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# Social determinants of male partner attendance in women's prevention-of-mother-to-child transmission program in Malawi

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## Abstract

**Background:** Male partners are rarely present during PMTCT (Prevention-Mother-To-Child-Transmission) services in Sub-Saharan Africa (SSA). Male involvement is increasingly recognised as an important element of women's access to care. This study aims to identify the socio-demographic characteristics, HIV-Knowledge, Attitude and Practice (KAP) among women accompanied and not accompanied by their male partners.

**Methods:** We included pregnant women enrolled in PMTCT programme between August 2018 and November 2019 in the Southern Region of Malawi. Eligible women were aged 18 years or older, living with a male partner, enrolled for the first time in one of the four selected facilities. We provided a KAP survey to women and their partners attending the facilities. Our primary objective was to assess and analyse the proportion of women who were accompanied by their partner at least once. We applied descriptive statistics and logistic regressions to study the association between being accompanied and explanatory variables.

**Results:** We enrolled 128 HIV-positive women: 82 (64.1%) were accompanied by their male partners and 46 (35.9%) were alone. In the multivariable model, women's unemployment and owning a means of transport are negatively associated with male attendance (respectively adjusted OR 0.32 [95% CI, 0.11–0.82] and 0.23 [95% CI, 0.07–0.77]), whereas, in the univariable model, high women's level of knowledge of HIV is positively associated with male attendance (OR 2.17 [95% CI, 1.03–4.58]). Level of attitude and practice toward HIV were not significantly associated to our study variable.

**Conclusions:** Our study shows a high male attendance in Malawi compared to other studies performed in SSA. This study highlights that women's level of knowledge on HIV and their economic condition (employment and owning a means of transport) affects male attendance. Moreover, the study points out that gender power relationships and stringent gender norms play a crucial role thus they should be considered to enhance male involvement.

**Keywords:** Knowledge, HIV, Gender, Access, Social determinants, Behaviour, Pregnancy

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## Background

In 2018, 37.9 million people across the globe were living with HIV/AIDS. Of these, 36.2 million were adults and 1.7 million were children (< 15 years old) [1]. Worldwide, there were 1.3 million pregnant women living with HIV in 2018, among them the 82% received Antiretroviral Therapy (ART) for Prevention Mother-To-Child Transmission (PMTCT) [2]. The WHO African Region was most severely affected with 25.7 million people HIV positive people [3].

Malawi is one of the countries with higher HIV prevalence in the adult population (15–49 years) amounting to 9.2% in 2018. It is estimated that one million Malawians, adults and children, are infected with HIV. Women infected represent 59.8% of adults living with HIV [4].

Previous literature shows that in Sub-Saharan Africa (SSA), male partners are scarcely present during PMTCT services [5]. In many low-income countries, the involvement of men in maternal services is increasingly recognised as an important element of women's access to needed care [6–8]. Male involvement is not a well-defined concept and currently there is no single widely used indicator to measure it. Several definitions have been used in previous studies [9–12], but the most comprehensive one was proposed by Muwanguzi et al. [13]. In this study male involvement in PMTCT was not limited to accompanying the woman to the clinic and perform Couple HIV Testing and Counselling (CHTC), but also supporting the woman during the treatment from an economic and psychosocial point of view. However, in some circumstances, men involvement could be considered disadvantageous to their partners since it may reinforce their role and promote men control over women's decision [9, 10]. Some studies have demonstrated that male support is relevant to women's adherence to therapy in PMTCT. The study performed by Katirayi et al. [14] in Zimbabwe and Malawi for instance shows that one of the main barriers to women initiating and adhering to ART were their male partners. Zacharius et al. [15] showed that women with male support in PMTCT were 3.5 times more likely to have good adherence than those without support. Male involvement has been recognized as a priority in PMTCT but currently remains a challenge in most low- and middle-income countries. Few programs have been implemented, but much improvement is still needed to enhance the male involvement, thus it is important to identify better strategies in PMTCT and in healthcare services in general [16].

This paper represents the first stage of a study aiming to identify interventions to improve male involvement along the cascade of HIV services in Malawi. This paper aims to: 1) assess the attendance of male partners in

PMTCT; 2) describe the socio-demographic characteristics of women enrolled in PMTCT, accompanied by their male partner or not; 3) determine the level of knowledge, attitude and practice toward HIV/AIDS associated with male attendance; 4) study the association between being accompanied by a male partner and socio-demographic characteristics and knowledge attitude and practice on HIV/AIDS.

## Methods

### Study population and setting

We included in the study pregnant women enrolled in Malawi's national PMTCT programme between 10 August 2018 and 30 November 2019 at four health facilities in the Southern region of Malawi. These health facilities are located in Blantyre (urban), Machinjiri (peri-urban), Chileka (peri-urban) and Balaka (rural) and they are part of the DREAM (Disease Relied through Excellent and Advanced Means) programme, a public health program runs by the Community of Sant'Egidio in 11 African Countries (sub recipient of Global Fund). This program focuses on HIV/AIDS, TB and NCDs [17–19].

The pregnant women were eligible if they were aged 18 years or older, lived with a male partner, enrolled for the first time in a DREAM facility and willing to sign a written informed consent. We have decided to include only women living with a male partner, assuming that a cohabitant partner could impact more on their behaviours.

This study is part of larger research program that aims to investigate the impact of male participation on women's ART adherence in PMTCT in Malawi.

We have administered a Knowledge, Attitude and Practices (KAP) survey [20] to women and their male partners attending the health facilities. KAP surveys assess knowledge gaps, cultural beliefs, and behavior of people with HIV/AIDS. It identifies misconceptions or misunderstandings that may represent barriers to access the health care, to uptake of interventions and to improve adherence to ART. We have designed the survey questionnaire following the guidelines for conducting a KAP survey [20, 21]. Previous literature has been taking into account in the questionnaire designing phase and to analyse the responses [22–24]. The final questionnaire consisted of 27 questions or statements (see Additional file 1,2,3): 15 on knowledge of HIV transmission (1–8), prevention and anti-retroviral therapy (9–15), 7 on attitudes towards HIV/AIDS, and 5 on sexual, alcohol or drug use behaviour. The answer to each question had three possible answers (yes, no, do not know).

To better adapt the questions to the Malawian context, we discussed the readability and clarity of the questionnaire with two healthcare workers and a medical doctor. We then pilot-tested it in a small group of randomly

selected women ( $n = 22$ ). The KAP survey was translated in the local language and administered to a woman and her male partner by community health workers of DREAM facility.

If the couple went together to the first visit, the survey was administered separately to the women and their partners. If the woman was alone, the healthcare worker would give her the invitation card (recommended by Minister of Health in Malawi) asking to go with the partner to the next visit. During the second visit, the healthcare worker would interview the woman (KAP survey). If the male partner did not attend any clinical visit during the 6 weeks after the first one, the questionnaire was to be completed only by the woman. If the male partner did attend, he has been interviewed, and this survey was not included in the paper due to small sample size. It is recommended that women have at least three PMTC visits after the first one. All the surveys administered to the women were included in the analysis. We adopted a convenience sampling method since this is a pilot study.

### Outcomes

Male attendance to health facilities at least once in the 6 weeks follow-up period was the primary outcome. Among the not-accompanied women, we collected secondary male partner specific outcomes such as the proportion of women who i) disclosed their status to their male partner, ii) reported to their male partners that they had a clinical appointment, iii) asked the male partners' permission before going to the facilities, iv) delivered the invitation slip and v) the transport fee was provided by their partners.

In addition to the KAP survey we also used the data from the electronic medical record system on the women enrolled in the study. These data included age, educational level, type of job, number of people in the family, socio-economic condition (e.g. availability of electricity), owning a means of transport, means of transport to get to facility and travel time from household to facility. A woman was considered lost to follow-up (LTFU) when she missed to collect the doses of anti-retroviral drugs for more than 2 months.

### Statistical analysis

The characteristics of the women were described using Fisher test or chi-square tests for categorical variables, and Wilcoxon rank sum tests for continuous variables.

To determinate the level of knowledge, attitude and practice of respondents, we asked women to answer "yes", "no" or "do not know" to every questions. Following literature [22, 23, 25] a score of '1' was assigned for each correct answer and '0' for each wrong answer. As it was previously done by other researchers [22–27],

overall knowledge was determined by aggregating correct answers from all questions according to other researchers. The maximum attainable score was 15 and the minimum score was 0. For the seven attitude related questions, each positive response was assigned a score of '1', and each negative response a score of '0'. In the same manner, for the five practice related questions, each safe response was assigned a score of '1', and each risky response as a score of '0'. We defined the overall level of attitude and practice by aggregating positive attitude answers and safe practise answers. The scoring range of the attitude section was from 0 to 7 and of the practice section was from 0 to 5. Then, we determined the percentage. Based on previous research [23, 24], levels of knowledge, attitude and practice were categorized in two segments depending on their median score, as data were not normally distributed. Low and high level of knowledge, positive and negative attitude and safe and risky practice presented the two categories. To evaluate how our KAP scoring method impacted the analysis of results, we also run the analysis considering an alternative scoring system: score of '1' for each correct, '0' for each uncertain, '-1' for each wrong answers.

We compared the single answer score using Mann-Whitney tests and the overall level of knowledge, attitude and practice using Mann-Whitney tests with 95% confidence intervals (CI) in order to determine if there was any difference in knowledge, attitude and practice among women accompanied and not accompanied by their male partner.

We conducted univariable logistic regressions to study the association between male attendance (yes, no) and explanatory variables. In the univariable logistic regression the explanatory variables considered age, education (no education/primary school, secondary school/pre-University), employment (employed, unemployed), owning a means of transport such as cars, motor cycles and bikes (yes, no), means of transport to get to facility (minibus, motorbike, car or bike, by foot, other), time to reach the facility (0–89 min, > 89 min), economic condition (availability of electricity in household, yes, no), and knowledge (low, high), attitude (positive, negative), practice (safe, risky) toward HIV. We included in the multivariable model our variables of interest (knowledge, attitude and practice) and all the variables that resulted to be significantly associated with male attendance in the univariable logistic regression. The "unemployed" category includes houseworkers (stay-at-home) and unemployed women, the "employed" category includes employee (formal job with contract) and temporary job (informal job with no contract).

We imputed missing values of explanatory variables using multiple imputation with chained equations (MICE). To improve the imputation we added the

following variables [28]: mother alive (yes/no), owns a phone (yes/no), gestational age (1–3, 4–6, >7), piped water available in the dwelling (yes/no), owned means of transport (bike, motorbike, car, bus, others). Furthermore, we considered our outcome in the imputation. We ran the model on 20 imputed datasets for each analysis and combined the estimates with Rubin's rule [29].

All analysis were performed using STATA 13.

## Results

### Characteristics of study participant and KAP survey

We screened 142 HIV-positive pregnant women. A total of 128 women met the eligibility criteria: 82 (64.1%) were accompanied by their male partners and 46 (35.9%) were alone. Two women came with their partners before they were transferred to another facility. None of them were lost to follow-up during the follow-up period.

Table 1 shows the socio-demographic characteristics of the participants, and their knowledge, attitude and practice toward HIV among the accompanied and non-accompanied women. The median age of the women was 27.8 years (IQR 22.8–32.3) with no significant difference in the two groups. Half of the women had no education or attended the primary school (46.8%). Significant differences in terms of employment and owning a means of transport were found among the two groups: among the accompanied women, 76.9% were employed, and only 6% of them had a means of transport. Among non-accompanied, 60.9% were employed and 23.9% had a transport. In term of economic condition, size of family, type of means of transport and travel time to the healthcare facility no significant differences were observed in the two group.

Responses to questions on the KAP survey are reported in the Additional files (1,2,3). The 53.7% of women accompanied by male partner showed a high level of knowledge on HIV/AIDS; only the 34.8% of women not accompanied presented high level of knowledge. No significant difference between the two groups was observed in term of median level of knowledge, attitude and practice (Additional file 4).

Table 2 shows “male partner specific” variables among the women who attended the facility alone.

As shown in Table 2, 29 (63.0%) partners of non-accompanied women took a HIV test and 24 (52.2%) tested positive. Their median age was 35.5 years (IQR 32–38) and 20 (43.5%) were employed.

In the univariable analysis, several sociodemographic variables were associated with male attendance (Table 3). KAP survey analysis showed that male attendance was associated to woman's level of knowledge on HIV/AIDS. High women's level of knowledge was associated with higher likelihood of male attendance (OR 2.17; 95% CI, 1.03–4.58), whereas women's unemployment and

owning a means of transport were associated with lower likelihood of male partners' participation (respectively OR 0.36 [95% CI, 0.16–0.84] and OR 0.21 [95% CI, 0.07–0.64]).

In the multivariable model, unemployment and owning a mean of transport remained negatively associated with male attendance (respectively adjusted OR 0.32 [95% CI, 0.11–0.82] and 0.23 [95% CI, 0.07–0.77]). Attitude and practice did not show any significant effect (respectively adjusted OR 1.02 [95% CI 0.40–2.57] and OR 1.01 [95% CI 0.45–2.29]).

We ran the analysis adopting an alternative KAP scoring system and we confirmed the results previously described, except for women's knowledge that was no more associated with attendance in the univariable analysis (Additional file 5, 6).

## Discussion

In this study we investigated the male partner involvement in a sample of women included in a PMTCT program in Malawi. We evaluated the association between the male attendance in care and the socio-demographic characteristics, HIV-knowledge, attitude and practice related to HIV/AIDS. To our knowledge this is the first study comparing the socio-economic characteristics and knowledge, attitudes and practices of women accompanied and not accompanied to PMTCT service by their partners.

Several studies evaluate the male involvement. Our study shows that the male attendance is 64.1% in PMTCT. This is comparable to the result reported by Rosenberg et al. [30] in a unblinded randomised controlled trial comparing the adoption of the invitation slip versus the use of invitation slip plus tracing (52% vs 74%) in Lilongwe, Malawi. Other studies performed in Malawi reported that the male attendance at antenatal clinic were: 13.7% in a retrospective study performed in 2004–2006 in Mwanza District [11]; 10.7% in a observational study in Bwaila Hospital in Lilongwe in 2009 [31]; 19% in a randomized control trial where the use of an invitation slip was compared to non-intervention [32]. Other studies reported male attendance rates of 16% in Uganda [9], 35% in South Africa [33], 36% in Kenya [34], and 53.5% in Tanzania [35]. Our result shows a good male attendance compared to other studies. One reason could be that in the last few years more attention and more interventions have targeted men in the country.

Our study shows that being unemployed and owing a means of transport are negatively associated with male attendance. These results reveal the role of the social determinants of health [36]. Owning a means of transport may indicate easier access to the healthcare facilities and higher economic conditions. However, among the women who possess a means of transport, 13 women

**Table 1** Socio-demographic information of HIV-positive women enrolled in this study in Malawi ( $n = 128$ )

	All ( $n = 128$ )	Women accompanied by the male partners ( $n = 82$ )	Women not accompanied by the male partner ( $n = 46$ )	P-value <sup>a</sup>
<b>Socio-demographics variables</b>				
<b>Age</b> Median (IQR)	27.8 (22.8–32.3)	27.4 (22.0–32.3)	28.6 (24.6–32.3)	0.356
<b>Educational level</b>				0.823
No education/ Primary	60 (46.9)	39 (47.6)	21 (45.6)	
Secondary/Pre-University	65 (50.8)	41 (50.0)	24 (52.2)	
Missing	3 (2.3)	2 (2.4)	1 (2.2)	
<b>Healthcare center location</b>				0.302
Machinjiri	74 (57.8)	36 (43.9)	38 (82.6)	
Chileka	35 (27.3)	31 (37.8)	4 (8.6)	
Balaka	12 (9.4)	10 (12.2)	2 (4.4)	
Blantyre	7 (5.5)	5 (6.1)	2 (4.4)	
<b>Employment Status</b>				<b>0.031</b>
Employed	91 (71.1)	63 (76.9)	28 (60.9)	
Unemployed	31 (24.2)	14 (17.0)	17 (37.0)	
Missing	6 (4.7)	5 (6.1)	1 (2.1)	
<b>Partner's Employment</b>				0.359
Employed	45 (35.2)	25 (30.5)	20 (43.5)	
Unemployed	70 (54.7)	48 (58.5)	22 (47.8)	
Missing	13 (10.1)	9 (11.0)	4 (8.7)	
<b>Size of your family</b>				0.280
0–3	31 (24.2)	23 (28.0)	8 (17.4)	
> 3	96 (75.0)	59 (72.0)	37 (80.4)	
Missing	1 (0.8)	0(0)	1 (2.2)	
<b>Travel time to the facility (minutes)</b>				0.151
0–89 min	92 (71.9)	55 (67.1)	37 (80.4)	
> 89 min	34 (26.5)	26 (31.7)	8 (17.4)	
Missing	2 (1.6)	1 (1.2)	1 (2.2)	
<b>Owning a means of transport</b>				<b>0.003</b>
No	109 (85.2)	75 (91.5)	34 (73.9)	
Yes	16 (12.5)	5 (6.0)	11 (23.9)	
Missing	3 (2.3)	2 (2.5)	1 (2.2)	
<b>Means of transport</b>				0.494
Minibus, motorbike	115 (89.8)	74 (90.3)	41 (89.1)	
Bike, by foot, other	11 (8.6)	6 (7.3)	5 (10.9)	
Missing	2 (1.6)	2 (2.4)	0 (0)	
<b>Electricity available in the dwelling</b>				0.167
Yes	77 (60.2)	29 (35.4)	22 (47.8)	
No	51 (39.8)	53 (64.6)	24 (52.2)	
<b>Knowledge, attitude and practice toward HIV</b>				
<b>Knowledge</b>				<b>0.040</b>
Low	68 (53.1)	38 (46.3)	30 (65.2)	
High	60 (46.9)	44 (53.7)	16 (34.8)	

**Table 1** Socio-demographic information of HIV-positive women enrolled in this study in Malawi ( $n = 128$ ) (Continued)

	All ( $n = 128$ )	Women accompanied by the male partners ( $n = 82$ )	Women not accompanied by the male partner ( $n = 46$ )	P-value <sup>a</sup>
<b>Attitude</b>				0.214
Negative	52 (40.6)	30 (36.6)	22 (47.8)	
Positive	76 (59.4)	52 (63.4)	24 (52.2)	
<b>Practice</b>				0.836
Risky	68 (53.1)	43 (52.4)	25 (54.3)	
Safe	60 (46.9)	39 (47.6)	21 (45.7)	
<b>Total</b>	128 (100.0)	82 (100.0)	46 (100.0)	

<sup>a</sup> Chi-square or Wilcoxon rank sum test

reach the clinic by minibus, 2 by foot and 1 by other means of transport. Thus, owning a means of transport does not imply to use your own vehicle to reach the clinic. Jennings et al. [37] observed that more empowered women (with higher economic status and access to a means of transport) are significantly less likely to have their partner's presence at facilities in Malawi. This finding could support our result if we consider owning a mean of transport as a proxy of women's empowerment. Thus, women highly empowered in healthcare and in household decisions show less need to invite men. One interpretation of the relation between unemployment and male attendance could be that unemployed woman reaches the healthcare facility alone because man needs to work during the day, whereas woman has more time available to spend to get to the healthcare centre [8]. In fact, married women (72%) are less likely to have been employed in the last 12 months than currently married men (98%) and women are more likely to being paid less for their work compared to men in Malawi, as reported by DHS [38]. This result could reflect complex gender roles in the Malawian social context where men are the providers of the family and women are primary carers and responsible for activities associated with care of the home and family. Thus, some women view male accompaniment as a foreign concept, and they do not

**Table 2** "Male partner specific" variables among the non-accompanied women ( $n = 46$ )

Variable	N of women, (%)
Disclose HIV status to partner	45 (97.8)
Report of having an appointment to partner	44 (95.7)
Ask Partner's permission to partner	42 (95.4)
Receive Transport refund to partner	42 (95.4)
Deliver the invitation slip to partner	43 (93.5)
Partner is tested	29 (63.0)
Partner is HIV positive	24 (52.2)

**Table 3** Univariable and multivariable analysis examining association between male attendance and explanatory variables ( $n = 128$ )

	Crude OR Estimate (95% CI)	Adjusted OR Estimate (95% CI)
<b>Socio-demographic variables</b>		
Age (years)	0.97 (0.91–1.03)	0.97 (0.89–1.04)
Education		
No education/primary	1	1
Secondary/Pre-University	0.92 (0.44–1.91)	0.87 (0.38–1.97)
Employment		
Employed	1	<b>1</b>
Unemployed	<b>0.36 (0.16–0.84)</b>	<b>0.32 (0.11–0.82)</b>
Owning a means of transport		
No	1	1
Yes	<b>0.21 (0.07–0.64)</b>	<b>0.23 (0.07–0.77)</b>
Travel time to the facility (minutes)		
0–89	1	
> 89	2.28 (0.93–5.55)	
Electricity available in the dwelling		
No	1	
Yes	0.60 (0.29–1.24)	
Means of transport		
Minibus, motorbike, car	1	
Bike, by foot, other	0.67 (0.19–2.34)	
<b>Knowledge, attitude and practice toward HIV</b>		
Level of Knowledge		
Low	<b>1</b>	1
High	<b>2.17 (1.03–4.58)</b>	2.31 (0.91–5.88)
Level of Attitude		
Negative	1	1
Positive	1.59 (0.76–3.30)	1.02 (0.40–2.57)
Level of Practice		
Risky	1	1
Safe	1.08 (0.52–2.23)	1.01 (0.45–2.29)

OR odds ratio, CI confidence interval

want men to invade their territory [39, 40]. Gender roles and norms strongly affect the male attendance.

Moreover, financial restraints could reduce ability to spend on transport fee which in turn result in reduced male partner attendance; providing the travel expense on public transport for two people can be challenging in this context [41, 42]. In fact, distance to healthcare facility is still indicated by 56% of women as a key barrier to health access when they are sick [43] with a median travel time of 1 h [44]. In regards of this, in the future it would be interesting to consider the transport fee spent to get to the facility, the geo-distribution [45] of the population and distance to facilities in our sample in order to see if any association exists with male attendance. Moreover, the country is extremely poor: 51.5% of the population income fell below the poverty line in 2016 [46]. A recent published research showed that 56% of household would spend less than 1 US\$ to reach the healthcare facility and that in the country are present only 14.3 cars and motor cycles per 1000 people [47]. In fact, lack of financial resources to pay for transport cost to reach a hospital has been reported by 39% of male and 59% of female head of households as one of the main barriers [44].

A relevant result is that a higher score in the level of HIV-knowledge was associated with attendance of the male partner in the univariate analysis that could reflect the fact that women with high level of knowledge may be more likely to voice and more capable to negotiate and involve their partners in PMTCT. The study of Ampt et al. [48] reported that male involvement in Maternal and Newborn Health was positively associated with women's level of education and men's level of knowledge on MNH in Myanmar. On the contrary, this paper shows that women's education does not play a significant role on male attendance. This finding highlights that women may be a better negotiator for the support they need, despite their educational level. However, the association was no more significant in the multivariate model being borderline.

This study has some limitations. Firstly, the small sample size prevented stratifications in statistical analysis and reduced the power of some analysis. Secondly, KAP questionnaire was surveyor-assisted incurring in social desirability bias [49]. Thirdly, there are no standards questions in KAP questionnaire that allow us to compare our results with others in a similar context. Although, the majority of KAP questions are also present in the Demographic and Health Surveys (DHS) performed in several Sub-Saharan African countries by USAIDS [50], a direct comparison was not possible due to the different sampling method. Fourthly, we included in this study only women living with a male partner. As

additional limitation, in our study distance to facility was not collected as part of information required to participants, despite it could play a role with respect to the likelihood of men involvement.

Our study suggests that male partners attendance could be improved by considering other socio-determinants of health beyond women's health education; public health initiatives may consider to target the couples or the family identity and the overall health of the relationship rather than solely women rights and emancipation. Interventions enabling to identify norms of male support within the couple without compromise the women's autonomy and promote men's control over women are strongly recommended. Moreover, male involvement would be enhanced with integrated multi-component strategies [51] enabling to deliver healthcare services closer to the villages or at home and to incentive male partners (economic or non-economic incentive) [52, 53]. As shown by Salmen et al. [54] promoting social network engagement through the development of "microclinic" intervention in villages (consisting of a small network of 5–15 neighbours, relatives and friends) may be promising and could be designed to evaluate the involvement of male partners. In order to design effective intervention, we have to recognise wider Malawian gender orders and gender norms around masculinities [55]. Such "restrictive gender norms" [56] and the wider societal inequality regimens [57] are reproduced in the healthcare systems [58] and may impact male engagement. Hay et al. [56] showed that gender norms and inequities are determined and reinforced in families, communities, structures and policies and perpetuated by institutions including healthcare systems. Previous studies in Malawi suggest that gender norms and masculinities [42] are factors in access, attitudes and stigma [55, 59]. Gender inequalities in health system could be disrupted" from within, through actions for reform and transformation, and from the outside, through progressive policies and laws and community pressure and activism" [56] involving a multi-disciplinary team of public health experts. Further studies to understand why and how men in Malawi become involved are required. Intersectional studies considering Malawian gender roles and norms, masculinities, income and healthcare system inequality including geographical accessibility and means of transport [60, 61] are needed in order to implement effective interventions to increase the involvement of male partners [62] and to achieve Sustainable Development Goals and universal health coverage [63].

## Conclusions

The results of this study show a higher level of male attendance in Malawi compared to other studies conducted in Sub-Saharan Africa. Women's knowledge on

HIV seems to play an important role in the male attendance in PMTCT. Owning a means of transport and being unemployed are two key factors negatively affecting attendance. These factors are strictly linked to the hierarchical nature of gender relations within the household and gender norms. Addressing socio-determinants of health as gender and socio-economic conditions is of paramount importance to improve the health of the entire family.

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-020-09800-4>.

**Additional file 1.** Knowledge on HIV/AIDS transmission (1–8), prevention and treatment (9–15) among women accompanied ( $n = 82$ ) and not accompanied by the male partner ( $n = 46$ ).

**Additional file 2.** Positive attitude toward people living with HIV/AIDS among women accompanied ( $n = 82$ ) and not accompanied by the male partner ( $n = 46$ ).

**Additional file 3.** Safe practice toward HIV/AIDS among women accompanied ( $N = 82$ ) and not accompanied by the male partner ( $n = 46$ ).

**Additional file 4.** Median of correct knowledge, positive attitude and safe practice toward HIV/AIDS among women accompanied ( $n = 82$ ) and not accompanied by the male partner ( $n = 46$ ).

**Additional file 5** Knowledge, attitude and practice toward HIV of women in PMTCT in Malawi ( $n = 128$ )\*. \*A different scoring system was applied (score of '1' for each correct, '0' for each uncertain, '-1' for each wrong answers).

**Additional file 6.** Univariable and multivariable analysis examining association between male attendance and explanatory variables ( $n = 128$ )\*. \*A different scoring system was applied (score of '1' for each correct, '0' for each uncertain, '-1' for each wrong answers).

## Abbreviations

HIV: Human immunodeficiency virus; AIDS: Acquired immune deficiency syndrome; DREAM: Disease reduced through excellent and advanced means; PMTCT: Prevention mother to child transmission; CHTC: Couple HIV testing and counselling; ART: Antiretroviral therapy; SSA: Sub-Saharan Africa; LTFU: Lost to follow-up

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## Authors' contributions

IT, SO and IP designed and coordinated the study. IT conceived the study, monitored, and evaluated the data collection in Malawi as well as she carried out data analysis and drafted the manuscript. OK provided advice in data analysis, as well as manuscript review for intellectual content. CS reviewed the manuscript for intellectual content on gender aspects. SS, JBS and JG participated in the questionnaire design and supervised data collection. FC, IP and SO co-supervised field workers and the interpretation of the results. CM, LP and GT reviewed drafts of the manuscript, provided suggestions for refinement, and were involved in the final approval of the version for peer-review. The author(s) read and approved the final manuscript.

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## Availability of data and materials

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

## Ethics approval and consent to participate

The patients were informed about the objectives of the project and written informed consent was obtained from all participants. Research approval was obtained from the National Health Sciences Research Committee (Minister of Health) in Malawi [Approval nr. 2021].

## Consent for publication

Not applicable.

## Competing interests

Both authors declare that they have no competing interests.

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