

**Indications for formula medical nutrition therapy in diabetes**

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**Abstract**

This article describes rational and pragmatic indications of signature or formula medical nutrition therapy (MNT) in diabetes care. Classifying MNT as meal/snack replacement and supplementation, it explores the biomedical, psychological and social indications of MNT usage. The need to ensure concordance of MNT with lifestyle and pharmacotherapy is reinforced. Highlighting the varied and flexible requirements of formula MNT, the authors reinforce the person-centred philosophy of diabetes care in general, and MNT in particular.

**Keywords:** Bio psychosocial, Dietary therapy, Macronutrient, Micronutrient, Nutrition, Type 2 diabetes.

**Introduction**

Medical nutrition therapy (MNT), an integral part of lifestyle modification, is the first line treatment for diabetes. Professional organizations of diabetes care providers and dieticians are in agreement regarding their understanding of the scope and relevance of MNT.<sup>1,2</sup> MNT seeks to provide an individualized diet plan to every person with diabetes, based upon his or her biomedical, psychological, and socioeconomic needs, limitations and preferences. Thus, MNT follows a patient-centred philosophy which is similar to that suggested for pharmacotherapy in diabetes. One grey zone in current MNT praxis, however, is the role of commercial MNT products.

**Heterogeneity of MNT**

Just as diabetes is heterogeneous, so is MNT (Table-1). MNT is defined not only as a prescription of a particular product (healthy nutrition), but also as the process of delivering that product.<sup>3</sup> MNT includes, in its ambit, not only home-cooked or market-sourced food, but also commercially available preparations. Clinical trials on weight loss and/or diabetes control<sup>4</sup> have used a variety of MNT strategies. These include modification of home cooked meals, exclusive use of commercially available

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**Table-1:** Classification of formula medical nutrition therapy (MNT).

<b>Intensity</b>	<ul style="list-style-type: none"> <li>◆ Meal replacement                             <ul style="list-style-type: none"> <li>○ Complete</li> <li>○ Partial</li> </ul> </li> <li>◆ Meal supplementation</li> </ul>
<b>Regularity</b>	<ul style="list-style-type: none"> <li>◆ Long term</li> <li>◆ Short term</li> <li>◆ Intermittent</li> </ul>
<b>Preparation</b>	<ul style="list-style-type: none"> <li>◆ Powder</li> <li>◆ Liquid                             <ul style="list-style-type: none"> <li>○ Premixed</li> <li>○ Freshly mixed</li> </ul> </li> <li>◆ Biscuits/bars</li> </ul>

**Table-2:** Uses of medical nutrition therapy.

<ul style="list-style-type: none"> <li>◆ Glycaemic control</li> <li>◆ Weight modulation</li> <li>◆ Nutrient sufficiency                             <ul style="list-style-type: none"> <li>○ Macronutrient</li> <li>○ Micronutrient</li> </ul> </li> <li>◆ Dining discipline/portion control</li> <li>◆ Dining satisfaction/ culinary pleasure</li> </ul>
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MNT formulas, or partial replacement strategies. A partial replacement approach, as was followed in the Look Ahead trial,<sup>5</sup> involves replacement of one or more (but not all) meals with a formula feed.

To be able to explore the indications of formula MNT, we need to understand its goals (Table-2) as well as composition. Various preparations are available, which provide a mix of macronutrients, micro-nutrients, and other nutraceutical principles.

**The Ideal MNT**

Simple measuring devices (spoons and scoops) allow for easy calorie, carbohydrate or protein counting. Good diabetes-specific MNT formulae are sucrose-free, high in fibre, and replete with essential vitamins and minerals. They also contain nutraceuticals such as chromium and inositol, which help improve insulin sensitivity. Along with biomedical adequacy, a good diabetes-specific MNT must be acceptable in taste and flavour, easy to use,

versatile enough to be used in a variety of cooking styles and methods, and lend itself to multiple recipes.

### Indications of MNT

While there is comprehensive and detailed guidance for most aspects of MNT, specific indication for use of formula

**Table-3:** Indication for signature medical nutrition (MNT).

<ul style="list-style-type: none"> <li>◆ Increased requirement of nutrient dense foods, e.g.,               <ul style="list-style-type: none"> <li>○ Tuberculosis</li> <li>○ Diabetic foot</li> <li>○ Convalescence</li> </ul> </li> <li>◆ Decreased intake of food/impaired appetite, e.g.,               <ul style="list-style-type: none"> <li>○ Chewing impairment</li> <li>○ Chronic kidney disease</li> <li>○ Gastroparesis</li> </ul> </li> <li>◆ Requirement of specific nutrient mix, e.g.,               <ul style="list-style-type: none"> <li>○ Gluten enteropathy</li> <li>○ Protein losing enteropathy</li> <li>○ Ketogenic diet</li> </ul> </li> <li>◆ Lifestyle related challenges, e.g.,               <ul style="list-style-type: none"> <li>○ Vigorous physical activity</li> <li>○ Prolonged fasting</li> </ul> </li> <li>◆ Pharmacotherapy related challenges, e.g.,               <ul style="list-style-type: none"> <li>○ Intensive insulin regimen (requiring 3+3 meal pattern)</li> <li>○ Modern sulfonylureas (requiring regular meals and snacks)</li> <li>○ High mix insulin regimens (requiring snacks at specific times)</li> </ul> </li> </ul>
<p><b>Psychosocial</b></p> <ul style="list-style-type: none"> <li>◆ Unwillingness to eat home cooked/market bought food</li> <li>◆ Inability to access home cooked/market bought food</li> <li>◆ Suboptimal dining discipline</li> <li>◆ Inability to perform calorie or carbohydrate counting in food</li> <li>◆ Desire for variation/culinary experimentation</li> </ul>

MNT have not been listed,<sup>6,7</sup> We attempt to do so, using the bio psychosocial model of health as our template (Table-3). We also endeavor to correlate formula MNT use with lifestyle therapy and pharma-therapy, so that concordance can be achieved between these pillars of diabetes care.

### Psychosocial Indications

Formula MNT for meal replacement may be used in persons who are unwilling to, or unable to, prepare or access tasty healthy food, at home or elsewhere. Examples include persons with a busy lifestyle, or those with limited access to home cooking. Limited culinary skills and limited nutritional literacy/numeracy are potential indications where formula MNT may be useful. Yet another psychosocial indication may be a need for variety in nutrition plans, or a desire for culinary experimentation.

It must be noted that the natural history of diabetes is

dynamic as well as flexible. Similarly the need for formula MNT may vary at different times of the day, and across weeks, months or years. An individual may report that he has access to healthy home cooked snacks in the evening, but not during morning office hours. Yet another may state that he brings home cooked lunch to office during summer, but needs an alternative for the cold winter months. MNT providers should take these person-centred specifics into consideration while discussing the role of formula therapy.

### Biomedical Indications

Formula MNT fulfils various types of biomedical needs. Signature MNT helps manage nutritional deficiency (e.g., protein deficiency), overcome limitations of digestion and absorption (e.g., in chewing-impaired persons, gluten enteropathy, diabetic gastroparesis) and provide requisite macro and micronutrients for health optimization in diabetes (e.g., during wound healing or recovery from acute illness)

MNT formulae can be used according to the biomedical needs of the patient. Meal supplementation, and/or snack replacement is done in persons where adequate caloric intake is needed, at regular intervals, to prevent hypoglycaemia. This occurs in lean/underweight persons, those on intensive insulin therapy and modern sulfonylureas. Specifically timed signature MNT may be indicated in persons on high mix insulin, and those who are fasting. Low fibre, low protein containing formulae are indicated in diabetic gastroparesis, and persons on ultra-rapid acting insulin analogues.

Meal replacement is prescribed in persons who are targeting weight loss. Other persons with impaired appetite, or increased requirement for nutrient dense foods, e.g., during recovery from infection, injury, or invasive procedure), can use formula MNT supplements as well.

### Lifestyle Modification-Related Indications

MNT must be personalized, or made concordant with physical activity as well. Formula feeds can be taken before or after physical activity, to prevent hypoglycaemia. Signature MNT, with high fibre and complex carbohydrate proportions, may be useful as meals replacement/supplement prior to fasting (e.g., Ramadan, Karva Chauth) as the slow release of nutrients prevents hunger, cravings and hypoglycaemia. High protein signature formulae are useful in persons following a ketogenic diet, or with protein wasting.

### Short Term MNT

Changes in nutrient requirement and ingestion may

occur due to variety of causes. Therefore, the need for signature MNT can vary as well. Commonly encountered indication for short term use of formula MNT include debilitating illnesses such as diabetic foot, tuberculosis and hepatitis. Impaired appetite may respond to a short course of signature MNT in persons with renal impairment or gastrointestinal upset.

### Summary

This communication shares rational indications for use of evidence backed signature MNT formula feeds in diabetes. Pragmatic usage of such preparations can help improve glycaemic control and weight modulation in diabetes and prediabetes.

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