergence of a condition gives rise to medical consultation or treatment adherence through drug intake and encourages financial and social support strategies that the State could implement according to the level of development of the community or locality (29).

In this way, treatment adherence would no longer result from urban health policies that favor those who have decision-making power centered on their personal and financial resources. It would derive from policies according to communities' needs and expectations where the formation of solidarity capital and the supporting climate would

prevail over community transmitted diseases such as epidemics or pandemics (30). The State would cease to be a self-management and self-control promoter only. Its new social function would be to micro-finance health services as human settlements move away from urban centers and other non-favored sectors approach this sub-scheme to deal with their illnesses and accidents (31). Therefore, health services show a social side because of the administration scheme and the targeting of needs and support for marginalized, excluded, and violated sectors.

Specification of the treatment adherence model

The public health models used, DCS and ERI, can not only be complementary in predicting stress. If they include treatment adherence after accidents, diseases, disorders, or conflicts arising from the climate of relationships and tasks, they promote trust, commitment, entrepreneurship, innovation, and satisfaction (32).

The proposed hybrid model includes four explanatory hypotheses of variable correlation trajectories reviewed in the literature (33). The association between demands and social support determines self-control and effort (Hypotheses 1 and 2). As the worker is involved in greater demands for efficiency and effectiveness, the social support of colleagues, friends, or family encourages self-control and regulates their effort. However, if the latter is not even recognized, then it will cause stress. Otherwise, the reward could anticipate the worker's adherence to the treatment of a disease, disorder, accident, or conflict (Hypotheses 3 and 4).

Unlike predecessors, the specified model states that dependency relationships among variables anticipate stress and treatment adherence. It would also encourage the follow-up on accidents, illnesses, conflicts, and disorders associated with the climate of relationships and tasks.

Method

The new model assumes the relationship between socioeconomic variables (per capita income),

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demographic factors (gender, age), institutional factors (micro-financing), and psychological strategies (attitudes, knowledge, and intentions. It is then necessary to carry out an exploratory study of the relationships reported between these variables to establish the parameters that indicate probabilities of treatment adherence.

The data universe was indexed repositories such as Copernicus, Dialnet, Latindex, Publindex, Redalyc, and Scielo. The sample consisted of the literature selected intentionally with the keywords "treatment adherence," "self-control," and "work demands," and published between 2005–2019 (see Table 1).

Table 1. Description of the data sample

	Treatment Adherence	Self-control	Work Demands
Dialnet	35	30	26
Latindex	27	24	21
Publindex	21	20	13
Redalyc	17	16	9
Scielo	10	11	4

Note. N = 38

Source: Own elaboration.

In order to weigh the findings reported by the reviewed literature, they were categorized according to the relationships between organizational social support and treatment adherence, as follows: Type A (literature with positive and significant results); Type B (literature with positive and spurious findings); Type C (literature with results of null relationships between organizational social support and treatment adherence); Type D (literature with negative results), and Type E literature with findings of unknown but theorized relationships) (see Table 2).

Table 2. Description of the data sample according to the type of literature

	A	B	C	D	E
Dialnet	10	7	5	3	2
Latindex	7	5	3	2	1
Publindex	4	3	2	1	0
Redalyc	2	2	1	0	0
Scielo	1	1	0	0	0

Note. Type A (e1 = significant relationships between organizational social support and treatment adherence), Type B (e2 = spurious relationships between organizational social support and treatment adherence), Type C (e3 = null relationships between organizational social support and treatment adherence), Type D (e4 = negative relationships between organizational social support and treatment adherence), Type E (e5 = unknown relationships between organizational social support and treatment adherence).

Source: Own elaboration.

The information was processed following the Delphi technique. Pairs of subject-matter experts evaluated extracts of the findings reported in the literature to establish the relationship among variables, considering -1 for negative data, 0 for irrelevant data, 1 for positive data (see Table 3).

Table 3. Delphi technique

	Definition	Indicators	Coding	Weighing
Treatment adherence	It refers to medication financing strategies, adherence to medical prescription, family, social, and organizational support.	Information search, data on the Internet, preventive courses in institutions, preventive or diagnostic health technology, or purchase of medicines	-1 for negative data, 0 for irrelevant data, and 1 for positive data	High scores suggest treatment adherence according to institutional policies and strategies.
Self-control	It refers to attitudes, knowledge, and intentions about financing, medication, social, family, or institutional support in case of an illness or injury.	Data of savings or channeling of financial resources to food, exercise, consultations, reviews, or medical certifications, medicines		High scores suggest self-control derived from academic, professional, and work training.

| **Work demands** | It refers to the institutional, financial, medical, or family requirements of the occupational environment in case of illness or accident. | Medical history, interrelation with risk areas, or personnel with dangerous tasks or handling toxic substances | -1 for negative data, 0 for irrelevant data, and 1 for positive data | High scores show the effects of the dissemination and communication of risks by the media and public health institutions. |

Source: Own elaboration.

In three rounds, the experts graded the extracts. First, they only compared the data. In the second phase, they gave feedback on their peers' scores. Upon reaching consensus in the third round, the judges compared their first and second opinions and gave a new score to reinforce their opinion or express new considerations.

Data were estimated considering the respondent's privacy, inhibiting the distrust of the possibility of being identified (33). In other words, data are coded (Table 2) in order not to affect their analysis, ensuring the confidentiality and anonymity of sources. In the traditional standard model, the respondents reduced or amplified their responses to not be identified. However, in the local privacy model, a random response algorithm processes these data without altering their dimensions, volume, or categories to avoid inference or association of respondents to a group (34). The random response algorithm is compatible with iPhone or Google technology.

Because the chi-square parameter is highly effective for nonparametric samples, the traditional standard model injects the disturbance into the data to ensure anonymity and confidentiality. Meanwhile, the local privacy model randomly injects the disturbance to everyone's responses, developing as many models as possible, and thereby reducing measurement biases or errors (35).

The local priority technique injects Laplace or Gaussian noise to orient the responses towards a chi-square distribution and establishes the contrast of dependence hypothesis or model fitting (36). The local privacy model is relevant because it is possible from its chi-square distribution to contrast models, considering distribution independence and adjustment, and apply regression models with ordinary unweighted least-squares (37). The local privacy model also offers minimum convergence rates to show the differences between privacy and statistical efficiency (29).

Consider datasets $x = (x1; \ldots; xn) \in X^n$ in some data universe X; typically $X = (0; 1)^d$ where d is the dimensionality. Two datasets $x; x^1 \in X^n$ are neighboring if they differ in at least one element, *i.e.*, $3i \in [n]$ such that $x^i =/= x'_i$ and $¥j =/= i, xj = x'j$. From this nomenclature, it is possible to advance in the hypothesis test. A null hypothesis can be rejected in the traditional standard model, limiting the error of choosing a false finding but offering inconclusive hypothesis tests when designing them to avoid type 1 errors. In contrast, the local privacy model allows the design of hypothesis tests to compare null hypotheses and avoid type 2 errors or non-rejection of false findings (38).

The information was processed in the qualitative data analysis package MIX-2, version 4.0, to quantify distribution parameters and nonparametric relationships. The chi-square was estimated, and, based on it, an instrument for model specification was designed.

Results

Table 4 shows the relationships between the selected extracts for the three major categories (work demands, self-control, and treatment adherence). It is possible to observe significant relationships to the extent that grading rounds succeeded one another, and a marked consensus on treatment adherence was reached.

Table 4. Descriptive relationships between categories and information extracts

E	M	SD	A	c1			c2			c3		
R1				X^2	df	P	X^2	df	p	X^2	df	p
e1	0.682	0.143	0.139	14.24	15	< 0.05						
e2	0.781	0.120	0.105				13.25	14	< 0.05			
e3	0.604	0.137	0.143									
e4	0.740	0.146	0.125							16.27	15	< 0.05
e5	0.738	0.122	0.174									
R2												
e1	0.773	0.145	0.143									
e2	0.762	0.187	0.196	15.26	13	< 0.05						
e3	0.739	0.190	0.178				14.35	14	< 0.05			
e4	0.741	0.163	0.132	17.29	15	< 0.05				16.28	12	< 0.05
e5	0.793	0.132	0.146				12.12	13	< 0.05	14.23	15	< 0.05
R3												
e1	0.734	0.136	0.139	15.26	13	< 0.05				15.36	12	<.05
e2	0.762	0.148	0.176				14.25	12	<.05	16.58	13	<.05
e3	0.751	0.156	0.167	16.27	12	<.05						
e4	0.780	0.139	0.109	11.24	13	<.05	11.43	12	<.05			
e5	0.763	0.130	0.146							15.43	12	<.05

Note. E = extract; R = round, R1 = evaluation, R2 = feedback, R3 = consensus. Type A (e1 = significant relationships between organizational social support and treatment adherence), Type B (e2 = spurious relationships between organizational social support and treatment adherence), Type C (e3 = null relationships between organizational social support and treatment adherence), Type D (e4 = negative relationships between organizational social support and treatment adherence), Type E (e5 = new relationships between organizational social support and treatment adherence). M = mean, SD = standard deviation, A = asymmetry. C = category, c1 = treatment adherence, c2 = self-control, c3 = work demands.

Source: Own elaboration.

Upon establishing the significant relationships among categories and the information extracts graded by the expert judges, we proceeded to estimate the structure of relationship trajectories (see Figure 1).

Figure 1. Structure of category relationship trajectories for the information extracts
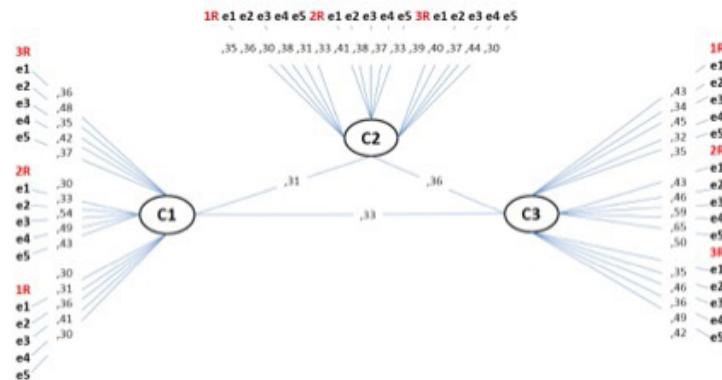
Note. E = extract; R = round, R1 = evaluation, R2 = feedback, R3 = consensus. Type A (e1 = significant relationships between organizational social support and treatment adherence), Type B (e2 = spurious relationships between organizational social support and treatment adherence), Type C (e3 = null relationships between organizational social support and treatment adherence), Type D (e4 = negative relationships between organizational social support and treatment adherence), Type E (e5 = new relationships between organizational social support and treatment adherence). C = category, C1 = treatment adherence, C2 = self-control, C3 = work demands.

Source: Own elaboration.

It can be appreciated that the consensus structure is weak because the relation trajectories between categories and extracts are close to zero, suggesting a spurious scenario. This result indicates that the expert judges who graded the information extracts recommended including other variables not contained in the reviewed models such as perceptions of risk, usefulness, efficacy, and treatment adherence.

Discussion

This paper has specified a determining factor model for treatment adherence from the review of the DCS and ERI. It explains the follow-up on accidents or diseases arising from conflicting work climates and their relationships with tasks. However, the model does not account for the subsequent treatment adherence processes, such as quality of life and subjective well-being.

Subjective well-being occurs when the task climate is subordinated to the relationship climate. In cases of illness or accident, treatment adherence increased subjective well-being by empowering the organization's employees. The worker evaluated their reintegration positively but contemplated other job offers with better rewards (39). So, the quality of life starts from the organizational culture and culminates with the worker's reinsertion if they limit their expectations to the organizational culture (40).

However, treatment adherence is a mediating variable between the organizational culture and the worker's well-being and implies self-care attitudes indicated by the frequency of consultations, medication intake, and attendance at therapy and rehabilitation sessions (41). It is more linked to social support than to the attitudes of injured or sick workers. In this phase, institutionalism determines the follow-up on cases. Because social security is an institutional derivative, the organizations that offer social benefits are distinguished from companies that hire their employees for limited periods as they provide a better quality of life (42). Therefore, the relationship between treatment adherence and quality of life would help explain the effects of the organizations' follow-up on their injured or sick workers (43).

The model specification would include: a) organizational culture—opportunity climate,

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risk climate, benefit climate—; b) capacities—attitudes, adherence, skills, knowledge—; c) biopsychosocial support—treatment quality, family support, therapeutic assistance—; d) quality of life, and e) subjective well-being—expectations, needs—.

In establishing a structure of organizational support categories for treatment adherence, this paper suggests the observation of relationships among variables such as self-control and work demands that the proposed model only explores. However, the model's confirmation in the occupational health or work psychological environment is pending. It means then that the established model gains consistent potential in the organizational diagnosis of the environmental demands against workers' resources and their effects on workers' health.

In this sense, organizations interested in balancing demands and resources encourage treatment adherence by promoting self-control in their talents. Alternatively, they reduce the risks of accidents and diseases through decision-making and responsible actions. To the extent that workers become aware of their responsibility for their health from the challenges of their environment and their abilities, organizations will implement occupational health programs focused on the climate of relationships or social work support.

In the discussion on treatment adherence, this process has been observed: a) as an effect after the diagnosis of diseases or accidents arising from an imbalance between demands and resources; b) as a consequence of social, family, and organizational support; c) as a subsequent phase to risk prevention and concomitant to self-control, but has been directly related to demands in this work.

Studies from organizational psychology and occupational health have established an indirect relationship between demands, capacities, accidents, diseases, and treatment adherence, but in this paper, we have explored the possibility that self-control is a mediating or moderating variable. A decrease or increase in self-control as a mediating or moderating variable in the relationship between organizational support and treatment adherence would explain why organizations that foster personal responsibility prevent risks of accidents or diseases.

Conclusion

This study intended to specify a model for the study of treatment adherence. Although the research design limited findings to the data sample, we suggest that research be extended to repositories such as Scopus and WoS.

Regarding health policies focused on treatment adherence because of the formation of an intellectual capital guided by self-control, it is necessary to involve the State in financing medicines and institutional and family support as pillars of risk-free lifestyles, health promotion, and diseases and accident prevention.

References

(1) Bautista M, Aldana W, García C. Análisis de expectativas de adhesión al tratamiento del virus de inmunodeficiencia humana (VIH) en estudiantes de una universidad pública. *Perspec Soc*, 2018;20(1):53–70.

(2) Morales M, Lopez S, Delgado M, Mendoza D, García C, Olvera A. Modelo de autocuidado y prevención de riesgos asociados al virus del papiloma humano en una universidad pública del centro de México. *Rev Inst Salud Pública Univ Veracruzana*, 2018;14(27): 7–25.

(3) Quintero M, Valdés O, Delgado M, García C. Evaluación de un modelo de las estrategias institucionales del autocuidado. Uso de condón y prevención en estudiantes universitarios. *Salud Probl*, 2018;12(23):56–68.

(4) Carreón J, Bustos J, Hernández J, Quintero M, García C. Confiabilidad y validez de un instrumento que mide la actitud hacia grupos cercanos a portadores de VIH/SIDA. *Eureka*, 2015;12(2):218–230.

(5) García C. Modelo de salud ocupacional migratoria intercultural. *Cienc Humanis Salud*, 2017;4(2):24–31.

(6) García C, Delgado M, Morales M, Méndez A, García E, Vilchis F. Determinantes psicológicos de la adherencia al tratamiento del VIH en una universidad pública del Estado de México. *Rev Psicol Univ Autón Estado México*, 2016;5(10):1–17.

(7) Llamas B, Lopez S, Garcia C. Especificación de un modelo de la adhesión al tratamiento. *Ajayu*, 2019;17(1):140–150.

(8) Martinez E, Sánchez A, García C. Governance of quality of life and well-being subjective. *Ajayu*, 2019;17(81):121–139.

(9) Garcia C. Dimensiones de la teoría del desarrollo humano. *Ehquidad*, 2019;11(1):27–54. doi: 10.15257/ehquidad.2019.0002

(10) Fierro E, Nava S, Garcia C. Confiabilidad y validez de un instrumento que mide el compromiso organizacional en un centro de salud comunitaria. *Tlatemoani*, 2018;29(1):42–68. doi: 10.22201/fcpys.20071949e.2017.26.59972

(11) De la Garza M, Cannett J. Actitudes laborales en la educación técnica pública de Celaya. *Enseñanza Invest Psicol*, 2005;10(1):271–289.

(12) Mendoza I, Torres J. Estudio sobre el clima organizacional de un sistema de atención médica en la ciudad de México y su relación con el liderazgo transformacional y transaccional de sus directivos. *Enseñanza Invest Psicol*, 2006;2(3):105–123.

(13) Rodríguez R, Moreno B, Rivas S, Alvarez A, Sanz A. Positive psychology at work. Mutual gains for individuals and organizations. *J Work Organ Psychol*, 2010;26(3):245–253. doi: https://doi.org/10.5093/tr2010v26n3a7

(14) González R, García F. Open innovation: a preliminary model from knowledge management. *Intangible Capital*, 2011;7(1):82–115. doi: 10.3926/ic.2011.v7n1.p82-115

(15) Juarez M, Garcia C, Quintero M. Composición factorial confirmatoria de la norma laboral percibida. *Cienc Soc*, 2009;1(1):1–14. Available from: eumed.net/rev/caribe/2019/01/norma-laboral-percibida.html

(16) Sánchez J. Frecuencia del burnout en policías de la Ciudad de México. *Liberabit*, 2012;18(1):69–74.

(17) Marques J. Closed versus open innovation, evolution or combination. *Int J Bus Manag*, 2014;9(3):196–203. doi: 10.5539/ijbm.v9n3p196

(18) Luama V, Lapalaimen R, Ustado O, Vos M, Lousa A, Maranen P. Added value of intangibles for organizational innovation. *Human Technol*, 2012,8(1):7–23. doi: 10.17011/ht/urn.201205141650

(19) Rodríguez R, Echavova M. A study of culture dimensions, organizational ambidexterity, and perceived innovation in teams. *J Technol Manag Innov*, 2013;9(3):21–33. doi: 10.4067/s0718-27242014000300002

(20) Urbanova H. Competitive advantage achievement through innovation and knowledge. *J Competitiveness*, 2013;5(1):82–96. doi: 10.7441/joc.2013.01.06

(21) Lemandosky M. How to monitor the effects of managerial innovations in public cultural institutions. *Knowl Manag Innov*, 2013;1(1):19–21. Available from: https://core.ac.uk/download/pdf/53110642.pdf

(22) Abdaziz M, Yossin A. Corporate innovation and organization performance: the case of Somalia telecommunication industry. *Bus Econ Law Conf*, 2014;4(1):260–271. Available from: https://www.ijbel.com/wp-content/uploads/2014/06/KLB4132-Mohamed-Abdiaziz-Ali-Yassin-CORPORATE-INNOVATION-AND-ORGANIZATIONAL.pdf

(23) Park J. Psychological burden and medication adherence of human of immunodeficiency virus positive patients. *Glob J Health Sci*, 2018;10(11):124–135. doi: 10.5539/gjhs.v10n11p124

(24) Nsitou B, Ikama M, Drame B, Kaboru B. Patients related predictors of poor adherence to antihypertensive treatment in Congo-Brazzaville: A cross sectional study. *Med Public Health*, 2013;2(5):1–9. Available from: http://www.gjmedph.com/uploads/O2-Vo-2No5.pdf

(25) Sajith M, Pankaj M, Pawar A, Modi A, Sumariya R. Medication adherence to antidiabetic therapy in patients with type 2 diabetes mellitus. *Int J Pharm Pharm Sci*, 2014;6(2):1–7. Available from: file:///C:/Users/toshiba/Downloads/8818dc8618c08fa-1956b7551e059764f49dd.pdf

(26) Fierro E, Alvarado M, Garcia C. Contrastación de un modelo de compromiso laboral en una institución pública del centro de México. *Rev Psicol Univ Autón Estado México*, 2018;7(13):32–48.

(27) Garcia C, Martinez E, Sanchez A. Estructura factorial exploratoria de las dimensiones institucionales del compromiso laboral en una institución de educación superior (IES) del centro de México. *Perspec Soc*, 2018;20(2):65–87. Available from: http://perspectivassociales.uanl.mx/index.php/pers/article/view/75/44

(28) Garcia J, Delgado M, Garcia C. Confiabilidad y validez de un instrumento que mide el bienestar sanitario. *Eureka*, 2018;15(82):44–52. Available from: https://psicoeureka.com.py/sites/default/files/articulos/eureka-15-2-12.pdf

(29) Acharya J, Canonne C, Han Y, Sun Z, Tyagi H. Domain compression and its applications to randomness optimal distributed goodness of fit. *ECCC*, 2019;98(1):1–38. Available from: http://proceedings.mlr.press/v125/acharya20a/acharya20a.pdf

(30) Carreón J, Hernández J, Bustos J, García C. Reliability and validity of an instrument that measures the commitment of social workers in healthcare institutions. *Crossroads*, 2017;26(1):69–86.

(31) Chávez J, Carreón J, Hernández J, García C. Análisis factorial confirmatorio con mínimos cuadrados ordinarios no ponderados de una escala de actitudes hacia el duelo. *Psicumex*, 2016;6(1):24–38. doi: 10.36793/psicumex.v6i1.256

(32) Fernández A, Fernández E, Siegrist J. El trabajo y sus repercusiones en la salud. El modelo "Desequilibrio Esfuerzo-Recompensa-DER". *Rev Calid Asist*, 2005;20(3):165–170. doi: 10.1016/S1134-282X(08)74743-2

(33) Gaboardi M, Rogers R, Sheffet O. Locally private mean estimation: Z test and tight confidence intervals. *35th International Conference of Machine Learning, Stockholm, Sweden,* 2018;80(1):1–10.

(34) García C, Carreón J, Hernández J, Rivera B. Confiabilidad y validez de un instrumento que mide la dimensión sociopolítica de la calidad de vida. *Psicumex*, 2015;5(2):79–92. doi: 10.36793/psicumex.v5i2.282

(35) García C, Carreón J, Quintero M, Bustos J. Confiabilidad y validez de un instrumento que mide la gobernanza del bienestar subjetivo. *Cienc Adm*, 2015;2(1):43–54.

(36) García C, Mejía S, Hernández J, López S, Salinas R. Confiabilidad y validez de un instrumento que mide la cultura organizacional relativa al institucionalismo educativo. *Cuad Hispanoam Psicol*, 2015;15(1):45–52. doi: 10.18270/chps..v15i1.1778

(37) García E, García C, Rosas F, Castillo B, Carreón J, Hernández J, Rivera L. Prueba empírica de un modelo de calidad de vida. *Civilizar*, 2015;15(28):181–196.

(38) Gómez V, Llanos A. Factores psicosociales de origen laboral, estrés y morbilidad en el mundo. *Psicol Caribe*, 2014;31(2):354–385.

(39) Iglesias S, Sule A. Introducción al análisis multivariable. In: Levy JP, Varela J (eds.) *Análisis multivariable para ciencias sociales.* Madrid: Pearson; 2003. p. 1–40.

(40) Kifer D, Rogers R. A new class of private chi squared test. In: *20th International Conference of Artificial Intelligence and Statistics, Florida, USA*; 2017. p. 1–10.

(41) Luceño L, García J, Rubio S, Díaz E. Factores psicosociales en el entorno laboral, estrés y enfermedad. *Edupsyche*, 2004;3(1):95–108.

(42) Ochiri S. Conceptual model on application of chi squared test in education and social sciences. *Educ Res Rev*, 2013; 8(15):1231–1241. doi: 10.5897/ERR11.305

(43) Üçkardeş F, Aslan E, Küçükönder H. A fast approach to select the appropriate test statistics. *Acad J Agric*, 2013;2(1):55–61.