

## Efficacy of therapeutic patient education in chronic diseases and obesity

Grégoire Lager, Zoltan Pataky, Alain Golay\*

Service of Therapeutic Education for Chronic Diseases, WHO Collaborating Centre, Department of Community Medicine, University Hospitals of Geneva, Switzerland

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### ABSTRACT

**Objective:** To evaluate the clinical, methodological and reporting aspects of systematic reviews and meta-analyses in order to determine the efficacy of therapeutic patient education (TPE).

**Methods:** A thorough search of the medical and nursing literature recorded in MedLine database from 1999 to August 2009 was conducted using the keywords: *patient education, efficacy, diabetes, asthma, COPD, hypertension, cardiology, obesity, rheumatology, and oncology.*

**Results:** Thirty five relevant meta-analyses were identified and initially selected for critical analyses (598 studies concerning approximately 61,000 patients). The detailed description of the educative intervention was present in 4% of articles whereas in 23% the interventions were briefly described. In the majority of studies, the educative interventions were only named (49%) or totally absent (24%).

The majority of studies reported improvement of patient outcomes due to the TPE (64%), 30% of studies reported no effect of TPE and 6% of the analysed reviews and meta-analyses reported worsening of measured outcomes.

**Conclusion:** Patient education could improve patient outcomes. The high benefit from TPE was shown by articles with detailed description of educational intervention as well as by those who report multidimensional and multidisciplinary educational intervention.

**Practice implications:** The impact of therapeutic patient education on health outcomes is 50–80%.

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### 1. Introduction

The majority of the medical demand today, representing 80% of the consultations, concerns chronic diseases. The answers that health care providers can propose consist in assisting patients in their choices and in accompanying them to improve bio-psychosocial aspects of health [1]. In this meaning, therapeutic patient education (TPE) helps the patient to learn and to develop numerous competencies, to adapt behaviors leading to an improvement of different health parameters, including bio-markers and quality of life [2]. TPE has been described for more than 30 years and numerous studies have demonstrated its efficiency based on very diverse outcome changes, in a health care systems often considered inefficient [3]. Reported adherence to drug treatments will vary by setting and drug and will not always be 50%. It may be attributed to a poor patient-physician relationship as well as a poor comprehension, by the patient, of the disease, the risks, and the effects of the treatment [4]. These issues can be addressed by TPE [5].

TPE is a recent domain of medicine but a very large and diverse range of educative interventions have been tested around the

world these last 30 years. Elasy et al. have proposed to organize the heterogeneity of the interventions, proposing a taxonomy that is often used in recent meta-analyses [6]. Nevertheless, some authors mark a separation between some “psychological interventions” such as cognitive and behavioral therapy, and “education” which would then only contain information providing sessions [7,8]. Including all strategies, such as psychological interventions, that are known to help patients to learn and change behaviors, under the term “education”, allows us to evaluate if learning in itself is linked to an improvement of the patient’s health. Thus, the “efficacy” of education can really be evaluated, as shown in the meta-analyses, with the use of various health indicators such as biomedical or psychological factors, compliance or hospital readmission, other social factors such as work disabilities.

The remaining question is: What are the actual results obtained by the implementation of patient education in clinical practice? What is the efficacy of TPE in different fields of medicine?

The aim of this review was to identify criteria for evaluating the efficacy of TPE and to analyse the reported efficacy of TPE as compared to classical biomedical approaches.

### 2. Methods

A thorough search of the medical and nursing literature recorded in MedLine database from 1999 to August 2009 was conducted. Using the Keywords: “patient education” more than

\* Corresponding author at: Service of Therapeutic Education for Chronic Diseases, WHO Collaborating Centre, University Hospitals of Geneva, Rue Gabrielle-Perret-Gentil 4, CH 1211 Geneva 14, Switzerland. Tel.: +41 22 372 97 26; fax: +41 22 372 97 15.

E-mail address: [alain.golay@hcuge.ch](mailto:alain.golay@hcuge.ch) (A. Golay).

**Table 1**  
Main chronic diseases and review articles analysed (Refs. [8–38]).

Disease	Type and number of analysed articles	Number of studies	Number of patients
Diabetes	4 meta-analyses, 3 reviews	60	12,000
Asthma	3 meta-analyses, 1 review	30	4000
COPD	3 meta-analyses, 2 reviews	80	5000
Hypertension	3 meta-analyses	100	8000
Cardiology	3 meta-analyses, 1 review	63	8000
Obesity	1 meta-analysis, 6 reviews	71	8000
Rheumatology	1 meta-analysis	17	4000
Oncology	4 meta-analyses	177	12,000
Total	22 meta-analyses 13 reviews	598	~61,000

**Table 2**  
Indexes of the quality of description of the educative interventions reflecting 360 studies.

Code	1	2	3	4
Code	No description of the educative interventions	The educative interventions are only named	Brief information on the type, length, frequency, setting, and substance of the educative interventions	Detailed description, allowing the reproduction of the educative interventions
Number of studies (%)	85 (24%)	177 (49%)	84 (23%)	14 (4%)

61,000 articles in MedLine were identified up to end of August 2009. We focused on most important diseases for which patient education is well recognized and broadly implemented. Next keywords used were: *patient education, efficacy, diabetes, asthma, COPD, hypertension, cardiology, obesity, rheumatology, and oncology*. We selected only meta-analyses and systematic reviews in English language. A particular focus has been made on meta-analyses and systematic reviews when the field of TPE remains poor (e.g. in obesity).

The meta-analyses and systematic reviews have been analysed according to their capacities in reflecting the substance of the education intervention realized by the authors of the original studies. The criteria for the quality of description were the following: type of educational intervention (EI) and pedagogical model used, the substance of the lessons and workshops, their setting (individual or group sessions), the length and the frequency of the EI and the profession of the teachers.

Indicators for the quality of description of EI have been defined as follow: 1 – absence of any description, 2 – simple qualitative name of the EI, 3 – brief information on type, length, frequency and content of the EI, and 4 – detailed description allowing the reproduction of the EI.

### 3. Results

A total of 35 meta-analysis and review articles have been initially selected according to keywords: (MeSH terms) in the field of the most prevalent chronic diseases; corresponding to 598 individual studies and encompassing approximately 61,000 patients (Table 1).

Sixty percent of them (360 individual studies) have been analysed in detail in order to evaluate both the description of the educative interventions (EI) and the efficacy of TPE.

#### 3.1. Description of the therapeutic patient education

The description of the EI as well as the classification of the quality of description of 360 studies (as related in meta-analyses and systematic reviews included in our analyses) is shown in Table 2.

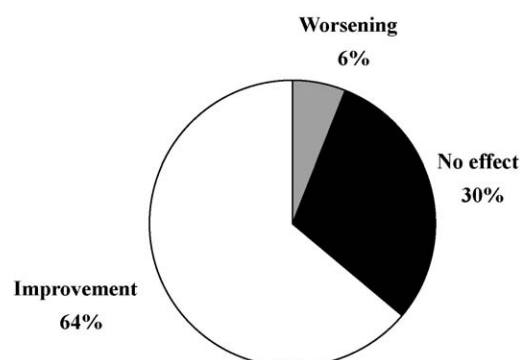
It is evident that the meta-analyses do not report the methodology of education applied in the studies (only 4% allow a reproduction of the educative intervention). Most frequently, a

simple naming of the lessons or workshops realized is indicated, e.g. «a group of 6 didactic sequences, one every week, has been conducted by a nurse, in the Hospital, about diabetes». These results show that only 27% of the programs reported in the meta-analyses give information (brief or detailed) about the pedagogical methodology of the EI.

#### 3.2. Efficacy of therapeutic patient education

Giving the poorly detailed EI, it is impossible to rely, for the majority of authors, the efficacy of EI (based mostly on biological or psycho-social criteria). However, it is evident that most of studies report significant improvement of different health parameters in different pathologies studied. The clear benefits were attributed to the implementation of TPE sessions. The result of our analysis made on 360 studies shows a significant positive effect in 64% of TPE on health as compared to control group (Fig. 1). Thirty percent of these studies show no effect or a non-significant one, and 6% report a worsening of health parameters in the education group. It should be noted that the efficacy criteria reported in publications are numerous and show a great variety (HbA1c, body weight, blood pressure, pain, disability, quality of life, hospital readmission, etc.).

**Effects of patient education on health outcomes**



**Fig. 1.** Proportion (%) showing worsening, absence of effect or improvement, respectively, due to patient education programs.

## 4. Discussion and conclusion

### 4.1. Discussion

On the basis of these results reflecting 360 studies, 27% of the data are put in relation with information on the pedagogical methodology used, with as little as 4% giving enough of data to reproduce the educative sessions. The authors of the meta-analyses and systematic reviews have not skipped this important information rather they complain about the lack of it in the original publications. However, it clearly appears that 64% of the studies show a significant positive effect of TPE.

When the TPE is complex and structured, with very precise indicators and a control group without TPE, education shows a great effectiveness in all considered chronic diseases. This can be explained by the cumulated effect of the patient education: work on the conceptions and beliefs of the patient who allows raising some barriers to the behavioral changes induced by cognitive-behavioral therapies. However, it should be mentioned that the control group was not systematically well defined in most of the meta-analyses.

Approaches based on cognitive-behavioral therapies are directly centered on the experimentation of new behaviors, (e.g. the daily use of drugs). The consequent improvement of the relation between patient and health care provider allows a more effective treatment of complications. The creation of a complex model of therapeutic education is often required by numerous authors of the meta-analyses we analysed and we propose a model in 5 dimensions [2]. An interdisciplinary, multidimensional TPE program showed that more than 50% of participants maintained their body weight at 5 years [39]. A combination between a in-hospital and ambulatory follow-up seems to show more satisfactory results in the long-term [40].

#### 4.1.1. Therapeutic patient education in obesity

In the field of obesity the current literature is surprisingly poor with regard to TPE. A recent meta-analysis of Sneath et al. analysed TPE in obese child and adolescent in studies published in the last 20 years [15]. The authors included in the meta-analysis only studies with control groups (total of 7 studies, 14 EI and 356 patients). In that publication, the authors did not describe the type of EI. This is found in the majority of publications and is an obstacle for the interpretation of the elements supporting learning and behavioral changes among patients. Moreover, it is almost impossible to reproduce the EI without a detailed description of the teaching program (number of meetings, duration of the intervention, place, profession of the teacher, teaching models, etc). Some authors recognize the difficulty of describing each intervention in a clear, correct, concise and coherent way [20,21], thus, a study might report that education was used, but provide insufficient information for readers to understand how the educational process was performed and how to replicate the process [41]. The single evaluated parameter is the weight loss and over a relatively short time of the follow-up (from 3 to 12 months). All reported studies showed statistically significant differences in terms of weight loss for the groups having received any EI, whereas control groups gained weight [15].

A review of literature focusing on behavioral interventions for the weight loss shows an interest to combine this type of psychotherapy with the lessons on both dietetics and physical activity. An average body weight loss of 10 kg (on an average initial weight of 94 kg), as well as the maintenance of the body weight over 6–12 month was highlighted in the 12 studies analysed by these authors [34].

#### 4.1.2. Efficacy underestimated

Amongst the different studies presented here, a closer look at the results shows that the benefits of education are often underestimated. Two main reasons for that are:

1. It is nearly impossible to avoid any information given to an eventual “control group”. The patients who have entered the medical system cannot be blind to any information, any learning process. In some meta-analyses, this bias is clearly mentioned “40% of the studies gave both the control an intervention groups an initial educational intervention that was not trivial”, and “because our main effect, net glycemc change, is the difference between the amount of improvement in the intervention group and that of the control group”. The true benefit of the intervention may be difficult to detect when the “control” is getting aid beyond “standard care” [20].
2. In a double-blind drug testing, the aim is to approach the ideal situation where only one parameter of the healing process is different between the intervention group and the control group. In patient education, the paradigm of the process is different, one can hardly separate the treatment (drugs, surgery, physical activity, diet) from the education. It is really the combination, the complex interaction of these dimensions which is efficient, “patient education is an integrated process”. It would not be correct to state that a benefit for the patient could come, in example, 40% from the education and 60% from the drugs. The patient learns, tries the medicine, experiments and receives new information from his body (the perceptive dimension of learning). The global result for his health, the change, is a resulting combination of the drug and of the educational process. Both are necessary and the effect of each cannot be partialled or numerically defined.

Another bias that can hardly be controlled in such studies evaluating the efficacy of patient education is the natural educative environment that cannot be controlled. A successful TV program or magazine published during the study, about the disease considered, can also interact with what the health care providers are teaching and perturb an ideally “isolated learning process”.

A current problem lies in the definition of educative interventions. For certain authors, education interventions were those where participants only received information [21]. In this idea, researches evaluating the effect of “psychological interventions” exclude the “education” and compare different psychological interventions to control groups, these latter being a melting pot that can contain “waiting list” as well as “education” [8]!

For us, a complex intervention aiming to the patient’s learning includes all known ways of proven, effective education processes, including providing information, psychological interventions such as Cognitive and Behavioral Therapies (CBT), a process known as behavioral education in education science, and many others such as bio-feedback [42,43].

It should be stated that a very low proportion of original studies qualify for a meta-analysis, for example they often require research including a control group, thus the vision proposed here cuts off the vast majority of creative educative interventions prone to enhance the global health of chronic patients.

#### 4.1.3. Study limitations

In this review, approximately 60% of all initially selected meta-analyses and systematic reviews have been analysed. The information from the remaining 40% of publications is missing. Articles other than meta-analyses and systematic reviews were not included in the review. It would be interested to critically review publications in non peer-reviewed medical and nursing journals. Therapeutic strategies, like patient education, are frequently

reported in such journals because of methodological difficulties linked to the evaluation of psycho-educational approaches in medicine and consequent non-acceptance of such of manuscripts in peer-reviewed journals.

Another study limitation is the selection of 8 principal chronic diseases we report. In fact, possible patient education based approaches are used also in other disease processes. Finally, publications written in non-English languages may probably contain huge information on therapeutic patient education.

#### 4.2. Conclusion

Based on our analyses, therapeutic patient education is efficient if understood as a complex and interdisciplinary use of interventions known to help patients to learn about their health. The future work to be done seems to be the organization of this recent field of medicine – therapeutic patient education with numerous authors asking for a new model, a theoretical framework and for an efficient patient education. Defining a new methodology of research adapted to this field also seems necessary.

#### 4.3. Practice implications

Therapeutic patient education is a useful approach for the management of the majority of chronic diseases that we analysed. Two-third of studies clearly show an improvement of health outcomes, including Quality of Life, induced by patient education. The positive impact of therapeutic patient education on these outcomes is between 50% and 80%.

#### Conflict of interest

None.

#### References

- Assal JP. Revisiting the approach to treatment of long-term illness: from the acute to the chronic state. A need for educational and managerial skills for long-term follow-up. *Patient Educ Couns* 1999;37:99–111.
- Lagger G, Giordan A, Chambouleyron M, Lasserre Moutet A, Golay A. Therapeutic education. Part 2. Practice implication of 5 dimensional model. *Médecine* 2008;4:269–73.
- Holman H, Lorig K. Patient self-management: a key to effectiveness and efficiency in care of chronic disease. *Public Health Rep* 2004;119:239–43.
- Gold DT, McClung B. Approaches to patient education: emphasizing the long-term value of compliance and persistence. *Am J Med* 2006;119:325–75.
- Roter DL, Hall JA, Merisca R, Nordstrom B, Cretin D, Svarstad B. Effectiveness of interventions to improve patient compliance: a meta-analysis. *Med Care* 1998;36:1138–61.
- Elsay TA, Ellis SE, Brown A, Pichert JW. A taxonomy for diabetes educational interventions. *Patient Educ Couns* 2001;43:121–7.
- Osborn RL, Demoncada AC, Feuerstein M. Psychosocial interventions for depression, anxiety, and quality of life in cancer survivors: meta-analyses. *Int J Psychiat Med* 2006;36:13–34.
- Winkley K, Landau S, Eisler I, Ismail K. Psychological interventions to improve glycaemic control in patients with type 1 diabetes: systematic review and meta-analysis of randomised controlled trials. *BMJ Online First* [doi:10.1136/bmj.38874.652569.55](https://doi.org/10.1136/bmj.38874.652569.55) (published 27 June 2006:1–5).
- Warsi A, Wang PS, LaValley MP, Avorn J, Solomon DH. Self-management education programs in chronic disease: a systematic review and methodological critique of the literature. *Arch Intern Med* 2004;164:1641–9.
- Guevara JP, Wolf FM, Grum CM, Clark NM. Effects of educational interventions for self-management of asthma in children and adolescents: systematic review and meta-analysis. *Brit Med J* 2003;326:1308–9.
- Devine EC. Meta-analysis of the effects of psychoeducational care in adults with asthma. *Res Nurs Health* 1996;19:367–76.
- Devine EC. Meta-analysis of the effect of psychoeducational interventions on pain in adults with cancer. *Oncol Nurs Forum* 2003;30:75–89.
- Devine EC, Pearcy J. Meta-analysis of the effects of psychoeducational care in adults with chronic obstructive pulmonary disease. *Patient Educ Couns* 1996;29:167–78.
- Turnock AC, Walters EH, Walters JA, Wood-Baker R. Action plans for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev* 2005;19. CD005074.
- Snethen JA, Broome ME, Cashin SE. Effective weight loss for overweight children: a meta-analysis of intervention studies. *J Pediatr Nurs* 2006;21:45–56.
- Norris SL, Lau J, Smith SJ, Schmid CH, Engelgau MM. Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. *Diabetes Care* 2002;25:1159–71.
- Valk GD, Kriegsman DM, Assendelft WJ. Patient education for preventing diabetic foot ulceration. *Cochrane Database Syst Rev* (Online) 2005. CD001488.
- Vermeire E, Wens J, Van Royen P, Biot Y, Hearnshaw H, Lindenmeyer A. Interventions for improving adherence to treatment recommendations in people with type 2 Diabetes mellitus. *Cochrane Database Syst Rev* (Online) 2005. CD003638.
- Deakin T, McShane CE, Cade JE, Williams RDRR. Group based training for self-management strategies in people with type 2 Diabetes mellitus. *The Cochrane Library* 2007;2:1–72.
- Ellis SE, Speroff T, Dittus RS, Brown A, Pichert JW, Elsay TA. Diabetes patient education: a meta-analysis and meta-regression. *Patient Educ Couns* 2004;52:97–105.
- Steed L, Cooke D, Newman S. A systematic review of psychosocial outcomes following education, self-management and psychological interventions in diabetes mellitus. *Patient Educ Couns* 2003;51:5–15.
- Gary TL, Genkinger JM, Guallar E, Peyrot M, Brancati FL. Meta-analysis of randomized educational and behavioral interventions in type 2 diabetes. *Diabetes Educator* 2003;29:488–501.
- Jadad AR, Moher M, Browman GP, Booker L, Sigouin C, Fuentes M, Stevens R. Systematic reviews and meta-analyses on treatment of asthma: critical evaluation. *Brit Med J* 2003;20:537–40.
- Halpin DMG, Miravittles M. Chronic obstructive pulmonary disease. The disease and its burden to society. *Proc Am Thor Soc* 2006;3:619–23.
- Lacasse Y, Guyatt GH, Goldstein RS. The components of a respiratory rehabilitation program. *CHEST* 1997;111:1077–88.
- Yu DS, Thompson DR, Lee DT. Disease management programmes for older people with heart failure: crucial characteristics which improve post-discharge outcomes. *Eur Heart J* 2006;27:596–612.
- Clark AM, Hartling L, Vandermeer B, McAlister FA. Meta-analysis, secondary prevention programs for patients with coronary artery disease. *Ann Intern Med* 2005;143:659–72.
- Dracup K, Baker DW, Dunbar SB, Dacey RA, Brooks NH, Johnson JC, Oken C, Massie BM. Management of heart failure. II. Counseling, education, and lifestyle modifications. *J Amer Med Assoc* 1994;272:1442–6.
- Gwadry-Sridhar FH, Flintoft V, Lee DS, Lee H, Guyatt GH. A systematic review and meta-analysis of studies comparing readmission rates and mortality rates in patients with heart failure. *Arch Intern Med* 2004;164:2315–20.
- Boulware LE, Daumit GL, Frick KD, Minkovitz CS, Lawrence RS, Powe NR. An evidence-based review of patient-centered behavioral interventions for hypertension. *Am J Prev Med* 2001;21:221–32.
- Devine EC, Reifschneider E. A meta-analysis of the effects of psychoeducational care in adults with hypertension. *Nurs Res* 1995;44:237–45.
- Ebrahim S, Smith GD. Lowering blood pressure: a systematic review of sustained effects of non-pharmacological interventions. *J Public Health Med* 1998;20:441–8.
- Fahey T, Schroeder K, Ebrahim S. Educational and organisational interventions used to improve the management of hypertension in primary care: a systematic review. *Brit J Gen Pract* 2005;55:875–82.
- Lang A, Froelicher ES. Management of overweight and obesity in adults: behavioral intervention for long-term weight loss and maintenance. *Eur J Cardiovasc Nurs* 2006;5:102–14.
- Keller C, Records K, Ainsworth B, Permana P, Coonrod DV. Interventions for weight management in postpartum women. *J Obstet Gynecol Neonatal Nurs* 2008;37:71–9.
- Walker LO. Managing excessive weight gain during pregnancy and the postpartum period. *J Obstet Gynecol Neonatal Nurs* 2007;36:490–500.
- Cole K, Waldrop J, D'Auria J, Garner H. An integrative research review: effective school-based childhood overweight interventions. *J Spec Pediatr Nurs* 2006;11:166–77.
- Birdsall KM, Vyas S, Khazaezadeh N, Oteng-Ntim E. Maternal obesity: a review of interventions. *Int J Clin Pract* 2009;63:494–507.
- Golay A, Buclin S, Ybarra J, Toti F, Pichard C, Picco N, de Tonnac N, Allaz AF. New interdisciplinary cognitive-behavioral-nutritional approach to obesity treatment: a 5-year follow-up study. *Eat Weight Disord* 2004;9:29–34.
- Buclin-Thiébaud S, Pataky Z, Bruchez V, Golay A. New psycho-pedagogic approach to obesity treatment: a 5-year follow-up. *Patient Educ Couns* 2010;79:333–7.
- Weingarten SR, Henning JM, Badamgarav E, Knight K, Hasselblad V, Gano Jr A, Ofman JJ. Interventions used in disease management programmes for patients with chronic illness—which ones work? *Brit Med J* 2002;325:1–8.
- Pataky Z, De León Rodríguez D, Golay A, Assal M, Assal JP, Hauert CA. Bio-feedback training for partial weight bearing in patients after total hip arthroplasty. *Arch Phys Med Rehab* 2009;90:1435–8.
- Pataky Z, De León D, Golay A, Allet L, Assal M, Assal JP, Hauert CA. Bio-feedback for foot off-loading in diabetic patients with peripheral neuropathy. *Diabetic Med* 2010;27:61–4.