

Giving women WOICE postpartum: prevalence of maternal morbidity using the WHO-WOICE instrument

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Abstract

Background There are no accurate estimates of the prevalence of non-severe maternal morbidities. Given the lack of instruments to fully assess these morbidities, the World Health Organization (WHO) developed an instrument called WOICE. **Objective** To evaluate the prevalence of non-severe maternal morbidities in puerperal women and analyses factors associated to impaired clinical, social and mental health conditions. **Method** A cross-sectional study with 519 postpartum women in a single encounter 6 to 12 weeks postpartum. The WOICE questionnaire included three sections: the first with maternal and obstetric history, sociodemographic data, risk and environment factors, violence and sexual health; The second considers functionality and disability, general symptoms and mental health; and the third includes data on physical and laboratory tests. Data collection was supported by Tablets with REDCAP software. Initially, a descriptive analysis was performed, with general prevalence of all variables contained in the WOICE, including scales on anxiety and depression (GAD-7 and PHQ-9- altered if ≥ 10), functionality (WHODAS- altered when ≥ 37.4) and data on violence and substance use. Subsequently, an evaluation of cases with alterations was performed, with a logistic regression to investigate factors associated to impaired non-clinical and clinical conditions. **Results** 517 women were included, majority (54.3%) multiparous, ages between 20 and 34 years (65.4%) and with partner (75,6%). Over a quarter had (26.2%) preterm birth, however good perinatal outcomes. Around a third (30.2%) reported health problems informed by the physician, although more than 80% considered having good or very good health. About 10% reported any substance and 5.9% suffered violence. Anxiety was identified in 19.8% of cases, depression in 36.9% and altered functioning in 4.4% of women. Logistic regression identified that poor overall health rating was associated to increased anxiety/depression and impaired functioning. Having a partner reduces the perception of women on the presence of clinical morbidities. **Conclusion** During postpartum care, women presented high frequency of anxiety and depression and relevant frequency of substance use and violence. These aspects of women's health need further evaluation and specific interventions to improve quality of care.

Background

Among the new objectives of the Sustainable Development Goals for 2030 is to ensure a healthy life and promote well-being for all, including improving maternal health and reducing maternal mortality (1). It has been suggested that for each maternal death 20-30 women suffer from some morbidity; however, these numbers are not based on standardized methods of assessment (2, 3).

In the last decade, there has been important progress in the study of severe maternal morbidity (SMM), with standard criteria for the identification of potentially life-threatening conditions (PLTC) and Maternal Near Miss (MNM) (4). Nevertheless, there is growing interest in understanding morbidity in a broader way, including non-severe morbidity that may influence and affect women's health and well-being, impairment of women's physical, sexual or mental health and of their ability to function in certain domains (cognition, mobility, participation in society), the image of their body and their economic and social status are all relevant conditions (5).

In 2012, the WHO Maternal Morbidity Working Group (MMWG) initially developed a new definition of maternal morbidity as "Any health condition attributed to the complication of pregnancy and / or childbirth that may have a negative impact on the well-being and / or functionality of women" (1, 5). The relevance of such definition is the innovation in capturing broadly the entire spectrum of morbidity (3). The MMWG further developed an instrument called WOICE, to measure maternal morbidity, focusing on the health and well-being perception that women have about themselves (1, 6, 7).

WOICE includes tools already developed and validated in the literature, such as the World Health Organization's Disability Assessment Schedule (WHODAS 2.0), version 12 items, to evaluate the functionality and ability to perform daily tasks (GAD-7) the General Anxiety Disorder test 7 items for mental health evaluation, and (PHQ-9) 9 items Patient Health Questionnaire to assess depression were used. (3). The questionnaire has three sections: 1) woman's background, 2) current symptoms, and 3) physical examination with medical chart review (3). The name of the tool precisely refers to the importance of "listening" to the voice, complaints and needs of women.

A pilot study using this instrument was previously performed in three different countries: Jamaica, Kenya and Malawi, between 2015 and 2016 (6) in pregnant women (around 28 weeks - ANC) and puerperium (between 6 and 12 weeks - PPC), mostly in a low risk setting with a total sample of 1490 female participants (750 ANC and -740 PPC) (8).

Lack of knowledge about important conditions can lead health professionals to neglect their occurrence what can affect women's health, especially during postpartum, leading to inadequate care of these women possible short and long- term consequences. Those women who are neglected in the puerperium, can return to their homes, with unidentified needs, thus harming life with their family, newborn and spouse (9).

Postpartum care should be an ongoing process to optimize the health of women and babies with support services tailored to the specific individual needs of women. The WHO WOICE questionnaire represents a new approach towards measuring non-severe maternal morbidity, allowing health professionals to have a broader understanding of women beyond clinical diseases (9, 10).

The objective of the present study is to evaluate the prevalence of non-severe maternal morbidity among puerperal women and analyze factors associated with impaired clinical, social and mental health conditions in a middle – income setting and using the new WHO instrument

Methods

This cross-sectional study used a questionnaire (which includes several instruments) developed by the WHO to assess maternal morbidity in its various aspects. The questionnaire was applied at the postpartum outpatient clinic of the University of Campinas, in a single encounter with women from 6 to 12 weeks postpartum. This outpatient clinic is a referral center and cases scheduled include high-risk

women, due to a clinical underlying condition or any complication diagnosed during pregnancy or childbirth.

This questionnaire includes several previously validated scales. To evaluate functionality and the ability to perform daily tasks the WHODAS 2.0 12-item version, for mental health assessment the General Anxiety Disorder test, 7 item (GAD-7) and the Patient Health Questionnaire, 9 item (PHQ-9) (11-13). To measure substance use and abuse, sexual satisfaction and sexual and domestic violence, parts of some scores already validated are within the WOICE, such as the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), Brief Sexual Symptom Checklist for Women (BSSC-W) and some questions from a questionnaire used in the Multi-country Study on Women's Health and Domestic Violence against Women of the WHO (14, 15).

The proposal was approved by the local Institutional Review Boards and all included cases signed an Informed Consent form. For adolescents, written consent was waived, due to the consideration that a written consent could put the subject at risk, since violence is one of the conditions evaluated by the study and it is well known that in cases of domestic violence, the perpetrator is often responsible or very close to the adolescent. However, interviews were conducted only after clarification and verbal consent, in a reserved room.

The maternal morbidity measurement questionnaire called WOICE was originally developed in English and further translated into the Brazilian Portuguese. The review was conducted by experienced obstetric investigators and the version was tested (pilot interviews) to measure the time of application and then adapt and modify some words to ascertain accurate understanding (appendix 1). In order to ensure the high quality and reliability of the information collected, the researchers were previously trained to ensure adequate use of the tablets and instruments included in the WOICE questionnaire.

Sample size was estimated in 500 participants for convenience sample, as a pilot study, taking into account that the WOICE instrument had not been previously published by the time when data collection was initiated. The only previous study using such instrument presented 250 women during PPC for each considered country (8).

Data collection was supported by tablets (Samsung Galaxy Tab Tablets S3 – Android), with further transmission, verification and storage of data protected to ensure confidentiality. Each interview was around 30-40 minutes.

Data processing and collection were supported by REDCAP software and later transferred to the SPSS program. The information gathered was stored in a server located in the informatic department of the institution. A descriptive analysis was performed, including socio-demographic data, clinical and obstetric history, as well as the general prevalence of scores of instruments considered for functional and mental health. Continuous variables were presented on mean (M) and Standard Deviation (SD) and categorical variables in percentage (%) of frequency. An evaluation of abnormal conditions was performed, considering scores ≥ 10 for anxiety and depression (12). For WHODAS-12, according to a previous study

published, dysfunctionality was considered with the score of ≥ 37.4 (95th percentile as the cutoff point) (16).

Further, a Poisson multiple regression analysis was performed, providing the respective Prevalence Ratio (PR) and 95% confidence intervals (CI), considering three models for evaluating factors associated with impaired conditions. The first model considered as outcome abnormal mental health (score ≥ 10 for anxiety and depression questionnaire), the second model considered abnormal functioning. The predictors tested were: maternal age, marital status, education, literacy, employed, travel time to facility, parity, gestational age, BMI (≥ 30 kg/m²), overall health rating, any clinical condition, preexisting conditions, taking any medication. The third model of logistic regression considered impaired clinical condition (women who answered “yes” to the question: “have you been told you have anything wrong or any medical condition?”) as outcome. The tested predictors were the same used in the previous models, also in addition to impaired mental health, abnormal functioning, substance use, sexual satisfaction and violence.

In order to understand if the same women were at risk of combined alterations in clinical, social, sexual and mental health, we performed also a descriptive analysis of altered conditions and its combinations two by two.

Results

In the present study, 519 postpartum women were invited to participate, 2 declined and the 2 women provided only sociodemographic data, therefore 515 gave full consent (**Fig 1**). The mean age was 28 years, women mostly had a partner, more than 50% were multiparous, the illiteracy level was less than 2.4% and most participants had a secondary level of education and were employed. Over one third of the population took 30-60 minutes to arrive from their house to the health service (**Table 1**).

Clinical conditions were initially considered through the question: “Since childbirth, have you been informed that there is something wrong / some medical condition?” and 30.2% of the women had a health condition reported by the attending physician, although more than 80% reported good or very good health. Considering the gestational results, a quarter (26.2%) had preterm birth, and 58.3% delivered by cesarean section; however, predominantly with good perinatal outcomes, 95.7% reported “good baby health” in the postpartum evaluation, with 88.1% of exclusive breastfeeding (**Table 2**).

Looking into detail in cases of clinical conditions, based on the question: “any pre-existing condition”, the majority (51.7%) reported having a condition before pregnancy and childbirth (**Table 2**). A list of conditions, classified them as direct and indirect, of which 13.8% had gestational diabetes, followed by gestational hypertension (13.4%), preeclampsia (10.7%), chronic hypertension (8.2%) and, operative wound infection (1.7%), as the most prevalent types of diseases (**Table 2**).

An important approach, besides evaluating pre-existing conditions, was to evaluate the amount of abnormal conditions diagnosed or identified by WOICE. We found that (53.1%) had at least one abnormal

condition identified by WOICE, a quarter of women (26%) had two concomitant conditions identified by WOICE and only 4.0% had no abnormal condition **(Table 2)**.

We identified, through the WOICE questionnaire in this group of women, the use of substances, asking participants whether they used (cigarettes, alcoholic beverages, marijuana, inhalants, sedatives or sleeping pills, hallucinogens, opioids and/or injectable drugs for non-medical use) and 10.0% of the participants used some type of substance during pregnancy **(Table 3)**. In this group of questions, we also asked "during pregnancy, someone (friend, relative or anyone) expressed concern about the use of any substance" and 66.7% expressed such concern, followed by 50% of women that "tried to reduce or stop consumption of any substance".

Around 1/3 of women had already resumed their sex life after giving birth and 89.2% felt they were satisfied with their sex lives, however 55.6% (n=10) reported pain during intercourse **(Table 3)**. Around 39% of the women used contraception and 77.2% of them were prescribed with a method during their first postpartum care medical visit.

Using the WOICE tool, tool, we explored exposure to domestic and sexual violence by asking participants "whether or not they were afraid of the current partner / most recent spouse or any other person" if the spouse / or any other person who pushed, hit and kicked". In our sample, 5.9% reported to have suffered violence **(Table 3)**.

As part of the Mental Health assessment of our study, we used the validated scales (PHQ-9 and GAD-7). Abnormal conditions were considered if scores ≥ 10 (12, 13) and almost 20% of the women had anxiety symptoms, followed by 36.9% with depressive symptoms. For the evaluation of functionality or ability to perform daily tasks, used WHODAS-12 version 2.0 and verified that the mean score was 10.9 (± 12.9), we found 4.4% of the women had functional alterations (score ≥ 37.4) (16). **(Table 4)**.

The questionnaire was always performed after the scheduled medical consultation and with no interference in the woman's medical follow-up. However, since some of the questions could potentially lead to unpleasant memories and reveal exposure to violence and substance abuse, additional support was offered. Among the included women, 28.3% used such support, of those 97% psychological support and 6.6% social service support **(Table 5)**.

In order to investigate factors associated with impaired functioning, mental health and clinical conditions, we performed three multiple regression analyzes. For the first model, that considered WHODAS ≥ 37.4 as the outcome, the conditions independently associated with abnormal functioning were the presence of impaired clinical health and increased age. Nevertheless, less education and having a partner were protective conditions towards the report of impaired functioning **(table 6)**. In model 2, considering as outcome abnormal anxiety and depression (scores ≥ 10), illiteracy and poor overall health rating were associated with increased anxiety/depression. However, parity was protective.

In model 3, the clinical conditions reported by the woman (defined when the woman reported having been informed of a clinical diagnosis after delivery) were considered as outcomes and we identified that having a partner reduces the perception of women on the presence of morbidities by 30% clinics (**Table 6**).

To understand if the same women suffer from combined conditions, or if there was a pattern in the combination of abnormal findings, we presented a figure that evaluates each parameter and its combinations. Almost a quarter of the participants presented depression and anxiety (38.6%), followed by clinical conditions associated to depression (14.6%), anxiety with clinical conditions (13.3%) (**Figure 2**).

Discussion

This study represents the continuation of an initiative led by the WHO Maternal Morbidity Working Group (MMWG), and represents the implementation the WOICE 2.0 questionnaire to measure non-severe maternal morbidity for the postpartum (PPC) women considering a broad approach of conditions that can impact maternal health, in a high-risk setting (10).

The pilot study conducted in Jamaica, Kenya and Malawi tested the WOICE in pregnant and postpartum women, for the first time, in a mostly low risk and low-income settings, with a total sample of 1490 women (6). In comparison to their findings, our sample included older, more educated women and mostly women with partners. In the pilot study, (6.1%) of the women reported having a health problem informed by the attending physician and in our study, this number was much higher, (over 50%), with more C-section and preterm birth.

Cesarean section rates are increasing worldwide, with Brazil among the most impressive figures (over 50%) (17, 18). Our sample represents a referral center and there is possible selection bias through postpartum scheduled visits, since mostly complicated cases are the ones followed at the institution, therefore not representing the overall cesarean rate in the institution.

Another marker of high-risk assessment is the rate of prematurity. Preterm birth is the main risk factor for infant morbidity and mortality, not only during the neonatal period but also in childhood, it can affect the cognitive dimensions, physical health and behavior, so it is one of the most important challenges for public health. Brazil has rates of preterm birth around 11.5% (19).

We evaluated the exposure to violence in the WOICE questionnaire, where we could identify that in this group of women surveyed, 5.9% of the participants were exposed to some type of violence (domestic-sexual). Previous reports showed exposure to domestic violence against women as a global phenomenon and these victims are frequently very familiar with their authors, who are people their of daily life. This violence is accepted as "normal" in many societies of the world (20). Estimates by the WHO say that 1 in 3 women worldwide suffer from physical and / or sexual partner and sexual violence by third parties at some point in their life (21) Violence is a sensitive subject, since women are often afraid to talk about it,

because of the possible repercussions. Our findings with low frequency of violence, might reflect such fear of the truth.

The high frequency of breastfeeding in our sample must be highlighted, especially considering the high-risk background and frequency of prematurity. Studies show that one of the priorities of these women is the good development of the baby that is supplied in large part by the mother's milk, thus reducing early weaning (22), this might support such levels of breastfeeding, adding the hospital's active work in campaigns, programs to inform women about the benefits of breastfeeding for the baby.

According to a study carried out in 2017 on the indicators of breastfeeding in Brazil in the last three decades, they have led Brazil to be considered a successful country in the implementation of policies and programs to promote breastfeeding with all the necessary tools, knowing that the breastfeeding is not only the responsibility of women, it is also shared with society. The prevalence of exclusive breastfeeding for children under 6 months of age in 2013 was 52.1% (10).

When considering abnormal conditions evaluated by the WOICE instrument, it was striking to observe less than 5% of women with none alteration. This supports the understanding of multiple aspects that are able to influence women's wellbeing and that during postpartum, women need multidisciplinary support. As a limitation, we do not have prospective assessment of women, in order to pursue the real impact of gestation throughout the reproductive cycle.

Multiple regression presented that having a partner decreased the women's perception of clinical morbidities and that might just reflect more care and support. Having a clinical diagnosis was an independent factor associated to impaired mental health and functioning. This is expected, but rarely reported in a systematic way. Knowing that clinical conditions can be associated to further impairment can guide interventions and improve care (23) In our sample, there was a significant number of women with complications due to hypertension. It is important to highlight that preeclampsia and eclampsia are major causes of morbidity and mortality, especially in low and middle-income settings (24, 25).

Postpartum care would need to provide much more than contraceptive method orientation, it needs to ensure the opportunity to promote women's health and well-being, and postpartum visits should include a thorough assessment of physical, social, psychological and mental health (9). It is necessary to know all these dimensions and possibilities of alterations in the puerperium, so that it is possible to establish adequate interventions in each scenario.

More research and studies are needed with this instrument to validate it globally, identifying problems and conditions that are not evaluated in a common medical consultation, improving care for women after childbirth.

Conclusions

The WOICE-WHO instrument allows for an overall evaluation of maternal morbidity. During postpartum care, women presented high frequency of anxiety and depression and relevant frequency of substance use and violence. These aspects of women's health need further evaluation and specific interventions to improve quality of care.

Abbreviations

1. **ANC** Antenatal Care
2. **ASSIST** Alcohol, Smoking and Substance Involvement Screening Test
3. **BSSC-W** Brief Sexual Symptom Checklist for Women
4. **GAD-7** General Anxiety Disorder 7
5. **MNM** Maternal Near Miss
6. **MMWG** Working Group Maternal Morbidity
7. **PHQ-9** Patient Health Questionnaire 9
8. **PLTC** Potentially Life- Threatening Conditions
9. **PPC** Posnatal Care
10. **PR** Prevalence Ratio
11. **REDCAP** Research Electronic Data Capture
12. **SD** Standard Desviation
13. **SMM** Severe Maternal Morbidity
14. **SPSS** Statistical Package for the Social Sciences
15. **WHO** World Health Organization
16. **WHODAS** World Health Organization Disability Assessment Schedule 2.0

Declarations

Ethics approval and consent to participate

The proposal was approved by the local Institutional Review Boards (#78497817.0.0000.5404) and all included cases signed an Informed Consent form. For adolescents, written consent was waived, due to the consideration that a written consent could put the subject at risk, since violence is one of the conditions evaluated by the study and it is well known that in cases of domestic violence, the perpetrator is often responsible or very close to the adolescent. However, interviews were conducted only after clarification and verbal consent, in a reserved room.

Consent for publication

Not applicable

Competing interests

The corresponding author, Maria Laura Costa is an Associate Editor of this journal. None of the other authors have any competing interests.

Availability of data and materials

The datasets used and/or analyzed during the current study will be provided and available from the corresponding author on reasonable request.

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Authors' contributions

CML, CJG and PMA had the initial idea for the study. LMN, LS, CMC and GJP were responsible for data collection. GJP, LMN, CJG and CML were responsible for planning the analysis and interpretation of data. LMN and CML wrote the first draft of the paper. VMF,LS, CD helped in the interpretation of the analysis. All authors read and approved the final manuscript.

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"Not applicable" in this section.

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Tables

Due to technical limitations, the tables have been placed in the Supplementary Files section.

Figures

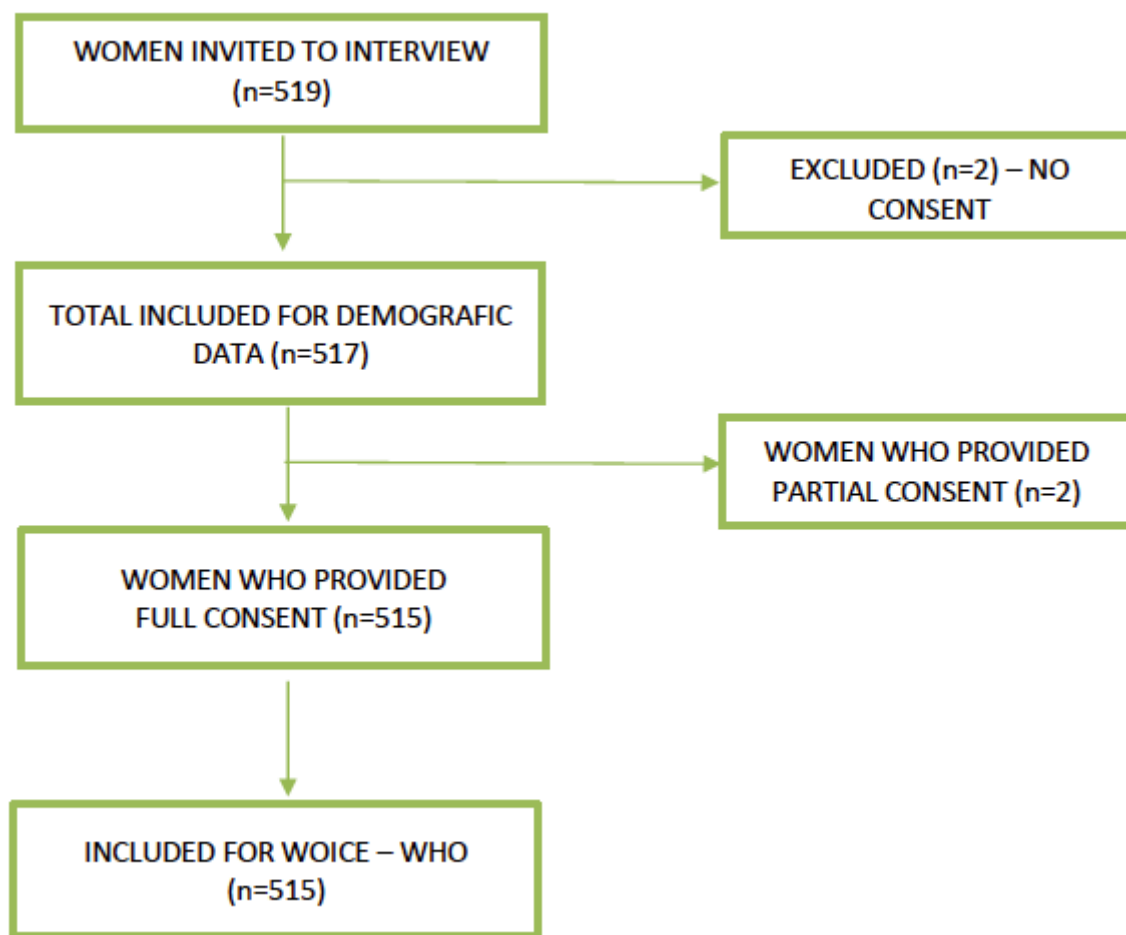


Figure 1

Flowchart of postpartum women included in the study.

	sexual	anxiety	depression	WHODAS	Substance use	Violence	Clinical
Sexual	18 (16.5%)	9 (8.3%)	6 (8%)	1 (0.9%)	4 (3.7%)	1 (1%)	6 (5.6%)
Anxiety		101 (37%)	59 (38.6%)	18 (6.8%)	23 (8.4%)	12 (4.6%)	36 (13.3%)
Depression			73 (47.7%)	16 (11%)	16 (10.5%)	7 (4.7%)	22 (14.6%)
WHODAS				22 (8.3%)	4 (1.5%)	3 (1.2%)	6 (2.3%)
Substance Use					52 (19.1 %)	10 (3.8%)	16 (5.9%)
Violence						30 (11.5%)	15 (5.8%)
Clinical							153 (56.5%)

Figure 2

Evaluation of all conditions considered in the WOICE, according to abnormal findings and its combinations. Clinical, social, mental and functional impairment are considered.

Supplementary Files

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