The impact of pre-diabetes diagnosis on behaviour change: an integrative literature review

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Abstract
Type 2 diabetes is a growing global problem that not only affects individuals but also has an impact upon the economic health of countries. The number of people developing type 2 diabetes can be reduced by up to by 80%; this can be achieved by targeting those who are ‘at risk’. This reduction can be achieved by appropriate lifestyle changes to diet and physical activity. It is not known what the impact of being informed of a diagnosis of pre-diabetes has on an individual’s motivation to make appropriate lifestyle changes.

The aim of this study was to assess whether having the diagnosis of pre-diabetes encourages or empowers people to make appropriate lifestyle changes to prevent progression to a diagnosis of type 2 diabetes.

Employing a systematic approach, an integrative literature review was undertaken using a standard retrieval and appraisal method. The studies demonstrated that pre-diabetes was found to be a challenging concept by patients and nurses alike. Lack of knowledge and support, along with patients’ perceived barriers, had an impact upon the various motivation and self-efficacy behaviours towards lifestyle changes.

The integrative review found that more education and support are required to motivate lifestyle change in the person with pre-diabetes. This, however, does not need to be medicine led; use of peer and community based programmes could be not only cheaper, but also have the ability to provide potentially long-term support for people, and would provide continued reduced risk. Intervention needs to ensure that it is provided at an appropriate level to account for cultural, social and gender needs. Innovative approaches need to be considered to reduce the number of people who are diagnosed with pre-diabetes from progressing to type 2 diabetes and its associated potential complications.

Key words
Type 2 diabetes; pre-diabetes; motivation; lifestyle; education; support

Background
It is acknowledged that type 2 diabetes is a major health issue worldwide and is currently at pandemic levels.\(^1,2\) The causes of type 2 diabetes are multifaceted, although not all the causes are fully known or understood. It is recognised that obesity and/or a reduction in physical activities are the main causes of type 2 diabetes.\(^3\) Type 2 diabetes can cause poor health outcomes and early death. There is available clinical evidence that type 2 diabetes can be prevented in up to 80% of cases via lifestyle changes.\(^4\)

The United Nations in 2006, via a resolution, set the agenda for combating what it described as the ‘diabetes pandemic’ by encouraging nations to develop effective policies to prevent, organise care and treatment of type 2 diabetes; this was reiterated by the World Health Organization 2013 publication: diabetes plan to prevent the development of type 2 diabetes.\(^5\)

However, surveillance and screening programmes are not uniformly applied or accessed consistently in the United Kingdom.\(^6\)

For high-risk people, lifestyle changes can reduce the risk of developing type 2 diabetes by between 25–72%.\(^7\) The Diabetes Prevention Programme was a multicentre research programme that established that weight loss and increased activity can reduce risk. This was mirrored in the Finnish Diabetes Prevention Study.\(^8\) The Healthy-Living Partnerships to Prevent Diabetes (HELP PD) demonstrated that community-based groups could also achieve a reduction in risk.\(^9\)

There is evidence that demonstrates appropriate lifestyle changes can prevent diabetes, and in some cases return the high-risk person to a normal HbA1c.\(^1\) Empowerment has long been advocated as a means to enable lifestyle change, encompassing behaviour change and motivational theory and initiating the desired shift of responsibility from...
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the nurse to the patient.\textsuperscript{10–13} There has been some recent debate in the use of the term ‘pre-diabetes’ or alternatively ‘at risk of diabetes’. The current prevention guidelines refer to people at risk of type 2 diabetes; however, patient information sources continue to use the term pre-diabetes interchangeably with ‘at risk’.\textsuperscript{14,15}

Integrative review methods

A systematic search was conducted in CINHAL, Embase and MEDLINE databases, using Boolean combinations of search terms: pre-diabetes, lifestyle, behaviour, diagnosis, change, prevention, empowerment, and type 2 diabetes.

Inclusion criteria

- The search was limited to studies undertaken since 2001, as this was when the National Service Framework for diabetes was published, and this was the first policy in the UK that advised there was a need to prevent type 2 diabetes. Using this date limitation also ensured that it would be more relevant to present practice.
- Only full text articles written or already translated in English were used, as there was no time nor financial aid to get others translated.
- Only articles with ‘pre-diabetes’ and ‘lifestyle’ changes were considered as it is the effect of that diagnosis that was being evaluated.
- Only primary sources were used, to reduce the risk of inaccurate or biased reporting by the author.
- Only literature that is applicable to the research question was reviewed to prevent time being wasted on inappropriate studies.
- Quantitative and qualitative studies were included in order to provide an encompassing view of the research question.

Exclusion criteria

- Drug treatments for pre-diabetes were not included as it was lifestyle changes that were being considered to answer the research question. There are numerous studies that have looked at certain medications to prevent type 2 diabetes that have been of benefit.
- Impaired glucose tolerance, impaired fasting glucose and risk of diabetes were excluded as this review is only concerned with the actual phrase ‘pre-diabetes’.
- Other chronic conditions for which lifestyle changes are deemed important, i.e. diabetes, chronic heart disease and other diseases with lifestyle interventions advised, as it is the impact of pre-diabetes that is being considered.
- Studies that were not available in English.
- Articles written before 2001.

Studies reviewed

Figure 1 shows the number of articles found on the databases. The quality of the studies was reviewed to ensure that they had been undertaken in a rigorous, valid and reproducible manner.

As both quantitative and qualitative studies were reviewed, the Critical Appraisal Skills Programme tool\textsuperscript{16} enabled the articles to be assessed critically for appropriate evidence in a logical, robust manner that reduced bias and ensured that there was equity for the different approaches as it is specifically designed to enable us to understand scientific evidence about health. The CASP scores for each research study reviewed are shown in Table 1. Following the scoring, the reviewed papers were discussed by the research team to enable the integration and identification of the themed findings.

Findings

Understanding the impact of pre-diabetes upon an individual

There has not been much work specifically done regarding the impact on an individual when they are informed that they have pre-diabetes. However, it has been shown that feelings of uncertainty about the disease, its management and physical consequences affect a person emotionally and socially. Lifestyle changes have been seen as a struggle, and therefore such changes were only undertaken if they did not impact on daily routines and habits.\textsuperscript{17,18}

Overall, however, it was found that when an individual is informed...
that they have pre-diabetes this caused a radical change in the way they viewed themselves and their health, which was sufficient to make appropriate lifestyle changes. Those who are motivated accept that individual responsibility is essential to make lifestyle changes and therefore become responsible for their own health. Modifying lifestyle can be enormously difficult to achieve and maintain. Continued motivational input is necessary, otherwise the lifestyle changes will wane. However, motivating self-efficacy with support can be effective in enabling lifestyle changes as there is an increase in self-confidence. The evidence demonstrated that lack of knowledge and understanding about pre-diabetes on diagnosis resulted in patients not recognising the importance of lifestyle changes even though there is a strong correlation between knowledge of pre-diabetes and adoption of healthy lifestyles.

### Does diagnosis empower or disempower the individual?

Studies have explored issues of uncertainty in the perceptions of the definition and severity of a diagnosis of pre-diabetes, and this may affect a desired empowerment outcome in an individual, leading to accessing services, support and enabling behaviour change. The lack of any physical symptoms can make an individual question as to whether they actually have a health issue and so subsequently not perceive a need to change their lifestyle behaviour. Some of this may well be as a result of how an individual is informed of the diagnosis and the subsequent follow up that they receive.

Jallinoja et al. observed that people can feel that any change is hopeless, thereby preventing even minor lifestyle changes, and that certain behaviour appears to be too hard to break; individuals accepted that they would remain as they were – which Hindhede describes as 'fatalism'. Zhou and Oh observed in their participants that, as food is perceived as a necessity for living, there can be feelings of anger and deprivation when they are advised to make changes to dietary intake.

Authors have described perceived barriers that may reduce the capability of making change and becoming self-efficient – in terms of guilt, mood, feelings of failure, isolation, ‘sabotage’ by family and friends, and lack of support. Geiss et al. found that a person’s educational status had an effect on their ability to make changes. Yudkin and Montori argue that another barrier is the label of pre-diabetes, stating that it is not useful to the individual concerned as they may not go on to develop type 2 diabetes, although the lifestyle changes that are advised for this would, however, be of benefit.

It has been suggested that lifestyle change is best achieved within a support programme and also linked to the concept of self-efficacy. Geiss et al. state that different ethnic groups need to have different interventions to modify behaviour. Self-efficacy underpins an individual’s ability to then make changes to their lifestyle. However, even with this understanding, ambivalence was one of the underpinning themes found in the studies.

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Table 1. Critical Appraisal Skills Programme (CASP) scores for each research study reviewed.
diabetes. Her focus-group work with health care professionals was interesting as they viewed it as a ‘weapon’ to be used to, in effect, bully or shame a person into making lifestyle changes. The individual with pre-diabetes felt that it altered their self-perception but that it encouraged self-efficacy. Unlike Yudkin and Montori, who considered that making this new category was counter-productive, Hindhede felt that there were positive benefits to the person with pre-diabetes to be informed of their diagnosis.

Chen and Lin found, in their study, that using a health promotion intervention to encourage lifestyle changes to reduce the risk of type 2 diabetes is ineffective until the person with pre-diabetes actually recognises that they are at risk. They state that having self-efficacy has a strong relationship with being able to undertake change.

There was a repeated finding from the studies that one of the main complaints voiced by the participants, which may have contributed to non-engagement in lifestyle changes, was the lack of structured advice and education about the diagnosis of pre-diabetes and the lack of ongoing support. The need for education is supported in the wider literature and also in policy. Several of the studies found that the participants wanted to have regular follow-up by their nurse. However, Jallinoja et al. found that there was a contrary view: that on the one hand people expected nurse support, but on the other rejected the suggestion of there being strict health care advice given. Koenigsberg et al. describe the effectiveness initially of individualised plans; however, this is very time consuming within service provision. Group interventions have a positive effect upon the ability of a person with pre-diabetes to make lifestyle changes: as their level of knowledge about pre-diabetes improves so does the ability to make lifestyle changes.

In order to provide effective support for lifestyle changes it is important to understand what actually prevents people from making appropriate lifestyle changes. Jallinoja et al. report how they found three different characteristic groups within their study and describe the hopelessness, struggle and self-governing repertoires.

It has also been shown that the more barriers that an individual perceives they have, the less action they are prepared to undertake. Barriers possibly outside the control of a person with pre-diabetes are those of education, gender and social status.

Discussion

Since the World Health Organization in 2011 changed the testing criteria for type 2 diabetes there has been some confusion about what to tell someone with pre-diabetes who does not have a normal HbA1c but who does not have type 2 diabetes. Yudkin and Montori argue that it is unfair to use this as a diagnosis, as not all people with pre-diabetes will develop type 2 diabetes. However, as found by Troughton et al., Hindhede and Chen and Lin, this can cause uncertainty for the person with pre-diabetes which can result in them taking no action to change lifestyle.

The studies reviewed provide an insight into how behaviour change takes place when someone is given the diagnosis of pre-diabetes. However, although there have been a significant number of studies that prove the need for change, there is a scarcity of primary research that has been undertaken to assess the impact of pre-diabetes diagnosis on a patient’s behaviour. This is surprising as the evidence for appropriate lifestyle changes is established.

One of the main findings was the need to appreciate the types of barriers that a person with pre-diabetes needs to overcome. The requirement for appropriate education for the person with pre-diabetes was highlighted, as all studies found that initially knowledge and understanding of pre-diabetes and lifestyle changes were low. Aligned to this was the need for support and, interestingly, this does not have to be the remit of the nurse. The use of the terms ‘at risk of diabetes’ and/or ‘pre-diabetes’ needs to be clarified into either one term or the differential definition of both terms, so that it is clear to the person and to practitioners.

In terms of how this impacts on the individual, it could be viewed that the term ‘pre-diabetes’ infers an inevitable progression to diagnosis of type 2 diabetes, as opposed to using ‘at risk’ which may imply that the risk status can be reversed.

The new national Diabetes Prevention Programme aims to reduce the incidence of type 2 diabetes. While we recognise that a large part of public health initiatives may not be effective with education being provided but with poor outcomes, the pilot studies being undertaken using social networks within the new programme may improve outcomes. However, more important than education, is the requirement that understanding the process of change, and the ability to bring about self-belief in a patient are the essential approaches to produce and maintain healthy lifestyle choices.

Declaration of interests

There are no conflicts of interest declared.

References

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Review

POEMS

Mediterranean diet produces moderate weight loss

Clinical question
What is the effect of a Mediterranean-type diet on body weight?

Bottom line
In addition to improving one’s cardiovascular outlook, a Mediterranean diet produces a greater sustained weight loss than does a low-fat diet and a similar weight loss as do other diets in patients who were overweight or obese, most of whom had type 2 diabetes mellitus.

The range of average weight loss was 3.8kg to 10.1kg after one year with a Mediterranean diet versus a loss of 5.0kg to a gain of 2.9kg with a low-fat diet.

Reference

Study design: Systematic review.

Funding source: Self-funded or unfunded.

Setting: Various (meta-analysis).

Synopsis
The so-called Mediterranean diet consists of high consumption of fruits and vegetables; monounsaturated fats, usually from olive oil; moderate consumption of poultry, fish, and dairy; and little or no red meat. To identify studies for this meta-analysis, the authors searched three databases, including the Cochrane Library, and identified five studies (n=998) of at least 12 months’ duration that investigated the diet’s effect on weight loss. The authors also searched reference lists of identified studies, reviews, and other meta-analyses. The included studies were published in either English or French.

Several of the studies had high dropout rates, but were otherwise at low risk of bias. Study results were heterogeneous and therefore the authors were unable to combine the results. The patients in the studies were between the ages of 44 years and 67 years and were obese or borderline obese, with an average body mass index of 29.7kg/m² to 33.5kg/m². Most of the patients in the studies had type 2 diabetes.

After 12 months, the Mediterranean diet produced a moderate weight loss, an average range of 3.8kg to 10.1kg across the studies, with an average body mass index change of -1.0 to -3.3kg/m².

These averages were greater than those found with a low-fat diet but were similar to a low-carbohydrate diet and an American Diabetes Association diet with similar proportions of protein, fat, and carbohydrates.