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Development and validation of interprofessional health education module for the management of gestational diabetes mellitus

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Abstract:

BACKGROUND: Gestational diabetes mellitus (GDM) is a glucose intolerance that shows its first onset during pregnancy. In India, GDM affects as many as 5 million women annually. The interprofessional collaborative educational intervention is crucial for GDM management. This study illustrates the collaborative effort in developing and validating an interprofessional health education module designed for healthcare professionals during consultation sessions with GDM patients.

MATERIALS AND METHODS: The investigation involved three stages: 1) needs assessment for module contents and objectives, 2) health education module development by an interprofessional team, and 3) module validation. We received ethics approval from the institution's ethics committee.

RESULTS: The interprofessional team developed and validated the evidence-based English-printed module. The module had 27 units and covered six topics: an introduction to GDM and its management, dietary recommendations for GDM, exercise, yoga recommendations for GDM, weight control, and postpartum care.

CONCLUSION: The interprofessional team developed the educational module, wherein there is an integration of the domains of exercise and yoga along with medicines and nutrition therapy. The module was developed based on local requirements and evidence-based practices. Healthcare professionals can use the interprofessional health education module when advising diabetic pregnant patients.

Keywords:

Exercise, gestational diabetes mellitus, interprofessional, module, nutrition, yoga

Introduction

Gestational diabetes mellitus (GDM) is a glucose intolerance that shows its first onset during pregnancy.^[1] The prevalence of GDM shows an upward trend in low-income and middle-income countries. The age-standardized prevalence of GDM in India is 28%, compared with 14% in high-income countries.^[2] GDM affects as many as 5 million women in India annually.^[3]

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GDM poses short-term and long-term health consequences for the mother and child. The importance of accepting and dealing with the disease is now an acceptable phenomenon among healthcare professionals. Despite several guidelines by various organizations, most women with GDM in low- and middle-income countries are undiagnosed or inadequately managed.^[4]

Reports have disclosed that scarcity of knowledge about GDM, limited availability

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of resources, failure to approach follow-up care, and low motivation and compliance of the patients due to a lack of social support acted as substantial barriers to detecting and managing GDM.^[5,6] Even though India has evidence-based GDM management and detection guidelines, there is a need for better implementation. A national audit showed that only one-third of the practicing physicians were adhering to the federal guidelines for screening, of which two-thirds were unable to recollect the protocol.^[7] In Bangalore, India, a study demonstrated that only 50% of the doctors had sound knowledge about GDM management.^[8] Educational interventions targeted to improve knowledge of clinical guidelines are effective in improving the practice of health providers and clinical outcomes, including diabetes.^[9,10]

Pregnancy is a considerable time in the life of any woman. GDM women are self-motivated to manage the condition as it may affect the life of a fetus. Limited programs are designed for GDM, even in high-income countries.^[11] Even highly effective programs fail to succeed in low- and middle-income countries if they are logistically challenging and may require resources.^[4]

The interventions should consider various circumstantial and structural factors, which might disturb the use of any interventions.^[4] These factors include the growing concern of family toward pregnant women, wherein every family member has an opinion that might confuse the patient and complicate the entire treatment process. Some patients even hesitate to seek answers, representing poor communication with healthcare professionals, leading to misconceptions.^[12,13] Although exercise benefits pregnant women, adherence to diet, training, and medications is a significant challenge to care for GDM patients, given one's cultural practices. The necessity to educate many patients about blood glucose control and treatment compliance diverts attention from the benefits of treatment. The knowledge gap of dietary concerns and treatment protocols leads to malnutrition in mothers and children due to inadequate glucose control.^[13]

The interprofessional collaborative educational intervention, including physicians, nutritionists, exercise consultants, and yoga therapists, is crucial for GDM management. This approach improves patient obedience and fosters better pregnancy outcomes.^[14-17]

The study illustrates the collaborative effort to develop and validate an interprofessional health education module designed for healthcare professionals during consultation sessions with gestational diabetic patients.

Materials and Methods

Study design and setting

The mixed-methods study involving both qualitative and quantitative methods was conducted at Sri Devaraj Urs Academy of Higher Education and Research, Kolar, Karnataka, India.

There were three stages of the investigation. 1) needs evaluation for the module contents and objectives, 2) health education module development by interprofessional team, and 3) professional validation of the developed module. The institution's ethics committee granted its approval (https://drive.google.com/file/d/14hvkjlvNJxjp82zW9FRzu8z7A5KYQ6G9/view?usp=share_link). All individuals provided written informed consent for the study.

Phase I: Needs assessment for module contents and objectives

Study participants

This study included physicians (n = 2), obstetrics and gynecology (OBG) consultants (n = 2), nutritionists (n = 2), physiotherapists (n = 2), and yoga consultants (n = 2) with more than 10 years of experience in their concerned field at our University.

Study design and data collection

Extensive literature review and semi-structured interviews were conducted by all the participants to determine the potential contents of interest in module development. The literature search began using search engines such as EBSCO Host and Google to find relevant guidelines, articles, and educational materials on GDM and exercise, nutrition, and yoga prescriptions for GDM. The information was extracted and summarized.

An interprofessional team from our institution that included physicians (n = 2), OBG consultants (n = 2), nutritionists (n = 2), physiotherapists (n = 2), and yoga consultants (n = 2) participated in semi-structured interviews.

Data analysis

Trained interviewers conducted the discussions in the private rooms of the participants of the study. The responses to the interview sessions were written down and summarized.

Phase II: Health education module development by an interprofessional team

Study participants

Five experts, a physician, OBG consultant, nutritionist, physiotherapist, and yoga therapist, are involved in the research activity.

Study design and data collection

Based on the interview outcomes and literature review the module development involved an iterative design and appraisal activity by five experts, comprising a physician, OBG consultant, nutritionist, physiotherapist, and yoga therapist. An English module was drafted based on the interview outcomes and review of existing literature. It consisted of 27 units under six topics of an overview of GDM and treatment, nutritional recommendations for GDM, exercise prescription for GDM, yoga prescription for GDM, weight management, and postnatal care.

Based on the phase I recommendation, printed material was the mode of delivery chosen, which can later be converted into audiovisual aids. The module used simple terms and language, colorful pictures, and culturally appropriate examples.

Phase III: Module validation

Study participants

The interprofessional team includes physicians, OBG consultants, nutritionist, physiotherapist, and yoga therapist from different private universities in our state.

Study design and data collection

The quantitative design used a content validation form. The validation form we used was adapted from an instrument proposed by Castro and colleagues.^[18]

We asked a panel of interdisciplinary teams from different private universities in our state with more than a decade of experience working in their chosen fields to assess the module's contents. The team consisted of a physician (n = 2), OBG consultant (n = 2), nutritionist (n = 2), physiotherapist (n = 2), and yoga therapist (n = 2). Five experts were chosen based on the prior study's recommendations.^[19] We specifically chose the diverse panel to provide concepts from each area of expertise.^[20]

Content validation was an independent evaluation process using a content validation form—a modified validation form from a tool suggested by Castro and associates^[18]—module on seven aspects: two aspects, scientific accuracy, and content linked to content validity. Five criteria on literary presentation, images, sufficiently explicit and understandable material, readability and printing characteristics, and quality information are related to face validity.

Data analysis

For content validation, a content validity index (CVI) was used.^[21] The experts studied each unit and rated the sections on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). We used the CVI to test the validity of the module content. The CVI was determined by dividing

the total number of experts by those who agreed or strongly agreed (4 or 5). The CVI conveys the acceptance rate of each item's relevance, which ranges from 0 to 1.^[22] An accepted item should have a CVI of 0.80 or higher.^[23] According to the analysis, each item was considered appropriate if the CVI was more than 0.79, in need of revision if it was between 0.70 and 0.79, and omitted if it was less than 0.70.^[24] Items considered validated for face validation had at least 75% positive answers.^[25] Additionally, we sent an open-ended inquiry regarding any suggestions for enhancing the module to the experts.

The validation activity during the coronavirus disease 2019 (COVID-19) pandemic was performed via email and phone communications. An email containing a brief overview of the produced module and guidelines on how the validation process should be performed was given to the participants. The module and a validation form were included in the email.

Ethical consideration

All ethical standards were strictly adhered to by the researchers, including informed consent, confidentiality, plagiarism, double publication, and data manipulation. The ethical clearance no. is SDUMC/KLR/IEC/362/2020-21 provided by the institutional ethics committee of Sri Devaraj Urs Medical College, Kolar, Karnataka.

Results

Phase I: Needs assessment for module contents and objectives

From the literature review and search, the plan was to consider four topics with 22 units for the health education module for health professionals for use during consultation sessions with GDM patients [Table 1].

During interview sessions, tabular presentations with proposed topics and contents were given to ten interprofessional panelists, with a mean age of 41 ± 5 years. The interprofessional panelists included were physicians (n = 2), OBG consultants (n = 2), nutritionist (n = 2), physiotherapist (n = 2), and yoga consultants (n = 2) from our university. Most were female (60%), with a mean working experience of 10 years.

The objectives of the module derived included educating patients about GDM, associated complications, and treatment strategies in GDM, creating awareness of the significance of diet, exercise, and yoga in managing GDM and education on illusions and health facts.

Most of the panelists agreed that emphasis on the significance of optimal blood glucose maintenance is required to manage GDM. Proper dietary intake, physical activity, yoga practice, and agreement with

medications and treatment plans will ensure optimum blood glucose maintenance. Regarding dietary management, most panelists highlighted the necessity for including meal portions in the diet plan. The exercise recommendations should ponder the cultural context. The panelist recommended a proposal to include common misconceptions regarding GDM and its management in the new module. Supplementing the suggested topics, the panelist also emphasized the need to include two more units on weight management and postnatal care. Culturally relevant information was also suggested by participants, as these lifestyle changes are mainly related to culture. The panelist recommended including typical locally available food as part of the cultural component.

The panelists also highlighted that a newly developed module should have fewer texts, the correct font sizes, and simpler layperson terms to cater to readers' literacy levels within a distinct educational background. Some of the recommendations that stemmed during an interview are represented in Table 2.

Phase 2: Development of health education module by an interprofessional team

The developed module has 27 units under six topics. The module comprises 40 pages, including a front cover and an introduction section describing the unit's objective. Table 3 summarizes the newly developed interprofessional educational module for managing GDM.

Phase 3: Module validation

Ten interprofessional experts from different universities validated the module with a mean age of 43 ± 7 years and a mean experience of 13 ± 6 years.

The content of the health education module obtained a CVI of 0.9 for content, and scientific accuracy obtained a score of 0.9, indicating an acceptable level of understanding between the experts for content validity [Table 4]. As the overall CVI was 0.9, the module was validated for its content.

The expert recommendations for improvement of the module were evaluated, and vital corrections were made wherever feasible. Table 5 depicts the expert suggestions given and the action taken.

Face validity is obtained using the expert opinion on the level of agreement for five aspects of the instrument: providing good quality information, good literary presentation, adequacy of the illustrations, legibility, specificity of contents, and accuracy. Figure 1 demonstrates agreement ranging from 80% to 90% among the expert group. The minimum agreement level was 75%. The agreement shows that the module has adequate face validity.

Table 1: Proposed topics and contents for the health education module

| Topics | Contents |
|--|--|
| Introduction to GDM and its management | <ol style="list-style-type: none"> 1. What is gestational diabetes mellitus (GDM)? 2. Why diabetes starts during pregnancy? 3. How is GDM screened and diagnosed during pregnancy? 4. Whom should I approach if I have GDM? 5. Will GDM affect my fetus? 6. Will GDM affect my delivery? 7. Will I have diabetes in the future? 8. What should I do if I have GDM? 9. The general treatment plan for GDM 10. Blood sugar monitoring and hypoglycemia |
| Nutritional recommendations for GDM | <ol style="list-style-type: none"> 1. Dietary tips for healthy eating during pregnancy 2. The meal plan composition 3. GDM sample meal plan 4. Carbohydrates, low glycemic index, and glycemic load foods 5. Regularity of meal timings 6. Diet control in insulin therapy 7. Diet chart |
| Exercise recommendation | <ol style="list-style-type: none"> 1. Benefits of exercise 2. Precaution to be taken 3. Exercise prescription (frequency and type mode) 4. Contraindications |
| Yoga recommendations | <ol style="list-style-type: none"> 1. Benefits of yoga 2. Types of yoga 3. Ratio and timing |

Table 2: Summary of recommendations

| |
|--|
| Suggestions and recommendations from an expert panel |
| Emphasis on the importance of optimal blood glucose maintenance through weight management, exercise, yoga, and following a diet plan |
| Treatment plans and their monitoring |
| Exercise recommendations and emphasis on the cultural context |
| Nutrition should include local foods and culturally acceptable |
| Alleviate misconceptions about GDM |
| Contraindications for exercise |
| New modules developed should have few texts, font sizes should be appropriate, and simple layman terms to cater to readers' literacy level within a diverse educational background |

Discussion

The current study effectively developed an interprofessional health education module for managing GDM, which consultants can use during interactions with gestational diabetics. Considering the prevalence and complications of GDM, this module will serve as an essential step in health education and management of GDM. It was developed based on the interprofessional team's suggestions and recommendations.

Pregnancy is one of the noteworthy times in any woman's life, and it is also a stressful condition. The

situation becomes even more fragile if the woman is diagnosed with GDM. Poorly controlled GDM is often associated with reduced quality of life.^[26-28]

GDM patients require detailed information and education on the gestational diabetes pathophysiology, available treatment, and the condition’s management. Self-monitoring blood sugar levels, maintaining

adequate weight gain, planning meal intake, exercising, and avoiding possible complications of GDM are required.^[29] The critical strategy of providing education during pregnancy is to gain sufficient knowledge and acquire skills for self-management of GDM. The module developed contains adequate information on managing GDM using a multi-professional approach. This module expects to fill this section’s knowledge and practice gap among healthcare professionals.

Table 3: Summary of the newly developed module

| Topics | Contents |
|--|--|
| Introduction to GDM and its management | 1. What is GDM? 2. Why diabetes starts during pregnancy? 3. Whom should I approach if I have GDM? 4. Will GDM affect my fetus? 5. Will GDM affect my delivery? 6. Will I have DM in the future? 7. What should I do if I have GDM? 8. General treatment plan for GDM 9. Blood sugar monitoring and hypoglycemia in GDM 10. Warning signs of GDM |
| Nutritional recommendations for GDM | 1. Dietary tips for healthy eating during pregnancy 2. The meal plan composition 3. GDM sample meal plan 4. Carbohydrates, low glycemic index, and glycemic load foods 5. Regularity of meal timings 6. Diet chart 7. Inclusion of locally available food in the recommended list |
| Exercise recommendation | 1. Benefits of exercise 2. Precaution to be taken 3. Exercise prescription (frequency, type, and mode) 4. Contraindications 5. Adjuvants |
| Yoga recommendations | 1. Benefits of yoga 2. Types of yoga 3. Ratio and timing |
| Weight management | 1. The target for weight maintenance |
| Postnatal care | 1. Postnatal care and follow-up |

There needs to be more than oral knowledge and skills in communication for an educational process. The printed educational materials, such as booklets, counseling, and communication shared by the consultant, effectively translate into patient education.^[30] Hence, healthcare professionals can use the educational material developed through this study during counseling sessions with patients. Educational modules improve patient compliance with medical advice, motivate patients, enhance their quality of life, and lower healthcare expenses in our society.

The booklets used for health education must comply with basic requirements regarding content, the flow of information, layout, and illustrations.^[31] Using simple language with appropriate charts, figures, and illustrations is vital while developing printed educational material.^[32] The content in educational materials should have authentic information (evidence-based) and be

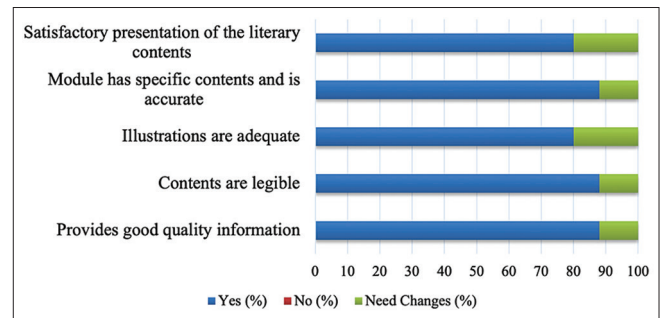


Figure 1: Level of agreement among experts for aspects of face validity

Table 4: Results of content validity by experts

| Items | Agree and strongly agree | Disagree and neutral | CVI | Interpretation |
|--|--------------------------|----------------------|-----|----------------|
| Content | | | | |
| The objectives of the module are evident | 09 | 01 | 0.9 | Accepted |
| The recommendation given regarding behavior change is satisfactory | 09 | 01 | 0.9 | Accepted |
| Important points rereviewed well | 09 | 01 | 0.9 | Accepted |
| Pointless information is eliminated | 09 | 01 | 0.9 | Accepted |
| The language used is neutral and self-explanatory | 09 | 01 | 0.9 | Accepted |
| Promotes and encourages treatment adherence by emphasizing the risk and benefits of a recommendation | 09 | 01 | 0.9 | Accepted |
| Scientific accuracy | | | | |
| The contents of the module are in agreement with the current trends | 09 | 01 | 0.9 | Accepted |
| Necessary recommendations are correctly managed | 09 | 01 | 0.9 | Accepted |

Table 5: Expert recommendations for improvement of the module

| Recommendations by experts | Rectification |
|--|--|
| A paragraph on regular follow-up with the pediatrician as babies of GDM mothers are prone to childhood obesity | Was added in follow-up after delivery |
| Use locally grown foods with nutritional value in food recommendation | Ragi and millets are included in the recommendation with the nutritional value |
| Recommended dietary allowance for pregnant women can be highlighted and the extra allowances needed can be justified | Highlighting performed with extra allowances justified |
| Benefits of yoga in mindfulness to be included | Rectified by adding a paragraph on the benefits of yoga |

reliable.^[31,33] The module developed by this study has undergone validation for all the aspects mentioned. This booklet will give additional help as it contains comprehensive information on the self-management of GDM.

A similar study was conducted, which developed an educational manual for healthy pregnancy designed for women with GDM.^[34] The feedback study on this showed high satisfaction among the patients. Even in this technological era, printed information can improve literacy on GDM and provide motivation and change in attitude toward the management of GDM, which will contribute to a decrease in morbidity and mortality associated with GDM for the mother and the fetus.

The use of technology and the transformation of information in the module into Web-based educational programs and applications will help disseminate remotely without physical contact between the patient and healthcare provider. Many studies have demonstrated the beneficial effect of such applications in GDM management.^[35,36] However, these types of Web-based interventions might be challenging to understand by women with low computer literacy. Printed modules developed through this study will help overcome this barrier and provide cost-effective solutions in resource-poor settings for better management of GDM.

Many reviews have mentioned that the interprofessional collaborative approach is the guiding force for managing GDM, as patient adherence to treatment and proper educational interventions will favor better pregnancy outcomes.^[37] An interprofessional team developed this educational module based on local requirements and evidence-based practices.

Limitations and recommendation

The primary limitation of the research is that it took place during the COVID-19 epidemic. Due to a patient shortfall, the module's acceptance among the intended audience of gestational diabetes is still to be determined. To accommodate larger people with varied literacy backgrounds, the English version of the educational material must be translated into a local language. For

wider use, the module needs to be transformed into a Web-based application.

Conclusions

An interprofessional team developed this validated education module by integrating exercise, yoga, medicines, and nutrition therapy domains. The module was designed based on local requirements and evidence-based practices. This validated interprofessional health education module for managing GDM can be used by healthcare professionals during consultations with GDM patients.

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Conflicts of interest

There are no conflicts of interest.

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