

Title: Preventive behavior at work - A concept analysis

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Abstract:

Background. Preventive behavior is a significant intervention target in order to promote health at work, but has never been discussed in an occupational perspective. **Aim.** To clarify the concept of preventive behavior at work. **Methods.** The Walker and Avant (2011) method was used to conduct the study. **Results.** The attributes of the concept are: 1) compliance with safety rules and procedures, 2) proactivity, participation, engagement, and initiatives related to prevention, 3) maintenance of physical environment, 4) concern for social environment, 5) reflexivity and analytical skills of work situations. The analysis also identified the antecedents and the consequences of the concept that are all related to either the person, the environment or the occupation. **Conclusion.** Preventive behavior occurs when a worker shows an active involvement to comply with safety rules and procedures of his trade, takes initiatives to improve prevention, preserves his physical environment, communicates with his peers and analyzes work situations before committing to it. **Significance.** Occupational therapists have a central role in primary prevention of work injuries and have the expertise to help develop each of the five attributes of the concept of preventive behavior.

Key words : occupational health and safety, health at work, primary prevention

Introduction

Work injuries and work-related disorders are considered as major public health concerns in the vast majority of industrialized countries. According to the International Labour Organization, 317 million accidents occur on the job annually (1). Because a healthy and safe work environment is essential to the quality of life and well-being of individuals (2), various preventive modalities are put in place to decrease the frequency and severity of injuries. When considering the perspective of the worker, preventive behavior may be seen as a determinant in the prevention of workplace injuries (3). This concept has been addressed in various disciplines, such as psychology, work organization and management and ergonomics, but not in occupational therapy. The aim of this study is to clarify the concept of preventive behavior at work in order to propose a definition relevant for the practice of occupational therapists.

Background

Occupational therapists are centrally involved in the rehabilitation of injured workers. A recent scoping review conducted on the role of occupational therapists in health and well-being at work suggested that the primary role of occupational therapists has been focused on strategies to enable workers to return to work following an injury (4, 5). While this focus on tertiary prevention is important, the expertise in occupational analysis, evaluation of occupational capabilities, teaching healthy behaviors and environmental adaptations strategically positions occupational therapists as the providers of choice to offer interventional primary prevention strategies (6, 7). Scientific writings show the effectiveness of occupational therapy interventions in prevention of injuries, disorders, illnesses or disabilities in multiple areas of practice, such as mental health (8) or geriatrics (9, 10). Also, the interest of occupational therapists about promoting healthy behaviors has been studied in different domains, such as sleep quality (11), physical exercises (12) or disease management (13). The professional community recognizes the importance of developing the role of occupational therapists in injury prevention and health promotion (6) and to integrate these types of interventions in daily practice (7). However, even if the occupation of work is one of the targets of interest of occupational therapists, few studies have been conducted in order to define and tag the role of occupational therapists in promoting preventive behavior at work. Few articles have been written on the adaptation of work environments or the teaching of safe work techniques, but the general field of promotion of preventive behavior at work has not been formally explored in occupational therapy. The

Canadian Association of Occupational Therapists has published a position statement about occupational therapy and workplace health in 2015 (5). Recommendations in this paper suggest a more active implication of occupational therapists in early interventions, in promoting healthy and preventive behavior at work among others.

One of the major steps to define the practice of occupational therapy in this field is to provide an operational definition of the concept of preventive behavior at work.

Methods

Walker and Avant (2011) concept analysis method was chosen to conduct this study. This analysis approach is a recognized application in nursing of the method developed by Wilson (1963) in education. This method has been described in the occupational therapy literature (14) and applied to various concepts such as quality of life (15), social participation (16), occupational balance (17), self-determination (18), professional confidence (19) or mental workload (20). A concept is a mental construction of a phenomenon, allowing its identification in reality (21). It is formed of different characteristics to define it (22).

Concept analysis is more than a linguistic exercise (15), it is part of a construction theory approach. Concept analysis allows to clarify ambiguities, overused or unexplored concepts in order to obtain an operational definition including principal attributes, antecedents, consequences and empirical referents. Based on eight systematic steps (see table 1), concept analysis is an iterative and dynamic process, enabling to go back and forth between the steps throughout the analysis. The method allows to evaluate the measurement of a concept by extracting the attributes, in agreement with the theory. Finally, concept analysis allows to work on the first steps of a theory construction by clarifying the relations between the concept, its antecedents and its consequences.

Table 1. Steps of the concept analysis method of Walker and Avant (2011)

1	Selection of a concept
2	Determination of the aim or purpose of analysis
3	Identification of all uses of the concept
4	Determination of the defining attributes
5	Identification of a model case
6	Identification of other cases (e.g.: borderline, related, contrary, invented, and illegitimate cases)
7	Identification of antecedents and consequences
8	Definition of empirical referents

Selection of a concept

The disciplines of psychology (23-25), work organization and management (26-32) and ergonomics (33-35) have approached the concept of preventive behavior or related concepts. Psychologists mostly present preventive behavior (often also called safety or safe behavior) as compliance or carefulness and safety initiatives (23-25). This bidimensional understanding of the concept is also reported in the work organization and management literature (26, 30). Although, some other definitions of preventive behavior in the field of work organization and management include the dimensions of advocacy (27), communication (28), exercise of rights and responsibilities (28), proactive safety behavior (31), engagement (32) and satisfaction related to prevention (32). Literature in this discipline also refers to safety citizenship role (29), which refers to actions taken by employees who go beyond their normal work activities in order to promote prevention. In ergonomics, behavior of prevention are mainly defined as "know-how of caution" which refer to the capacity of a worker to mobilize a set of knowledge in order to protect his health and that of others (33). The review of the literature suggests that no consensus exists about the definition of the concept of preventive behavior. Moreover, to our knowledge, no study has been conducted to define this concept following a recognized scientific method. The concept of preventive behavior at work has also never been discussed in the occupational therapy literature. Currently, there is a terminological vagueness about the description of the concept, which makes it difficult to understand and even harder to measure. Lack of a clear and consensual definition of the concept makes difficult to select the appropriate measurement tool in clinical practice or in a research setting (14). Several related terms are used interchangeably in the literature to refer to preventive behavior, such as "preventive behavior" or "safety behavior" or "know-how of caution" or "safety citizenship role". Among these, some may be attributes, antecedents or consequences of the preventive behavior at work. Clarifying links between these concepts and the preventive behavior will allow for a better understanding and will add a scientific value to actual knowledge in this field.

Aim

The aim of the present concept analysis is to clarify the concept of preventive behavior at work.

Data source

To investigate how preventive behavior was defined, an extensive literature review has been conducted. The research process used dictionaries (Oxford, Merriam-Webster), databases (Medline, PsycInfo, CINAHL, ProQuest Dissertations and Thesis), specialized textbooks and

websites on health at work. The key words "preventive behavior", "safety behavior", "know-how of caution" and "safety citizenship role" were used to conduct the data search. Inclusion criteria included: 1) articles written in English or French and; 2) context related to work. As the concept of preventive behavior has a relatively young history, no limit to the publication date of the relevant sources has been imposed. The list of references of the selected documents was reviewed to identify additional sources. Following the research process, 27 documents (24-50) met the inclusion criteria and were selected for analysis. Two researchers reviewed the literature and performed the concept analysis to increased rigor of the research.

Extraction process

To extract the relevant information from the documents, an extraction grid developed for concept analysis in occupational therapy was used (14).

Results

Dictionary definitions

Although dictionaries do not define "preventive behavior", each term can be defined separately. The adjective "preventive" refers to what is intended to prevent the onset of something bad, such as disease, injury, accident or incident (36). The definition of the word "behavior" implies the presence of an observable action carried out by the person (36). Behavior consists of a set of cognitive, emotional and motor observable manifestations, implemented by the individual in relation to his environment.

Concept history

Heinrich was the first to address the concept of preventive behavior at work in a textbook of 1931 on the topic of industrial accident prevention (37). At that time, preventive behavior at work was understood in a behaviorist manner, reducing it to compliance with the prescribed rules and procedures. For more than 60 years, the definition has stayed almost the same and reported mainly in the sociology literature (26). By the end of the '90s, the unidimensional definition of the concept evolved toward a more complex and sophisticated understanding (26, 28), including cognitive, behavioral and social components. This contemporary understanding of preventive behavior at work will be explained in the following sections.

Attributes

Attributes are characteristics that enable the recognition of the concept of the reality (22). Following the exhaustive literature review, the attributes of the concept of preventive behavior

at work are: *Attribute 1 - Compliance with safety rules and procedures*, such as wearing individual protective equipment or performing regulated activities (e.g.: lockout) (23-28, 38, 39); *Attribute 2 - Proactivity, participation, engagement and initiatives related to prevention*, such as attending safety oriented training or taking part of health and safety committees (23, 25, 27, 29, 31, 38-40); *Attribute 3 - Maintenance of the physical environment*, such as maintaining cleanliness of workstations and preventive maintenance of work equipment (23, 24, 26, 28, 39); *Attribute 4 - Concern for the social environment*, such as team work, communication with others about health and safety (24, 26, 28, 29, 31, 33, 38-40) and; *Attribute 5 - Reflexivity, analytical skills of work situations*, such as health and safety risks identification and appropriate knowledge mobilization (33, 35, 40, 41).

Constructed cases

Constructed cases facilitate the understanding of the concept, illustrating its attributes (22). Walker and Avant (2011) propose to first construct a model case, which proposes a concrete example of what is the concept, highlighting the presence of the attributes. Other cases may also be constructed, such as a borderline case, which may partly represent the concept or a contrary case to illustrate what does not represent the concept.

Model case

A model case is an example based on real life that has all the attributes of the concept under consideration. The following case is inspired by a participant met as part of a study on the development of preventive behavior at work:

Martin works in a manufacturing company for over 25 years. Proud to work for this company, he is very involved in various committees. Among others, he is vice president of health and safety committee and is also involved in the reception and orientation of new employees. Martin is considered a model and a reference by his colleagues because he knows the rules of health and safety, he works assiduously to implement and does not neglect the maintenance of his work equipment. He makes sure to have a workstation in good condition before beginning his work day and takes the time to analyze work situations to make the right decisions to avoid injury.

The current situation clearly demonstrates the presence of five attributes of the concept of preventive behavior at work. Indeed, Martin meets the health and safety rules associated with its work (attribute # 1) and is involved in committees (attribute # 2). Moreover, it is concerned

with the maintenance of its physical environment (attribute # 3) and communicates and transmits his knowledge to his colleagues (attribute # 4). Finally, the example highlights reflective skills and problem solving in regard to health and safety at work (attribute #5).

Borderline case

A borderline case is an example, presenting just some of the attributes of the concept (22). It may contain most of the attributes, but differs substantially on at least one characteristic. The following borderline case was developed from the experience of the authors:

Annette works as self-employed in the field of computer graphics. Because she is aware of her health, she hired an ergonomist to evaluate her job to make sure to have an appropriate work environment. She put in place the recommendations.

This reflects partly the current understanding of preventive behavior, as described in the literature. Indeed, Annette meets health and safety-related recommendations applicable to its business (attribute #1) and is aware of the importance of maintaining an adequate workstation (attribute #3). She could even show initiatives for safety by hiring an ergonomist (attribute #2). However, the situation does not have the awareness of the social environment and communication (attribute #4). Moreover, this example makes no mention of the analysis of work situations with a view to identifying risks to health or safety (attribute #5). Thus, all attributes for understanding the entire concept are not represented.

Opposite case

An opposite case is a clear example of what is not the concept studied (22). This type of event provides information on the attributes to exclude from the concept. The following opposite case was developed from the experience of the authors:

Joey works as an assistant cook in a restaurant. He is reserved and solitary and he communicates little with others. It also gives little importance to occupational health and safety by failing to wear appropriate shoes and neglecting to properly sharpen his knives. For him, what matters is to work as quickly as possible.

This clearly shows the absence of the concept of preventive behavior because none of the identified attributes are represented.

Antecedents

Antecedents are events, characteristics, incidents that must be in place before the occurrence of the concept. It is suggested that knowledge, skills, training and motivation regarding health and safety at work are important antecedents of preventive behavior at work (23, 25, 28, 33, 42).

Self-efficacy toward the ability to work in a preventive manner is also precursors of the preventive behavior (31). Furthermore, it appears that attitudes and influences of colleagues and supervisors toward health and safety and the importance of developing preventive behavior among workers are of crucial importance (24, 26, 30, 31, 33, 43). Finally, safety climate (i.e. perceptions of employees of the emphasis on work prevention of injuries and illnesses at all levels of the organization) (25, 29, 32, 38, 43, 44), activity requirements and management style are also considered as antecedents of the concept of preventive behavior at work (24, 28, 45).

Consequences

After the identification of the concept, it is possible to examine the consequences of the occurrence of the concept, the outcomes. These may be actions, feelings, attitudes or behavior. The evaluation of the consequences may help to identify new research hypotheses or to propose new relations between the concept, its attributes, antecedents and consequences (22). Authors suggest a feeling of satisfaction (45) and engagement (32, 42) from the workers toward the work organization may be considered as consequences of the concept. This may also contribute to health (33) and well-being (31). Furthermore, literature suggests that preventive behavior contribute to a better health and safety performance of the work organization (25, 26). It is also reported contributing to develop a culture of health and safety at work among the organization (46) and, ultimately, to decrease occupational injuries and illnesses (23). Because an attribute cannot also be an antecedent or a consequence, this step allows to specify again the choice of attributes (22). The figure 1 exposes the concept analysis of preventive behavior at work, including its antecedents, attributes and consequences.

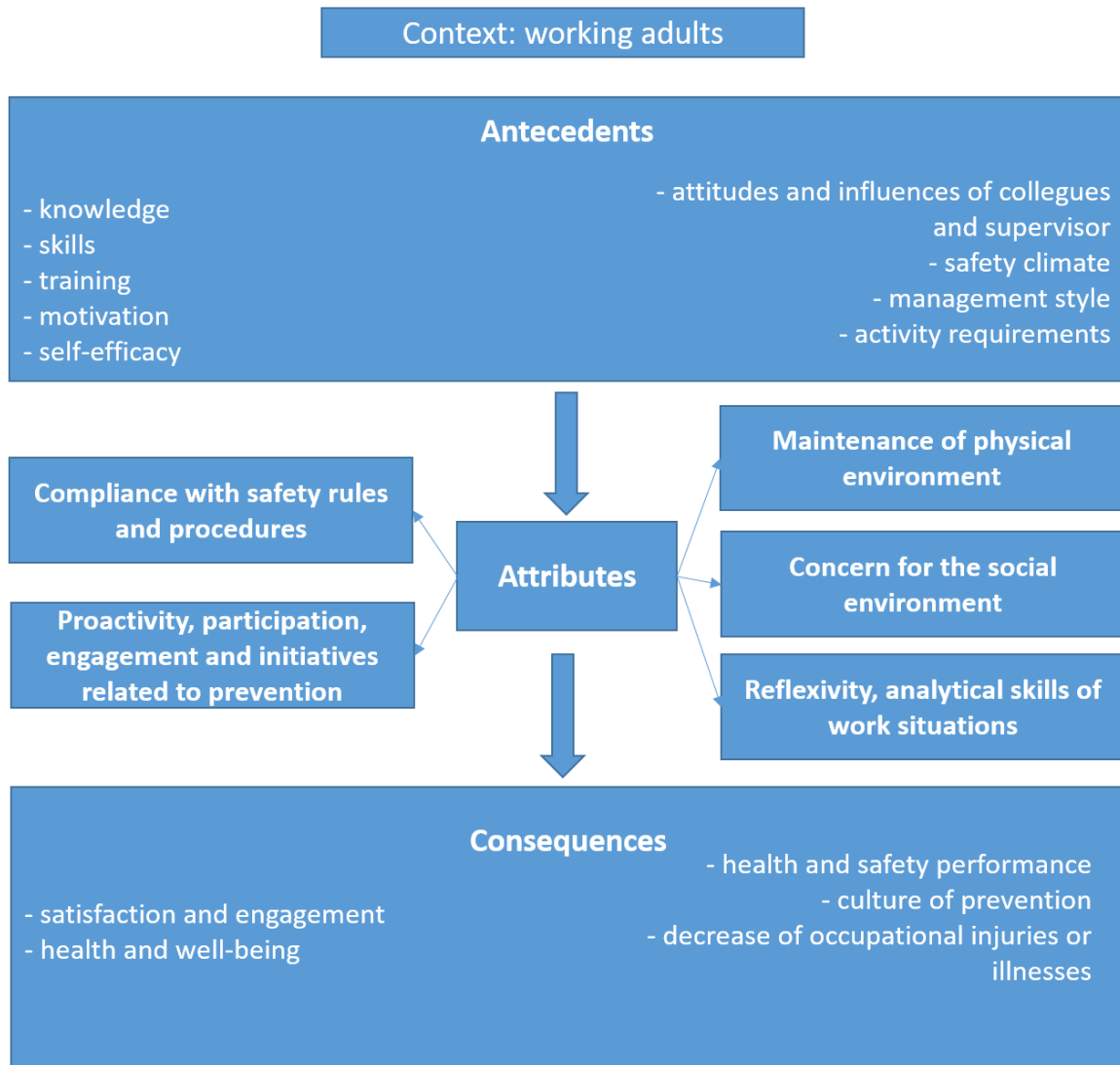


Figure 1. Concept analysis of preventive behavior at work

Empirical referents

The definition of empirical referents is an important step in the concept analysis since it allows the operationalization and measurement of the concept (22). Empirical referents are categories of the concept that, by their presence, demonstrate the occurrence of the concept itself. In this study, empirical referents measure the attributes of the concept .

The lack of consensus on the definition of preventive behavior has led to the creation of various measuring instruments. Some focus on measuring a single dimension, while others attempt to measure two to four dimensions. As presented in table 2, no tool actually exists to measure the entire concept, including all attributes.

Table 2. Description of the measurement tools that evaluate some attributes related to the concept of preventive behavior at work

	Evaluated attributes					Psychometric properties studied			Scale	Number of items
	Compliance with safety rules and procedures	Proactivity, participation, engagement, initiatives	Maintenance of physical environment	Concern for social environment	Reflexivity and analytical skills	Validity	Test-retest reliability	Internal consistency	Likert	
Work behavior instrument (23)	x	x	x						x*	11
Psychosocial safety behavior (43)	x	x				x		0.70< α <0.75	5	6
General safety performance scale (28)	x	x		x		x			7	27
Safety behaviors scale (38)	x	x		x				α =0.89	6	10
Safety behavior scale (25)	x	x				x		0.86< α <0.93	5	6
Compliance with safety behavior (24)	x	x				x		α =0.88	5	11
Safety citizenship behavior scale (29)		x		x		x		α =0.96	5	27
Échelle du comportement préventif au travail (39)	x	x	x	x		x	0.71<r<0.99	0.80< α <0.82	5	9
Compliance with safety rules and safety initiatives scales (26, 47)	x	x				x		0.64< α <0.69	5	13
The Exit-Voice-Patience-Neglect-Compliance scales (27)	x	x		x		x		0.69< α <0.92	7	22

* information not available

Discussion

The concept analysis has clarified the definition of preventive behavior at work in determining its attributes, antecedents, consequences and empirical references. In addition, the review of assessment tools available to measure some attributes of the concept is an asset to guide the occupational therapy practice in this emerging field.

Preventive behavior at work: a multidimensional concept

One of the main conclusions that can be drawn after this analysis is that the concept of preventive behavior at work is complex and involves the interaction of several factors. Our results suggest that preventive behavior at work would be different from the concept of safety behavior, which is often described with the only two attributes of compliance with safety rules and procedures (attribute #1) and proactivity, participation, engagement and initiatives related to prevention (attribute #2) (24-26). As some authors suggest that this description of the concept is simplistic and would fail to understand the entire concept (27, 28), our results confirm that the concept of preventive behavior at work would thus be multidimensional. Among others, the concept of preventive behavior goes beyond compliance with the rules and procedures (attribute #1) and participation in prevention activities (attributes #2). It asks the worker to act in prevention consistently, analyzing work situations before engaging in activities and be on the lookout for risks throughout its implementation. Preventive behavior at work also requires workers to mobilize appropriate knowledge to carry out their work activities without putting their health or safety at risk. Reflexivity and cognitive skills are thus required in the manifestations of preventive behavior (attribute #5) (33, 35, 40, 41).

Also, the communication component with the social environment (attribute #4) seems to define the preventive behavior at work. Indeed, literature reflects that importance of teamwork, mutual assistance and consultation with colleagues and supervisors are important manifestations of preventive behavior (24, 26, 28, 29, 31, 38).

Finally, interactions with the physical environment and the evaluation of needs in terms of cleanliness of work station and maintenance of equipment is part of the preventive behavior (attribute #3) (23, 24, 26, 28, 39).

The analysis of these attributes indicates that preventive behavior at work is a complex concept that involves reflexivity, analysis, and decision-making of the worker. The concept also requires an investment, a commitment of the worker in his work team and its organization. The social dimension is important, as the behavior is developed under the influence of others. Also,

preventive behavior goes beyond the normally expected of the worker tasks; it helps contribute to the development of a culture of prevention (48).

Preventive behavior at work: gaps in measuring tools

This concept analysis was also interested in documenting the various empirical referents for measuring the preventive behavior at work in reality. Although several tools were identified to measure certain attributes, several shortcomings need to be discussed. All measurement tools identified are built as self-administered questionnaires which the worker must assess the frequency he performs the behavior or the level of importance he places on the behavior. As a preventive behavior is defined as an observable action, it might be appropriate to develop tools that also include the observations of the therapist. Moreover, Likert scales may be insufficient to entirely evaluate the concept because they do not take account of reflexivity and analytical skills related to work situations. Results of our analyses revealed that no tool can measure the concept in its entirety. Furthermore, none can actually measure the attribute #5 (reflexivity, analytical skills of work situations). As mentioned earlier, literature exposes that preventive behavior at work is not only behaviorist, it requires analysis of work situations and decision making on the part of the worker. A measure that takes account of reflexivity and analytical skills used by workers would be a great asset to fully capture the concept.

Psychometric properties of existing instruments have been studied only a little. Also, no measurement tool identified had been evaluated for its property of sensitivity to change, which is a major limitation. This psychometric property deserves to be documented in order to validate whether the tools can be used as an indication of the effectiveness of interventions in injury prevention and health promotion at work.

Preventive behavior at work : an intervention target for occupational therapists

This concept analysis was based on literature from disciplines other than occupational therapy. This extra disciplinary understanding allows us to draw the basis for a definition of the concept in occupational therapy. In fact, results of the concept analysis suggest that characteristics of the preventive behavior can be understood in an occupational perspective (49). One of the assumptions of the occupational therapy practice is that the human doing, or occupational performance, is the result of the interaction of various factors coming from different constructs that are the person, the occupation and the environment (50, 51).

Our analysis revealed that the five attributes defining the concept of preventive behavior are related to either the worker (person), the environment (physical or social) or the work activity

(occupation) or a combination of these components. The figure 2 exposes the understanding of the attributes of the concept with regard to the occupational therapy basic constructs. It is possible to understand that each of the attributes implies the interaction of elements from the person, from the environment and from the occupation. Some attributes result of a simple interaction between two components of the model, while others are the result of several interactions between the components.

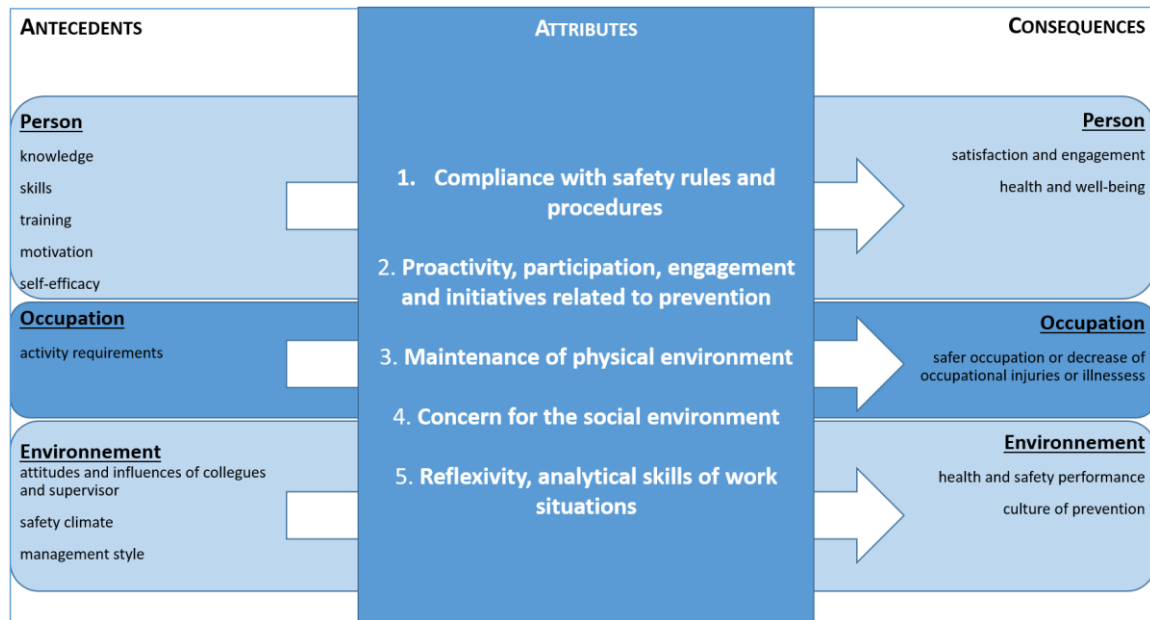


Figure 2. Characteristics of the concept of preventive behavior at work according to the basic constructs of the occupational therapy practice - the person, the occupation and the environment

This article helped to understand that the development of preventive behavior, by its attributes, antecedents and consequences, fits completely within the scope of practice of occupational therapy. This concept analysis of preventive behavior can thus serve as a basis for defining the role of the occupational therapist in this area. As occupational therapy interventions in injury prevention or health promotion often put efforts on behavior changes among individuals (52), a better understanding of the concept and measurement tools related to it will provide a significant resource to support the practice of occupational therapists. Among other things, concept analysis has identified antecedents to develop among workers to promote the preventive behavior. Among them, several are already characteristics that are part of the occupational therapists treatment goals, such as the development of motivation or skills and

self-efficacy improvement, for example. Occupational therapists can be a change agent for workers by supporting the acquisition of antecedents and attributes leading to the development of preventive behavior.

Occupational therapy interventions in health at work have to move toward health promotion and primary prevention approaches (5). In this perspective, the understanding of the concept of preventive behavior at work is essential for occupational therapists to develop the enabling skills in the area of injury prevention or health promotion at work. An occupational perspective of the concept allows to understand, assess and address the interactions between person, occupation and environment. This could help to enable individuals to develop a preventive behavior in the context of work, which will allow a successful occupational commitment (53).

Study limitations

Some limitations about this study have to be discussed. First, it should be recognized that other methods of concept analysis do exist and that maybe the use of another method would have lead to different results. Also, the present concept analysis was realized toward the use of the concept of preventive behavior in the context of work only. Walker and Avant (2011) warn not to limit the use to only one aspect. However, other authors consider it is a mistake to include material from different topics since the same word may be used in different ways (54). Finally, results of this concept analysis have to be considered temporary, as concepts are constantly subject to change (22).

Conclusion

This concept analysis added to a better understanding of the concept of preventive behavior at work, as seen in an occupational perspective. The literature demonstrates that the concept fits perfectly with the occupational therapy practice fields. Concept analysis is a rigorous scientific exercise to establish the basis for new theories, refine existing theories and to engender the development of measuring instruments. The method of Walker and Avant (2011) is a systematic method that is recognized in occupational therapy and other health sciences disciplines. This research has identified attributes of the concept that are widely supported, defined and streamlined in terms of behavior.

Although research on preventive behavior has focussed mainly on physical health, mental health problems at work are an important limitation to occupational participation of thousands of

workers. The research should continue to better define the concept of preventive behavior in a perspective of global health to enable occupational therapists to have a holistic view of the concept.

This article proposed a first step in the definition of the concept in an occupational perspective, but more works remain to be done in order to better conceptualize and guide the practice of occupational therapy in the development of preventive behavior at work.

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