

Interdisciplinary Care Compliance with Antenatal Physical Activity and Exercises Guidelines for Management of Excessive Gestational Weight Gain for Prevention of Overweight and Obesity, Busia County, Kenya

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ABSTRACT

Gestational overweight and obesity remains one of the leading causes of adverse health consequences for women and their offspring. Despite recommended antenatal guidelines on gestational weight gain monitoring and management of excessive weight gain as a risk factor for poor pregnancy outcomes, trends continue to increase. The study determined interdisciplinary compliance to antenatal guidelines by antenatal care providers to stipulated strategies for management of excessive gestational weight gain for prevention of overweight and obesity during pregnancy in primary healthcare settings, in Busia County, Kenya. Socio-Ecological Theory guided the study. A prospective descriptive study design was adopted. The study population were antenatal care workers from level four primary healthcare settings in the antenatal clinics. Stratified sampling was used to select urban and rural health facilities while purposive sampling was used to select key informants. A sample size of 43 was selected. A structured questionnaire was administered face-to face by investigators. The data collected was entered and analysed with SPSS version 20. The study revealed majority (67.4%) antenatal care providers in the interdisciplinary team were females with 32.4% males with a ratio of 1:2. Majority (37.2%) were aged between 26 to 33 years with (46.5%) midwives nurses. Majority (58.1%) qualified with a diploma and 39.5% had worked for more than 2-5 years. Majority (76.7%) revealed screening of gestational weight gain were practiced and implemented in line with National maternal policy for early detection of gestational overweight and obesity in ANC. There was a significant relationship on age and number of years worked with a (P-Value 0.000); one's qualification level (p-value 0.001); number of years of practice (P-value (P-value 0.003) that influenced weight gain screening that determined frequency of gestational overweight and obesity among pregnant women in antenatal clinics. Majority (46.5%) acknowledged gestational overweight and obesity were highest recorded in the second and third trimesters respectively. Majority (65.2%) recommended light aerobics. While 70% did not recommend high-intensity exercises or daily activities participation. A few (46.5%) recommended strengthening while 69.8% vigorous exercises. Majority (90.7%) were awareness of gestational overweight and obesity trends occurred between 18 to 30 years in their 2nd and 3rd trimesters. Despite screening of gestational weight gain, more than (75.2%) in the four hospitals had never and less often diagnosed pregnant women with gestational hypertension, diabetes mellitus, obstructed labour, prolonged labour and urinary incontinence. There is need for more proactive implementation of antenatal physical activity and exercises guidelines for management of excessive weight gain for management of overweight and obesity among pregnant women aged between 18-30 years in their 2nd and 3rd trimesters. More so, there is need to screen and document pregnancy-related risks to excessive weight gain in the 2nd and 3rd trimesters. The study recommends further exploration interdisciplinary care compliance to prescription of supervised structured antenatal physical activity and exercises guidelines to maintain recommended weight gain for management of gestational overweight and obesity.

Key words: Antenatal Care Providers, Compliance, Exercises, Gestational Overweight, Interdisciplinary, Obesity

I. INTRODUCTION

Gestational overweight (GOW) and obesity (OB) involve excessive weight gain or high body fat levels during pregnancy, which impact both maternal and fetal health (Kent et al., 2024; Darling et al., 2023; Simko et al., 2022; Langley-Evans et al., 2022). GOW is a BMI of 25-29.9 kg/m², and OB is a BMI of 30 kg/m² or more (Simko et al., 2022; WHO, 2021). The global prevalence of GOW and OB continues to increase, particularly in urban areas, and is now spreading to low- and middle-income countries like Kenya due to urbanization, fast refined foods, and sedentary lifestyles assumed during pregnancy (Darling et al., 2023; Wambui et al., 2020). This issue has also been linked to urbanized means of transport, unhealthy fatty and sugary diets, and low physical activity participation in both urban and rural areas (Mkuu et al., 2021; Kumar & Ranjan, 2021; Nurul-Farehah & Rohana, 2020).

GOW and OB remains under-recognized in antenatal care (ANC) services in addressing EWG comprehensively. In Kenya, ANC services do face limited infrastructure and lack of knowledge by antenatal healthcare provider (HCPs)



with compliance to antenatal physical activity and exercises guidelines (Olander et al., 2020; Wamalwa et al., 2020). Gaps in interdisciplinary and multi-disciplinary approach expertise in physical activity prescription, nutritional counselling, public health education, and midwife weight gain screening to prevent EWG and improve health outcomes for both mother and child still remains (Puoane et al., 2019). However, nutritional guidance during pregnancy is often insufficient, particularly in some settings where antenatal HCPs' knowledge and awareness of the risks of GOW and OB is low (Dewidar et al., 2023).

GOW and OB are often overlooked in antenatal care in Kenya, where limited resources and healthcare providers' lack of knowledge hinder compliance with physical activity and exercise guidelines (Olander et al., 2020; Wamalwa et al., 2020). Gaps in interdisciplinary care expertise and inadequate nutritional guidance may contribute to the challenges in managing EWG and improving maternal and fetal health outcomes (Dewidar et al., 2023; Puoane et al., 2019).

It is estimated 50% of pregnant women will gain excess weight beyond recommendations leading to poor maternal and foetal health outcomes and lifespan vicious cycle of OW and OB (Walker et al., 2019). Excessive gestational weight gain (EGWG) remains a leading cause of maternal OW and OB during pregnancy, with significant maternal short-term, long-term, and intergenerational health complications mostly hypertensive disorders, obstructed labor, and birth asphyxia and cerebral palsy (Heslehurst et al., 2023; Mitha et al., 2023; Masaba et al., 2022; Sun & Chien, 2021). For infants, maternal obesity is linked to fetal macrosomia, birth injuries, stillbirths, neonatal death, and childhood OB (Herring et al., 2015; Sondglass et al., 2014; Boney et al., 2005). Infants born to overweight or obese mothers are also more likely to develop cardio-metabolic disorders in later life (Langley-Evans et al., 2022). For mothers, increases risks for gestational diabetes, preeclampsia, hypertension, and increased rates of caesarean deliveries as noted by American College of Obstetricians and Gynecologists (ACOG), 2020; World Health Organisation (WHO), 2018). In Kenya, maternal obesity contributes significantly to maternal deaths, with hypertensive disorders and obstructed labor accounting for a substantial portion of these deaths (Masaba et al., 2022). Despite pregnancy being an optimal time for activity interventions, many women, especially in Kenya, continue to gain excessive weight, heightening the risks for maternal morbidity and mortality (Wambui et al., 2020). Maintaining healthy GWG through proper lifestyle management has been linked to better pregnancy outcomes and long-term health benefits for both mother and child (Mitha et al., 2023).

Compliance with interdisciplinary monitoring and management of gestational weight gain (GWG) by antenatal care (ANC) healthcare providers (HCPs) is crucial, but gaps in knowledge, awareness, and implementation of personalized guidelines based on pre-pregnancy BMI exist (Tatah et al., 2023; Grieger et al., 2021; Musa et al., 2020). Many ANC HCPs do not follow established guidelines from ACOG (2021) and IOM (2019), which are essential for preventing excessive gestational weight gain (EGWG), gestational overweight (GOW), and obesity (OB) (Wamalwa et al., 2020; Puoane et al., 2019). Lack of knowledge and adherence to these guidelines may leads to suboptimal care, increasing risks for pregnancy complications (Chumba et al., 2021; Kamau et al., 2019). This study highlights current gaps and areas for improvement in the implementation of antenatal care practices for managing GWG to prevent GOW and OB as pointed by Simkhada et al. (2020) and Olander et al. (2021).

Monitoring weight gain during pregnancy, across all trimesters, is crucial for identifying deviations and enabling early interventions by ANC HCPs (Syed et al., 2021; Yang et al., 2022). However, the use of anthropometric measurements like BMI and mid-upper arm circumference (MUAC), along with documenting weight gain in maternal health records, remains inconsistent, despite their importance in WHO guidelines (2022). Many women exceed recommended weight gain limits (ACOG, 2021), increasing their risk for GOW and OB. Early detection requires interventions such as managing calorie intake, increasing physical activity, and regular weight tracking, to offer targeted counselling and support (WHO, 2021; Berge et al., 2016). An interdisciplinary approach has been recommended for managing GWG, but the role of physiotherapists in ANC is underutilized despite evidence supporting modified physical activity (Ochieng et al., 2018). In Busia County, the knowledge, awareness, and compliance of ANC HCPs with interdisciplinary guidelines on weight gain, physical activity, and nutrition for preventing GOW and OB remain unclear.

1.1 Statement of the Problem

The management of weight gain for prevention of GOW and OB remains a significant challenge in healthcare settings, despite growing awareness of its health risks. ANC services, designed to enhance maternal and fetal health, often lack sufficient guidance and interventions for managing EWG. These particularly prominent in low- and middle-income countries like Kenya, where ANC HCPs' inadequate training on physical activity and exercises interventions and lack of infrastructure exacerbate the problem (Puoane et al., 2019; Ochieng et al., 2018). It unclear if HCPs to cultural attitudes prioritize EWG management during pregnancy (Escañuela et al., 2022; Kamau et al., 2020; Ferreira et al., 2020). As a result, many women retain postpartum weight gain or enter to pregnancy already OW and gain weight beyond the recommended guidelines, increasing the risk of gestational diabetes, hypertension, fetal macrosomia, and preterm delivery (ACOG, 2021; WHO, 2021). In a situation, where the rising prevalence of GOW and OB pose health cost burdens to healthcare systems, due to increasing pregnancy related complications and long-term care (Masaba et al., 2022; Bauserman et al., 2020). Compliance to interdisciplinary care approach involving obstetricians, midwives,

dietitians, physiotherapists, and public health officers remains essential (Musa et al., 2020; Wambui et al., 2020). In Busia County, existing interdisciplinary ANC frameworks to adequately address antenatal care weight gain guidelines and interventions to lower GOW and OB for improved maternal and fetal health outcomes (Wamalwa et al., 2020; Puoane et al., 2019). Thus, there is need on focusing on early identification of excess weight gain, personalized weight management plans, routine nutritional counselling, and promoting physical activity for prevention of GOW and OB in Busia County, ANC settings.

1.2 Research Question(s)

What is the clinical practice with compliance to interdisciplinary care of recommended weight gain monitoring and antenatal physical activity guidelines in management of gestational overweight for prevention of obesity during pregnancy in ANC, Busia County, Kenya?

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Socio-Ecological Theory

To better understand how interdisciplinary care compliance to clinical practices by antenatal HCPs' to recommended physical activity and exercises guidelines for management of gestational overweight and obesity, the study adopted Social-Ecological Model (SEM) (Sun et al., 2023; Lee & Park, 2021; Timmermans et al., 2020). The SEM examined the multifaceted determinants influencing gestational weight management to prevent obesity, highlighting the roles of antenatal healthcare providers. The model emphasizes the interplay between various levels of influence, including: Intrapersonal Level that focuses on the individual HCPs' compliance, with recommended weight gain monitoring and screening guidelines for early interventions to manage OW and prevent OB. At interpersonal Level it focuses on the interactions between interdisciplinary healthcare providers in fostering understanding of each other roles, referring and motivating adherence to regular weight monitoring and management guidelines for effective interventions. That maximizes maternal and fetal health benefits.

At organizational and Community Level: The SEM also highlights how organizational policies, including the implementation of antenatal physical activity (PA) and exercise (ANEx) guidelines in ANC settings, remains one of the major clinical practice in preventing EGW (Hollis et al., 2024; Sun et al., 2023). Policy Level: The SEM aids in exploring how national maternal physical activity policies, within the National Physical Activity Action Plans (2018) guidelines (NPAAP) have been implemented and effectively integrated into ANC practices to manage EWG for prevention of GOW and OB management. However, it remains unclear how interdisciplinary care comply with implementation of antenatal physical activity and exercises guidelines by HCPs in ANC clinics in Busia. The theoretical constructs is shown below in Figure 1.

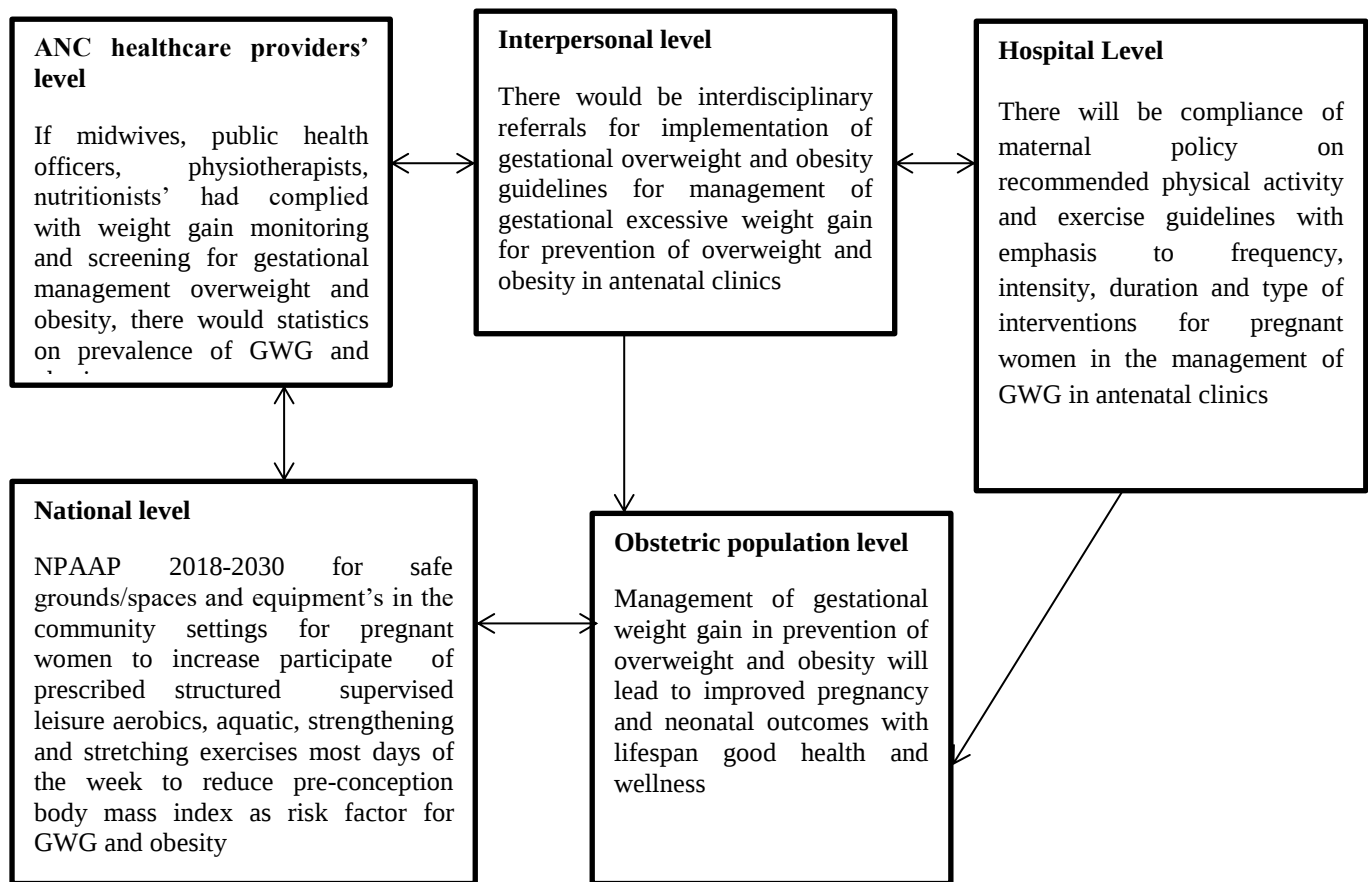


Figure 1
Theoretical Constructs

2.2 Empirical Review

2.2.1 Compliance to Interdisciplinary Approach for Gestational Weight Gain Monitoring Guidelines

Overweight and obesity among pregnant women is a growing global concern, affecting 30-40% in high-income countries and an increasing proportion in low- and middle-income countries like Kenya, where 30% of pregnant women are affected, raising risks like gestational diabetes and hypertension (WHO, 2021; Hinkle et al., 2019). Despite awareness, antenatal healthcare providers (HCPs) often fail to consistently monitor weight, provide nutritional counselling, and recommend physical activity (Dodd et al., 2019; Njeru et al., 2017), highlighting the need for better adherence to guidelines. Improved collaboration and training for HCPs can enhance compliance and outcomes (Simmons et al., 2021; Kingsland et al., 2021; Simpson et al., 2020). Interdisciplinary care in developed healthcare systems, like South Africa, shows better adherence (Tapsell et al., 2021). However, low-resource ANC settings in Kenya face infrastructure and cultural barriers, along with gaps in knowledge and adherence to national guidelines (Omondi et al., 2021; Kamau et al., 2020; Adebisi et al., 2020; Wambui et al., 2020; Ochieng et al., 2018; Berge et al., 2016).

2.2.2 Antenatal Care Guidelines for Management of Excessive Weight Gain for Prevention of Overweight and Obesity during pregnancy

Despite the importance of weight gain screening based on pre-pregnancy BMI and consistent monitoring, many antenatal HCPs fail to adhere to established guidelines by the Institute of Medicine (IOM, 2019), leading to excessive weight gain in pregnant women, increasing the risk for maternal obesity and complications (ACOG, 2021). In low-resource settings, inadequate training and challenges in delivering weight management interventions hinder guideline adherence (Syed et al., 2021). Personalized care has been shown to reduce weight gain compared to standard care (Althuisen et al., 2014), and implementing physical activity during pregnancy lowers the risk of childhood obesity and related health issues (Barakat et al., 2024; Díaz-Burrucco et al., 2021; Voerman et al., 2019). Barriers like lack of interdisciplinary referral networks, insufficient training, resources, and time constraints contribute to inconsistent guideline application (Wang et al., 2023; Moore et al., 2021). An interdisciplinary approach, involving obstetricians, midwives, dieticians, and physiotherapists, is most effective for managing gestational weight gain (Goldstein et al., 2020). In Kenya, the Social Health Insurance Fund (SHA) supports best practices, but more documentation is needed on HCP engagement with these guidelines (Ministry of Health, Kenya (MOH), 2023; Kapp et al., 2015).



2.2.3 Interdisciplinary Care Compliance Challenges with Weight Gain Monitoring and Management Recommended Antenatal Guidelines

Effective management of GOW and OB in Kenya is impacted by ANC HCPs' knowledge and adherence to weight monitoring, nutrition, and physical activity guidelines. Inadequate training in rural areas leads to inconsistent care and poorer outcomes (Chumba et al., 2021), while urban providers face challenges like high patient loads, time constraints, and limited resources (Wamalwa et al., 2020). Barriers include insufficient training, cultural norms that view EWG as healthy, and the lack of integration of GOW and OB management into routine antenatal care training (Simkhada et al., 2020; Puoane et al., 2019; Musa et al., 2020; Olander et al., 2021). Research in Busia County is needed to improve interdisciplinary management and lower GOW and OB (Grieger et al., 2021).

III. METHODOLOGY

3.1 Research Design

A prospective descriptive study design was adopted.

3.2 Study Location

The study was conducted in Busia County, Kenya. Busia lies in the former western province. It borders several other counties; to the East (Kakamega), North (Bungoma), South (Lake Victoria and Siaya), West (Uganda). Currently the Busia County has 7 Sub-Counties and several number of public healthcare facilities as follows; Teso North (11), Teso South (18) Nambale (13), Matayos (17), Butula (18), Samia (12) and Bunyala (9) some located in urban and rural settlements. According to Kenya Demographic surveys (Kenya National Bureau of Statistics [KNBS], 2022), the county has a total population 426,252 female with a total of 198,152 households. The county has fertility rate of 4.7 % above national average of 4.6%. Out of 426,252 total female populations in the seven sub-counties, 226,406 females were at their reproductive age of 15-49 years (County Integrated Development Plan (2018-2022; KNBS, 2022).

3.3 Target Population

The target population was approximately 20,000 healthcare providers working in the 98 public facilities with provision of ANC services in Busia sub county and referrals hospitals. There 88 health facilities namely; one county referral hospital, six Sub county referral hospitals (Kocholia, Nambale, Alupe, Khunyangu, Sio-Port, Port Victoria); 12 health clinics, 49 dispensaries, 10 medical clinics and six nursing homes offering ANC care services in these Sub-Counties from different level of hospital. Each sub-county and referral hospitals has a minimum of three (3) ANC care services.

3.4 Sample Size and Sampling Technique(s)

ANC were stratified into two (2) urban and 2 rural sub county referral hospitals. Kocholia and Alupe as urban while Port Victoria and Sio-Port as rural catchment as categorised by Kenya Demographics Health Surveys (KNBS, 2022). Purposive sampling was adopted for healthcare workers in ANC clinics. A total sample size of 43 antenatal HCPs was selected from the four sub county and referral hospitals. The key informants were midwives' nurses, physiotherapists, public health officers (PHOs), medical doctors/clinical officers and nutritionists in ANC in Busia County in Kenya.

3.4.1 Inclusion and Exclusion Criteria

Those HCPS who have worked in antenatal clinic in rural and urban settings for more than one year were included. Those on duty covering due to absence of others were excluded.

3.5 Data Collection Instruments

Data was collected using a structured questionnaire. The questionnaire had 3 section; socio-demographics data, practice on weight gain monitoring guidelines, and antenatal physical activity and exercise prescription by HCPs for weight gain monitoring and management of EGWG in prevention of gestational overweight and obesity during pregnancy.

3.6 Data Analysis

Descriptive statistics was adopted to analyze data. Data was presented in frequencies, percentages, bar graphs, histograms, regression multinomial logistic and chi-square. To understand how antenatal HCPs socio-demographics characteristics influenced compliance to GWG screening in relation to pregnancy related complications in ANC, a cross tabulation analysis was carried out using SPSS version 20. Data collection had reliability and validity of 0.968. To understand how antenatal HCPs socio-demographics characteristics influenced compliance to gestational weight screening in relation to pregnancy related complications in ANC, a cross tabulation analysis was carried out.

3.7 Ethical Considerations

Ethical clearance was obtained from the Institutional Research Ethics Committee from the Alupe University (AU-018/2024), National Commission for Science, Technology and Innovation (NACOSTI/P/24/36267), Kenya, Busia County and Referral hospital and sub-county and referral hospitals (CG/BSA/H/ADM/1/56/IX(38)). Informed written consent was sought from all the study participants. Participation was voluntary and withdrawal from the study at any time with no consequences. Participants' data was handled with confidentiality according to Kenya Data under Protection of Personal Information Act 24 of 2019 on Personal data.

IV. FINDINGS & DISCUSSION

4.1 Socio-Demographics Characteristics

The independent variables were compliance to interdisciplinary care with antenatal guidelines do influence weight gain monitoring, nutritional counselling and prescription of antenatal physical activity (dependent variable) for management of EWG prevention of OW and OB (independent variable). The study examined the influence of compliance with interdisciplinary care on weight gain monitoring, nutritional counselling, and physical activity prescription for managing excessive gestational weight gain (EWG) and preventing obesity (OW and OB). Forty-three HCPs from four sub-county and referral hospitals participated, with representation from Alupe (14%), Kocholia (30.2%), Sio-Port (27.9%), and Port-Victoria (27.9%). The majority (67.4%) were female with a ratio of 1:2, with most HCPs aged 26-33 years (37.2%). Nurses (46.5%) were the largest group, followed by public health officers (30.2%), nutritionists (11.6%), physiotherapists (9.3%), and one medical officer (2.3%). Most HCPs had diplomas (58.1%), with 34.9% holding degrees and 7% certificates. A majority (39.5%) had 2-5 years of experience in antenatal clinics year as shown in Table 1 Socio-demographic characteristics below;

Table 1
Socio-Demographics Characteristics of Antenatal Care Providers

Socio-Demographics Characteristics		Frequency	Percentage
Sub county Referral Hospital	Alupe	6	14.0%
	kocholia	13	30.2%
	Sio-Port	12	27.9%
	Port victoria	12	27.9%
Age	26-33	16	37.2%
	34-41	14	32.6%
	42- Above	13	30.2%
Gender	Male	14	32.6%
	Female	29	67.4%
Qualification	Diploma	25	58.1%
	Degree	15	34.9%
	Certificate	3	7.0%
Years worked in ANC	less than 1	7	16.3%
	2-5	17	39.5%
	5-9	10	23.3%
	above 10	9	20.9%
Interdisciplinary healthcare Providers in ANC	Nurse	20	46.5%
	Physiotherapist	4	9.3%
	Public health officer	13	30.2%
	Medical officer	1	2.3%
	Nutritionist	5	11.6%
Total		43	100.0%

Nurses (46.5%) played a key role in gestational weight screening and management, while Public Health Officers (30.2%) focused on nutrition education and physical activity (Lindsay et al., 2019). However, physiotherapists (9.3%) and nutritionists (11.6%) were underrepresented, despite their expertise in promoting physical activity and dietary advice, which can enhance weight gain control in line Deputy et al. (2018), Mottola et al. (2018) and Herring et al. (2015). The low representation of medical officers (2.3%) suggests a gap in specialized obstetric care, similar to findings by Durnwald and Boulton (2022). This highlights the need for more coordinated interdisciplinary care compliance to manage weight gain to prevent GOW and OB during pregnancy.

4.1.1 Antenatal Healthcare Provider's Knowledge on Prevalence of Gestational Overweight and Obesity during Pregnancy

The study found that 62.8% of HCPs recognized that EGWG was less common in women under 18, while 46.5% identified higher rates of GOW in women aged 18-30, especially in the 2nd trimester. The highest prevalence of GOW and obesity (69.8%) occurred in women aged 30-42 years, with GOW and OB peaking in the 2nd and 3rd trimesters (46.5% and 44.2%, respectively) (Santos et al., 2022). HCPs were highly aware (90.7%) of these trends as shown in Table 2 below. The study suggests early implementation of antenatal physical activity and nutritional counselling to manage weight gain, particularly during the 2nd and 3rd trimesters, to reduce risks for maternal and fetal health (Sanders et al., 2020; Kominiarek et al., 2018; Santos-Rocha et al., 2022). The need for structured interventions and educational programs is emphasized (Durnwald & Boulton, 2022).

Table 2

Antenatal HCPs Knowledge of Gestational Overweight and Obesity among Pregnant Women Aged between 18 years and above

Prevalence		Number	Percentage
Gestational overweight less than 18 years	Less often	27	62.8%
	Often	8	18.6%
	Very often	8	18.6%
Gestational obesity between 18 to 30 years	Never	4	9.3%
	less often	19	44.2%
	more often	20	46.5%
Gestational overweight and obesity above 42 years	less than 18	1	2.3%
	18-30	9	20.9%
	30-42	30	69.8%
	above 42	3	7.0%
Gestational overweight and obesity	1st trimester never	4	9.3%
	2nd trimester less often	20	46.5%
	3rd trimester more often	19	44.2%
Total		43	

4.1.2 Interdisciplinary Care Knowledge and Awareness of Antenatal Physical Activity and Exercises Guidelines for Management of Excessive Gestational Weight Gain

The study highlights a significant gap in ANC HCPs' knowledge of physical activity guidelines for managing GOW and preventing OB as shown in Table 3.

Table 3

Interdisciplinary Care Knowledge and Awareness of Antenatal Physical Activity and Exercises Prescription for Management of Excessive Gestational Weight Gain

Guidelines on antenatal physical activity and exercises for pregnant women			Qualification level			Total
			Diploma	Degree	Certificate	
Yes	Years worked in ANC	less than 1	1	0		1
		2-5	1	2		3
		5-9	2	0		2
		above 10	1	3		4
	Total		5	5		10
No	Years worked in ANC	less than 1	4	2	0	6
		2-5	8	5	1	14
		5-9	5	3	0	8
		above 10	3	0	2	5
	Total		20	10	3	33
Total	Years worked in ANC	less than 1	5	2	0	7
		2-5	9	7	1	17
		5-9	7	3	0	10
		above 10	4	3	2	9
	Total		25	15	3	43

As shown in Table 3, only 23.3% of HCPs were aware of these guidelines, with diploma holders showing the least awareness (11.6%) and certificate holders having no knowledge (Kominiarek et al., 2018; Langley-Evans et al.,

2022). Degree holders had slightly better awareness (33.3%), indicating that higher education is linked to improved knowledge and adherence to guidelines (Santos et al., 2022). HCPs with less than one year of experience also had limited knowledge (2.3%). The findings underscore the need for improved education and on-going training, particularly for diploma holders and less experienced HCPs, to enhance the management of gestational weight gain and prevent obesity (Chan et al., 2019; Durnwald & Boulton, 2022) as shown in Table 3 below;

To understand how antenatal HCPs socio-demographics characteristics influenced compliance to GWG screening and implementation of antenatal physical activity and exercises guidelines, a cross tabulation analysis was carried out. Descriptive cross tabulation analysis revealed significant and strong relationship between antenatal HCPs age (P-value 0.000), years of experience (P-Value 0.000), qualification level (P-0.001), years worked (P-0.003) and ones' healthcare profession (p-value of 0.001) as key determinants that influenced routine clinical practice on screening of weight gain to determine frequency of GOW and OB among pregnant women in ANC. However gender of antenatal HCPs did not matter on outcome on the number of pregnant women screened for GOW and OB (P-value 0.156) as shown in Table 4 below;

Table 4

Prevalence of Gestational Overweight and Obesity and Compliance of Antenatal Care Clinical Practices

Socio-demographics characteristics	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	Df	Sig.
	29.925 ^a	.000	0	.
incidences of overweight pregnant women in ANC	49.419	19.494	3	.000
Incidences of obese pregnant women in ANC	49.339	19.414	3	.000
Age of healthcare workers	57.413	27.488	6	.000
Gender of healthcare workers	35.145 ^b	5.219	3	.156
Qualification level	51.677	21.752	6	.001
Years worked in ANC station	54.889	24.964	9	.003
Healthcare profession	64.742	34.817	12	.001

The study aligns with Alvarado et al. (2020), suggesting that older antenatal HCPs provide more effective weight gain care due to experience. Education level significantly influenced involvement in weight gain screening and exercise prescription, supporting Sharma et al. (2019) that higher qualifications improve guideline implementation. Interdisciplinary collaboration among midwives, nurses, physiotherapists, public health officers, and nutritionists were key in weight gain screening, dietary management, and exercise interventions (Bauer et al., 2018; Kramer et al., 2017). Gender did not affect compliance with weight screening guidelines (P-value 0.156), contrary to Browne et al. (2014). The study highlights the need for updated training for diploma holders, opposing Jones et al. (2020) and Vinter et al. (2012). Findings emphasize the value of team-based care in managing EWG and preventing obesity, in line with Ferraro et al. (2019) and Healy et al. (2017).

4.2 Interdisciplinary antenatal care Compliance to Gestational weight gain monitoring and management Guidelines

The study found that 76.7% of antenatal HCPs followed weight gain monitoring strategies aligned with IOM (2019) guidelines, but 23.3% lacked knowledge on physical activity interventions for weight management in line with Pahlavani et al. (2023) and Santos et al. (2022); While 44.2% monitored mid-upper arm circumference (MUAC) and promoted unstructured activity, only 2.3% used both MUAC and BMI for comprehensive assessments. Most HCPs (97.7%) provided nutrition and active lifestyle advice in line with WHO (2022) and Siega-Riz & Fox (2021). The study highlights the need for standardized physical activity protocols, particularly in rural areas like Busia, Kenya in line with Simpson et al. (2020) and Wambui et al. (2020). Training in physical activity guidelines is essential for better maternal and fetal outcomes in line with Hollis et al. (2024) and Pahlavani et al. (2023) The study also noted midwives and nutritionists sometimes overemphasized weight monitoring, diminishing physiotherapists' role in physical activity programs as pointed by Santos-Rancho et al. (2022) as shown in Table 5 below;

Table 5*Interdisciplinary Care Compliance to Approach of Gestational Weight Gain Monitoring and Management Protocols*

Other clinical care practices	Frequency	Percent
Advise on good nutrition(MUAC), balanced diet and low fat diet without physical activities	13	30.2
Balanced diet (MUAC), BMI charts, active lifestyle, health education on physical activities and exercise	6	14
Measurement of bodyweight, height and upper arm circumference (MUAC)	1	2.3
None	10	23.3
Drinking plenty of water, walking, free active exercises	1	2.3
Maternal nutritional counselling and reviews	12	27.9
Total	43	100.0

4.3 Challenges to Interdisciplinary Antenatal Care Compliance with Weight Gain Monitoring and Management Guidelines

Despite awareness of risks associated with GOW and OB in the second and third trimesters, antenatal HCPs frequently failed to diagnose conditions like gestational hypertension (GH) (65.8%), gestational diabetes (GDM) (71.4%), obstructed labor (83.7%), and prolonged labor (72.1%), and stress urinary incontinence (SUI) (94.4%) as shown in Table 6 below. This highlights gaps in screening and the need for better training and clinical guidelines to improve recognition and management of these conditions in line with Nakshine and Jogdand (2023), Durnwald and Boulton, (2022) and Hanson et al. (2022). The under-recognition of these conditions emphasizes the importance of awareness campaigns for improving clinical outcomes, particularly for women with EWG in support with Langley-Evans et al. (2022). Despite evidence linking OB to increased SUI risk similar to Tessema et al. (2024) and Sangsawang et al. (2014), 95.2% of providers rarely diagnosed SUI in overweight or obese pregnant women. Well-trained HCPs in weight gain guidelines were more likely to identify risks and improve maternal outcomes as shown by Escañuela et al. (2021) and Lindsay et al. (2019).

Table 6*Antenatal Healthcare Providers Screening Knowledge and Awareness of Risks linked to Excessive Weight Gain, Overweight and Obesity*

Diagnosing pregnancy- related complications to excessive weight gain		Number	Percentage
Hypertensive disorders	Never	10	23.3%
	Less often	18	41.9%
	More often	15	34.9%
Diabetes Mellitus	Never	8	18.6%
	Less often	27	62.8%
	More often	8	18.6%
Obstructed labour	Never	17	39.5%
	Less often	19	44.2%
	More often	7	16.3%
Prolonged labour	Never	17	39.5%
	Less often	14	32.6%
	More often	12	27.9%
Urinary incontinence	Never	22	51.2%
	Less often	19	44.2%
	More often	2	4.7%
Total		43	100%

4.4 Antenatal Physical Activity and Exercises Guidelines for Management of Excessive gestational weight gain for Prevention of Overweight and Obesity

The study found that 100% of antenatal HCPs guided pregnant women on various exercises, with significant variation in the frequency and types prescribed. Most (65.2%) recommended light aerobic exercises (Lindsay et al., 2019; Mottola et al., 2018), while 44.2% recommended moderate aerobic exercises, and 23.3% did not recommend any as shown in Table 7, despite their benefits in managing GWG and preventing obesity (Mottola et al., 2018; Herring et al., 2015). Nearly 70% of HCPs did not recommend vigorous exercises, and 46.5% did not recommend strengthening exercises, despite their importance for maternal health contrary to da Silva et al. (2023), Wang et al. (2019), Mottola et al. (2018) and Herring et al. (2015). The lack of interdisciplinary collaboration and knowledge on structured exercise prescriptions indicates the need for enhanced training in physical activity guidelines for managing excessive weight gain

(EWG) during pregnancy, especially in LMICs (Pahlavani et al., 2023; Durnwald & Boulton, 2022; Weeks et al., 2018; Muli et al., 2017; Vanstone et al., 2016). These findings are consistent with Tesemma et al. (2024), Sangsawang et al. (2023), and Yang et al. (2022), highlighting the importance of addressing physical activity, exercise, and dietary guidelines in ANC to reduce the incidence of GOW and OB.

Table 7

Implementation of Antenatal Physical Activity and Exercises guidelines for Management of Excessive gestational weight gain for Prevention of Overweight and Obesity

Prescription of antenatal exercises		Number	Percentage
Prescription of light aerobics to pregnant women	Not all	8	18.6%
	Less often	7	16.3%
	Often	18	41.9%
	Very often	10	23.3%
Prescription of Moderate aerobics to pregnant women	Not all	10	23.3%
	Less often	12	27.9%
	Often	19	44.2%
	Very often	2	4.7%
Prescription of vigorous aerobics to pregnant women	Not all	30	69.8%
	Less often	6	14.0%
	Often	7	16.3%
Prescription of strengthening exercises to pregnant women	Not all	20	46.5%
	Less often	14	32.6%
	Often	6	14.0%
	Very often	3	7.0%
Total		43	100.0%

The study found that 51.2% of antenatal HCPs did not recommend structured, supervised exercise, contradicting Canada Society of Obstetricians and Gynaecologists (SOGC) (2019) guidelines. It highlighted the underutilization of physiotherapists in GWG management, consistent with Mottola & Ruchat (2018), Dumoulin et al. (2017), and Sondglass et al. (2014). This contrasts with Taliento et al. (2024) and Santos-Rocha et al. (2022), who emphasize the benefits of modified physical activity for maternal and fetal health. The study also showed variability in moderate-intensity exercise prescriptions, with some HCPs failing to tailor programs to individual needs, conflicting with Gascoine et al. (2023). Many HCPs were unaware of the 2019 Canadian guidelines (Ruchat & Mottola, 2020), leading to inconsistent exercise recommendations. Despite the benefits of physical activity, many HCPs prioritize nutrition and fetal monitoring, neglecting exercise contrary to Hollis et al. (2024) and Durnwald and Boulton (2022). Additionally, 23% of diploma holders did not prescribe strengthening exercises, compared to 21% of degree holders, contradicting findings by Lindsay et al. (2019), Flannery et al. (2019), and Santos et al. (2016) as shown in Table 8 below.

Table 8

Antenatal Healthcare Providers Clinical Practice and years of Experience for Prescription of Strengthening Aerobic Exercises to Pregnant Women

Extent to prescription of strengthening aerobic exercises to pregnant women			Qualification level			Total
			Diploma	Degree	Certificate	
Not all	Years worked in ANC clinics	less than 1	1	2	0	3
		2-5	3	3	0	6
		5-9	4	2	0	6
		above 10	2	2	1	5
	Total		10	9	1	20
Less often	Years worked in ANC clinics	less than 1	1	0	0	1
		2-5	4	3	1	8
		5-9	1	1	0	2
		above 10	1	1	1	3
	Total		7	5	2	14
Often	Years worked in ANC clinics	less than 1	2	0		2
		2-5	1	1		2
		5-9	2	0		2
	Total		5	1		6



very often	Years worked in ANC clinics	less than 1	1			1
		2-5	1			1
		above 10	1			1
	Total		3			3
Total	Years worked in ANC clinics	less than 1	5	2	0	7
		2-5	9	7	1	17
		5-9	7	3	0	10
		above 10	4	3	2	9
	Total		25	15	3	43

4.5 Discussion

The study emphasizes the importance of interdisciplinary care compliance in managing EWG and preventing OW and Obesity in pregnant women. It highlights the need for weight gain monitoring based on pre-pregnancy BMI, in line with IOM (2019) and WHO (2021) guidelines, which improve maternal and fetal health outcomes (Bauserman et al., 2020; ACOG, 2021). Effective compliance with weight gain screening is linked to early detection of complications of GDM, preeclampsia, and obstructed labor, reducing risks in line with Stirrat et al. (2014) and Macdonald-Wallis et al. (2013). Despite strong associations, many HCPs failed to consistently follow guidelines, leading to delay an ANC physical activity intervention, which exacerbates maternal risks as shown by Hollis et al. (2024) and Raju et al. (2023). Challenges such as time constraints and lack of protocols hinder effective monitoring and management (Wambui et al., 2020). Training gaps in weight gain monitoring and exercise prescriptions were noted in line with Ellinor et al. (2021) and Mottola et al. (2018). Knowledge and awareness of EWG helps identify women at risk, allowing for timely implementation of ANC physical activity and exercises in line with Martínez-Vizcaino et al. (2023) and Morris et al. (2017). Although nutrition counselling was common, structured antenatal physical activity and exercises recommendations were often neglected, contrary to Siega-Riz and Fox (2021) and Rifai (2010), guidelines for management of GOW and OB. Socio-demographic characteristics such as qualifications and experience influenced HCPs' adherence to ANC weight gain monitoring and implementation of physical activity and exercises guidelines, emphasizing the need for further training in line with Hollis et al. (2024) and Durnwald and Boulton (2022).

The study highlights key factors influencing HCPs adherence to guidelines on managing EGWG and promoting physical activity during pregnancy. Chi-square analysis showed significant relationships between HCPs' age, experience, qualifications, and profession with their compliance to ANC practices for weight monitoring and prescribing physical activity. Older, more experienced, beliefs and views of HCPs demonstrated better compliance, supporting Daglas et al. (2024), but contradicting Hoffman and Kamaroff (2019), who argued that younger HCPs might adhere more due to recent training. Higher qualifications also influenced compliance, in line with Morris, et al. (2017) and Okafor and Goon (2021), but contrary to Vurigwa (2020) and Bauer et al. (2010), who emphasized that qualifications alone may not ensure adherence due to personal attitudes. The study also found that years of experience in ANC correlated with better compliance, supporting Leiferman et al. (2012), but conflicting with Seyoum et al. (2021), who argued that experience alone isn't enough without institutional support to conformity of ANC guidelines. The healthcare profession types impacted compliance, aligning with Johnson and Smith (2021), but contrasting with Murray-Davis et al. (2020), who stressed that lack of interdisciplinary collaboration can hinder adherence to ANC guidelines for EGWG management and GOW and OB prevention.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Overall, this study's findings provide insights into how HCPs' socio-demographic factors can enhance interdisciplinary care compliance with weight gain monitoring and management through nutritional counselling and implementation of antenatal physical activity and exercise guidelines for management of GOW and OB.

5.2 Recommendations

The study recommends interdisciplinary care compliance for implementation of antenatal physical activity and exercises guidelines for management of EWG for prevention of GOW and OB. Further research is needed to explore collaborative barriers among interdisciplinary care team on weight gain management guidelines to optimise maintenance of normal GWG and prevent GOW and OB in rural and urban ANC settings.

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