Supplementary File #2396

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Content analysis using of CIPP Model

Table S1 Content analysis using of CIPP Model

No	Author(s) Design of study Study sample (size) Country	Context Goals / Objective Strategies-PICO	Input Intervention Group (IG) Control Group (CG) Time & Follow-up Theory (If any)	Process Approach & Technique Implemented (Competency) Outcome Measure Instruments used	Product Impact Domains	Quality assessment Score
1	(Zandinava et al., 2017) RCT N = 46 for each group Country: Iran	**Goals / Objective** To ascertain how an educational package for women with GDM affected their self-care behavior, quality of life, levels of fasting blood glucose, and GTT. **Strategies-PICO** P- GDM women I - educational program C - Routine perinatal care O - Self-care behaviors and Quality of life	**IG** Four-session self-care education to women with GDM (one session per week). **CG** Routine prenatal care **Time & Follow-up** Before and after 4 weeks **Theory (If any)** Not applicable	**Approach & Technique** Groups approach Lectures (7-14 participants), question and answer. Booklet provided **Implemented (Competency)** Not mentioned **Outcome Measure** Self-care behaviors score Quality of Life (QOL-GRAV) score Fasting blood sugar Glucose Tolerance Test **Instrument used:** Questionnaire on self-care behavior Questionnaire on Quality of Life during pregnancy (QOL-GRAV)	**Impact** Intervention of self-care education improved self-care behaviors with mean difference 19.5, 95% CI = 14.4 to 24.6, p<0.001. Effective two hours following testing for glucose tolerance (-17.3; -23.0 to -11.6; P < 0.001). The FBS (P = 0.443) and quality of life (P = 0.264) were not found to differ statistically significantly four weeks following intervention. **Domains** 1. Knowledge about/details concerning GDM: definitions, causation, symptoms, treating the condition and preventing complications 2. Physical activity 3. Nutrition or healthy diet	**Accept 5/5**
2	(Mackillop et al., 2018) RCT N = 203 (101 intervention group and 102 control group) Country: United Kingdom	**Goals / Objective** To ascertain if using a real-time system for remotely managing blood glucose through mobile phones by women with GDM controlled blood glucose as effectively as clinics' provision of standard care. **Strategies-PICO** P- GDM women I - Remote glucose monitoring C –Standard Clinic care O – rate of change in glycaemia, maternal and	**IG** Each participant was lent a mobile phone installed with the GDm-health app and sent a website-based motivational message at the time of their clinic visits. Each subject was informed how their blood glucose readings could be registered, tagged and reviewed. Mobile app was provided: - - automatic alert for recording blood glucose reading - short message services on healthy diet advice, adjustment of medication if	**Approach & Technique** Mobile phones and informing how blood results could be to be recorded, tagged and reviewed **Implemented (Competency)** Midwife (Diabetes midwife) **Outcome Measure** HbA1c Satisfaction scores **Instrument used** Diaries to log blood glucose diaries (CG) Mobile phones installed with the GDm-health app (CG)	**Impact** The system for mobile app was safe and comparable glucose control and data capture. Mean HbA1c results decreased (intervention group experienced a 0.02% increase for every 28 days and control group experienced a 0.03% increase every 28 days). Difference between groups not significant (intervention against control: –0.01%, 95% CI –0.05 to 0.03) Improved patient satisfaction in the both group	**Accept 5/5**

		neonatal outcome, maternal satisfaction	hypoglycemia. **CG** The blood glucose values were recorded in a paper diary. If their blood glucose violated predefined levels, women were advised to call the diabetes midwife. **Time & Follow-up** 2 to 4 weeks – control group 4-8 weeks – intervention group **Theory (If any)** Not applicable	Questionnaire on Oxford Satisfaction with Maternity Diabetes Treatment	(intervention: median 43, IQR 39-46; control: median 44.5, IQR 41-46; Kruskal-Wallis $\chi 2=3.9$, P=.049) **Domains**: - 1. Knowledge /Information of GDM: -Adjustment of medication if hypoglycemia 2. Blood glucose Monitoring 3. Lifestyle: -Diet advice 4. Others: -Motivation message	
3	(Rasmussen et al., 2020) RCT N = 12 (6 each group) Country: Denmark	**Goals / Objective** To measure how glycemic variability and glucose control are affected by high (HCM) versus low (LCM) intakes of carbohydrates in the morning. **Strategies-PICO** P - GDM women I - Dietary treatment C - HCM vs LCM Suren O - Glucose level	**IG** "Breakfast diet": - HCH - Morning: - High carbohydrate and energy - Evening: - Low carbohydrate and energy **CG** - Morning: - Low carbohydrate and energy - Dinner: - high carbohydrate and energy <u>Calorie content for HCM and LCM</u> Follow the individual needs: - 1800, 2000, 2200 or 2400 kcal Followed by the standard care **Time & Follow-up** Four times during the two intervention periods **Theory (If any)** Not applicable	**Approach & Technique** Each participant was given a list of groceries and individual images of items of food **Implemented (Competency)** Dietician **Outcome Measure** Glucose levels: Four times a day (Before breakfast, lunch, dinner and before bedtime) **Instrument used** Glucometer.	**Impact** High carbohydrate (50%) in the morning improves glucose level and insulin sensitivity for GDM women but higher in glycemic variability. The FBGs of the two diets were found to differ significantly (p = 0.01) when the mean difference between the HCM and LCM diets was compared. **Domains** Lifestyle: - High intake of carbohydrates in the morning (HCM) and low intake of carbohydrates in the morning (LCM).	**Accept 5/5**
4	(Ammulu et al., 2019) RCT N = 54 (34 intervention group and 20 control group) Country: India	**Goals / Objective** To conduct an evaluation of patients' quality of life following patient counselling that featured counselling aids. **Strategies-PICO** P- GDM women I – Counselling C – Intervention Vs Routine management O – Quality of life	**IG** Advice obtained with the support of patient counselling aids on GDM disease, pharmacological treatment, diet therapy and exercise. **CG** Routine management **Time & Follow-up** Baseline and one month after intervention	**Approach & Technique** Individually counselling session **Implemented (Competency)** Not mentioned **Outcome Measure** Quality of life **Instrument used** WHOQOL-BREF questionnaires	**Impact** The outcomes revealed that in comparison to the control group, each domain's conditions (physically, psychologically, socially, and environmentally) improved significantly (p=0.043, 0.038, 0.047, 0.043). It shown beneficial effect of patient counselling on GDM management. **Domains**	**Accept 4/5**

			Theory (If any) Not applicable		1. Knowledge / Information of GDM; - GDM disease and pharmacological 2. Lifestyle: Diet therapy and exercise	
5	(Al-Ofi et al., 2019) RCT N = 57 (27 Intervention group and 30 control group) Country: - Saudi Arabia	**Goals / Objective** To examine how remotely delivering dietary advice via telemedicine affected the blood glucose level monitoring and weight management among GDM women. **Strategies-PICO** P- GDM women I – Tele-monitoring device (Smartphone app) C – standard follow-up O – Glucose level, maternal weight and HbA1c	**IG** Each subject's phone was installed with a smartphone Glucometer and the Glucomail program, while full training was offered on using the device. Glucose levels and gains in weight were monitored via their smartphones. Each participant needed to download their glucose reading every day while measuring their weight and completing the questionnaire were undertaken each week. Each week, evaluations were conducted of these details to determine if a participant required additional interventions like an adjustment to their insulin. An automated message was produced weekly from the application to the patient and coaching system according to participants due date. **CG** Routine care **Time & Follow-up** Weekly reviewed on glucose level and weight 6 weeks post-delivery for laboratory test (FPG, 2-hour PPG and HbA1c) **Theory (If any)** Not applicable	**Approach & Technique** Coaching system according to participants due date. Individually Glucose monitoring by Smartphone. **Implemented (Competency)** Diabetic care team **Outcome Measure** Fasting plasma glucose (FPG) 2-hour postprandial plasma glucose (PPG) Hemoglobin IAc levels Maternal weight **Instrument used** Questionnaires (healthy food intake. Glucose intake, medications, exercise. toileting, stress and pain). Smartphone-Glucometer	**Impact** Tele-monitoring is a valuable method to make it easier to monitor pregnant women with GDM closely. Patients were expected to be motivated to maintain healthier lifestyles, while weight gains during pregnancy should be prevented. A significantly lower two-hour PPG was detected in the IG compared to the CG (P=0.002). Between-group differences in FPG and HbAIc were not significant. Improved in weight gain (p<0.05). **Domains** 1. Knowledge or Information of GDM 2. Blood glucose monitoring: - Emergency alert for hypoglycemia and hyperglycemia 3. Lifestyle: - Healthy food and what to avoid during pregnancy 4. Others: - Weight management	**Accept 5/5**
6	(Guo et al., 2019) RCT N = 124 (64 intervention group and 60 control group) Country: - China	**Goals / Objective** GDM patients were to be educated and managed, while an exploration was to be conducted into the ways mobile medical interventions affected these patients' management of their weight, control of their blood glucose and pregnancy outcomes. **Strategies-PICO**	**IG** Participant used Dnurse App for self-measurement of fasting and postprandial, monitored by outpatient doctor. When an elevated blood glucose result was registered by the patient, they were informed and the underlying cause was examined. Education through diets, exercising, medicine and diabetes reading supplements were also provided. Each night (7-9pm), an education nurse handled online	**Approach & Technique** Used Dnurse App as outpatient mode for self-measurement. An education nurse instructed patients online each night. Each participant was monitored for three days each week. A paper diary was used for manual recording and reviewed alongside their doctor during all visits. The educational nurses review the implementation of the diet and exercise plans during the return visit, and the doctor changes the treatment plan as required.	**Impact** Dnurse App group demonstrated resulted ideal regulation of glucose level, favorable pregnancy outcomes and weight. Intervention group demonstrated higher levels of compliance (83.3 ± 12.5% vs. 70.4 ± 10.1%, p < 0.001), lower HbA1C before delivery (4.7 ± 0.2 vs. 5.3 ± 0.3, p < 0.001). Fasting (4.6 ± 0.4% vs. 8.3 ± 0.6%, t p < 0.001)	**Accept –** 5/5

		P- GDM women I – Mobile Health C - Standard outpatient treatment model O – Glucose level, pregnancy outcome and maternal weight	instructions. Duties included giving answers to queries concerning topics. **CG** Standard Outpatient treatment model. The daily protein, fat and carbohydrate requirements were assessed by a nurse according to weight and activity levels. The nurse then created a scheduled workout plan, choose appropriate physical exercises and undertook checks of their diet and exercise scores when they returned for further visits. **Time & Follow-up** Once a week for 3 consecutive weeks. Every 2–4 weeks (When stabled)	**Implemented (Competency)** Education Nurse **Outcome Measure** Patient compliance Glucose level (fasting and 2 hours postprandial (2hpp) & HbAlc) Pregnancy outcome Maternal weight **Instrument used** 1. Glucose meter namely Dnurse 2. Dietary guidance (Personalized) **Theory (If any)** Not applicable	2hpp (7.9 ± 0.7% vs. 14.7 ± 0.8%, p < 0.001). Weight gain in the IG was less than CG (3.2 ± 0.8 vs. 4.8 ± 0.7, p< 0.001). The **Domains** 1. Knowledge / Information of GDM 2. Blood glucose monitoring 3. Lifestyle: - Diet and exercise 4. Others: - Medicine and weight management	
7	(Mirghafourvand et al., 2019) RCT N = 92 (46 each group) Country: Iran	**Goals / Objective** To measure how effective self-care training was in terms of pregnancy outcomes among women with GDM **Strategies-PICO** P- GDM women I – Diabetes self-care training C – Self-care training and routine prenatal care O – pregnancy outcome	**IG** Received four sessions GDM self-care training. The sessions contained lectures, questions and answers. When the first session ended, each participant was presented with an instructional booklet. Every week, the researcher phoned everyone in the intervention community to emphasize the training they had been given **CG** Only received routine pregnancy care education and the method of self-blood glucose control at home Just education on pregnancy care and instructions about the home-based regulation of levels of blood glucose were given to the control group **Time & Follow-up** Every week until delivered **Theory (If any)** Not applicable	**Approach & Technique** Group training sessions. Lectures, questions and answers. At the end of the first session, provided with booklet **Implemented (Competency)** Nurse Midwifery **Outcome Measure** Pregnancy outcome **Instrument used** Questionnaire on demographics Checklist of pregnancy outcomes: gestational age when delivery occurred, delivery type, indices of neonate anthropometrics.	**Impact** Self-care training for GDM reduced the frequency of macrosomia (0.05; 0.007 to 0.49; P = 0.009) and caesarean delivery (0.07; 0.02 to 0.23; P < 0.001). Result was significance difference between groups. Women with GDM were able to reduce their macrosomia rates and caesarean delivery frequency through self-care training. **Domains** 1. Knowledge/Information of GDM: - Concept of self-care 2. Blood glucose monitoring 3. Lifestyle: - Diet and controlling GDM with exercise 4. Others: - Prevention of infection and foot care	**Accept –** 5/5
8	(Gharachourlo et al., 2018) RCT	**Goals / Objective** To determine how the lifestyles of women with high-risk pregnancy and GDM were affected by an approach to	**IG** The subjects were given routine pregnancy care counselling and six sessions on lifestyle modifications	**Approach & Technique** In a group, once a week and 1.5 hours per session. Booklet provided **Implemented (Competency)**	**Impact** If they apply the correct counselling principles to resolve problems faced by mothers, a midwife might more	**Accept –** 5/5

	N = 84 (42 each group) Country: Iran	counselling that involved health literacy **Strategies-PICO** P - GDM women I - Health literacy counselling C – Health literacy counselling Vs routine pregnancy counselling O - Health literacy and lifestyle	based on the health literacy approach. Session 1: Explaining on GDM, lifestyle coping Session 2: self-awareness skills, explaining the suffering and difficulties they experienced, introducing and learning how to use insulin Session 3: Sexual health Session 4: Nutrition and nutritional supplements Session 5: Introduction to risk factors Session 6: Problem-solving, breastfeeding and postpartum care CG Received 6 sessions counselling on regular antenatal care advice as per Iran's Ministry of Health and Medical Education's stable national maternal protocol. **Time & Follow-up** Before, immediate after counselling and three weeks after counselling sessions Booster by phone calls **Theory (If any)** Not applicable	Researcher (Midwifery) **Outcome Measure** Health literacy Lifestyle **Instrument used** Iranian Health Literacy Questionnaire (IHLQ) Lifestyle Questionnaire (LSQ)	effectively improve a mother's health and pregnancy outcomes. The two groups' mean lifestyle and health literacy scores differed significantly straight away and three weeks post-intervention IG=175.64±12.84, 184.00±12.24, P<0.001 CG=151.33±18.33, 153.40±16.56, p<0.001 **Domains** 1. Knowledge / Information of GDM: - - awareness skills: suffering on GDM, method and coping of insulin 2. Lifestyle: - Basic nutrition and essential diets, physical exercise 3. Others: - Emotional skill, concepts of communication skills	
9	(Kim et al., 2019) Quasi-experiment N = 44 (22 each group) Country: Korea	**Goals / Objective** Learner-centered education on behaviors linked to self-care was to be provided for patients with GDM through an online self-care program that involved consistent counseling and evaluation while childbirth approached. A further aim was to ascertain how this program affected self-care behavior, anxiousness, feeling depressed, and levels of blood glucose **Strategies-PICO** P- GDM women I – web-based self-care program and nutrition education	**IG** Subjects were given the online self-management program and education on nutrition, called DIETEX. The group members completed a weekly online health diary recording their fasting blood glucose levels and step counts every day. The researcher reviewed the dietary and exercise patterns of the participants once a week for 20-30 minutes per session and administered individual web-based education. **CG** Nutrition education. **Time & Follow-up** 12 weeks **Theory (If any)**	**Approach & Technique** Web-based self-care program Personalized education with counseling and emotional Support **Implemented (Competency)** - Nurse - Nutritionist **Outcome Measure** Self-care behavior score, Anxiety score Depression score. Glucose level (Hb1Ac, Fasting blood glucose and 1 hour postprandial (1hpp) **Instrument used** Department of Endocrinology examination data was used to measure the questionnaires on self-care behaviors, anxiety, and	**Impact** The program of web-based self-care was effective. Increased self-care behavior scores in both groups; CG: 31.5 ± 6.7 to 42.8 ±6.3, IG: 34.9 ± 8.2 to ±43.5 ±6.4, p=0.001 Decreased anxiety in the IG by 5.1 points but increased by 1.0 point in the control group (p = 0.048). Depression in- creased in both groups HbA1c: Decreased from baseline and lower than the control group. CG:5.1 ± 0.4 to 5.3 ± 0.2, IG: 5.1 ± 0.2 to 5.0 ±0.2, P=001 Fasting and 1hpp decreased in the experimental group but not significantly. **Domains** 1. Blood glucose	**Accept –** 5/5

		C – self-care program Vs nutrition education O - Self-care behaviors, anxiety and depression score. Glucose level.	Not applicable	depression; indicators assessed blood glucose.	Monitoring 2. Lifestyle: - diet therapy, physical activity & exercise 3. Others: - Weight management	
10	(Mohebbi et al., 2019) Quasi-experiment N = 110 (55 each group) Country: Iran	**Goals / Objective** To ascertain how an intervention program based on theory affected women with gestational diabetes mellitus (GDM). **Strategies-PICO** P- GDM women I – Self management education C - SuRoutine GDM education O – HbAIc and self-management	**IG** Earned education in self-management focused on the Health Belief Model (HBM). The content included: - 1. Basic information of GDM 2. Self-management: perceptions of susceptibility to and severity of GDM, obstacles and advantages, perceptions of self-efficacy and self-management through the incorporation of cues for action. 3. Specific topics on healthy diet and healthy lifestyle. To enhance participants' self-efficacy, obtainable of goals and motivational interviews were used in educational sessions. **CG** Regular clinic-based education **Time & Follow-up** 3 and 6 months after intervention **Theory (If any)** Health Belief Model (HBM)	**Approach & Technique** Group discussion. Lectures, power point presentation, role play and small booster by phone calls as reminder. Phone call as small booster **Presented by:** Not mentioned **Outcome Measure** Hemoglobin iMac level Score of HBM construct **Instrument used** Hospital record for Hemoglobin IAcSelf-management questionnaires based on HBM	**Impact** Intervention based on HBM able to enhance healthy behaviors and glucose control for GDM. The post-intervention scores of the HBM construct in the IG differed significantly in comparison to the CG ($P < 0.001$). In the IG, HbA1c was shown to differ significantly before and after three and six months ($P < 0.001$); meanwhile, no significant differences could be identified in the CG ($P > 0.05$) **Domains** 1. Knowledge / Information of GDM: - Basic information of GDM, figures and self- management based on HBM 2. lifestyle: - Healthy diet And healthy lifestyles	**Accept 5/5**
11	(Skar et al., 2018) Interpretative phenomenological analysis in RCT N = 17 (from intervention group only) Country: Norway	**Goals / Objective** To examine how participants experienced the use of an app in terms of controlling their blood glucose values and receiving details about health and nutrition. The RCT was intended to ascertain if using the app made any contribution to improved values of blood glucose among women with GDM. Oral glucose testing at three months postpartum was used to measure this. **Strategies-PICO** P- GDM women I – Pregnant + app C - Intervention Vs. Standard	**IG** Each respondent used the Pregnant + app, which could perform analyses of the process of automatically transferring values of blood glucose. The transfer of the glucose values to the app occurred using a measurement tool; a graphic overview of the values of blood was incorporated. Each respondent was also given tailored health and nutrition information in written form. **CG** Standard care for GDM. Instructed to record blood glucose levels and provide them with written accompanying reports on verbal health and nutrition information.	**Approach & Technique** Mobile app. Automatic transfer for blood glucose and analyze the value. Semi-structured interviews are used and recorded. **Implemented (Competency)** Researcher (Nutritionist) **Outcome Measure** Experiences of using the Pregnant + app **Instrument used** Smartphone: - Pregnancy + app Semi-structured interview	**Impact** The smartphone app might support women with GDM, especially in terms of ways they manage blood glucose. **Domains** 1. Knowledge / Information of GDM**: -** Information of Health 2. Blood glucose monitoring 3. Lifestyle: - Nutrition	**Accept –** 5/5

		Care O – Experiences of using the Pregnant + app	**Time & Follow-up** 3-10 months postpartum experience's interview **Theory (If any)** Health Belief Model			
12	(Carolan-Olah & Sayakhot, 2019) Qualitative study N = 18 Country: United States	**Goals / Objective** To examine how a group of Hispanic women originally from Mexico but then in El Paso, Texas, experienced life after a GDM diagnosis. A further aim was to understand these participants' difficulties while they self-managed their GDM. **Strategies-PICO** P - GDM women I - Self-management C - No O - experiences and challenges on self-managing their GDM	**IG** Each participant was provided with a nutritional class featuring food values, changing one's diet and foods that should be limited or avoided. The subjects were also given guidelines on monitoring blood glucose and controlling their GDM through healthy food and exercise. **CG** No control groups **Time & Follow-up** After 3 weeks self-management **Theory (If any)** Not applicable	**Approach & Technique** Face to face interview using semi-structured questions. Participants were free to speak about their opinions and knowledge. **Implemented (Competency)** Not mentioned **Outcome Measure** An experiences and challenges **Instrument used** Semi-structured questions Interview transcript	**Impact** Participants struggled to fulfil the self-management requirement that involved major improvements in diet and exercise**.** They are highly motivated on necessary dietary and exercise changes to successful in GDM management. **Domains** 1. Blood glucose monitoring 2. Lifestyle: - Healthy eating and exercise	**Accept 5/5**
13	(Rokni et al., 2022) Quasi-experiment N = 54 (27 each group) Country: Iran	**Goals / Objective** To assess how diabetic self-management training affects GDM women's quality of life and blood glucose levels **Strategies-PICO** P - GDM women I - 5A model Self-management education C - Routine education O - Blood glucose level and quality of life	**IG** 3 sessions of self-management education based on the 5A model. 1. Evaluation and direction: Emphasized the action and advantages of the behavior change. 2. Agreement - Provide educational sessions on managing blood sugar levels, stress, and a balanced diet activity, stress, and blood glucose management. 3. Follow up - The agreed-upon operational strategy and behavior targets were reviewed, and their level of success was assessed during the interview sessions. Goals or operational plans were adjusted to consider the participants' health. **CG** Routine education **Time & Follow-up** Daily for the first two weeks Twice a week for the next two weeks,	**Approach & Technique** Depending on the participant's state, approached either singly or in a group. Each educational session lasts for 1.5 hours. Each participant received a pamphlet containing educational material. **Implemented (Competency)** Not mentioned **Outcome Measure** Quality of life Blood glucose level **Instrument used** Diabetes quality of life questionnaire (DQOL). Checklist for blood glucose level	**Impact** The self-management education was effective in improving the quality of life and blood glucose control of GDM women. The mean blood glucose level of the intervention group was significantly lower compared to the control group. group ($p < 0.001$) and quality of life in the intervention group was significantly improved when compared to the control group ($p < 0.001$). **Domains** 1. Blood glucose monitoring 2. Lifestyles: Healthy eating and Physical activity 3. Others: stress	**Accept – 5/5**

			Once a week until the end of the follow-up period. **Theory (If any)** Not applicable			
14	(Tian et al., 2021) RCT N = 269 (133 intervention group and 136 control group) Country: United States	**Goals / Objective** To determine if providing health information and lifestyle counselling through a WeChat group chat was more helpful at helping GDM women regulate their glucose levels (GL) than receiving traditional clinical prenatal care. **Strategies-PICO** P - GDM women I – WeChat group management C –Standard perinatal prenatal care O – Glucose level and pregnancy outcome	**IG** Encourage patients to actively participate in managing their GDM and provide them with a task card with the essential criteria, such as nutrition recommendations, recipes from other group members, and activity guidelines. Patients' self-care according to the standards offered for their specific circumstances, and they uploaded pictures of their daily meals and snacks, physical activity, and GL experiences. **CG** GDM management training in accordance with the Beijing Municipal Health Commission, participants learned the fundamentals of GDM and self-management, including how to check glucose, what the goal GL levels are, and how to maintain a lifestyle journal. **Time & Follow-up** Weekly until delivery. **Theory (If any)** Not applicable	**Approach & Technique** WeChat software. Provide each person with self-management advice or provide others an example of a group member's circumstance. Interaction between participant and researcher via WeChat. **Implemented (Competency)** Researcher **Outcome Measure** Glucose level Pregnancy outcome **Instrument used** WeChat –Telemedicine Lifestyle Diary	**Impact** WeChat, a popular platform in China for health education and lifestyle change, is frequently more efficient in controlling blood sugar levels than just traditional professional prenatal treatment. Nearly all-time intervals had a higher qualifying rate for the intervention group than for the control group, with three time points seeing a statistically significant difference (p 0.001): Group 1 at T3 (54.8% vs. 83.3%) and Group 2 at T3 (62.5% vs. 80.0%) and T7 (75.0% vs. 100%). **Domains** Blood glucose monitoring Lifestyle: - Healthy eating and exercise	**Accept 5/5**
15	(Surendran et al., 2021) Explanatory sequential mixed-methods study N = 340 (170 in each group) and 14 semi structured interview from intervention arm Country: Singapore	**Goals / Objective** To assess the application's usability and to investigate how GDM women perceived the app's suitability in GDM management **Strategies-PICO** P - GDM women I – Habits-GDM Application C - Usual care O - experiences and challenges on self-managing their GDM	**IG** Applying habits to GDM will help women become more self-aware when controlling GDM. Three essential parts make up the application: 1. Interactive educational session 2. Tracking devices for self-monitoring blood glucose, physical activity, diet, and weight 3. Direction **CG** Usual care that includes a face-to-face education session led by a dietician and a diabetes nurse educator	**Approach & Technique** The mHealth application Virtual coach **Implemented (Competency)** Researcher **Outcome Measure** Usage frequency Behavior tracking Glycemic level Pregnancy outcome **Instrument used** Smartphone for Habits-GDM Semi-structured questions Interview transcript	**Impact** The mHealth applications are excellent in encouraging self-awareness about healthy lifestyle choices. Due to the poorly phrased food items and small food database, only 35 meals on average were reported for eight weeks by 57/170 users (or 34% of users). Users reported that the automatic coach messages immediately increased their sense of self-awareness regarding their dietary choices and motivated behavior [6/14 (43%)]. **Domains** 1. Self-blood glucose monitoring	**Accept 4/5**

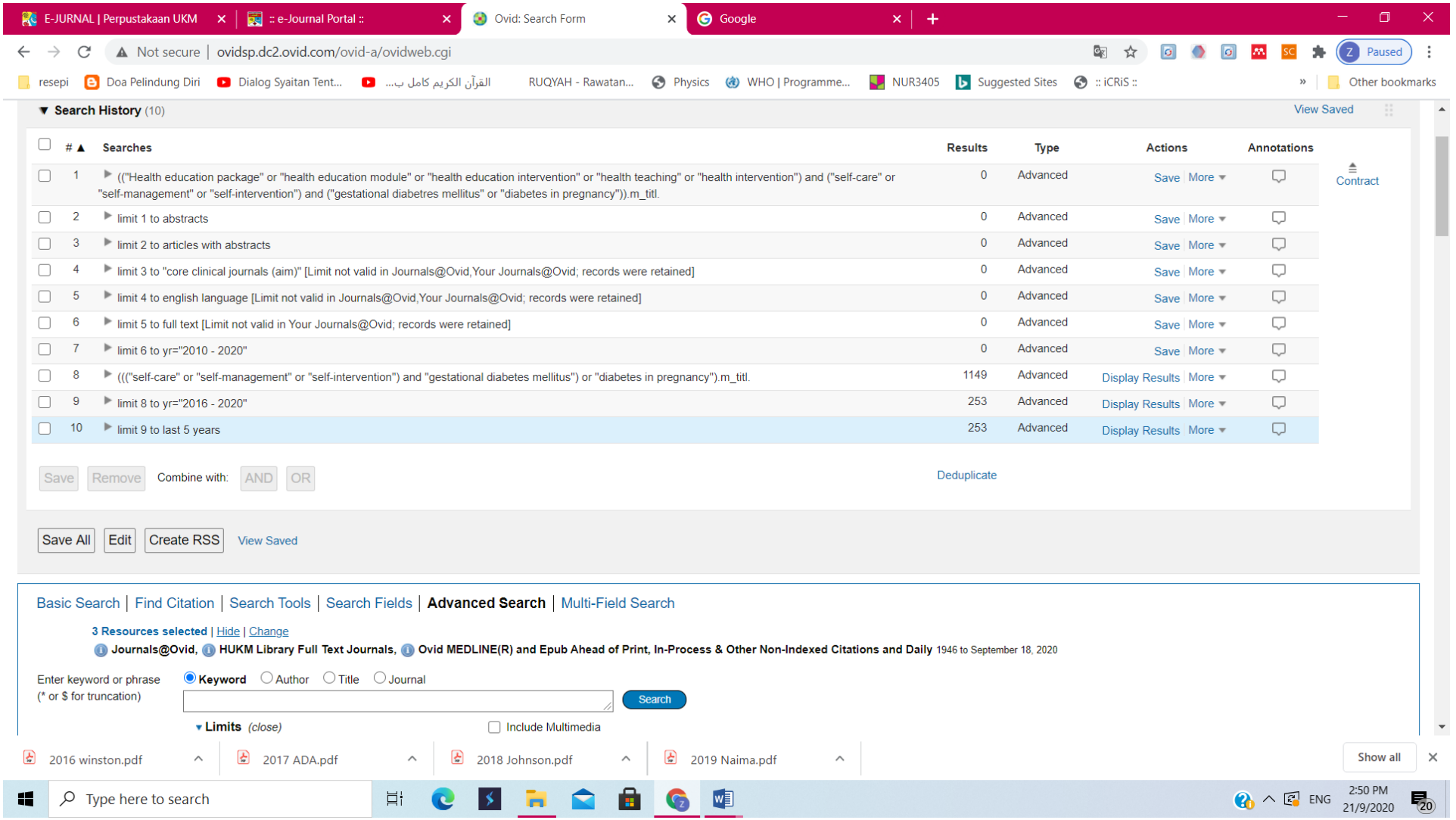
			Time & Follow-up 8 weeks **Theory (If any)** Health Belief Model		2. Lifestyle: physical activity, diet, and weight	
16	(He et al., 2022) RCT N = 170 (85 in each group) Country: China	**Goals / Objective** To investigate how tailored psychological nursing care and health education can affect the pregnancy outcomes of women with gestational diabetes mellitus (GDM) **Strategies-PICO** P - GDM women I - Health education combined with personalized psychological nursing C – Routine nursing education O - weight, blood glucose index, compliance, disease awareness, self-adjustment management ability, satisfaction, and pregnancy outcome	**IG** Combination of health education and personalized psychological nursing interventions: 1. Basic information on GDM 2. Nutrition and exercise 3. Medication 4. Blood glucose control level 5. Psychological stress and coping, 6. Postpartum follow-up Question and answer via online consultation. If participant developed anxiety or depression or other negative emotions, special psychological and counselling intervention session were given. **CG** Routine nursing education that included dietary guidance, psychological counselling and discharge instruction. **Time & Follow-up** From diagnosis until delivered **Theory (If any)** Not applicable	**Approach & Technique** One-to-one for education session and WeChat group for question and answer. The teaching approach: - PPT, pictures, cartoons, short videos, health education prescription, and self-management manual. **Implemented (Competency)** Team (Obstetrician and diabetes nurses) **Outcome Measure** Weight gain, blood glucose index, compliance, disease awareness, self-adjustment management ability, satisfaction, and pregnancy outcome **Instrument used** Pregnancy Weight and Blood Glucose Indicators**.** Compliance, disease awareness rate and Self-psychological adjustment and Management ability questionnaires	**Impact** The management of the patients' circumstances and the quality of the pregnancy were improved by an intervention carried out in accordance with conventional nursing practices. Blood sugar levels were significantly lower in the intervention group than in the control group (P <0.001). In comparison to the control group, there was a significantly higher rate of compliance, disease awareness, self-psychological adjustment, management ability, satisfaction, and pregnancy outcome (P< 0.001). **Domains** 1. Information/knowledge of GDM 2.Lifestyle: Nutrition and exercise guidance 3. Blood glucose monitoring 4. Others: psychological stress and coping, and postpartum follow	**Accept 5/5**
17	(Xie et al., 2022) RCT N = 100 (49 in Resistance exercise group and 51 in aerobic exercise group) Country: China	**Goals / Objective** To determine the effect of resistance exercise versus aerobic exercise on blood sugar level, insulin utilization used, and pregnancy outcome GDM women. **Strategies-PICO** P - GDM women I - Aerobic exercise C - resistance exercises for upper and lower limb muscle training	Both groups must complete at least 18 tasks three times each week for six weeks. As recommended by the American College of Obstetricians and Gynecologists for activity during pregnancy, the exercise session was limited to 50 to 60 minutes. **IG** Aerobic exercise: step walking, leg and arm exercises, as well as stretching exercises for the neck and arms, were the key components of the aerobic exercise group. Patients had to complete a minimum of 13 exercise sessions.	**Approach & Technique** Patients were monitored for any negative side effects, such as dyspnea, early membrane rupture, or vaginal bleeding; if any of adverse event occurred, the patients were advised to stop exercising and received prompt treatment from the Gynecologists and Endocrinologists on the research team. **Implemented (Competency)** Each intervention was performed by three members of this research group, and assisted by a sport medicine expert	**Impact** Both the strength exercise group and the aerobic exercise group had lower blood glucose levels after the intervention (p <0.05). The incidence of negative pregnancy outcomes, insulin utilization rate, and fasting blood glucose levels did not differ significantly between the two groups (p>0.05). **Domains** Aerobic exercise Resistance exercise	**Accept 5/5**

		O - Blood sugar level, compliance and pregnancy outcome	**CG** Resistance exercises for upper and lower limb muscle training were adopted, including elbow flexion exercise, ankle extension exercise, resistance exercise of the upper limb, leg lift exercise, upper limb dorsiflexion exercise, and leg abduction exercise **Time & Follow-up** 6 weeks duration **Theory (If any)** Not applicable	**Outcome Measure** Blood glucose level Patient compliance Pregnancy outcome		
18	(Kolivand et al., 2019) RCT N = 151 (75 intervention group and 76 control group) Country: Iran	**Goals / Objective** To ascertain how an innovative self-care package affected the maternal and neonatal outcomes among pregnant women with GDM, in comparison to the standard services. **Strategies-PICO** P- GDM women I – Health education package C - Health education package Vs Routine clinical services O - glucose level, self-efficacy and pregnancy outcome	**IG** Health education package (guidebook, logbook and educational software) given. Participant educate on: - - insulin injection (taught using a model) - stress reduction methods - several methods of relaxation, breathing, and meditation techniques - practice on appropriate exercises during pregnancy **CG** Routine visits from clinical service personnel, including endocrinologists or internists, as well as brief 10-minute training courses delivered by a nutrition expert and diabetes nurse on nutrition, control of plasma glucose, and injecting insulin. **Time & Follow-up** Three sessions every two weeks, with follow-ups lasting one month to seven weeks **Theory (If any)** Not applicable	**Approach & Technique** Face to face group discussions. Used slideshows, videos, question-and answer sessions. **Implemented (Competency)** Researcher (passed diabetes self-care educational courses) **Outcome Measure**. Levels of glucose (FBS & 2hpp) Scale of self-efficacy Maternal and neonatal outcomes (Apgar scores, birth weights, delivery types, neonatal hospitalizations) **Instrument used** Hospital records and postpartum data. Self-efficacy questionnaire	Regarded as the country's first GDM self-care package available for use by midwives (nurses) and diabetes educators. Effective in 2hpp (105.1 ± 17.6 vs 127.2 ± 20.4 mg/dL, p<0.001. Positive effect in self-efficacy (74.4 ± 7.0 vs 36.4 ± 5.2, p<0.001) and pregnancy outcomes. Not significant in FBS (p=0.163) **Domains** 1. Knowledge/Information of GDM 2 Nutrition - weekly and daily tables on food intake 3. Self-management blood glucose. 4. Insulin 5. Physical activity & exercise 6. Mental health & pregnancy 7. Delivery & post-partum care	**Accept 5/5**
19	(Al-Hashmi et al., 2018) Quasi-experiment	**Goals / Objective** To ascertain how effectively a self-efficacy-enhancing intervention (SEEI) for a group of women with GDM from Oman improved their	**IG** The self-efficacy-enhancing intervention (SEEI) used numerous self-efficacy-enhancing methods, consisting of motivational messages, role modelling, setting targets and	**Approach & Technique** Individualized approach. Used video presentation, given pamphlet and motivational text messages biweekly. **Implemented (Competency)**	**Impact** For GDM, the SEEI produced higher perceived self-efficacy and true maintenance of healthy behaviors. The SEEI and control groups differed significantly in regard to the pre-post	**Accept 5/5**

	N = 90 (45 each group) Country: Oman	perceived self-efficacy and real maintenance of healthy behaviors. **Strategies-PICO** P - GDM women I - self-efficacy-enhancing intervention (SEEI) C – SEEI Vs. Standard antenatal care O - Perceived self-efficacy and Self-care behaviors	mastery experiences. Women with GDM would (ideally) be inspired to adhere to the recommended healthy behaviors. The respondents instructed to watch a health education video. The IG then received encouragement to practice the session's recommended activities. Each participant was given a blood glucose meter, as well as training so that the readings could be checked and recorded four times daily for the duration of the study. Respondents also received individualized educational sessions by diabetes dietician. **CG** Standardized antenatal care was received, including regular antenatal visits, blood sugar profiling, and monitoring fasting blood sugar, glucose, along with individually tailored educational classes with a dietician specializing in diabetes. **Time & Follow-up** Baseline and 4 weeks after intervention **Theory (If any)** Not applicable	Nurse and diabetes dietician **Outcome Measure** Perceived self-efficacy Self-care behaviors **Instrument used** Diabetes Management Self-Efficacy Scale (DMSES) Summary of Diabetes Self-Care Activities (SDSCA)	score changes for perceived self-efficacy (9.9 ± 19.6 versus −1.8 ± 17.6; P <0.05) and actual adherence to healthy behaviors (1.5 ± 1.1 versus 0.4 ± 0.8; P <0.01). **Domains** 1. Knowledge / Information of GDM: - General information on GDM, complication of GDM 2. Blood glucose monitoring: - self-monitored glucose levels 3. Lifestyles: - healthy diet and physical activity	

Searching Strategy

Searching strategy for year 2016 to 2020 (Ovid)



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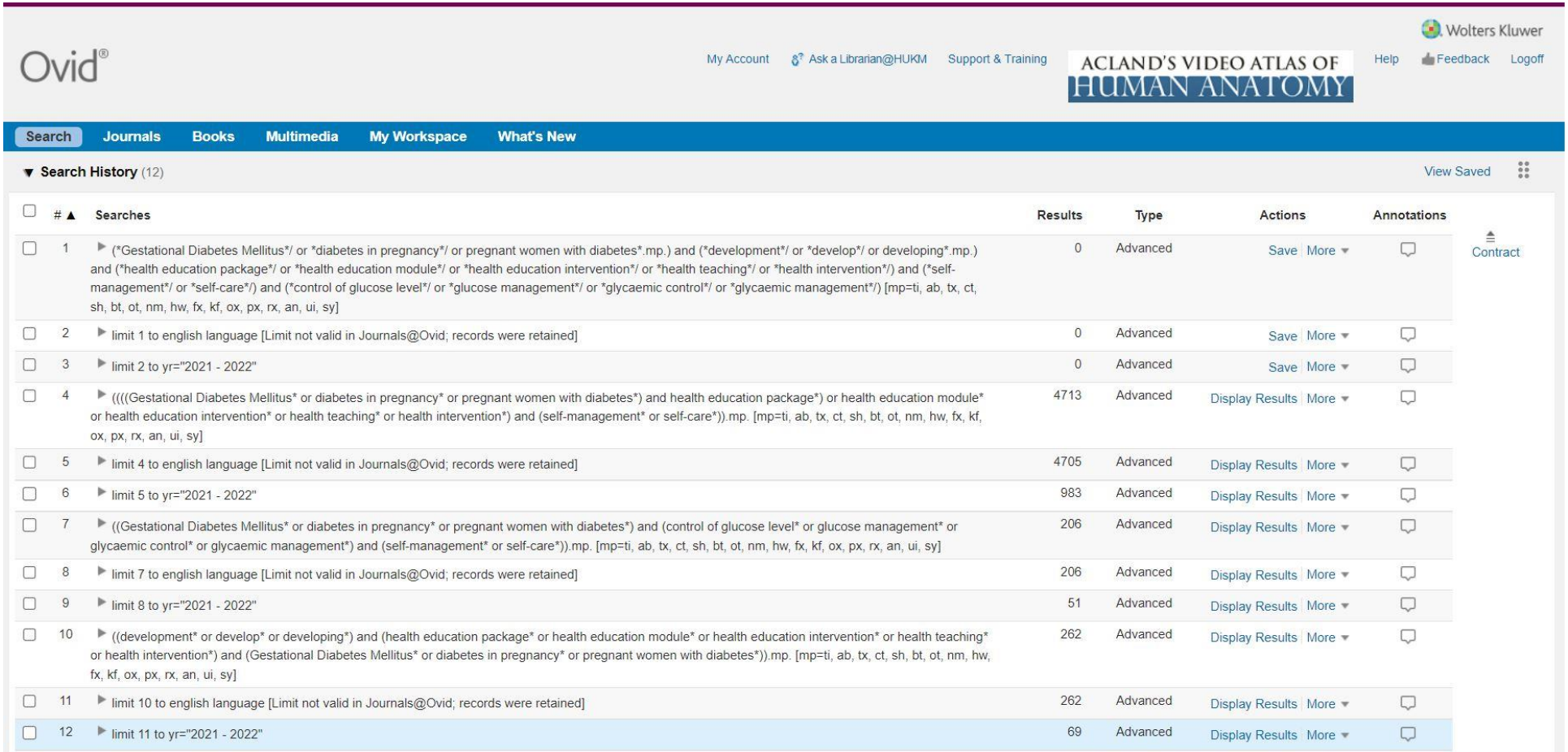

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9	limit 8 to yr="2021 - 2022"	51	Advanced	Display Results | More	
10	((development* or develop* or developing*) and (health education package* or health education module* or health education intervention* or health teaching* or health intervention*) and (Gestational Diabetes Mellitus* or diabetes in pregnancy* or pregnant women with diabetes*)).mp. [mp=ti, ab, tx, ct, sh, bt, ot, nm, hw, fx, kf, ox, px, rx, an, ui, sy]	262	Advanced	Display Results | More	
11	limit 10 to english language [Limit not valid in Journals@Ovid; records were retained]	262	Advanced	Display Results | More	
12	limit 11 to yr="2021 - 2022"	69	Advanced	Display Results | More	

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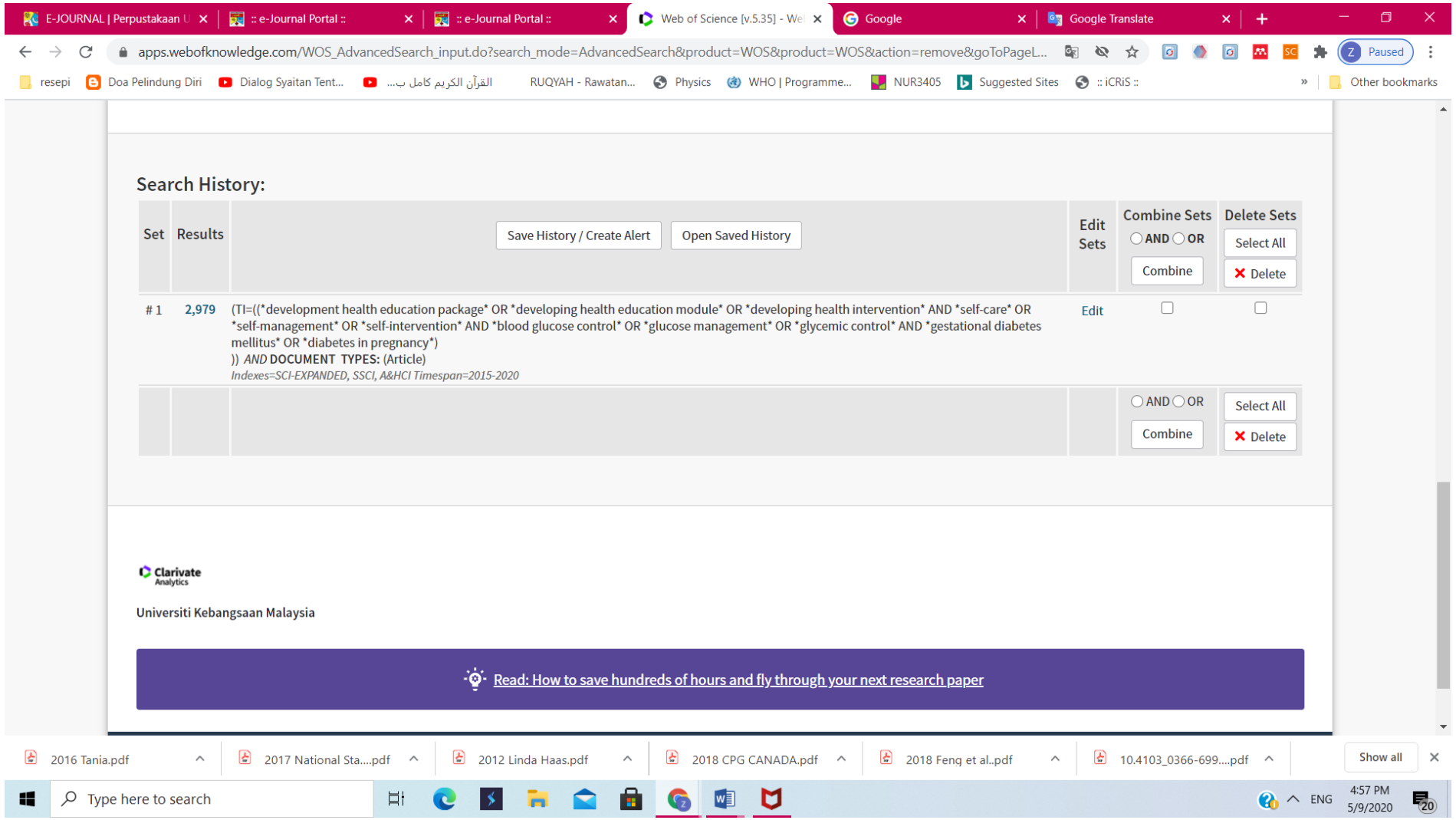
Searching strategy for year 2016 to 2020 (Web of Science)



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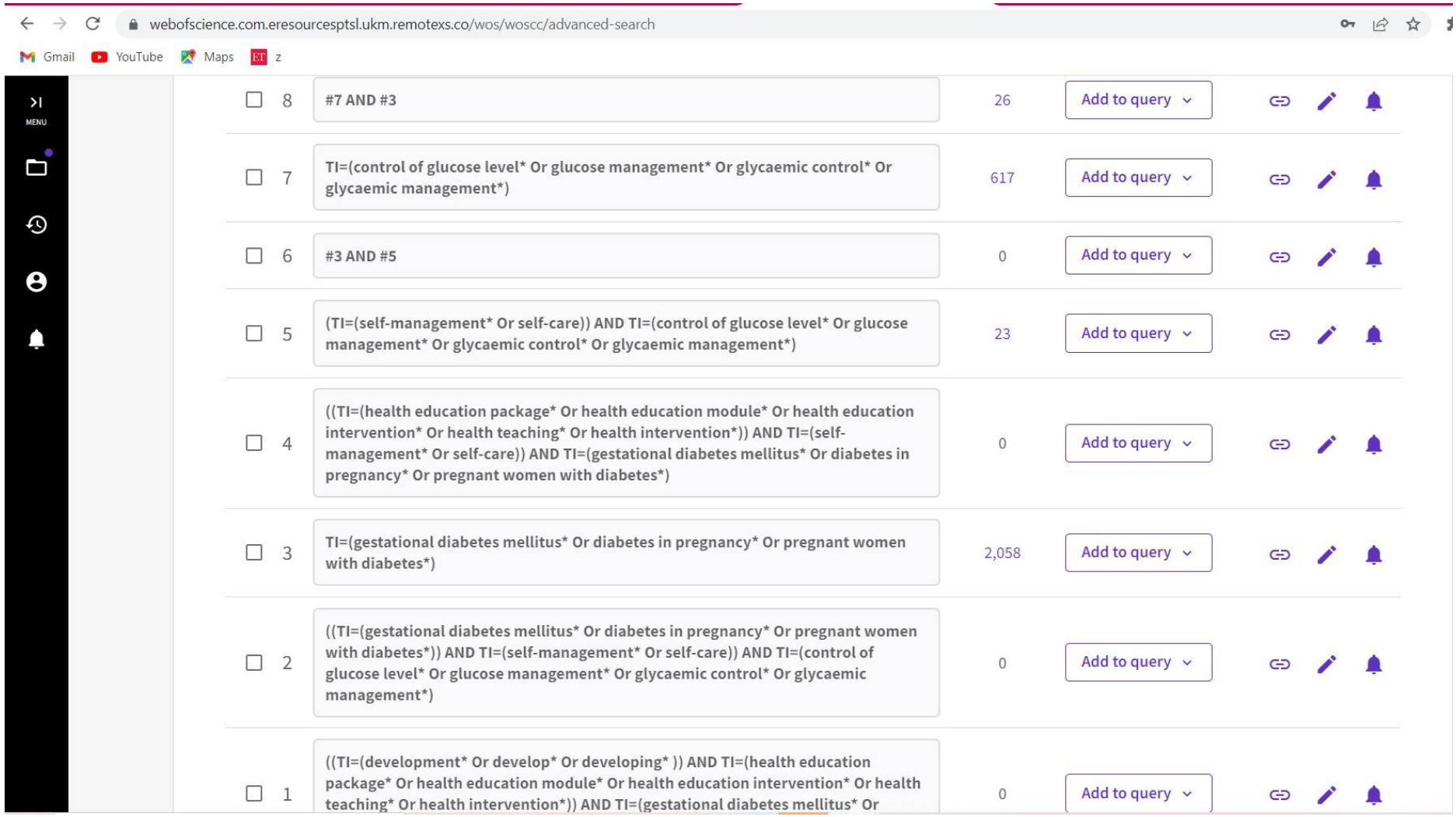

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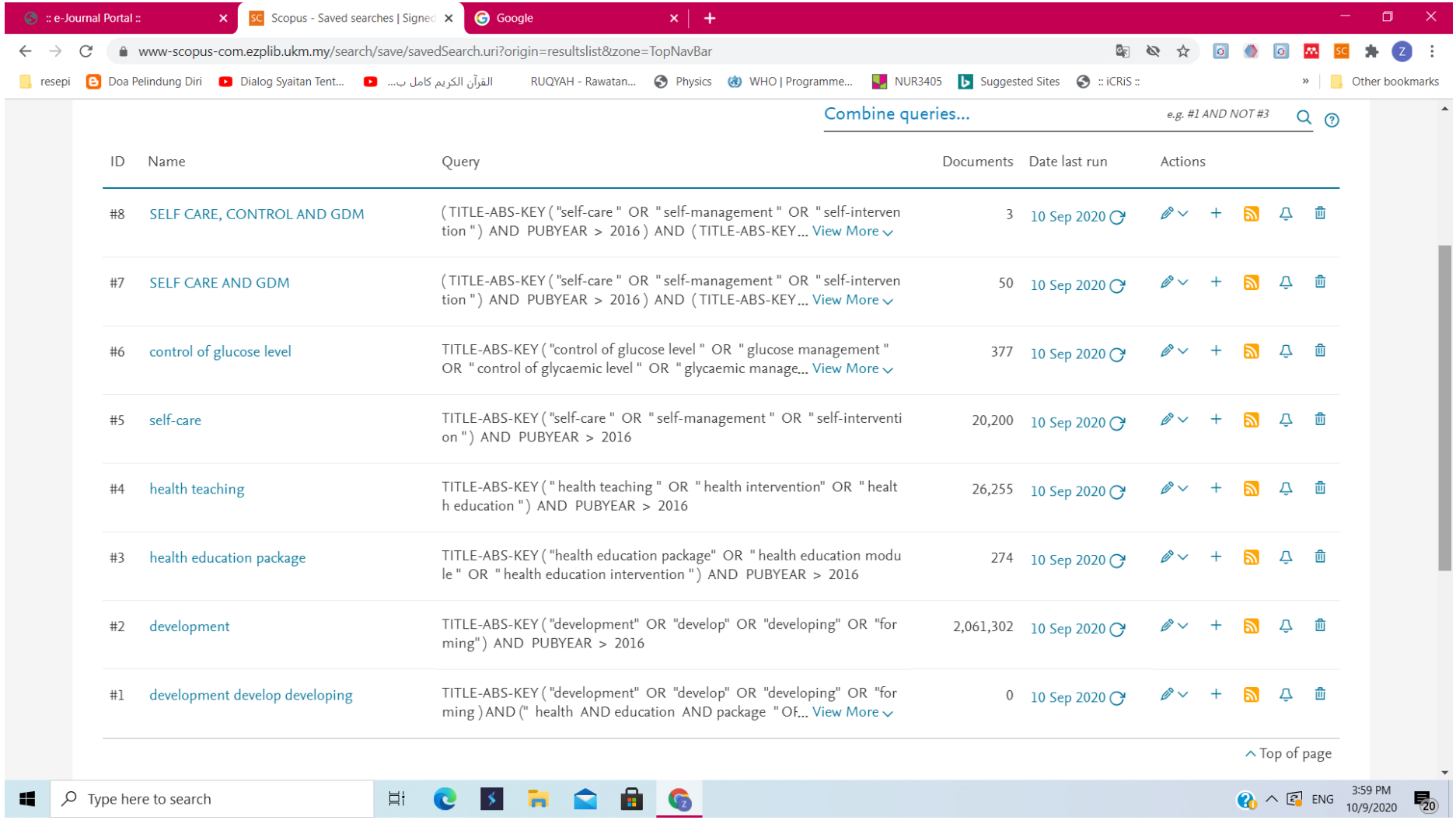

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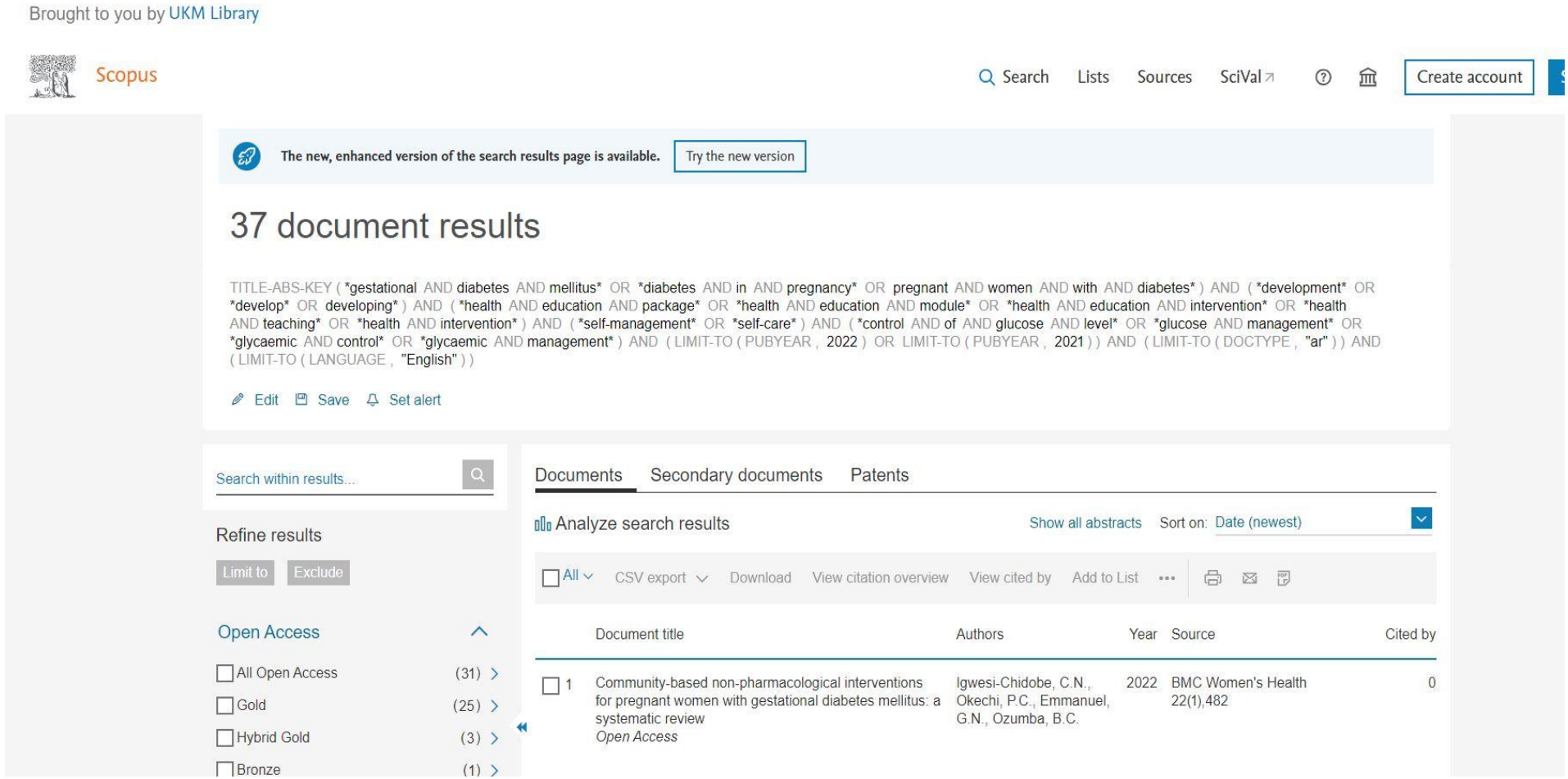

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