Health Education
& Behavior

Links between Perceptions and Practices in Patient Education: a Systematic Review

Journal:	*Health Education & Behavior*
Manuscript ID	HEB-18-0195.R1
Manuscript Type:	Review
Research Methods:	
Topics:	Patient Education < GENERAL TERMS, Healthcare Professionals, Perceptions, Attitudes, Patient-centred Care

Abstract: Background. Two decades after 'patient education' was defined by the World Health Organisation, its integration in healthcare practices remains a challenge. Perceptions might shed light on these implementation difficulties. This systematic review aims to investigate links between perceptions and patient education practices amongst healthcare professionals, paying particular attention to the quality of practices in order to highlight any associated perception. Method. PubMed, PsycINFO and Scopus were searched using the following search terms: 'perceptions', 'patient education', 'healthcare professionals' and 'professional practices'. PRISMA guidelines were used. Results. Twenty studies were included. Overall findings supported the existence of links between some perceptions and practices. Links were either correlational or 'causal' (generally in a single direction: perceptions affecting practices). Four types of perceptions (perceptions of the task including patient education, perceptions about the patient, perceptions of oneself as a healthcare professional and perceptions of the context) were identified as being linked with educational practices. Links can although be mediated by other factors. Results concerning links should, however, be considered with caution as practices were mostly assessed by prevalence measurements, were self-reported and concerned exclusively individual education. When analysing the quality of practices, the two retained studies highlighted their changing nature and the central role of perceptions with respect to the individual patient. Conclusions. This literature review led us to specify the quality criteria for further research: covering the entire spectrum of patient education, operationalising variables, exploring specific practices, measuring the quality of practices, developing designs that facilitate causation findings and considering a bidirectional perspective.

Patient education is defined by the World Health Organisation (1998, p.8) as a process that 'should enable patients to acquire and maintain abilities that allow them to optimally manage their lives with their disease. It is therefore a continuous process, integrated in health care. It is patient-centred' (...). Two decades later, patient education implementation remains a challenge (Chambouleyron, Lasserre-Moutet, Lagger, & Golay, 2013; Hoving, Visser, Mullen, & van den Borne, 2010; Kai, Maki, Takahashi, & Warner, 2008). It is worth trying to understand why it remains the case. Focusing on the educational practices of the healthcare professionals (HCP), an examination of their perceptions might shed light on this. 'Perception' is understood here as the way we view the world; our image of it. Perceptions are a kind of common-sense knowledge (Jodelet, 1989) which coexist with objective, scientific knowledge. Links between perceptions and practices are actually well-known at a theoretical level; our perceptions guide our practices (Abric, 1987; Ajzen & Fishbein, 1980; Rosenstock, 1974; Schwarzer, 2008) and our practices influence our perceptions (Festinger, 1957; Joulé & Beauvois, 1998). Consequently, a better understanding of links between a HCP's perceptions and his/her educational practices may help to improve the implementation of the latter.

This systematic review aims to provide up-to-date information regarding these links in the patient education field. During these analyses, specific attention is paid to the quality of practices (*i.e.* what the practices consist of) in order to highlight possible perceptions associated with a patient-centered and integrated into care educational practices, as stated in the WHO definition.

The investigation of the practice-perception links required consideration of the following questions: (1) What hypotheses in relation to links appeared in the studies? (2) How did the authors proceed? (3) What were their conclusions with respect to the links between HCP' educational practices and HCP' perceptions?

Methods

The method of this systematic review was inspired by the PRISMA Statement (Moher, Liberati, Tetzlaff, Altman, & The Prisma Group, 2009) and Petticrew and Roberts (2006). The methodological quality of the research was carried out using the QATSDD grid (Sirriyeh, Lawton, Gardner, & Armitage, 2012) as both qualitative and quantitative research were considered.

Selection strategy

Published literature was searched using the PubMed, PsycINFO and Scopus electronic databases. The following research terms were considered: 'perception', 'healthcare personnel', 'patient education' and 'professional practices'. Given that these databases have distinctive focus and specific operating mode, two complementary equations were carried out considering two terms for 'perception'. The first equation was based on the term 'attitude' proposed by (PubMed and PsycINFO) thesauri. The three databases mentioned above were considered. The second equation was based on the term 'perception' which is commonly-used in English. Scopus only was considered as this database does not operate with thesaurus. The search was conducted in January 2017. Alerts were created. Subsequent relevant articles were incorporated up until June 2017.

Inclusion criteria

The criteria for retaining studies were:

1. Design: empirical studies.
2. Participants: Healthcare professionals. Articles regarding both HCP and another population were also considered. In such cases, the parts dealing with HCP were extracted for analysis.
3. Field: patient education in all its diversity: unilateral information, co-construction of knowledge, etc. A study did not need to be labelled as 'patient education' to be retained. Conversely, referrals to another professional and information collection were not taken into consideration, even if the label 'patient education' was used.

4. Variables: perceptions, educational practices and the links between the two need to be analysed.
5. Editorial process: peer-reviewed.
6. Language: English or French.

No restrictions were put on time limits.

Data extraction and analysis

References identified by the selection strategy were screened independently by two reviewers (including the first author) by title and abstract. The full-texts of selected articles were then analysed by these two reviewers on the basis of the same criteria. Disagreements were resolved through discussion. Any uncertainty about the relevancy of a publication was discussed and validated by a third party, the second author.

In order to understand the findings regarding links between perceptions and educational practices, we need to consider what the aim of the study was and how the different terms had been analysed. Therefore, the following key information was extracted in descriptive tables. It was reported as mentioned by the authors: (1) study objectives regarding the practice-perception links; (2) theoretical framework; (3) field in which patient education was studied; (4) population (sample, HCP' profession and response rate); (5) method (design and instruments); (6) perceptions (type(s) and modalities considered); (7) practices (type(s) and modalities considered); (8) analysis methods used in analysing the links; (9) findings with respect to the links considered, including other variables involved. Contacts were made with authors to clarify aspects which remained unclear. Information has been integrated when available.

Results

This section includes the search process, an overview of retained studies, the study hypotheses, the measurements and analyses of both the variables and their links and finally, the findings.

Search process

The initial search yielded 561 records. After applying the inclusion criteria, 21 publications remained. None of the two research equations succeeded in identifying all the relevant studies. Eight were the result of the 'attitude' equation, eleven of the 'perception' one. Overlaps were rare: two were the common result of the two equations (Ampt et al., 2009; Bondarianzadeh, Yeatman, & Condon-Paoloni, 2011). The selection process is depicted in Figure 1. In line with Sirriyeh's work (2012, p.751), the QATSDD was not used to retrieve publications because of the limited availability of literature on this topic and the focus of these publications which is not necessarily the analysis of the practice-perception links. The QATSDD contributed to discussing how this link is analysed in the literature.

Descriptive overview

The 21 retained publications represented 20 studies. When two articles reported the same study, the article proposing the most in-depth analysis (Millstein & Marcell, 2003) is referred to. The quality assessment (see Table 1) revealed that research on this topic largely failed to report rationale for methodological choices (criteria 4,7 and 13) or tools (criteria 11) which did not allow us to assess their methodological quality. In addition, one third of the studies scored relatively low compared to the highest scores. An overview of their methodological characteristics and findings with respect to the link(s) between perception and the educational practices is provided in Table 2.

Of the 20 retained studies, 8 were carried out in (north) America, 7 in Europe, 3 in Oceania, 1 in Asia and 1 both in Asia and Africa. Nurses were the most studied (n=6), followed by a sample of various

HCP (n=5), physicians (n=4), pharmacists (n=3), dentists (n=1) and midwives (n=1). One study considered both HCP and patients.

With respect to the preventive or curative aspects of care, 8 studies concerned curative aspects (diabetes, use of medicines, HIV, preoperative information, chronic obstructive pulmonary disease, and medically unexplained symptoms), 8 studies concerned preventive aspects (cancer screening, dietary counselling, alcohol abuse, drug abuse, and listeria during pregnancy), 2 studies concerned both aspects and 2 studies were presented as 'patient education' with no further specification.

Hypotheses about links between perceptions and patient education practices

The 'causal' link was most often considered (n=10; 50%). Nevertheless, forty percent of the studies aimed to establish an association (n=8) (Chwalow, Costagliola, Mesbah, & Eschwege, 1994; Cochran, Field, & Lawson, 2015; Elovainio et al., 2013; Esposito & Fitzpatrick, 2011; Kleier, 2004; Lemmens, Strating, Huijsman, & Nieboer, 2009; Millstein & Marcell, 2003; van Dillen, Hiddink, Koelen, & van Woerkum, 2005). Finally, two studies (10%) did not initially consider links between perceptions and practices (Bondarianzadeh et al., 2011; Woivalin, Krantz, Mäntyranta, & Ringsberg, 2004).
Theoretical frameworks were sometimes (n=7; 35%) mentioned. The frameworks were as follows: the theory of reasoned behaviour (Coleman, 2003; Kleier, 2004); the theory of planned behaviour (Ampt et al., 2009; Cannon-Breland et al., 2013); the process of experience by Le Boterf (Vigil-Ripoche, 2006); Pender's health promotion theory (Esposito & Fitzpatrick, 2011); Cretin and Lin's approaches (Lemmens et al., 2009); the expectancy theory (Lemmens et al., 2009) and the common sense model (Cannon-Breland et al., 2013). Only two studies (Esposito & Fitzpatrick, 2011; Vigil-Ripoche, 2006) used them in their original format.

Perceptions were never considered to be linked with educational practices in isolation. All the studies actually aimed at identifying the various factors including perceptions that linked with these practices. Moreover, two studies assumed that those other factors might be more predictive of practices than perceptions are. They viewed the practice-perception links from a distal perspective. In this instance, either the intention of practice (Kleier, 2004) or the 'communication style', a kind of generic practice (van Dillen et al., 2005) exert a mediating effect.
The types of perceptions initially considered were specified in the hypothesis of the majority of studies (65%; n=13). A large spectrum of perceptions was envisaged: perceptions of the illness/health problem (n=8) (Cannon-Breland et al., 2013; Chwalow et al., 1994; Cochran et al., 2015; Esposito & Fitzpatrick, 2011; Levy & Raab, 1993; Loh et al., 2015; Millstein & Marcell, 2003; van Dillen et al., 2005); perceptions of oneself as a HCP (n=8) (Cannon-Breland et al., 2013; Cochran et al., 2015; Coleman, 2003; Kleier, 2004; Lemmens et al., 2009; Levy & Raab, 1993; Millstein & Marcell, 2003; van Dillen et al., 2005); perceptions of the context (n=7) (Cannon-Breland et al., 2013; Cochran et al., 2015; Elovainio et al., 2013; Kleier, 2004; Lemmens et al., 2009; Millstein & Marcell, 2003; van Dillen et al., 2005) and perceptions about the patient (n=5) (Chwalow et al., 1994; Cochran et al., 2015; Millstein & Marcell, 2003; Tse & So, 2008; van Dillen et al., 2005). A combination of several types was generally considered. The other seven studies (35%), all qualitative inductive ones, did not determine the types of perceptions upstream due to their paradigm choice.

Studies' methodology

Thirteen studies adopted a quantitative approach (65%) (Cannon-Breland et al., 2013; Chwalow et al., 1994; Cochran et al., 2015; Coleman, 2003; Elovainio et al., 2013; Esposito & Fitzpatrick, 2011; Kleier, 2004; Lemmens et al., 2009; Levy & Raab, 1993; Loh et al., 2015; Millstein & Marcell, 2003; Tse & So, 2008; van Dillen et al., 2005) including one quasi-experimental design (Lemmens et al., 2009), whereas seven followed a qualitative approach (35%) (Ampt et al., 2009; Bondarianzadeh et al., 2011; Desclaux & Alfieri, 2009; Karlsen, 1997; Turnbull & Roberts, 2004; Vigil-Ripoche, 2006; Woivalin et al., 2004).
All studies called on self-reported measures from HCP, either questionnaires (n=12; 60%) or interviews (n=8; 40%). One study (Desclaux & Alfieri, 2009) was also based on other complementary

sources of data: observation, document analysis and patient interviews. With the exception of three studies (Cannon-Breland et al., 2013; Cochran et al., 2015; Elovainio et al., 2013), no measuring instrument was included in the articles.

Measurement of practices
Insofar as no interview guide was available in the case of interviews, the analysis of how 'educational practices' were grasped, turned out to be impossible. Studies based on questionnaires intended to assess the prevalence or a qualitative content of the practices. Prevalence was measured most frequently (92%, all except for Lemmens et al. (2009)). Prevalence consisted, for example, of the proportion of patients to whom educational practices related within a period. Appreciation of qualitative content was less common (n=4; 33%) (Cannon-Breland et al., 2013; Lemmens et al., 2009; Millstein & Marcell, 2003; van Dillen et al., 2005). Nevertheless, a wide range of measurements was observed in this case: from the type of information provided or the duration of a consultation to the degree of patient education implementation. Finally, a single study (Karlsen, 1997) explicitly encouraged the respondent to evoke a specific practice by giving concrete examples.

Measurement of perceptions
As in the case of the measurement of practices, the lack of access to interview guides made it impossible to analyse how perceptions were grasped. In the case of studies based on questionnaires, respondents were invited to express an agreement rate regarding diverse proposals. Except for three studies (Coleman, 2003; Levy & Raab, 1993; Millstein & Marcell, 2003) out of twelve which did not specify the origin of their questions, the studies used (or were partly inspired by) pre-existing validated questionnaire(s) or questionnaire(s) from published research.

Analysis methodology
Two types of analysis were conducted in accordance with their study methodology: qualitative ones (n=7) and quantitative ones (n=13). In the latter case, regression analysis was planned for all studies but two (Esposito & Fitzpatrick, 2011; Tse & So, 2008).

Studies' Findings

Studies' findings comprise a description of the practices studied, the perceptions in connection with these practices and the conclusion concerning the links between these practices and these perceptions.

Patient education practices studied
The authors highlighted both the dearth of (n=6) and the great variation in (n=7) educational practices. With respect to their dearth, both their scarcity (Cannon-Breland et al., 2013; Levy & Raab, 1993; Millstein & Marcell, 2003; Turnbull & Roberts, 2004) and their being limited to a prescriptive approach (Desclaux & Alfieri, 2009; Vigil-Ripoche, 2006) were emphasised. The variation in educational practices was highlighted both amongst different respondents (Ampt et al., 2009; Bondarianzadeh et al., 2011; Millstein & Marcell, 2003) and in the case of each respondent (Chwalow et al., 1994; Karlsen, 1997; van Dillen et al., 2005; Woivalin et al., 2004).

Only individual education (gathering together one HCP and one patient) was considered. Data with respect to how patient education is really performed (*i.e.* an analysis of the quality of the educational practice) were available in three studies (Chwalow et al., 1994; Karlsen, 1997; Vigil-Ripoche, 2006).

Perceptions linked with the practices surveyed
Four types of perceptions were found to be linked with educational practices: perceptions of oneself as a HCP (n=11), perceptions of the illness/health problem (n=10), perceptions about the patient (n=9) and perceptions of the context (n=6). Perceptions of oneself as a HCP involved in patient education concerned their own role (n=8) (Ampt et al., 2009; Bondarianzadeh et al., 2011; Cannon-Breland et al., 2013; Cochran et al., 2015; Coleman, 2003; Kleier, 2004; Lemmens et al., 2009; Turnbull & Roberts, 2004) and their skills/performance (n=7) (Ampt et al., 2009; Cannon-Breland et al., 2013; Cochran et al., 2015; Coleman, 2003; Karlsen, 1997; Levy & Raab, 1993; Millstein & Marcell, 2003).

Perceptions of the illness/health problem and its management mainly regarded the illness/health problem (n=6) (Ampt et al., 2009; Bondarianzadeh et al., 2011; Cannon-Breland et al., 2013; Millstein & Marcell, 2003; Turnbull & Roberts, 2004; Woivalin et al., 2004) and the health behaviour (n=4) (Esposito & Fitzpatrick, 2011; Levy & Raab, 1993; Loh et al., 2015; Turnbull & Roberts, 2004). They anecdotally referred to: the healthcare relationship (Esposito & Fitzpatrick, 2011); health objectives (Ampt et al., 2009); the required education task (Karlsen, 1997); the extent to which that body part has sexual associations (Turnbull & Roberts, 2004) and scientific knowledge (Bondarianzadeh et al., 2011). Perceptions about the patient regarded his/her expectations (n=5) (Ampt et al., 2009; Cochran et al., 2015; Kleier, 2004; Turnbull & Roberts, 2004; Woivalin et al., 2004); his/her cognitive aspects or learning needs (n=3) (Bondarianzadeh et al., 2011; Karlsen, 1997; Woivalin et al., 2004); his/her role (n=2) (Ampt et al., 2009; Bondarianzadeh et al., 2011); his/her compliance (Chwalow et al., 1994) and his/her economic status (Desclaux & Alfieri, 2009). Lastly, the less cited, perceptions of the context can be divided into three groups: the institutional policy (n=4) (Elovainio et al., 2013; Kleier, 2004; Lemmens et al., 2009; Levy & Raab, 1993), the external context (n=2) (Millstein & Marcell, 2003; Woivalin et al., 2004) and the patient's social network (Woivalin et al., 2004). A combination of more than two types of perceptions was observed in 47% (n=8 of 17) of the studies (Ampt et al., 2009; Bondarianzadeh et al., 2011; Cochran et al., 2015; Karlsen, 1997; Kleier, 2004; Millstein & Marcell, 2003; Turnbull & Roberts, 2004; Woivalin et al., 2004).

In contrast to their hypotheses, some authors pointed out no (significant) link between practices and the following perceptions: perceptions of the illness/health problem (Chwalow et al., 1994), perceptions of the expected results (Cochran et al., 2015), perceptions of the context (Cannon-Breland et al., 2013; Cochran et al., 2015; Elovainio et al., 2013) and perceptions about the patient (his/her specific age group) (Millstein & Marcell, 2003).

The nature of the practice-perception links

Seventeen studies (85%) concluded there was a direct link between some perceptions and patient education practices. Two other studies (10%) found no direct link. The remaining study (5%) (Vigil-Ripoche, 2006) analysed the process (with respect to perceptions) behind the difficulties in implementing patient education. Amongst the studies that indicated a direct link, the link was reported either as correlational (n=10) (Cannon-Breland et al., 2013; Chwalow et al., 1994; Cochran et al., 2015; Coleman, 2003; Elovainio et al., 2013; Esposito & Fitzpatrick, 2011; Kleier, 2004; Lemmens et al., 2009; Loh et al., 2015; Millstein & Marcell, 2003) or as 'causal' (n=7). In case of 'causal' links, they were either unidirectional (n=4) (Desclaux & Alfieri, 2009; Levy & Raab, 1993; Turnbull & Roberts, 2004; Woivalin et al., 2004) or, bidirectional (n=3) (Ampt et al., 2009; Bondarianzadeh et al., 2011; Karlsen, 1997). In case of unidirectional link, the link was always from perceptions to practices. In case of bidirectional links, the link regarding practices influencing perceptions was reported anecdotally. Two practice features were found to exert an influence over perceptions: their successful outcome (Ampt et al., 2009; Karlsen, 1997) and the experience of the illness amongst practitioners' patients (Bondarianzadeh et al., 2011). Finally, amongst the two studies that found no direct link, Tse and So (2008) found no link whereas van Dillen et al. (2005) found an association between practices, perceptions and another factor: 'communication styles'. The nature of the link reported appeared to have an association with the methodological approach. Most of the studies reporting a 'causal' link were qualitative studies whereas the quantitative studies reported a 'correlational' link owing to their cross-sectional design.

Perceptions were generally considered as a part of a greater collection of factors. Their usefulness as predictors of educational practices varies in comparison with other factors. Two studies (Coleman, 2003; Millstein & Marcell, 2003) highlighted practitioners' perceptions of their own role and skills as the best predictor. Conversely, three other studies highlighted the age of the physician (Chwalow et al., 1994), the intention of practice (Kleier, 2004) and 'communication styles' (van Dillen et al., 2005) as the best predictors. Amongst these, the two distal link hypotheses (Kleier, 2004; van Dillen et al., 2005) were actually supported by results. Consequently, though most of the studies concluded that there was a link between some perceptions and practices, an in-depth analysis shows there was no consensus on the predictive power of perceptions.

As the retained studies did not consider the quality dimension of practices systematically, a second-step was needed: a focus on studies analysing 'quality of practices'. These elements are actually relevant in assisting the implementation of patient education according to the WHO's definition.

Focus on studies analysing the quality of practices

To be included in this part, studies must not have been restricted to the unilateral delivery of information. They also needed to analyse the factors leading to the choice of one practice or another. Whereas Vigil-Ripoche (2006) attempted to understand what process makes an educational practice ineffective, and identified the lack of conceptualization of their practices, two studies (Chwalow et al., 1994; Karlsen, 1997) provided an analysis of the quality of educational practices. The following practices were observed: an education based on individual needs *versus* the transmission of standardised information (Karlsen, 1997) and a co-activity (*i.e.* viewing the patient as a partner, 'someone who makes independent decisions') *versus* a non-co-activity approach (*i.e.* authoritarian, fear arousal or leaving the responsibility to the patient) (Chwalow et al., 1994). Although, these authors did not provide details concerning the real practices (*i.e.* what the professional is doing while educating the patient). These studies had in common the principle that various practices co-existed within every professional. Practices were therefore not constant.

As regards perceptions-practices links, Karlsen (1997) pointed out the choice between the two teaching processes was determined by the perception of the patient's learning needs (collaborating for an exam or coping with a chronic illness) and by the perception of the professional's competencies. Professionals' confidence in their own competencies was retrospectively reinforced by successful practices. The existence of a perceived institutional policy in favour of patient education was identified as a facilitator to education. Chwalow et al. (1994) pointed out that perceptions were not the best predictor of co-activity; the (young) age of the HCP was the best predictor. The choice of co-activity was also associated with perceptions about the individual patient (more specifically, the perception of his/her compliance) and contextual factors. Consequently, we might question the extent to which co-activity does apply that 'the patient makes independent decisions' as co-activity is associated with the perception that the patient is compliant (*i.e.* that he/she obeys).

These studies indicated that some perceptions, amongst other factors were linked with practices. Perceptions about the patient and perceptions of the professionals' role and skills were key, whereas the context might facilitate quality practice implementation.

Discussion

This systematic review investigated the links between perceptions and patient education practices amongst HCP. Our selection strategy aimed to overcome the lack of a common term for 'perceptions'. Two equations needed to be considered as none of them allowed us to find all relevant articles and overlaps were rare. Consequently, it is necessary to combine different terms in order to define the concept of 'perception'.

The overall results of this review support the existence of links between some perceptions and practices. Links can either be correlational or 'causal'. 'Causality' is almost always 'unilateral', from perceptions to practices. Models (Festinger, 1957; Joulé & Beauvois, 1998) teach us that perceptions can be changed through practices. As a result, it is important to ask which educational practices influence HCP' perceptions and how, in turn, those changed perceptions are likely to alter practices by means of a succession of adjustments.

Perceptions are seldom considered in isolation. Other factors are considered in addition to them. Four types of perceptions have nevertheless been identified as linked to educational practices. They practically correspond to the categorisation of perceptions of Abric (1987): perceptions of oneself, of the task (here: the illness and its management), about the other (here: the patient) and of the context.

Both the nature of links and the perceptions involved appear dependent upon the kind of research undertaken. Qualitative studies tend to find a 'causal' link whilst quantitative studies find a correlational one. Qualitative studies identify a wide range of perceptions. They systematically highlight the 'influence' of perceptions about the patient and perceptions concerning illness/health problem whereas perceptions of the context are rarely reported. Conversely, quantitative studies refer to fewer perceptions. The most frequently observed perceptions were the practitioner's perceptions of himself/herself and his/her role, followed by perceptions of the context.

Regarding practices, studies mostly rely on self-reported measures. They exclusively consider individual patient education. The prevalence is the most commonly used measure, whereas very few studies analyse the quality of practices. Although the prevalence of patient education is indubitably an issue, prevalence is of no use in determining what perceptions are linked to quality in educational practices. Furthermore, the observation of Millstein and Marcell (2003) that prevalence models yield a greater number of predictors than the quality models do, suggests that we must be careful when applying trends observed in studies using prevalence measurement to those using quality measurement.

So, what do we learn from the two studies which analysed the quality of patient education practices? They highlight that: (1) various practices can be used by a sole professional; (2) perceptions are considered amongst other factors and they are not always the best predictor of practices; (3) regarding the links to practices, perceptions are found to be associated with or to influence. Perceptions about the individual patient and perceptions of the professional's role and skills are linked to the educational practice choice.

Limitations

These findings should be interpreted with caution: (1) The methodological quality of some studies raises questions; (2) Variables are generally poorly described. We were therefore unable to assess what was actually measured; (3) The practice-perception links are not always the focus of the retained studies; (4) Causality findings can be considered to be hasty as they are based upon cross-sectional designs.

Recommendations for Future Research and Practice

It would be premature to offer suggestions for practices on the basis of this literature review. However, as the findings support the existence of links between educational practices and perceptions, further analyses of these links are relevant since this might help to assist in improving the quality of patient education practices so that they meet the requirements of the WHO (1998).

Further research should (1) cover patient education's entire spectrum (individuals or groups of patients, teamwork or individual practice); (2) ensure a better articulation between qualitative and quantitative methods, opting for a mixed-method design; (3) benefit from well-operationalised variables; (4) explore real specific practice; (5) measure educational practices' quality; (6) elaborate designs allowed for a causality finding and (7) take into account a bidirectional perspective.

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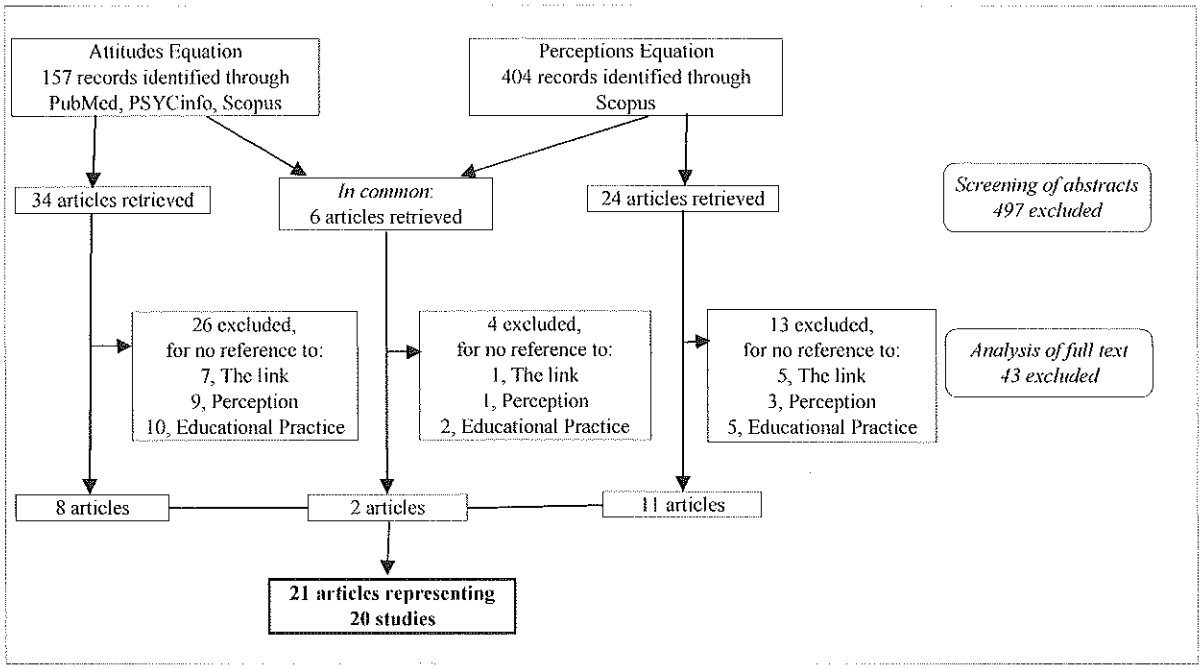

Figure 1. Flowchart of the review process

Table 1. Results of the Critical Appraisal of the Retained Studies, based on the QATSDD.

	Score (0-3[1])																				% of maximum possible score obtained for all papers
Criteria	Ampt, 2009	Bondarianzadeh, 2011	Cannon-Breland, 2013	Chwalow, 1994	Cochran, 2015	Coleman , 2003	Deschaux , 2009	Elovainio, 2013	Esposito, 2011	Karlsen, 1997	Kleier, 2004	Lemmens, 2009	Levy, 1993	Loh, 2015	Millstein, 2003	Tse, 2008	Turnbull, 2004	van Dillen, 2005	Vigil-Ripoche, 2006	Woivalin, 2004	
1. Explicit theoretical framework	3	0	3	0	0	3	0	1	3	1	3	3	0	0	0	0	0	2	3	0	42
2. Statement of aims/objectives in main body of report	3	3	3	2	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3	2	92
3. Clear description of research setting	3	2	2	2	3	3	3	2	2	2	2	2	1	2	2	1	2	2	3	2	72
4. Evidence of sample size considered in terms of analysis	3	0	2	2	1	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	22
5. Representative sample of target group of a reasonable size	2	1	2	3	2	2	2	2	1	2	2	2	2	1	3	1	1	2	2	2	62
6. Description of procedure for data collection	2	2	3	2	2	2	1	1	1	2	2	2	2	2	2	1	1	3	1	1	58
7. Rationale for choice of data collection tool(s)	0	0	0	2	2	0	0	0	0	0	2	0	0	0	0	0	2	2	0	0	17
8. Detailed recruitment data	2	2	3	3	3	1	1	0	0	2	3	2	1	2	3	2	0	3	0	1	57
9. Statistical assessment of reliability and validity of measurement tool(s) (Quantitative only)	x	x	1	1	2	2	x	2	2	x	2	2	1	1	2	2	x	3	x	x	59
10. Fit between stated research question and method of data collection (Quantitative only)	x	x	2	1	2	2	x	2	2	x	2	2	1	2	2	1	x	2	x	x	59
11. Fit between stated research question and format and content of data collection tool (Qualitative only)	0	0	x	x	x	x	0	x	x	2	x	x	x	x	x	x	0	x	0	1	14
12. Fit between research question and method of analysis	2	2	2	2	3	2	2	3	3	3	3	2	1	2	2	1	1	2	0	0	63
13. Good justification for analytic method selected	0	0	1	1	2	1	0	2	2	0	0	0	0	0	1	0	0	1	0	0	18
14. Assessment of reliability of analytic process (Qualitative only)	2	2	x	x	x	x	2	x	x	2	x	x	x	x	x	x	0	x	0	2	48
15. Evidence of user involvement in design	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	0	12
16. Strengths and limitations critically discussed	1	2	3	1	2	3	2	3	1	1	1	3	1	2	3	1	1	1	2	1	58
Total score	23	16	27	23	27	27	16	21	20	21	28	23	13	17	22	14	11	27	14	12	
% of highest possible score	55	38	64	55	64	64	38	50	48	50	67	55	31	40	52	33	26	64	33	29	

[1]**Ratings**: 0=no mention, 1=very slightly, 2=moderately, 3=complete.

Table 2. Descriptive Characteristics of Articles Reviewed.

Author-s (year)	Objective	Theoretical framework	Field	Population, response rate	Method	HCP' perceptions (P)	Educational practices	Analysis method	Findings-links between perceptions and educational practices
Ampt et al. (2009)	Factors affecting practices	Theory of planned behaviour	Prevention amongst 45–49-year-olds	16 HCP (15 general practitioners, 1 nurse); Australia	Qualitative exploratory; interviews	Not predefined	Patient motivation: education and counselling. Chosen priority for interventions and risk factors	Thematic analysis on the basis of the theoretical framework	Perceptions (of their role, their abilities, patient role and expectations, health objectives, health problems) amongst other factors influence practices. Practices also influence the perceptions (of the practice, as successful) Other factors: knowledge, norms and external control.
Bonfantinzadeh, Yeatman, and Condon-Paoloni (2011)	Perceptions and practices (No link analysis)	None	Listeria education during pregnancy	10 midwives, Australia	Qualitative exploratory; semi-structured interviews	Not predefined	Not predefined; listeria education	Inductive; emerging categories	Perceptions (of their responsibility, confidence in scientific knowledge, of patient's responsibility and level of knowledge, of the priority status of the health problem) amongst other factors influence practices and vice-versa. Focus on the influence of perception on practice
Cannon-Breland et al. (2013)	Factors affecting practices	Common sense Model and Theory of Planned Behaviour	Antidepressant medication counselling	118 pharmacists; USA; 20.6%	Cross-sectional; self-administered questionnaire	P. of depression, of their role and performance, of the context. Validated and newly developed measures; (scale)	Medication counselling: frequency (proportion of patients) and depth	Regression analyses	Other factors: health services factors, HCP' knowledge. Perceptions (of depression, of their role in the depression management, of own performance) are associated with practices. Perceptions of the context are not associated with practices; few counselling practices.
Chwalow, Costagliola, Meshah, and Fschwege (1994)	Factors associated with practices	None	Management of type 2 diabetes	2229 general practitioners; France; 70.4%	Telephone interview study	Not predefined	Approach to treatment. Co-active-shared responsibility vs not co-active (questions)	Univariate statistical and logistical regression analyses	Perceptions (about the patient) amongst other factors predict practices (co-activity); perception of self-monitoring is not associated with practices; approach choice is determined by the perception of individual patient Other factors: patients' age, physician's age, inclusion of the family, number of patients seen. Best predictor = Physician's age.
Cochran, Field and Lawson (2015)	Factors associated with practices	None	Prescription opioid abuse	739 pharmacists; USA; 19%	Cross-sectional; self-administered web-based questionnaire	P. of the pharmacists' role, about the patient, of the results of the task, of the pharmacy. Adaptation of pre-existing scale	(screening and) discussion about opioid abuse (yes or no).	Descriptive statistics and logistic regression	Perceptions (of the pharmacist's role, about the patient) amongst other factors are associated with practices. Other factors: motivation, chain setting, screening practice.
Coleman (2003)	Factors influencing practices	(adaptation of) Theory of reasoned action	Use of antibiotics	375 pharmacists; USA; 60%	Self-administered questionnaire	P. of attitudes, norms (i.e. role), perceived control (scale) and barriers perceived (open question)	Discussion with patients about antibiotics (% of time) and about antibiotic resistance (discussion frequency)	Regression analyses	Perceptions (of their role) amongst other factors are associated with practices. Other factor: organisational factors. Best predictor = the perception of their role.
Desclaux and Alfieri (2009)	Factors affecting practices	None	Infant-feeding amongst HIV-positive mothers	25 HCP; 229 mothers; Cambodia, Burkina Faso, Cameroon	Qualitative; ethnographic; document analysis, observation, interviews	Not predefined	Counselling regarding breast-feeding for HIV-positive women	Content analysis and comparison between countries	Perceptions (of the patient's economic status) amongst other factors affect practices (always prescriptive) Other factors: international recommendations and their national and institutional interpretations.
Elovainio et al. (2013)	Factors associated with practices	None	Type 2 diabetes management	467 HCP (414 general practitioners, 53 nurses), UK	Self-administered questionnaire	P. of organisational justice: 2 components: procedural and interactive; (scale)	Advice about weight; self-management and general education (performance within a year with the last 10 patients; scores)	Hierarchical linear regression analyses and Sobel test	Perceptions (of organisational justice, procedural component only) are associated with practices
Esposito and Fitzpatrick (2011)	Association between practices, perceptions and HCP's health behaviour	Pender's health promotion theory	Physical exercise	112 nurses; USA	Self-administered questionnaire	P. of the benefits of exercise (pre-existing scale)	Teaching regarding physical exercise for health promotion and as part of the treatment (scale)	Descriptive statistics. Correlation (Pearson)	Perceptions (of the health behaviour's benefits) amongst other factors are associated with practices. Other factors: their own exercise behaviour in private (associated both with perceptions and practice).
Karlsen (1997)	Factors affecting practices	None	Patient education for adults	14 registered nurses; Norway	Qualitative; semi-structured interviews.	Not predefined	Educational process (questions about their experience, with examples)	Thematic content analysis; grounded theory	Perceptions (of tasks—info vs learning…, about patients and their learning needs) amongst other factors affect practices; practices affect perceptions (confidence reinforcement). Co-existence of the 2 distinctive educational processes in every respondent Other factors: institutional policy.

Author-s (year)	Objective	Theoretical framework	Field	Population, response rate	Method	HCP' perceptions (P)	Educational practices	Analysis method	Findings-Links between perceptions and educational practices
Kleier (2004)	Association between perception, practice intention (mediator) and practices	(derived from) Theory of reasoned action	Cancer prevention: Testicular self-examination (TSE)	532 nurse practitioners; USA; 36%	Cross-sectional; explanatory; self-administered questionnaire	P. of oneself as a TSE teacher, of opinions of professional and male patients; pre-existing questionnaire; (scale)	Education regarding TSE (frequency of practice within the 60 previous days; scale)	Descriptive statistics, bivariate correlations and multiple regression analyses	Perceptions (of their role towards education, of opinions of professional and male patients and motivation to comply with these opinions) are associated with practices. Perceptions and practices are associated with practice intention Best predictor = intention of practice.
Lemmens, Strating, Huijsman, and Nieboer (2009)	Association between factors and practices changes. Professional factors (mediator)	(based on) Expectancy theory and theories of Crozin and of Lin	Delivering care to chronic obstructive pulmonary disease patients	52 HCP (33 physicians, 17 nurses, 2 physiotherapists); Netherlands; 87%	Exploratory, quasi experimental design (1-year follow-up); self-administered questionnaire	Professional commitment; organisational factors; (scale)	Self-management support amongst other components of care improvement (perceived implementation; scale)	Paired-sampled t-test and Wilcoxon test and regression analyses	Professional factors (professional commitment and cultural group and climate, two components of institutional context) are associated with practices (the educational component of care) improvement Professional commitment has no mediating effect. Best predictor = group culture.
Levy and Raab (1993)	Factors affecting practices	None	Dietary counselling	212 dental hygienists; USA; 72%	Self-administered questionnaire	P. of nutrition in dental health; of confidence in dietary counselling skills; (scale)	Dietary counselling (situation analysis, information, follow-up) (frequency, scale)	Descriptive statistics; correlation; (Chi-square and Anova)	Perceptions (of nutrition, of confidence in skills and of practice constraints) amongst other factors influence practices; few practices.
Loh et al. (2015)	'Reasons' for a practice	None	Breast cancer screening (BSE)	205 HCP (physicians, physician's assistants or nurses); USA; 50.7%	Cross-sectional; self-administered questionnaire adapted from a previous study	P. of the BSE and the guidelines; (scale) (previous study)	BSE teaching (a practice not recommended by current guidelines)	Descriptive statistics; logistic regression	Perceptions of BSE (as relevant for early detection and for empowering women) amongst other factors are associated with practices Other factors: gender, medicine residency.
Marcell, Halpern-Felsher, Cortell, and Millstein (2002); Millstein and Marcell (2003)	Association between practices and predictive factors	None	Alcohol abuse prevention in adolescents	1842 HCP (1008 paediatricians, 834 family doctors); USA; 63%	Self-administered questionnaire	P. of the adolescents, of HCP's own skills, of prevention as a priority; access to referral resources; (scale)	Screening and counselling. (Prevalence: % of patients concerned) (Quality: prevalence of kind of information given)	Multiple hierarchical regression analyses; attempt to build a predictive model	Perceptions (of their skills, the referral resources, the importance of prevention and early screening) amongst other factors are associated with practices. Few practices. Single predictor of quality: perceptions of their skills. No association with perceptions about adolescents. Other factors: speciality, gender, graduation year Discrepancy between perceptions and practices.
Tse and So (2008)	Factors affecting practices	None	Preoperative teaching for ambulatory surgery	91 nurses; China; 54%	Cross-sectional study; self-administered questionnaire	P. of the importance of preoperative information for patients; (scale); pre-existing questionnaire	Preoperative information delivery; information delivery methods (%)	Descriptive statistics; McNemar's test	
Turnbull and Roberts (2004)	Factors affecting practices	None	Teaching breast self-examination (BSE)	8 nurses; Australia	Qualitative; semi-structured interviews	Not predefined	Participation in BSE teaching (participation vs non-participation)	Inductive analysis; emerging categories	Perceptions (of their role in a health promotion context, of breasts linked to sexuality, of breast cancer as a low priority problem in a task-oriented biomedical model, of BSE linked to cancer, of the patient's expectations) affecting practices. Little participation.
van Dillen, Biddink, Keelen, and van Woerkum (2005)	Association between: factors and "communication styles"; Association between those styles and practices	New model created	Nutrition communication	267 family doctors; Netherlands; 45%	Quantitative cross sectional; self-administered questionnaire	P. of interest in nutrition, of nutrition communication to patients, of nutrition information about patients, of the office.	Nutrition communication behaviour in general and for overweight people in particular (Frequency, duration)	Descriptive Statistics; multiple linear regression analyses	No direct association between perceptions and practices. Association between practices and "communication styles", whereas the latter is associated with other elements such as perceptions Best predictor= communication style. The style is not constant and depends upon time, context and patients.
Vigil-Ripoche (2006)	Factors influencing and influenced by practices	Process of the experience (Le Boterf)	Patient education	18 nurses; France	Qualitative, 'quite' directive interviews	Not predefined	Patient education practices	Not specified	Practices did not go further than the prescriptive role and the biomedical model due to a lack of conceptualization, which made it impossible to reconsider practices.
Wolvalin, Krantz, Mäntyranta, and Ringsberg (2004)	Perceptions and practices	None	Management of medically unexplained symptoms	27 general practitioners; Sweden	Qualitative, focus group	Not predefined	Management of patients suffering from medically unexplained symptoms: 4 approaches used	'Phenomenographic' approach	Perceptions (of the illness, of the patient expecting biomedical treatment, of the patient's knowledge, of the patient's social network, of the media regarding medical information) amongst other factors influence practices. Practices are not constant and depend upon perceptions. Other factors: age of the HCP