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Do no harm: Balancing the costs and benefits of patient outcomes in health psychology research and practice

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Abstract

This article analyses research exploring medication adherence, help-seeking behaviour, screening and behaviour change to argue that all interventions have the potential for both benefit and harm. Accordingly, health psychology may have inadvertently contributed to psychological harms (e.g. lead times, anxiety, risk compensation and rebound effects); medical harms (e.g. medication side effects, unnecessary procedures) and social harms (e.g. financial costs, increased consultations rates). Such harms may result from medicalisation or pharmaceuticalisation. Or, they may reflect the ways in which we manage probabilities and an optimistic bias that emphasises benefit over cost.

Keywords

adherence, behaviour change, harm, help seeking, iatrogenesis, screening

The Hippocratic Oath to 'do no harm' has underpinned medicine since its origins; yet, much has been written about medical iatrogenesis and the damage that medicine can do in its attempts to prevent, manage and cure disease (Bonell et al., 2015; Illich, 1974). In the 1970s, health psychology positioned itself alongside medicine with its goal to describe, predict and influence the many psychological issues involved in the progression from health to illness (Ogden, 1997). But in its dealings with medicine, has health psychology also shown a version of iatrogenesis? Some research in health psychology emphasises prevention with a focus on behaviour change and the promotion of healthier behaviours such as exercise, healthy eating and smoking cessation. Some highlights the patient experience in terms of symptom perception, quality of life, pain and the management of stress, while other research focuses health outcomes in terms of disease progression and life expectancy. This article will explore the possible harms incurred by health psychology with a focus on medication adherence, help-seeking behaviour, screening and behaviour change, as these reflect the times at which, in its attempt to promote health and reduce illness, health psychology research and practice are most closely aligned to medicine through encouraging and promoting access to healthcare.

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Medication adherence

Medication adherence has been defined as the extent to which a patient's behaviour matches agreed recommendations from their health professional (National Institute for Health and Clinical Excellence (NICE), 2009) and is considered essential for symptom management and patient recovery. For example, DiMatteo et al. (2002) reviewed 63 studies of adherence to a wide range of recommendations and concluded that the odds of effective treatment were three times higher in those that showed good adherence, and Simpson et al. (2006) reported that the odds of dying were halved if people took their medication. Yet, studies indicate that adherence rates are often poor, and in 2003, the World Health Organization (WHO) (2003) estimated that about a third of all prescribed drugs are not taken as directed. This also has cost implications which have been estimated at approximately £4 billion per year in the United Kingdom (NICE, 2009). As a result, research within health psychology has explored the reasons behind non-adherence drawing upon theories such as Ley's (1988) model of compliance and Horne's (2001) perceptions and practicalities approach. For example, Ley (1989) explored the role of factors such of anxiety, knowledge and primacy effects on the recall of medication instructions; and Horne and colleagues explored the role of beliefs about the necessity and concerns of adherence to medication across a number of conditions including asthma (Horne and Weinman, 2002), diabetes, cancer and coronary heart disease (CHD) (Horne and Weinman, 1999) and HIV/AIDS (Horne et al., 2007). In addition, research has also explored different approaches to improving adherence including the use of knowledge-based leaflets, planning and implementation intentions, interventions to change beliefs and the use of text prompts (see Kripalani et al., 2007; Schroader et al., 2008 for reviews). Health psychology has therefore engaged in research to both understand the predictors of medication adherence and to increase medication uptake. Although aiming to promote symptom management and patient health, could this emphasis on medication adherence be doing harm?

There are several possible detrimental consequences from promoting adherence to medication. Primarily, all drugs come with a financial cost and are either a drain on the individual's own budget or that of the available healthcare system. For example, an analysis in 2015 in the United States concluded that more than half a million Americans have annual prescription drug costs of more than US$50,000 (Express Scripts, 2015), and recent estimates for the National Health Service (NHS) in the United Kingdom indicate that the annual drug budget is £13.3 billion (NHS Annual Report, 2015). Second, all drugs have side effects and can cause symptoms as diverse as tiredness, headaches, skin rashes and stomach upsets to cancer and death. For example, the potential side effects of statins (used to lower cholesterol and prevent strokes and heart attacks) are muscle pain, impotence and diabetes; one possible side effect of tamoxifen which is used for breast cancer treatment is uterine cancer, and hormone replacement therapy (HRT) to help with menopausal symptoms may protect against osteoporosis but can trigger a stroke or breast cancer. Although this information is made readily available through the patient information leaflet which comes with all drugs and can also be found in the British National Formulary (BNF) (2015), it is, however, often reliant upon patients reporting their symptom experiences to their general practitioner (GP) or directly to the drug companies to be collated in a meaningful way. Encouraging patients to adhere to their medication therefore has financial implications and may result in unpleasant and damaging side effects. More importantly, however, encouraging adherence is based upon an assumption of effectiveness of the medication being adhered to and this is not always supported by the evidence.

Effectiveness is based upon evidence from research trials which most often produce an outcome in terms of effect sizes, confidence intervals and significance testing. These outcome

statistics are familiar to those working in health psychology as they reflect findings reported within our discipline for more psychological outcomes. It therefore seems appropriate to encourage adherence to a drug that is significantly more effective than treatment as usual and has a reasonable effect size. But such data are misleading as it does not illustrate how many people do or do not benefit from the drug in question. Data, however, are also available regarding the number needed to treat (NNT) which indicates how people need to take any given drug to prevent one event (i.e. a stroke, a cancer recurrence and a headache). For example, an NNT of 1 indicates that all patients benefit, whereas an NNT of 2 indicates that only half of the patients benefit. These data are available from Bandolier (n.d.) (http://www.medicine.ox.ac.uk/bandolier) or the NNT (n.d.) (thennt.com) indicating, for example, that the NNT for antibiotics for acute earache is 7, that a flu vaccination to prevent flu has an NNT of 23 and that statins to prevent a primary stroke by 1 year have an NNT of between 641 and 850 (depending on the trial). Using these databases, it would seem that the vast majority of drugs have NNTs much greater than 1 indicating that many people take them without any clinical benefit. Furthermore, data are also available concerning the disbenefits of medicine calculated as the number needed to harm (NNH; thennt.com). For example, evidence on statins for secondary prevention indicates an NNH of 100 for the development of diabetes and 10 for muscle damage, indicating that for every 100 people who take statins after a stroke to prevent a further stroke, 1 develops diabetes; and for every 10, 1 develops muscle damage. Even for those drugs that are regarded as among our most effective medicines such as anti-retrovirals for HIV (NNT: 5 for deaths prevented in 1 year) or statins after a stroke or heart attack (NNT: 83 for deaths prevented by 5 years or 415 in any 1 year), the effectiveness is far below an NNT of 1 indicating that many people take even these 'effective' drugs with no benefits and the potential for disbenefits and harm (Palella et al., 1998; Writing Committee for the CASCADE Collaboration, 2011; thennt.com). Reviews of cancer drug trials illustrate similarly poor levels of effectiveness. For example, Apolone et al. (2005) explored the effectiveness of those cancer drugs approved by the European Medicines Agency (EMA) in its first 10 years and found that they only improved survival by a mean of 1.5 months and a median of 1.2 months. Likewise, a more recent review of 71 new drugs approved by the Food and Drug Administration (FDA) between 2002 and 2014 for solid tumours indicated that the mean-added progression free time was 2.5 months and the mean-added survival time was 2.1 months (Fojo et al., 2014). In line with this, Light and Lexchin (2015) questioned 'Why do cancer drugs get such an easy ride' and suggested that a combination of fear of cancer, desperate patients, the vested interests of drug companies and the overenthusiasm of officials within the FDA result in drugs being released which offer little benefit and may harm patients with their side effects. They also argued that many cancer drugs are licensed without rigorous testing citing evidence that cancer trials are 2.8 times less likely to be randomised, 2.6 times less likely to have a comparator arm and 1.8 times less likely to be blinded (Hirsch et al., 2013). Health psychology research encourages adherence to medication. Yet, this medication, for whatever condition, may not only have financial costs and cause side effects but may also be ineffective. Doctors promise to do no harm. But by encouraging successful adherence to medication, and while emphasising the benefits of medication, rather than the possible costs, psychology researchers may be assisting in a process of harm by not considering the consequences of any success they achieve.

Help-seeking behaviour

Medical research frequently concludes that treatment would be more effective if disease could be detected at an earlier stage, and late presentation is often cited as the explanation for failed interventions. To support this, health psychology research has focused on help-seeking behaviour with an emphasis on early symptom

detection through self-management strategies such as breast self-examination, testicular self-examination and general vigilance towards symptoms. In particular, research has addressed issues such as symptom perception (Gijsbers van Wijk and Kolk, 1997; Pennebaker, 1983; Rief and Broadbent, 2007), illness cognitions (e.g. Leventhal et al., 1997) and the costs and benefits of going to the doctor (Scott et al., 2009) and has drawn upon a number theoretical perspectives including social cognition models (Conner and Norman, 2015) and the self-regulatory model (Leventhal et al., 1997). Furthermore, research has also explored the predictors of delayed help seeking for conditions such as cancer and myocardial infarction (MI), and some studies have evaluated the effectiveness of interventions to encourage participants to seek help earlier for any symptoms they detect (Scott et al., 2009). This is reflected in health promotion campaigns which have been funded by both charities and government designed to encourage patients to seek help for symptoms which may be indicative of disease such as chest pain or breathlessness (for a heart attack), coughing (for lung cancer), blood in urine or faeces (for kidney, bowel or colon cancer) and bloatedness (for ovarian cancer) (e.g. Public Health England, 2014). The benefits from such early help seeking are cited as improvements in life expectancy for a number of diseases including breast, bowel and ovarian cancers and reduced mortality following heart attacks. Accordingly, medicine argues that it can treat disease more effectively if patients would present earlier, and health psychology has identified ways to encourage this behaviour. For acute problems such as stroke and MI, evidence indicates that this may indeed be the case (Moser et al., 2006). But in line with research exploring medication adherence, a focus on symptom perception and help-seeking behaviour may also come with a cost.

Primarily, there is the problem of lead times (Biswas et al., 2015). Many trials of disease treatment indicate that patients live longer if they present earlier. But as the health outcome of any disease intervention is measured from time of diagnosis until death, if a patient seeks help earlier, they 'live longer' but only compared to the time of diagnosis, not in absolute terms. Early help seeking may therefore not only make people 'live longer', it may also make them 'be ill for longer', rather than extending life in any meaningful way (Biswas et al., 2015). Second, there are also potential consequences of symptom vigilance. Research indicates that symptoms are a perception, rather than a sensation influenced by a range of psychological factors including mood, focus and distraction and that people vary in the extent to which they monitor and process their bodily symptoms (Henningsen et al., 2003; Ogden and Zoukas, 2009; Pennebaker, 1983). Studies also show that this degree of self-awareness can result in health anxiety and even hypochondriasis which in turn is linked to behaviour (e.g. Barsky and Klerman, 1983; Salkovskis and Warwick, 1986). Encouraging symptom vigilance may therefore not only encourage help seeking but also generate hypervigilance and health anxiety. Finally, early help seeking may also increase consultation rates as illustrated by Barsky et al. (2001), who identified a significant correlation between health anxiety and consulting behaviour in a large sample of patients across the United States. Similarly, a report using QResearch compared consultation rates in England between 1996 and 1997 and 2008 and 2009 for men and women for all clinicians and showed an overall increase from 224.5 million to 303.9 million consultations and from a mean of 3.9 consultations per person per year to a mean of 5.5 (Hippisley-Cox and Vivogradova, 2009). In addition, while the elderly showed higher consultation rates overall and a marked increase over the study period, there was also a distinct increase in consultation rates for those aged between 30 and 50 years old, particularly for men. It could be argued that this reflects greater accuracy of symptom perception and that younger men are becoming aware of their real health problems. Alternatively, it may illustrate, however, that encouraging symptom vigilance can generate health anxiety, particularly in younger men,

thereby increasing inappropriate consulting behaviour. Furthermore, increased consultation rates in turn have implications both for the accuracy of clinical judgements and doctor's workload. In terms of accuracy, as with all decision-making processes, clinical judgement is influenced by a number of psychological factors, including beliefs about risk and probability and a balance between the likelihood of false positives versus false negatives (e.g. Kahneman et al., 1982; Newell and Simon, 1972; McWhinney, 1995). As expert decision makers, clinicians also draw upon a number of effort reducing heuristics in order to decide upon their management strategy (Kahneman et al., 1982; Shah and Oppenheimer, 2008; Tversky and Kahneman, 1973). Therefore, following a meningitis diagnosis, subsequent similar symptoms are more likely to be diagnosed as meningitis due to the increased perceived salience of this rare condition and the use of an availability heuristic (Kahneman et al., 1982; Tversky and Kahneman, 1973). In contrast, the more consultations consisting of health anxious patients rather than 'real' symptoms, the more a doctor's perception of risk will be reduced as their availability heuristic informs them that symptoms are most likely to be benign. Increased consultation rates and a higher ratio of worried well versus ill patients may therefore increase the chances of false negatives compared to false positives and real illness will be missed. In terms of workload, much has been written recently about the crisis in the healthcare system in terms of the inability to recruit and retain general practitioners due to burnout and the lack of available resources to prevent, treat and cure disease across both primary and secondary care (BMA, 2015). This can only be exacerbated by encouraging an increasing number of patients into the system. In sum, promoting early help seeking and vigilance towards symptoms is emphasised as a means to detect illness at an earlier stage. But not only does this raise the issue of lead times it may also create problems of health anxiety and higher consultations rates which could change clinical judgements and pressurise the health service with patients who are not in any medical need of its healthcare services.

Screening

Whereas early help seeking emphasises a time after symptoms have been perceived, screening refers to interventions designed to detect illness at an asymptomatic stage of development. This can take the form of opportunistic screening when a patient is already in contact with the healthcare system, or population screening programmes which involve inviting people into a clinic or sending kits to people's homes for them to collect samples of bodily products. Cervical screening, breast screening and bowel screening are current examples of the latter approach and aim to detect illness at an early stage to maximise treatment effectiveness. Over the past few decades, health psychology research has explored the predictors of screening uptake as a means to encourage patient participation and therefore improve patient health outcomes. For example, Bish et al. (2000) and Norman and Conner (1993) explored the predictors of the uptake of a cervical smear test and health checks, respectively, while Luszczynska and Schwarzer (2003) and Luszczynska et al. (2010) explored ways to improve the uptake of cervical screening and breast self-examination. Health psychology has therefore provided an evidence base for improving screening uptake but does this also come with a cost?

There are several possible harms associated with screening research which have been addressed through psychological research. For example, researchers have explored the impact of screening on anxiety and worry in terms of receiving a screening invitation (e.g. Cockburn et al., 1994); the impact of either a positive or negative result (e.g. Marteau et al., 2004); or an inadequate result (e.g. French et al., 2006); and the impact of being involved in a screening programme (Collins et al., 2011). The essential premise behind research to improve screening uptake, however, is the assumption that screening is effective, and several studies indicate that this is not always the case. For example, Lee

et al. (2013) carried out a meta-analysis of colorectal and breast cancer screening programmes across the United States, United Kingdom, Sweden and Denmark and concluded that such programmes only have a modest impact on survival. For example, for colorectal screening by 5 years, 10,000 people need to be screened to prevent 2.8 deaths; and by 15 years, 10,000 people need to be screened to prevent 23 deaths. This indicates that it takes a mean of 4.8 years to prevent one death from colorectal cancer for 5000 people screened and 10.3 years to prevent one death for 1000 people screened. Likewise, for breast cancer, their analysis indicated that by 5 years, 5.1 deaths from breast cancer were prevented for every 10,000 people screened; and by 15 years, 19 deaths from breast cancer were prevented for every 10,000 people screened. It therefore takes a mean of 3 years to prevent one breast cancer death for 5000 women screened and 10.7 years to prevent one death for 1000 women screened. Furthermore, the authors concluded that about 1 in 10 patients would receive a false positive result and that many more would have unnecessary treatment. Similarly, Croswell et al. (2009) explored the false positive rates associated with repeated multi-modal cancer screening tests for prostate, lung, colorectal and ovarian cancers. Participants ($n = 68,436$) received serial tests over a 3-year period including transvaginal sonograms, flexible sigmoidoscopies, digital rectal examinations and chest radiographs. The authors concluded that after 14 repeated tests, the risk of a false positive test was about 50 per cent (60.4% for men and 48.8% for women). In addition, the data indicated that after 14 tests, the cumulative risk of having an invasive diagnostic procedure prompted by the false positive test was 28.5 per cent for men and 22.1 per cent for women. Furthermore, recent studies have cast doubts upon the effectiveness of screening for abdominal aortic aneurysms (Johansson et al., 2016) and cancer screening in general (Prasad et al., 2016). Accordingly, health psychology research explores the means to encourage screening uptake. Yet, not only screening may result in psychological costs such as anxiety and worry, it may also not save lives and can result in false positive test results and promote unnecessary and invasive treatment.

It would therefore seem that research exploring medication adherence, help-seeking behaviour and screening may cause potential harm to the individuals it is trying to help. The final area to be discussed is behaviour change research, which may similarly have detrimental consequences for the individuals concerned.

Behaviour change

Over the past century, it has become increasingly clear that the greatest risks to health in the developed world are unhealthy behaviours such as smoking, poor diet, lack of exercise and unsafe sex which result in diseases including obesity, diabetes, cancer and HIV/AIDS (Mokdad et al., 2004). Health psychology has therefore developed theories and models to describe the predictors of behaviour which in turn have been used to frame behaviour change interventions (see Conner and Norman, 2015 for a review). It would seem that encouraging and even succeeding in promoting healthier behaviours could only have benefits. But could this endeavour also cause harm?

There are three potential detrimental consequences to promoting behaviour change. Primarily, there is the problem of risk compensation with research indicating that individuals who manage to improve one health behaviour may end up compensating by behaving more unhealthily in another domain (Rabiau et al., 2006; Radtke et al., 2010). For example, a person who is on a diet may smoke more, while someone who has just exercised may compensate by overeating. This in turn may be harmful to their health. Second, there is the problem of rebound effects. Much research suggests that the intention to change a behaviour predicts actual change (see Conner and Norman, 2015). Research in the area of eating behaviour, however, often shows the opposite; intending to eat less may result in overeating. This has been called ‘the what the hell effect’, ‘disinhibition’ or ‘counterregulation’ and has been shown

across a wide range of laboratory and naturalistic settings and may be triggered by factors such as dieting, smoking cessation, lowered mood and alcohol (Boon et al., 2002; Polivy and Herman, 1999; Soetens et al., 2006). It also finds reflection in 'rebound effects' which are a core component of research into addiction, parenting and psychotherapy (e.g. Marlatt and Gordon, 1985; Ogden, 2014). In the main, this research indicates that intending to perform any behaviour less (such as eating, drinking or smoking) may encourage excessive behaviour which has been explained using a number of different explanatory models including attachment, the abstinence violation effect or the ironic processes of mental control (e.g. Marlatt and Gordon, 1985; Wenzlaff and Wegner, 2000). Encouraging behaviour change may therefore trigger either risk compensation (if the behaviour is changed) or rebound effect (when it is not). Finally, interventions to change behaviour are prefaced on the assumption that they will be successful. Unfortunately, however, this is often not the case and clearly depends upon the definition of success used. For example, although reviews of smoking cessation interventions including brief advice, counselling, individual or group behaviour change or complex interventions indicate that such approaches are more effective than no intervention and can produce some change for some people, the majority of people show no change in their behaviour with systematic reviews showing continuous abstinence rates of between 7 and 40 per cent (e.g. Lemmens et al., 2008; Martín Cantera et al., 2015). Likewise, interventions to promote physical activity may produce significant effects at times, but again the majority of participants show no change in their behaviour (e.g. Muntaner et al., 2015) and any change may only be temporary lasting less than 24 months (Hobbs et al., 2013). Furthermore, a recent systematic review of behaviour change interventions for obese adults reported a mean weight loss of 2.59 kg by 12 months which is very small given that needed for health gains (NICE, 2014), with data from the United States also showing that about 80 per cent of people who lose at least 10 per cent of their body weight, show weight regain by 1 year (Kraschnewski et al., 2010; Wing and Phelan, 2005). Encouraging behaviour change may therefore also do harm by subjecting the majority of people to interventions which are ineffective for them. In the case of smoking behaviour when the benefits of smoking cessation clearly outweigh any costs, even if the intervention fails, such potential harm may be worth the risk. But this may not be the case for weight management when such failure can generate feelings of guilt, stigma, shame and low self-esteem which in turn may trigger subsequent overeating, thereby exacerbating the initial weight problem (e.g. Ogden, 1995b; Ogden, 2000; Ogden and Clementi, 2010; Puhl and Heuer, 2010).

Doing harm

Medicine therefore offers interventions in the form of medication and surgery and indicates a role for behaviour in patient health. In response, health psychology research has addressed ways in which patients can be encouraged to adhere to their medication, become more symptom aware and seek help earlier, attend for screening and change their behaviour. In doing so, the aim is to improve health outcomes, but there are many potential unintended harms resulting from such endeavours. At times, these involve negative psychological states such as longer lead times, health anxiety, risk compensation, rebound effects, guilt and stigma. Such harm may also be medical in the form of unpleasant and sometimes dangerous side effects to medication and unnecessary and ineffective invasive procedures. Furthermore, these endeavours can also lead to social consequences as they increase the financial burden on the individual or healthcare system through drug costs and may flood the healthcare system with the worried well causing burnout in doctors and leaving less available time for those who really need support. All interventions have the potential not only for benefit but also for harm. In joining forces with medicine as a means to promote patient health, and by overestimating benefits

while underestimating the possibility of harm, health psychology may inadvertently cause harm to the very people it is trying to help. So why has this situation arisen? And what are the implications for developing better research and practice?

Why has this situation arisen?

There are several explanations for these unintended consequences of research and practice within health psychology. First, it is possible that researchers have been drawn into the medicalisation project described by Illich in the 1970s (Illich, 1974), now seeing causes and solutions from a predominantly biomedical perspective. Accordingly, although initially positioning itself as a challenge to biomedicine (Ogden, 1997), the discipline of health psychology has shifted its status from critic to champion. Second, these unintended consequences could be interpreted as a product of pharmaceuticalisation driven by the drug companies in their search for financial gain. This process has been described extensively from a more sociological perspective (e.g. Abraham, 2010), and it has been argued that a process of pharmaceutical expansion has influenced not only what research trials are carried out due to industry funding but also drug regulation policies, treatments offered and patient expectations and demand. Both these analyses indicate a more passive approach to how disciplines function and suggest that health psychology has been subsumed by medicine or manipulated by the pharmaceutical industry in line with notions of politics, power or vested interests (Ogden, 1995a). Alternatively, however, this alignment between psychology and medicine and the subsequent harm being enacted could reflect a change in the way in which we manage probabilities and have come to see risk.

The potential harms resulting psychological research and practice each involve an assessment of risk that the intervention will be effective versus the chance that it will be either ineffective or do harm. For example, encouraging patients to take a drug with a high NNT, to seek help for a condition that may not be treatable, to attend a screening programme with a low detection rate or to embark upon a behaviour change programme that probably will not work, all rely upon a risk assessment which favours the poor chance of success over the greater risk of failure or even harm. Doing harm could therefore be understood as a result of how probability is understood and an increasingly optimistic focus on benefits rather than costs and success rather than failure. Accordingly, biases in judgement identified across a number of other decision-making domains may also be driving research and a determination to believe in the benefits of medicine even in the face of evidence to the contrary (e.g. Kahneman et al., 1982; Shah and Oppenheimer, 2008; Tversky and Kahneman, 1973). Furthermore, all such decisions also illustrate a similarly optimistic model of health not only as desirable but also as controllable by the self (Ogden, 1995a, 1995c). So, what are the implications for research and practice?

Implications for better research and practice

This analysis of inadvertent harm has implications for health psychology in terms of both practice and research. Primarily, there are implications for communication between health professionals and patients. In much of its research and practice, particularly in the areas of medication adherence, help seeking and screening, health psychology focuses on increasing patient access and contact with medicine so that people can take advantage of available medical and surgical interventions. Such interventions, however, are often not as effective as presented either by practitioners or researchers or as believed by the media or general public. Accordingly, risk communication regarding medical interventions should be improved to include a clearer indication of both the potential benefits and harms of any intervention in a way that is meaningful to patients. In particular, this could include details of effectiveness using NNTs, a description of

economic, medical and psychological side effects including NNHs and an analysis of the balance between quantity and quality of life gained. In fact, research indicates that patients may be less likely to accept medication once they are given effectiveness data as an NNT (Misselbrook and Armstrong, 2000). In addition, there are also implications for choice of research question. The literature within health psychology encompasses a wide range of aspects of health including prevention, illness experience and patient outcomes. If research and practice come with the potential for doing harm, then before embarking upon any study or delivering any intervention, it becomes necessary to consider not only the outcome of the psychological component but also the subsequent outcomes of any medical interventions administered. Accordingly, research on medication adherence should consider both the proximal effectiveness of the adherence intervention and also the more distal effectiveness of whether or not the drug itself is worth adhering to. Furthermore, it may only be acceptable to encourage help seeking or screening for a condition which is better managed at an early stage and to attempt to change behaviour if the benefits of this change outweigh the costs. Not all benefits of intervention are equal, some harms are greater than others and not all benefits outweigh the costs. The choice of research study or intervention within health psychology should therefore be prefaced by weighing up not only the proximal outcomes but also the distal ones as patients are delivered into the world of medicine. Finally, there are also implications for understanding of the role of vested interests. While the pharmaceutical industry has explicit financial interests which not only influence which studies are carried out but also how the findings are disseminated and turned into policy and practice, those working within medicine may also hold more implicit interests derived from the need to be seen to be able to prevent, treat and cure disease. Such explicit and implicit vested interests may well influence both risk communication to patients and choice of focus by researchers by creating a culture in which medicines are seen as the key solution to all health problems.

The Hippocratic Oath promises to 'do no Harm', but all medical interventions have the potential to both benefit and harm the patients involved. With its research on medication adherence, help-seeking behaviour, screening and behaviour change, this article has argued that health psychology may have inadvertently contributed to a violation of this oath and a form of iatrogenesis. In particular, such harms may be psychological in the form of extended lead times, anxiety, risk compensation, rebound effects or shame, medical in the case of side effects or unnecessary invasive procedures or social as illustrated by financial costs and an increased burden on the healthcare system. Patients should therefore be better informed of the balance between the benefits and harms of any interventions they are offered, and researchers and practitioners need to consider this balance before embarking upon their research or clinical endeavours. These harms may be the products of external pressures upon the discipline created by medicalisation or pharmaceuticalisation. Such harms, however, may also reflect a change in the way in which we make sense of risk with an optimistic bias towards a focus on benefits rather than costs and a determination that health is controllable.

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